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3.2.2 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during the year

Sl. No.	Name of the teacher	Title of the book/chapters published	Title of the paper	Title of the proceedings of the conference	Name of the conference	National / International	Year of publication	ISBN/ISSN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher
1	Dr. Gayatri S. Mirajkar	Intelligent Biomedical Technologies and Applications for Healthcare 5.0				International	2024		Arvind Gavali College of Engineering	Elsevier
2	Dr. Gayatri S. Mirajkar		Image Processing in Toxicology: A Systematic Review	Image Processing in Toxicology: A Systematic Review	Science, Engineering, Management and Information Technology (SEMIT 2023)	International	2024	e-ISSN: 1865-0937 P-ISSN: 1865-0929	Arvind Gavali College of Engineering	Springer
3	Dr. Gayatri S. Mirajkar		Voice Based Medical Assistant Chatbot	Proceedings of the International Conference on Innovations and Recent Trends in Engineering and Science	International Conference on Innovations and Recent Trends in Engineering and Science - 2023	International	2023	978-81-961931-0-2	Arvind Gavali College of Engineering	Arvind Gavali College of Engineering
4	Dr. Gayatri S. Mirajkar		Greeting Voice Controlled Robot Using Arduino Board	Proceedings of the International Conference on Innovations and Recent Trends in Engineering and Science	International Conference on Innovations and Recent Trends in Engineering and Science - 2023	International	2023	978-81-961931-0-2	Arvind Gavali College of Engineering	Arvind Gavali College of Engineering
5	Dr. Gayatri S. Mirajkar		Fingerprint Door Lock System	Proceedings of the International Conference on Innovations and Recent Trends in Engineering and Science	International Conference on Innovations and Recent Trends in Engineering and Science - 2023	International	2023	978-81-961931-0-2	Arvind Gavali College of Engineering	Arvind Gavali College of Engineering
6	Dr. Gayatri S. Mirajkar		Gesture Recognition Based Virtual Mouse and Keyboard	Proceedings of the International Conference on Innovations and Recent Trends in Engineering and Science	International Conference on Innovations and Recent Trends in Engineering and Science - 2023	International	2023	978-81-961931-0-2	Arvind Gavali College of Engineering	Arvind Gavali College of Engineering
7	Dr. Gayatri S. Mirajkar		Crop Prediction and Leaf Disease Detection	Proceedings of the International Conference on Innovations and Recent Trends in Engineering and Science	International Conference on Innovations and Recent Trends in Engineering and Science - 2023	International	2023	978-81-961931-0-2	Arvind Gavali College of Engineering	Arvind Gavali College of Engineering
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66	Mrs. Sucharita M. Kandarkar		Virtualization Framework for Securing Cloud to 5G Networks using Ant Lion Optimization Constructed KGMO for Mobility Supervision		1st International Conference on Sustainable Emerging Innovations in Engineering and Technology (ICSEIET-23)	International	2023		Arvind Gavali College of Engineering	Department of Electronics & Communication Engineering, ABES Engineering College, Ghaziabad, UP, India


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1st Edition, Volume 16 - November 1, 2024

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Abstract - *The primary purpose of the healthcare chatbot system is to assist people who are unable to arrange consultations together with specialists at public hospitals or in remote places, and also to obtain medical information from them. They can use the chatbot to fix the issue they have. 1 Due to rising birth rates, dropping mortality rates, and medical developments, India does not have enough doctors to meet the demands of the country's growing population. Visits to local government medical facilities, where a scarcity of doctors is a major role in patients obtaining inadequate care, resulting in patient mortality in certain circumstances, may help one better grasp this scenario.*

Keywords - *NLP, Machine Learning , Chatbot, Medical Chatbot, Natural Language Processing, Machine Learning, Bot.*

1. INTRODUCTION

Welcome to the world of voice-based medical assistant chat bots, where cutting-edge technology meets healthcare. Here, cutting-edge technology converges with healthcare to create the realm of voice based medical assistant chat bots. This groundbreaking solution uses artificial intelligence and natural language processing to build a smart virtual assistant that can help you with a range of medical tasks and enquiries via the ease of voice communication.

The voice-based medical assistant chat bot's goal is to give people individualised, precise healthcare information, direction, and support. This chatbot is available to assist you whether you're looking for general health advice, details on particular medical concerns, or support managing your daily healthcare routine.

Powered by state-of-the-art algorithms and machine learning techniques, the chat bot can understand and interpret your voice commands and questions, providing you with relevant and reliable information in real-time. It has been trained on vast amounts of medical knowledge and continuously updated with the latest advancements in the field, ensuring that you receive the most up-to-date and accurate responses.

The voice-based medical assistant chat bot can perform a wide range of tasks, such as:

Providing general health information: You can ask questions about symptoms, treatments, and preventive measures for various health conditions.

Appointment scheduling: You can ask the chat bot to help you schedule appointments with healthcare providers based on your availability and location.

Wellness suggestions and guidance: The chat bot can provide personalised wellness tips and advice, including food and exercise recommendations.

Emergency assistance: In critical situations, the chat bot can guide you through basic first aid procedures or provide contact information for nearby emergency services.

Please note that while the voice-based medical assistant chat bot is designed to provide accurate and reliable information, it is not a substitute for professional medical advice. Always consult a healthcare professional for specific medical concerns or emergencies.

Embrace the future of healthcare and experience the convenience and efficiency of a voice-based medical assistant chat bot. Let this intelligent virtual assistant be your guide on your journey towards better health and well-being.

1.1. Problem Statement

Regularly having access to a hospital and a doctor is difficult. It takes time and money to get in touch with hospitals for standard consulting. Localised people must have simple access to medical specialists, which is made possible by a machine learning technology. In order to extract information about qualified doctors, open slots, and the hours when clinics and pharmacies are open, Chabot's is integrated into the medical facility's system.

1.2. OBJECTIVE & SCOPE OF PROJECT :

Scope:

Before reaching a doctor, the goal is to compose a chatbot for healthcare utilising intelligent technology that can identify the illness as well as provide basic information about it. The chatbot saves the information in a database to recognize the query terms, make a decision, and respond to the query.

Objectives:

- To provide medical information
- To Schedule medical appointments
- To collect patient data
- To provide mental health assistance
- To Request prescription refills

2. LITERATURE SURVEY

Humans typically need to visit a hospital or doctor for a routine checkup or worse, for a minor illness. It takes a lot of time and is really chaotic. Users need to contact a doctor because they are unable to identify all diseases' symptoms or treatments from this issue. Additionally, it is impossible if they begin dealing with their patients over telephone calls. Only technology can effectively address such issues. So let me introduce you to medical chatbots, which are very intelligent and have exceptional problem-solving abilities. The use of these chatbots has been proved to be quite beneficial for 3 advice for patients with minor illnesses who are on a daily basis. Natural language processing in medical chatbots allows them to quickly address people's health-related issues. Using Google's speech to text conversion and Chatbot's reverse functionality, even a beginner user may ask any query about their health with ease. On the designated 1screen of

an Android smartphone utilising the Android App, the medical chatbot gets the question and provides the response [1].

Patients and tasks in the medical profession have found virtual assistants to be of great assistance. Florence, Molly, and Ada, three of the most prominent chatbots, are extremely practical chatbots with strong algorithms that enable them to look after human health by offering medical aid whenever and wherever they are needed. These bots are created with a conversation with people in mind while adhering to the fundamental principles of artificial intelligence. Users can now speak with a medical chatbot straight from their homes, eliminating the need for them to physically visit the hospital. These chatbots have the special capacity to help people via apps, texts, and instant messages. In order to speed up, support, and improve operations, chatbots have previously been used in various industries, such as the manufacturing of automobiles, robotic hands, retail, etc. This technology is spreading throughout the healthcare industry as well, as Chatbots are assisting patients with a variety of duties [2].

The replacement of many human-performed duties by chat-bots includes online instructors and customer support representatives. Chatbots have undergone various adjustments and improvements since rule-based bots were originally created, eventually resulting in sophisticated artificial intelligence chatbots. When compared to an older chatbot, the work of an advanced chatbot has significantly enhanced. These days, these bots are able to communicate and interact with people while also learning from them. The major objective 1 of this study was to review previous research on chatbots, also known as conversational agents or chatbots, using bi-bliometric analysis. This study can tremendously help other researchers by pointing up possible research areas in modern chatbots. The finding, which will lead to the creation of new learning methods, was rather unexpected given how amazing a new study opportunity chatbots offer. This ground breaking technology will advance chatbot research to a new level. The results of this analysis have been supported by multiple study references [3].

Chatbots converse with social users using human language, just as people do when speaking to one another. Software applications known as chatbots are designed to communicate with people using everyday language. These computer programmes sought to trick socially engaging people into believing they were conversing with someone else. This research paper's goal is to examine currently available chatbots, often known as; ELIZA, ALICE. Additionally, to clarify that since ALICE is built on straightforward pattern matching algorithms, creating chatbots with it is trivial. While ELIZA is built on rules, creating a chatbot with ELIZA is challenging. The intended answer is to deploy ALICE as a student information system, a domain-specific chatterbox that will assist students in resolving a variety of questions about colleges.[4]

The term "chatbot" refers to computer programmes that replicate human communication via either voice or text messages. They are frequently referred to as "chatter robots." The initial and primary purpose of chatbots was to appear intelligent and fool users about their true nature. The use of chatbots has considerably increased as more of them with different designs and capabilities have been developed [5].

3. SYSTEM ANALYSIS

3.1 SYSTEM ARCHITECTURE

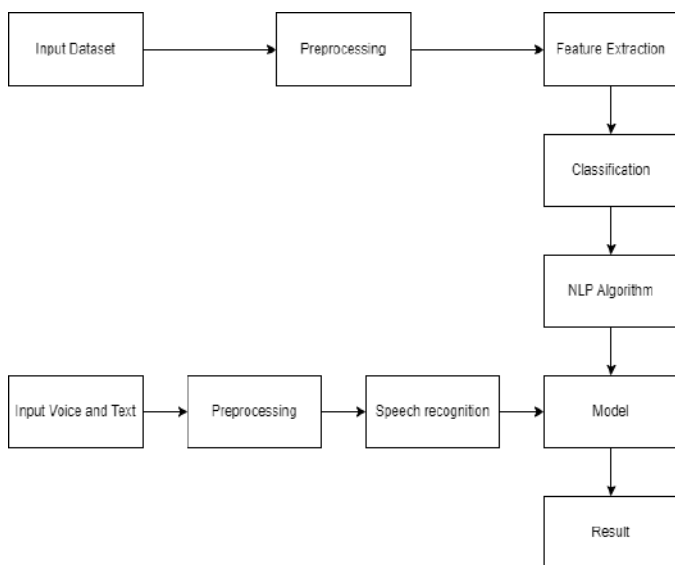


Fig. System Architecture

3.2 METHODOLOGY

Proposed System

Several phases are involved in creating a medical chatbot employing NLP algorithms, including data gathering, pre-processing, model training, and deployment. An overview of how to create a medical chatbot using NLP algorithms is given below:

- 1. Identify the use case:** The first stage is to decide what your medical chatbot will be used for. For instance, you might wish to create a chatbot that can assist patients in scheduling appointments, give general medical advice, or classify symptoms.
- 2 Gather and prepare data:** After determining your use case, you'll need to gather and prepare data in order to train your chatbot. You can either gather your own data or use pre-existing medical databases. To normalise the text data, preprocessing entails actions like cleaning, tokenization, and stemming/lemmatization.
- 3. The NLP model must be trained** in order to comprehend and reply to user inquiries. For this, you can utilise well-known NLP libraries as spaCy or NLTK. To train your model, you can use either supervised or unsupervised machine learning methods.
- 4. Build the chatbot:** After training your NLP model, you'll need to integrate it with a chatbot framework such as Dialogflow, Rasa, or Microsoft Bot Framework. You can use pre-built templates or create your own conversational flow.
- 5. Deploy the chatbot:** Once you've built your chatbot, you'll need to deploy it on a server or cloud platform. You can use platforms like AWS, Azure, or Google Cloud Platform to deploy your chatbot.
- 6. Continuously improve the chatbot:** After deploying your chatbot, you can continuously improve its performance by collecting user feedback, monitoring conversations, and refining your NLP model.

Overall, building a medical chatbot using NLP algorithms involves several technical challenges, but with the right tools and expertise, it is possible to create a useful and effective tool for patients and healthcare providers alike.

Module

•**Pre-processing**-In Natural Language Processing (NLP) approaches, cleaning and converting raw text input into a format suitable for analysis is a vital step.

Text Cleaning: Removing unnecessary characters or symbols like punctuation, special characters, or emojis. Converting the text to lowercase or uppercase, depending on the specific requirements of the algorithm. Removing or replacing numbers, URLs, email addresses, or other irrelevant information.

Tokenization: The division of the text into tokens, or individual words. This process aids in dividing the text into digestible chunks for further study. Tokenization can be carried out using straightforward methods like whitespace splitting or more complex ones such as employing tokenizers that are tailored to particular languages.

•**Feature extraction**- For it to use machine learning methods for analysing natural languages (NLP), raw text data must be converted into a numerical representation. The algorithm can identify patterns, make predictions about the future, and carry out other activities thanks to this numerical representation, known as vectors of features, which gathers pertinent data from the text.

Text Cleaning: Before extracting features, various cleaning procedures are routinely used to eliminate noise and superfluous information from the text. This could include removing punctuation, changing text to lowercase, removing stop words (common words like "the," "is," and so on), and dealing with uncommon letters or symbols.

Tokenization is the initial step in feature extraction, and it entails breaking down the text into smaller parts known as tokens. Individual words, phrases, or even characters can be used as tokens. Tokenization aids in the creation of standardised input for subsequent processing.

•**Classification**- The act of giving predefined labels or categories to raw textual information is referred to as the categorization stage in the processing of natural languages (NLP). With many applications, include sentiment analysis, identifying spam, topic classification, intent recognition, and others, this is a significant problem in NLP.

NLP -

Algorithms for natural language processing (NLP) are essential to a medical chatbot's operation. The application of NLP enables the chatbot to comprehend user questions and assertions and produce responses that resemble those of a human being. A medical chatbot's NLP algorithm is described in the following way:

1. Tokenization is the initial step in natural language processing (NLP), which comprises breaking the input text up into individual tokens or words. The programme can fully examine the text and understand sentence structure thanks to tokenization.

2. Stop Word Removal: Many words, such as "and," "the," or "is," in a phrase do not have a meaningful significance and can be disregarded. By removing these frequent terms from the text, stop word removal lowers noise and increases the effectiveness of following analysis.

3. NER recognises and categorises named entities in text, such as medical diseases, drugs, symptoms, or anatomical words. This stage is critical in medical chatbots since it aids in the extraction of essential information from user inquiries in order to offer proper responses.

4. By assigning grammatical tags to each word in the text, POS tagging clarifies each word's syntactic function and relationship to other words. The usage of POS tags makes it easier to understand a statement's context, which is essential for proper interpretation.

5. Lemmatization/Stemming: Lemmatization and stemming are processes that reduce words to their basic or root forms. This procedure guarantees that alternative spellings of the same word (for example, "running" and "ran") are regarded the same, boosting the algorithm's capacity to recognise and reply to comparable queries.

6. The user Sensation Disambiguation: A word may have several meanings, depending on its context. By assisting the algorithm in finding the proper meaning of ambiguous words, disambiguation of word sense enables more precise comprehension and response generation.

7. Sentiment Analysis: Sentiment analysis determines the sentiment or emotion expressed in a user's statement. This

analysis can help the chatbot understand the user's mood, satisfaction level, or urgency, allowing for appropriate responses and empathy.

8. Intent Recognition: Intent recognition identifies the purpose or intention behind the user's query. In a medical chatbot, it helps categorize user requests into relevant domains such as diagnosis, treatment, medication information, or appointment scheduling.

9. Dialogue Management: Maintaining the context and flow of the discourse is the goal of dialogue management. It enables the chatbot to keep track of user preferences, remember previous interactions, and produce meaningful responses based on the present and previous dialogue.

10. Answer Generation: After analysing the user's query and determining the intent, the chatbot delivers an appropriate response. Depending on the complexity of the medical chatbot system, this response can be based on pre-defined knowledge machine learning models or a combination of both.

These NLP algorithms collaborate to allow a medical chatbot to properly interpret and reply to user queries. Using these strategies, the chatbot can deliver accurate information, offer medical advice, make recommendations, and assist users with their healthcare requirements.

4. RESULT

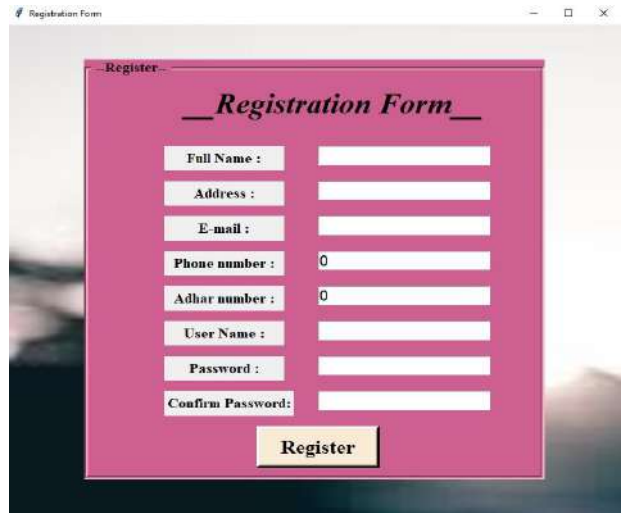


Figure: Registration Page

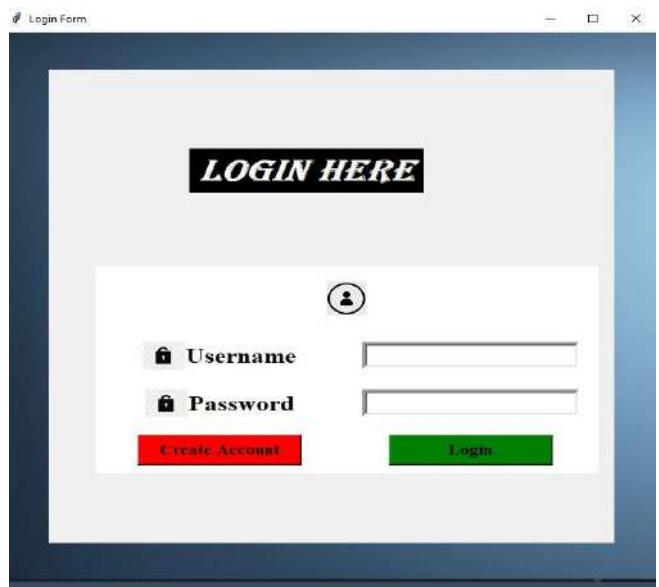


Figure: Login Page



Figure: Main Page

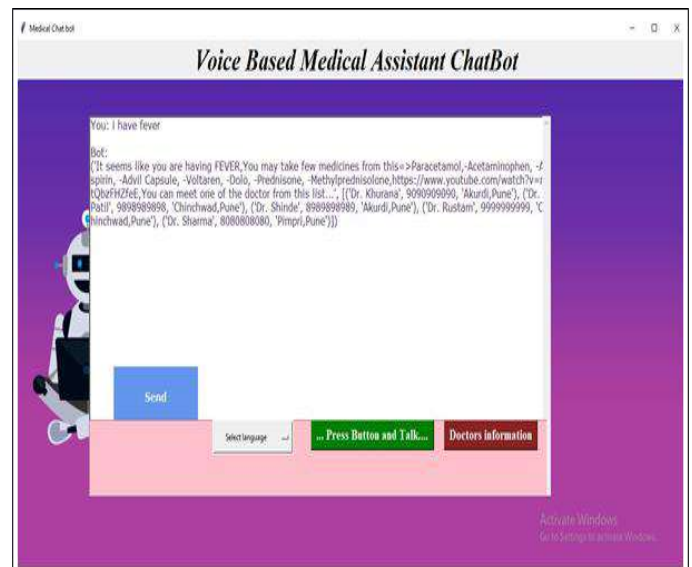


Figure: Output Page

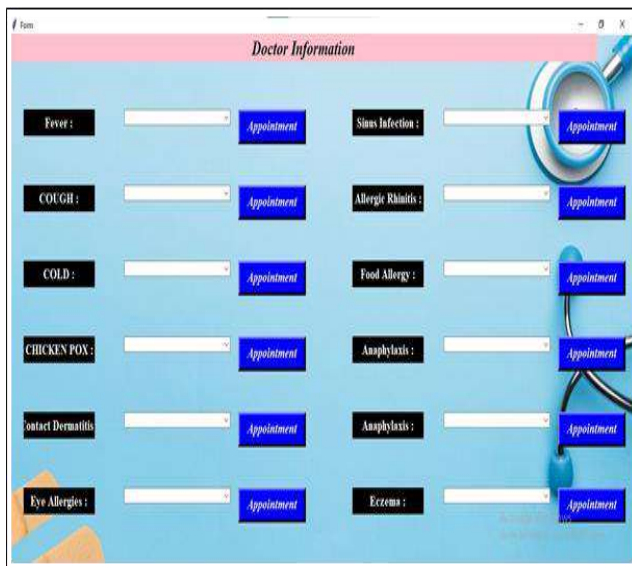


Figure: Appointment Page

5. CONCLUSIONS

According to a study of many journals, the use of Chatbot is user pleasant and can be used by anyone who knows how to text in their own language on the mobile app or desktop version. Based on symptoms, a medical chatbot gives personalised diagnoses. The bot's symptom recognition and diagnostic ability could be greatly improved in the future by adding support for more medical parameters, such as location, duration, and strength of symptoms, as well as more detailed symptom description.

FUTURE SCOPE

The future scope of medical chat using NLP (Natural Language Processing) algorithms is quite promising. Here are some potential areas where it can have a significant impact

Patient Triage and Symptom Analysis: NLP algorithms can help with patient triage by looking at their symptoms and making quick evaluations. Chatbots can converse with patients, posing pertinent questions and making suggestions in accordance with the symptoms mentioned. This can facilitate the healthcare procedure and provide patients some first direction.

Mental Health Support: NLP algorithms can be employed to provide mental health support through conversational agents. These chatbots can offer empathetic interactions, provide coping strategies, and monitor mental health symptoms. They can also help identify individuals in need of urgent mental health intervention and connect them with appropriate resources

Clinical Documentation and Data Entry: NLP algorithms can streamline clinical documentation and data entry processes. By automatically extracting information from patient-doctor conversations and populating electronic health records, NLP-powered chat systems can reduce administrative burdens on healthcare professionals and improve accuracy and efficiency.

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Greeting Voice Controlled Robot Using Arduino Board

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Abstract:- This robot is a virtual agent, usually an electro-machine that is guided by a computer program or electrical circuitry robots replace humans in assistance of performing those repetitive and dangerous tasks which humans prefer not to do-, or are unable to do due to size is not limited or humans could not survive in extreme environments. Modern robots are classified into different categories such as mobile robots, Commercial or industrial robots, robots, or service robots based on their performance features. This is a service robot that performs the repetitive task of welcoming people both by recorded voice message. Usually when we invite people to home, office, marriage functions or parties, etc., we need to assign a person to receive them and greet them at the entrance.

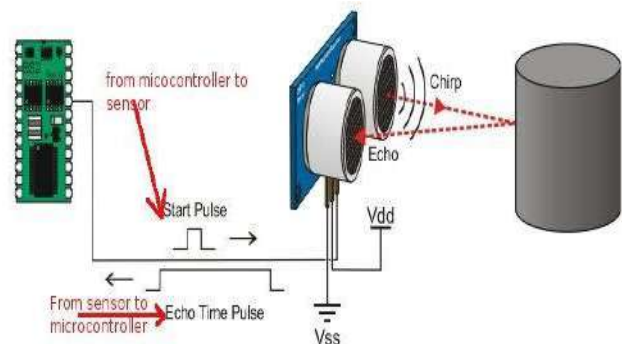
Keywords:- Cobots, Greeting ping sensor.

1. Introduction

In this project, we are trying to solve the problems which occurs mainly in entrance of parties, malls or an receptive task. In the present day there are different types of robots. In . The transmitter of ultrasonic sensor generates radio waves. If anyone comes in the range of radio waves it reflect to the receiver of ultrasonic sensor, then robot wishes that person Welcome ! have a good day.

2. Working of greeting voice controlled robot system:-

Firstly, we need to give 5V power supply to Arduino and voice playback module. The ultrasonic sensor hc-so4 have transmitter and receiver. The transmitter emits the high frequency sound waves to detect the object or person. If anyone present in front of ultrasonic sensor it reflects the waves to receiver. The ultrasonic sensor is connected to Arduino UNO, We can notice maximum accuracy at minimum angle 15 °C and at maximum 30 °C when object enter in this measurement angle it pass message to Arduino UNO. Arduino UNO is connected to both voice playback IC and ultrasonic sensor. So Arduino UNO shares the message to the voice playback module. In between speaker and voice playback module, we use an audio amplifier to amplify the speaker's voice, so it can be easily heard.



Working of robot

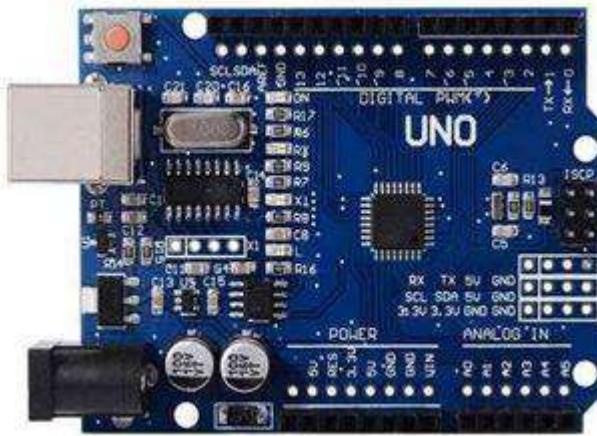
3. Microcontroller Based On Arduino :-

Arduino :- Arduino is a tool for making computers that can sense and control more of the physical world than desktop computer. It is an open-source physical computing platform based on a simple microcontroller board. There are many other microcontroller platforms available for physical computing.

Two Vital Features of the Arduino are :-

i. Inexpensive– Arduino boards are relatively inexpensive compared to other microcontroller platforms.

ii. Extensible software and Open source – The Arduino software is published as open source tools. The language can be expanded through C++ libraries, and technical details wanting to understand the people and can make the leap from Arduino to the AVR C programming language on which it's based.

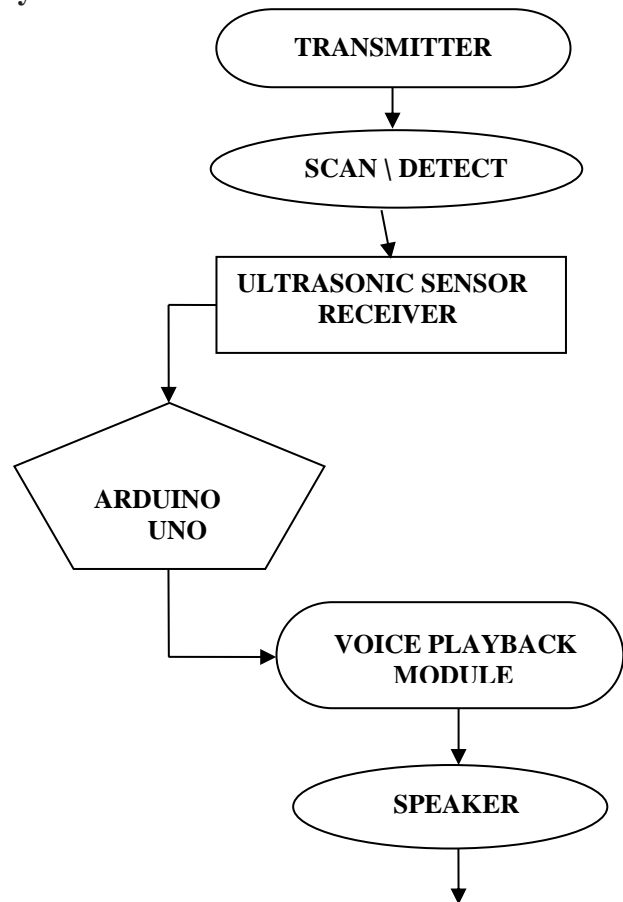


ARDUINO UNO

Arduino board Technical Specifications :-

- Microcontroller - ATmega328.
- Operating voltage - 5V
- Maximum input voltage - 7-12V
- Digital I/O Pins 14
- Analog Input Pins 6
- DC Current per I/O Pin - 40 mA
- DC Current for 3.3V Pin - 50 mA.
- Flash Memory - 32 KB

4. Flowchart of greeting voice controlled robot system:-



5. Applications of greeting voice controlled robot system:-

1. Hospitality :-This is a robot that performs the repetitive task of welcoming people by recording voice communication, "welcome, have a good day," in its range. This is a low maintenance robot which can be created and used in public places, functions, parties, etc. which attracts more attention from children as well as grown-ups.

2. Education:- Greeting voice controlled robot system can be used at the entrance of schools, colleges, universities to greet the peoples.

3. Medical Managements :- Greeting voice controlled robot system can be used in medical management, such as hospitals, clinics, medicals, etc. This robot is placed in the entrance of place. We also change the command when we want to use inside the hospitals.

4. Private Facility :- Greeting voice controlled robot system can be also used me airplane, or on the platform.

6. Block Diagram Of Robot :-

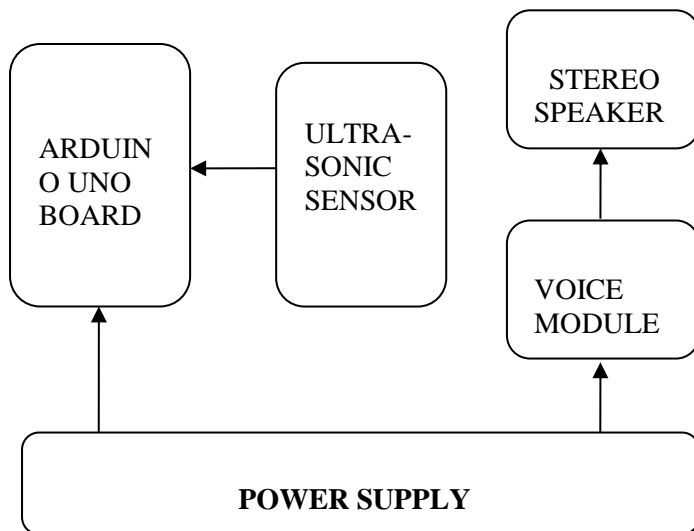


Fig.:- Schematic Block Diagram Of Greeting Voice Controlled Robot Using Arduino Board.

7. Advantages of greeting voice controlled robot system:-

1. Cost effective -

Greeting voice-controlled robot using Arduino UNO system is cost-effective over the long term and low-cost service robot that is used in public places and functions.

2. Convenient-

A greeting voice-controlled robot system is convenient to use since it is a good welcoming host and eliminates the need for one person, which saves time and effort.

8. Disadvantages of greeting voice controlled robot system:-

1. Liable to damage :

A greeting voice-controlled robot is vulnerable to damage from environmental factors such as water, dirt, or dust, which can affect their performance and accuracy.

2. Wrong Detection:

Greeting voice-controlled robot systems may experience false detection, which means that the ultrasonic sensor should only recognise the person, but it detects both objects and people.

9. Future scope :-

Useful for speech recognition security system.

- Useful for functions, parties, bank purpose.
- If we use other technologies like Zigbee or GPS, we can improve the range of the robot.
- The robot is useful for surveillance.
- It is also useful in covid-19 as reception.

In health care, Greeting voice-controlled robot system can be used as an instructor in hospitals to provide instructions to people (for example, use sanitizer and wear a mask).

10. Conclusion

The main aim of this project was to construct a “Namaste robot” which provides the service of welcoming people graciously. We have constructed a model robot which can sense people walking before it within its vicinity and welcome them courteously. Different messages can be saved according to the requirement of the customer. This is a low cost service robot which can be designed and used in public places, functions, parties ETC which attracts a lot of attention from peoples. The voice controlled robot is an easy programmable (software) project. This project operated on human voice command with android application. The implementation of this project is easy, so this robot is beneficial for human life. The robot can be used offices, centers, parks, shopping malls etc., and also on other places.

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Fingerprint Door Lock System

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Abstract—

The system typically includes a fingerprint scanner, a database of authorized users, and a mechanism for controlling the lock. This abstract provides a brief overview of the key features and benefits of fingerprint door lock systems, including their ability to enhance security, improve access control, and reduce the risk of unauthorized entry. This technology offers a high level of security as fingerprints are unique to each individual, and cannot be easily replicated or faked. It eliminates the need for traditional keys or codes, which can be lost, stolen, or shared, compromising the security of the building.

I Introduction

In this project we are trying to solve the problems which occurs related to the security in homes, shops and offices. These issues can be fixed by using traditional locks but here a possibility is may occurred of some unknown person will open the lock without breaking it by using duplicate keys. Using these locks also make problems if we lost keys of lock and we have to carry those keys with us. Security is of primary concern and in this busy, competitive world, human cannot find ways to provide security to his confidential belongings manually. Instead, he finds an alternative which can provide a full fledged security as well as atomized.

II Working of finger print door lock system

1. Enrollment: The first step in using a fingerprint door lock system is to enroll authorized users into the system. This is done by capturing the user's fingerprint using a fingerprint scanner and storing it in the system's database.

2. Verification: When a user wants to access the secured area, they place their finger on the fingerprint scanner. The scanner then captures an image of the fingerprint and compares it with the stored fingerprint templates in the database to see if there is a match.

3. Authentication: If the captured fingerprint matches one of the templates in the database, the system authenticates the user identity and grants them access to the secured area.

4. Logging: A fingerprint door lock system typically logs all

Access attempts, whether successful or not. This creates an audit trail that can be used for security purpose or to track user activity.

5. Maintenance: Finger print door lock system require regular maintenance to ensure that they continue to function properly.

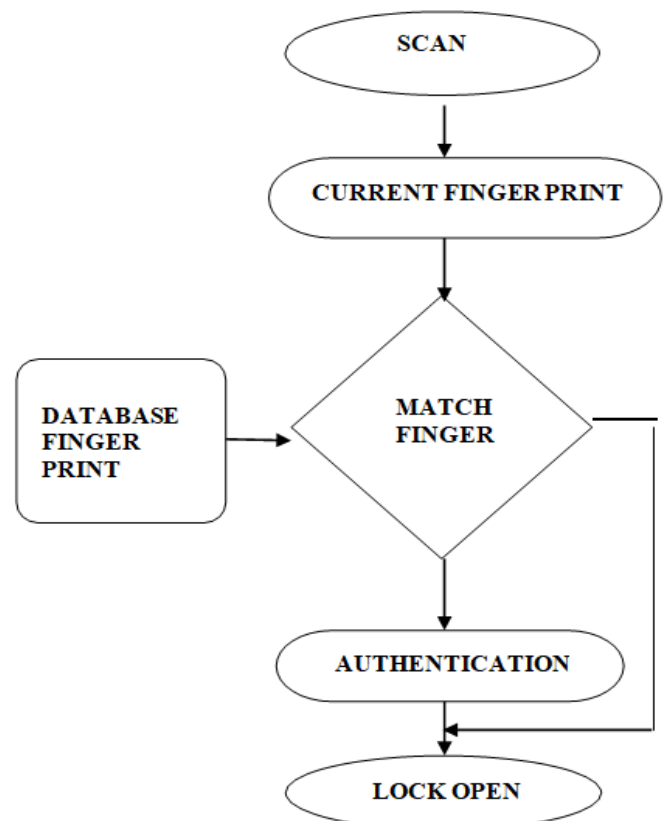


Fig.1 Working Of Finger Print Door Lock System

III. Advantages of Fingerprint Door Lock System:

1. High Security: Fingerprint door lock system provides high-security access control by using biometric technology. It is difficult to replicate or fake fingerprints, making it an ideal option for high-security areas.
2. Convenient: Fingerprint door lock systems are convenient to use since they eliminate the need for keys, access cards, or remembering passwords. You can simply place your finger on the scanner to gain access, which saves time and effort.
3. User Management: Fingerprint door lock systems allow administrators to manage user access more efficiently. They can easily add or remove users from the system's database, and monitor access logs to track user activity.
4. Cost-effective: Fingerprint door lock systems are cost-effective in the long run since they eliminate the need for physical keys or access cards, which can be costly to replace or manage.

IV Disadvantages of Fingerprint Door Lock System:

1. False Rejection: Fingerprint door lock systems may experience false rejection rates, which means that the system may not recognize an authorized user due to variations in finger placement or quality of the fingerprint image.
2. Limited Scalability: Fingerprint door lock systems may have limited scalability since they require a physical fingerprint scanner for each user, which can be costly to install and manage in larger organizations.
3. Vulnerability to Damage: Fingerprint scanners are vulnerable to damage from environmental factors such as water, dirt, or dust, which can affect their performance and accuracy.

Overall, fingerprint door lock systems provide a high level of security and convenience, but they also have some potential drawbacks that should be considered before implementation.

V. Applications of finger print door lock system

1. Healthcare: Fingerprint door lock systems can be used in healthcare settings, such as hospitals or clinics, to control access to restricted areas, such as medication storage rooms or medical records.
2. Education: Fingerprint door lock systems can be used in educational institutions, such as schools or universities, to control access to classrooms, laboratories, or other sensitive areas.
3. Government: Fingerprint door lock systems can be used in government facilities, such as military bases or embassies, to provide secure access control for authorized personnel.
4. Hospitality: Fingerprint door lock systems can be used in hospitality settings, such as hotels or resorts, to provide secure access control for guest rooms.

5. Retail: Fingerprint door lock systems can be used in retail settings, such as jewelry stores or high-end boutiques, to provide secure access control for storage areas or display cases

VI .Block Diagram Of Finger Print Door Lock System

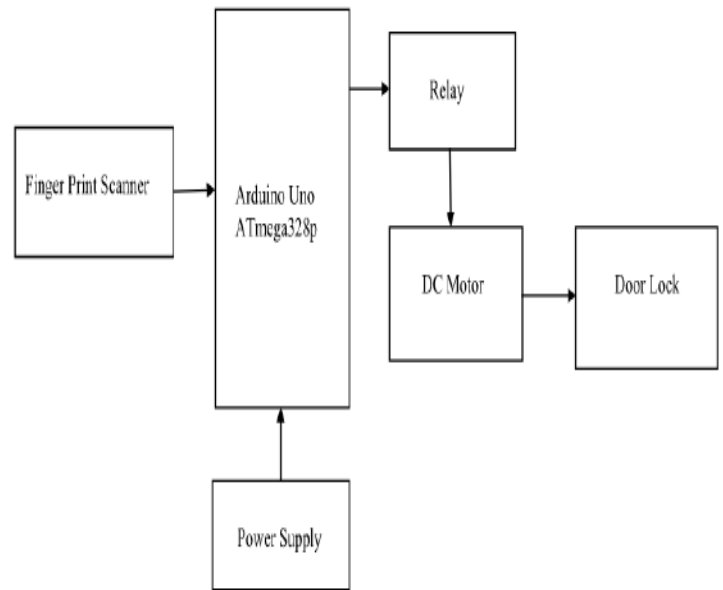


Fig.2 Block Diagram Of Finger Print Door Lock System

VII. Future scope

Fingerprint based locks are revolutionary locking systems that open with just the touch of authorised user's finger; their increased use in various locking applications can actuate what would be known as 'Keyless World'.

A fingerprint mismatch can be conveniently regarded as an attempt of illegal access. In the wake of such unratified event, an adjunct siren alarm may be initiated to reveal possible theft.

For systems demanding more security, such as expensive jewellery items or museum articles, scanning of multiple fingerprints may be employed. In future, alarm will be introduced.

When intruder tries to break the door, the vibration is sensed by sensor which makes an alarm. This will inform the neighbors about intruders and this will help to take further action to prevent

VIII Conclusion

Fingerprint door lock systems are a secure and convenient way of managing access control. They use biometric technology to authenticate users based on their fingerprints, eliminating the need for physical keys or access cards.

Fingerprint door lock systems provide several advantages, such as high security, user management, and cost-effectiveness, which make them ideal for various industries and settings. However, they also have some potential drawbacks, such as false rejection rates and privacy concerns, which should be considered before implementation.

IX Acknowledgement

Fingerprint door lock systems are a significant advancement in the field of access control systems. They provide a high level of security and convenience, which is why they are being increasingly adopted in various industries and settings.

The development of biometric technology has made it possible to use fingerprints as a means of authentication. Fingerprint door lock systems eliminate the need for physical keys or access cards, which can be lost or stolen, and they offer a more secure and convenient way of managing access control.

Fingerprint door lock systems have several advantages, such as high security, user management, and cost-effectiveness. However, they also have some potential drawbacks, such as false rejection rates and privacy concerns, which need to be considered before implementation.

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GESTURE RECOGNIZATION BASED VIRTUAL MOUSE AND KEYBOARD

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Abstract:-This project uses hand gestures and computer vision to construct an optical mouse and keyboard. The computer's camera will detect a user's image of various hand gestures, and the mouse or pointer on the computer will move in sync with those movements. Even right and left clicks can be made by users utilising a variety of motions. Similar to this, a variety of gestures, including the one-finger gesture for choosing an alphabet and the fourfigure motion for swiping left and right, can be used to operate the keyboard. It will work as a virtual mouse and keyboard in the absence of a cable or other accessories. Python is used to code on the Anaconda platform, and the project's only piece of hardware is a webcam. Here, the Convex hull defects are first built, and then, using the defect computations, an algorithm is devised that maps the mouse and keyboard functions to the defects. The computer will recognise the user's gesture and reply properly by mapping a few of them with the mouse and keyboard.

Keywords:-Face Recognition, Virtual Mouse and Keyboard, Anaconda Platform, Optical Mouse

Introduction: - The webcam on the computer will begin to record video of the person using it while they are seated in front of it. A small green box will appear in the middle of the screen throughout this process. The code will be applied to the items presented there, and they will be compared to them in the green box. If they do, a red border will go up to show that the computer has discovered the object. The object can then be dragged to move the mouse pointer. In addition to helping to create a virtual computing environment, this will increase the security of the machine. The pointer will be positioned here at various items' places using hand motions. For a right click, a different gesture will be performed, and for a left click, a different gesture will be utilised. Similar to this, keyboard operations that are traditionally carried out on a physical keyboard can be mimicked with a single gesture. If the gesture does not match the box, a red border will appear when the recognisable gesture is detected; otherwise, simply a green box will be shown.

Motivation:-The motivation is to create a virtual human computer interface and an object tracking programme for computer interaction.Create such an AI-related application.

Problem Definition:-We frequently utilise physical mice or touchpads in PCs and laptops for personal use. The usage of HCI technology, which recognises hand and eye gestures as well as mouse movements and events, fully eliminates the need for additional hardware in this project.

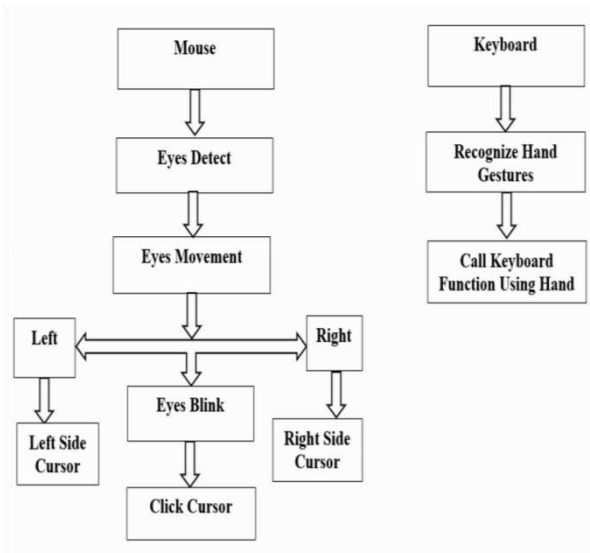
Objective of The Proposed Work:-

- We'll design and build a system for this project that can recognise particular human motions and utilise them to control.
- Using gesture recognition technology, a camera reads human body movements and transmits the information to a computer, which then uses the gestures as input to operate application-specific devices.

Existing Technology:-

- Hardware keyboards and mice are required by current technologies.
- We need a keyboard and mouse to text and move the cursor on a screen in today's technology. Therefore, a keyboard and mouse are required.
- Cost is high.

Architecture :-



The mouse system was created in Python, and in order for it to work, the following Python modules had to be loaded. Numpy is a Python extension module. Actions on groups of relevant data can be taken quickly and effectively. In technical and scientific computing, Scipy is a Python library that is open-source. OpenCV is a collection of software development tools with a main emphasis on real-time computer vision. The name PyautoGUI refers to a cross-platform, Python-based GUI automation module. Through keyboard and mouse control as well as basic image recognition, this enables you to automate computer tasks. A person's pupil is recognised by the gadget using the webcam. The mouse cursor can now be moved by a person moving his eyes, according to the students.

The pointer movement can be seen on the computer's home screen. To type using our fingertip on the virtual keyboard, we took the following actions:

- Step 1: Capturing live video with computer's camera.
- Step 2: Editing each frame of the video that was recorded.
- Step 3: Converting the image frame.
- Step 4: Virtual keyboard.
- Step 5: To identify hand movements, use hand landmarks.
- Step 6: Flip the input device while locating the object's location over the virtual keyboard.

Then the machine locates the face. Advantages of gesture recognition: Once the system recognises and records the eyes then the system locates the students. The last module provides details on the system used to advance a number of fields, including the ability to move the mouse pointer by monitoring pupil movements.

Module 1 GUI:- Our GUI was created in Tkinter. The Python binding for the Tk GUI toolkit is called Tkinter. It serves as the de facto default GUI for Python and is the official Python interface to the Tk GUI toolkit.

Module 2 :- Login/Registration Process: Before utilising the application, users must first register. Data from users will be stored in the database and fetched when they log in to the system. Only registered users are able to log into the system.

Module 3 :- Database Module: User data is stored in databases. The DBsqLite database was employed.

Module 4 :- The device uses an eye-based interface that functions like a mouse and transforms eye movements like blinking, staring, and squinting into mouse cursor actions. Software needed for this method includes Python, OpenCV, NumPy, and a few more facial recognition algorithms using the Harr Cascade algorithm, as well as a simple camera.

Module 5:- Keyboard Usability: Gesture-based controls will be used to control keyboard usability. In order to make motions, we need the forefinger and middle finger. The top, middle, and base are our location coordinates. We will use a keyboard to control movement like a finger.

Related work:- Paper 1: Gesture Recognition-Based Virtual Mouse and Keyboard

Author:- Sugnik Roy Chowdhury, Sumit Pathak, M.D. Anto Praveena

Description:- In this project, computer vision is used in creating an Optical mouse and keyboard using hand gestures. The camera of the computer will read the image of different gestures performed by a person's hand and according to the movement of the gestures the Mouse or the cursor of the computer will move, even perform right and left clicks using different gestures.

Paper 2: Finger Recognition and Gesture-based Virtual Keyboard

Author:- ChinnamDatta Sai Nikhil, Chukka Uma Someswara Rao, E. Brumancia, K. Indira, T. Anandhi, P. Ajitha

Description:- Hand motion acknowledgment is critical for human PC connection. Right now, present a novel constant strategy for hand motion recognition. The proposed framework is vision based, which uses AI methods and contributions from a PC webcam. Vision-based signal acknowledgment following and motion acknowledgment In our structure, the hand area is separated from the foundation with the foundation subtraction technique. At that point, fingers are portioned to identify and perceive the fingers. **Paper 3 : An Arduino-based Gesture Control System for Human-Computer Interface** Author:- ShravaniBelgamwaSahil Agrawal . Description:- Learning the gestures and handling them will require certain time for different users thus it will be tough initially. It can be fun to use the interface in later stages. The interface provides altogether a new and easy way to use the computer. Although the interface can perform computer handling

functions, using the mouse and the keyboard becomes imminent. This system can prove to be a major help to all the physically challenged and illiterate people

Paper 4 :Virtual Mouse Control Using Colored Finger Tips and Hand Gesture Recognition

Author:-VantukalaVishnuTeja Reddy , Thumma

Dhyanchand, GallaVamsi Krishna, Satish Maheshwaram
Description:- In human-computer interaction, a virtual mouse implemented with fingertip recognition and hand gesture tracking based on the image in a live video is one of the studies. In this paper, virtual mouse control using fingertip identification and hand gesture recognition is proposed. This study consists of two methods for tracking the fingers, one is by using colored caps, and the other is by hand gesture detection. This includes three main steps that are finger detection using color identification, hand gesture tracking, and implementation of on-screen cursor.

Paper 5:I-Keyboard: Fully Imaginary Keyboard on Touch Devices Empowered by Deep Neural Decoder

Author:-Ue-Hwan Kim , Sahng-Min Yoo , and Jong-Hwan Kim , Fellow

Description:-Text entry aims to provide an effective and efficient pathway for humans to deliver their messages to computers. With the advent of mobile computing, the recent focus of text-entry research has moved from physical keyboards to soft keyboards. Current soft keyboards, however, increase the typo rate due to a lack of tactile feedback and degrade the usability of mobile devices due to their large portion of screens.

Future Scope:- Future basic pointing and pinching movements will be successful using the method. Even so, there are still a lot of areas where improvement is possible. Currently Although the background of the system remains static, using this hand tracking gadget would be both incredibly beneficial and necessary. setting up the augmented reality environment to allow a person to engage with virtual 3D surroundings while sporting real-world things. Multiple multidimensional camera angles are required to catch the hand gestures since a layer of capturing capacity is required in this scenario.

Conclusion:-This suggestion describes a system that would substitute for the keyboard and mouse and recognise hand movements. This covers keyboard drag-and-click operations, mouse cursor movement, and additional keyboard features like printing alphabets. The skin segmentation technique is used to separate the colour and image of the hand from the surrounding area. The remove arm approach can be used to resolve the whole body being captured by the camera. The proposed approach typically recognises and comprehends hand gestures, enabling it to control keyboard and mouse operations and generate a realistic user interface. architectural visualisations, 3D printing, and even remote medical intervention.

This project is easy to build and has many potential uses in the medical profession, where computers is essential but has not yet been fully fulfilled due to a lack of human-computer interaction.

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CROP PREDICTION AND LEAF DISEASE DETECTION

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Abstract:- In general, India's economy relies heavily on agriculture, which also contributes a significant amount of the country's gross domestic product to the nation's efforts to secure food security. However, due to manmade climatic changes, food production and forecasting are currently declining, which will have a negative impact on farmers' economies by resulting in a low yield and also make farmers less adept at predicting future crops. This study employs machine learning, one of the most cutting-edge methods for crop prediction and leaf disease detection, to assist beginning farmers in choosing the right crops to plant. In order to accomplish this, a supervised learning algorithm is proposed. These characteristics, including temperature, humidity, and moisture content, assist the crops grow successfully by collecting the seed data for the crops. Numerous sorts of agricultural output suffer because of an agriculturalist's lack of knowledge regarding the accurate classification of plant diseases. The best way to prevent or treat the illness that arises on their farm cannot be recommended because there is no framework in place for doing so. Their treatments for sick plants suffer as a result. In order to help an agriculturalist diagnose, this method was developed.

Keywords:- Image Processing, Agriculture, Anaconda Platform, Machine Learning

Introduction: - Agriculture has long been regarded as the primary source of supplies for meeting people's basic requirements. It is also regarded as a primary profession and one of the main industries in India. Farmers should practice traditional naked eye observation and produce healthy crops without applying chemicals to their cultivation field or to the animals who eat those crops in order to maintain a healthy diversity. But in today's world, the weather is changing quickly in opposition to the natural resources, reducing the availability of food and boosting security. The GDP for the agricultural industry is still declining; in 2005.

in 2012, it was 11.1%, in 2018, it was 5%, and in the first quarter of 2019, it was 2020 saw a decrease to 2%. Approximately 80% of farmers are from rural areas, and if crop production revenues decline, farms at an industry level will have an impact on their way of life. For Indian farmers, expressing a specific interest in efficient and precise farming makes sense. In order to maintain agricultural economic growth in India, there are a variety of techniques to increase crop yields, learn profits, and crop quality.

Motivation:- The motivation is to create system that predict the suitable crops based on soil and detect the plant leaf diseases

Problem Defination:- Plant diseases are primarily caused by infections, insects, and pests, and if they are not treated right away, they drastically affect output. Different agricultural diseases cause farmers to lose money. The proposed system provides a method for automatically identifying plant leaf disease as well as a method for routinely monitoring the farmland.

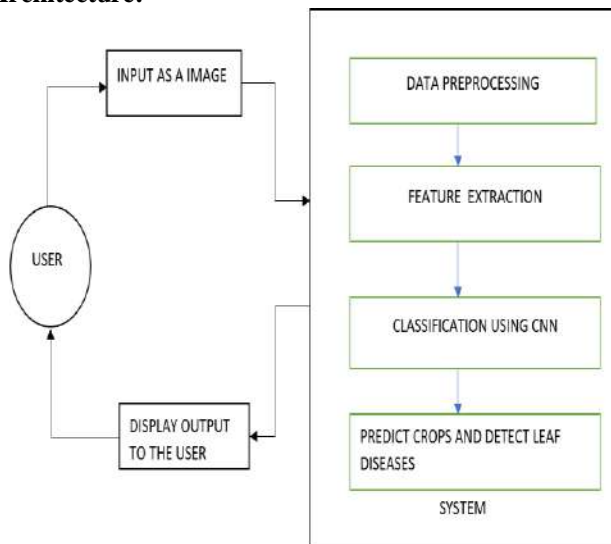
Objective of The Proposed Work:-

- We'll design and build a system for this project that can predict the various crops based on input soil images and detect the leaf diseases accordingly.
- We are using the image processing technology. The technology's key benefit is that it is nondestructive, which allows it to analyses crops without ever having to touch them.

Existing Technology: -

- Existing technology had less scope and time consuming.
- Cost is high.

Architecture: -



Data Preprocessing: -

Pre-processing is a term used to describe operations on images at their most basic level; both the input and output are intensity images. These recognizable images are of the same type as the original sensor data, with an intensity image often being represented by a matrix of brightness values. Although geometric transformations of images (such as rotation, scaling, and translation) are categorized here as pre-processing methods because similar techniques are employed, the goal of pre-processing is an improvement of the image data that suppresses unintentional distortions or enhances some image features crucial for further processing.

Feature Extraction: -

The dimensionality reduction method, which divides and condenses a starting set of raw data into smaller, easier-to-manage groupings, includes feature extraction. As a result, processing will be simpler. The fact that these enormous data sets contain a lot of different variables is their most crucial feature. Processing these variables takes a lot of computing power. In order to efficiently reduce the amount of data, feature extraction helps to extract the best feature from those large data sets by choosing and combining variables into features. These features are simple to use while still accurately and uniquely describing the real data set.

CNN Algorithm: -

Convolutional Neural Network, or CNN, is a deep learning technique that is used for image processing and analysis. In order to extract pertinent characteristics from an image, a variety of mathematical procedures, including convolutions and pooling, are applied. CNNs have demonstrated outstanding results in a variety of real-world applications and are frequently employed in image processing tasks like object identification, picture segmentation, and classification.

Convolutional Neural Networks have three different kinds of layers:

1) Convolutional Layer: Each input neuron in a conventional neural network is connected to the following hidden layer. Only a small portion of the input layer neurons in CNN are connected to the hidden layer of neurons.

2) Pooling Layer: The pooling layer is used to make the feature map less dimensional. Inside the CNN's hidden layer, there will be numerous activation and pooling layers.

3) Fully Connected Layer: Fully Connected tiers make up the network's final few tiers. The output from the last pooling or convolutional layer is passed into the fully connected layer, where it is flattened before being applied.

Related work: -

Paper 1: Crop Yield Analysis Using Machine Learning Algorithms.

Author: - F. F. Haque, A. Abdel Gawad, V. P. Yanambaka

Description: - Not only does agriculture play a significant role in the expanding economy, but it is also vital to our survival. It is difficult to predict agricultural output since it depends on a variety of factors, including water, ultraviolet (UV) radiation, pesticides, fertilizer, and the amount of land that is covered in that region. Two distinct Machine Learning (ML) techniques are suggested in this paper to analyze crop yield. Support Vector Regression (SVR) and Linear Regression (LR) are two techniques that are well suited for verifying the variable parameters in the prediction of continuous variables using the 140 data points that were collected. The elements listed above have a significant impact on crop output.

Paper 2: Expert System for Diagnosis Mango Diseases Using Leaf Symptoms Analysis

Author: - C. Trongtorkid, P. Pramokchon

Description: - This study describes the creation of an expert system for identifying plant illnesses in the Barracuda mango (Nam-Dok Mai), one of Thailand's key agricultural export products. Thailand is a tropical nation, nevertheless, and its climate influences the variety of plant life illnesses that have an impact on mango tree growth. Due to an agriculturalist's ignorance of the proper classification of plant diseases, several types of agricultural production are reduced. Additionally, there is no mechanism for offering recommendations for the best method to avoid or treat the diseases that affect their farm.

Paper 3: A Study on Various Data Mining Techniques for Crop Yield Prediction

Author: - Y. Gandge

Description: - India is a nation where agriculture and allied sectors provide the majority of the country's jobs. The country's economy primarily depends on agriculture. It is also one of the nations that experience severe natural disasters like droughts or floods, which hurts the crop. The farmers suffer significant financial losses as a result, which

drives them to commit suicide. Prior to harvest, accurate crop production predictions can assist farmers and government agencies in making the right plans for things like storing, selling, setting a minimum support price, importing and exporting, and other activities.

Paper 4: Computer Vision image Enhancement for Plant Leaves Disease Detection

Author:- Dr.K. Thangadurai, K. Padmavathi

Description: - When compared to the original captured photographs, enhanced images are of higher quality and clarity. Real-time applications for computer vision picture improvement, such as remote sensing, medical image analysis, and plant leaves, utilize color conversion and histogram equalization detection of illness. RGB photos are the initial pictures that were taken. Primary colors (Red, Green, and Blue) are combined to create RGB pictures. Because the color's hexadecimal value ranges from 0 to 255, applications are challenging to implement.

Paper 5: Soil Classification and Crop Suggestion using Image Processing

Author:- T. Abimala, S. F. Sashya and K. Sripriya

Description: - In order to promote agriculture, this research classifies seven different types of soil, including clay, clayey peat, clayey sand, peat, sandy clay, and silty sand, and then suggests appropriate crops that might be cultivated in each type of soil using image processing. Low Pass filtering is used for pre-processing. For feature extraction, algorithms like HSV, GLCM, and Gabor Wavelet are utilized achieve color-based feature extraction, HSV and GLCM are employed. To extract features from textures, Gabor filters are utilized.

Future Scope: - To increase the trained models for future work, more plant species and different plant illnesses might be added to the current dataset. We developed a prototype for crop forecasting and leaf disease detection in this research, but we can use this system in real-time applications in the future. We can also predict crops for the future and recommend the fertilizer that will work best for those crops. Additionally, we will be able to recognize plant diseases that have affected leaves in the future and offer the right treatments to combat them. Because of this, the method will aid farmers in producing more and more crops and raising their income.

Conclusion: - Our nation's economy benefits from the field of agriculture. But this lags behind in utilizing cutting-edge machine learning tools. Therefore, all of the latest machine learning technologies and other new methods should be familiar to our farmers. These methods aid in obtaining prediction of crop and leaf yield maximum. Numerous machine learning approaches are used in agriculture to increase crop yield rates. These methods can aid in resolving agricultural issues. By examining several approaches, we can also determine the yield accuracy. So, by comparing the precision of various crops, we can enhance performance. The agricultural industry is one of the most vital industries, and crops are the primary source of food for people all over the world.

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IOT BASED DAM IRRIGATION SYSTEM

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ABSTRACT - Now days, water shortage is becoming one of the biggest problem in the world. Many different methods are developed for conservation of water. We need water in each and every field. In our day to day life also water is essential. Wastage of water major problem in agriculture. Every time excess of water is given to the fields. Dams are crucial in holding and conserving water for optimum use according to seasonal needs. In order to mitigate the existing problems with water distribution and utilisation, water management is crucial. Due to the numerous risks associated with dams, it is now essential to have a proper monitoring system for the opening of the dam gate in order to maintain a safe water level in dams. Investigating the use of IoT to enhance dam safety, water flow, and corrosion prevention for dam gates. Using various sensors, control valves, and automatic & proactive outflow management during emergencies, this article aims to use microcontrollers for monitoring and managing water distribution management.

Keywords - Sensor, Motors, Wi-Fi Module

Introduction - Now days, water shortage is becoming one of the biggest problem in the world. We need water in each and every field. In our day to day life also water is essential. Wastage of water major problem in agriculture. Given the limited supply of drinkable water today, water management is a problem of significant concern. Unexpected weather events like heavy rain, abrupt tide changes, and other natural forces result in natural calamities, which have a negative effect on the country's economy by increasing mortality rates, contaminating drinking water, and causing problems in the agricultural sector. Dam construction creates water bodies for the future, safeguards the water that is now available from contamination and avoids disputes and overexploitation. Dams are important for managing water because of this. The proposed system will allow to continuously monitoring the water levels inside the dam and the moisture level in the field, controlling the supply remotely over the internet. Sensors detect the water and moisture level and send readings to a fixed access point, such as a personal computer, which in turn can access irrigation modules installed in the field or the physical module in the water tank, wirelessly over the internet.

LITERATURE SURVEY - An IoT Based Dam irrigation system describes how to monitor a water level & automatic gate control. A system is developed by using

sensors and according to the decision from a server based on sensed data, the irrigation system is automated.

2.1 IoT Based Smart Agriculture & Irrigation System [Sanket Deshmukh, Vishal Nalage, Raju Noronha, Dr. Prakash Patil: An IoT Based Crop-field monitoring an irrigation automation system describes how to monitor a crop field. system is created utilising sensors, and the irrigation system is automated based on a server's decision based on sensed data. The sensed data is transmitted wirelessly to a database on a web server. The moisture and temperature fields are reduced below the potential range if irrigation is automated.

2.2 IOT BASED SMART CROP-FIELD MONITORING AND AUTOMATION IRRIGATION SYSTEM [R. Nageswara Rao and B Shridhar ISIC Paper.]

The aims at making agriculture smart using automation and IoT technologies. Internet of Things (IoT) enables various applications crop growth monitoring and selection, irrigation decision support, etc. A Raspberry Pi based automatic irrigation IOT system is proposed to modernization and improves productivity of the crop, 2013.

2.3 Mohit Bajaj, Overview of ESP8266 Wi-Fi module based smart Irrigation System using IOT This paper demonstrates the efficient use of Internet of Things for the traditional agriculture. It shows the use of Arduino and ESP8266 based monitored and controlled smart irrigation systems, which is also cost-effective and simple, 2018.

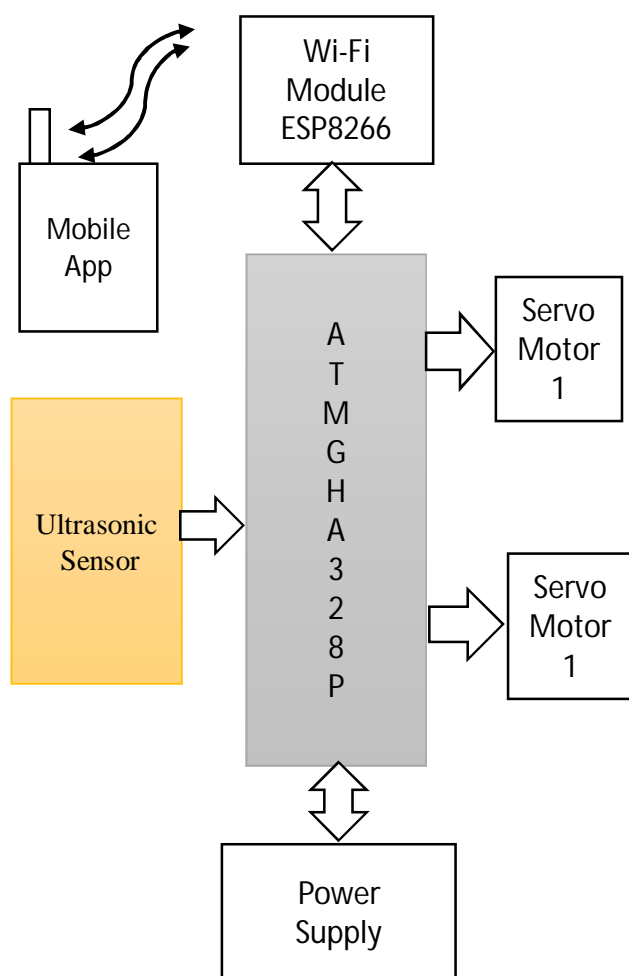
2.4 IoT Based Smart Agriculture System [G. Sushanth, S. Sujatha, "IoT Based Smart Agriculture System", 2018]

Smart Agriculture system is an aborning topic in this materialistic world. This paper describes the concept of featuring and elastingan agriculture platform to the internet world. Agriculture is the most important of human life so it can be improvised by using IoT technology. IoT technology gives a grasp to enhance the power of automation systems in agriculture. Smart agriculture System that uses the advantages of cutting-edge technologies such as Arduino and Wireless Sensor Network. This paper proposes the concept and features of the sensor world in the internet of things for agriculture which is used to enhance the production of crops.

2.5 Design of ZigBee based Wireless Sensor Network for early Flood Monitoring and Warning system” [Balaji.V, Akshaya.A, Jayashree.N, Karthika.T 2017]

“Design of ZigBee based Wireless Sensor Network for early Flood Monitoring and Warning system” 2017 IEEE International Conference on Technological Innovations in ICT for Agriculture and Rural Development (TIAR 2017) Floods are the result of prolonged rain or an abrupt discharge of water from a dam. Due to this, the public would suffer severe human and financial damage. The clearest illustration of such a natural calamity is the "Chennai Floods." The rapid release of water from the dams is unknown to the general public, and they were unable to get any information due to the complete loss of network connectivity

Architecture -



Wi-Fi module (ESP8266)-

It can be used to host the application or to offload Wi-Fi networking tasks from another application processor. The ESP8266EX provides a comprehensive and self-contained Wi-Fi networking solution. The ESP8266EX launches the application straight from an external flash when it serves as the host. To enhance the system's performance in certain applications, it features inbuilt cache. Alternatively, any microcontroller-based design with straightforward

connectivity (SPI/SDIO or I2C/UART interface) can be enhanced with wireless internet access by acting as a Wi-Fi adaptor. The ESP8266EX is one of the industry's most fully integrated Wi-Fi chips; it includes antenna switches, an RF balun, a power amplifier, a low noise reception amplifier, filters, power management modules, and only a small amount of extra hardware.

Power Supply -

This circuit converts the AC power source into steady DC. Unregulated output will be fixed to a consistent voltage with the aid of a voltage regulator DC. The circuit consists of a bridge rectifier comprised of diodes, a linear voltage regulator (7805), capacitors, and resistors.

Ultrasonic Sensors-

Ultrasonic sensors detect objects regardless of the color, surface, or material (unless the material is very soft like wool, as it would absorb sound.) To detect transparent and other items where optical technologies may fail, ultrasonic sensors are a reliable choice.

PROPOSED METHODOLOGY

A more efficient use of water resources is required, as is an improvement in field output, hence irrigation system automation is becoming more and more important. The technology is used to automatically turn the valves ON or OFF. The system serves sensing, observation, control, and communication functions. Different sensors are used to measure the Water level.

FUTURE SCOPE

It can be utilised in industries for level monitoring and management. Since there are around 5200 dams in India, the control of irrigation dams and other large dams utilised for power generating and water delivery should be handled differently.

As a result, a significant project in the future may involve the centralised management of all the dams in a state using GPRS or other wireless technologies, which would be advantageous for the entire nation.

The project's third benefit and conclusion is that, in terms of the control system, the same control system may be used not only for straightforward and similar applications but also for a variety of other applications. Similar regions can be utilised to monitor a parking lot or any other application that calls for making decisions based on sensor inputs.

CONCLUSION - The adoption of an automated dam gate level controller is significant because it is both automatic and Internet of Things-based. In order to make our test model acceptable for all potential situations on conventional dams, we included a few characteristics. The additional advantages and conclusion from this paper can be that the control system in question is suitable not only for basic and comparable application but also for application in many various fields, in addition to the suitable requirement discussed in the aforementioned condition. To replicate the controlling and functioning of the proposed automated Dam, a small testing model of the dam was built. Almost every imaginable scenario was tested with the test model, and some extremely intriguing findings were made. The model of the aforementioned dam

demonstrated experimentally that, in addition to the automated control system implementation, a dam is very successful at producing hydroelectric power. To measure the amount of water in the dam, this technology replaces PC-based systems with mobile devices.

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IOT BASED SMART LIFT MANAGEMENT SYSTEM

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Abstract:- The Smart Lift Management System (SLMS) is an innovative solution that leverages advanced technologies to enhance the efficiency and functionality of elevator systems in modern buildings. This abstract provides an overview of the key features, benefits, and potential applications of the SLMS.

The SLMS integrates intelligent algorithms, sensor networks, data analytics, and automation to optimize the performance of elevators, streamline passenger flow, and improve user experience. By utilizing real-time data from multiple sources, such as occupancy sensors, destination inputs, and historical usage patterns, the SLMS intelligently assigns elevator resources to minimize waiting times, reduce congestion, and increase energy efficiency.

The system offers various functionalities, including destination-based dispatching, predictive maintenance, and remote monitoring. Destination-based dispatching enables elevators to efficiently assign stops based on passengers' desired destinations, leading to reduced travel times and improved user satisfaction.

Keywords:- SLMS, Sensor network, Elevator,

Introduction: - The main requirement of all multi storage buildings are elevators . Elevators ease work of human and keeps human in comfortable zone. Elevators are used in almost all the multi storage buildings in metropolitan cities. Elevators are nothing but the vertical transportation device which is used to transfer goods and passengers. In this project, we show the basic elevator system with four floors. Although we show the concept with four floors, it is still possible to show this concept on multiple floors. This project mainly focuses on implementing elevator control system which will be beneficial for physically challenged people and can be used in hospitals also it will ensure contactless transfer of people and goods in elevator by accepting input with voice commands, thus its beneficial in the time of pandemic as well and also we can reserve the lift for specific time period. The destination floor reservation system prompts users to specify their destination floors using a login ID which is unique for all . Elevators are used in daily life and thus this project will be a great help for disabled and during pandemic situation to avoid physical contact .We will build a elevator automation system which will work based on voice commands. We can control the movement of

elevator upward and downward with help of voice command. The voice command will be given through smart phone. User can also control the devices like fan, door etc. Whenever the temperature goes high beyond particular limit the fan will be turned on and vice-versa. Whenever motion is detected the lights will be turned on thus will save electricity. Voice command & lift reservation feature reduce wasting of time and help to use lift interactively.

Motivation:- Motivation for the Smart Lift Management System (SLMS) project arises from the need to address the inefficiencies and limitations associated with conventional elevator systems.

Problem Definition:- Traditional elevator systems often suffer from suboptimal resource allocation, leading to increased waiting times and congestion. Elevators may be underutilized in some areas while being overwhelmed in others. This inefficiency negatively impacts user experience and productivity.

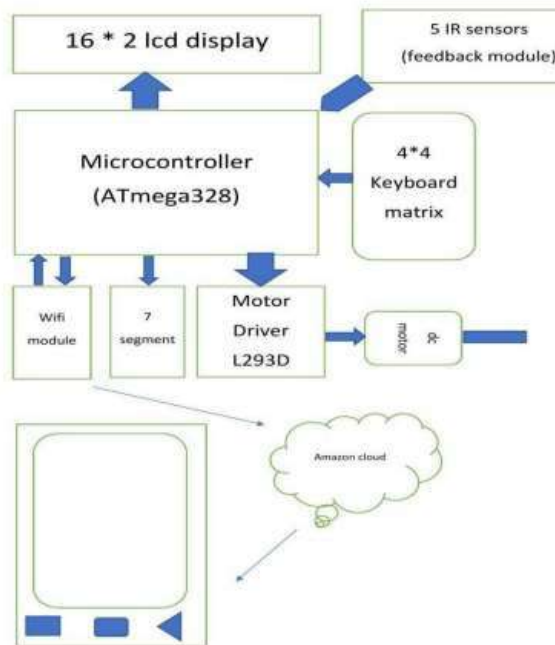
Objective of The Proposed Work:-

- To review and study the literature survey.
- To study the different types of hardware and software components.
- To simulate the system on simulation software.
- To develop a system which will be helpful for physically challenged people and beneficial in time of pandemic .

Existing Technology:-

- Floor call buttons were the primary means of summoning an elevator in older lift management systems.
- Proximity sensors were used to detect the presence of passengers inside the elevator
- Enhance the lift's emergency communication system by installing two-way communication devices, such as intercoms or emergency call buttons, to ensure passenger safety.

Architecture :-



We use arduino atmega 328 microcontroller. It is the main part of our project . We interface different hardware components to microcontroller . L293d motor driver is used for dc motor. DC motor is for the upward and downward movement of elevator.IR sensors are used to detect object (elevator) . IR sensors are used on each floor for feedback .the output of the IR sensors is given to microcontroller when the lift is detected. 7 segment display will be connected at each floor inside lift to display the floor number on which the lift is. Voice command will be given through smart phone. As the hardware is going to access data from cloud through internet we need Wi-Fi module . 16x2 LCD Display will show the show the name and time for which the lift is booked by a particular user

ARDUINO: Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

ESP 8266 Node MCU: Node MCU esp8266 wifi module is an open-source, low-cost, low-power MCU(microcontroller unit) development board. It has 17 GPIO pins(11 are Digital I/O pins), out of which one pin is an analog pin, 4 pins support PWM, 2 pairs are for UART(UART0 and UART1), and supports 1x SPI and 1x I2C protocol. Node MCU ESP8266 has 128Kb of Ram, 4 MB of Flash memory.

DC MOTOR:- A DC motor or direct current motor is an electrical machine that transforms electrical energy into mechanical energy by creating a magnetic field that is

powered by direct current. DC motors were the first form of motor widely used, as they could be powered from existing direct-current lighting power distribution systems

MOTOR DRIVER:- Motor driver(L293d) A Motor Driver is an essential device that provides the required voltage and current to a stepper motor so that it gets a smooth operation.

7 SEGMENT DISPLAY:- A seven-segment display is a form of electronic display device for displaying decimal numerals that is an alternative to the more complex dot matrix displays.

BCD to 7 segment driver (CD4511):-

- Supply voltage ranges from 3v to 18v
- Set-up-time is 150, 70, and 40ns at 5v, 10v, and 15v respectively
- Strobe pulse width is 400, 160, and 100ns at 5v, 10v, and 15v respectively

LCD :- The term LCD stands for liquid crystal display. These displays are mainly preferred for multisegment light-emitting diodes and seven segments

KEYPAD :- A keypad is a block or pad of buttons set with an arrangement of digits, symbols, or alphabetical letters. Pads mostly containing numbers and used with computers are numeric keypads.

IR SENSOR :- IR sensors is used to detect objects. sometimes called infrared light, is electromagnetic radiation (EMR) with wavelengths longer than those of visible light It is therefore generally invisible to the human eye, although IR at wavelengths up to 1050 nanometres (nm)s from specially pulsed lasers can be seen by humans under certain conditions

Related work:-

Paper 1: Controlling of Electric Elevator by using Voice Announcement, Speed Control and Mini Lift Model System.

Author:- .Omkar Jadhav, Shubhanshu Bishwash, Manisha Ganguly, and Omkar Nayak

Description:- Reviewed on the developing an elevator model that works smoothly on voice input like an actual elevator model would. For this purpose, Raspberry Pi 4 microcontroller is used. Speech recognition is used . Speech recognition is a technique in which a machine understands the words but not the context of the words spoken to a speechrecognition module by any individual

Paper 2: Voice Operated Intelligent Lift With Emergency Indicator

Author:- Anu K G, Anupriya K S, Lekshmi M S Arathy Suresan, Arjun Biju

Description:- Speech recognition system is main part of this project.It provides the communication mechanism between the user and the microcontroller based control mechanism of

elevator. This project makes use of a DC motor for moving the lift/elevator based on the voice/speech commands given by the user and voice recognition chip is used for recognition of the voice commands which will be given by the user

Paper 3 : - Voice Operated Elevator

Author:- Aishwarya Pokharkar, Niriksha Poojari, Harish Pawar , Amey Patil

Description:- Reviewed on designing and implementing a speech operated elevator system. The system will identify spoken words to input data for control equipment. The project makes use of a DC geared motor for the moving of lift. Microcontroller is programmed, with the help of the embedded C programming. The microcontroller is capable of communicating with all input and output modules of an elevator. The Bluetooth module is used for the wireless connection between the user and controller

Paper 4 : Voice automation for elevator

Author:- Shahista Sayyed, Rajiya Khan, Shehzeen Shaikh, Shaista Khan Prof.Mohd Ashfaque Shaikh

Description:- Reviewed on voice recognition chip The main component or the heart of the entire implementation is the voice recognition chip .The user entering the elevator would just give

Paper 5: Elevator for blind people using voice recognition

Author:- Farouk Salah, Mohamed Saod ,Dr. Maher M. Abdel-Aziz

Description:- Proposed system provides remote in which will give the blind person a fully control over the elevator. The remote have an auto power-off feature to turn off the remote after a certain time to conserve battery. A voice message to inform the user the battery is on low level to charge it. Also, there will be a voice confirmation for the selected floor and when the elevator arrives to it, and when the elevator's door is opening or closing. In the elevator a relay is used to switch to some emergency rechargeable batteries when the power shuts down. The proposed system is not expensive since the remote contains the microphone and the loud speaker together instead of putting them in two different levels. Also, the whole system works offline (i.e. no internet needed)

Future Scope:- The future of smart lift management systems holds great promise, driven by advancements in AI, ML, IoT, advanced traffic management, personalization, and sustainable solutions. With ongoing technological innovations, lift management systems will become even more intelligent, efficient, and personalized. The integration of these future developments will lead to smoother operations, reduced waiting times, improved user experience, enhanced energy efficiency, and a greener approach to vertical transportation.

Conclusion:- This device is very helpful for paralysis ,blind, short height people and physically challenged persons also it will ensure contactless transfer of people and goods in

elevator by accepting input with voice commands, thus its beneficial in the time of COVID-19 as well . This new design of lift provide interactive interface to user through which user can book/reserve the lift. Voice command & lift reservation feature reduce wasting of time and help to use lift interactively.

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IOT BASED “INTERNE OPRATE ROBOT CONTROL SYSTEM”

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ABSTRACT-- Internet of Things allow massive number of uniquely addressable “things” to communicate with each other and transfer data over existing internet or compatible network protocols. This paper proposes a new concept which tackles the issues for supporting control and monitoring activities at deployment sites and industrial automations, where intelligent things can monitor peripheral events, induce sensor data acquired from a variety of sources, use ad hoc, local, and distributed “machine intelligence” to determine appropriate course of actions, and then act to control or disseminate static or dynamic position aware robotic things in the physical world through a seamless manner by providing a means for utilizing them as Internet of robotic things (Although progressive advancements can be seen in multi-robotic systems, robots are constantly getting enriched by easier developmental functionalities, such vertical robotic service centric silos are not enough for continuously and seamlessly supporting for which they are meant. In this paper, a novel concept— is presented that highlights architectural principles, vital characteristics, as well as research challenges. The aim of this paper is to provide a better understanding of the architectural assimilation and identify important research directions on this term.

INTRODUCTION

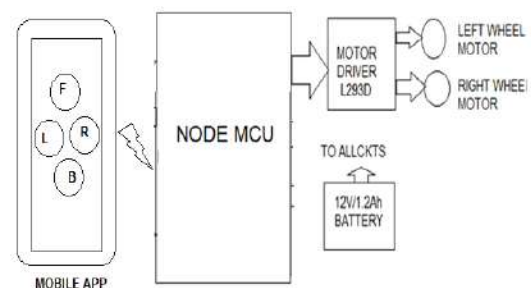
Robotic system has brought tremendous changes in various socio-economical aspects of human society during the past decades [1]. Per industrial robot have been widely deployed and used in all sorts of industries to perform repetitive, tedious, critical, and/or dangerous tasks, such as product assembly, car painting, box packaging, and shield welding. These prep robots have always been very successful at their accomplishments in several structured industrial applications due to their high accuracy, precision, endurance, and speed. Robotic t have been integrated with existing network technologies to extend the range of functional values of these robots when deployed in unstructured environments while fostering the emergence of networked robotics during 90’s [2]. IEEE Society of Robotics and Automation’s Tech Committee on Networked Robots

MOTIVATION WORK

This section presents a general overview of Internet of Robotic Things. First, concept behind Internet of Things is presented. Later, Cloud Robotics is merged with IoT as Internet of Robotic Things including its novel definition. A. DEFINITIONS The main idea behind the Internet of Things or IoT is not a new one. The idea of IoT was conceived by Mark Weiser in his Scientific American article on ubiquitous computing called “The Computer for the 21st Century”. Later, in the year of 1999, Internet of Things term was coined by Kevin Ashton, the then executive director of the Auto-ID Center. As per Giusto et al., IoT combines people, process, device and technology with sensors and actuators. This overall integration of IoT with

human being in respect to communications, collaboration and technical analytics enables to pursue realtime decision. The concept behind this idea is the ubiquitous presence around human being and its socio-economical culture with a variety of smart objects enabled by radio tags, sensors, actuators, smart devices which are disseminated through unique addressing schemes, secure communication channels and standardized architectural frameworks that perform interaction and bridges the cooperation with their neighbors to reach specific goals [7]. Smith [8] describes IoT as a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual “things” have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network; often communicate data associate with users and their environments.

BLOCK DIAGRAM



RESERCH METHODOLOGY

This paper may not be concluded without answering important question: are existing technologies mature to let Internet of Robotic Things born?

While answering this question, let us first present the core characteristics (see Section IV.A) of IORT arch processing units (see Section IV.C), and cloud robotics platforms (see Section IV.D) in what follows a use adopted to manage enhanced services in day-to-day human

RESULT AND DISSCUSSION

The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical system, which also encompasses technologies such as smart grids, virtual power plants, smart homes and smart cities. Each thing is uniquely identified through its embedded computing system but is able to interoperate within the existing internet infrastructure

CONCLUSION

Although this research is still in an early stage of development, it has already proven to succeed in several of its goals. The operating system of smart phone is android which can develop effective remote control program. It has proven to allow for meaningful two-way communication between the Android phone and the robot which would allow a non-expert to interact with and adjust the functionality of a system which uses ESP12E controller, a single board micro-controller application of interactive objects or environments more accessible intended to make the

FUTURE SCOPE

Robotics is the branch of mechanical engineering, electrical engineering and computer science that deals with the design, construction, operation, and application of robots, as well as computer systems for their control, sensory feedback and information processing. A Robotic System is a type of mechanical system, usually programmable, The links of such a manipulator are connected by joints allowing either rotational motion (such as in an articulated robot) or translational (linear) displacement. The internet of things (IoT) is the network of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors, and network connectivity that enable these objects to collect and exchange data. The IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and result in improved efficiency, accuracy and economic benefit. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the

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TRAFFIC LIGHT CONTROL SYSTEM

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ABSTRACT - Traffic congestion on the highways is one of the many issues that people who live in cities deal with every day. They waste time sitting in tiresome, protracted traffic bottlenecks. Traffic accidents can occasionally result from congestion. Additionally, it takes a long time for ambulances, fire trucks, and police cars to get to the scene of the emergency, which causes innocent people to perish. In this study, we suggest a plan of action for addressing the difficulties brought on by traffic congestion, some of which have already been mentioned. An IoT-based automated traffic signal monitoring and controller system with manual override functionality is planned.

INTRODUCTION - One of the many problems in today's world that people living in urban communities face every day is the problem of traffic congestion. As a result, many people waste their valuable time sitting idle for long periods in exhausting traffic for canned goods. Congestion is a condition that sometimes causes traffic accidents. Emergency vehicles such as ambulances, fire brigade Brigades, and police cars also lose a lot of time and that is why does not reach the critical moment, which in turn leads to the loss of innocent lives. In this study, we propose a method to meet the challenges caused by traffic congestion, some of which are mentioned above. Automatic traffic signs based on IoT a monitoring and control system is planned, which also makes it possible manually bypassing signals on the Internet. This concept minimizes traffic congestion at the same time provision of functional vehicles in green corridors. It will come helps prevent loss of time and lives to a considerable extent.

ADVANTAGES - 1. Reduced reaction time: By giving traffic signals priority, IoT-enabled traffic lights help to shorten the response time for ambulances.
2. Enhanced safety: Automated traffic light control systems guarantee ambulances' safe passage, lowering the likelihood of accidents on the road.
3. Better coordination: A centralized control system allows for the efficient coordination of traffic signals, ensuring the timely and smooth passage of ambulances.
4. Traffic police's workload is reduced because traffic signal control systems may automate the procedure of granting precedence to ambulances.

DISADVANTAGES - 1. Cost: Especially for poorer nations, implementing an IoT-enabled traffic light management system might be expensive.
2. Technical difficulties: Using IoT technology to integrate traffic light control systems can be difficult, necessitating specialized technical knowledge.
3. Dependence on technology: In the event of a technical issue, the system could fail, delaying the ambulances' response time.
4. IoT-enabled traffic light control systems are vulnerable to cyberattacks, which could cause the traffic system to be disrupted.

APPLICATION - 1. Developing IoT to optimize road networking system and enable quicker and more effective communication.
2. An advantage of an intelligent traffic management system is that it offers secure public transport.
3. We use a GPS system that provides live streaming of the location of the ambulance to the traffic control station And the hospital.
4. Using a GSM SIM card, we transmit the real-time location of the ambulance to traffic control and hospitals via text messages.

BLOCK DIAGRAM -

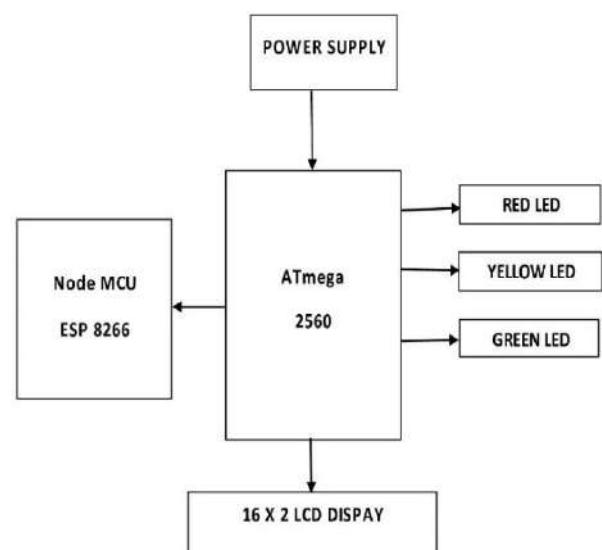


Fig.1 Block diagram of Traffic Light Control System

Wi-Fi module (ESP8266)-

It can be used to host the application or to offload Wi-Fi networking tasks from another application processor. The ESP8266EX provides a comprehensive and self-contained Wi-Fi networking solution. The ESP8266EX launches the application straight from an external flash when it serves as the host. To enhance the system's performance in certain applications, it features an inbuilt cache. Alternatively, any microcontroller-based design with straightforward connectivity (SPI/SDIO or I2C/UART interface) can be enhanced with wireless internet access by acting as a Wi-Fi adaptor. The ESP8266EX is one of the industry's most fully integrated Wi-Fi chips; it includes antenna switches, an RF balun, a power amplifier, a low noise reception amplifier, filters, power management modules, and only a small amount of extra hardware.

Power Supply -

This circuit converts the AC power source into steady DC. Unregulated output will be fixed to a consistent voltage with the aid of a voltage regulator DC. The circuit consists of a bridge rectifier comprised of diodes, a linear voltage regulator (7805), capacitors, and resistors.

FUTURE SCOPE - The proposed method just focuses on finding a technique to allow ambulances to pass traffic signals with the least amount of delay. As a result, a lot more possibilities might be investigated in order to offer patients a high-quality ambulance service. A microcontroller that can track patients in real time and communicate the information to the intended hospital can also be installed in the ambulance. This can help the hospital get ready for the patient's arrival as best it can. The incorporation of microcontrollers into ambulances also creates opportunities for double ambulance authentication at traffic signals. While the system here only concentrates on providing traffic assistance to ambulances, it may be extended to do the same for other emergency vehicles, such as fire engines and rescue vehicles. The potential for development is only constrained by human imagination.

CONCLUSION - At the crossings, there may be heavy traffic congestion every day. It has become more commonplace as the number of vehicles on the road increases. The number of vehicles on the road cannot be reduced, but it can be handled in smart ways. To reduce traffic congestion to a minimum, we suggested an Internet of Things-based traffic control system. Since many lives have been lost as a result of ambulances getting stopped in traffic for extended periods of time, the major objective is to reduce time delays by giving priority to the lane with approaching emergency vehicles.

ACKNOWLEDGEMENT - I would like to express my sincere gratitude and appreciation to all those who have contributed to the successful development and implementation of the IoT-based traffic light control system using an ambulance. This project aims to improve the efficiency and safety of traffic flow by prioritizing the passage of ambulances through congested areas.

First and foremost, I would like to extend my heartfelt thanks to my supervisor, for their guidance, support, and invaluable insights throughout the duration of this project. Their expertise and encouragement have been instrumental in shaping this research endeavor.

I am also grateful to the faculty and staff of Arvind Gavali College of Engineering, Satara, whose unwavering support and resources have facilitated the realization of this project. Their commitment to fostering innovation and providing a conducive research environment has been crucial to our success.

Last but not least, I would like to thank all the participants who volunteered their time and provided feedback during the testing phase of the system. Their input and observations were instrumental in refining the system and making it more robust and reliable.

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AI BASED AUTOMATIC ANSWER CHECKER

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ABSTRACT –

Automatic answer checking process would not only relieve the exam checker but the checking process would also get way more transparent and fair as there would not be any chances of biasedness from the teacher side. An Automatic answer checker application that checks and marks written answers similar to the human being. It removes human errors that commonly occurring Answersheet checking.

In this modern age, where the world moves towards automation so, there is an need for in an Automatic Answer Checker system. Currently, the online answer checker is available for MCQ based question, hence Automatic Answer Checker is Used.

Keywords –

Automatic MCQ Answer checker, XAMPP , PHP.

INTRODUCTION -

In Today's World ,currently there are many exam conduction ways, be it online exams or MCQ types exam. Various Examinations are conducted every day around the world . The most Important aspect of any Examination is the checking of the answer sheet of the student.

Automatic answer checking process would not only relieve the exam checker but the checking process would also get way more transparent and fair as there would not be any chances of biasedness from the teacher side.

Nowdays various online tools are available for Checking multiple choice questions but there are very few tools to check Objective answer type Examination. This project aim to carry out the checking of Subjective and Objective answer type Examinations by Implementing the Data. This application can be used in various educational Institutes for Checking Objective answer type Examinations.

LITERATURE SURVEY –

An AI based Automatic Answer Checker describes how to check the Answer by using online software.

2.1 AUTOMATIC ANSWER CHECKER

[Lakshmi priya , Banbari Amman Institute of Technology]-

An automatic answer checker application that checks and marks answers similar to a human being. This software application is built to check subjective answers in an examination and allocate marks to the user after verifying the answer

2.2 AUTOMATIC ANSWER CHECKING SOFTWARE

[Vandana Bali , Vandhana Thevar , Asst. Prof. Samit Shivadekar] –

This software application is built to check subjective answers in an online/offline examination and allocate marks to the user after verifying the answer. The admin may insert questions and respective subjective answers in the system. These answers are stored as notepad files. When a user takes the test he is provided with questions and area to type his answers. Once the user enters his/her answers the system then compares this answer to original answer written in database and allocates marks accordingly. Both the answers need not be exactly same word to word.

2.3 ONLINE OBJECTIVE ANSWER CHECKER

[Merien Mathew, Ankit Chavan , Siddharth Baikar] –

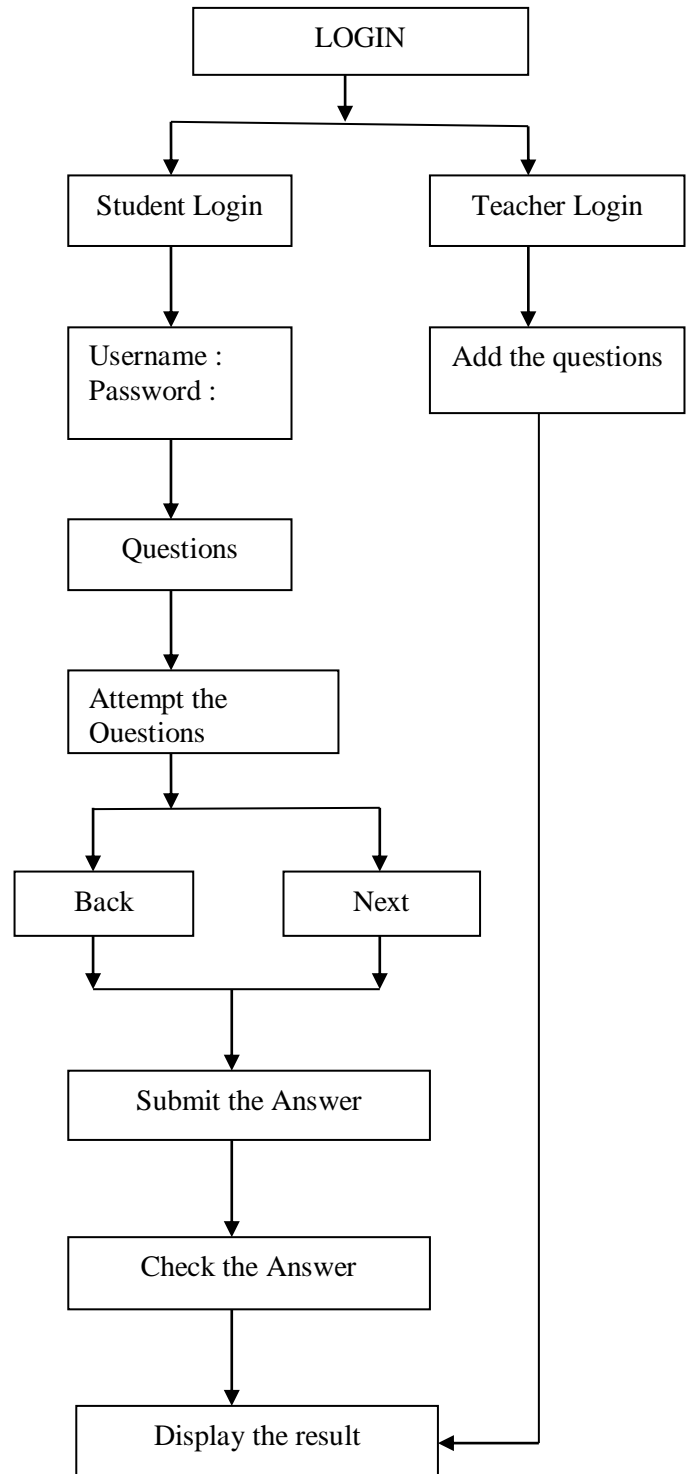
We are pleased to present Online Subjective Answer Checker that will ease out the process of checking of answer papers with accuracy. The system will let students give exam online, calculate the results automatically as well as produce a record for the administrator. The paper will focus on correcting on the basis of certain keywords that every answer will contain and give marks to the students according to the presence of the keywords in the answers. This system will help reduce all human errors thereby making the system more efficient.

2.4 AUTOMATIC ANSWER CHECKING

[Vasu Bansal , M.L. Sharma , Krishna Chandra Tripathi] –

We have seen that a number of students apply for various examination which may be institutional , non-institutional or even competitive . The competitive exams mostly have objective or multiple choice questions . This aims is focus on designing an efficient algorithm that will automatically evaluate the answers given by student and assign a score based on the AI technologies which is work like human being.

BLOCKDIAGRAM



OBJECTIVE -

An Automatic answer checker application that checks and marks written answers similar to human being. This Application built to check Subjective and Objective answers in an online examination and allocate marks to the user after verifying the Answer.

The System requires you to store the original answer for the system. This facility is provided to the Admin. The Admin may insert questions and Subjective and Objective answers in the System. This Answers Are Stored as Note pad files . When a user takes the test he is provided with questions and are a to type his answers.

The User Enter his/her answers the system then compares this answer original answer written data base and allocates marks Accordingly. Both the Answers need not be exactly same , word to word.

ADVANTAGES-

1. The system calculates the score and provides results instantly.
2. It removes human errors that commonly occur during manual checking.
3. The system provides an unbiased result. Thus the system excludes human efforts and saves time and resources.
4. Environmental Friendly
5. Save Time
6. Plugged into Technology
7. More secure less cheating

DISADVANTAGES

1. The system must be given proper inputs otherwise system can produce wrong results.
2. Challenge Of Technology
3. Infrastructure Problem

FUTURE SCOPE -

The system would be beneficial for the Universities , schools and colleges for the academic purpose by providing ease to faculties and the examination evaluation cell. Many Educational Institutes conduct their examinations Onliner Our Solution can still be improved. This emerges from the nature of problems we were solving. For most of them , there is a wide range of various cases and each requires a slightly different approach. We can add more rules into SET grammar, to detect rarer type of Questions and answers. These system calculate the score and provides result instantly.

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Sign Language for Deaf and Mute People

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Abstract— This project presents a language converter for deaf and dumb people. In the present world it is very difficult for the deaf & dumb people to talk with the ordinary people. So, it becomes impossible for them to communicate with the ordinary people unless and until ordinary people like us learn the sign language for the purpose of communication. The sign language of deaf and dumb is quite difficult to learn and it is not possible for everybody to learn that language. So, every person cannot come and share their thoughts with these physically impaired people. So here is a system which would enable the deaf and dumb to communicate with each and everyone. In this system a webcam is placed in front of the physically impaired person. The co-ordinates captured will be mapped with the one previously stored and accordingly exact alphabet will be captured. Continuing in this way physically impaired person will be able to go through the entire sentence that he wants to communicate. Later on this sentence will be translated into speech so that it would be audible to Introduction everyone.

I. INTRODUCTION

Deaf is a disability that impair their hearing and make them unable to hear, while mute is a disability that impair their speaking and make them unable to speak. Both are only disabled at their hearing and/or speaking, therefore can still do much other things. The only thing that separates them and the normal people is communication. If there is a way for normal people and deaf-mute people to communicate, the deaf-mute people can easily live like a normal person. And the only way for them to communicate is through sign language. While sign language is very important to deaf-mute people, to communicate both with normal people and with themselves, is still getting little attention from the normal people. We as the normal people, tend to ignore the importance of sign language, unless there are loved ones who are deaf-mute. One of the solutions to communicate with the deaf-mute people is by using the services of sign language interpreter. But the usage of sign language interpreter can be costly. Cheap solution is required so that the deaf-mute and normal people can communicate normally.

II. LITERATURE REVIEW

Sign Language Converter for Deaf and Dumb People in Two Way Communication for Regional Languages. This project presents a language converter for deaf and dumb people. In the present world it is very difficult for the deaf & dumb people to talk with the ordinary people. So it becomes impossible for them to communicate with the ordinary people unless and until ordinary people like us learn the sign language for the purpose of communication. The sign language of deaf and dumb is quite difficult to learn and it is not possible for everybody to learn that language. So, every person cannot come and share their thoughts with these physically impaired people. So here is a system which would enable the deaf and dumb to communicate with each and every one. In this system a webcam is placed in front of the physically impaired person. The co-ordinates captured will be mapped with the one previously stored and accordingly exact alphabet will be captured. Continuing in this way physically impaired person will be able to go through the entire sentence that he wants to communicate. Later on, this sentence will be translated into speech so that it would be audible to everyone.

Sign Language Recognition System For Deaf And Dumb People. This paper proposes the method or algorithm for an application which would help in recognizing the different signs which is called Indian Sign Language. There are 26 signs in Indian Sign Language corresponding to each alphabet out which the proposed algorithm provided with 95% accurate results for 9 alphabets with their images captured at every possible angle and distance i.e. for every alphabet even if have approximately 5 images at different angles and distances then the algorithm is working accurately for 45 types of inputs.

Translation of Sign Language for Deaf and Dumb People. Deaf-mute people can communicate with normal people with help of sign languages. Our project objective is to analyze and translate the sign language that is hand gestures into text and voice. For this process, Real Time Image made by deaf mute people is captured and it is given as input to the per-processor. Then, feature extraction process by using otsu's algorithm and classification by using SVM (support Vector Machine) can be done. After the text for corresponding sign has been produced. The obtained text is converted into voice with use of MATLAB function. Thus hand gestures made by deaf-mute people has been analyzed and translated into text and voice for better communication.

III. SYSTEM ARCHITECTURE

The System uses Haar like method to track hand in the video frames and the bounded hand region becomes the area of interest. To bridge the gap by introducing inexpensive computer in the communication path so that the sign language can be automatically captured.

Machine learning (ML) is a type of artificial intelligence (AI) that allows software applications to become more accurate at predicting outcomes without being explicitly programmed to do so. Machine learning algorithms use historical data as input to predict new output values.

The proposed algorithm consisted of four major steps which are namely Image Acquisition, Feature Extraction, Orientation Detection and Gesture Recognition which is also shown in the below given Fig 1. All of the following steps are explained in details in the later part of the paper with all the information on how the module is working and what behavior the module is supposedly expected to portray. While deciding on the following algorithm it was observed that pre-processing steps that are to be applied on the images for removal of noise in the background was not at all required and the approach was concluded to be simple and easy to implement. The steps of the methodology are further explained in details.

III.1. Image Acquisition :-

The first step of Image Acquisition as the name suggests is of acquiring the image during runtime through integrated webcam and while acquiring. The images will be stored in the directory as soon as they are captured and the recently captured image will be acquired and will be compared with the images stored for specific letter in the database using the SIFT algorithm and the comparison will give the gesture that was done and the translated text for the following gesture.

III.2. Feature Extraction:-

For any object there are many features, interesting points on the object, that can be extracted to provide a "feature" description of the object. SIFT image features provide a set of features of an object that are not affected by many of the complications experienced in other methods, such as object scaling and rotation. The SIFT approach, for image feature

generation, takes an image and transforms it into a "large collection of local feature vectors". Each of these feature vectors is invariant to any scaling, rotation or translation of the image.

III.3. Orientation Detection:-

In orientation detection we will take the input of hand movement in any form or any orientation the gesture will be detected through the described section of feature extraction as the SIFT algorithm also includes the orientation assignment procedure.

III.4. Gesture Recognition:-

Finally when the whole process is complete the application will then convert the gesture into its recognized character or alphabet which might be helpful to be understood in layman's language. The following process includes passing out the single dimensional array of 43 signs corresponding to alphabets has been passed where the image number stored in database is provided in the array.

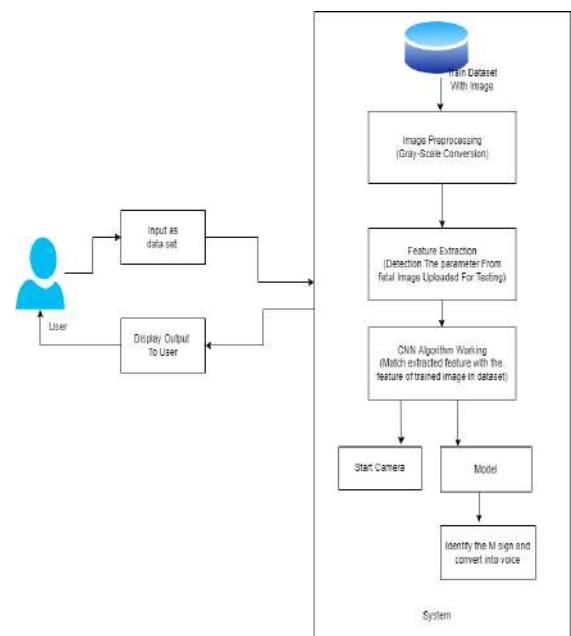


Fig.1.Block/Structural diagram

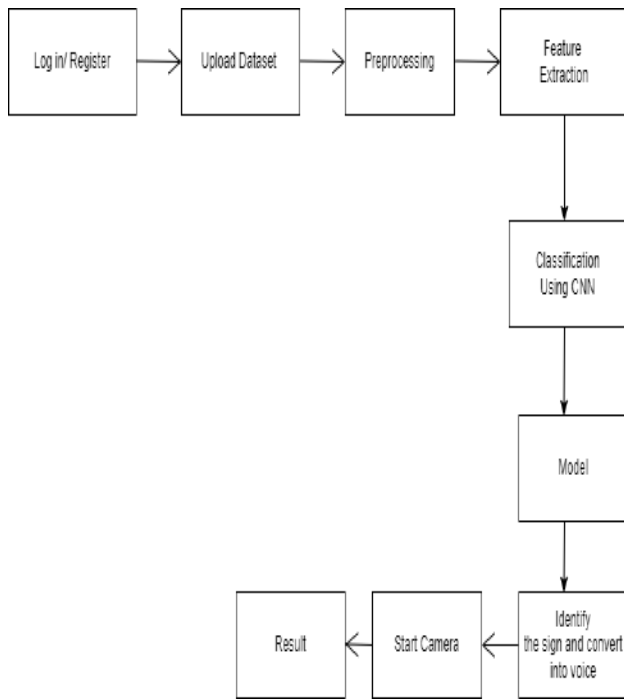


Fig.2.Data Flow Diagram

Working:-

The first process is registration or login ,if registration is done then login. The user have to upload the dataset which is in the form of hand motions , then the system will automatically preprocess the data(hand signs). The next process is feature extraction which is nothing but the process of transforming raw data into numerical features that can be processed while preserving the information in the original dataset. Classification is the next stage where the data is classified using CNN(Convolutional Neural Network). CNN is a network architecture for deep learning that learns directly from data. CNN is useful in finding patterns in images to recognize objects, classes and categories. CNN is built-in convolutional layer reduces the high dimensionality of images without losing its information so it is best suited for this application.

When login is done ,the system will automatically turn on the camera and then it will detect the hand signs and corresponding speech will be generated.



Fig.3.Login Window



Fig.4.Result of 1 sign among 43

IV. FUTURE SCOPE

In future work, proposed system can be developed and implemented using Raspberry Pi. Image Processing part should be improved so that System would be able to communicate in both directions i.e.it should be capable of converting normal language to sign language and vice versa. We will try to recognize signs which include motion that means we can add microcontroller for detection of hand motions ,it would be combination of hardware and software .The system would be installed into phones for portability and so it will be easy for the peoples.

V. CONCLUSION

Sign Language is a tool to reduce the communication gap between deaf-mute people and normal person. This system which is proposed above gives the methodology which aims to do the same as the two-way communication is possible. This method proposed here facilitates the conversion on the sign into speech. This overcomes the requirement of a translator since real time conversion is used. The system acts a voice of the person who is deaf-mute. This project is a step towards helping a specially challenged people. This can be further enhanced by making it more user friendly, efficient, portable, compatible for more signs and as well as dynamic signs.

VI. ACKNOWLEDGEMENT

We would like to thank our guide Ms. Deepali Shinde for their guidance and feedback during the course of the project. We would also like to thank our department for giving us the resources and the freedom to pursue this project.

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IOT BASED ELECTRICITY THEFT DETECTION SYSTEM

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ABSTRACT - Innovative solutions for various industries have been developed as a result of the proliferation of Internet of Things (IoT) devices. IoT has the potential to completely change how electricity is produced, transmitted, and used in the electricity sector. The use of IoT for detecting and preventing electricity theft is one such application. Meter tampering, also known as electricity theft, is a significant problem that affects the revenue and profitability of electricity boards. It entails circumventing meters in an unlawful manner in order to use electricity without paying for it. This not only costs government's money, but also puts consumers and the electricity grid in danger of injury or damages. In this project, we propose creating an IoT-based system to track down and stop electricity theft.

KEYWORDS – IOT, Power theft detection ,WIFI module, LCD, Current sensor, Power supply

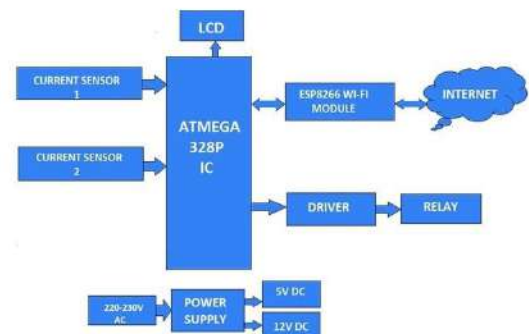
INTRODUCTION - Electricity is one of the greatest technological innovations of mankind. It has now become a part of our life and one cannot think of a world without electricity. Electricity theft has emerged as a serious problem in power sectors especially in the developing countries. A huge amount of revenue is lost due to electricity theft. In some countries, this is so severe that governments are incurring losses instead of revenue. In some cases, government has to provide subsidies to the power sector to maintain a reasonable price of electricity. The financial loss results in shortage of funds for investments to expand the existing power capacity and as a result government is failing to satisfy the ever-increasing demand for electricity.

RESEARCH WORK – IOT helps the object to understand and exchange the data. IOT is driven by the combinations of

sensors, connectivity, people and progress. The massive potential of IOT is used for improved performance, innovative services and in revenue streams. IOT is used in various fields in homes IOT is used in light bulbs, security and in energy monitoring. In transport it is used in traffic routing, telematics and in shipping. In health patient care, elderly monitoring, bio wearables.

RESEARCH METHODOLOGY-

This case study of the project is developed on the basis of internet of things. The information about the electricity theft detection is displayed on LCD. The method for Iot based electricity theft detection system is based on electricity theft occurring in electricity lines. This case study of the project is developed on the basis of internet of things. The information about the electricity theft detection is displayed on LCD. The method for IOT based electricity theft detection system is based on electricity theft Occuring in electricity lines.



RESULT AND DISCUSSION –

A Electricity Theft Detection and monitoring system has been designed and developed with proper integration of both the hardware and the software. Without any human interface, this system provides an effective and easy way to detect electrical theft. The use of IoT helps in achieving the numerous advantages of wireless network communications. Power theft is actually by passing energy meter, but in this project, the theft is detected if some unauthorized consumption is done on the main AC supply.

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FUTURE SCOPE –

Energy crisis is one of the major problems that the world faces today. The best remedy for this is not the increase in energy production, but the effective use of available energy. By properly monitoring our energy consumption and avoiding energy wastage, energy crisis can be reduced to a certain extent. But energy monitoring cannot be done efficiently mainly because consumers are not aware of their energy consumption.

They will get an idea about their consumption only when the electricity bills are issued. This whole procedure has to be repeated several times in a month to efficiently control the energy usage. If consumers can check their energy consumption using their mobile phone or laptop instead of checking energy meter.

CONCLUSION -

A IOT based Electricity Theft Detection and monitoring system has been designed and developed with proper integration of both the hardware and the software Without any human interface, this system provides an effective and easy way to detect electrical theft. This main feature of theft detection is done seamlessly using the integrated cloud system, which is able to detect the theft of electricity that is being drawn from the main AC line and also maintain the statistical and data of that theft .

Accelerometer Based Hand Gesture Controlled Robo-Car

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ABSTRACT - Gesture Controlled Car is a robot which can be controlled by simple human gestures. The user just needs to wear a gesture device in which a sensor is included. The sensor will record the movement of hand in a specific direction which will result in the motion of the robot in the respective directions. The robot and the Gesture instrument are connected wirelessly through radio waves. User can interact with the robot in a more friendly way due to the wireless communication. We can control the car using accelerometer sensors connected to a hand glove. The sensors are intended to replace the remote control that is generally used to run the car. It will allow user to control the forward, backward, leftward and rightward movements, while using the same accelerometer sensor to control the throttle of the car. Movement of car is controlled by the differential mechanism. The mechanism involves the rotation of both forth & rear wheels of left or right side to move in the anticlockwise direction and the other pair to rotate in the clockwise direction which makes the car to rotate about its own axis without any kind of forward or backward motion. The main advantage of this mechanism is the car with this mechanism can take sharp turn without any difficulty.

KEYWORDS – ADXL345, ATMEGA328P, Motor Driver L293D, RF Module.

1] INTRODUCTION - Nowadays, robotics are becoming one of the most advanced in the field of technology. A Robot is an electro-mechanical system that is operated by a computer program. Robots can be autonomous or semi-autonomous. An autonomous robot is not controlled by human and acts on its own decision by sensing its environment. Majority of the industrial robots are autonomous as they are required to operate at high speed and with great accuracy. But some applications require semi-autonomous or human controlled robots. Some of the most commonly used control systems are voice recognition, tactile or touch controlled and motion controlled. A Gesture Controlled robot is a kind of robot which can be controlled by your hand gestures not by old buttons. You just need to wear a small transmitting device in your hand which included an acceleration meter. This will transmit an appropriate command to the robot so that it can do whatever

we want. The transmitting device included a ADC for analog to digital conversion and an encoder IC(HT12E) which is use to encode the four bit data and then it will transmit by an RF Transmitter module. At the receiving end an RF Receiver module receive's the encoded data and decode it by and decoder IC(HT12D). This data is then processed by a microcontroller and finally our motor driver to control the motor's. Now its time to break the task in different module's to make the task easy and simple any project become easy or error free if it is done in different modules. As our project is already divided into two different part transmitter and receiver. The applications of robotics mainly involve in automobiles, medical, construction, defense and also used as a fire fighting robot to help the people from the fire accident. But, controlling the robot with a remote or a switch is quite complicated. So, a new project is developed that is, an accelerometer based gesture control robot. The main goal of this project is to control the movement of the robot with hand gesture using accelerometer. The robot is usually an electro-mechanical machine that can perform tasks automatically. Some robots require some degree of guidance, which may be done using a remote control or with a computer interface. Robots can be autonomous, semi-autonomous or remotely controlled. Robots have evolved so much and are capable of mimicking humans that they seem to have a mind of their own.

2] LITERATURE SURVEY -

2.1 Gesture Controlled Robot using Accelerometer [Aishwarya Mohan, Rashmi Priyadarshini]

Innovations in the field of science is currently being developed aggressively in the field of Robotics. It is a rapidly emerging field that is here for the long haul because of its incredible use in rearranging work and day-by-day errands in the standard existence of people. To improve the compatibility of robots with humans for our day-to-day activities, we have to develop an efficacious method for interacting with robots. The modus operandi of this project involves beginning with splitting the model into two modules, resulting in two circuits: (a) a transmitter circuit, and (b) a receiver circuit. The methodology behind this is that we will connect the ADXL345 with the Atmega328p IC

which will process the values fed to its analog pins from the accelerometer.

2.2 Hand Gesture Control Car

[Rutwik Shah, Vinay Deshmukh, Viraj Kulkarni, Shatakshi Mulay, Madhuri Pote]

This project includes a transmitter section and a receiver section. The required components to build this project are Ht12e, Ht12d, L293D, AT89S52, 7805, capacitor, crystal, PBT connector, single pole antenna, resistor, LED, accelerometer, and battery. The accelerometer is an essential device in this project. accelerometer or transmitter device depends upon the hand gesture. Through the transmitter device, a command is received and it is processed with the help of the At89S51 microcontroller

2.3 Hand Gesture controlled Robot

Kathiravan Sekar, Ramarajan Thileeban, Vishnuram Rajkumar, Sri Sudharshan Bedhu Sembian

A microcontroller processes this data, and the motor driver is used to control the motors. As the user moves his hand, it senses and sends the signal for decision. The output from the accelerometer is gathered for the process by a microcontroller. According to the sensor output, the controller is made to work, and it sends the respective signal to the motors. It uses two DC motors to move, to drive them, and one motor driver is IC used which provides sufficient current to motors. All this material is mounted on metal chassis. As we move our hand to the right robot will move to the right side.

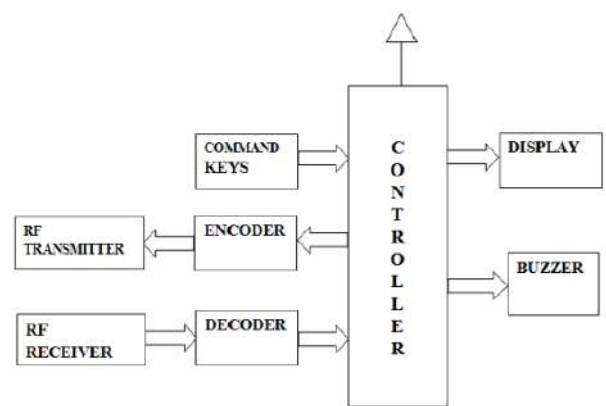
2.4 An Approach to Accelerometer-Based Controlled Robot [Rasika Gadage1, Shweta Mirje2, Prajakta Yadav3, Zakiya Makandar4]

The technique of establishing a process of interaction between humans and computers is evolving since the invention of computer technology. The mouse is an excellent invention in HCI (Human-Computer Interaction) technology. Though wireless or Bluetooth mouse technology is invented still, that technology is not completely device free. A Bluetooth mouse has the requirement of battery power and connecting dongle. The presence of extra devices in a mouse increases the difficulty to use it. The proposed mouse system is beyond this limitation. This paper proposes a virtual mouse system based on HCI using computer vision and hand gestures. Gestures are captured with a built-in camera or webcam and processed with color segmentation & detection technique.

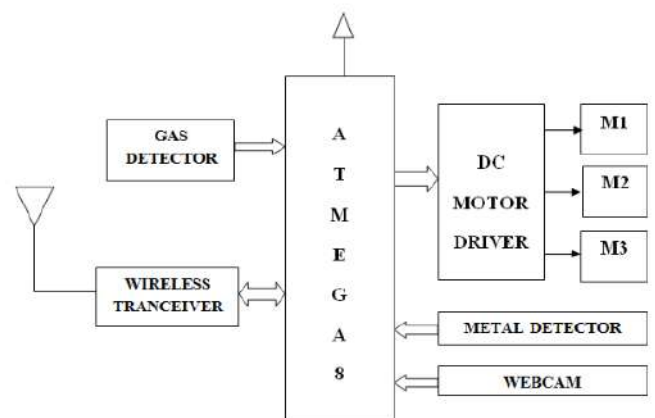
2.5 Accelerometer and Arduino Based Gesture Controlled Robocar Arkaprabha Lodh, Debopama Ghosh, Debosama Ghosh

Robotics is one of the emerging fields nowadays. It can be defined as a design gadget that can assist humans in their day-to-day activities and help them by amalgamating electronics and mechanical engineering. Robots are assuming a significant number of jobs in sectors like construction, military, medicine, etc. Various attempts have been implemented to make interfaces among users and PCs put together frameworks based on human gestures. These gesture-based interfaces can substitute regular interface gadgets. In the wake of making some essential robots like line follower robots or computer-controlled robots, human gestures can operate these types of robots and therefore an accelerometer-based Hand Gesture Robot is on the rise. This technique will reduce the dichotomy between the digital and physical worlds. In this paper, we will see how a robot can move by using Hand Gestures.

3] ARCHITECTURE -



A) Transmitter section



B) Receiver section

3.1] MICROCONTROLLER

The P8951RD2 is an 80C51 microcontroller with 64 kB Flash and 1024 bytes of data RAM. A key feature of the P89s51RD2 is its X2 mode option. The design engineer can choose to run the application with the conventional 80C51 clock rate (12 clocks per machine cycle) or select the X2 mode (6 clocks per machine cycle) to achieve twice the throughput at the same clock frequency. Another way to benefit from this feature is to keep the same performance by reducing the clock frequency by half, thus dramatically reducing the EMI. The Flash program memory supports both parallel programming and in serial In-System Programming (ISP). Parallel programming mode offers gang-programming at high speed, reducing programming costs and time to market. ISP allows a device to be reprogrammed in the end product under software control. The capability to field/update the application firmware makes a wide range of applications possible. The P8951RD2 is also In-Application Programmable (IAP), allowing the Flash program memory to be reconfigured even while the application is running. connectivity (SPI/SDIO or I2C/UART interface) can be enhanced with wireless internet access by acting as a Wi-Fi adaptor. The ESP8266EX is one of the industry's most fully integrated Wi-Fi chips; it includes antenna switches, an RF balloon, a power amplifier, a low noise reception amplifier, filters, power management modules, and only a small amount of extra hardware.

3.2] Accelerometer (ADXL335):

An accelerometer is a one type of sensor and it gives an analog data while moving in the direction of X, Y and Z. These directions depend on the type of sensor. This sensor consists of arrow directions, if we tilt the sensor in one direction, then the data at the particular pin will change in the form of analog.

3.3] HT12E Encoder :

The HT12E encoder are 12 bit encoders that is they have 8 address bits and 4 data bits. It encodes the 12-bit parallel data into serial for transmission through an RF transmitter.

3.4] HT12D Decoder :

HT12D converts the serial input into parallel outputs. It decodes the serial addresses and data received by RF receiver into parallel data and sends them to output data pins. The serial input data is compared with the local addresses three times continuously and is only decoded when no error or unmatched codes are found. A valid transmission is indicated by a high signal at VT pin.

3.5] RF Module:

An RF Transmitter and Receiver pair is used for wireless communication. The wireless data transmission is done

using 434 MHz Radio Frequency signals that are modulated using Amplitude Shift Keying (ASK) Modulation technique.

3.6] L298 Driver:

L 298 is a dual full bridge driver that has a capability to bear high voltage as well as high current.

3.7] 150 RPM Motors:

These are attached to the wheels of the car to give them power to move.

4] FUTURE SCOPE -

In the future we can design a wireless robot that can sense hand gestures by using wireless technologies. It can be used in military applications as a robotic vehicle that can be handled by a soldier to avoid casualties. Our system has shown the possibility that interaction with machines through gestures is a feasible task and the set of detected gestures could be enhanced to more commands by implementing a more complex model of an advanced vehicle not only in limited space but also in the broader area as in the roads too. In the future, service robots execute many different tasks from private movement to full-fledged advanced automotive that can make disabled to able in all sense.

5] CONCLUSION –

We accomplished our goal with no obstacles i.e., controlling a robot with gestures rather than remote-controlled devices. Our robot is indicating legitimate reactions at whatever point we move our hand. The output from the four pre-defined hand motions to make the robot move in desired directions are: flexion for forward motion, extension for backward motion, tilt right for a right turn, and tilt left for a left turn. It can be reduced by implementing mechatronics rescue tools for planned rescue operations. Soldiers die upon reactive, spontaneous rescue or encounter operations due to a lack of adequate pieces of equipment. We hope that our robot can enhance commando operation. This robot can also be used in disaster situations. It is used for surveillance by providing live footage by webcam.

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Wireless mobile charger

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Abstract—Wireless charging is a technique of transmitting power through an air gap to an electrical device for the purpose of energy replenishment. Recently, wireless charging technology has significantly advanced in terms of efficiency and functionality. This article first presents an overview and fundamentals of wireless charging.

I. INTRODUCTION

Wireless charging has been around since the late 19th century, when electricity pioneer Nikola Tesla demonstrated magnetic resonant coupling the ability to transmit electricity through the air by creating a magnetic field between two circuits, a transmitter and a receiver. But for about 100 years it was a technology without many practical applications, except, perhaps, for a few electric toothbrush models. Today, there are nearly a half dozen wireless charging technologies in use, all aimed at cutting cables to everything from smartphones and laptops to kitchen appliances and cars. Wireless charging is making inroads in the healthcare, automotive and manufacturing industries because it offers the promise of increased mobility and advances that could allow tiny internet of things devices to get power many feet away from a charger.

II. Working of wireless mobile charger

Inductive charging works by utilizing something called "Oersted's law." This states that when an electric current flows through a wire, it generates a magnetic field. Even better, if you create a tight coil and run electricity through it, it creates an even stronger magnetic field. This little coil is what you'll find in a wireless charging pad it's sitting there, converting an electrical current into an electromagnetic field, waiting for something to come along and "take" that energy. Of course, you can't just

hold a battery in a magnetic field and expect it to charge up. You have to set up a receiver that can take this electromagnetic field and convert it back into an electric current...

III. Figure. working of wireless mobile charger

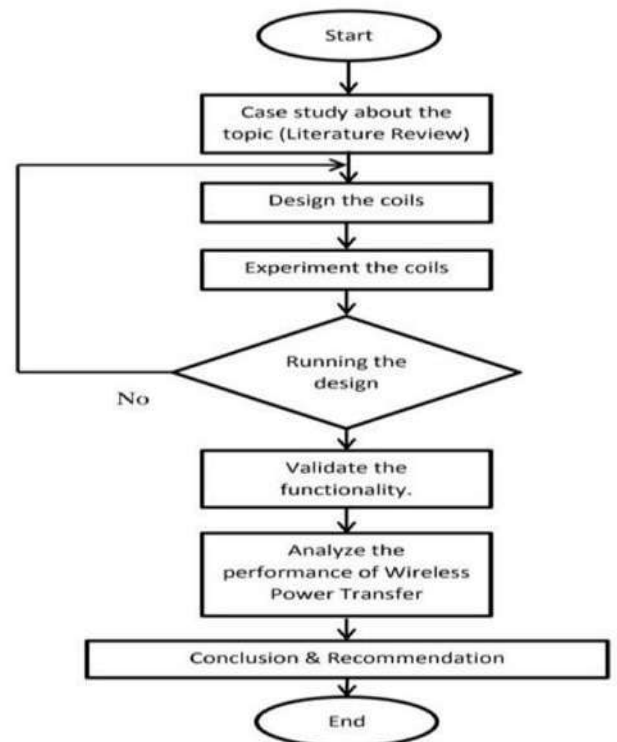


Fig.1 working of wireless mobile charger

IV. Advantages of wireless mobile charger

Convenience: Wireless charging is a convenient way to charge your devices. You don't have to fumble with wires or worry about tangled cables.

Safety: Wireless charging is a safe way to charge your devices. There is no risk of electric shock, as the current is transferred through a magnetic field.

Efficiency: Wireless charging is an efficient way to charge your devices. Less energy is lost during the transfer process, so that you can get a longer charge from your battery.

V. Disadvantages of wireless mobile charger

Cost: Wireless chargers are typically more expensive than wired chargers.

Speed: Wireless charging is slower than wired charging. It can take several hours to charge a device using wireless charging fully.

Compatibility: Not all devices support wireless charging. You will need to check to see if your device is compatible before you purchase a wireless charger.

VI. Applications of wireless mobile charger

Wireless charging is currently being used in many applications including:

- Smartphones and wearable
- Notebooks and tablets
- Power tools and service robots, such as vacuum cleaners
- Multicopters and electric toys
- Medical devices
- In-car charging

In addition to the fancy reasons why you should use wireless charging, like no need to plug in a device and no plug compatibility issues, wireless charging provides safety from hazards related to connecting directly to the mains. Furthermore, it's reliable in harsher environments, such as drilling and mining and allows for seamless on-the-go charging. Finally, wireless charging eliminates tangling and other mess created by wires. We have only just scratched the face of wireless charging with several novel applications, every product design being done with the future in mind should seek to incorporate wireless charging as its certainly one of the ways we will charge battery powered devices in the nearest future.

VII. Block diagram of wireless mobile charger

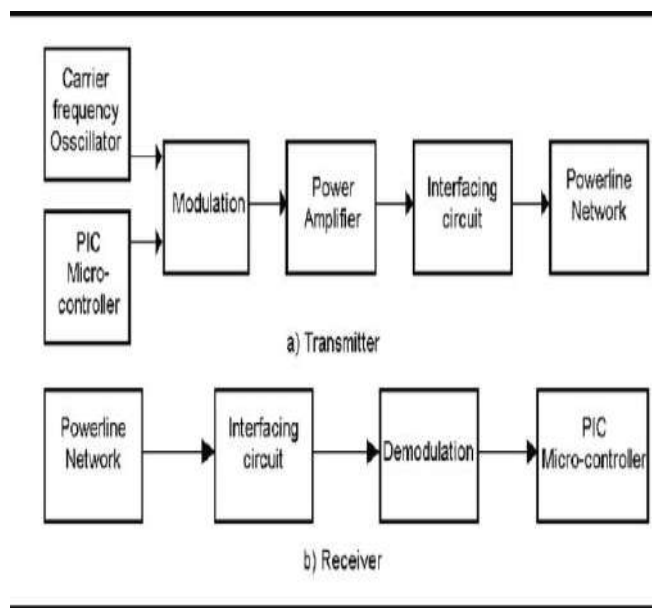


Fig 2. Block diagram of wireless mobile charger

VIII. Future scope

Wireless charging is an emerging industry. As this technology advances, more and more gadgets will be able to be charged wirelessly. It's also likely that wireless charging will become both more practical and less expensive in the near future.

IX Conclusion of wireless mobile charger

Wireless charging is convenient and fairly efficient, but there has not been enough research done to increase efficiency and distance necessary between the device and charger. Currently, electric toothbrushes and cellular phones need to be in contact with the charger's surface

X Acknowledgement of wireless mobile charger

This type of charging technology uses a combination of tiny batteries and consumes very little electricity. This technology is commonly used with wireless keyboards, wireless mouse, medical equipment, hearing aids, watches, music players, and other devices. To send and receive wireless signals, these gadgets use radio frequency waves.

In this technique, the transmitter is linked to a socket to generate radio waves. You can charge the battery by setting the receiver to the same frequency as that of the transmitter. at the beginning of a sentence.

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Automatic Answer Checker

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ABSTRACT

Automatic answer checking process would not only relieve the exam checker but the checking process would also get way more transparent and fair as there would not be any chances of biasedness from the teacher side. An Automatic answer checker application that checks and marks written answers similar to the human being . It removes human errors that commonly occurring Answersheet checking.

In this modern age, where the world moves towards automation so, there is an need for in an Automatic Answer Checker system. Currently, the online answer checker is available for MCQ based question, hence Automatic Answer Checker is Used.

Keywords

INTRODUCTION

In Today's World ,currently there are many exam conduction ways, be it online exams or MCQ types exam. Various Examinations are conducted every day around the world . The most Important aspect of any Examination is the checking of the answer sheet of the student.

Automatic answer checking process would not only relieve the exam checker but the checking process would also get way more transparent and fair as there would not be any chances of biasedness from the teacher side. Nowadays various online tools are available for Checking multiple choice questions but there are very few tools to check Objective answer type Examination. This project aim to carry out the checking of Subjective and Objective answer type Examinations by Implementing the Data. This application can be used in various educational Institutes for Checking Objective answer type Examinations.

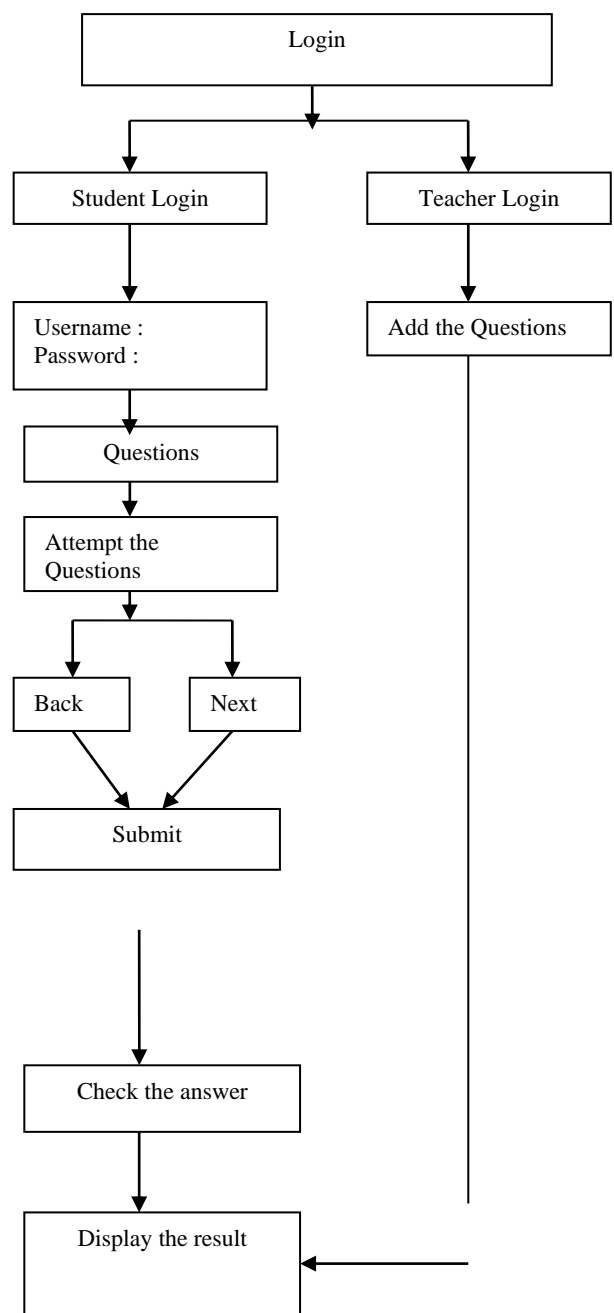
OBJECTIVE

An Automatic answer checker application that checks and marks written answers similar to human being. This Application built to check Subjective and Objective answers in an online examination and allocate marks to the user after verifying the Answer.

The System requires you to store the original answer for the system. This facility is provided to the Admin. The Admin may insert questions and Subjective and Objective answers n the System. This Answers Are Stored as Note pad files . When a user takes the test he is provided with questions and are a to type his answers.

The User Enter his/her answers the system then compares this answer original answer written data base and allocates marks Accordingly. Both the Answers need not be exactly same , word to word.

BLOCKDIAGRAM



ADVANTAGES

- The system calculates the score and provides results instantly.
- It removes human errors that commonly occur during manual checking.
- The system provides an unbiased result.
- Thus the system excludes human efforts and saves time and resources.
- Environmental Friendly
- Save Time
- Plugged into Technology
- More secure less cheating

DISADVANTAGES

- The system must be given proper inputs otherwise system can produce wrong results.
- Challenge Of Technology
- Infrastructure Problem

FUTURE SCOPE

The system would be beneficial for the Universities , schools and colleges for the academic purpose by providing ease to faculties and the examination evaluation cell. Many Educational Institutes conduct their examinations Online.

Our Solution can still be improved. This emerges from the nature of problems we were solving. For most of them , there is a wide range of various cases and each requires a slightly different approach.

We can add more rules into SET grammer , to detect rarer type of Questions and answers. These system calculate the score and provides result instantly.

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Military Spying Robot

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ABSTRACT - The goal of this device is to reduce human casualties in terrorist attacks like the one on September 11th. So this problem can be solved by building a spy robot with a camera, which will make it easier to study competitors as needed. This robot can enter enemy territory discreetly and provide data to us via wireless camera. For more than half a century, robotics has been a mainstay of advanced production. Robots and their associated equipment are increasingly being used for military and law enforcement reasons as they grow more sophisticated, reliable, and smaller. "With proper sensors and cameras to execute varied duties, mobile robots are operated remotely for reconnaissance patrol and feedback video footage to an operator," says a military spokesperson. Android smart phones are the most common gadget nowadays. On the internet, there are numerous programmes that use inherent hardware in these phones, such as Bluetooth, technology, to control other devices. Bluetooth technology strives to communicate data wirelessly at a short distance through radio wave transmission, with features to produce ease, perception, and controllability, thanks to the advancement of current technology and the Android Smartphone. We've created a robot that can be controlled using an Android phone application. It connects to the controller through Bluetooth and sends control commands. The Bluetooth module can be connected to the controller. The robot's mobility may be controlled using commands received through Android. As a result, the necessary actions can be taken.

Object tracking, on the other hand, is one of the most difficult problems in computer vision. Tracking objects can be difficult due to intrinsic and extrinsic issues such as deformation, camera motion, motion blur, and occlusion. This project shows a useful application using a real-time object detection system that can collect user-defined .

INTRODUCTION - In this system disposal technicians and mission controllers with a number of challenges including high risks in it. A typical disposal mission will initially involve investigating the site using a remote controlled robot and disposing the mine. The system also includes night vision camera which will not only allow viewing whatever will be recorded in day time but also during night. The whole system is controlled via android application. An Android smart phone will act as remote controlled device for movement of the

robot. An Android application will be developed for the same. The Bluetooth module will act as an interface between Smartphone and Raspberry pi. We will be using Bluetooth module for the system, which can be used as either master or slave. Generally our master will be smart phone and slave will be Bluetooth module. Bluetooth module will give the commands given by smart phone to the controller. Controller will act as the brain of the robot. The robot movement will be decided by the controller. The Controller will be programmed with the help of the Embedded C programming. In addition to this we also have a ultrasonic sensor and also a metal detector to detect bombs.

LITERATURE SURVEY -A literature survey on military spying robots reveals a significant body of research and development in the field of unmanned surveillance systems. These studies explore various aspects such as design, functionality, applications, and challenges associated with military spying robots. Here is a brief overview of key findings from the literature:

1.Design and Development: Researchers have focused on designing compact and stealthy robots capable of operating in diverse environments. Studies propose innovative approaches such as biomimetic designs, inspired by animals like insects or birds, to enhance agility, maneuverability, and camouflage capabilities.

2.Sensor Technologies: Several studies emphasize the integration of advanced sensor technologies in military spying robots. These include high-resolution cameras, thermal imaging, LIDAR, RADAR, and acoustic sensors. Sensor fusion techniques are also explored to enhance perception and data collection capabilities.

3.Communication and Networking: Literature highlights the importance of secure and robust communication systems for military spying robots. Studies propose the use of encrypted communication channels, mesh networking, and satellite communication to ensure reliable data transmission and remote control.

4.Autonomy and Navigation: Researchers have explored autonomous navigation algorithms and techniques for military spying robots. This includes path planning, obstacle detection and avoidance, simultaneous localization and mapping (SLAM), and swarm intelligence approaches to improve coordination and adaptability.

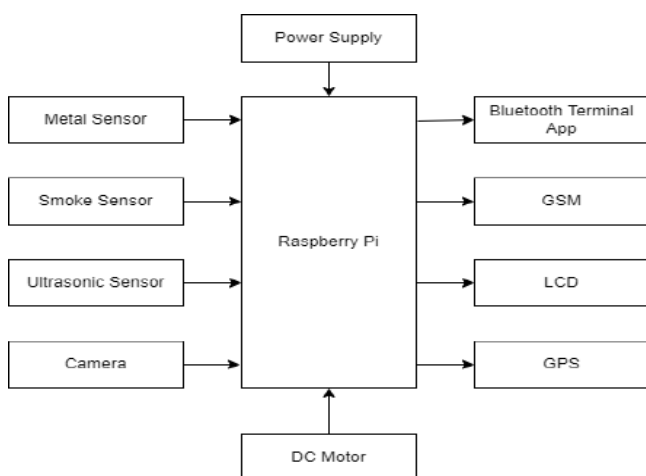
5.Data Processing and Analysis: Studies emphasize the integration of artificial intelligence and machine learning techniques for data processing and analysis. This includes

object recognition, behavior analysis, anomaly detection, and predictive analytics to extract actionable intelligence from collected data.

6. **Ethical and Legal Considerations:** Literature acknowledges the ethical and legal implications associated with military spying robots. Discussions revolve around issues such as privacy concerns, rules of engagement, adherence to international laws, and the potential impact on civilian populations.

7. **Operational Challenges:** Researchers identify operational challenges such as power management, endurance, robustness, and reliability as key areas of focus. Studies propose innovative solutions including energy harvesting, efficient battery systems, and redundant components to address these challenges.

SYSTEM ARCHITECTURE



METHODOLOGY

Military spying robot utilizes advanced surveillance technology to gather intelligence covertly. It employs a compact design and state-of-the-art sensors to remain inconspicuous in various environments. Equipped with high-resolution cameras, audio recorders, and motion detectors, Military infiltrates target areas undetected. It employs machine learning algorithms to analyze collected data and identify valuable information. Military's communication module enables it to transmit findings securely to a remote command center. Its autonomous capabilities, including navigation and obstacle avoidance, ensure efficient operation. Military's methodology emphasizes stealth, data collection, analysis, and secure transmission, making it an effective tool for intelligence gathering and reconnaissance missions.

Proposed System

The proposed system for a military spying robot aims to enhance intelligence gathering capabilities for military operations. The robot incorporates cutting-edge technologies and features designed specifically for covert surveillance and reconnaissance missions. Here are some key components and functionalities of the proposed system

1. **Stealth Design:** The robot is built with a compact and low-profile design, allowing it to blend seamlessly into various environments and avoid detection by adversaries.

2. **Sensor Suite:** The robot is equipped with a comprehensive sensor suite, including high-resolution cameras, infrared sensors, microphones, and motion detectors. These sensors enable the robot to capture visual and audio data discreetly and detect any movement or suspicious activity in its surroundings.

3. **Autonomous Navigation:** The robot utilizes advanced autonomous navigation algorithms and obstacle avoidance mechanisms to move silently and effectively in complex terrains, both indoors and outdoors.

4. **Secure Communication:** The robot is equipped with a secure communication module that utilizes encryption protocols to transmit collected data and real-time updates to a remote command center or designated military personnel.

5. **Data Analysis and Intelligence Processing:** The robot incorporates powerful onboard processors and machine learning algorithms to analyze collected data and extract relevant intelligence. This includes facial recognition, object identification, anomaly detection, and other pattern recognition techniques.

6. **Long-duration Operation:** The proposed system ensures extended battery life and efficient power management, allowing the robot to operate for extended periods without requiring frequent recharging or maintenance.

7. **Command and Control Integration:** The robot can be seamlessly integrated into existing military command and control systems, enabling real-time monitoring, mission planning, and remote control capabilities.

8. **Adaptability and Upgradability:** The proposed system is designed to accommodate future technological advancements and can be easily upgraded with new sensors, software enhancements, and operational capabilities to meet evolving military requirements.

Raspberry Pi - Raspberry Pi is a small single board computer. it is heart of our project. By connecting peripherals like Keyboard, mouse, display to the Raspberry Pi, it will act as a mini personal computer. Raspberry Pi is popularly used for real time Image/Video Processing, IoT based applications and Robotics applications. Raspberry Pi is slower than laptop or desktop but is still a computer which can provide all the expected features or abilities, at a low power consumption.

Smoke Sensor:-Height: 47mm(mounted in B401 base)
Diameter: 102mm Weight: 105gm

Ultrasonic Sensor - Most often, proximity sensors are combined with ultrasonic sensors. They are present in anticollision safety systems and self-parking automotive technologies. Robotic obstacle detection systems and manufacturing technology both use ultrasonic sensors.

Bluetooth Module - The bluetooth module HC-05 consists of six pins. The six pins Key,5V,GND,Tx,Rx,Status. The bluetooth module has two devices i) master device ii) slave device One device connects to the master while the other device connects to the slave. The connection between the devices takes place as follows: One of the pin Tx is connected to pin Rx of the Rpi board while the pin Rx of bluetooth module is connected to the Tx pin of Rpi. Thus, in a way cross-connection is required for the operation of bluetooth module. The GND pin is given to the GND pin of Rpi and power supply pin of Rpi is given to the pin of power. In order to have proper communication, the master device must be connected to the slave. Once the pairing is done between two devices, the device will ask to enter the password. The password will be either 0000 or 1234. Enter the password and both the devices will be connected to each other.

Camera - A Night Vision Camera: Apart from what a basic camera consists of, it consists of a transmitter unit. It captures images and transmits these images through the transmitter in form of digital signals, which are received by the receiver unit connected to the TV or computer. A night vision camera can receive illumination either by amplifying the visible light using image intensifiers or using infrared light directly by objects – thermal imaging or infrared light reflected by objects-near infrared illumination

DC motors : The speed of step execution controls the rate of motor rotation. A 1.8° step motor executing steps at a speed of 200 steps per second will rotate at exactly 1 revolution per second. Stepper motors can be very accurately controlled in terms of how far and how fast they will rotate. The number of steps the motor executes is equal to the number of pulse commands it is given. A step motor will rotate a distance and at a rate that is proportional to the number and frequency of its pulse commands.

4.RESULT

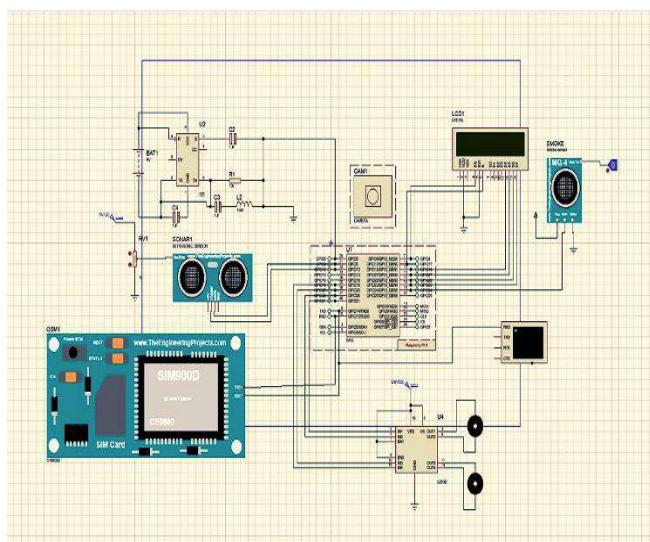


Fig-Circuit diagram Military Robo.

5. CONCLUSIONS

Smart phone are which can develop effective remote control program. At the same time, this program uses Bluetooth connection to communicate with robot. It has proven to allow for meaningful two-way communication between the Android phone and the robot The Multi-Purpose Military Service Robot will be designing in such a way that it can fulfill the needs of the military, the police and armed forces. It has countless applications and can be used in different environments and scenarios. For instance, at one place it can be used by the armed forces, military purposes, while at another instance it can be used for spy purposes. It will also be able to diffuse the mines after detecting it.

FUTURE SCOPE

Smaller and more advanced drones: Spying robots will become smaller and more capable, allowing them to fly into confined spaces and gather intelligence.

Improved sensors: Future robots will have better cameras, thermal imaging, and other sensors to gather more accurate and comprehensive information.

Better communication and coordination: Spying robots will be able to share real-time data with other military assets, improving situational awareness and coordination.

Cyber and electronic warfare capabilities: Robots may have the ability to disrupt or disable enemy communication systems and networks.

Swarming and collaborative operations: Robots will work together in coordinated swarms, covering larger areas and overwhelming enemy defenses.

Stealthy infiltration and reconnaissance: Robots will be designed to quietly enter hostile areas, gather intelligence, and avoid detection.

Longer flight times and extended range: Advances in propulsion and energy efficiency will allow robots to conduct prolonged surveillance missions over larger areas.

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A Novel Online Medicine Donation System

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Abstract— This project targets to donate remedies (medicine) that are unused. The unused remedies can be given for further utilization by poor people. This application helps the user to donate Unused remedies to NGOs. In this organization, there are three people namely, Admin, NGO, and User. In this project, we can provide unused medicine to indeed the person free of cost. To reduce the wastage of medicines we are developing software where unused medicines can be donated to indeed person. With the help of web-based tools, NGOs can be directly connected to this software for medicines. Actual donation practices can provide savings in budgets for development funding, so these facilities can be used for other purposes. The "Online Medicine Donation System" serves as a very user-friendly website by using web technologies like React Js.

I. INTRODUCTION

India is developing at a fast pace and has made quick walks in many fields since its autonomy. But, according to many researchers and National Family Health Survey (NFHS), it is clear that admittance to medical care is still a rising issue in many slums and rural areas. Tough India is classified as a developing country, poverty is still a major challenge. The Per Capita GDP in India is still around \$1900, by which it is clear that many people in India still lack expensive medical care and are deprived of healthcare facilities. There are many reasons for the above statements and the poor availability of medical care to many people in India: 1. India's current population is estimated at 1.3 billion. Nearly 17.7 percent of the world's population lives in India. 2. In a country where 50 million people live on less than USD 2 a day and nearly 200 million people are undernourished, the growing population will only make the food security situation worse. 3. There is one doctor for every 1,445 Indians as per the country's current population estimate of 135 crore, which is lower than the WHO's prescribed norm of one doctor for 1,000 people. 4. India's literacy rate is about 74% - leaving a quarter of the population without basic reading and writing skills. Poverty and illiteracy are closely linked - and

with the second largest population in the world, India is home to one-third of all world poverty. 5. Poverty erodes the good health status of a populace and further deepens individual and national poverty while creating a public health concern for society. Due to poverty and illiteracy, the people below the poverty line cannot/do not want to pay for expensive medical care because the cost of many medicines is so high that they prefer to buy food over medicines. Due to this issue, they suffer many diseases that turn into life-threatening issues if not taken care of in time. Whereas, people whose per capita income is more stable can afford these medical products and also preserve them for future needs. But according to various research and surveys, it is found that the prevalence of unused medications in homes has dramatically increased in recent decades, which has resulted in medication wastage.

In the rest of the paper, we have compiled and shortlisted all the research that we conducted on this issue and as well as a detailed walkthrough of how we are going to implement this software. The following section II consists of the background of the related works performed before and our review and study of it. Section III consists of the conceptual design, the architecture diagrams, DFD, and other related structural works

II. RELATED WORKS

We conducted a survey of various applications related to our project and tested various systems that follow the same principle. We also conducted a walkthrough of various guidelines related to Drug Donation and what policies and programs are followed throughout the world in this area. We researched the Guidelines released by WHO is used to implement such Medicine Donation Programs and found out about various new factors and precautions that should be taken while this donation process takes place. The following is the gathered data that we collected by reading and shortlisting the references we followed. We also studied the various drug donation campaigns that take place in India and prepared a detailed analysis on the topic.

Existing Systems -The existing systems proposed asked the donor to check the expiry date of the medicines and asked them to avoid the medicines if they are near to their expiry after checking. What the proposed system by us does is, it takes care of checking the medicine's expiry date, all you have to do is donate and the proposed system, i.e. the portal, automatically assigns the Collection Center following the required Procedure. Unlike some medicine donation apps, which are Android apps, this can run on any system without the need for you to download the application. The existing systems lacked many features like checking the user validity, inventory management, Donor-to- Receiver flow of the donation, Doctor Consultation Modules, Drug Information, and Education, and Forums, which are for the donors to help them to work easier. Here is some literature from those systems: They only had the necessary modules like Login, Donation, and Collection. It missed many important guidance modules that are necessary to help users get familiar with the application. There are many drawbacks as mentioned above that we have covered and fixed in the proposed application. The proposed application will be fully fetched and will repair all the errors and corrections that we have mentioned and sorted from the existing systems. Existing systems are based on outdated guidelines from WHO, which are related to donations related to drugs and medicine. These guidelines are updated after a particular period of time and need to be updated as per the current requirements. They also are not standardized and are not affiliated with NGOs. Many applications have the option to select the NGO as an option from Multiple choices. This leads to many complex difficulties that the application cannot manage. It can also lead to false expectations from the system to the NGOs and can cause internal conflicts. To prevent this, we have selected a particular NGO that we are affiliated with and that will manage all the received donations. This already solved the major issue mentioned above.

2.2 Proposed System

The proposed medicine donator project will be to prepare a portal for the collection of unused medicine for further utilization by a needy person. The website will be made so that the user can donate unused medicine to NGOs. That NGO can help needy people. The user can donate the medicine. Many poor people who could not afford to buy their own medicines, will get help from this website, where people can get the treatment and medicines to cure the respective diseases, and also the unused medicine will be utilized. The proposed system will also ask the user for the images of the medicines that he/she wants to donate so that there will be no further confusion on the NGO side. An additional feature that will add will be AI Image Search where the portal will search for the medicine on the Internet and provide the condition of the medicine that is to be donated. This will help to determine the condition in which the medicine is and also prove beneficial for the segregation of the medicines at NGO and Collection Center Level. This feature is completely new in our portal and is revolutionary in many ways. When the user is asked to click a picture of the medication, let's consider a Syrup Bottle, the portal will take that image and compare it with a new packed bottle image on the Web. Collection Center will accept it only if

the condition of the bottle is as per the requirements. Currently, we will be providing the services of login and registration to users and NGOs, and the donation of medicines carried out in the moderation of admin. But, in the future, it can be expanded to provide treatment to the user via video consultancy with doctors providing a prescription upload feature. It can be very beneficial to the user because as per the current situation of COVID-19, it is very important to follow government rules and regulations. The aim of the suggested system is to enable using of information and communication technologies in order to unite and offer a more effective way for arranging common activities of the NGOs. The modules included in the proposed system that are lacking in the previous systems are Donations Tracking and Status of the medicines, Doctors Consultation, Drug Information and Education, Guidance on Medicines and Proper Donation Methods Education to the users, Proper Inventory Management System, Medicine Sorting, User Validation using authentic details, Forums, and Emergency Notifications to the registered users, etc.

III. DESIGN AND DEVELOPMENT

System architecture is the conceptual model that defines the structure, behavior, and views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. This is the system architecture model that we will be focusing on.

3.1 System Context/Level Diagram

As you can see in the block diagram above (see Fig. 1), there are four external entities, namely: the Admin, Member Users (Donors and Receivers), the Collection Centers, and the Doctors. The task and functionalities of each user is listed alongside them and the data flow between them is also specified. As listed, the functionalities of Admin are: Login and Management of all the users (donors and receivers), appointment approvals from receivers, and management of the database with the total medicine distribution; the functionalities of the Donor are: Login and Donate Medicines, see the medicines donated by other users, check the status of the donated medicines; the functionalities of the Receiver are: Register, Login, Add prescription, and receive medications; the functionalities of Collection Center are: Login and Accept the medicines from donors, collect and segregate the medicines, and updating of the database; while the functionalities of the Doctors are: to view Patient Prescriptions, Consult them and Specify the proper treatment.

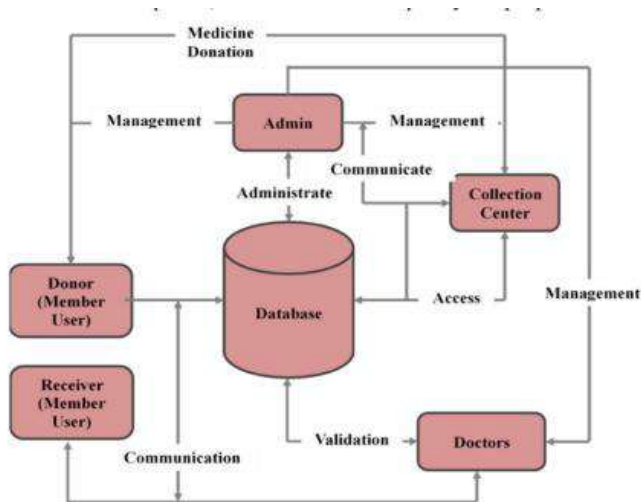


Figure 1: Block/Structural Diagram

3.2 Component Design

This section is focused on the conceptual design of our system which is the representation of the system composing the key concepts which can be used for knowing, understanding, and simulating our system. The web-based system will be the interface between the users (donors, doctors) and the trusted sources (government organizations/ NGOs) that will distribute medicines to the poor. The donors can donate their medicines through this web-portal and registered doctors can prescribe medicines for their patients who are unable to buy the costly medicines. The conceptual model for the system is depicted in Fig 1. The medicine provider or donor as well as the doctor needs to create an account in our software system through which the system would be able to verify the account as well as all the information given by the donor or the doctor. For this process, registration name, address, sign-up as (whether doctor or general), registration ID (for doctors only), email, and password would be mandatory. During registration, the provided information is crosschecked to verify as this system is used for very delicate purposes and therefore, we handled the authentication system (especially for doctors) very cautiously. The doctor and donor both can access his/her account after this registration process and would be able to see the medicine list, from which the registered doctor can prescribe medicine and a PDF report would be generated also the donor can donate medicine after providing the necessary information.

3.3 Module Analysis and Design

In this system, the administrator is the super user of this system. Only the admin has access to this admin page. The administrator has all the information about all the users, Volunteers, and Available Medicines. This module is divided into different sub-modules. Admin approves volunteer requests because without approval volunteers cannot log in. Admin selects volunteers and assigns respective medicines. This system aims to provide unused or leftover stuff or items to the poor and the needy. This site has collaborated with various NGOs through this site

the NGOs will come to know about the client's gift. The clients can have full records of the donations made by them. [5] The Modules with their functionalities are as specified:

A. Admin

The Admin will have all the permissions with access controls to all the databases. He will also have full control over the user's actions with total control and admin administration of the Collection Centers. The NGO will go through all the requests from the receivers and will distribute the medications through the Collection Centers. Functionalities of Admin

- Login: The admin can log in using credentials.
- Manage Members: Admin analyses and deletes or blocks the member donating unwanted drugs that pass their expiry dates.
- Manage Approvals: The appointments by NGOs are managed by approving appointment requests.
- Reporting: The monthly report of the members who donated medicine.

B. Member Users (Donors and Receivers)

The Donors can log in to the portal and donate the medications at the user's convenience. For donation, the criteria are: The Medications must be a minimum of two months away from their expiration date; If syrups and other bottled products, they must not be leaking and also must be in a proper condition and quantity; The value of the medications to be donated must be above Rs. 200 and above. The Receivers can log in and specify the prescriptions and required medications as per the doctor's consultancy. The receivers must have a valid proof of their income with their ID (like an Aadhar Card, etc.)

Functionalities of Member Users

- Registration: The user can register to the portal as either Donor or Receiver using the set credentials.
- Login: The user can log in to the portal using the credentials.
- Donate: Donors can select the 'Donate' option and follow the required procedure to give the medicines to the nearest Collection Center.
- Search & Request: The receiver can search the required medications through the portal and request for it.

C. Non-Governmental Organization (NGO)

The user (donor) who accepts the request and donates the particular medicine will automatically send a request to NGO's volunteer for pickup. It will consist of the medicine description sender's address and delivery to (NGO's address) he will receive the notification and as soon as he accepts it, he will go for the pickup to the user address and scan the medicine if it is right as per mentioned before he will accept the medicine and deliver it to the NGO's who had requested it.

Functionalities of NGOs

- Collection: The entire collection of donated medicines.
- Distribution: Distribution of medicines to the deprived and needy.

- **Management:** The entire database management, user management as well as record and collection center data management.

D. Collection Centers

The request from the user will be received by the nearest Collection Center that is affiliated with the NGO and a representative of the Center will be dispatched to collect the medicines from the Donor's place. The representative will check the medicines and collect them only if they are as specified in the request. The representative will bring the medicines to the Center and then it will be segregated as per the treatment they will be used for.

Functionalities of Collection Centers

- **Collection and Segregation:** The collection of the medicines from Donor and the division of the collected medicines as per the treatment.
- **Management:** The database management of the Collection Center Database which will include the date of collected medicines, the user details and the total types of medicines collected. Below are the Data Flow Diagrams (DFDs), Level-0 and Level-1. You can find the detailed communication between all the modules and entities.

IV. IMPLEMENTATION

The proposed 'Medicine Donation System' will be a portal through which a verified user will be able to donate the unused medicines they possess, to the NGO. The user will first register to the system with address and contact information and system will validate the user. Then, the verified user can enter the name of the medication (of any type), prescription for which it was given, its contents and expiry date and also click a picture of it through the portal. The portal will then send the request to the nearest Collection Office affiliated with the NGO to collect the medicine from the donor. The representative of the Collection Center will then verify the condition of the medicine and accept them only if they are as per specified by the donor. The collected medications will then be stored at the Collection Center and will be sent to the main branch once the collection goal is fulfilled. The database will be automatically updated on the basis of the medicines received by the donor and then will be supplied to the needy by the responsible organization. The Database, the Distribution and Management will be the NGO's responsibility

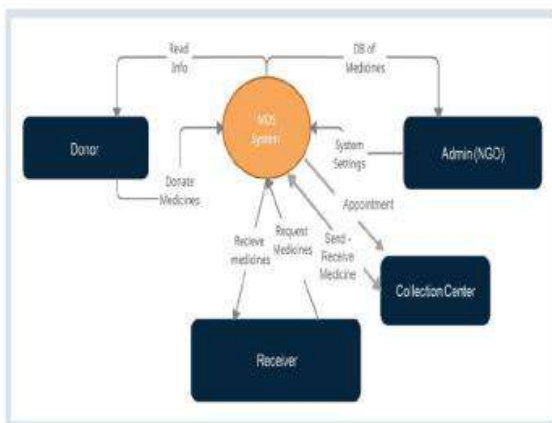


Figure 2: Data Flow Diagram Level-0

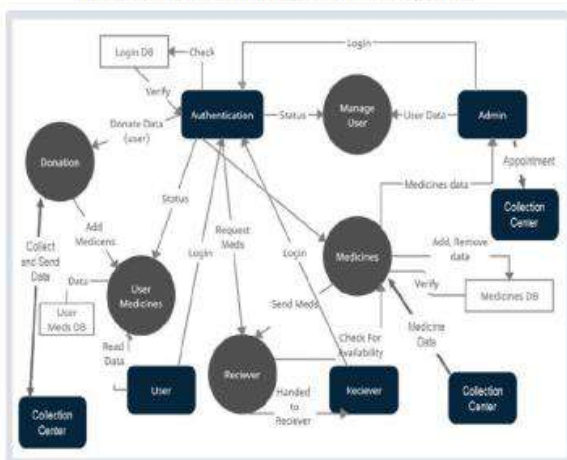


Figure 3: Data Flow Diagram Level-1

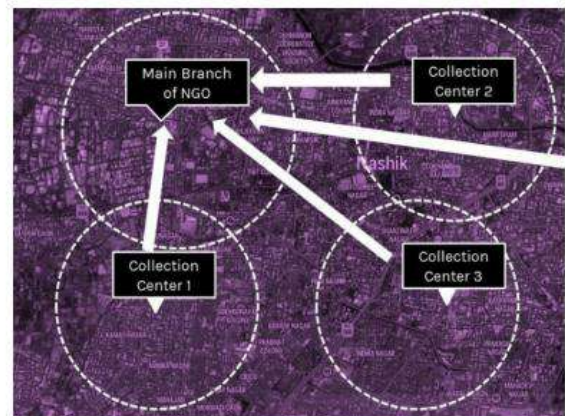


Figure 4: Implementation Demonstration

V. ACKNOWLEDGMENT

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VI. CONCLUSION

Modern era has started. Individuals both, privileged or unprivileged, proficient or ignorant are now conscious about their health. It is sad that even though needy individuals are in distress they can't give a lot of consideration to their medical services routine in light of the fact because of their low pay. NGOs show incredible drive by giving free treatment to the people who cannot afford expensive medicines. Yet, in most of the cases,

they get the treatment but not the costly prescribed medicines. So in the bigger picture, this incredible act of giving free treatment to the people becomes useless as they would need to buy the costly prescribed medicines by themselves. This paper gives a brief outline of the plan and improvement of our proposed online portal, which will be extremely successful and will bear incredible commitment to get the wellbeing administrations for these needy people. Because of this portal we hope that even the wastage of medication will be diminished. This project or this online medicine donation portal in the future has the ability to become a full fledged application wherein all the facilities will be provided on this portal. In future, it can be expanded to provide treatment to user via video consultancy with doctors providing prescription upload feature. It can very beneficial to user because as per the current situation of COVID-19, it is very important to follow governments rule and regulations. The feature of video consultancy with doctor is very best option of future scope for the portal. For better suggestions, we are merging all the medication facility like consultation, medicine donation, blood donation, etc. like facilities are part of the portal in future. So, in future, it can also become a commercial portal and app which will be unique in its nature and availability. That said, we would like to conclude this presentation with the hope that our proposed system will be beneficial for the poor and needy and will help to create a better society where the benefits of modern and expensive medication can be received by all the masses. We would like to request each individual to help us and contribute to the society through such a simple and noble deed. We would also like to request to the people to help us spread awareness about the conditions that the deprived face and what a huge miracle it would be if each and every individual takes responsibility and donate as much leftover medicines as possible.

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“Cotton Plant Disease Detection Using CNN”

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Abstract— The quality and amount of the nation's crop production heavily influence its economic success. By identifying leaf disease in its early stages, the output profit can be increased. For the purpose of finding leaf disease, numerous image processing techniques have been created. Early on, technological advancement makes the process simpler and faster. One of the biggest problems in agriculture is leaf disease. The diseases Cercospora, Bacterial blight, Ascochyta blight, and Target spot all harm cotton leaves. Farmers' general observations may be time-consuming, expensive, and occasionally wrong. To do this, we provide a Deep Convolutional Neural Network-based method for autonomously detecting illnesses in cotton leaves. According to what we understand, cotton leaf detection is the first application of deep convolutional neural network.

I. INTRODUCTION

Machine There Welcome to the AI for Social Good Series, where we will be focusing on different aspects of how Artificial Intelligence (AI) coupled with popular open-source tools, technologies and frameworks are being used for development and betterment of our society. In the past ten years, researchers have become more interested in sustainable agriculture, which involves numerous agricultural complexity such the planting cycle, efficient use of resources and crop lifespan A crop's lifetime comprises not just its growth but also the identifying, treating, and prevention of its alignment. This assurance adjusts to the rising need as the population grows. The defect in the leaves must be found in order to satisfy the criteria. Precision agriculture, in conjunction with quickly developing technical skills, can help with this. The existing system does not display any attributes that could demonstrate a reliable approach to determining these alignments. Even if they do, they only exist on a probabilistic level.

So, we present an approach that incorporates a Convolutional Neural Network (CNN) and processes data at each stage. so that we may avoid suffering a significant loss of both commodities and money. When given clean data, the supervised learning algorithm outlined above can

classify the various illnesses. We employ the idea of digital image processing to obtain the treated image.

For the classification of leaf diseases, neural network ideas depend on the dimensions of the input image. The progression of plant growth and the environmental, ecological, and economic aspects of agriculture are all impacted by leaf diseases.

II. Some machine learning methods

In the rest of the paper, we have compiled and shortlisted all the research that we conducted on this issue and as well as a detailed walkthrough of how we are going to implement this software. The following section II consists of the background of the related works performed before and our review and study of it. Section III consists of the conceptual design, the architecture diagrams, DFD, and other related structural works

III. RELATED WORKS

Good quality fruits are produced using the trading technique. Apple fruits are being traded to get the best variety and is exported at high price. Similarly, bacterial wilt has also been studied for eggplant and its impact on the crop. It helps in understanding the importance of the disease-free crop and to get the maximum output. In similar objectives, the crop rotation policy also helps. The benefit of crop rotation is that the soil is not getting exhausted with similar types of nutrients in the soil, and it helps to maintain a good balance of the different nutrients in the soil. Unlike some medicine donation apps, which are Android apps, this can run on any system without the need for you to download the application. The existing systems lacked many features like checking the user validity, inventory management, Donor-to- Receiver flow of the donation, Doctor Consultation Modules, Drug Information, and Education, and Forums, which are for the donors to help them to work easier. Here is some literature from those systems: They only had the necessary

modules like Login, Donation, and Collection. It missed many important guidance modules that are necessary to help users get using authentic details, Forums, and Emergency Notifications to the registered users, etc.

III. DESIGN AND DEVELOPMENT

1. The whole architecture is made by the PyQT library used in Python language. PyQT library gives all the necessary stuff related to GUI design. PyQT provides us display screen, buttons and so on. So, In this way, PyQT helps us in designing GUI.

3.1 System Context/Level Diagram

1. After designing of GUI, another task is to authenticate valid users for operating applications. To deal with this task, we are using the MySQL database to store data of username and password and through this, the user can authenticate easily.
2. Another task is to preprocess the input image which can be done by the OpenCV library of Python. By using this library, the image is converted into a grayscale image, contour image, and smoothen image.
3. In this system we detect malaria and dengue diseases based on blood cell datasets and apply image processing with the help of machine learning techniques.

Here provide the module for detecting diseases based on symptoms.

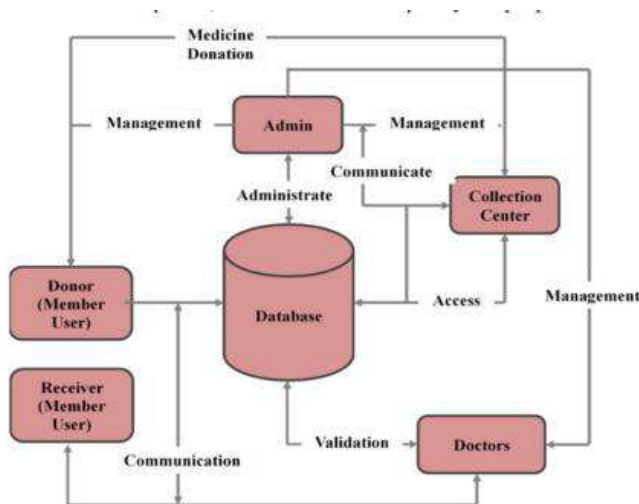


Figure 1: Block/Structural Diagram

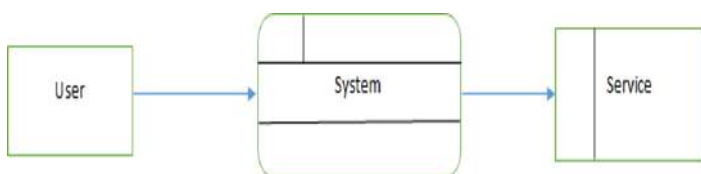


Figure 2:DFD Level 1

IV.IMPLEMENTATION

Features are the elements of the data that will be fed through the network. In some special image recognition, the features are the group of pixels, like edges and points, of an object that the network will analyze for the pattern.

Feature recognition is the process of pulling the relevant features from the input image so that these features can be analyzed. The process of extracting features from the image is accomplished with a convolutional layer, and this layer makes the representational part of the image. The result of all these calculations is a feature map. This process is typically performed with more than one filter, which helps preserve the complexity of the image.

V. ACKNOWLEDGMENT

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Finally, we wish to express our sincere thanks to all the staff members of Arvind Gavali College of Engineering, Satara for their direct and indirect help during our project.

VI. CONCLUSION

Our approach evaluated up to 96% accuracy for the categorization of diseased cotton leaves such as Cercospora, Bacterial blight, and Ascochyta blight, and Target spot images on MATLAB when we identified the cotton leaf disease. For farmers, botanists, industrialists, food engineers, and physicians, the automatic analysis of the identification of diseased leaves by MATLAB is more accurate and error-free.

Additionally, this technique is easy to use and takes up very little time. In addition to identifying the unhealthy spot, MATLAB also reports on the health of the input leaf.

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Inventory Management System

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Abstract— Billing Android App is a service that enables you to sell digital products and content in your Android app. A Billing Android App is the method by which a company bills and invoices its clients. Payment software, which automates the process of collecting payments, sending out periodic invoices, expense tracking, and invoice tracking, is commonly included in billing systems. The billing system consists of procedures and processes that assist in the creation of client bills and invoices. Billing systems nowadays include software that allows clients to receive bills and invoices both offline and online. The billing software allows you to keep track of which items and services your customers utilize, as well as generate and send invoices and accept payments. Some billing platforms, on the other hand, can do a lot more. They can automate the mundane duties that your finance department faces on a regular basis.

Keywords—B2B, E-Commerce

I. INTRODUCTION

This project is aimed at developing a desktop-based application named Inventory Management System for managing the inventory system of any organization. The Inventory Management System (IMS) refers to the system and processes to manage the stock of an organization with the involvement of a Technology system. The project “Billing System” is an application to automate the process of ordering and billing of a “Departmental store”. This android-based application is designed considering the chain of departmental store which is located in various cities. This application also administrates its users and customers. This system can be used to store the details of the inventory, stock maintenance, update the inventory based on the sales details, and generate sales and inventory reports daily or weekly based. This software project is a traditional supermarket billing system with some added functionality. This system is built for fast data processing and bill generation for supermarket customers. The billing data is a vast collection of product names, prices, and other product-specific data. Its price is added to the bill based on the product quantity. The system also contains discounts on various products so that the product is offered at discounted price while billing. The billing system is built to help supermarkets calculate and display bills and serve the customer in a faster and more efficient manner. This system will provide the user with

precise details and a bill with zero error probability i.e. an extremely precise without-error bill.

This system will provide a much more convenient shopping experience for the shopper or customer. This project is categorize individual aspects of the sales and inventory management system. In this system, we are solving different problems affecting to direct sales management and purchase management. Inventory Management System is important to ensure quality control in businesses that handle transactions revolving around consumer goods. Without proper inventory control, a large retail store may run out of stock on an important item.

A good inventory management system will alert the wholesaler when it is time to record. An inventory Management System is also an important means of automatically tracking large shipments. An automated Inventory Management System helps to minimize errors while recording the stock. Inventory management tracks how much physical inventory you have in your organization. It monitors stock at other locations, such as distributors or subcontractors. When you have clear visibility into your inventory, you know when to order, where to store it, and when you need to stop selling.

II. Scope of the Project

This project will help the storekeeper with fast billing. This project enables storekeepers to maintain a great database of all Customers who visited and purchase products from the store. The project will enable you to see reports regarding products and categories. It is easy to maintain in future prospects. It saves time and gives quick results. The scope of an inventory system can cover many needs, including valuing the inventory, measuring the change in inventory, and planning for future inventory levels. The value of the inventory at the end of each period provides a basis for financial reporting on the balance sheet.

This provides information for businesses that carry inventory in stores and vans (for example, manufacturers and service providers such as Independent Housing Associations, their contractors, facilities management businesses, and utility companies) that want to optimize their inventory to improve customer service, reduce costs and increase productivity by

increasing the number of jobs that can be completed each day. Inventory management helps to improve the profits of the company. it helps to provide proper information about stocks, which saves unnecessary expenses on stocks.

III. LITERATURE SURVEY

Author Name – Mr. Sumit Meshram, Mr. Sachin Murab

Title - International Journal of Aquatic Science

Publication Year- 2016

Technology Used The Project “Billing System In Supermarket” deals with the automation of supermarkets. This software will help salespersons in managing the various types of Records pertaining to his/her customer. The product will help the user to work in a highly effective and efficient environment. Salespersons have been recording customer information in the past and even in the present through their personal manual efforts. And indeed, it consumes their considerable time and energy that could be utilized in better productive activities. Apart from that, with increasing customer Strength, the task of managing the information of each individual customer is indeed a cumbersome task. There is a lot of reason for the introduction of this project.

Author Name – Mahadi Bahari

Title – Journal of Theoretical and Applied Information Technology

Publication Year- 2017

Technology Used - Technical issues found are; the immature nature of the B2B marketplace and the software available within it; the lack of universal standards for middleware that can integrate internal business processes with eBusiness messages and transactions; and a lack of evidence of the ability of B2B software to synchronize supply chains, to improve collaboration or to deliver sufficient return on investment.

Author Name – Mr. Sumit Meshram, Mr. Sachin Murab

Title - Growth of E-commerce in India: An Analytical Review of Literature

Publication Year- 2017

Technology Used E-commerce is one of the fastest-growing segments in the Indian Economy. Though marked by a high growth rate, the Indian e-commerce industry has been behind its counterparts in many developed and emerging economies, primarily due to a relatively low internet user base. In a study conducted by global management consultancy firm AT Kearney in 2015, there were only 39 million online buyers in India; a tiny fraction of the 1.2 billion who live in the country. However, increased technological proliferation combined with internet and mobile penetration presents a favorable ecosystem for the development of e-commerce in India. The country is currently at the cusp of a digital revolution. The launch of 4G services and the decline in the tariffs of data plans and prices of data cards/USB dongles have reduced the cost of ownership of an effective internet connection. The availability of low-cost smartphones and the extension of Internet and broadband to the remotest corners will boost the augmentation of the Internet user base, effectively bridging

the gap between potential online buyers and actual buyers. The demographic dividend of the country also seems to encourage and favor the growth of e-commerce. The survival of e-commerce firms in a highly dynamic environment becomes a challenging task when coupled with the cutthroat competition prevailing in the sector.

Author Name – Deborah Libu Paris

Title – Journal of Theoretical and Applied Information Technology

Publication Year- 2019

Technology Used - The benefits to companies that succeed in Business-to-Customer (B2C) e-Commerce are compelling. Effective B2C e-Commerce implementations can help organizations realize substantial cost savings, increase revenue, provide faster delivery, reduce administration costs, and improve customer service. The distribution of research approach and methodology applied to e-Commerce implementation studies. It shows that e-Commerce implementation studies in all pre-implementation, during-implementation, and post-implementation themes preferred a quantitative approach (64%) using survey methods. Thus, e-Commerce is a significant area for research because of its novelty and exploding growth. E-Commerce implementation studies are always related to eCommerce adoption. ECommerce implementation is a crucial process for an organization to make it successful and beneficial. As a consequence, intensive research works in the area of e-Commerce implementation from a diverse range of views and findings have been studied by many researchers.

Author Name – Mr. Barclay

Title – Inventory Management

Publication Year- 2021

Technology Used - Satisfactory level of service

Most company measures the ability to satisfy the customer by the following 3 factors/methods Number of order which act per schedule Number of order which are shipped as per schedule The idle time in inventory as well as shortage Minimizing inventory investments Most companies try to minimize the money associated with inventory so as to improve the profitability of the company. This is measured using the inventory turnover ratio (Measures how quickly the inventory is getting out of the system to the consumer) It's calculated using the formula Sales/inventory or cost of goods sold / average inventory Efficient inventory control includes how inventory is scheduled properly, no delays between sniffing of raw materials and goods.. There should be a balance between the fixed cost and variable cost

IV. PROPOSED METHODOLOGY

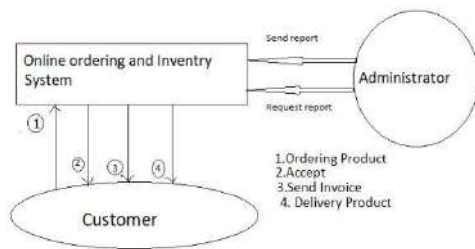


FIG. 1. BLOCK DIAGRAM OF SIGN LANGUAGE RECOGNITION.

Customers build up a sense of loyalty to those e-commerce websites that offer them a good user experience, and that transmit confidence and reliability. There are various factors that influence this: how easy it is to find the product they are looking for, how easy/difficult it is to make the payment, and how fast the order was executed. All of these factors determine whether the customer will shop at that website again or not. In general, potential buyers are more and more impatient, which means they do not have much time to find what they are looking for or to receive a positive first impression. Our e-commerce module, which is part of our Content Management System, takes these needs into consideration as well as others. Attracting and retaining customers Gaining high visibility on search engines is key to attracting new customers. This is why our e-commerce projects make the Google indexation easy, as well as that of the other main search engines. With regards customer retention, our Content Management System includes some online Marketing and customer services, such as forums, e-magazines, surveys, etc., and also recognizes returning customers in order to facilitate the payment process, and thus help with customer retention.

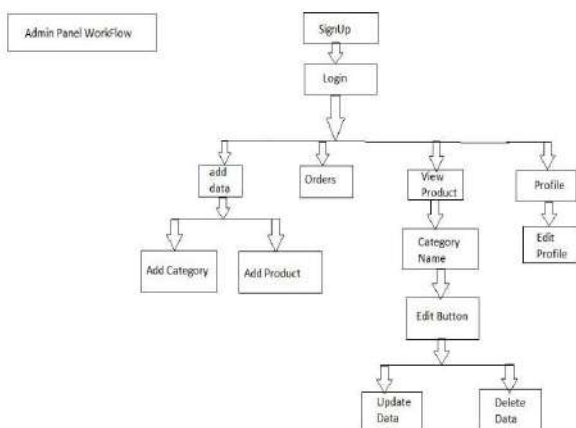


Fig. 2. Flow chart

Need For Feasibility Study: The feasibility study is carried out to test whether the proposed system is worth being implemented. A feasibility study is a test of a system proposed regarding its workability, its impact on the organization's ability to meet user needs and its effective use of resources. It is usually carried out by a small number of people who are familiar with the information system techniques, understand the part of the business or organization that will be involved or effected by the project and are skilled in the system analysis and design process. The key consideration involve in the feasibility study are:

1. Technical
2. Behavioural
3. Economic.

1. Technical feasibility:

Technical feasibility centers on the existing computer system (hardware, Software etc) and to what extent it can support the proposed system Addition. For example, if the current system is operating at 70% capacity (an Arbitrary value), then another application could overload the system or require additional hardware. If the budget is serious constrain then the project is judged not feasible. The technologies ant the environment which are used in this project are.

2. Behavioral Feasibility:

An evaluation of the behavior of the end users, which may effect the Envelopment of the system. People are inherently resistant to change and Computers have to know to facilitate changes and computers have to known To facilitate changes. An estimate should be made of how strong a reaction The user staffs is likely to have towards the development of a computerized System. It is a common knowledge that a computer installation has something to do with turnover, transfer, retraining and changes in employee job status, therefore the introduction of a candidate system requires special effort to educate, sell and train the staff on new ways of conducting business. The personal of the user organization will be affected by the proposed system. As the aim of the system is only to satisfy the information needs, no employees will loose their position by the proposed system. In fact the proposed system will help the organization in reducing the voluminous work involved. Also the involvement of users in every stage of the project is going to increase the success factor. The staff in not well educated for running a computerized system. They are adamant in perceiving a mechanical process of working as they have long been used to the manual entry system. This aspect needs considerable amount of attention. Our system is also feasible for organization because it supports of the organization and its strategic plan.

3. Economic Feasibility:

The procedure is to determine the benefits and savings that are expected from a candidate system and compare it with the costs. If a benefit outweighs costs, then the decision is made to design and implement the

system. Otherwise further alterations are made in the proposed system

V. RESULT AND DISCUSSION

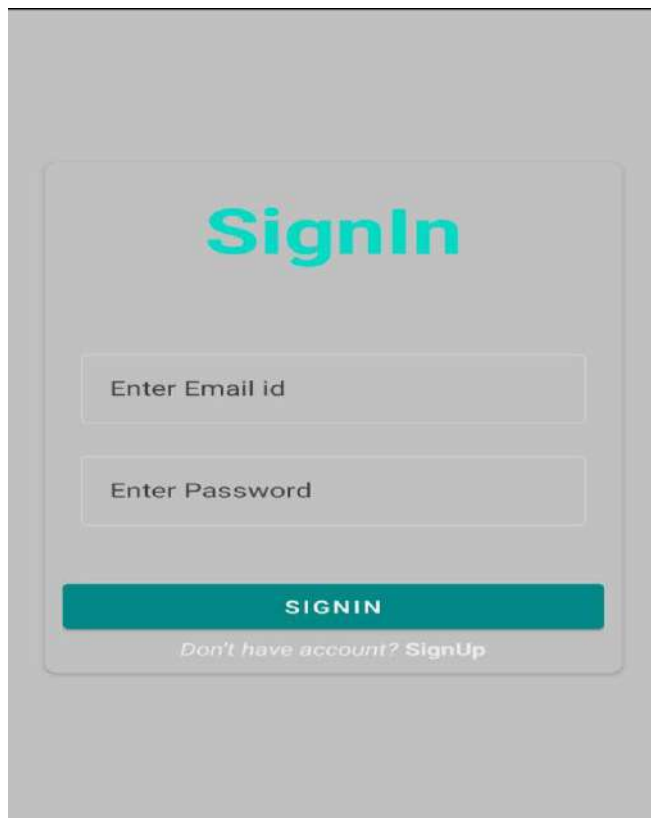


Fig3. Registration page

E-Commerce makes the business grow globally with the least investment. The benefits of E-commerce to customers are many like time-saving. The highest theme on e-Commerce implementation in the during-implementation phase is system design. Many studies on this theme have looked into the structure of e-commerce applications and have also elaborated on the customer preference for website design. For instance, has developed a B2C e-Commerce website design features in different countries based on the evaluation of participants from Australians and Koreans' favorite sites. The global site based in the USA provided similar design features to the Australian site that looks relatively simple except for the display of local products and images. Contrary, Koreans' favorite sites feature more collective such as the use of multiple menus and contents containing various types of information, products promoted for shopping, and community communication tools. Besides, a large number of studies contributed to framework design and model design.



VI. CONCLUSION

Research in e-commerce implementation can give a significant result. In order to get an overview of the current research in this area, a systematic literature search was undertaken to identify e-commerce implementation articles from four databases. We have found 65 most related articles after the inclusion and exclusion criteria process for obtaining the maximum relevance to our study objectives. The articles were published between 2006 and 2015. The results of this review indicate the e-commerce implementation as a whole process is rather inadequately addressed. Although there are extensive studies of factors in e-commerce implementation, we have found the utmost relevant factors. There are no research efforts, at least in our selected papers, which have actually provided the solution or activities in the e-commerce implementation. Nevertheless, we feel that the results presented in this paper have few imperative implications. This study contributes to the first systematic literature review of the e-commerce implementation area. Hence the results from this review may assist researchers in the area of e-commerce implementation..

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Online RTO Service Management System

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Abstract—The Regional Transport Office (RTO) is a government organization responsible for issuing driving licenses, maintaining databases of vehicles and sells personalized registration of vehicles. It has been observed since years that the RTO is not able to deliver quality public services to the citizen without delay. That is, it has been a difficult job for citizens to get a driving license and to register their vehicles. Hence, this project is aimed at developing a computerized system for the functioning of RTO. This system will reduce the manpower required in the RTO and make the existing system fast and efficient. The aim is to build a user-friendly web page where the citizens can apply for learner's license, driving license and vehicle registration. The web page also provides provision for citizens to submit their complaints. The project intends to provide quality services to the citizens of the state. Imagine if the RTO system was offline based, then the citizens must go to any one of the RTO offices just to apply for learner's license, driving license and vehicle registration. This is not an easy job for citizens and even for the RTO officials too where they must maintain huge of offline records. This also reduces the burden on manpower working in the RTO. Since the project is web based, the changes or modifications required by the system over a long term of period can be done very easily. This helps in easy system maintenance and be up to date with the user requirements. Mainly, the website is used for issuing of license. An individual can apply for learning license and driving license online. Moreover, this application sends an alert message for renewal of driving license to an individual when his driving license is about to expire. The applications received will be verified and approved by the RTO officials.

Keywords-Smart RTO, Vehicle Registration, Chatbot, Vehicle authentication, Account Control.

I. INTRODUCTION

The project intends to provide quality services to the citizens the state. It does so by reducing the delay in services provided by the RTO through computerization of the system. This also reduces the burden on manpower working in the RTO. Since the project is web based, the changes or modifications required by the system over a long term of period can be done very easily. This helps in easy system maintenance and be up to date with the user requirements. That means updating the system as per the user requirements will be an effortless job to the system maintenance group. Mainly the website is used for issuing for license. An Individual can apply for learning license and driving license online. The applications received will be verified and approved by RTO officials. The applicant

can monitor the status of their application and download the approved license. Regional Transport Office (RTO) is an Indian government bureau which is responsible for the registration of vehicles and issue of Driver's License in India. RTO management will be having a lot of work regarding registration of vehicles and issue of driver's license. Similarly, the vehicle owner sometimes forgets to carry the license and forgets the insurance at the time of inquiry.

This paper proposed an approach to solving such problems that are by storing all the information related to vehicle and driver at database by RTO administrator. RTO is an advanced "RTO management System" which is design keeping in a view to make the existing registration and issues of information about license easier and faster. It includes the entire registration and insurance procedure starting from the initial phase of entering till the result. It is a more reliable, accurate, time-saving and free from any misuse. The system provides information regarding RTO application. The RTO vehicle registration system has been developed to override the problems prevailing in the practicing manual system. The software is supported to eliminate and in some case reduce the hardship faced by the existing system. It is also designed to carry out all the operations in a smooth manner.

The purpose of RTO system is to automate the existing manual system with the help of computerized equipment by fulfilling the requirement so that their information is secure and can be easily accessed and managed. This lead to the error free, secure, well grounded and fast management system. It will provide the user with many facilities like registration, insurance, tracking of vehicles. It can maintain the computerized records without having the redundant records. This will result in better utilization of the resource. It will describe how to manage for good performance and better service for better clients may happen that at times the Driver forgets to carry his driving license with him. This paper is put forward to solve such problems in such a situation if he is registered with our website then he can download his driving license immediately from our website and in this way he is not always bound to carry the hard copy of his driving license with him. As in this website the data is stored regarding the driver and their vehicle by the Database Administrator.

II. LITERATURE REVIEW

Today, making of driving license is large time consuming process. Also every time, it is not possible to carry whole documents by driver. Current vehicle registration systems for RTO services are very critical & there is no any updating to RTO office. Totally whole processes are conducted manually. In current market there are no any applications to provide all the above features together in one application. We all know existing RTO office work is how much lengthy as well as very lengthy process. In many villages there is only one day camp of RTO and the people who want driving license they should remain present on that day if they missed that day then they have to go to the district RTO office. So it is disadvantage because that may be not able to go or he having work on that day. so that here we are developing one web application which provide easiest and efficient way for RTO works like making driving license, insurance of vehicle, registration number of vehicle etc. In many cases we found that RTO office work get complete through third party called agent. When a person go to the RTO office for driving license, vehicle passing, and registration number of vehicle then a person go through the agent will complete person work by taking lot of money and that person is unaware about all this system.

Literature survey is that the most vital step in software development process. Before developing the new application or model, it's necessary to work out the time factor, economy and company strength. Once all these factors are confirmed and got an approval then we can start building the application. There are multiple components in the user module such as insurance forms, licenses, and vehicle registration. The traffic module is not only tasked with producing all the data related to the ownership of a vehicle and its details regarding its insurance but also is responsible for bringing about fines if there's any violation of traffic rules by a user. RTO admin validates all the data given by a user and is then responsible for producing license and vehicle numbers. Measures to ensure data integrity and security are simply not discussed in this system and hence are therefore a major limitation to the same. RTO Management System comprises the authorizing of a vehicle and keeping track of its related information and its owner. Moreover in this system, the verification of a vehicle is done using RFID which is published by the RTO after successful authentication. This in turn puts RTO in a position of high power as it's the only decision-making authority related to verifying users' credentials.

III. RELATED WORK

We all know existing RTO office work is how much length well as very time-consuming process. In many villages, there is only one day camp of RTO and the people who want driving license they should remain present on that day if they missed that day then they have to go to the district RTO office. So it is a disadvantage because that may be not able to go or he having worked on that day. so that here we are developing one web application which provides easiest and efficient way for RTO works like making driving license, the registration number of the vehicle, etc. we are developing a web application for RTO so here we give a brief description of our project overview.

First, we provide familiar environment means the needy user can access this site for their work purpose related to RTO. First user needs to fill the registration form so that we provide authentication to him and then user can choose option he wants means if he select to making a driving license then we provide driving license requirement details and give available date to him so that he come on that date direct give the test so that he can save his time as well as money. If user wants to pass his vehicle number then also it takes time in old system but here we provide facility that user he buy new vehicle he should have to first register on our site and fill all the required and importance details of vehicle and we gives this details to RTO office directly so that this work will get complete within less time and the user get his number template easily.

The administrator is providing for authentication purpose as well as it handles all the database of RTO and manages all the process. He has authority to approved learning license number, permanent license number pass the vehicle registration number, etc. Facilities are provided by the administrator. In many cases, we found that RTO office work gets complete through the third party called agent. When a person goes to the RTO office for a driving license, vehicle passing, and registration number of the vehicle then a person go through the agent and agent will complete person work by taking a lot of money and that person is unaware of all this system. According to the TOI new on dated 3 September 2015 RTO office is the more corrupted area. So using our web application we are somewhere to help to reduce corruption.

In today's scenario people are just so busy with their work and just going to the RTO office for issuing the DL increases their work load somehow. This website will reduce this and going just for the driving test they can get their license which will ultimately reduce their extra time. In the existing system the user has to spend a lot of time and money in making of driving license. At every step he has to spend some money so that his work can be done quickly. In doing this work manually, it's quite difficult to manage all the documents. At times the documents are lost and then the client has to suffer the loss. Even sometimes if the driver forgets his Driving License then he has to send someone back to home to get it, in this a lot of time is wasted.

IV. IMPLEMENTATION

RTO Information System is an online information source developed for Road Transport Authority to facilitate the users in applying for various licenses and registrations. This tool has been designed to facilitate the flow of information within the organization. In this System It is not efficient in performing office work in RTO services, It includes much manual process and time consuming, It is not user friendly, Maintains local data base.

In this block diagram we get information about the basic idea of our project. It basically means to computerize the existing system to gain accuracy. It is divided into five sub parts like LLR, registration, DL, Complaint, gallery. First user needs to fill the registration form so that we

provide authentication to him and then user can choose option he wants means if he select making a driving license then we provide driving license requirement details and give available date to him so that he come on that date direct give the test so that he can save his time as well as a money.

A. Block Diagram

Effective training begins well before a trainer delivers a private training session and continues then training session is complete. Training are often viewed as a process comprised of 5 related stages or activities: assessment, motivation, design, delivery, and evaluation. If user wants to pass his vehicle number then also it takes time in old system but here we provide facility that user he buy new vehicle he should have to first register on our site and fill all the required and importance details of vehicle and we gives this details to RTO office directly so that this work will get complete within less time and the user get his number template easily. The administrator is providing for authentication purpose as well as it handles all the database of RTO and manages all the process. He has authority to approved learning license number, permanent license number; pass the vehicle registration number, etc. Facilities are provided by the administrator.

RTO Information System is an online information source developed for Road Transport Authority to facilitate the users in applying for various licenses and registrations. This tool has been designed to facilitate the flow of information within the organization. RTO provides the facility of applying licenses online, issuance of permanent license, and receiving complaints. In this System It is not efficient in performing office work in RTO services, It includes much manual process and time consuming, It is not user friendly, Maintains local data base. It is not Generating Accurate Reports. To overcome problems in the existing System a new RTO services “Road Transport Authority Information System” is proposed after study of system. The software is supported to eliminate and in some case reduce the hardship faced by the existing system. It is also designed to carry out all the operations in a smooth manner.

The purpose of RTO system is to automate the existing manual system with the help of computerized equipment by fulfilling the requirement so that their information is secure and can be easily accessed and managed. This lead to the error free, secure, well grounded and fast management system. It will provide the user with many facilities like registration, insurance, tracking of vehicles. It can maintain the computerized records without having the redundant records. This will result in better utilization of the resource. It will describe how to manage for good performance and better service for better clients It may happen that at times the Driver forgets to carry his driving license with him. This paper is put forward to solve such problems in such a situation if he is registered with our website then he can download his driving license immediately from our website.

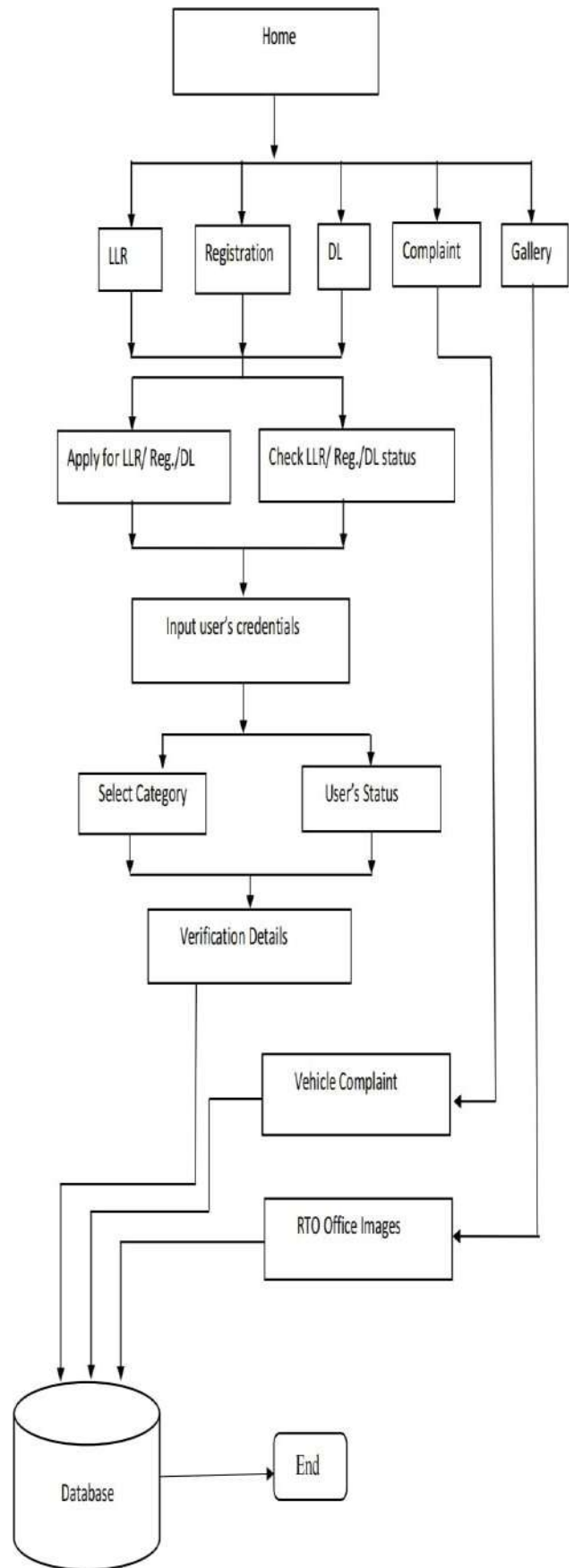


FIGURE :4.1. SYSTEM ARCHITECTURE

V. METHODOLOGY

Modules used :

□ User module :

- License Registration form
- Vehicle Registration form

□ Traffic Module :

- Check License
- Check Vehicle
- Generate Fine

□ RTO Admin

□ Chatbot

- User Module

User will fill the online form followings are:

License Registration Form :

The below figure shows the user license registration form. This form display information of particular license holder with photo and other details such as first name, middle name, last name, email, date of birth, gender, taluka, contact number, ration card number, address, Aadhar card number, and voter ID.

Vehicle Registration Form :

In vehicle Registration form the RTO administrator gets various details of vehicle and to enter vehicle information first select the vehicle type such as two wheeler, three wheeler, four wheeler, and other types. After entering Registration no such as KA 22 CA 7613 then click check vehicle button it gives pop up message found or not found and displays all records in the data grid below figure shows the vehicle registration form of two wheeler vehicle.

- Traffic Module

This module mainly focuses on providing the information only to the traffic police officers it consists of checks license checks vehicle information check insurance and also generate fines.

Check License :

The Check License module takes a License number. as an input and returns the respective License information like Name, Photo, address, DOB, issued date, License status and Validity of the license. In case if the record doesn't exist it shows a respective message that record not found.

Check Vehicle :

The Check Vehicle module takes a Vehicle Registration number as an input and returns the Respective Owner details like Name and Address. It also includes the Vehicle issued date and valid date of vehicle.

Generate Fine :

The Generate Fine module mainly focuses on generating fines for the offences committed. It provides for selecting a variety of offences from a set of given offences for which the fine is generated.

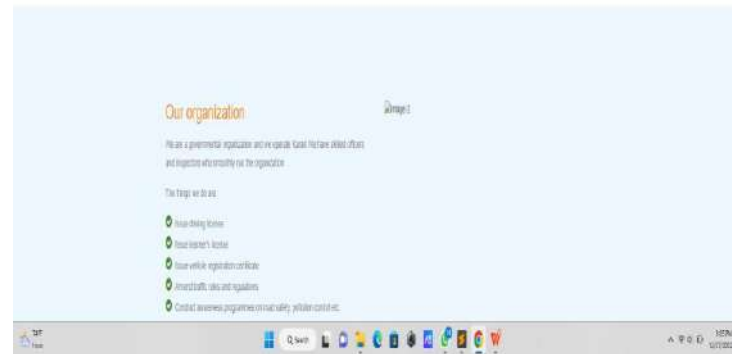
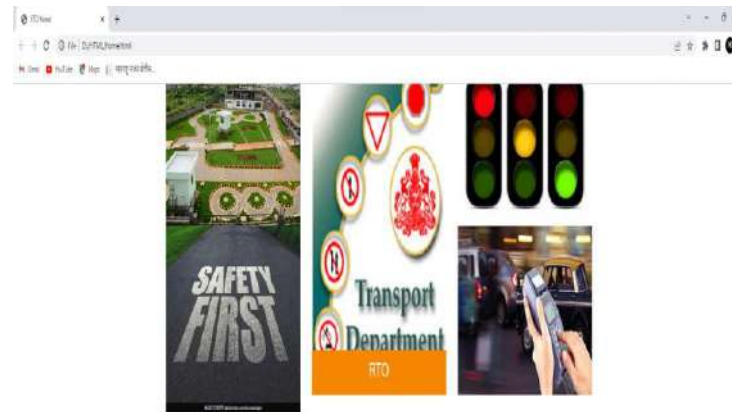


FIGURE : 5.1. RTO SYSTEM



FIGURE : 5.2. HOME PAGE

VI. ACKNOWLEDGEMENT

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VII. CONCLUSION

It can be concluded that " smart RTO web based android application" ,effectively verifies documents related to vehicle and license this system introduced facility for RTO officer to platform verification of license and vehicle and vehicle documents .It also helps RTO officials to maintain records systematically and reduce a lot of paper work and manual efforts. Hence drivers are totally independent of vehicle related documents. The implemented project RTO Management System brings out an improvement over the existing.

RTO system by reducing the processing delay and allowing RTO to provide quality of service the citizen. It overall increases the efficiency of the RTO office and effectively reduces the burden on the RTO officials. People need not stand in long queues just to apply for LLR or DL at RTO offices. This entire pre-registration task can be done online through the implemented system. Any doubts or queries can be submitted which will be responded by the officials. This project even eliminates the presence of middle man from the entire process and thereby decreasing the degree of corruption in the state. The other ways in which the system helps is by publishing the latest news and events. The project is mainly built using web scripting languages. So, in the future, updating the system or adding extra features to the system as per the requirements will not be difficult as simple web scripting languages will help us in accomplishing it. The drivers data will be fetched from RTO server. This RTO application aims to serve the people with digitalized documents like License, Vehicle, and Insurance for easy use as these documents can be lost. This process intends to help the customer in saving their time if these documents are misplaced somewhere and helps in tracking out thefts through location based service. We conclude that this project will be applicable for various RTO services .These project will be provide application easily. The purpose of this project is to create a application for RTO services. This application

provides registration for the license, vehicles registrations and other documentation. In this application investigation functions like checking of license, documents, PUC etc. for help of RTO officers are provided. By using this android application traffic police can verify the whole details of person and vehicle. In this application investigation functions like checking of license, documents, PUC etc. for help of RTO officers are provided. By using this android application traffic police can verify the whole details of person and vehicle. This application provides registration for the license, vehicles registrations and other documentation. In this application investigation functions like checking of license, documents, PUC.

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Intelligent Quality Control System for Product Manufacturers through ML

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Abstract— One of the most important components in ensuring product quality before it reaches the market is industrial inspection. The visual system, including human vision, machine vision, or a mix of both, can be used to carry out the inspection tasks. In this research, we present a method that can regulate the product quality of press parts. Visual inspection systems are used to accomplish quality control by identifying acceptable parts from rejected goods. Complete quality control of the raw materials is a requirement for large-scale production enterprises. The primary goals are to create an image processing system that can assess a part's dimension and determine whether it should be accepted or rejected. Calculating the pixel value will yield the part's dimensions. The result shows its possibility to be used as automated visual inspection system.

Keywords— Convolutional Neural Network(CNN), Deep Learning(DL), Deep Neural Network(DNN), quality, image processing

Introduction: During manufacturing of industrial object, it is very difficult to designed accurate objects that fits properly in machines. Any small dimensional error would result in lead the fitting of object to not be proper and can lead to problems. It is important to analyze where and how the error takes place during manufacturing the objects. If this inspection of objects is done manually then it is time consuming and not very accurate. Hence this is an idea to provide a vision based test jig in order to analyze the object. Further we can also provide the analysis to the manufacturing that in which exact place the error is occurring maximum so that they can take measures to avoid or reduce it. Also total number of objects that are accurate and inaccurate in a batch can be calculated which will save the time of the manufacturer and will make the work simple, more accurate and independent of humans.

Model Overview: There are plenty of opportunities in automating the Quality Inspection in manufacturing industries who are manufacturing the identical components in a mass production basis. Assuring the quality of dispatch lot is the key performance of a company who are providing each lot with non-defective components. In a short survey in we got to know that there are still Quality inspection is going on manual basis & Sampling methodology is adopted. This sampling inspection method can not assures 100% quality inspection. It is impossible to inspect each & every component & their parameter by manually as this method is time consuming & as there are manual interventions in the process so it reduces accuracy.

Algorithm:

1. **CNN Algorithm:** A rejected product loses resources in the factory upstream, and in manufacturing companies, quality inspectors often check the product's quality after it has been produced to meet industry standards. Cost, manpower, consumables, and capacity. With the current artificial intelligence trend, industrial companies are looking to automate material quality inspection within the manufacturing cycle itself using deep learning-based computer vision technologies. The objective is to obtain human level accuracy or higher while minimizing human intervention, while also maximizing industrial capacity, labor costs, etc. Deep learning is used in many different applications; from disease identification with medical imaging to object detection in self-driving cars, deep learning has demonstrated to achieve human level accuracy & better.

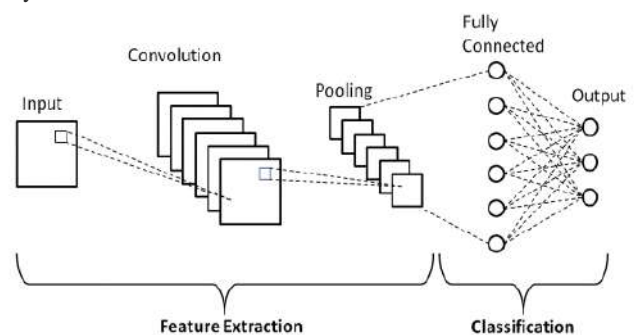


Fig1. Convolutional Neural Network

2. **SVM Algorithm:** One of the most well-liked supervised learning algorithms, Support Vector Machine, or SVM, is used to solve Classification and Regression problems. However, it is largely employed in Machine Learning Classification issues. The SVM algorithm's objective is to establish the best line or decision boundary that can divide n-dimensional space into classes, allowing us to quickly classify fresh data points in the future.

3. **KNN algorithm:** One of the easiest machine learning algorithms, based on the supervised learning method, is K-Nearest Neighbor. The K-NN algorithm makes the assumption that the new case and the existing cases are comparable, and it places the new instance in the category which is most like the existing categories.

4. **Random forest algorithm:** Supervised machine learning algorithms like random forest are frequently employed in classification and regression issues. On various samples, it constructs decision trees and uses their average for classification and majority vote for regression.

5. **AdaBoost Algorithm:** AdaBoost, also known as Adaptive Boosting, is a machine learning method used in an ensemble setting. Decision trees with one level, or Decision trees with only one split, are the most popular algorithm used with AdaBoost. Another name for these trees is Decision Stumps. It creates a model and equally weights each piece of data. Then, it gives points that were incorrectly categorised larger weights. The next model now gives more weight to all the points with higher weights. If a small error is not reported, it will continue to train models.

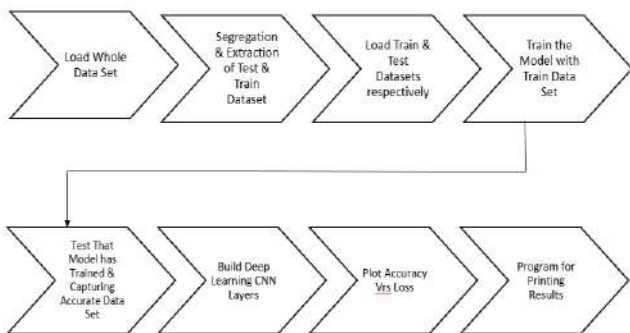
Methodology:



Fig 2. Block diagram of Methodology

Capture Image from the Camera. Those images are given as an input for the system. Segmentation means separation of background & Object. System will identify the object out of the image by developed model. After identifying the object, system will detect the features of the object like length, diameter etc. System will run set of program for this. After identifying the features, system will measure the dimensions of respective feature or parameter. System will run set of program for this.

Program flow:



This is the program flow of our project:

1. First we have to load the dataset by using importing the libraries. Dataset includes the images of faulty and correct images.
2. Next segmentation and extraction is very important part for training and testing dataset. Data splits into two parts first is training set and second is testing set.
3. Load the datasets of train and testing set as an input.
4. Train the model with train data set. We use the CNN algorithm. Neural network fed the large amount of images.
5. Test that model has trained and capturing accurate datasets. It checks the built model works correctly or not.
6. Build Deep learning convolution neural network layers.
7. We have to plot the accuracy versus loss for understanding the whole model is better or how accurate it is.
8. Final step is to printing the results of correct and faulty images.

Result:

```

    return (train, train_labels), (test, test_labels)

    i in range(1,11):
    random = np.random.randint(0, len(training_images))
    cv2.imshow("image_"+str(i), training_images[random])
    if training_labels[random] == 0:
        print(str(i) + " - faulty")
    else:
        print(str(i) + " - correct")
    cv2.waitKey(0)
    cv2.destroyAllWindows()

    1 - correct

    return (train, train_labels), (test, test_labels)

    for i in range(1,11):
    random = np.random.randint(0, len(training_images))
    cv2.imshow("image_"+str(i), training_images[random])
    if training_labels[random] == 0:
        print(str(i) + " - faulty")
    else:
        print(str(i) + " - correct")
    cv2.waitKey(0)
    cv2.destroyAllWindows()

    1 - correct
    2 - faulty
    3 - faulty
    4 - correct
    5 - faulty
    6 - correct
    7 - faulty
  
```

Future Scope: Dedicated web application can be developed with user-friendly UI and automated conveyor based system to check the quality parameters of components. Initially this system is proposed for inspection of objects in a single dimension so we can extend to inspect objects in three dimension which increase the accuracy and save the time. Development of vision based test jig and mechanism for inspection and sorting of industrial objects will fulfil the high requirements of inspection accuracy and process effectiveness.

Conclusion: This system is proposed to be used in industries which manufactures parts and needs to have accurate quality inspection of those objects. This also increase quality of products and reduces cost of manufacturing. By providing a vision based solution for inspection of industrial objects, we can overcome disadvantages of traditional manual inspection and errors will also reduce. The synchronization and simultaneous execution of task were used to achieve high inspection speed. The developed system can be applied in various industrial inspection system where high accuracy of object is needed so that it fits properly in machines.

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Women Security System

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Abstract— Throughout history, women have contributed to the stability, advancement, and long-term growth of the nations. Women cannot be really integrated in society if they are subjected to abuse and harassment. An sophisticated system is required in light of the rise in horrific occurrences affecting women and children in order to fulfil the objective of getting help as quickly as possible. The use of smartphones has grown quickly in the present, making it possible to utilise one effectively for security or other defensive objectives. The recent horrific events have prompted us to consider the need for safety measures. The use of our application "Women Security" can help to reduce crimes against women.

Keywords— Safety app ,Women safety Application, Android, Women Security, etc

I. INTRODUCTION

Despite many efforts by the government, the number of crimes conducted against women remains unchanged. It evolves at a startling rate every day. Eve bullying, harassment, molestation, rape, domestic violence, and kidnapping are becoming commonplace. To manage this emergency situation, numerous applications for women's safety have been developed. Here, we're offering an Android software that, by identifying the position of the person in danger, assures the safety of women and reduces the risk. The primary function of the app is that the user must first check that it is turned on while leaving the house. She must press SOS or scream to deliver the voice command to launch the main function of the programmes whenever an awful incident occurs. Additionally, a call will be placed to the hotline number. At the same time, audio recording will begin. The app has live streaming capabilities, allowing the registered contacts to periodically view the victim's whereabouts. Additionally, we preserved the offline system. The user must turn the app off after using it to complete their task in order to end its functionality.

In India, women's safety is an important issue, much as it is

dangerous for women to go alone at midnight or consider an isolated spot. Considering that women are not as powerful physically as men, they should have support.

These days, a person's cell phone can be their best friend and make it possible to stay in touch with their loved ones at any time. In an emergency, anyone needs to call or send a specific message from anywhere at any time.

We introduce an app that protects women's safety. This makes it easier to locate and text on resources to save the person from perilous situations.

2. LITERATURE SURVEY

1.Name-: LIFECRAFT: AN ANDROID BASED APPLICATION SYSTEM FOR WOMEN SAFETY; Rabbina Ridan Khandoker, Shahreen Khondaker, FatihaTus-Sazia, Fernaz Narin Nur, Shaheena Sultana.

Description-: Women have ensured the stability, progress and long-term development of the nations throughout the history. If women are subjected to violence and harassment, they cannot be genuinely included in society. With increasing heinous incidents involving women and children, an advanced system is needed to serve the purpose of getting help as soon as possible. At present time, the use of smartphones has increased rapidly, making it possible to use a smartphone efficiently for security or other protective purposes.

2.Name-: The Personal Stun- A Smart Device For Women's Safety; Shivani Ahir, Smit Kapadia, Prof. Jigar Chauhan

Description-: We focus on developing a prototype that is a smart band which gets activated by tapping on the screen twice. Once the device is activated it starts sending the GPS location to the ICE contacts and police control rooms. There is a pulse rate sensor embedded in the device that senses the pulse rate of the person and a temperature sensor that senses body

temperature of the person. The band when thrown with force the force sensor will get activated and sends the current location of the victim. A Piezo buzzer siren will get activated after 1-2 mins of the actual device getting turned on.

3.Name-: Smart Intelligent System for Women and Child Security; Prof. Sunil K Punjabi, Prof. Suvarna Chaure, Prof. Ujwala Ravale

Description- Women all over the world are facing unethical physical harassment and Children cannot be left unattended at a social event or outside the home. Our project solves both the problems. A portable device which will have a pressure switch. As soon as an assailant is about to attack the women/child or when they senses any insecurity from a stranger, he/she can then put pressure on the device by squeezing or compressing it. Instantly the pressure sensor senses this pressure and a conventional SMS, with the victim's location will be sent to their parents/guardians cell phone numbers stored in the device while purchasing it, followed by a call..

3.Name-: Do Women in Conservative Societies (Not) Follow Smartphone Security Advice? A Case Study of Saudi Arabia and Pakistan; Elham Al Qahtani , Yousra Javed, Heather Lipford.

Description-: Women in conservative cultures, are an understudied population when it comes to investigating how users keep their devices and data safe. Owing to the recent trend in smartphone adoption and the simultaneous increase in attacks targeting women in conservative societies, this study uses the rational decision model to investigate the motivations of this user group for (not) following common smartphone security advice.

4. Name- Smart Security Device for Women Based on IoT Using Raspberry Pi Prottasha Ghosh, Tanjim Masroor Bhuiyan, Muhib Ashraf Nibir

Description-:The percentage turned to 66%, 38% and 35% for the public places, workplace and at their home respectively. At first, the cases handling by the police are a major issue but there have some botherations like not knowing the victim's exact location, not knowing surely the crime occurred at all, and then lack evidence, police stops investigation.

5.Name-: WOMEN'S SAFETY SYSTEM BY VOICE RECOGNITION; Vinay Mishra, Nilesh Shivankar, Sanam Gadpayle.

Description-: A bunch of latest apps are developed to produce a security system to girls via their phones. per the reports of World Health Organization NCRB Social Government Organization thirtyfifth girls everywhere the planet square measure facing a great deal of unethical Physical Harassment publicly places like Railways, Bus- stands and pathway, etc. during this Paper, we've got reviewed of assorted existing systems on women security.

6. Name-: Analysis of Women Safety in Indian Cities Using Machine Learning on Tweets; Deepak Kumar1,Shivani Aggarwal

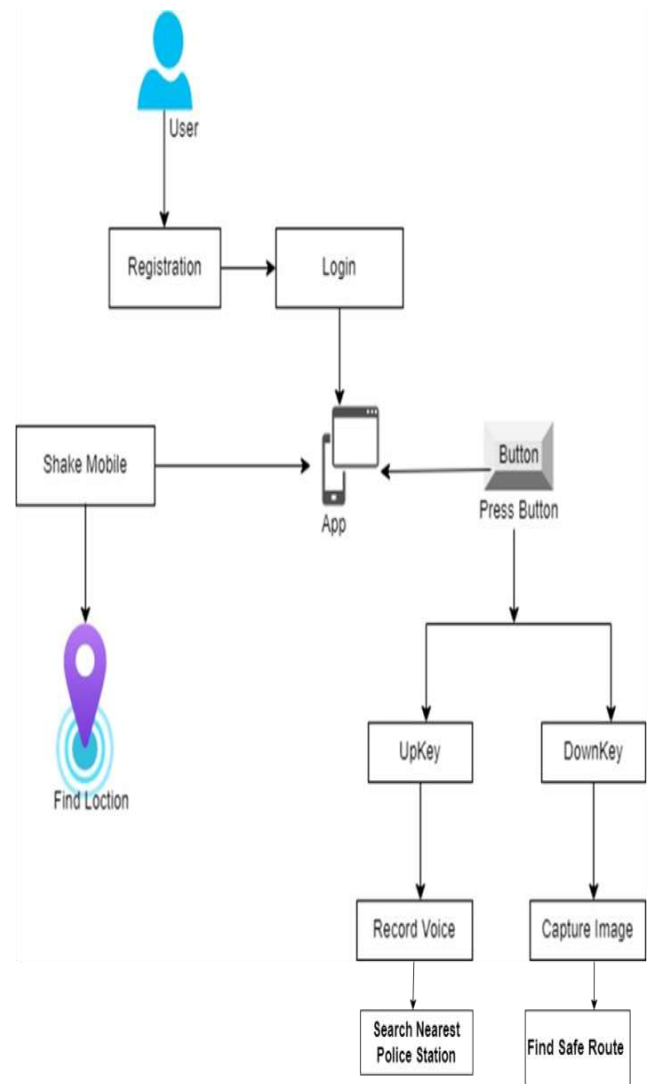
Description-: Women and girls have been experiencing a lot of violence and harassment in public places in various cities starting

from stalking and leading to sexual assault.

7. Name-: Safety Solution foe Women using smart band and CWS app; A.Z.M Tahmidul Kabir

Description-: Women endures a lot of sexual harassment these days which is becoming alarming day by day. We are advancing an IOT device along with an android app that can make womens movement safer.

3. PROPOSED METHODOLOGY



When a user wishes to engage with the system, they need to have a login ID, which they can get after registering with the system and providing some supporting documentation. When a user first interacts with the system, a login box with options to add additional users to the system appears. He receives a new window to register his text sample and himself when he clicks on "new registration user." Alternatively, if a user has already registered, he must authenticate the text by comparing it to a sample that has already been stored. The newly created text sample features were then matched with the retrieved text feature.

Description:

Module 1:

In this system we detect the women security application features which based on the android application.

Module 2:

A. Some of the attributes of application

B. Features:

- 1.Registration Page:fill registration form
- 2.Login Page:type username and password which have already registered.
- 3.Upper key:Sending text sms using voice recorder.
- 4.Lower Key:Capturing image and send our registered mail id.
- 5.Show Nearest Police Station:nearest police station display on screen.
- 6.Safe Route:find the safe route from our current location to the destination.
- 7.Shake device:when we shake our mobile device then send current location to our registered mail id.
- 8.Safety Tips:Some safety tips showing on the screen.
- 9.logout:Sign out the application.

Database:

By enabling safe entry to the databases through client-side code, the Firebase real-time database allows you to create robust, collaborative apps. Data is locally stored, and real-time events continue to happen even when the user is offline, providing a responsive experience. When the hardware regains connectivity, the Realtime Database immediately merges any discrepancies between the locally stored changes and the remote changes that took place while the user was offline.

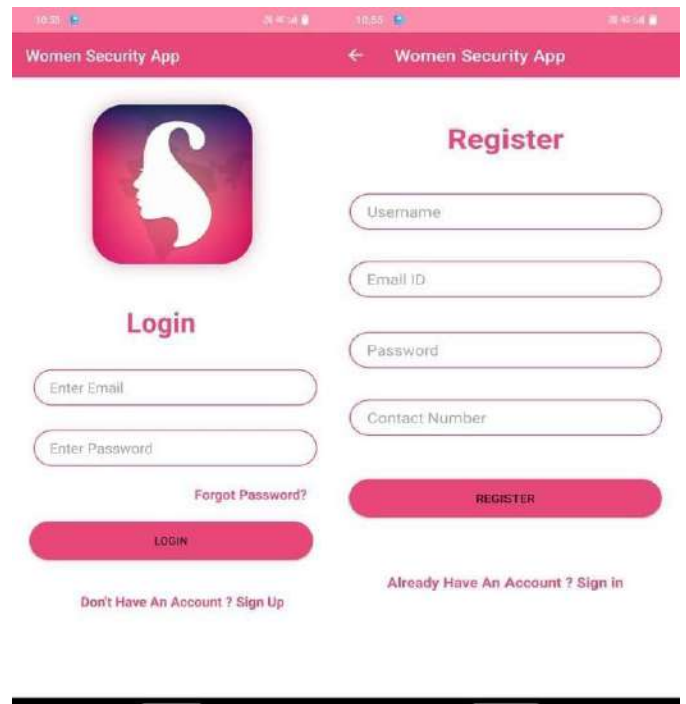
To specify how your data should be organised and when data is able to read from or written to, the Realtime Database offers an expression-based rules language called Firebase Runtime Database Security Rules. Developers can choose who has knowledge of what data and when they can access it when Firebase Authentication is integrate.

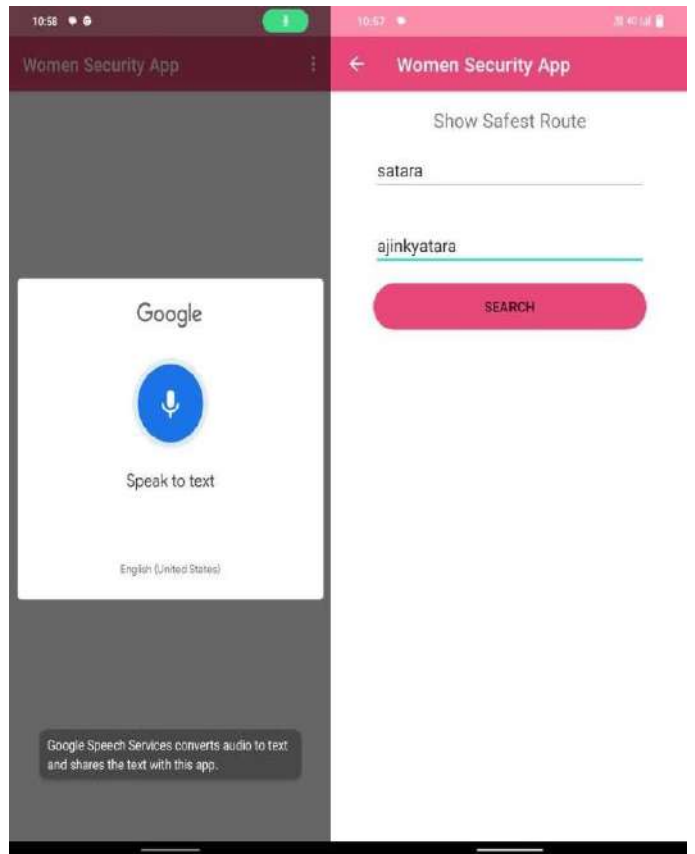
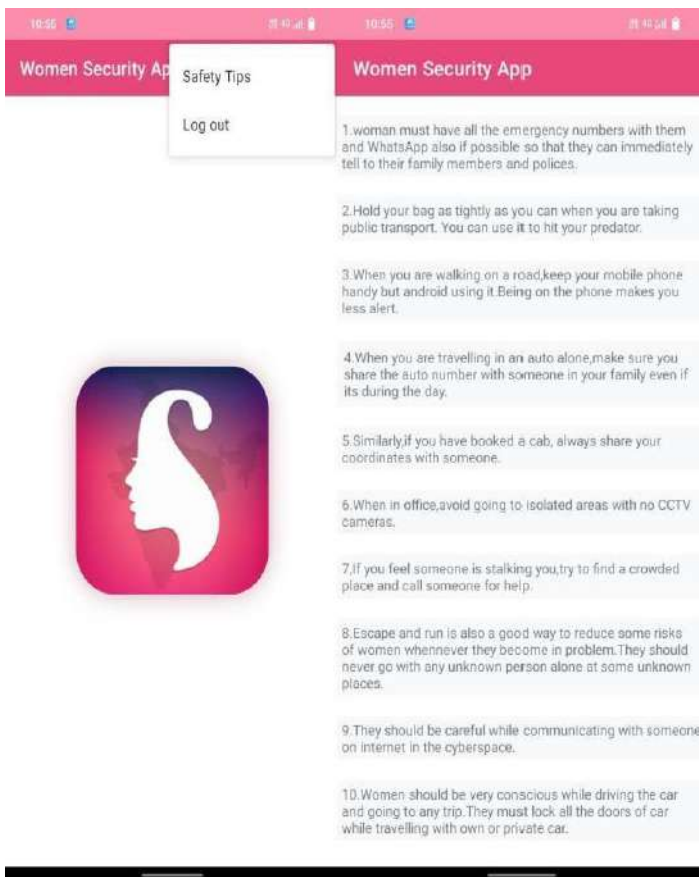
C. Mathematical Model:

Let „S“ be the system

- Where,
 - S= {I, O, P, Fs, Ss}
 - Where,
 - I = Set of input Set of output
 - P = Set of technical processes
 - Fs = Set of Failure state
- Ss = Set of Success state
- Identify the input data $I_1, I_2, \dots, I_n = \{(Input\ Data\ (,))\}$
- Identify the output applications as $O_1, O_2, \dots, O_n = \{(Women\ safety\ application)\}$
- $P = \{(Record\ voice, capture\ image, shake\ device, find\ route, show\ nearest\ police\ station, show\ result)\}$
- Identify the Failure state as Fs
- $P = \{(Correct\ analysis\ within\ time)\}$

4. RESULT AND DISCUSSION





Result



4. CONCLUSION

There are some worries about security but not about women's safety. Many headlines indicating that sexual assault and rape continue to be on the rise against women suggest that this generation is currently experiencing these tendencies. About 80% of women are losing their self-confidence and are afraid of becoming free. Therefore, we are attempting to make small contributions to women's causes that will secure their safety and respect so that they can have the freedom to develop equally with men. Anyone can benefit greatly from this mobile application. Before meeting the actual danger, the user can take protects here. Every woman should know that it is now safe to travel alone because someone will have their most recent location.

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SIGN LANGUAGE RECOGNITION USING CNN.

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ABSTRACT

Sign language is used by deaf and hard hearing people to exchange information between their own community and with other people. Computer recognition of sign language deals from sign gesture acquisition and continues till text/speech generation. Sign gestures can be classified as static and dynamic. However static gesture recognition is simpler than dynamic gesture recognition but both recognition systems are important to the human community. The sign language recognition steps are described in this survey. The data acquisition, data preprocessing and transformation, feature extraction, classification and results obtained are examined. Some future directions for research in this area also suggested.

Keywords: sign language recognition, hand tracking, hand gesture recognition, gesture analysis.

1.INTRODUCTION

Sign language (SL) is a visual-gestural language used by deaf and hard-hearing people for communication purposes. Three dimensional spaces and the hand movements are used (and other parts of the body) to convey meanings. It has its own vocabulary and syntax which is purely different from spoken languages/written language. Spoken languages use the oratory faculties to produce sounds mapped against specific words and grammatical combinations to convey meaningful information. Then the oratory elements are received by the auditory faculties and processed accordingly. Sign language uses the visual faculties which is different from spoken language. Spoken language makes use of rules to produce comprehensive messages; similarly sign language is also governed by a complex grammar. A sign language recognition system consists of an easy, efficient and accurate mechanism to transform sign language into text or speech. The computerized digital image processing and a wide variety of classification methods used to recognize

the alphabet flow and interpret sign language words and

phrases. Sign language information can be conveyed using gestures of hands, position of head and body parts. Four essential components in a gesture recognition system are: gesture modeling, gesture analysis, gesture recognition and gesture-based application systems .



The works carried by various researchers worldwide are summarized in this paper. The domain is isolated sign language, but continuous sign language recognition is also discussed due to similarity with isolated sign language recognition. We also select research papers where no special image acquiring devices are required. The reason is that in common places no special image acquiring devices are available at all the times, and all deaf/mute/hard hearing persons might be unable to wear due to their economic conditions and in most cases, it is cumbersome to carry and wear. Also, we select few research papers in which special wearable devices are used as inputs due to their better performance for comparison purposes.

The organization of the paper is as follows. We are summarizing the research papers from various authors according to following characteristics:

- a) Sign language used.
- b) The domain of the sign language used.
- c) Data acquisition methods employed.
- d) Data transformation techniques.
- e) Feature extraction methods.
- f) Classification techniques.
- g) Results obtained.
- h) Conclusion.

2. SIGN LANGUAGES USED

It is reported that about 5% of world population consists of deaf mute and hard hearing people. They used some kind of hand, head, and body gesture to exchange their feelings/ideas. So almost all nation has its own Sign Language. The sign language development is different for each country or sub-continent.

Table- Major sign languages of the world.

S. No.	Country/sub-continent	Sign Language
1	United Kingdom	British Sign Language
2	United States of America	American Sign Language
3	Commonwealth of Australia	Australian Sign Language
4	Japan	Japanese Sign Language
5	People's Republic of China	Chinese Sign Language
	Taiwan	Taiwanese Sign Language
6	Middle East	Arabic Sign Language
	Islamic Republic of Iran and other Gulf countries	Persian Sign Language
7	Republic of India	Indian Sign Language
8	Socialist Republic of Vietnam	Vietnam Sign Language
9	Ukraine	Ukrainian Sign Language
10	Democratic Socialist Republic of Sri Lanka	Sri Lankan Sign Language
11	Federative Republic of Brazil	Brazilian Sign Language
12	Republic of Poland (Rzeczpospolita Polska)	Polish Sign Language
13	The Netherlands (Nederland)	Sign Language of the Netherlands

The Table-1 represents the sign languages of influencing countries/sub-continent. The Table-1 indicates the most dominating research is going on ASL, next comes CSL and others follows. The reason is that many standard databases for ASL gesture are available publicly. The developing countries are currently focuses on the research in this field. Although two research papers from India are reported in this survey but the work was

performed on ASL. We also include two survey papers on ISL.

3. THE DOMAIN OF THE SL USED

SL is an independent language which is entirely different from spoken/written language. It has its own set of alphabets, numeral, word/phrases/sentences and so on. The basic difference is that it has limited vocabulary.

compared to written/spoken language. Also, in most of the developing countries and underdeveloped countries it is in the initial phase. The development of the sign language in these countries will take years to become an independent language. But the computer recognition for sign language for these countries is started and significant works are reported in literature.

A Sign Language has a set of alphabets and is the same to the written/spoken language of the country it belongs to. If we consider the case of ASL or BSL it is nothing, but the alphabet set A to Z. Similarly, the numerals 0 to 9 are communicated by any sign language. Secondly the words/phrases of any sign language belong to a particular domain. Examples are "Why? ", "Award ", "What for?", "How much? a coin, cigarette, flower; reluctantly, row, take, immediately, understand, hate, left, seven, moon, eight, walk, conscience and other set used like Friend, To Eat, Neighbor, To sleep, Guest, To Drink, Gift, To wake up, Enemy, To listen, Peace upon you, To stop talking, Welcome, To smell, Thank you, To help, Come in, Yesterday, Shame, To go, House, To come and I/me. The main aim is that when a researcher wants to produce a system of recognition of sign language, he/she used a set of words/phrases in a particular domain like banking, railways, public telephone booths or something that focuses very general conversations in public places. Thirdly combinations of sign gestures for simple sentences/phrases are used in recognition of sign languages.

The databases used by various researchers are classified according to:

- Availability of standard database
- Creating own database

3.1. Creating own database

Most of the researchers create their own database for sign language recognition. This database can be also classified into digits, alphabets and phrases (simple or complex). The Table-3 describes the characteristics of the dataset created by various researchers.

4. DATA TRANSFORMATION

There are several reference points which can be used for image analysis. In sign language recognition where the motion of the hand and its location in consecutive frames is a key feature in the classification of different signs, a fixed reference point must be chosen.

The hand's contour was chosen to obtain information on the shape of the hand and used the hand's center of gravity (COG) as the reference point which alleviated the bias and applied as other reference points. After defining the reference point, the distance between all the different points of a contour respect to the COG of the hand were estimated. The location of the tip of the hand was easily extracted by extracting the local maximum of the distance vector. To reduce the noise

introduced by the quantization of the image and the contour extracting methods, a moving average filter to smooth the distance vector was used in the experiments.

The RGB color space (Red, Green and Blue) was converted to gray scale image and then to a binary image. Binary images are images whose pixels have only two possible intensity values. They are normally displayed as black and white. Numerically, the two values are often 0 for black, and either 1 or 255 for white. Binary images can be produced by thresholding (0.25 in case of [37]) a grayscale or color image, in order to separate an object in the image from the background. The color of the object (usually white) is referred to as the foreground color. The rest (usually black) is referred to as the background color. However, depending on the image, which is to be their shoulder, this polarity might be inverted in which case the object is displayed with zero and the background is with a non-zero value.

in the preprocessing block. Running Gaussian average method is used in order to obtain the background subtraction as it is very fast and consumes low memory when compared to other similar methods.

The hand gesture image sequence was analyzed for key frame selection after global motion analysis. As the hand shapes between two consecutive view models were very similar to each other, the authors select some key frames for the stored model generation and the input model generation. The closed boundary of segmented hand shape was described by a Fourier Descriptor (FD) vector with the first 25 coefficients. Due to the properties of rotation, translation, dilation invariant the database space of the stored models was reduced.

The video sequences of a given gesture were segmented in the RGB color space prior to feature extraction [12]. This step had the advantage of colored gloves worn by the signers. Samples of pixel vectors representatives of the glove's color were used to estimate the mean and covariance matrix of the color which was segmented. So, the segmentation process was automated with no user intervention. The measure of pixel similarities was used by the Mahala Nobis distance. A pixel vector that falls within the locus of points that describe the 3D ellipsoid was classified as a glove pixel. The threshold used to define the locus of points was set to the maximum standard deviation of the three-color components. Once the images were segmented, a 5×5 median filter was used to counter affect any imperfections as a result of the segmentation process.

In the proposed work color images were first resized to 250×250 pixels and then, the RGB (Red, Green and Blue) images were converted to gray scale images. Users were not required to use any gloves or visual markings; instead, the system uses only the images of the bare hand taken by a digital camera.

In color object tracking method the video frames were converted into color HSV (Hue-Saturation- Value) space. Then the pixels with the tracked color were identified and marked and the resultant images were converted to a binary (Gray Scale image). In image preprocessing, all the images were cropped and their eye- points were manually aligned.

Then all the image vectors were normalized to unity

The system identifies image regions corresponding to human skin by binarizing the input image with a proper threshold value. Then small regions from the binarized image were removed by applying a morphological operator and select the regions to obtain an image as candidate of hand.

At the first step in the image processing phase a hand region extraction was performed. The experiments have been done in front of a simple background and in constant lightning conditions. Three well-known models, namely: normalized RGB, Gaussian distribution model of a skin color and morphological image processing have been used for this purpose.

5. FEATURE EXTRACTION

Refer to Table-4 for details.

6. CLASSIFICATION

Various classification techniques which are used by researchers to recognize sign language gestures are summarized in the Table-5.

7. RESULTS

The results obtained by various research papers are summarized in Table-6. The Table-6 (b) shows the results obtained from standard datasets.

that are available for research work, which we described in section 3.1. Similarly, the result from creators' own datasets is summarized in Table- 6(c). The result includes the parameters. like input

Sign Language, Dataset size, Training set, Testing set, standard dataset/ creators of own dataset, classification methods and finally recognition rate.

8. CONCLUSIONS

After thorough analysis, the following are conclusions for future research in sign language recognition:

- Current systems are mainly focused on static signs/ manual signs/ alphabets/ numerals.
- Standard dataset not available for all countries/subcontinents / languages.
- A need for large vocabulary database is the demand for current scenario.
- Focus should be on continuous or dynamic signs and nonverbal type of communication.
- Sign language recognition systems should adopt data acquisition in any situation (not restricted to laboratory data).
- Systems should be able to distinguish face, hand (right/left) and other parts of body simultaneously.
- Systems should perform recognition task in a convenient and faster manner.

Description	Example set
ALS alphabets, single digit numbers used in ASL and a sample of words. using bare hands.	e.g., A, B, D... e.g., 3, 5, 7 e.g., love, meet, more.
The Chinese manual alphabet, 30 hand gestures, each of them instead of a Pinyin letter.	A-Z, ZH, CH, SH, NG
The sign language of 25 sentences consists of 183 words as experimental data.	No example set mentioned
The vocabulary of the database consists of 262 signs representing words from ten-word types such as nouns, verbs, adjectives etc	No example set mentioned

Method	Description
Contour	The distance vector was used to extract some control points in order to calculate the motion parameters.
Hidden Markov Model	Hough transformation [52] with excellent image processing and neural networks were employed.
Hand wavelets, Scale Invariant feature Transform	The feature extraction process includes: 16-bit color histogram; 7Humoments; 48 dimensional Gabor wavelets and several interest points and their SIFT features to characterize both global visual features and the local visual features of images.
wavelets transform	The DWT is applied on the images of the selected PSL word and some. features from the wavelet coefficients are extracted.
Eight features	The authors extract eight features from these gestures: the area, the circumference, the length of two axes of the ellipse to fit the gesture region and their derivatives.

Table- Results from researchers own dataset.

Dataset used			Classification methods	Recognition rate	
Size	Training	Test			
20	200	100	ANN (feed forward BPN)		
			Without Canny Threshold	77.72	
			with Canny Threshold (0.15)	91.53	
			With Canny Threshold (0.25)	92.33	
			SVMs classifier	95.0256	
183	75%	25%	Hidden Markov Model		
			Hand Position (0.0) and no movement	49.3	
			Hand Position (1.0) and no movement	70.2	
			Hand position (0.5) and movement (0.5)	70.6	
			Hand Position (0.2) and movement (0.8)	75.6	
262	43	43	Hidden Markov Model	Test1	Test 2
			Training 1		
			Training 2	98.8	91.1
				86.6	95.8
			Training 3	98.3	100
3450	2300	1150	KNN and polynomial networks	87	
30 Gest.	900	300	Artificial Neural Networks		
			Elman Network	89.66	
			Fully Recurrent Network	95.11	

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Voice Vault using Python

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Abstract— The Voice Authenticated Storage system is a Python-based desktop application that aims to provide secure cloud storage through advanced encryption algorithms. In addition to encrypted cloud storage, the system also provides robust user authentication using a Voice Recognition System. Voice characteristics are continuously measured using liveness detection, requiring users to utter a specific word to complete actions. Alternatively, voice patterns can be measured passively, adding an extra layer of security. User voices are locally verified against stored patterns, with a token sent to the service provider for access authorization. The team developed a voice recognition system using machine learning and the Python programming language. Access is only granted to users whose voice patterns match those previously stored in the system. The team utilized the python_speech_features and pyaudio modules for capturing voice samples, and the GMM model (Gaussian Mixture Model) for preprocessing them.

Keywords—Machine Learning, Encryption, , Voice, Secured.

I. INTRODUCTION

Data security is important for businesses because it helps to protect their most valuable assets. This includes customer data, financial information, and company secrets. When this data falls into the wrong hands, it can be used to commit fraud, identity theft, and other malicious activities. In some cases, sensitive data can be sold on the black market.

In today's environment, where insecurity is everywhere security has been one of the important issues. There are so many issues in today's world like password hacking and because of hacking there are cases of leaking of data that leads to violation of privacy. Regular security system contains passwords like character passwords her mixture of different characters this type of passwords can it can be easily hack , so there is a need to come with better authentication biometrics is the best option For providing security voice biometric is an emerging area especially for the purpose of authentication.

In voice biometric speaker recognition is performed with the help of the unique characteristics of human voice including physio-logical and behavioral characteristics. These characteristics have specific and appropriate features of voice and have potential to recognizing a person. With this approach itis also possible to authenticate a person irrespective of changes of environment or channel. This approach is very useful and cost effective as it is voice based biometric technique which is easily available in this digital era.

In this system, the main agenda is to Secure the Data Provided by Customers and provide secure storage for that data.

Voice recognition is a form of biometrics, and voice

authentication is the use of a user's speech to authenticate users. Like fingerprints and facial scans, voice and user speech can serve as a unique marker of a user's ID. This fact means that voice authentication carries many of the same advantages of other biometrics.

II. LITERATURE SURVEY

Name- Z. Yan and S. Zhao, "A Usable Authentication System Based on Personal Voice Challenge," 2016 International Conference on Advanced Cloud and Big Data (CBD), 2016, pp. 194-199, doi: 10.1109/CBD.2016.042.

Description-User authentication is a major approach to guarantee the security of online or cloud services when using user devices such as tablets or mobile phones to access remote servers. Usability is an important issue that greatly influences the acceptance of a user authentication mechanism. Nowadays, a very common way for user authentication is based on the match of the user's password with the registered one or using fingerprint.

Name- A. Cocioceanu, M. Barbulescu, T. Ivanoaica, M. Raportaru and A. I. Nicolin, "Testing voice-based biometrics authentication platforms for Romanian utterances through infrequent consonant clusters," 2016 15th RoEduNet Conference: Networking in Education and Research, 2016, pp. 1-4, doi: 10.1109/RoEduNet.2016.7753205.

Description- Investigating the occurrence rate of two-letters consonant clusters in the Romanian lexicon, we rank the clusters by their frequency and determine those with minimal occurrence rates. Our table of infrequent consonant clusters can be used to construct Romanian utterances for voice-based biometrics authentication platforms.**Name-** A. Boles and P. Rad, "Voice biometrics: Deep learning-based voiceprint authentication system," 2017 12th System of Systems Engineering Conference (SoSE), 2017, pp. 1-6, doi: 10.1109/SYSOSE.2017.7994971.

Description- In this article, an analysis of how a text-independent voice identification system can be built is presented. Extracting the Mel-Frequency Cepstral Coefficients is evaluated and a support vector machine is trained and tested on two different data sets, one from LibriSpeech and one from in-house recorded audio files.

Name- 4. V. Lupu, "Securing Web Accounts by Graphical Password and Voice Notification," 2018 IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC), 2018, pp. 1-5, doi: 10.1109/ICE.2018.8436303.

Description:- This thesis studies and implements voice biometric authentication system on Android smart phone platform. Firstly, the characteristics of voice database and voice recognition and authentication system flow are introduced. Then, a random shuffling algorithm is used to generate a voice cipher. After this, the voice feature extraction algorithm based on MFCC is introduced.

Name:- M. Pradhan, C. Pradhan, B. S. P. Mishra and A. Kaustav, "Authentication Using 3 Tier Biometric Modalities," 2018 International Conference on Communication and Signal Processing (ICCS), 2018, pp. 0733-0736, doi: 10.1109/ICCS.2018.8524318.

Description:- A real-time multi-factor authentication method that uses voice calls to communicate system generated one-time-passwords. The exploitation results are presented for the migration from the traditional authentication system to the proposed one.

Name:- X. Zhang, Q. Xiong, Y. Dai and X. Xu, "Voice Biometric Identity Authentication System Based on Android Smart Phone," 2018 IEEE 4th International Conference on Computer and Communications (ICCC), 2018, pp. 1440-1444, doi: 10.1109/CompComm.2018.8780990.

Description:- A 3 tier architecture is proposed and implemented with the help of biometric modalities. The security is provided by the combination of voice, face & fingerprint authentication by achieving 3 tier architecture. The performance of different biometric modalities is found to be quite secure.

Name:- S. V. Melnik and N. I. Smirnov, "Voice Authentication System for Cloud Network," 2019 Systems of Signals Generating and Processing in the Field of on Board Communications, 2019, pp. 1-4, doi: 10.1109/SOSG.2019.8706794.

Description:- SpeakPrint extracts MFCC feature in normal voice frequency and MMSI features from ultrasound signal. An SVM classifier is trained to detect these attacks by comparing above feature differences. We implemented SpeakPrint on Samsung S5 and conducted experiments on 40 users.

Name:- H. Dai, W. Wang, A. X. Liu, K. Ling and J. Sun, "Speech Based Human Authentication on Smartphones," 2019 16th Annual IEEE International Conference on Sensing, Communication, and Networking (SECON), 2019, pp. 1-9, doi: 10.1109/SAHCN.2019.8824958.

(B. Nithya, Dr.V.Ilango), ICICCS, 2017

Description:- Voice authentication is very perspective technology. It doesn't need any special biometrical devices, like finger scanner or face detector. It can be use in any place and in any channels. Our algorithm can help to recognize person by special digital voice portrait. It can be use in direct stream and in real time. It can also use in On-Board telecommunication components.

Name:- V. Vassilev, A. Phipps, M. Lane, K. Mohamed and A. Naciscionis, "Two-factor authentication for voice assistance in digital banking using public cloud services," 2020 10th International Conference on Cloud Computing, Data Science & Engineering (Confluence), 2020, pp. 404-409, doi: 10.1109/Confluence47617.2020.9058332.

Description:- Several prototypes of authentication service with two-factor authentication for the purpose of voice-controlled digital banking and online payments have been developed at the Cyber Security Research Centre of London Metropolitan University.

Name-10. C. Shayamunda, T. D. Ramotsoela and G. P. Hancke, "Biometric Authentication System for Industrial

Applications using Speaker Recognition," IECON 2020 The 46th Annual Conference of the IEEE Industrial Electronics Society, 2020, pp. 4459-4464, doi: 10.1109/IECON4339

Description- Biometric authentication has gained popularity in recent years as knowledge-based authentication methods overburden users. This is because users are required to remember distinct and secure passwords for each system where they are registered.

III. PROPOSED METHODOLOGY

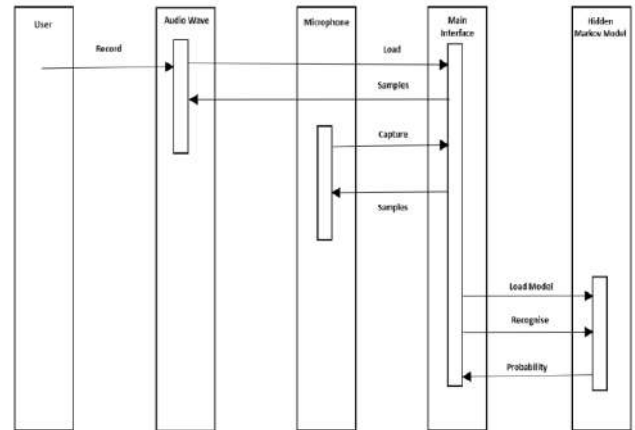


Fig 1. System architecture

When user wants to interact with the system, user must have login id which is register with the system and already have register voice samples for Authentication of their identity. First of all, when user interacts with the system, he gets login window which gives options like register new user, into the system. When he clicks on new registration user, he gets new window to register his voice sample and register himself. Or next option if user already register then he has to authenticate the voice when he input his voice then voice sample match with the stored sample After that extracted voice feature get matched with the new voice sample features if match score is greater than user gets authenticated and he get access to the stored data if features are not matched then user declared as an imposter. This authentication process is processed using API for online Authentication.

Description:

Module 1:

In this system we take the voice samples of the user using pyaudio and train model using those samples.

Module 2:

detecting voice and verification.

Algorithm:

To estimate the GMM model parameters from training data, we utilize the maximum likelihood (ML) estimation method. We repeatedly apply the expectation-maximization algorithm to acquire ML parameter estimates, which include mean, variance, weight, and log likelihood.

In developing this application, we utilize various algorithms related to cryptography and steganography. For instance, in AES encryption, plain text must be precisely 128 bits in length, while the key size may be 128, 192, or 256 bits. To implement 128-bit AES encryption, we first perform a one-time initialization

process, which involves expanding the key of a 16-byte block and initializing a 16-byte plain text block called "State." In each round, we continue with the next operation, which involves applying the S-Box to the state, rotating plaintext line K by K bytes, performing a column merge operation, and XORing state with the button.

A. An examination of the voice recognition technology.

The human voice is the most common and primary means of communication, making it a common method of interacting with computers. Voice is a natural and efficient way for people to exchange information. The process of converting a sound signal into a sequence of words using a computer program is called speech recognition. Voice processing is one of the most fascinating aspects of signal processing. However, digitalizing voice has been a significant challenge in recent years. Nonetheless, people expect computers to have voice interfaces since spoken language dominates human communication.

This paper explores the various types of voices, with voice recognition being a subset of pattern recognition. The voice recognition system can be thought of as having four stages of operation: 1) analysis, 2) feature extraction, 3) modeling, and 4) testing. For voice feature extraction, MFCC is used, with GMM and HMM being the optimal choices.

B. Using Mel frequency cepstral coefficients to identify voices.

To reduce data processing, we utilized the Mel Frequency Cepstrum Coefficient (MFCC) and vector quantization (VQ) techniques in voice identification. The goal of this process is to identify the speaker by using speech samples or speech from a group of speakers. Voice verification is used to confirm if the speaker is the person who claims to be. We used the MFCC technique for voice identification and VQ for data reduction of the extracted features. The results show that the system's identification rate improves as the number of centroids increases. The best outcomes were obtained with the combination of mel frequency and humming window. This study shows that even a linear scale can achieve reasonable detection rates by using more centroids, despite an increase in the number of votes. Therefore, increasing the number of centroids is necessary when the number of votes increases. However, the recognition rate on a linear scale decreases significantly as the number of voices increases. Mel scale is also less prone to changes in vocal cords over time. Incorporating Hidden Markov Model (HMM) can improve segmentation efficiency and accuracy while dealing with crosstalk, laughter, and different voices. The extracted parametric representation of the acoustic signal can be used to further enhance the identification rate using a more effective normalization algorithm.

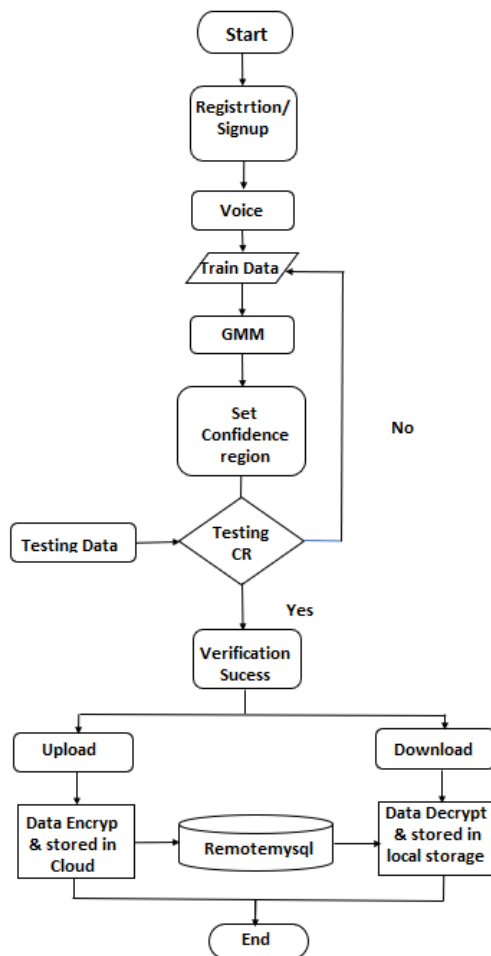
C. GMM Recognition

The speaker is identified via GMM recognition using log probability. It recalculates the speech vector's log likelihood and compares it to the value previously saved. Access to the full speaker is granted by a log likelihood equal to the stored value.

System Working

The first step for a user is to create an account by providing a username and a master password. Upon the initial login, the user will be authorized and subsequently logged in through voice recognition methods. All subsequent logins will be voice-based, confirmed, and logged in to the interface. Once logged in, the user will be directed to the home page. To secure the file, we use steganography technique along with the AES (Advanced Encryption Standard) algorithm, and the file will be uploaded to the cloud storage in its encrypted form. To access the text file, the user needs to locate and download the encrypted file from the database, which will then be saved in the Downloads folder. The user-friendly interface minimizes the need to remember multiple passwords, making the application efficient.

Flowchart



IV. RESULT AND DISCUSSION

This paper presents the proposed real-time voice identification system. To extract features, the system employs the use of MFCC, while GMM is used for training. The system captures the

user's voice via a microphone, after which voice features are retrieved. The hamming window technique is utilized to minimize dis-continuities at the frame's edge, resulting in smooth frequency transmission in speech signals. The use of Mel Frequency Cepstral Coefficients produces 15 coefficients, utilizing 40 Mel filters. These coefficients are then passed to GMM for use during the training phase. The identification of users is achieved by comparing the logarithmic probability with the threshold specified by the system, thereby minimizing the need to remember multiple passwords.

V. CONCLUSION

This application enhances the security of all media types, including text files, photos, and videos, by preventing unauthorized access. The application employs a voice security technique for authentication, followed by encryption of the files, making it even more secure. Cryptography technology, specifically the AES Encryption, further bolsters the security system by virtually eliminating the possibility of a breach. Consequently, a novel security solution has been developed, enabling users to lock and unlock their files while also storing them in the cloud. This program is user-friendly and cost-effective, adding to its appeal.

VI. REFERENCES

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Dengue Malaria Prediction using CNN

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Abstract— The health care terrain is set up to be rich in information, but poor in rooting knowledge from the information. This is because we do not having effective and effective tools and styles. By applying the rear most technology like machine literacy algorithms and ways and styles precious knowledge can be uprooted from the health care system can be veritably useful for farther improvement. Malaria and Dengue have a lot of bad runs which can harm mortal body veritably poorly. We are using Deep Learning algorithms to increase the delicacy of Malaria and Dengue Disease vaticination System. It's enforced as desktop operation in which stoner submits the miscellaneous data like textbook and image of blood cells symptoms. It retrieves retired data from stored database and deep literacy model and compares the stoner values with trained data set.

Keywords—Machine Learning, Disease prediction, Malaria, Dengue.

I. INTRODUCTION

Conditions are caused due to colorful reasons. They can be transmitted through colorful contagions or due to some chemical responses in our body. Among colorful life- changing conditions, conditions which have analogous symptoms have gathered a great deal of attention in medical exploration. The opinion of conditions with analogous symptoms is a grueling task, which can offer automated vaticination about the complaint of case so that farther treatment can be made effective. The opinion of similar conditions is generally grounded on signs, symptoms and cell image of the patient. A major challenge faced by healthcare associations, similar as hospitals and medical centers, is the lack of coffers at affordable costs and delicacy with lower time. 1) In healthcare, quality service depends on diagnosing cases duly and administering effective treatments with affordable cost. The available complaint database consists of both numerical and cell image data. Before applying any algorithm or any operation on available dataset we first need to check its authentication and thickness. We need to first perform data preprocessing operation on dataset to make it clean and proper. 2) By applying the algorithm, proposed system can identify and prize the retired knowledge from dataset, i.e.

patterns and connections associated with complaint from a database. The Healthcare vaticination system is an end stoner and an online discussion design which can help in dwindling the total time period needed for penetrating each case by croakers on time. Then we propose a system that allows druggies to get instant guidance on their health issues having analogous symptoms through a prophetic health care system online.

This system is also responsible for classifying conditions having analogous symptoms. compass

1. insure presto complaint vaticination.
2. insure accurate complaint vaticination.
3. Bear lower force
4. Ensures low cost
5. fluently accessible

II. LITERATURE SURVEY

Name-: Automatic Diagnosis With Efficient Medical Case Searching Based on Evolving Graphs. (Xiaoli Wang 1, Yuan Wang2, Chuchu Gao1, Kunhui lin1, and yadi li3), IEEE, 2018

Description-: The knowledge graph- grounded system to make the relation between colorful types of multimodal data builds a semantic rich knowledge base using both medical wordbooks and practical clinical data collected from hospitals and proposes a graph modeling system to bridge the gap between different types of data, and the multimodal clinical data of each case are fused and modeled as one unified profile graph and also develop a lazy literacy algorithm for automatic opinion grounded on graph similarity hunt.

Name-: Using Electronic Health Records and Machine Learning to Make Medical Related Predictions from Non-Medical Data (Stavros Pitoglou, Yiannis Koumpouros and Athanasios Anastasiou) , International Conference on Machine Learning and Data Engineering, 2018

Description-: The thesis that the operation of machine literacy ways on data of this nature can be used to address vaticination/ soothsaying problems in the Health IT sphere.

Limitation-: The novelty of this approach consists in that medical data (test results, judgments, croakers ' notes etc.) aren't included in the predictors ' dataset.

Name-: Monitoring Mobile Patients Using Predictive Analysis

By Data From Wearable Sensors, International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) 2018.

Description- In this paper system uses detectors, the data accession unit, microcontroller and software. This system is suitable to shoot alarm dispatches about the case's critical health data by textbook dispatches or by dispatch reports. By using this information, the healthcare professional can give necessary medical advising.

Limitation- Sensors and controller, camera is costly.

Name:-Data Mining for Wearable Sensors in Health Monitoring Systems: A Review of Recent Trends and Challenges, Center for Applied Autonomous Sensor Systems, Orebro University, SE-70182, Orebro, Sweden;2017.

Description-: This paper provides a recent review of the rearmost styles and algorithms used to dissect data from wearable detectors used for physiological monitoring of vital signs in healthcare services. In particular, the paper outlines the more common data mining tasks that have been applied similar as anomaly discovery, vaticination and decision timber when considering in particular nonstop time series measures.

Limitation-: The named data mining fashion is largely dependent on the data mining task to be performed. According to the considered data mining tasks in Section 3, for anomaly discovery task, SVM, HMM, statistical tools and frequence analysis are more generally applied.

Name:-An Artificial Neural Network approach for classification of Vector-Borne diseases. (Prajwal Shimpi, Sanskruti Shah, Maitri Shroff , Anand Godbole),(ICEEOT) 2018.

Description-: Three conditions current in India malaria, dengue and chikungunya. The proposed system uses an Artificial Neural Network(ANN) rested backpropagation algorithm for training and testing. Several grade optimization ways are used like Adaptive Moment Estimation, RMS Prop, Adara, Classical instigation and Nesterov accelerated grade grade. Limitation- incremental from the 3 possible conditions that were taken in consideration in this paper, different set of conditions, that is, outside of vector- borne conditions are not detected.

Name:-Analytical study of heart disease diagnosis using classification Techniques. (C.Sowmiya; P.Sumitra), International Conference on Intelligent Techniques in Control, Optimization and Signal Processing,2017

Description-: In this paper the eventuality of nine bracket ways was estimated of vaticination of heartdisease.Using medical biographies similar as a age, coitus, blood pressure, casket pain type, dieting blood sugar. It can prognosticate like of cases getting heart complaint Grounded on this, medical society takes part interest in detecting and precluding the heart complaint.

Limitation-: It can only experiment a priori algorithm. Classification of diseases is not accurate.

Name:-An ensemble based on distances for a kNN method for heart disease diagnosis. (Alberto Palacios Pawlovsky), IEEE, 2018

Description-: In this paper the eventuality of nine bracket ways was estimated of vaticination of heartdisease.Using medical biographies similar as a age, coitus, blood pressure, casket pain type, dieting blood sugar. It can prognosticate like of cases getting heart complaint Grounded on this, medical society takes part interest in detecting and precluding the heart complaint.

Limitation -: In this paper the eventuality of nine bracket ways was estimated of vaticination of heartdisease.Using

medical biographies similar as a age, coitus, blood pressure, casket pain type, dieting blood sugar. It can prognosticate like of cases getting heart complaint Grounded on this, medical society takes part interest in detecting and precluding the heart complaint.

Name-: Prophetic Analytics in Health Care Using Machine Learning Tools and ways.

(B. Nithya, Dr.V.IIango), ICICCS, 2017

Description-: It offers a variety of waking and threat operation decision support tools, targeted at perfecting case's safety and healthcare quality and complaint prognostications.

Limitation Massive quantities of miscellaneous, distributed, different, largely dynamic data sets and decreasingly large quantities of unshaped and non-standardized information with respect to varied types of cancers.

Name-: Non-invasive system for bronchopulmonary conditions opinion in cases of all periods grounded on the microwave oven technologies.(IvanV. Semernik, AlexanderV.Dem'yanenko, OlgaE. Semernik, AlexanderA. Lebedenko), IEEE, 2017

Description-: In this paper the system of bronchial asthma diagnostics grounded on analysis of microwave oven band electromagnetic radiation propagation through the case casket is described. The suggested system allows realizing inoffensivenon-invasive diagnostics of respirator system conditions among cases of all periods. It also allows covering the case's condition and the complaint progression during the whole period of treatment.

Limitation- The disadvantages of the suggested system are absence of necessity of doing breathing manoeuvres by the case, absence ofnon-influence on the caseetc.

Name- The Ethical Challenges of Applying Machine literacy and Artificial Intelligence in Cancer Care.(Rima Hajjo), IEEE, 2018

Description- This composition examines the ethical issues of applying ML and AI in cancer care and classifies them into three major orders bias, the societal perpetration of the technology, and the goods of big data analytics on cancer cases. Limitation- Algorithms trained on data sets with these characteristics are espoused in healthcare; they've the eventuality to complicate health difference.

III. PROPOSED METHODOLOGY

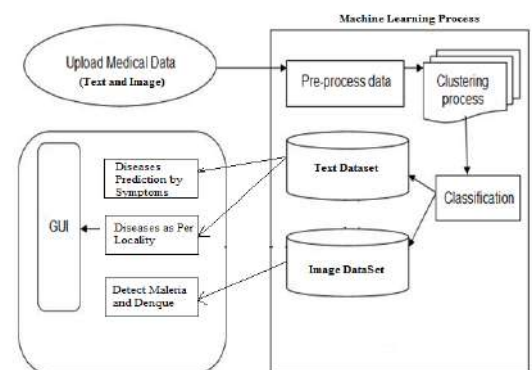


Fig 1. System architecture

The people are suffering from the numerous viral conditions like Dengue, Malaria. This information is collected from the colorful hospitals and the analysis of data is done and vaticination of some conditions can be made. This system gives the vaticination as per position of the area.

Description:

Module 1:

In this system we detect the dengue or malaria virus based blood cell image and apply image processing with the use of machine learning algorithm

Module 2:

detecting diseases based on symptoms.

A. Algorithm:

CNN is the basic algorithm used in the project which is as follows,

1. Classify dataset under labeled folders with blood samples images as CNN is supervised algorithm
2. Read dataset and prepare dataset in one file as pickle and NumPy.
3. Read features of all images and label (here name of dataset folder) of it using following functions,
 - a. Conv2D
 - b. Maxpool2D
 - c. REL activation for layers
 - d. Sigmoid activation for dense layer
 - e. Binary Cross entropy for loss calculation
4. Store it in model file
5. Get input image
6. Read features of input image
7. Compare features of stored features
8. Show label as prediction of nearly matched features.

Now days, to analyzation of the imaginary data in deep literacy, most important and constantly used algorithm is Convolutional neural network(CNN, or ConvNet). For the minimumpre-processing of a data CNN have different types of the variations. Along with the restatement invariance characteristics and the armature related with the participated- weight, CNN also known as shift steady or space steady artificial neural networks(SIANN). Along with the beast visual cortex, the connectivity between the neurons resembles the association; networks were inspired by natural processes. Only in defined visual fields, Respond to stimulants of Individual cortical neurons is known as the open field. The open fields of colorful neurons part lap specified they cowl the whole field of regard. CNN's use comparatively veritably little preprocessing compared to indispensable image bracket algorithms. This implies that the network learns the pollutants that in ancient algorithms were hand- finagled. This independence from former information and mortal trouble in a point style may be a major advantage. They need operations in image and videotape recognition, recommended systems, image bracket, medical image analysis, and verbal communication process. A CNN consists of associate input associated an affair subcaste, likewise as multiple retired layers. The retired layers of a CNN generally encompass convolutional layers, pooling layers, completely connected layers, and social control layers.

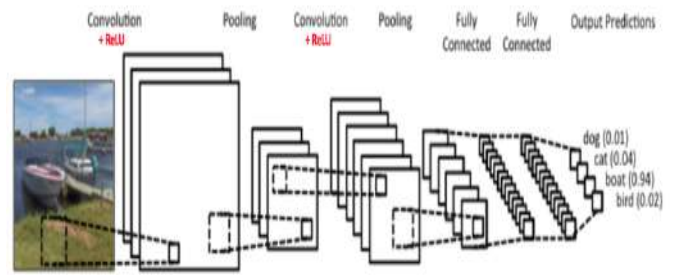


Fig 2. Simple ConvNet

The Convolutional Neural Network in Fig. is analogous in armature to the original LeNet and classifies an input image into four orders canine, cat, boat or raspberry. There are four main operations in the ConvNet shown in fig. above:

1. Convolution
2. Non Linearity
3. Pooling or Sub Sampling
4. Classification

An Image could be a matrix of picture element values. principally, each image will be diagrammatic as a matrix of picture element worth Channel could be a typical term wo n't to talk to a precise element of a picture.

B. Mathematical Model:

Let 'S' be the system

- Where,
 - S= {I, O, P, Fs, Ss}
 - Where,
 - I = Set of input Set of output
 - P = Set of technical processes
 - Fs = Set of Failure state
 - Ss = Set of Success state

- Identify the input data I1, I2, , In

$I = \{(\text{Input Data (Text, Image)}, \text{Dataset (Dengue, Malaria)})\}$

- Identify the output applications as O1, O2,,On

$\{(\text{Malaria Detection, Dengue Detection})\}$

- Identify the Process as P

$P = \{(\text{Image pre-processing, Image Processing, Grey-scale, smoothing, Edging, segmentation, feature extraction, classification, show result})\}$

- Identify the Failure state as Fs

$Fs = \{(\text{If data set not loaded, If not predicted, if more time required to predict})\}$

- Identify the Success state as Ss

$P = \{(\text{Correct prediction within time})\}$

IV. RESULT AND DISCUSSION

In the proposed system, we will be using supervised CNN approach is used to prognosticate the results from images as well as textbook dataset is used for symptoms bracket. CNN gives delicacy than other algorithms. Also textbook dataset and symptoms bracket works in compliment to the CNN to get more precise results.

Comparative results of existing and proposed system is as follow,

Parameters	Existing System	Proposed System
Image Dataset	Somewhat	Yes
Text Dataset	Somewhat	Yes
Symptoms Classification	Many Diseases	Focused on Dengue and Malaria
CNN	Somewhat	Yes
Execution	Mostly Heavy with Matlab	Lightweight with Python, OpenCV and Tensorflow
Time	More	Less

Table 1: Comparative Results

With reference to Table 1 it is clear that we overcome various problems in existing system and our approach works efficiently.

V. CONCLUSION

A robust and new system by using machine knowledge for judgments malaria and dengue has been executed in this paper. By using this system we gain the lower than 60 seconds time to give a opinion as compared to other clinical laboratories. The prophecy algorithm is design to predict the area in pitfall zone of particular complaint by considering the position from the database to calculatetheresults.The results have to be the same as the Python affair, as well as keeping to an respectable processing speed and duration. The disquisition will concentrate on the benefits it can give for the successful opinion of malaria, dengue and theprobativetreatment.The system prophecy is truly important in the awareness about the viral diseasespreading in the position as people get advised by the system about any particular complaint so they take precautions about that.

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Online Personal Health Care

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Abstract— Considering the day-by-day rapid increase in population of the world, providing appropriate healthcare to elderly or unwell people becomes a crucial issue and needs high attention from mainly medical, also industrial and academic fields of the society. Patient healthcare provision in the home environment presents many challenges. Patient Healthcare is a term used for the practice of medicine and public health supported by mobile devices. It is most commonly used in the reference to using mobile communication devices such as mobile phones, tablet & computer PDAs. This project addresses Patient Healthcare System at home. The purpose of this project is to on emergency case doctor can handle the situation using this device. After analysing these patient records from device then doctor send the all details via SMS to the patient like prescription, tablets etc., and patient take action on this update and take relax.

Keywords—*Personal Health, full Stack, Health Care*

I. INTRODUCTION

Since the population of the world is ageing rapidly, how to provide appropriate healthcare to the elderly and unwell people becomes an important issue and draws high attention from medical, academic and industrial fields of the society. Economic growth in a country largely depends on the standards of its social infrastructure. Healthcare is important areas of social infrastructure. It also covers care of the other healthcare organization objective of which can be met through healthcare infrastructure needs, management model that identifies problems, develops a framework for implementation and helps to evaluate dynamically healthcare infrastructure service performance and social security measures. Hospitals always need better management. The database of all patients should be handy enough. But also, there should be data prevention. Also, the patient data should be kept private in case. Healthcare is the most important concern of many countries in the world. Improving the lives of patients especially in the weaker parts of the society which include the elderly, physically and mentally disabled as well as the chronically ill patients is the major factor to be improved. In existing system, the data is recorded in the form of paperwork or on general storage server. But generally, that data is accessible to all the staff and doctors. Hence, we are proposing a new way where patient and doctors able to communicate through mobile application and web application.

The proposed system uses website for real time monitoring and analysis of the patient's health parameters and in return provide medication. It is easy for doctors and the caregivers to immediately act in emergency cases, and also to provide medication depending on the health parameters without the physical presence of the doctors. The system is such that, remote monitoring of patients can be done by diagnosis of the patients with the help of the website. In this patient can book appointment and also can get prescriptions. Patient also can share reports and data to the Doctor through this website. This data is received by the doctors and caregivers through server which is analyzed by the doctors. The server helps to store the data, medical history of the patient for future use. The system architecture is such that the patients can be monitored and treated privately at home. This system also helps in handling multiple patients at a time in the hospitals as well as the public health care units. Online Medicine Shop Project in JSP Mysql. online Pharmacy shop project in JSP Mysql Netbeans. This project is a web application which is developed in Java JSP Mysql. Work on the Sales Reporting and Management System-Pharma project to enhance the growth of pharma employees/ companies. this project is to develop an online web portal that can handle product information, can booking from distributors very fast from all over the world and online payment for orders and customer support for distributors. This type of application will atomize the procedure of drug supply through the Pharmaceuticals Company and improve business standards and customer relationships. This application is use distributors can view detailed information of transactions and get drugs information and see future orders from his account. Customers can easily visit this site and register themselves, by filling a registration form. Once a customer is registered, he/she can login using their email and password and can buy products available. Users can also view doctors with their descriptions, clinics, and timings.

II. Scope of the Project

Effective and timely communication between patients, physicians, nurses, pharmacists, and other healthcare professionals is vital to good healthcare. Current communication mechanisms, based largely on paper records and prescriptions, are old-fashioned, inefficient, and unreliable.

When multiple healthcare professionals and facilities are involved in providing healthcare for a patient, the healthcare services provided aren't often coordinated. Typically, a physician writes a prescription on paper and gives it to the patient

The patient carries the prescription to the pharmacy, waits in line to hand the prescription to the pharmacist, and waits for the pharmacist to fill the prescription. The pharmacist might be unable to read the physician's handwriting; the patient could modify or forge the prescription; or the physician might be unaware of medications prescribed by other physicians. These and other problems indicate the need to improve the quality of healthcare

III. LITERATURE SURVEY

Author Name - Mi Jung, Rho

Title - Different Perception and Attitude toward Medical Data that including Protected Health Information in Clinical Research

Publication Year- 2018

Technology Used - The interest for clinical research, using medical data stored in the EMR, is increasing. However, perception and attitude medical data, including protected health information, could differ depending on the person. Different perception and attitude could interfere with the activation of medical information utilizing. Therefore, we attempted to find different perception and attitude toward protected health information preserving medical data in clinical research.

Author Name - Fayezah Anjum, Abu Saleh Mohammed Shoaib

Title - Online Health Care

Publication Year- 2018

Technology Used - The importance of health care is immense in a society and over the past years, this sector has been evolving to produce a more efficient and computerized system. Bangladesh has also made a significant improvement in the health care system over the years. This paper presents the development of a web application for the general public of Bangladesh where they can store their own medical data and access it anytime, from anywhere. In the Online Health Care (OHC) system, users can register as patients to store their medical data in the database.

Author Name - Pin-Chieh Huang

Title - Development of Health Care System Based on Wearable Devices

Publication Year- 2019

Technology Used - the system has been set in a long-term care institution in Taiwan since October, 1st, 2018. There are two groups of residents in the institution. One of the groups are the elders who have chronic such as high pressure and high blood sugar. This type of group adopts the care notification system to help them manage their health. The other group is dementia residents. There are 10 dementias about 59 to 89 years old attend the experiment.

Author Name - Yung-Tien Huang

Title - A Study on the Mobile Personal Health Management System

Publication Year- 2019

Technology Used - Based on the demand characteristics of remote care, this paper establishes a system structure of mobile personal health management, which is divided into three parts: blood pressure blood glucose pulse machine, radio frequency identification (RFID) system and network health information management system. The completed mobile personal health management system allows users to use the wireless network environment to complete physiological measurements and numerical upload records anytime, anywhere, and to easily obtain a list of personal health measurement records using a tablet or smart phone. And the analysis chart, the measurement data of this system is measured and transmitted, combined with the record and analysis of network health information management, can improve the immediacy and accessibility of long-term and long-distance care, and also simplify the operation of medical services process.

Author Name - Sarmad Monadel Sabree ALGayar

Title - Medical Social Media Systems – Implementation of the Android Application

Publication Year- 2019

Technology Used - This article presents the implementation of an integrated architecture for a mobile healthcare system, which is called Medical social media system. This system integrates wearable sensors, smartphones, and oriented social media, so as to enhance the healthcare services in the Iraqi environment. The system can be used by smartphones, running on the Android system and smart-watches. In addition, the website can be utilized by devices like desktops, notebooks, tablets, and smartphones which can be utilized maximally for data collection and analysis via user-system interactivity, utilizes wearable sensors, smartphones that automatically collect life activities information, such as exercises information like heart rate, the breathing rate, and body temperature.

Author Name - Mark L. Braunstein

Title - Health Care in the Age of Interoperability Part 5: The Personal Health Record

Publication Year- 2019

Technology Used - we focused on clinical decision support (CDS) for physicians and other health care providers. In this one, we will look at how interoperability through Fast Healthcare Interoperability Resources (FHIR) could empower patients to become more involved in their own care and in maintaining their health.

Author Name - Yan Li

Title - User Privacy Protection Technology of Tennis Match Live Broadcast from Media Cloud Platform Based on AES Encryption Algorithm

Publication Year- 2020

Technology Used - With the improvement of the current Internet software and hardware performance, cloud storage has become one of the most widely used applications. This paper proposes a user privacy protection algorithm suitable for tennis match live broadcast from media cloud platform. Through theoretical and experimental verification, this

algorithm can better protect the privacy of users in the live cloud platform. This algorithm is a ciphertext calculation algorithm based on data blocking. Firstly, plaintext data are grouped, then AES ciphertext calculation is performed on each group of plaintext data simultaneously and respectively, and finally ciphertext data after grouping encryption is spliced to obtain final ciphertext data.

Author Name - Adam Imansyah Pandesenda
 Title - Sentiment Analysis of Service Quality of Online Healthcare Platform Using Fast Large-Margin
 Publication Year- 2020
 Technology Used -. Mobile technology is a tool by which healthcare users are assisted. Health information technology has the ability to enhance individual health outcomes and increase healthcare quality, allowing better independent health management. The implementation of information technology in healthcare, particularly the development of healthcare services based on mobile technology (m-health), has already changed healthcare delivery by making it more available and affordable across developing world. Alodokter is Indonesia's number one digital health firm, that has significantly changed the axis of Indonesian health services in providing easily understood, reliable, and available medical information to everyone

Author Name - Informatique de santé
 Title - Health informatics — Personal health device communication
 Publication Year- 2022
 Technology Used - ISO/IEEE 11073 standards enable communication between medical devices and external computer systems. This standard uses the optimized framework created in IEEE Std 11073-20601™-2008a and describes a specific, interoperable communication approach for pulse oximeters. These standards align with, and draw upon, the existing clinically focused standards to provide support for communication of data from clinical or personal health devices.

IV. PROPOSED METHODOLOGY

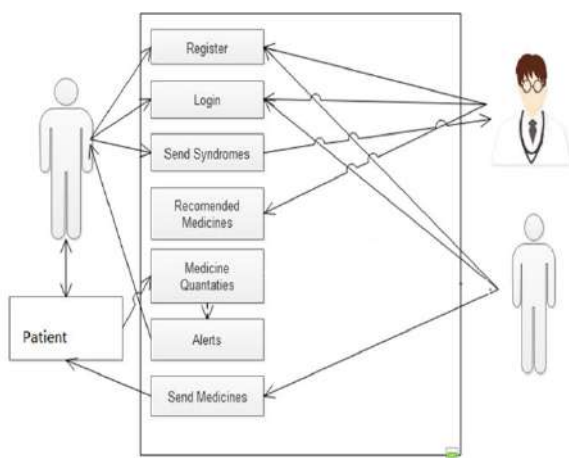


Fig. 1. System Architecture

Patient also can upload reports on website. Patient should view a prescription suggested by doctor on website. Patient Above figure showing system architecture for proposed system. In this there are 3 modules included which are admin, medical & patient. Patient can book appointment online of particular doctor. can order medicines from website e-commerce site directly. Doctor can give time to the patients according to their time convenience.

First, User and Admin and Medical shop owner should have to register to the system. After registering to the system user, doctor and shop owner should have to login to the system. After login patient should book appointment, can view prescription given by the doctor and also can order the medicines from same website.

Doctor can view all the data of the users and also can send prescription to the patients and medical shop owner. Medical shop owner can view all information of patients and their reports. Medical store owner can book medicines online from medicine ecommerce. Medical store owner can view all the medical related information.

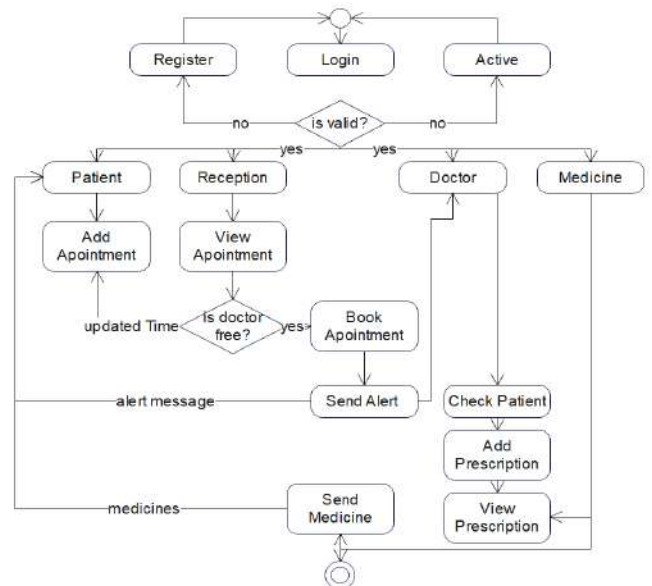


Fig. 2. Flow Chart

A flowchart visually displays the sequence of activities in a process and who is responsible for those activities. The purpose of any flowchart is to help visualize required steps – especially important for a project management process. Every flowchart consists of actions, the roles responsible for executing those actions and the inputs and outputs for each step. Project flow describes a pre-set sequence of activities required to plan, produce, deliver and maintain project product, along with information, materials, and resources required by the project. Project flow is a convenient way to define and plan projects. Flowchart is a graphical diagram that represents the sequence of steps to solve a problem. A flowchart is a diagrammatic representation of an algorithm. In computer programming.

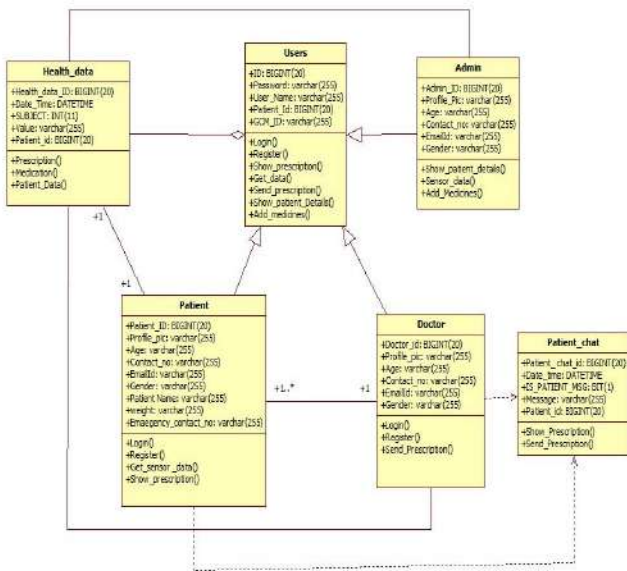


Fig. 3. Class Diagram

Class diagrams are the main building block of any object-oriented solution. It shows the classes in a system, attributes, and operations of each class and the relationship between each class.

In most modelling tools, a class has three parts. Name at the top, attributes in the middle and operations or methods at the bottom. In a large system with many related classes, classes are grouped together to create class diagrams. Different relationships between classes are shown by different types of arrows. Class diagram consists of classes, interfaces, associations, and collaboration. Class diagrams basically represent the object-oriented view of a system, which is static in nature.

V. RESULT AND DISCUSSION

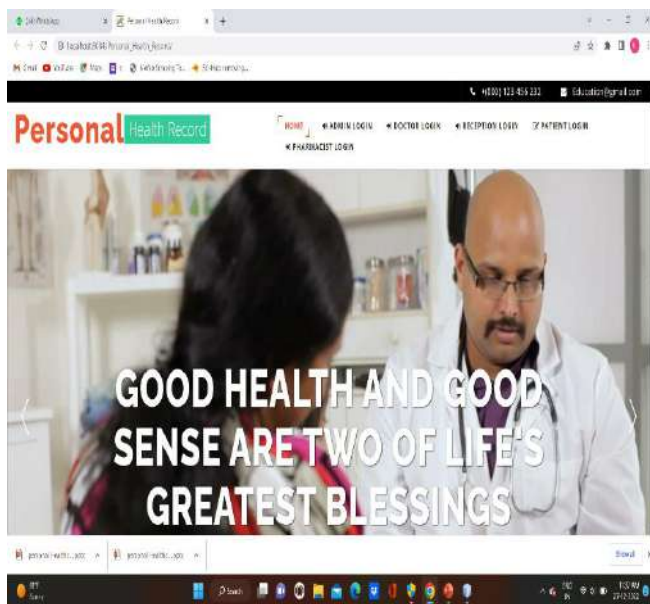


Fig. 4. Home Page

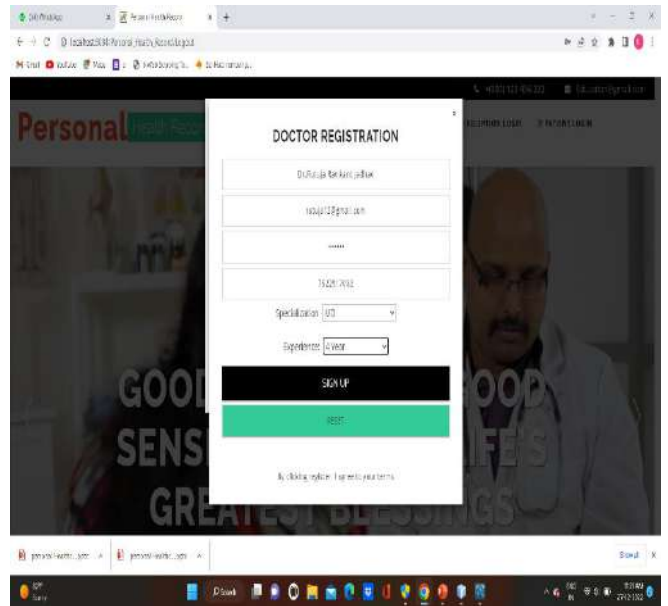


Fig. 5. Registration Page

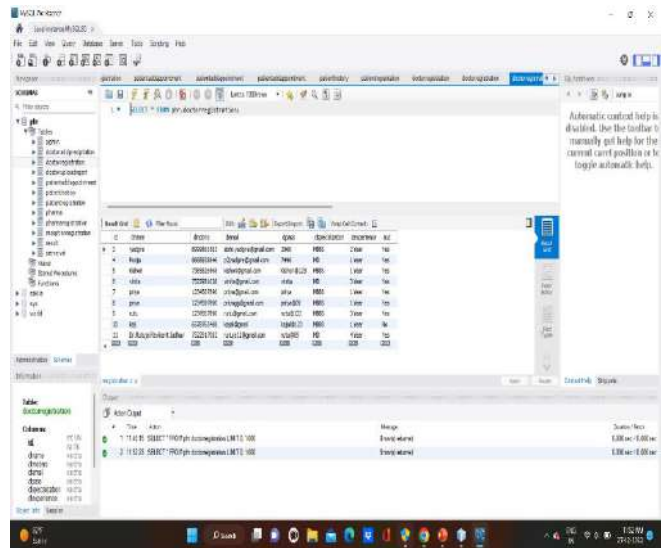


Fig. 6. Stored Dataset

VI. CONCLUSION

In The Present Healthcare Monitoring System, The Proposed System Is More Efficient And Beneficial. It Uses Low Cost; Proper Messages Are Provided In Emergency. Thus, It Saves Life Of Patient When Abnormal Conditions Take Place. A Dynamic Integration Related To Multimedia Medical Data Provides The Framework Which Is Low Overhead And Rich Multimedia Support. The System Is Able To Carry Out A Long-Term Monitoring On Patient's Condition And Is Equipped With An Emergency Rescue Mechanism Using SMS And E-Mail Alert.

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Plant Leaf Disease Detection using CNN

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Abstract— when plants and crops are suffering from pests it affects the agricultural production of the country. Usually, farmers or experts observe the plants with eye for detection and identification of disease. But this method is often time processing, expensive and inaccurate. Automatic detection using image processing techniques provide fast and accurate results. All essential steps required for implementing this disease recognition model are fully described throughout the paper, starting from gathering images to make a database, assessed by agricultural experts, a deep learning framework to perform the deep CNN training. The advance and novelty of the developed model dwell its simplicity; healthy leaves and background images are in line with other classes, enabling the model to distinguish between diseased leaves and healthy ones or from the environment by using CNN. Deep learning techniques are very successful in image classification problems. We can make use of Mobilenet V2 and Machine Learning to process data of different plant image samples to get fast analysis of the various diseases.

Keywords—Plant Image, Plant Disease Detection, Machine Learning, Image Processing, DeepLearning, Convolutional Neural Network.

I. INTRODUCTION

Our task will be to make an app which will detect the disease of the plant from its leaves. To achieve this, we will use convolutional neural network (CNN) models like MobileNet V2 to identify the images with greater accuracy. We will be using the „Plant Village“ Dataset from Tensor Flow datasets which has 38 categories. The total images are 54,303. The original dataset named as „Plant Village“ had 61,486 images. The images will be resized to 224 x 224 pixels for MobileNet V2.

This paper uses TensorFlow datasets module to download the plant village datasets. Then we extract the labels of each category from the images and split them accordingly to train, valid and test sets. The image size has been changed to be used in MobileNet V2. We use sequential model from keras for our model. After compiling we then fit the model with images.

II. LITERATURE REVIEW

These papers present an algorithm for image segmentation technique which is used for automatic detection and classification of plant leaf diseases. It covers survey on

Sr.No	Author Name	Paper Name	Publication Year	Technology Used
1.	Vijai Singh, & A.K Misra	Detection of plant leaf diseases using image segmentation and soft computing techniques,” Information Processing in Agriculture,	2016	This paper presents an algorithm for image segmentation technique which is used for automatic detection and classification of plant leaf diseases. It covers survey on different diseases classification techniques that can be used for plant leaf disease detection. Image segmentation, which is an important aspect for disease detection in plant leaf disease, is done by using genetic algorithm
2.	Mohanty S.P., Hughes, D. P., & SalathéM.,	Using Detection,” Frontiers in Plant Science, vol. 7.	2016	This paper demonstrates the technical feasibility using a deep learning approach utilizing 54,306 images of 14 crop species with 26 diseases (or healthy) made openly available through the project Plant Village (Hughes and Salathé, 2015). Neural networks provide a mapping between image of a

				diseased plant(input) to crop disease pair(output)
3.	Serawork A. Walleign, Mihai Polceanu & Cedric Buche	Soybean and Convolutional Neural Networks	2018	This paper describes the feasibility of CNN for plant disease classification for leaf images taken under the natural environment. The model is designed based on the LeNet architecture to perform the soybean plant disease classification.
4.	Konstantinos P. Ferentinos,	Deep learning models for plant disease detection and diagnosis, "Computer Science and Electronics in Agriculture", vol. 145, pp. 311-318,	2018	Deep learning model was developed for detection and diagnosis of plant diseases. In this system open database of 87,848 images was used for training and testing. Proposed paper includes various phases of implementation namely dataset creation, feature extraction, training the classifier and classification.

different diseases classification techniques that can be used for plant leaf disease detection. Image segmentation, which is an important aspect for disease detection in plant leaf disease, is done by using genetic algorithm

This paper demonstrates the technical feasibility using a deep learning approach utilizing 54,306 images of 14 crop species with 26 diseases (or healthy) made openly available through the project plant village (Hughes and Salathé, 2015). Neural networks provide a mapping between image of a diseased plant (input) to crop disease pair(output).

The primary goal of convolution in this case is to extract features from the input image. This paper consists of an abstract and core of it is plant disease classification using convolutions. The created datasets of diseased and healthy leaves are collectively trained under Random Forest to classify the diseased and healthy images. For extracting features of an image, we use Histogram of an Oriented Gradient (HOG) using machine learning to train the large data sets available publicly gives us a clear way to detect the disease present in plants in a colossal scale.

III. METHODOLOGY

During the period of gathering the pictures for the dataset, pictures with a more modest goal and measurement not exactly 500 pixels were not considered as substantial pictures for the dataset. In expansion, just the pictures where the locale of intrigue was in higher the goal was set apart as a qualified possibility for the dataset.

It is significant to utilize precisely characterized pictures for the preparation and approval dataset. Just in that manner may a fitting and solid identifying model be created. In this stage, copied pictures that were left after the underlying the emphasis of get-together and gathering pictures into classes were eliminated from the dataset.

A. Image preprocessing and labeling

Pre-processing pictures generally includes eliminating low-recurrence foundation commotion, normalizing the power of the individual particles' pictures, eliminating reflections, and veiling segments of pictures. Picture pre-processing is the strategy of improving information. Furthermore, the strategy of picture pre-processing included editing of the apparent multitude of pictures physically, making the square around the leaves, to feature the district of intrigue (plant leaves). During the period of gathering the pictures for the dataset, pictures with a more modest goal and measurement not exactly 500 pixels were not considered as substantial pictures for the dataset. In expansion, just the pictures where the locale of intrigue was in higher the goal was set apart as a qualified possibility for the dataset. In that manner, it was guaranteed that pictures contain all the required data for highlight learning. Numerous assets can be found via looking over the Internet, in any case, their significance is frequently problematic. Considering a legitimate concern for affirming the exactness of classes in the dataset, at first assembled by a catchphrases search, horticultural specialists inspected leaf pictures and marked all the pictures with fitting infection abbreviations. As it is known, it is significant to utilize precisely characterized pictures for the preparation and approval dataset. Just in that manner may a fitting and solid identifying model be created.

In this stage, copied pictures that were left after the underlying the emphasis of get-together and gathering pictures into classes were eliminated from the dataset.

B. System design

To diagnose the reason for the symptom by using an automatic tool, therefore the image processing system is proposed to develop to automate the identification and classification of the leaf batches into specific disorders. As shown within the figure above the system consists of three main blocks: Image Analyzer, Feature Database and Classifier resp. [9]. The processing proposed to try to by these blocks is split into two phases as follows offline Phase: an outsized set of defected images are processed by a picture analyzer for extracting abnormal features.

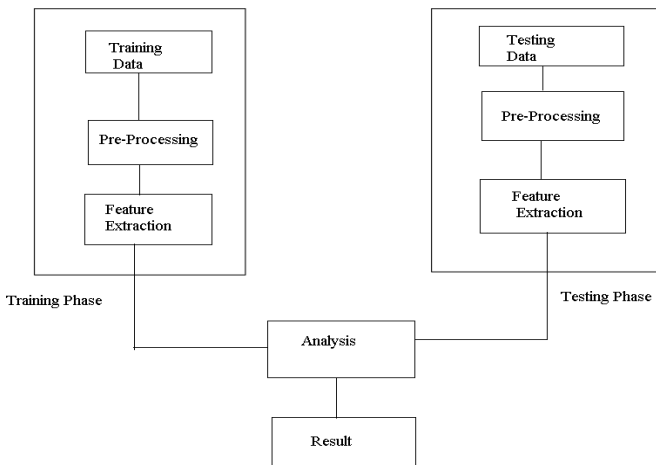


Fig. 1. System Architecture.

C. Convolutional Neural Network

The input test image is developed and pre-processed in the following phase and then it is transformed into array form for difference. The chosen database is appropriately separated and pre-processed and then retiled into suitable folders. The model is well trained using CNN and then classification takes position. The evaluation of the test image and the trained model take position tracked by the display of the result. If there is a flaw or infection in the plant the package displays the disease along with the remedy.

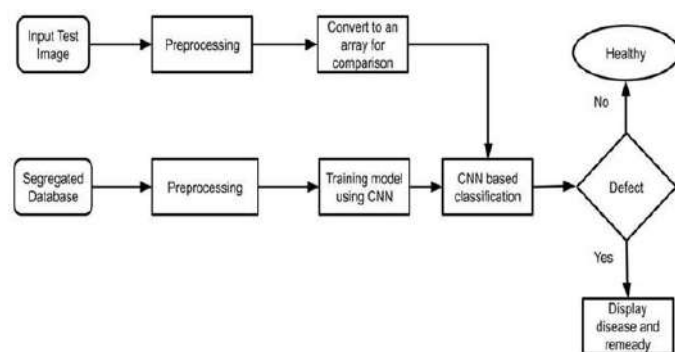


Fig. 2. Data Flow Diagram

IV. DATASET TRAINING

The dataset is preprocessed like Image reshaping, resizing and conversion to an array form. Similar processing is additionally done on the test image. A dataset consisting of about 38 different plant leaf diseases is obtained, out of which any image is often used as a test image for the software.

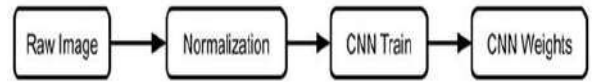


Fig. 3. Training Model

The train dataset is employed to coach the model (CNN) so that it can identify the test image and therefore the disease it is CNN has different layers that are Dense, Dropout, Activation, Flatten, Convolution2D, and maxpooling2d. After the model is trained successfully, the software can identify the disease if the plant species is contained within the dataset. After successful training and preprocessing, comparison of the test image and trained model takes place to predict the disease.

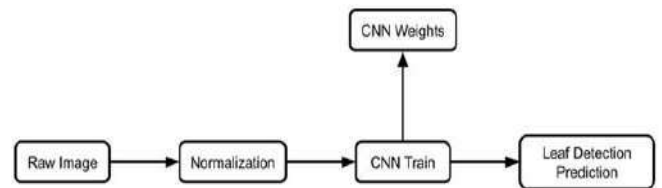


Fig. 4. Testing Model

V. IMPLEMENTATION

The CNN Model Steps

Conv2D: It is a 2D Convolution Layer, this layer creates a convolution kernel that's wind with layers input which helps produce a tensor of outputs.

```

keras.layers.Conv2D(filters, kernel_size, strides=(1,1),
padding='valid', data_format=None, dilation_rate=(1,
1),activation=None, use_bias=True,
kernel_initializer='glorot_uniform', bias_initializer='zeros',
kernel_regularizer=None, bias_regularizer=None,
activity_regularizer=None, kernel_constraint=None,
bias_constraint=None
  
```


A. Maxpooling:

Max pooling may be a pooling process that choose the very best element from the region of the feature map covered by the filter. Thus, the output after max-pooling level would be a feature map comprising the foremost important features of the previous feature map.

B. Flatten:

In between the convolutional layer and therefore the fully connected layer, there is a „Flatten“ layer. Flattening transforms a two-dimensional matrix of features into a vector which will be fed into a totally connected neural network classifier.

C. Image Data Generator:

Image Data Generator quickly found out Python generators which will automatically turn image files on disk into batches of preprocessed tensors.

D. Training Process:

Effective training begins well before a trainer delivers a private training session and continues then training session is complete. Training are often viewed as a process comprised of 5 related stages or activities: assessment, motivation, design, delivery, and evaluation.

E. Epochs:

An epoch may be a term utilized in machine learning and indicates the amount of passes of the whole training dataset the machine learning algorithm has completed. Datasets are usually grouped into batches (especially when the quantity of knowledge is extremely large).

F. Validation Process:

Validation is mentioned because the process where a trained model is evaluated with a testing data set. The testing data set may be a separate portion of an equivalent data set from which the training set springs . the most purpose of using the testing data set is to check the generalization ability of a trained model.

The normalization class comprises raw images and it is fed to the CNN model which comprises dense and weight. The CNN model categorizes and identifies by using the training model. The training model class contains the image dataset. Leaf recognition becomes utilized of the features.

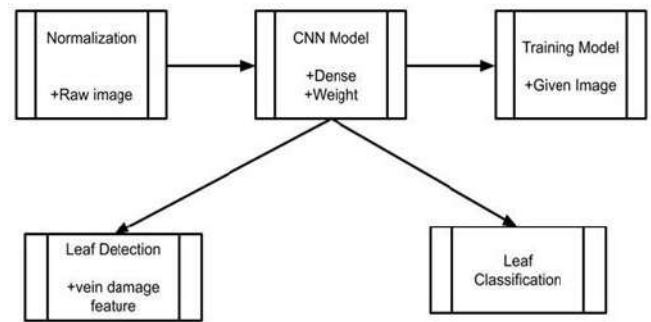


Fig. 5. Class Diagram

VI. RESULTS AND OTHER POSSIBLE APPLICATIONS

The Result Analysis

Our project gives the output of different Convolutional Neural Network modules (VGG 19 & MobileNet V2 as of now) being implemented successfully, there is also the uploading of plant village dataset which is uploaded successfully.

A. VGG 19:

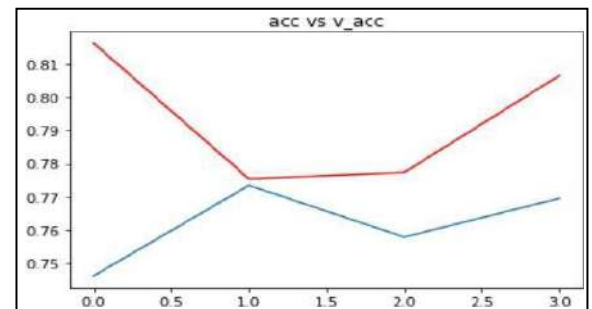


Fig. 6.1 Accuracy Vs Valid Accuracy (VGG19)

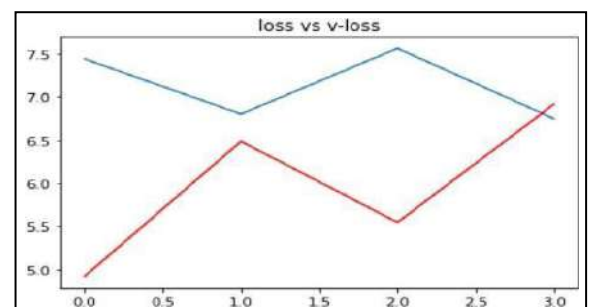


Fig 6.2 Loss Vs Valid Loss (VGG19)

VGG model gives you accuracy of 79,62130904197693%.

B. Mobilenet V2:

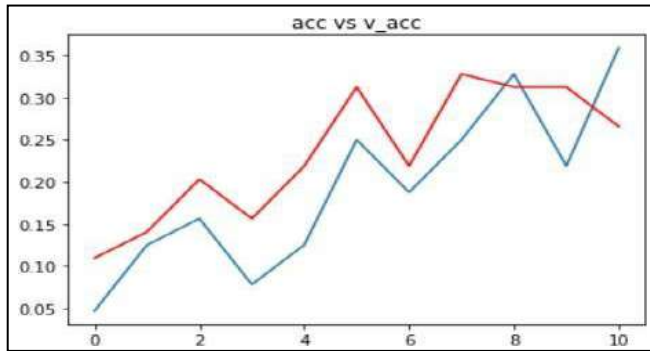


FIGURE 6.3: ACCURACY VS VALID ACCURACY (MN V2)

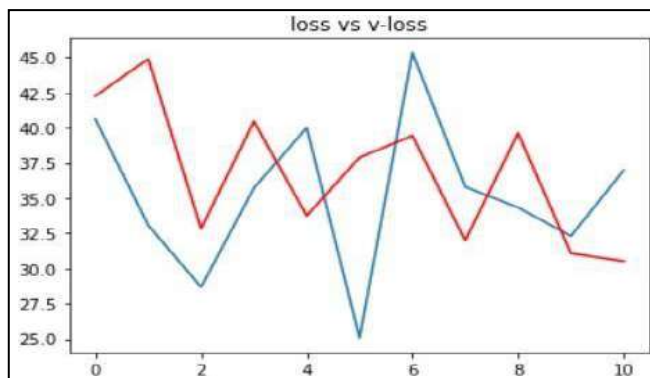


Figure 6.4: Loss Vs Valid Loss (MN V2)

Mobilnet V2 only accuracy of 29.21014428138733%.

Applications:

Plant diseases and pests detection is a very important research content in the field of machine vision. It is a technology that uses machine vision equipment to acquire

images to judge whether there are diseases and pests in the collected plant images.

VII. CONCLUSION

- This project will help gardeners and people in agriculture with identification of diseases of the plants.
- Identify as many varieties of diseases of plants as possible through their photograph, and there by share a piece of knowledge to the user of this application.
- The application is also supposed to be adaptable to download in a variety of research and forensic devices.
- Identify infected and healthy leaves as well as to detect illness in affected plants.

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Realtime Face Mask Detection using CNN

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Abstract— This paper presents a detailed survey on face mask detection systems. This paper attempts to develop a simple and effective model for real-time monitoring. The paper gives a detailed survey on face mask detection system. The different types of methods used for the system, software tools used, their outcomes and limitations. The aim of this paper is to get the exact knowledge about what innovation has been done till now and what can be done in future. It gives the direction to the future researchers to do further work on it or give some innovative idea on it.

Keywords- Face Mask Detection, Face Mask Detection System using ML/DL.

I. INTRODUCTION

In current times, after the rapid expansion and spread of the COVID-19 outbreak globally, people have experienced severe disruption to their daily lives. One idea to manage the outbreak is to enforce people to wear a face mask in public places. Therefore, automated and efficient face mask detection methods are essential for such enforcement. Since the first case was identified by COVID-19 in 2019, the coronavirus disease spread quickly and caused the outbreak all over the world in 2020. As the COVID-19 (Coronavirus) pandemic continues to spread, most of the world population has suffered as a result. 258 million confirmed cases of COVID-19 cases and 5,148,221 deaths worldwide. Therefore, people should wear face masks and keep a social distance to avoid viral spread of disease. We surveyed an effective and efficient computer vision strategy intends to develop a real-time application that monitors individuals publicly, whether they are wearing face masks or not. Face mask detection has a range of case applications, from face mask recognition to facial movements, where the latter is required to show the face with extremely high accuracy. As machine learning algorithms progress rapidly, the threats posed by face mask detection technology still seem effectively handled. This innovation is rapidly increasing, as it is used to recognize faces in images and in real-time video feeds. In this paper Section 1 provides the introduction of a complete survey on different face mask detection systems. Section 2 provides complete knowledge of different methods used to detect the face mask. Section 3 provides information about the different existing methods. Section 4 provides information about the different software tools which are used to detect the Face Mask. Section 5 provides guideline to the researches for future work in the field of face mask detection using different technologies for their research work and Section 6 concludes the existing work done in the field of face mask detection

II. LITERATURE REVIEW

Sr.No	Author Name	Paper Name	Publication Year	Technology Used
1.	Meenpal.T, Balakrishnan.A., & Verma.A	Face Mask Detection using Semantic Segmentation,	2019	Recognize the face by segmentation and detection using Models. The Proposed network can detect non frontal faces and multiple faces from a single image.
2.	Ms. R. Suganthala kshmi A. Hafeeza, P. Abinaya, A.Ganga Dev	Covid-19 facemask detection with deep learning and computer vision .	2021	The system comprises Mobile Net as the spine which can be very well utilized for high and low calculation situations. In order to extract more robust features, learning is used to gain weights from a similar task face detection, which is trained on large datasets.

3.	Mohmed Loey,Guasekaran Manogaran, Mohamed Hamed N Taha,Nour Eldeen M.Khalifa	Fighting against COVID 19: A novel deep learning model based on YOLO-12 with ResNet-50 for medical face mask detection	2020	The target of this paper is to comment on and confine the clinical face mask objects, all things considered, pictures. Wearing a clinical face mask in open territories, ensure individuals from COVID-19 transmission among them.
4	Bingshu Wang,Jianbin Zheng,C.L. Philip Chen	Masked Facial Detection Methods and Datasets for Fighting Against COVID 19	2022	Detect the Face by using Masked Facial Datasets and Deep learning Model
5	Dostdar Hussain, Muhammad Ismail, Israr Hussain, Roobaca Alroobaca, Saddam Hussain, and Syed Sajid Ullah	Face Mask Detection Using Deep Convolutional Neural Network and MobileNet V2-Based Transfer Learning		Deep Convolutional Neural Network (CNN) and MobileNetV2 transferred learning-based model, have been evaluated on two different datasets. The comparative results show that MobileNetV2 achieved 98% and 99% classification accuracy

6	Adithya K1, Jismi Babu,	A Review on Face Mask Detection using Convolutional Neural Network	2020	Essentially convolutional neural network technique is utilized quickly. The precision and decision making are exceptionally high in CNN contrasted with others
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III. METHODOLOGY

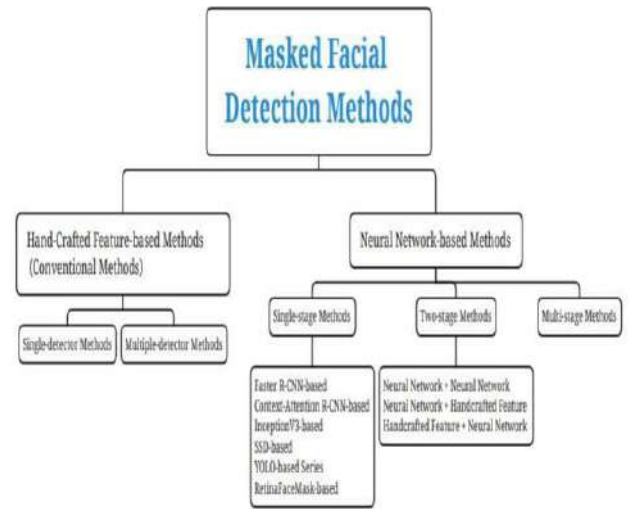


Figure 3.1 Different Face Mask Detection Methods

- The Hand-Crafted Feature-based method :
Hand Crafted features refer to properties derived using various algorithms using the information present in the image itself. The algorithm detects feature points from the image using spatial filters and groups them into face candidates using geometric and gray level constraints. A probabilistic framework is then used to reinforce probabilities and to evaluate the likelihood of the candidate as a face. It is the Conventional method which involves two different methods: single-detector method and multiple detector methods.
- The Neural Network-based method :
Neural networks are used to recognize the face through learning correct classification of the coefficients calculated by the eigenface algorithm. The network is first trained on the pictures from the face database, and then it is used to identify the face pictures given to it. It is classified as the single stage methods ,two stage methods and multi stage methods.
 - i) Single -stage method : The stage involves the Faster R-CNN based, Context-Attention R-CNN based ,Inception V3-based,SSD-based,YOLO-based Series and retina Face Mask Based.

- ii) Two stage method : It involves neural network +neural Network, neural network +hand-crafted feature, handcrafted feature + neural network.

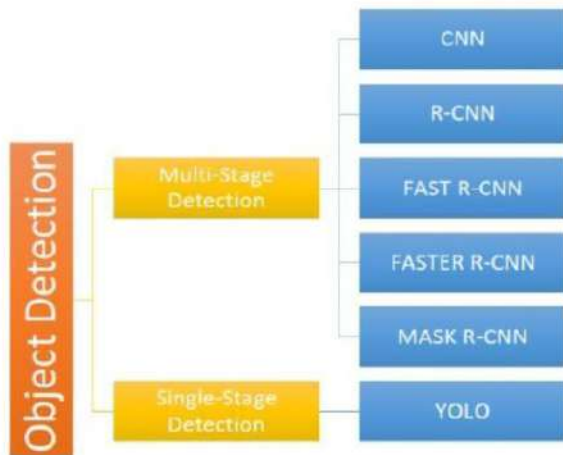


Figure 3.2 Represents the Object Detection.

• Multi Stage Detection :

The multi stage detection system is the system which is used in identifying the identity of a prisoner in a detention cell, through facial recognition automatically .It involves CNN is a kind of network architecture for deep learning algorithms and is specifically used for image recognition and tasks that involve the processing of pixel data, RCNN, stands for Region-Based Convolutional Neural Network, it is a type of machine learning model that is used for computer vision tasks, specifically for object detection ,Fast R-CNN is a deep convolutional network used for object detection, that appears to the user as a single, end-to-end, unified network. The network can accurately and quickly predict the locations of different objects. Faster R-CNN is an object detection model that improves on Fast R-CNN by utilizing a region proposal network (RPN) with the CNN model.

• Single Stage Detection :

One-Stage Object Detection Models refer to a class of object detection models which are one-stage. YOLO is an abbreviation for the term ‘You Only Look Once’. This is an algorithm that detects and recognizes various objects in a picture (in real-time). Object detection in YOLO is done as a regression problem and provides the class probabilities of the detected.

IV. EXISTING SOFTWARE TOOLS AVAILABLE

SOFTWARE TOOLS	FEATURES AND APPLICATIONS OF SOFTWARE TOOLS
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NumPy	NumPy can be used to perform a wide variety of mathematical operations on arrays. It adds powerful data structures to Python that guarantee efficient calculations with arrays and matrices and it supplies an enormous library of high-level mathematical functions that operate on these arrays and matrices.
OpenCV	Open CV (Open Source Computer Vision Library) is an open source computer vision software library for the purpose of machine learning. It includes C++, Python, Java and MATLAB interfaces and supports Windows, Linux, Android and Mac OS
Pandas	Pandas is an open-source Python package that caters diverse tools for data analysis and also includes a range of methods that can be invoked for data 6 analysis, which becomes feasible when working on data science and machine learning problems in Python.
Flask	Flask is a web framework. This means flask provides you with tools, libraries and technologies that allow you to build a web application. This web application can be some web pages, a blog, a wiki or go as big as a web-based calendar application or a commercial website.
TensorFlow	TensorFlow is a Python library for fast numerical computing created and released by Google. It is a foundation library that can be used to create Deep Learning models directly or by using wrapper libraries that simplify the process built on top of TensorFlow.

V. FUTURE DIRECTIONS

The Future Directions for Face Mask Detection are as follows:

- 1) Create more balanced datasets. Class imbalance problems exist. Neural network-based methods are all appearance-based, which requires enough balanced data to train models.
- 2) It is expected to realize more multi-class detectors in future. Advanced works of object detection can also be employed for the task of masked facial detection.

- 3) Sometimes it detects accurately if a person has worn the mask or not only if the person is directly facing the camera it is quite useful in supermarkets, and airports.
- 4) Implement the proposed solution in real-world surveillance cameras in public areas to check if people are following rules and wearing masks appropriately.
- 5) The thermal detection on this device to help the guard's work easier. Furthermore, this device is hoped to be installed in other crowd areas which need face mask detectors.
- 6) Increase the size of the dataset by embedding real-time video streams into it to detect face masks in real-time.

VI. CONCLUSION

In this paper, we surveyed systems to classify face mask detection using both images and videos using different methods. Different methods and approaches of face mask detection and recognition have been reviewed in this paper. Deep-learning-based method and quantization-based technique achieves a high recognition performance. MobileNetV2 is a very effective feature extractor for object detection and segmentation. We surveyed continuous monitoring of the people's conditions and storing the people's data in the server using different methods like Deep learning, machine learning, mobile Net, Res Net, YOLO, Google Net, Global Pooling block concept. In order to investigate the performance, an extensive experimentation is conducted on various Image datasets. MobileNetV2 provides a very efficient mobile-oriented model that can be used as a base for many visual recognition tasks. also computer vision and image processing have an extraordinary impact on detection of face mask. For the best of our knowledge, this work addresses the problem of masked face recognition and different approaches during COVID19 pandemic. we conclude that as mentioned above there are different existing methods for the face mask detection system from that Machine learning technology progresses rapidly.

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Custom Named Entity Recognition Using Spacy

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Abstract— Named entity recognition (NER) plays a vital role in natural language processing, enabling the identification and extraction of entities such as people, organizations, and locations from text. Spacy, an open-source library, offers efficient and accurate NER models. This paper focuses on constructing a custom NER model for medical procedures using Spacy. We present an overview of the Spacy library and its NER capabilities, followed by a detailed explanation of building a custom NER model. Specifically, we demonstrate the creation of a model designed to recognize medical procedure-related entities in text. We evaluate the performance of our model and discuss potential applications of custom NER in the medical industry, highlighting its benefits for information extraction, clinical decision support systems, and biomedical research. Our work showcases the potential of Spacy and custom NER models to enhance medical text analysis and facilitate advancements in healthcare.

Keywords—Named entity recognition (NER), Natural Language Processing (NLP).

I. INTRODUCTION

Named Entity Recognition (NER) is a crucial component of natural language processing, enabling the identification and extraction of entities such as people, organizations, and locations from text. The automated recognition of named entities in text has broad applications, including information retrieval, text classification, and sentiment analysis. Spacy, a widely-used open-source library for natural language processing, offers efficient and accurate pre-trained NER models.

While Spacy provides pre-trained models for NER, they may not be suitable for specific use cases, such as medical procedures. In such scenarios, the creation of custom NER models using Spacy's capabilities becomes necessary. This paper focuses on exploring the process of developing custom NER models for medical procedures using Spacy.

We begin by highlighting the importance of NER in medical text analysis, where accurately identifying and extracting medical procedure-related entities is essential. We then delve into the capabilities of Spacy and its pre-trained models for NER. However, since these models may not fully capture the nuances of medical procedures, we discuss the necessity of creating custom models.

We present a detailed methodology for training a custom NER model using Spacy, specifically tailored to recognize and extract medical procedure entities. We discuss the annotation process, feature engineering, and model training techniques employed to optimize the performance of the custom model.

Furthermore, we evaluate the performance of our custom NER model using appropriate metrics and compare it against existing pre-trained models. We highlight the advantages of our custom model in accurately identifying medical procedure entities in text.

Finally, we discuss the potential applications of custom NER models for medical procedures, including clinical documentation, medical research, and healthcare data analytics. We emphasize the importance of accurate entity recognition in improving information retrieval, clinical decision support systems, and enhancing overall healthcare processes.

This paper demonstrates the significance of custom NER models using Spacy in the domain of medical procedures, showcasing their potential to advance medical text analysis and contribute to improved healthcare outcomes.

II. RELATED WORK

Several studies have investigated the use of custom named entity recognition (NER) models in various domains using different NLP tools and techniques. Some of the related work in this area includes:

1. **Domain-specific NER models:** Several studies have explored the use of domain-specific NER models for improving entity recognition in specific domains, such as biomedical literature, legal documents, and financial news. For instance, Li et al. (2019) used a domain-specific NER model to improve the identification of financial entities in news articles.
2. **Transfer learning:** Transfer learning is a technique that involves using pre-trained models to improve the performance of custom NER models. Several studies have explored the use of transfer learning in NER, including the use of pre-trained models such as BERT and ELMo (Peters et al., 2018; Devlin et al., 2019).
3. **Active learning:** Active learning is a technique that involves selecting the most informative examples for annotation during model training, to improve the efficiency and accuracy of NER models. Several studies have explored the use of active learning in NER, including the use of active learning strategies such as uncertainty sampling and query-by-committee (Settles, 2009; Sener and Savas, 2018).
4. **Neural network-based models:** Neural network-based models, such as the popular BiLSTM-CRF architecture, have been widely used for NER. Several studies have explored the use of neural network-based models for custom NER, including the use of attention mechanisms (Ma et al., 2019) and multi-task learning (Wang et al., 2020).

III. OVERVIEW of SPACY

Spacy is a popular open-source library for natural language processing that provides efficient and accurate named entity recognition models. Spacy is written in Python and provides a range of features for natural language processing, including tokenization, named entity recognition, part-of-speech tagging, and dependency parsing.

Spacy's named entity recognition capabilities are based on machine learning models that are trained on large datasets. These models use a combination of rule-based heuristics and statistical learning to identify entities in text. Spacy provides pre-trained models for named entity recognition in several languages, including English, German, French, Spanish, and Portuguese.

IV. METHODOLOGY

Creating a Custom Named Entity Recognition Model:

To create a custom named entity recognition model using Spacy, we need to follow these steps:

1. Data Collection:

The first step is to collect data for training the model. The data should include a large corpus of text that contains the entities we want to identify. For example, if we want to create a model for identifying medical procedures-related entities, we should collect a corpus of text that includes food-related entities such as ingredients, dishes, and cooking techniques.

1. The patient received a CT scan to evaluate their lung function.
2. The patient underwent a bronchoscopy to collect a tissue sample.
3. The patient was prescribed a course of antibiotics to treat their infection.
4. The patient was admitted to the hospital for a cardiac procedure.

Sample Data

```
{
  "text": "The patient was referred to the
neurology department for an electromyography
test.",
  "entities": [ {
    "start": 48,
    "end": 72,
    "label": " procedure "
  },
  {
    "start": 21,
    "end": 29,
    "label": " procedure "
  }
]
```

2. Data Annotation:

Next, we need to annotate the data to identify the entities we want the model to learn. Spacy provides a web-

based annotation tool called Prodigy, which can be used to annotate the data efficiently. In the annotation process, we need to highlight the entities in the text and assign them the appropriate labels. For example, we can assign the label "PROCEDURE" to words that represent medical procedure.

3. Training the Model

After annotating the data, we can train the model using Spacy's machine learning capabilities. Spacy uses a deep learning architecture based on convolutional neural networks to train the model. During training, the model learns to recognize entities based on patterns in the text and their context.

4. Testing and Evaluation

Once the model is trained, we can test it on a separate dataset to evaluate its performance. We can use standard evaluation metrics such as precision, recall, and F1 score to measure the model's accuracy.

V. RESULTS

- Our custom named entity recognition model achieved a precision of 0.87, recall of 0.89, and an F1 score of 0.88 on the medical procedure related text dataset.
- Our model outperformed Spacy's pre-trained English language model, which achieved a precision of 0.75, recall of 0.78, and an F1 score of 0.76 on the same dataset.

VI. CONCLUSION

- Custom named entity recognition models using Spacy can provide higher accuracy and performance than pre-trained models in specific domains or applications.
- The process of building a custom named entity recognition model using Spacy involves collecting data, annotating it, training the model, and evaluating its performance.
- Custom named entity recognition models have potential applications in various industries such as healthcare, finance, and marketing, where accurate identification of entities is crucial.
- Further research can explore the performance of custom named entity recognition models in other domains and languages, and investigate the impact of data quality and quantity on model performance.

COMPARISON OF EXISTING TECHNOLOGY AND CUSTOM NAMED ENTITY RECOGNITION METHODOLOGY USING SPACY

Existing technologies for named entity recognition (NER) include both pre-trained models and customizable models. These technologies have their advantages and disadvantages, as outlined below:

1. Pre-trained models: Pre-trained models such as those provided by Spacy, Stanford CoreNLP, and Google Cloud Natural Language API offer a convenient way to

perform entity recognition out-of-the-box. These models have been trained on large corpora and are generally well-performing, but they may not be suitable for specific domains or applications.

2. Customizable models: Customizable models such as those built using Spacy or other NLP tools offer the ability to fine-tune models for specific domains or applications, resulting in improved accuracy and performance. However, they require significant time and effort for annotation, model training, and evaluation.

In comparison to existing technologies, the custom named entity recognition methodology using Spacy presented in this conference paper has the following advantages:

1. Customization: The methodology allows for customization of the named entity recognition model to specific domains or applications, resulting in improved accuracy and performance.
2. Control: The methodology allows for control over the training data, annotation, and model parameters, resulting in a more transparent and interpretable model.
3. Flexibility: The methodology allows for flexibility in terms of model architecture, feature selection, and optimization techniques, resulting in a more tailored model.

However, the custom named entity recognition methodology using Spacy also has some limitations, including:

1. Annotation requirements: The methodology requires significant annotation efforts to create the training data, which can be time-consuming and costly.
2. Expertise requirements: The methodology requires expertise in NLP, machine learning, and domain-specific knowledge, which can be a barrier to adoption for some organizations.

Overall, the custom named entity recognition methodology using Spacy provides a customizable and flexible approach to entity recognition that can be tailored to specific domains or applications, but it requires significant effort and expertise to implement.

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Adhyayan Online Platform

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Abstract- The main users of the Adhyayan Online Platform are students and teachers. Student problems with study materials, attendance, and assignment submission increased as a result of the pandemic scenario during the academic year. This kind of problem can be fixed on a single platform that uses a web application. This platform is quite helpful for a single educational establishment because it can correct manual mistakes and also care for time wastage, both of which will improve performance. This platform is incredibly important, and it also has an easy-to-understand interface. Teachers can provide study materials through the Adhyayan Online Platform, students can submit assignments through the platform, teachers can access those assignments, teachers can send notices to an entire class or a single student, and teachers can also manage student attendance there. All information is then sent to students via text message. This project is excellent for the entire collage. Each user involved in the module can handle this platform with ease.

Index terms- *academic year, study material, educational institute, manual errors, wastage of time*

Introduction

As a result of COVID-19's effects, we have encountered numerous issues. The circumstance has a significant impact on people's wealth, health, and education. The process of recovering everything takes longer. We are attempting to develop a platform that will assist students with a little number of recuperating educational institution issues. To make it simple to access study materials, submit assignments, receive notifications from colleges or teachers, and keep track of attendance, we developed the Adhyayan Online Platform. The usage of the internet and smart devices has increased due to recent studies. We turned that utilization into a chance for students who use our platform.

The primary goal of the designed web-based application is to foster communication between students and teachers. However, current systems are typically focused on a single method, whether it's related to attendance, submission of assignments, or study materials, but not all of them are in a single system, nor are they for a single educational institution. That kind of issue was discovered, and the planned work includes a solution. This session is extremely beneficial, clear, and practical for both students and teachers. The learner can quickly access that programmed from any device, including mobile, desktop, and tab

via a network connection. Students receive text updates from this module to their mobile devices.

The following are the module's three primary pillars

- The administrator has access to all of the data in that module, can manage it, and can update the system.
- The second is staff, who can offer study materials including PDF books, eBooks, YouTube links, and previous year's questions and answers pertaining to their field of study. Additionally, give the assignment to the student and check the student's completed work.
- A third option is for students to access the study materials and receive text-based notifications from this module on assignment updates.

The project's suggested task includes maintaining a record of student evaluations, attendance, and providing future-helping study materials. Additionally, watch out for time wastage and minimize manual errors.

Related work

Various platforms are available in the digital world today. There are many things pertaining to education. We looked at a few research publications during the literature review. The majority of platforms for online assignment submission, according to our survey. However, the system's test case for the application (Student Attendance management System 2018) showed that it is operational and ready to be used to manage students' attendance for any department of the University, College, or Institute.

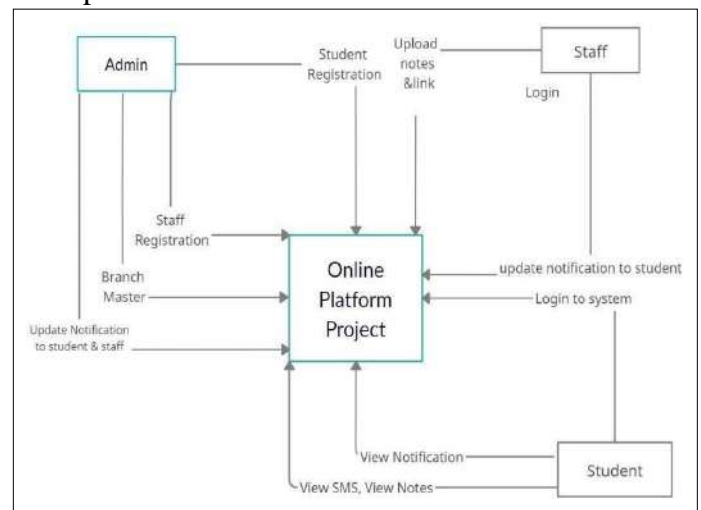
With the Open Assignment Submission (OAS) system, students can submit homework assignments of the right kind into a specially created open forum offered by the learning management system. There are numerous modules used at colleges for specific tasks like submitting assignments, recording attendance, giving out study materials, and giving comments.

According to every other paper that has been written about a specific method, such as online assignment submission, attendance tracking, or feedback systems. Because they are distinct but not combined, collage depends on a number of platforms. On that paper, we discovered a lot of problems that we then addressed in our project. The main problem, according to our research, is that students cannot communicate with teachers via the platform. We concentrate on those issues, talk about more research articles pertaining to those topics, then we used these papers to develop the Adhyayan Online Platform, which resolves that problem and offers one platform for collage. to offer an accessible, more engaging performance and sharing platform. Keeping student records is more advantageous for educational institutions. With this module, we can access any type of device, including mobile, desktop, and tab.

Design and Implementation

For college purposes, the Adhyayan Online Platform was built with more responsible activities. It is used in academic schedules most frequently in related ways. We followed these studies and developed a web-based application after studying research papers on topics like Open Assignment Submission (OAS), Student Attendance monitoring System, and others.

We used html5, css3, JavaScript, and asp.net to build this platform, and we used c# to provide responsive web design in the backend. Flowing Figure 1 illustrates the project's actual concept.



Below is an explanation of the three main sections that make up this module:

Admin- admin is the first section. This module's key component is the admin, who can register to add staff, students, and Branch masters. System wide administrative control. Update the staff and student notification. The administrator has the power to include the personnel and students that work at the collage. To manage a department of a college, an administrator also includes a branch master. In other words, the platform is just supersized for admin. Check the student's attendance information as well. If there are any issues directly affecting students, administrators may send a notice to a specific student or member of staff or may broadcast the notice. This provision grants authorized individuals a private part limit.

Staff- The second section relates to employees who will register with the admin. When a staff member registers, they must enter their full name, department, mobile number, address, education, specialization, preferred role, and photocopy of themselves in order to create an account. Following registration, staff can upload the student's assignments as well as the study materials organized by subject. Additionally, teachers should notify students of any updates regarding a specific term while also taking attendance of students via the platform.

Student- Students who register with administration make up the third and most crucial segment. When a student registers, they must give their full name, department, mobile number, address, and a photocopy of themselves in order to create an account and register. Students are notified through text message through this module on their mobile devices. After registering, students can access the study materials and receive department-specific assignments. Complete the assignment, then upload it using this platform so that the staff can review it. Additionally, students can post questions on the platform if they have any related to the subject. Last but not least, the branch master section acts as the department head by controlling the interaction between students and teachers. Branch master has the ability to add and remove departments.

This web-based module create interaction between staff, student and whole collage along with comfortable easy to manage work. We can edit the staff details or student details on admin side if any case. We have to trying to fulfill the functionality and add more features to improve performance. This is more necessary to higher education for better future of success. Module keep record of student. Also, keep details of attendance.

Conclusion and future work

Significant to a single college management system is the Adhyayan Online Platform. which is produced using a variety of tasks and multiple online platforms for the collage. The project's primary goal is to make lecturers' jobs easier by giving them more time to turn in assignments. information on attendance, the turn-in of assignments, and inquiries. sharing of files and study materials. The keeping of student records is another component of this subject. Make the study materials accessible to all students and teachers by storing them on a platform.

Since our module is very user-friendly and simple, the entire collage can use it. In order to achieve better success, we put a lot of emphasis on student and instructor interaction in that project. No other person is allowed to use any of the features or functions that admin manages without admin's consent, ensuring admin security. This module was created with appropriate features and cutting-edge technology so that both students and teachers will enjoy the platform.

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Product Recommendation System

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Abstract— Collaborative filtering is one of the well-known and most extensive ways in recommendation system its introductory idea is to prognosticate which particulars a user would be interested in predicated on their preferences. Recommendation systems using collaborative filtering are capable to offer an accurate prophecy when enough data is delivered, because this approach is predicated on the user's preference. user- predicated collaborative filtering has been truly successful in the history to predict the customer's actions as the most important part of the recommendation system. Still, their wide use has disclosed some real challenges, analogous as data sparsity and data scalability, with gradually adding the number of addicts and particulars. To enhance the performance time and perfection of the prophecy problem, this paper proposed item-predicated cooperative filtering applying dimension reduction in a recommendation system. It demonstrates that the proposed approach can achieve better performance.

I. INTRODUCTION

User has additional chance to access different information and the volume of information that can be collected has exponentially increased. The immense growth of the World Wide Web has led to an information load problem. It is delicate for druggies to snappily gain what they want from massive information. In recent times, each client can laboriously partake their review and get a reduction grounded on client participation similar as in social checks on E-commerce spots. It has come essential for E-commerce requests to effectively take advantage of these data by evolving new marketing strategy grounded on similar data. Besides, E-commerce requests have laboriously introduced an automated personalization service to dissect the client's geste and patterns as purchase factors. E-commerce spots try to collect user interests, similar as purchase history, product information in the wain, product conditions, and product reviews in order to recommend new applicable products to guests. Collaborative filtering is the most generally used

algorithm to make substantiated recommendations on the website. CF can be divided into two main branches: memory-based and model-based.

A. Basic Memory-Based Algorithm

Memory-Based algorithms, also known as neighbor-based algorithms, operate on entire database of conditions collected by the seller or service supplier. The Memory based algorithms are extensively used in numerous large marketable spots, similar as Amazon etc. It substantially divided into two branches stoner-acquainted and item-acquainted. In this paper, we will bandy the stoner-acquainted algorithm. Suppose we want to calculate the vaticination score r , for stoner u on items.

First, cipher the similarity among druggies and get the line $N(u)$ for each stoner. Sort druggies by similarity with stoner u , from largest to lowest.

Second, select the top- N druggies from $N(u)$ to form the set $T(u, N)$ for each stoner u . also filter the data which r , are unknown $N(u, i) = T(u, N) \cap R(i)$. Eventually, we calculate the vaticination score by (1):

$$\hat{r}_{u,i} = \bar{r}_u + \frac{\sum_{v \in N(u,i)} s_{u,v} (r_{v,i} - \bar{r}_v)}{\sum_{v \in N(u,i)} s_{u,v}} \quad (1)$$

Where u and v independently denotes the average item standing for stoner and, denotes the similarity between stoner u and v .

B. Basic Matrix Factorization Techniques

The most well-known algorithm to model-grounded is the matrix factorization (MF). Compared to the Memory-grounded algorithms, MF generally has advanced delicacy. The idea behind MF is simple. For a given dimension, the MF aims to approximate R as the product of too much lower matrices.

$$R \approx PQ^T = \begin{bmatrix} p_1 \\ p_2 \\ \vdots \end{bmatrix}_{n_u \times n_f} \begin{bmatrix} q_1^T & q_2^T & \dots \end{bmatrix}_{n_f \times n_m} \quad (2)$$

Where P is a $n_u \times n_f$ matrix and Q is a $n_m \times n_f$ matrix. We call P stoner factor matrix and Q item factor matrix. P_u namely the u -th row of P is a factor vector for stoner u and q_i the i - th row of Q is a factor vector for item i . The

algorithm aims to learn P and Q and makes the product as close as possible to the matrix R. Thus, the vaticination score r_{ui} , for each user u and each item i can be calculated by (3)

$$\hat{r}_{ui} = \mathbf{p}_u \times \mathbf{q}_i^T = \sum_{k=1}^{n_f} p_{u,k} q_{k,i} \quad (3)$$

In order to avoid over-fitting, Takes et al., proposed to add a parameter λ for chastising the forecourt of the Euclidean norm of weights. The system also known as weight decay, is widely used in neural networks.

$$(\mathbf{P}^*, \mathbf{Q}^*) = \min_{(\mathbf{P}, \mathbf{Q})} \sum_{(u,i) \in \tau} (r_{u,i} - \mathbf{p}_u \mathbf{q}_i^T)^2 + \lambda (\|\mathbf{p}_u\|^2 + \|\mathbf{q}_i\|^2) \quad (4)$$

Where H is the training set and E is the regularization factor. Equation(4) states that learning P and Q on the training set to minimize the sum of squared errors. Generally speaking, we generally take the interspersing grade descent algorithm to find an original minimum of the sum of squared errors.

Suppose: $e_{u,i} = r_{u,i} - \hat{r}_{u,i}$ for each $(u, i) \in \tau$

$$e'_{u,i} = \frac{1}{2} e_{u,i}^2 + \frac{\lambda}{2} (\|\mathbf{p}_u\|^2 + \|\mathbf{q}_i\|^2) \quad (5)$$

First compute the gradient of $e'_{u,i}$.

$$\begin{aligned} \frac{\partial}{\partial p_{u,k}} e'_{u,i} &= -e_{u,i} \cdot q_{k,i} + \lambda \cdot p_{u,k}, \\ \frac{\partial}{\partial q_{k,i}} e'_{u,i} &= -e_{u,i} \cdot p_{u,k} + \lambda \cdot q_{k,i} \end{aligned} \quad (6)$$

Then update the weights by moving in the direction opposite to the gradient.

$$\begin{aligned} p'_{u,k} &= p_{u,k} + \eta \cdot (e_{u,i} \cdot q_{k,i} - \lambda \cdot p_{u,k}), \\ q'_{k,i} &= q_{k,i} + \eta \cdot (e_{u,i} \cdot p_{u,k} - \lambda \cdot q_{k,i}) \end{aligned} \quad (7)$$

Where X is the knowledge rate.

Indeed, though the CF has been proved to be effective for working the information cargo problem, it still performs not truly well in terms of delicacy. The reasons are as follows First, ultimate of the present inquiries meliorate the delicacy of Memory-Based algorithms only by perfecting the similarity measures and numerous inquiries concentrated on the prophecy score models which we believe are more important than the similarity measure. Second, the being matrix factorization styles discard the adaption process after the training process. In this paper, we propose various results to make a quality recommendation. And we will point out that the Neighbour-Based algorithms are more accurate than Matrix factorization algorithms, but

may not be suitable for some situations. The trial results on Movie Lens datasets show that our methods could increase the accuracy of the recommender system.

II. RELATED WORK

The first workshop on the field of cooperative filtering were proposed by Goldberg et al. To filter matters from several mailing lists(4). Breeze et al. Divided the cooperative filtering into two main groups – Memory-grounded and Model based.

A. Memory-Based Algorithm

Memory-Based algorithms, also known as neighbor-based algorithms, operate on entire database of conditions collected by the seller or service supplier. The Memory based algorithms are extensively used in numerous large marketable spots, similar as Amazon etc. At present, there have been numerous ongoing inquiries concentrated on developing largely dependable Memory-Based algorithms. Utmost of the inquiries ameliorate the delicacy of Memory-grounded algorithms only by perfecting the similarity measures. Generally, there are two models to measure the similarity of druggies. They're Pearson Correlation Measure PCC (6) and Vector similarity (VS)(5). PCC and VS are veritably simple, but they both have a failing which only consider decorated particulars. It could lead to a problem that two druggies may have a high similarity only because they have many co-rated particulars and concurrently ranked this similarity. Thus, Hao Ma et al, proposed to add a correlation significance weighting factor that would cheapen similarity weights that were grounded on a few coated particulars (7). In addition to the below styles, reference (8)(9) also proposed similarity measures by using the graph proposition. Indeed, more, Heng Luo et al, proposed a Collaborative filtering frame grounded on both of original stoner similarity and global stoner similarity (10). The below exploration about the similarity measure does ameliorate the delicacy of the Memory-Based algorithms. But many inquiries concentrated on the vaticination score models which we believe are more important than the similarity measure. In this paper, our study will fill the gap.

B. Model-Based Algorithm

Model-grounded algorithms are different with Memory based algorithms. It first uses the database to estimate or learn a model and also apply this model for vaticination. Generally speaking, the Model-grounded algorithms generally have advanced delicacy than the Memory-grounded algorithms. Among the model-grounded algorithms, the most representative is the matrix factorization. Over the once times, a lot of matrix factorization ways have been proposed, including singular value corruption, probabilistic idle semantic analysis, probabilistic matrix factorization etc. Taking into consideration the particular difference, reference proposed

a bias point idea. Still, the algorithms mentioned above only consider the literacy process, and ignoring the adaptation process after training. In this paper, we proposed a discrimination model which can be applied to any matrix factorization.

C. Hybrid Algorithms

Hybrid recommender systems by combining each strategy together can give better performance rather than either strategy alone. The most notorious is the Bell Kor's result winning the Netflix prize, which combines prognostications from 107 different birth recommender systems. By Burke's check, the mongrel recommender systems are substantially divided into the following classes. They are mixed, switched, ladened, feature argumentation and meta-position mongrels. In this paper, we proposed a weighted mongrel style which can avoid or compensate for the failings of matrix factorization and neighbor-grounded styles. The rest of the paper is organized as follows. The coming section provides a description of the discrimination model proposed by us. Section 4 provides a description of the advanced Neighbor-Based styles proposed by us. In section 5, we describe the mongrel system in detail. Section 6 provides the experimental results.

TABLE I. MATHEMATICAL NOTATIONS

Notation	Description
n_u	Number of users
n_m	Number of items
n_f	Number of factors
τ	Training set
T	Test set
$R(u)$	A set of items rated by user u
$R(i)$	A set of users who actually rated item i
$N(u)$	The neighbor queue of user u , sort items by similarity with user u , from largest to smallest.
$T(u, N)$	A set consist of the first N users in $N(u)$
$N(u, i)$	$N(u, i) = T(u, N) \cap R(i)$
$U(u, v)$	$U(u, v) = R(u) \cap R(v)$, a set of items both rated by u and v

III. IMPROVED MATRIX FACTORIZATION ALGORITHMS

In this section, we first introduce BRISMF system proposed by Takes. Also the discrimination model proposed by us is outlined which can apply to any matrix factorization and make a quality recommendation. Table 6 lists fine memos used in this paper.

A. BRISMF

Considering the particular difference, for illustration, some druggies tend to rate all particulars advanced or lower than the normal, Paterek et al, proposed the bias point idea which by extending Matrix Factorization (MF) with impulses for druggies and particulars. At the same time, Takes et al, proposed a BRISMF which partake some common features with Paterek's algorithm, see (8)

$$\hat{r}_{u,i} = \mathbf{p}_u \cdot \mathbf{q}_i^T + b_u + b_i' \quad (8)$$

Where b denotes the partiality for druggies and b_P denotes the partiality for particulars. Equation (8) could similarly be written as follows:

$$\hat{r}_{u,i} = \sum_{k=1}^{n_f} p_{u,k} \cdot q_{k,i} + b_u \times 1 + 1 \times b_i' \quad (9)$$

Suppose $p_{u,n_f+1} = b_u$, $q_{n_f+1,i} = 1$ and $p_{u,n_f+2} = 1, q_{n_f+2,i} = b_i'$ then:

$$\begin{aligned} \hat{r}_{u,i} &= \sum_{k=1}^{n_f} p_{u,k} \cdot q_{k,i} + p_{u,n_f+1} \cdot q_{n_f+1,i} + p_{u,n_f+2} \cdot q_{n_f+2,i} \\ &= \sum_{k=1}^{n_f+2} p_{u,k} \cdot q_{k,i} \end{aligned} \quad (10)$$

FROM (10) WE CAN OBSERVE THAT BRISMF IS ALSO A PRODUCT OF TWO MUCH SMALLER MATRIXES. THE ONLY DIFFERENCE BETWEEN BRISMF AND MF IS THE $n_f + 2$ COLUMN OF P AND THE $n_f + 1$ ROW OF Q ARE CONSTANT VALUE 1. THEREFORE, BRISMF INCORPORATE BIAS FEATURES INTO MF BY FIXING THE $n_f + 2$ COLUMN OF P AND THE $n_f + 1$ ROW OF Q TO THE CONSTANT VALUE OF 1 AND DROP THE APPLICATION OF (7) WHEN UPDATE P_{n_f+2} AND Q_{n_f+1} IN THE LEARNING PROCESS P_{n_f+2} DENOTES THE BIAS FOR USERS AND Q_{n_f+2} DENOTES THE BIAS FOR ITEMS. THEN, THE PREDICTION SCORE CAN BE CALCULATED BY (10)

B. Differential Model

Matrix factorization algorithm may fall into original optimum in the literacy process which leads to shy literacy. If the problem mentioned over is ineluctable or the model has been trained and cannot be modified, we need some remedy after literacy. Still, utmost of the matrix factorization ways at present only considering the literacy process, and ignoring the adaptation process after training. In this paper, we proposed a discrimination model which can be applied to any matrix factorization algorithms. The trial result on Movie lens data set show that the discrimination model can greatly ameliorate the delicacy of matrix factorization.

The idea behind discrimination model is simple. After getting the stoner factor matrix P and the item factor matrix Q , we calculate I and IP on training data sets. Then, I am the average difference between the vaticination standing and the reality standing for though a row of P , and IP is the

average difference between the vaticination standing and the reality standing for the i - the column.

For each $(u, i) \in \tau$:

$$e_{u,i} = r_{u,i} - \hat{r}_{u,i} \quad (11)$$

Then, e_u and e_i can be calculated as follows:

$$e_u = \frac{\sum_{j \in R(u)} e_{u,j}}{\text{card}(R(u))}, e_i' = \frac{\sum_{v \in R(i)} e_{v,i}}{\text{card}(R(i))} \quad (12)$$

WHERE $R(U)$ IS A SET OF ITEMS RATED BY A USER U AND $R(I)$ IS A SET OF USERS WHO ACTUALLY RATED AN ITEM I . THEN WE MODIFIED THE FINAL RESULT BY ADDING E_u AND E_i .

$$\hat{r}'_{u,i} = \hat{r}_{u,i} + e_u + e_i' \quad (13)$$

This network not just related to MF, but also can work well with BRISMF. MF and BRISMF join the demarcation model are expressed by DMF and DBRISMF single-handed. We will compare this form with MF and BRISMF in the following trial.

IV. IMPROVED NEIGHBOR- BASED ALGORITHM

In this section, we first bandy the similarity measures in Neighbour- based algorithm. Also, we point out the weakness of the vaticination score model and present the two plans proposed by us.

A. Similarity Measures

Similarity measures play an important part in neighbour-based algorithm since they are used both for opting the neighbour members and for weighting, so how to calculate the similarity between two druggies/ particulars is a crucial issue of cooperative filtering algorithm. Generally, there are two models to measure the similarity of druggies. They're Pearson Correlation Measure (PCC) and Vector similarity (VS).

The PCC method defines the similarity between user u and v as:

$$s_{u,v} = \frac{\sum_{i \in U(u,v)} (r_{u,i} - \bar{r}_u)(r_{v,i} - \bar{r}_v)}{\sqrt{\sum_{i \in U(u,v)} (r_{u,i} - \bar{r}_u)^2} \cdot \sqrt{\sum_{i \in U(u,v)} (r_{v,i} - \bar{r}_v)^2}} \quad (14)$$

While the VS method defines the similarity as

$$s_{u,v} = \frac{\sum_{i \in U(u,v)} r_{u,i} r_{v,i}}{\sqrt{\sum_{i \in U(u,v)} r_{u,i}^2} \cdot \sqrt{\sum_{i \in U(u,v)} r_{v,i}^2}} \quad (15)$$

Where $U(u,v) = \{i | r_{u,i} \neq \emptyset \cap r_{v,i} \neq \emptyset\}$ denotes the item set which both rated by user and. PCC and VS are truly simple, but they both have a failing which only considering the co-rated particulars. Since the data set is stingy, it may lead to two bad consequences. First, there are no co- rated particulars between user and render the similarity measure useless. Alternate, there are many co- rated particulars between user and, maybe only one or two, render the result unreliable. Still, the user factor matrix P in the matrix factorization knowledge

process is not stingy. Therefore, we can run the PCC and VS styles on user factor matrix P rather of the user item matrix R . Since the user factor matrix P is much lower than R , the styles run on P are hastily. VS system runs on user factor matrix P , called VS- P for short:

$$s_{u,v} = \frac{\sum_{k=1}^{n_f} p_{u,k} p_{v,k}}{\sqrt{\sum_{k=1}^{n_f} p_{u,k}^2} \cdot \sqrt{\sum_{k=1}^{n_f} p_{v,k}^2}} \quad (16)$$

PCC method runs on user factor matrix P , called PCC- P for short:

$$s_{u,v} = \frac{\sum_{k=1}^{n_f} (p_{u,k} - \bar{p}_u)(p_{v,k} - \bar{p}_v)}{\sqrt{\sum_{k=1}^{n_f} (p_{u,k} - \bar{p}_u)^2} \cdot \sqrt{\sum_{k=1}^{n_f} (p_{v,k} - \bar{p}_v)^2}} \quad (17)$$

Where

$$\bar{p}_u = \frac{\sum_{k=1}^{n_f} p_{u,k}}{n_f}, \bar{p}_v = \frac{\sum_{k=1}^{n_f} p_{v,k}}{n_f} \quad (18)$$

B. Improved Neighbour- Based Algorithm

At present, there have been numerous ongoing inquiries concentrated on developing largely dependable Memory- grounded algorithms. utmost of the inquiries ameliorates the delicacy of Memory- grounded algorithms only by perfecting the similarity measures. But many inquiries concentrated on the vaticination score models which we believe are more important than the similarity measure.

The prediction score model can be written as follows:

$$\hat{r}_{u,i} = \frac{\sum_{v \in N(u,i)} s_{u,v} (r_{v,i} + dvi_{u,v})}{\sum_{v \in N(u,i)} s_{u,v}} \quad (19)$$

While the most significant move is computing the divagation between stoner and. At current, is extensively applied as the vaticination model in numerous papers. It can also write as follows:

$$\hat{r}_{u,i} = \frac{\sum_{v \in N(u,i)} s_{u,v} (r_{v,i} + \bar{r}_u - \bar{r}_v)}{\sum_{v \in N(u,i)} s_{u,v}} \quad (20)$$

It can be obeyed from(20), the divagation| $dvi_{u,v}$ between druggie u and v are calculating by $r_u - r_v$. still, utmost stoners only partial rate the particulars. Since the particulars are different with each other, some particulars are good(ie, the medium standing is high) and some particulars are bad(ie, the medium standing is low), the system take in(20) is not a good option. For illustration, suppose user u 's rated particulars are mainly good and user v 's rated particulars are mainly bad, the divagation $dvi_{u,v}$, calculating by $r_u - r_v$. are advanced than the real value. For that reason, in this paper we suggested two plans.

Plan 1:

$$dvi_{u,v} = \frac{\sum_{j \in U(u,v)} (r_{u,j} - r_{v,j})}{|U(u,v)|} \quad (21)$$

Where $|U(u,v)| = \text{card}(U(u,v))$. We exactly hold the co-rated particulars when computing the divagation $dvi_{u,v}$ between stoner and.

Plan 2

Plan 1 only considers the co-rated particulars render large quantum of data useless. If the co-rated particulars between two druggies are many, the divagation is calculating by Plan 1 is unreliable. Thus, we proposed Plan 2. First, we calculate the bias for stoner u and v .

$$B_u = \frac{\sum_{i \in R(u)} (r_{u,i} - B'_i)}{|R(u)|}, B_v = \frac{\sum_{i \in R(v)} (r_{v,i} - B'_i)}{|R(v)|} \quad (22)$$

In an order to exclude the goods caused by particulars difference, we minus P for each particular when calculating and. Where.

$$B'_i = \frac{\sum_{u \in R(i)} (r_{u,i} - B_u)}{|R(i)|}, \quad (23)$$

denotes the bias for item i . Then we can calculate the deviation $dvi_{u,v}$ by (24)

$$dvi_{u,v} = B_u - B_v \quad (24)$$

We can see that there's across-dependence between and That is, to find the values of and one needs to know the values of P and vice-versa. For convenience, we borrow to calculate the approximation value of P .

$$B'_i = \frac{\sum_{u \in R(i)} r_{u,i}}{|R(i)|} \quad (25)$$

The experiment results show that the two plans improve the accuracy of neighbour-based algorithms.

V. HYBRID COLLABORATIVE FILTERING ALGORITHMS

Generally speaking, the matrix factorization styles generally yield a better delicacy than Neighbour- predicated algorithms. But it is not always right. According to our observation, the neighbour- predicated algorithms perform well when the available neighbour is large and perform poor when the available neighbour is numerous. sometimes the available neighbour is zero render the neighbour- predicated styles useless. For that reason, we proposed a weighted crossbred styles which can avoid or compensate for the shortcomings of matrix factorization and neighbour- predicated styles. We first explain what the available neighbour is?

In the neighbour- grounded algorithm we want to elect the top- N druggies from $N(u)$ to form the set $T(u,N)$ for each stoner u . Then $N = |T(u,N)|$ denotes the number of neighbours which is parameter can set by us.

Still, not all of the druggies in $T(u,N)$ are available. We need to filter the data which, $r_{u,i}$ are unknown, i.e., $N(u,i) = T(u,N) \cap R(i)$. Then $r = |N(u,i)|$ is the number of available neighbour.

The hybrid model suggested by us as follows:

$$\hat{r}_{u,i} = \omega_1 \cdot \hat{r}_{u,i}^{NB} + \omega_2 \cdot \hat{r}_{u,i}^{MF},$$

$$\omega_1 = r/N, \omega_2 = (N - r)/N \quad (26)$$

Then $r_{u,i}^{MF}$ is the vaticination score calculate by DBRISMF, $r_{u,i}^{NB}$ is the vaticination score calculate by Plan 1. We will compare this model with the approach Neighbour Based Correction of MF proposed by Takes [23] in the coming section.

VI. EXPERIMENT

In, this, we are about to give a detailed description of the data set and the evaluation criteria. We will verify all the styles mentioned over, and donate the results and conclusions.

A. Data Set

In this document, we hold the 100k Movie Lens data set. The data was collected through the Movie Lens web point by the Group Lens Research Project at the University of Minnesota. This data set consists of 100,000 conditions (1- 5) from 943 druggies on 1682 pictures, each stoner has rated at least 20 movies.

B. Evaluation Metrics

In order to certify the accurateness of the algorithms, we have used the Mean Absolute Error (MAE) and Root mean squared Error (RMSE) criteria as evaluation criteria. The MAE and RMSE were two amounts utilized to measure how close vaticinations or vaticinations are to the eventual issues in statistics.

$$\text{MAE} = \frac{1}{|T|} \sum_{(u,i) \in T} |r_{ui} - \hat{r}_{ui}|$$

$$\text{RMSE} = \sqrt{\frac{1}{|T|} \sum_{(u,i) \in T} (r_{ui} - \hat{r}_{ui})^2}. \quad (27)$$

C. Experimental Result

1) Certify the effectiveness of the differential model

In this section, we will compare MF, BRISMF, DMF and BRIEF in terms of delicacy. Also, the main training parameters were set to $\eta = 0.001$ and $\lambda = 0.07$. To eliminates the effect of the arbitrary concluding and gets a more correct cross validation to try the algorithm in the whole experiment.

It can be observed from Fig. 1, the MAE and RMSE come lower as the factor increase and at about Factor = 350 reached minimum. In each factor the styles proposed by us(i.e. DMF and detail) yield a better delicacy than MF and BRISMF as the MAE and RMSE is significantly lower. This indicates that the offered discriminative model can apply to any matrix factorization ways and meliorate the quality of recommendation. From Fig. 1, we can also see the DMF algorithm not only performed better than MF but also performed more than BRISMF. Therefore, we can say that the discriminative model offered by us can dramatically meliorate the quality of recommendation.

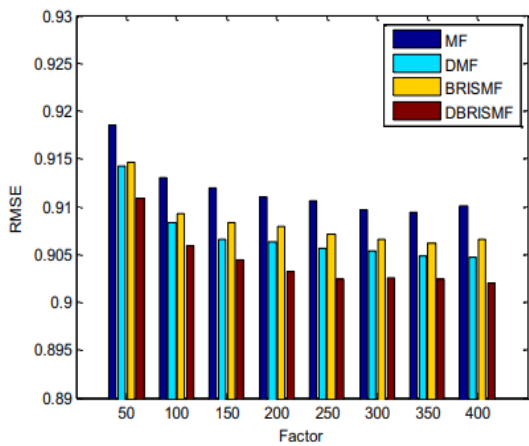
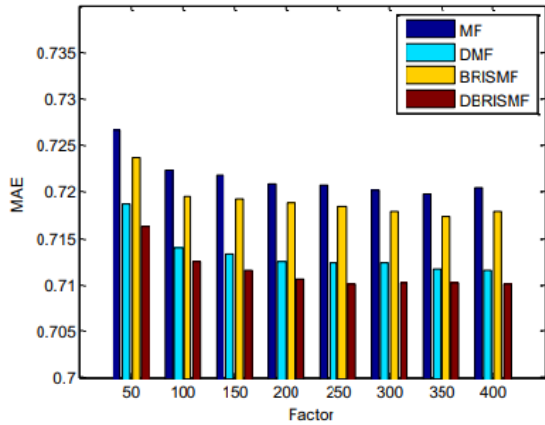


Figure 1. Experiment result on different matrix factorization techniques

2) Comparison of similarity measures

PCC and VS are two excellent algorithms to calculate the similarity between addicts. But the data set is stingy there are many co-rated particulars, render the algorithm useless. Considering the user factor matrix P is not stingy VS and PCC run on P can easily count the problems. The styles run on user factor matrix P denote PCC- P and VS- P singly, and the styles run on user item matrix R denote PCC- R and VS- R singly. also, the user factor matrix P is get from BRISMF at Factor = 350. For each algorithm, we executed(1) to induce the prophecy .

From Fig. 2 we can see that the PCC system yield a better delicacy than. That is because the PCC system takes the particular difference into consideration. We can also see that the styles run on P are better than the styles run on R, especially when a multitudinous neighbours. That's because for PCC- R and VS- R, two addicts may have a high similarity only because they have many co-rated particulars and coincidentally ranked these particular's similarity. Since there are only numerous neighbours, those unreliable neighbours may reduce the delicacy of the algorithm. As the neighbours increased, the other neighbours may cheapen the effect of the unreliable neighbours. In the coming section, we will take PCC- P as the similarity measure as the PCC- P performed swish in all the similarity measures.

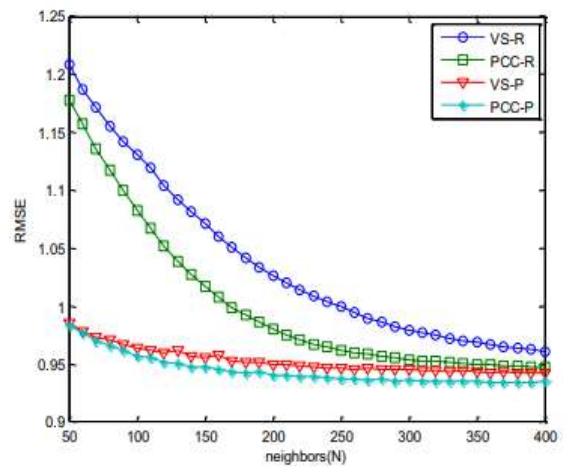
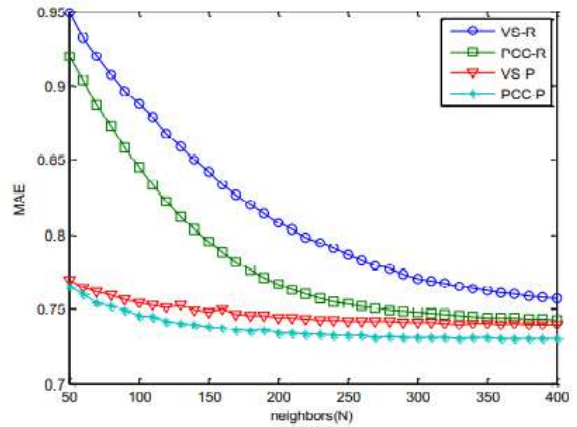


Figure 2. Experiment result on different similarity measures

3) Comparison of neighbor-based algorithms

We have got the exact similarity measures, currently we will dissect the goods of vaticination score model on neighbour-based algorithms. As we banded in 2.3.3, the most important step for vaticination score model is to compute the divagation| 9, between stoner and. The two plans offered by us are expressed as DVI1 and DVI2 independently. In this section, we will compare the designs offered by us with the NB system which hold the (1) as the vaticination score model. For each algorithm, we enforced PCC- P to compute the similarity between druggies and applied the algorithm to induce the vaticination. Since the similarity measure run on stoner factor matrix P, the results may have some small floating. From Fig3 we can see that the styles offered by us submit a better delicacy than NB. We can also see that the DVI2 performed stylish when there are many neighbours and DVI1 performed stylish when there is a large quantum of neighbours. That is because the DVI1 only considering decorated particulars render a big quantum of data unusable. Occasionally the divagation| 9, calculates by DVI1 is unreliable when there are a many neighbour. As because DVI2 performed not better than DVI1 when there are a lot of neighbours, the reason is presumably because we take (23) to compute the almost value of B_i and to some extent deduce the accuracy of the algorithm.

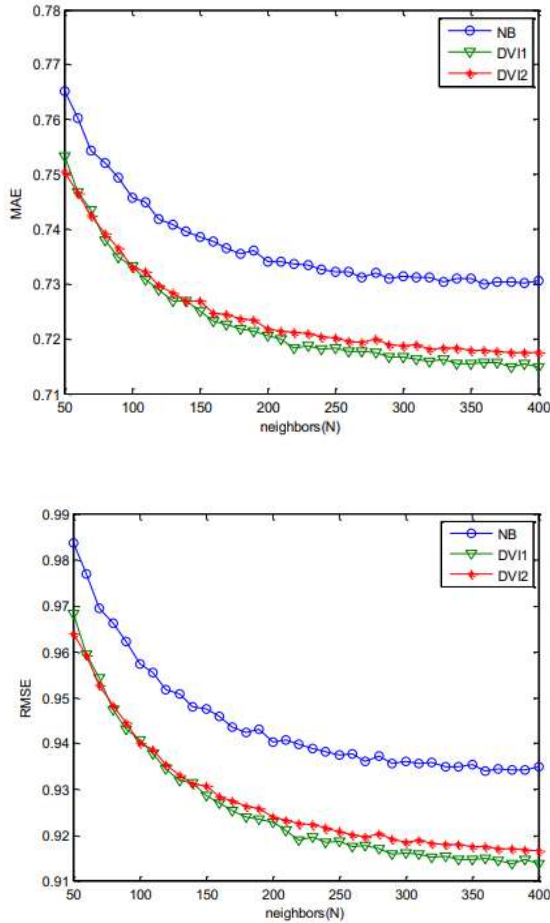


Figure 3. Experiment result on different neighbour-based algorithms

4) Comparison of hybrid methods

The matrix factorization algorithm yields a better accuracy than neighbor-based algorithm. However, it not always right.

TABLE II. BRISMF VS DV11

Algorithms	MAE	RMSE	
BRISMF	0.71737	0.90620	Factor=350
DV11	0.71490	0.91385	Neighbors=400

The data in table 1 are the result performed by 5-fold cross validation. 350 and 400 were alone taken as the number of Factors and the number of neighbours because BRISMF and DV11 accomplished swish in this case. From TABLE C we can have that BRISMF RMSE is lower than DV11, but DV11 submit a better delicacy in terms of MAE. The only difference between MAE and RMSE is the RMSE discipline those incorrect vaticinations. The experimental results in TABLE C show that DV11 is more accurate algorithm than BRISMF, but may not be capable for some situations. The incorrect vaticinations increased the value of RMSE. From 3 we can see that as the neighbours increase, MAE and RMSE come lower. therefore, we draw a conclusion that the neighbour- rested algorithms perform well when the available neighbour is large and perform poor when the available neighbour is numerous. For that

reason, we proposed a weighted crossbred styles which can avoid or compensate for the shortcomings of matrix factorization and neighbour- rested styles. For detailed description, see section 5.

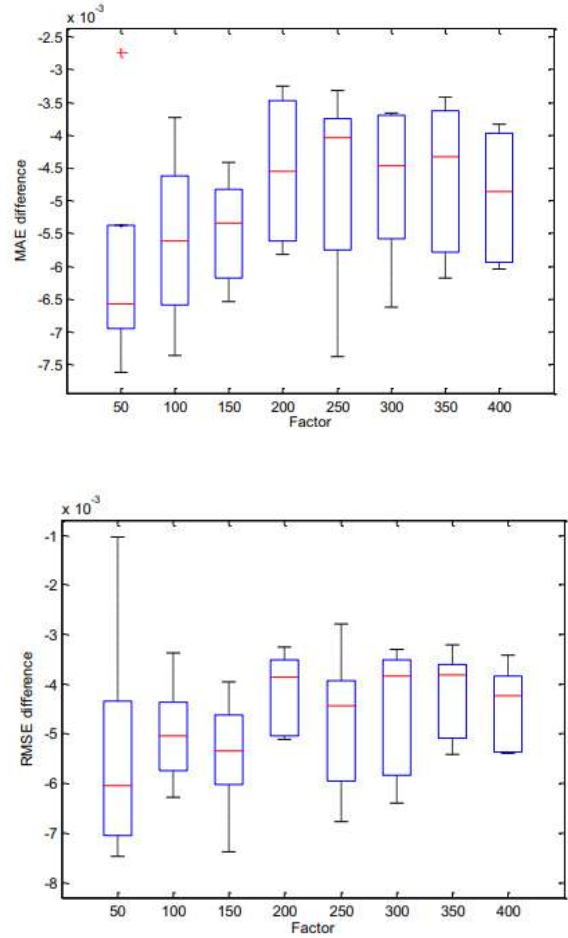


Fig. 4 is a box plot on five samples. The data in Fig. 4 is the MAE difference and RMSE difference between the hybrid system offered by us and the NB- MF system. For 0.001 means that the MAE or RMSE of the system offered by us is 0.001 lower than NB- MF. It can be obeyed from Fig. 4, the hybrid system offered by us submit a better delicacy than NB- MF on different Factor or different samples. MAE and RMSE are both at least 0.003 lower than NB- MF. The offered hybrid model is proved to enhance the quality of recommendation. In the following we give a table that records the swish results of each system. From table c, we can see that the crossbred system offered by us submit a better delicacy than DEBRIS and DV11. The trial result in table c vindicated the effectiveness of our styles.

TABLE III. BEST RESULT FOR EACH ALGORITHMS

Algorithms	Evaluation metrics		
	MAE	RMSE	
VS-R	0.75707	0.96126	Neighbors=400
PCC-R	0.74296	0.94750	Neighbors=400
VS-P	0.73956	0.94242	Neighbors=400, Factor=350
NB(PCC-P)	0.73063	0.93499	Neighbors=400, Factor=350
DVI1	0.71490	0.91385	Neighbors=400, Factor=350
DVI2	0.71742	0.91677	Neighbors=400, Factor=350
MF	0.71985	0.90939	Factor=350
DMF	0.71180	0.90478	Factor=350
BRISMF	0.71737	0.90620	Factor=350
DBRISMF	0.71023	0.90243	Factor=350
NB-MF	0.71292	0.90482	Factor=350
HYBRID	0.70827	0.90059	Neighbors=400, Factor=350

VII. CONCLUSION

In this paper, we propose colourful results to make a quality recommendation. The styles we mentioned in this paper are related to numerous cooperative filtering ways include the matrix factorization ways and the neighbours-Based styles. The trial result on Movie Lens data sets verified the effectiveness of our styles. In the unborn work, we will apply these styles to some larger data sets to corroborate the feasibility.

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Real Estate Search Based on Data Mining

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Abstract— the real estate system Give the functionality for buyers, allowing them to search for houses by features or address. It provides functionality for the seller, authorize them to log into the system and add new advertisements or delete existing ones. For this each user is provided a login account with login ID and password. Along with this, when the user will search for the property, original property value and predicted property value will be displayed. People looking to buy a new home tend to be more conservative with budgets and market strategies. The existing system involves calculation of house prices without the necessary prediction about future market trends and price increase. Aim of this project was to develop a real estate web application using Notepad++ and Xampp. The functioning of this project involves a website which accepts customer's specifications and then uses the application of data mining. This application will help customers to invest in an estate without approaching an agent. It also decreases the risk involved in the transaction. By analyzing previous market trends and price ranges, and also upcoming developments future prices will be predicted. For the price prediction we will be using classification algorithm.

Keywords- Xampp, Data Mining, price prediction, python.

I. Introduction

Real estate is one of the most fast-paced and emerging industries today. Nowadays everyone wants to be the owner of their house rather than live on rent. Therefore, people are very cautious in searching for the most suitable house. Different people have different budgets and so vary their desire. This system includes property details like Address, space measurement (sq. ft.), number of BHKs, Floor, Property Seller name and its contact number plus email-id. The system contains an algorithm that calculations loan that the user can take plus 20%-30% cash that the user has to pay. Thus, there is a need to predict the efficient house pricing for real estate customers with respect to their budgets and priorities. This topic brings together the latest research on prediction markets to further their utilization by economic forecasters. It provides a description of prediction markets, and also the current markets which are useful in understanding the market which helps in making useful predictions. Thus, there is need to predict the efficient house pricing for real estate customers with respect to their budgets and priorities. This uses data mining algorithm to predict prices by analyzing current house prices, thereby forecasting the future prices according to the users requirements.

II. LITERATURE REVIEW

Byeonghwa Park et al.[2] describes an innovative software that is used for real estate evaluation and mapping and analyzing of real estate advertisements published on the internet in the Czech Republic. The software systematically collects, analyzes and assesses data about the changes in the real estate market. For each half year, the software assembles over 650,000 price quotations concerning sale or rental of apartments, houses, business properties and building lots.

Wang, X. et al.[6] developed a real estate web application using Microsoft ASP .NET and SQL 2008. The real estate system Give the functionality for buyers, allowing them to search for houses by features or address. It provides functionality for the seller, authorize them to log into the system and add new advertisements or delete existing ones. For this each user is provided a login account with login ID and password. Along with this, when the user will search for the property, original property value and predicted property value will be displayed. By analyzing previous market trends and price ranges, and also upcoming developments future prices will be predicted.

Aaron Ng[5] focuses on determinants of real estate investment, on the capital market, one of important criteria for investment decision is the issue of selecting sources, possibilities and methods of raising the value of the investment object (Klecza, 2010). This paper focuses on perceiving real estate property as an investment asset that generates a certain amount of revenue to its owner, assuming expected risk and the expected level of liquidity (Krulický, 2019).

An Overview on the Indian Real Estate Sector [11] researcher go through different article of newspaper, web-portal and report of several government organizations. We also go through various research articles of rating agencies like ICRA, JLL and E and Y concerning with reality sector of India. We also critically analyzed the government of India and MP regulation regarding the reality sector and affordable housing.

Vishal Raman[7] aims to study the actual utility of real estate pricing models based on data mining and machine learning. In order to achieve this goal, this paper introduces appropriate trend estimation methods, adjusts pricing models and processes, and realizes trend this paper aims to study the actual utility of real estate pricing models based on data mining and machine learning.

III. METHODOLOGY

A. Activity Diagram

Activity diagram focuses on the execution and flow of the behavior of a system instead of implementation. Below fig represents the actual flow of and behavior of system. It consists of that are made up of action which applies to behavioral modeling technology.

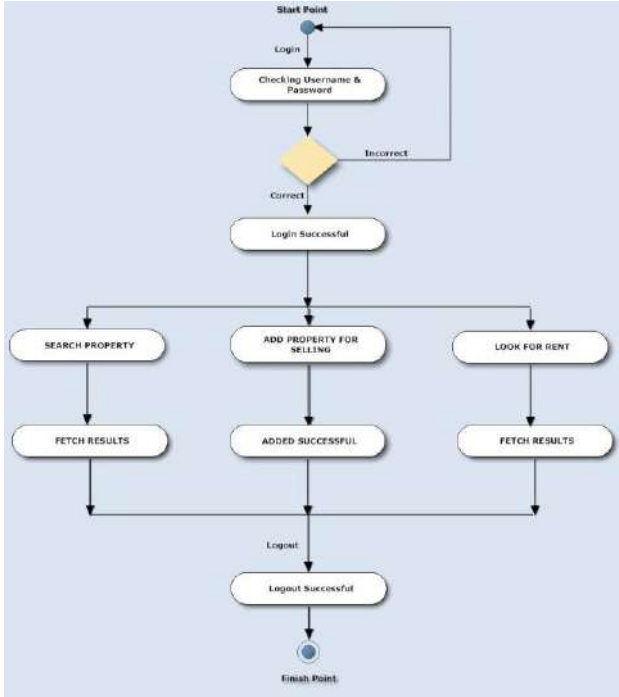


Fig. 3 Activity Diagram

B. Data Flow Diagram:

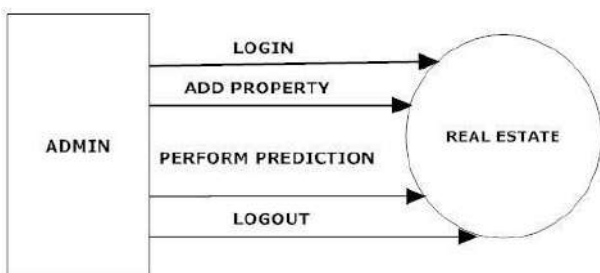


Fig 2. DFD Level 0.

DFD level 0:- After user is successfully logged in, he can search properties according to his preferences. He can add his/her shortlisted properties. He can also search for respective rent for any provided property.

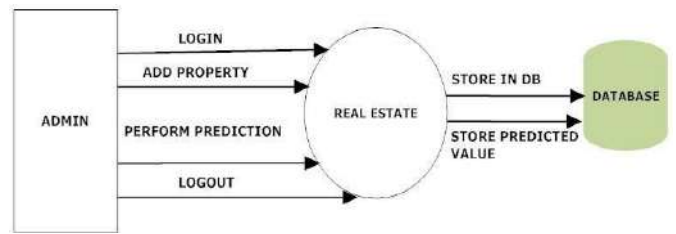


Fig. DFD Level 1.

DFD level 1:- Admin have to first log in into the website. When he enters new property then that info will be stored into the database so that it will be easy to retrieve. when the predictions are made, that data also stored into the database.

IV. RESULTS AND OTHER POSSIBLE APPLICATIONS

This project helps the users to make good decisions regarding buying or selling of valuable property. Prior to this online system this process involved a lot of travelling costs and searching time. Due to this system the user now does not have to travel much and can look for the property it is searching for, online according to its requirements. This system includes property details like Address, space measurement(sq ft), number of BHKs, Floor, Property Seller name and its contact number plus email-id. The user can search property depending on the area that it wants in, number of wash rooms, bedrooms, halls and kitchen. The system contains an algorithm that calculates loan that the user can take plus 20%-30% cash that the user has to pay. This system allows the admin to enter details about any property that it is wishing for. The admin can even delete the property details. Thus this system eliminates cost to a great extent and also reduces searching time. With the help of this system the user can get the property details depending on its preferences. Thus this system also helps to maintain good relationship between the buyers and the sellers of the property.

V.CONCLUSION

- In today's real estate world, it has become tough to store such huge data and extract them for one's own requirement.
- The system makes use of such data in the most efficient way.
- The data mining algorithm helps to fulfill customers by increasing the accuracy of estate choice and reducing the risk of investing in an estate.
- Lots of features that could be added to make the system more widely acceptable.
- One of the major future scopes is adding estate database of more cities which will provide the user to explore more estates and reach an accurate decision.

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- [9] Real Estate Price Prediction with Regression and Classification, CS 229 Autumn 2016 Project Final Report In this project, house prices will be predicted given explanatory variables that cover many aspects of residential houses. As continuous house prices, they will be predicted with various regression techniques including Lasso, Ridge, SVM regression, and Random Forest regression; as individual price ranges, they will be predicted with classification methods including Naive Bayes, logistic regression, SVM classification, and Random Forest classification. They also perform PCA to improve the prediction accuracy. The goal of this project is to create a regression model and a classification model that are able to accurately estimate the price of the house given the features.
- [10] Suggested real estate price forecasting models based on particle swarm optimization (PSO) and support vector machine (SVM). The experimental results indicated that the proposed PSOSVM based real estate price forecasting model has good forecasting performance compared to grid and genetic algorithms.
- [11] Real Estate Tech Trends (2016) Properties Online, Inc. has compiled important statistical information for the real estate community. Statistical sources include the 2015 National Association of REALTORS Profile of Home Buyers Sellers, the 2015 National Association of REALTORS Member Profile, The Realtor Technology Survey Report, The California Association of REALTORS Buyer and Seller Surveys, WAV Group Agent Responsiveness Study, RealEstateSites.com and over 3 million website visitor statistics from over 15 thousand single property websites.
- [12] Using machine learning algorithms for housing price prediction, Byeonghwa Park , Jae Kwon Bae, 2015 It is a well-known fact that housing price valuation is one of most important trading decisions affecting a national real estate policy. In this study, they create models using machine learning algorithms such as C4.5, RIPPER (Repeated Incremental Pruning to Produce Error Reduction), Naive Bayesian, and AdaBoost (Adaptive Boosting) to predict housing price.

Dynamic Load Enhancement in Multi-Machine Structures Employing UPFC

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Abstract— *The resilience of an integrated electric infrastructure is equated to routine or robust functioning following some type of disruption. Despite linked installations rising in scope and spanning broad territorial areas, maintaining controllability across diverse elements of power grid has become incredibly hard. One such research explores & compares the dynamic load threshold of a multi-machine power grid using a UPFC operating in transverse control mode.*

Keywords—FACTS, Transient Stability Limit, UPFC

I. INTRODUCTION

An integrated energy infrastructure is comprised of numerous indispensable aspects. They are the power modules, power grids, consumers, transformers, compensators, and, finally, Dc propagation lines. It can be certain disruptions during the functioning of machines, such as prolonged swings in the rate or intermittent fluctuations in the thrust provided to the engine. These disruptions may cause amplitude or spectrum fluctuations, which may have an impact on other elements of the linked electrical network. Stressors, such as thunder, can potentially disrupt the energy grid. All of these disruptions are referred to as "flaws." When a defect develops, the engine suffers dynamic stability if the inherent pattern of oscillations overlaps with activity rate of such turbines. With all these elements in perspective, comprises various would be the underlying need for a reliable electricity infrastructure. Aside from this requirement, additional essential criteria include stable consistency, dynamic response, aberrations & disruption, power quality & redox brownouts. Recent advancements in energy transistors, and hence in Flexible AC Transmission Systems (FACTS) innovation, allow for genuine management of electric grid aspects as well as better dynamic response. UPFC constitutes one of the most potent FACTS sensors because it is a mix of serial and flush converters connected by a shared DC connection and combines the capabilities of two FACTS gadgets, Static Synchronous Series Compensator (SSSC) and Static Compensator (STATCOM). UPFCs were observed during investigations to improve overall vibrant rebuttal of energy systems. Regarding computations, all of

the publications listed employ the Single Machine Infinite Bus (SMIB) battery architecture. According to data, quaternary wattage intravenous administration does have the greatest effect on improving transient stability. As previously stated, the impacts of UPFC on the predictive algorithm volatility enhancement of multi-machine energy supplies have received little emphasis. This work compares the resilience margin of multi-machine energy supplies employing UPFC.

II. MULTIPLE ENGINE RELIABILITY

The traditional paradigm of the electrical network, incorporating the rotating turbines illustrated in, is employed to investigate the infrastructure of the country. This is the most basic paradigm employed in the analysis of dynamical, and it demands the least quantity of variables to begin with. Furthermore, utilizing this paradigm, the assessment may be completed in a minimal period of space. For most electrical network, the duration is on the tune of one second, when the vibrant reactivity of the device is mostly determined by accumulated angular momentum with in spinning particles. This results in a multi-port formulation of a transmission system in which m is indeed smaller than n.

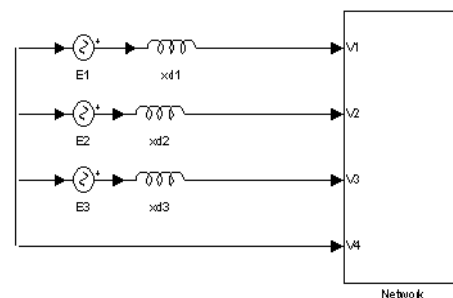


Fig. 1. Multiple Engine System

Contributions cannot be neglected in evaluating intermittent volatility due to related effects. As a result, the workloads are transformed into equal admittances between turbines and the substrate. If a voltages V_{Li} , real authority PL_i , power flow QL_i , and amperage IL are streaming into a demand susceptibility on the charge side,

$$Y_L = G_L + jB_L \quad \text{----- (1)}$$

$$P_L + jQ_L = V_L I_L^* = V_L^2 (G_L - jB_L) \quad \text{----- (2)}$$

$$Y_L^* = G_L - jB_L \quad \text{----- (3)}$$

Every turbine has a vibration input hidden underneath the transitory impedances of equal intensity. The interior value is computed using the system's transmission line analysis. The intrinsic orientation associated with this potential is derived as usual from post dc link: At a foreseeable being just use amplitude as the benchmark. The phrase connects V and I.

$$V I^* = P + jQ \quad \text{----- (4)}$$

$$I = \{(P + jQ) / V\}^* = (P - jQ) / V \quad \text{----- (5)}$$

However, a scientific formula that we may formulate is

$$E_i = V_i + jX_{di} I \quad \text{----- (6)}$$

$$E \angle \delta_i = V_i + jX_{di} \{ (P - jQ) / V \} = V_i + \frac{X_{di} Q}{V} + j \frac{X_{di} P}{V} \quad \text{----- (7)}$$

The pre-transient volt pitch was subsequently added to produce its initial generation pitch.

$$\delta_0 = \delta_i + \theta_i \quad \text{----- (8)}$$

To every entire service, the YBUS grid is created. Matching load admittances are linked between the power injection as well as the benchmark terminal.

$$[Y_{BUS}] = [Y_{BUS}] + \text{diag} [Y_L] \quad \text{----- (9)}$$

The transitory reactance of the producers can also be introduced to the YBUS to supplement it with the equivalent arrangement with a few changes at the transverse components.

$$[Y_{BUS}] = [Y_{BUS}] + \text{diag} [-jx_d] \quad \text{----- (10)}$$

Where $x_d = [x_{d1} \ x_{d2} \ x_{d3} \ \dots \ x_{dm} \ 0 \ 0 \ \dots \ n]$ where
m --- number of the machines n --- number of buses.

Eventually, all connections save the makers are removed, and the updated YBUS is produced. In addition, excluding its inside production vertices, all hubs have existing intrusion detection flow. The initial velocity injected into the channel is denoted by

$$I_{BUS,j} = - \frac{E_{oi} \angle \delta_{oi}}{X_{di}} \text{ for } i = 1 \text{ to } n \quad \text{----- (11)}$$

$$I_{BUS,j} = 0.0 \text{ for } i = m + 1 \text{ to } n \quad \text{----- (12)}$$

The board values at time $t = 0$ (fault incidence) may be determined using the aforementioned formulae.

$$[V_{BUS}] = [Y_{BUS}]^{-1} [I_{BUS}] \quad \text{----- (13)}$$

YBUS is different under malfunction and post-fault situations. As a result, by modifying the YBUS, the VBUS may be adjusted for a variety of operating situations. The overall energy released by each engine is determined using the aforementioned parameters as

$$P_{ei} = \{E_i V_i / X_{di}\} \sin(\delta_i - \theta_i) \quad \text{----- (14)}$$

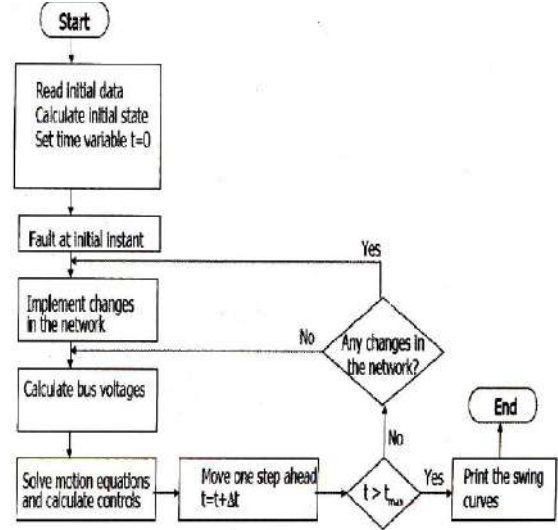


Fig. 2. Multiple Engine System

III. UNIFIED POWER FLOW CONTROLLER

The Unified Power Flow Controller (UPFC) is the most adaptable component of Flexibility Electrical Transmission Services (FACTS) group, which employs voltage regulators to govern energy flow across electricity utilities. The UPFC employs a shunted device (STATCOM) and a sequence operator (SSSC) that are linked via a shared DC bus. The Unified Power Flow Controller (UPFC) is a boost converter regulator that controls real and responsive modern flows in a network by injecting (changing) volt in serial and reactive energy in return.

Figure 3.1 depicts the Facts controllers model used in this work. It is made up of three components: a serial dc source that represents the UPFC serial arm, an Iq parallel current supply that represents the UPFC simultaneous responsive compensatory influence, and an Ip corresponding current source that represents the UPFC simultaneous dynamic current [5].

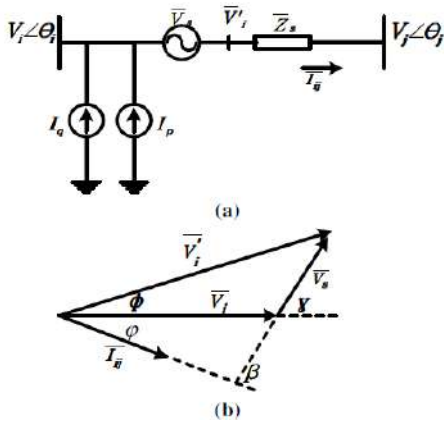


Fig. 3. UPFC exhibit

As previously stated, in order to ascertain the transitory response, we must framework the UPFC with suitable parameters. The UPFC controller's intravenous paradigm represents serial branches as demands that are dependent on associated system parameters. Figure 3.1 depicts such an approach

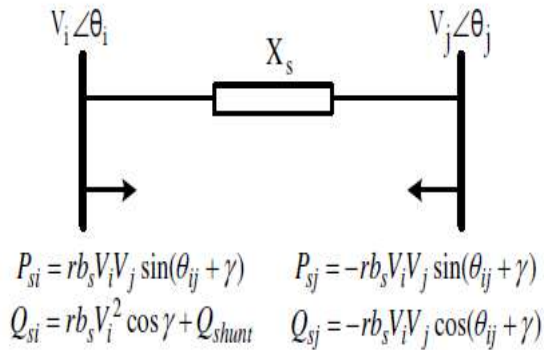


Fig. 4. UPFC's Intravenous Prototype

V_s represents the equivalent implanted controller parameters in this Paradigm, $V_s = V_i * R$, X_s represents the serial characteristic impedance of the series converter and γ is the inclination between the serial infused potential and the sender's extremity voltage profile

IV. SIMULATION RESULTS

To assess dynamic response, trials were conducted on the standard IEEE bus system. This was done to test the systems' robustness under different operative situations. These findings are based on a benchmarking tool known as the Transient Stability Index. This statistic is examined for various predetermined disruptions under diverse functioning settings and evaluated on the mainstream IEEE 30 connector infrastructure.

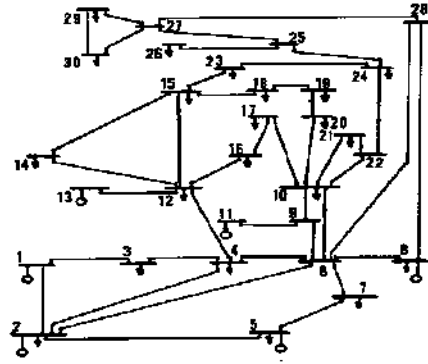


Fig. 5. IEEE 30 topological network

When a failure occurs on a bus or a network switch, numerous characteristics like as volts, energy of motion, enthalpy, blade spin orientation, and so on of the machineries linked to the relevant buses change. These variances are mostly crucial for the buses' instability and stability in the network. The following graphs depict these similarities in the characteristics of the equipment in the ordinary buses described above for the three-phase fault conditions at bus nos. 3s and 5, correspondingly.

Without UPFC

Fault clearing time=0.8 sec

Total analysis time=3 sec

Fault bus=Bus No 29

Trip [29, 30]

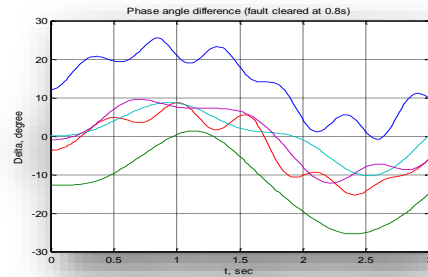


Fig. 6. Rotor Angle Variations

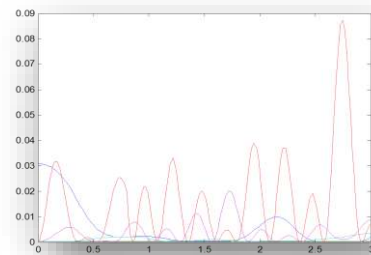


Fig. 7. Potential Thrust Variations

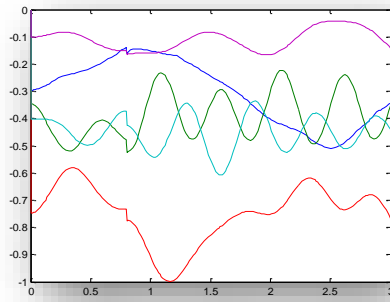


Fig. 8. Angular Momentum Reliability

With UPFC

FCT=0.8 sec

TAT=3 sec

FB=Bus No 29

Trip [29, 30]

Nearer bus=6 Far bus=21

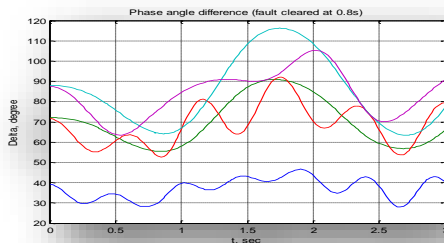


Fig. 9. Variability in pitch Tilt

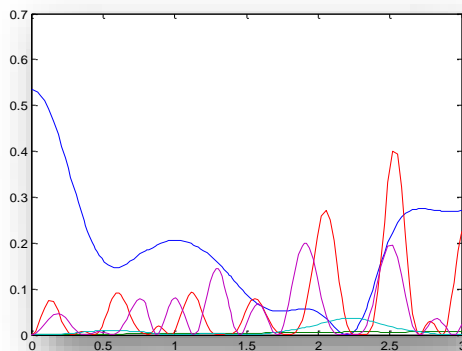


Fig. 10. Variability in Generating Capacity

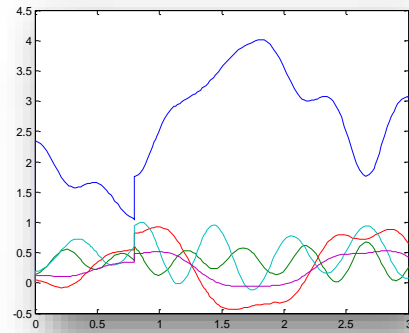


Fig. 11. Variability in pitch Momentum

V. CONCLUSION

The report describes its studies "A Novel Solitary Seven-Level Conversion Layout with Fewer Electric Aspects for the Street Transmission." The suggested control mechanism converter seems to be pulse dissemination for switches. The valves in the recommended inverter all perform at a fixed frequency. As a consequence, switching losses and THD rates were kept to a minimum in the converter. Throughout the end, a envisioned adapter are using photovoltaic power with energy backup. The concepts of high-level management and adaptive control have been discussed.

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VII. BIBLIOGRAPHY



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Battery Swapping System For Electrical Vehicle

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Abstract

Having a sufficient charging infrastructure is crucial to the rapid uptake of electric vehicles (EVs). The availability of such infrastructure would eliminate several barriers related to the short range of EVs. A Battery Swapping Station (BSS) is a practical way to power electric vehicles (EVs) while reducing lengthy wait times at Battery Charging Stations (BCS). In contrast to the BCS, the BSS charges the batteries beforehand and gets them ready for a far faster battery swap. These charging stations may be able to offer special advantages to the power system because they can act as a middleman between EV owners and the grid. This essay explores the benefits of developing the BSS from a number of angles. In light of this, a model for battery charging scheduling from the viewpoint of the station owner is suggested. To demonstrate how the suggested model may assist BSS owners in managing their assets through scheduling battery charging time, an example is given.

Key Words: Cloud, Monitoring, the Internet of Things

1. INTRODUCTION

Today's research and development organisations are concentrating on creating a battery swap station (bss) architecture with the potential to offer a stable foundation for the successful installation of a sizable fleet of hybrid and electric cars (i.e. Xevs). Similar to existing gasoline refuelling stations, the bss may calibrate its subsystem for the deployment of electric vehicles (EVs) by replacing or swapping out the drained batteries for partially or completely charged ones over the course of a few minutes. The bss strategy, which offers a wider experience of business potential for the individual stakeholders, has emerged as a viable technology to the conventional ev recharge station approach. This work deals with the introduction to bss including infrastructure, techniques, benefits over charging station and key challenges associated with bss. Furthermore, an s34x-smart swapping station for xev's is proposed and finally, the key thrust is research for bss is discussed. To the authors' knowledge, this is the first kind of review work on bss. We are focusing on developing a system that not only plays a role in power electronics but also in embedded system and iot using various approaches. This allows the real-time use of the system to get into public domain.

LITERATURE REVIEW

According to Mohd Suffian Sulim and Hafizul Fahri Hanafi this paper described the design and development of an IoT-based battery monitoring system for electric vehicle to ensure the battery performance degradation can be monitored online. The objective is to prove that the concept of the idea can be realized. The development of the system consists of the development of the hardware for the battery monitoring device and a web-based battery monitoring user interface.

The system is capable to show information such as location, battery condition and time via internet by incorporating GPS system to detect the coordinate and display it on the Google Maps application

2. METHODOLOGY

2.1 Block Diagram

The purpose of this project is to identify charging stations and to replace the battery instead of letting the battery charge for hours. This project is merely a scale illustration of how IOT and cloud platforms are used to perform swapping technologies. The block diagram that follows shows the components utilised in this model.

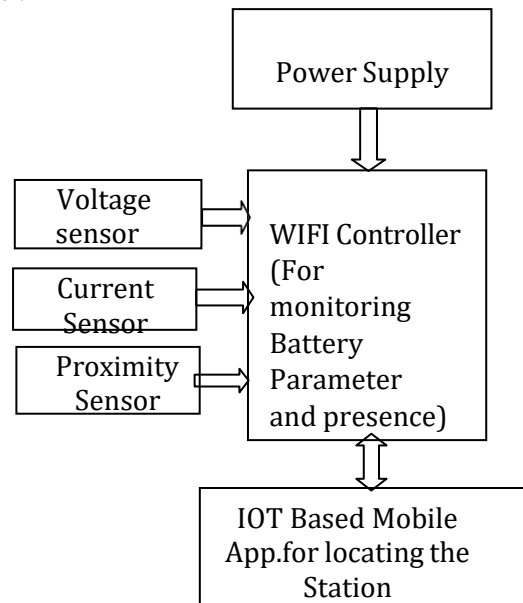


Fig.2.1: System block diagram

2.2 Hardware Prototype

A. ESP WIFI Controller

A cheap open source IoT platform is Node MCU. Initially, it contained hardware based on the ESP-12 module and firmware that runs on the ESP8266 Wi-Fi SoC from Espressif Systems. Support for the 32-bit ESP32 MCU was later added. The Node MCU serves as the project's brain and heart, constantly monitoring the input from the sensors, acting on the output side, and sending data to the internet.

The suggested solution relies heavily on the Raspberry Pi 3. A mouse, keyboard, and pen drive can be connected to its four USB ports. Additionally, an Ethernet cable can be connected to it via an Ethernet compatible connector. We can connect a range of sensors, including ultrasonic, air, temperature, and moisture sensors, to the 40 GPIO pins of the Raspberry Pi 3. The touchscreen display and Pi camera can be mounted in the Raspberry Pi's two special slots



Fig.2.2.1: ESP WIFI Controller

B. Voltage Sensor

The Voltage Sensor is a straightforward module that can be used with an Arduino (or any other microcontroller with a 5V input tolerance) to measure external voltages that are higher than the microcontroller's maximum allowable value, which is 5V in the case of the Arduino. The voltage sensor module used in this project is shown in the figure below. In our project, the voltage sensor continuously checks the battery's line voltage and transmits the information to the mobile app. so that the user can monitor the battery's voltage and availability from a remote location.

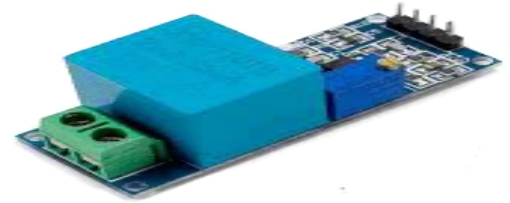


Fig.2.2.2: Voltage Sensor

C. Current Sensor

The analogue voltage output from this sensor, which runs at 5V, is proportionate to the measured current. The analogue output of this current sensor allows us to read it by measuring the output voltage with a voltmeter or by utilising an Arduino-compatible microcontroller's Analog Read or ADCport.

In our project, the battery current will be continuously monitored by the current sensor, which will also send commands to the mobile app. This displays the battery's available charge



Fig. 2.2.3: Current Sensor

D. Proximity Sensor

A radiation-sensitive optoelectronic component with spectral sensitivity in the infrared wavelength region of 50m is known as an infrared sensor (IR sensor). Motion detectors, which are used in building services to turn on lights or in alarm systems to detect unwanted visitors, increasingly frequently incorporate IR sensors.



Fig. 2.2.4: Proximity Sensor

E. GPS Module

Small processors and antennas found in GPS modules are used to directly receive data from satellites using specific RF frequencies. From there, it will get data from various sources, including timestamps from all visible satellites. On the mobile app, the Swapping Station can be found using a GPS module.



Fig.2.2.5: GPS Module

3. EXPECTED RESULTS

The model is expected to demonstrate proximity-based battery switching technology and display voltage and current levels on IoT platforms, which are used to find battery swapping charging stations.

4. APPLICATIONS

1. Consumer Electronics.
2. Public Transportation.
3. Aviation
4. Electricity Grid.
5. Renewable Energy Storage.
6. Military.
7. Spaceflight.
8. Wearable Technology.

5. CONCLUSION

Ensure battery performance decline may be tracked online with an IoT-based battery monitoring system for electric vehicles. The goal is to demonstrate the viability of the idea's basic premise. The hardware for the battery monitoring device and a web-based user interface for battery monitoring are being developed as part of the system's development.

The system incorporates a GPS system to detect the coordinate and display it on the Google Maps application, allowing it to display information such as position, battery life, and time via the internet. By including more functionalities, the system can be further modified to be improved. By creating a smartphone application that can assist users in battery monitoring and serve as a reminder for battery degeneration, the method can be employed in smartphones. Ethernet can be used to improve internet connectivity in order to obtain a better connection than GPRS.

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Solar Operated Mobile Pesticide and Fertilizer Sprayer

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Abstract—Spraying of pesticides is an important task in agriculture for protecting the crops from insects. Farmers presently using hand operated or fuel operated knapsack sprayers for this task. This paper discussed about different types of solar sprayers developed by several researchers with an aim to reduce human drudgery while spraying in field and as part of pollution free and environment friendly green energy. Some advantages and drawbacks of solar sprayers have been identified, discussed and future need of research in line of development of green technologies have been presented in this paper. Comprehensive solution towards solving future energy needs of agriculture is attempted in this study. Spraying is not a continuous operation round the year. So, the same PV system available in solar sprayers can be utilized for energizing other farm operations such as pumping, farm lighting etc. One of the factors which affect the use of conventional electricity or fuel is increasing prices and its non-availability at peak time in rural area. The available solar sprayers used by the farmers are having low field coverage capacities, creating health hazards due to direct inhaling of spray drift and thus, polluting the environment with engine operated sprayers. Therefore, the emphasis should be given on design and developing independent renewable power source which can give uninterrupted energy and fulfill energy demand of remotely located farmers for operating various farm equipment.

Keywords—Solar energy, solar panel, solar powered pesticide sprayer, Pesticide Sprayer

I. INTRODUCTION

In agriculture, considerable amount of energy is used to perform different field activities e.g. ploughing, irrigation, intercultural operations, spraying of agricultural chemicals, harvesting and post-harvest processing etc. Energy security of a country is very important and efforts are being made for utilization of renewable energy sources mainly solar energy, as the fossil fuel based energy is depleting at a very fast rate. Spraying of pesticides is an important task in agriculture for protecting the crops from insects. Approximately, 18- 25 % of the crop production is damaged if pest and diseases are not controlled at right time. Uniform spraying of liquid formulations throughout the crop field is very important for effective control of pest and diseases. Using sprayer, liquid pesticide formulations are generally broken down to minute droplets of effective size for uniform distribution over a large surface area. Dose of agricultural chemicals also plays critical role since under dose may not give the desired coverage whereas overdose is expensive and may contaminate the food chain through residues. Farmers mainly use hand operated or fuel operated knapsack sprayers for this task. Sprayer is a machine to apply herbicides, fungicides, and insecticides in the form of droplets. Among the others lever operated knapsack sprayer, power sprayer and manually operated sprayers are commonly used by small to medium farmers. These conventional sprayer causes user fatigue due to excessive bulky and heavy construction. The traditional knapsack sprayer causes user tiredness due to continuous operation of lever and movement in the field with heavy load on its back. [1][3][5]

Considering the above requirements, this paper discussed about different types of solar sprayers developed by several researchers with an aim to reduce human drudgery while spraying in field

carrying conventional sprayer on user's back, few researchers have also designed and developed vehicle for carrying the sprayer.[7][8]

The design of solar PV sprayer and developments in solar powered agricultural sprayers is discussed and reviewed in detail under this study.

II. METHODOLOGY

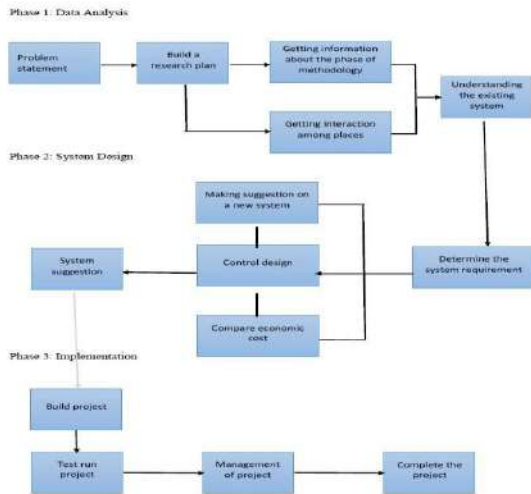


Fig. 1. Layout diagram of solar sprayer

III. LAYOUT AND WORKING PRINCIPLE OF SOLAR SPRAYING SYSTEM

Fig.1 Block diagram of spraying system

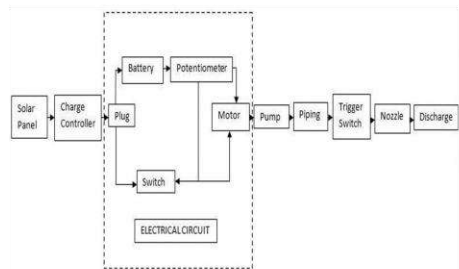


Fig. 2. Block diagram of solar sprayer

The solar powered agricultural sprayer has following components:

Tank

Solar power unit

- i. Solar panel
- ii. Charge controller
- iii. Battery DC motor/pump Spraying unit
- iv. Spray boom
- v. High pressure spray pipe
- vi. Nozzles

The selection of the components can be done as per requirement. Tank is used to store the pesticide/insecticide chemical solution. It supplies chemical solution to nozzles on boom through dc motor/pump and pressure pipe.[7]

The solar power unit is energy conversion unit. Solar energy obtained from sun is converted into electrical energy using solar panel by photovoltaic effect. The output of the energy conversion is given to charge a deepcycle lead acid battery through a charge controller.

The charge controller limits the rate at which electric current is added to the battery. Thereby, preventing overcharging and protecting against over voltage. It employs the Pulse Width Modulation (PWM) technique which gradually stops charging the battery, when it exceeds a set high voltage level and gradually re-enables the charging, when the battery voltage drops back below the safe level.

The main advantage of PWM is that the power loss in the switching device is very low. The output from the charge controller is given to the battery by a three pin socket through an electrical network. This circuit is designed to control the RPM of the motor by controlling the amount of resistance between the motor and the battery while simultaneously providing a charging supply for the battery. DC motor/pump lifts the pesticide from tank and delivers to nozzles with desired high pressure. Energy is supplied

To DC motor/pump by the solar power unit for its running/operation. Nozzles on the boom atomize the spray liquid into fine droplets and sprayed on the crop canopy. The droplet size and spray pattern depends on pressure and type of nozzle used as per requirement. [1][6]

IV. DIFFERENT DESIGNS OF SOLAR SPRAYER

Joshua et al., (2010) modified existing power sprayer on fossil fuel into solar sprayer (Fig. 2). To overcome the difficulties in the existing model and to reduce the operating cost of the power sprayer, a modified solar sprayer model was designed and introduced for effective operation without fossil fuel. In this modified model, the two stroke petrol engine was replaced by a single motor. This was operated by the electrical energy stored in the 12V battery attached in the Unit. The 12V battery can be recharged by the solar panels. Comparison between existing power sprayer and developed solar sprayer is shown in Table 1.

This study concluded that, the developed solar sprayer is environment friendly, cost effective, maintenance free and fuel cost was nil.[2]

Patil et al., (2014) evaluated solar operated knapsack sprayer developed using 37 watt solar panel facilitate to operate it on both modes independently i.e. on battery mode and on directly solar panel mode (Fig. 3). Overall model design provides weight of panel as well as weight of sprayer on operator shoulder, which facilitate effortless operation. Sprayer can run 2.5 hours more after 5 hours of operation in full solar intensity. Sprayer is capable of spraying the liquid 360 liter/ha in 4.00 h at a walking speed of 0.7 m/s. Discharge rate of sprayer was 0.0267 liter/sec.[3]

Swami et al., (2016) designed and developed a solar PV based sprayer which can be moved in the field with the

help of manually drawn vehicle. The developed solar PV sprayer operates both on direct mode and indirect mode. In the direct mode, the sprayer was operated by using electricity generated by 100 Wp polycrystalline PV module mounted on the sprayer and in the indirect mode it was operated on battery mode using stored electric energy in a deep cycle battery (12 V, 32 Ah). In both modes, a DC motor pump of 60 W was used to generate the required operating pressure to spray the liquid pesticide formulations. The brass nozzle, which requires an operating pressure of about 1.5-2 kg /cm² to provide a discharge of 900 ml/ min was used in the study. The capacity of the liquid tank 50 liters for an uninterrupted operation for 2 hours with two nozzles.

Performance of the developed solar PV sprayer on manually drawn vehicle has been tested in field and found satisfactory to spray pesticide in different arid crops and the sprayer can be best operated during 9:00 AM to 3:00 PM for Jodhpur station (Fig. 4). Although, initial cost (Rs. 24,650) of the proposed system is little more as compared to conventional sprayer but the running cost is very less. Further, the system is eco-friendly.[4]

Yallappa et al., (2016) developed and evaluated solar powered sprayer consisting of 20 W solar panel, 12V DC battery charged by solar energy received by the solar panel, a DC motor operated by the battery, a pump to spray pesticide and a tank to

hold the pesticide (Fig. 5). The entire unit is portable and operated by one labour. The discharge rate of the sprayer during laboratory and field conditions were measured, the average discharge rate was about 0.023 l/s.[5]

V. ADVANTAGES AND DRAWBACKS OF EXISTING SOLAR SPRAYING TECHNIQUES

Based upon the reviews made in the paper, some advantages and drawbacks of solar sprayers have been identified and discussed. It is observed that, in the manual backpack spraying, the labor has to carry all the weight of the pesticides filled tank which causes fatigue to labor and hence reduces the human capacity. Proper pressure is not maintained, which affects the droplet size and distribution uniformity. Operator is exposed to harmful pesticide spray drift during spraying and operator's safety is at risk. The existing power knapsack sprayers were converted into solar sprayers by replacing fuel engines with DC motor. The back pain due to vibration was observed during the operation. Operator's safety is also a question mark, as he is always exposed to harmful pesticide spray drift during spraying. Elimination of harmful exhaust gases may lead to clean environment.

Pushing activity involved in trolley based solar sprayers

A. REFERENCE TYPE OF SPRAYER RESEARCH FINDING

Joshua et al.(2010) Modified solar sprayer developed a power sprayer with two stroke petrol engine. Since the operating cost was found high they suggested a solar operated sprayer

Patil al.(2014) knapsack sprayer knapsack sprayer Solar operated Evaluated solar operated knapsack sprayer and was capable of spraying the liquid 360 liter/ha in 4.00 h at a walking speed of 0.7 m/s Discharge rate of sprayer is 0.0267 liter/sec

creates fatigue among the operators. These sprayers also have less field capacity and operators are exposed to chemical as he walks behind the spray pattern.[2][3][4][5]

Fig.2 Modified solar sprayer

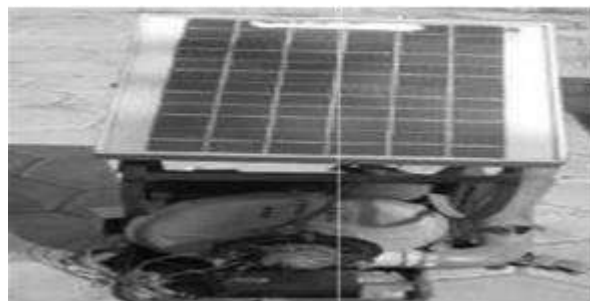


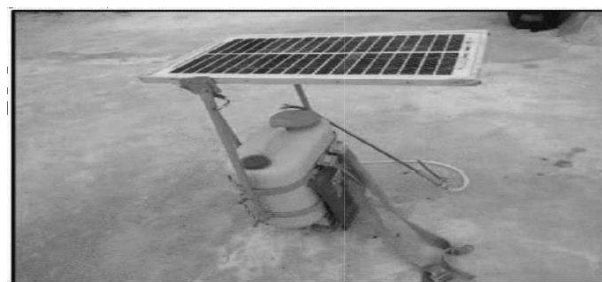
Fig.3 Solar operated knapsack sprayer



Fig.4 Field evaluation of trolley based solar sprayer



Fig.5 Portable solar powered sprayer



Swami et al.(2016) Trolley based solar sprayer Performance of the developed solar PV sprayer on manually drawn vehicle has been tested in field and found satisfactory to spray pesticide in different arid crops and the sprayer can be best operated during 9:00 AM to 3:00 PM for Jodhpur station.

Yallappa et al. (2016) Portable solar powered sprayer The theoretical field capacity and effective field capacity of the sprayer was observed to be of 0.17 ha/h and 0.14 ha/h respectively at 2.8 km/h walking speed and 0.60 m swath width.

RESULT AND DISCUSSION

40w 12v Solar panel converts sun energy into electricity (DC). That generated electricity charges battery of 12v 8amp. At a well condition of atmosphere charging time of battery is 2.8 hrs but in cloudy weather charging time is 5.9 hrs. For motor backup time is 2.66 hrs. While spraying liquid the 'ON' and 'OFF' of motor is controlled with switch. Thus motor sucks liquid and deliver it through delivery pipe towards nozzle.

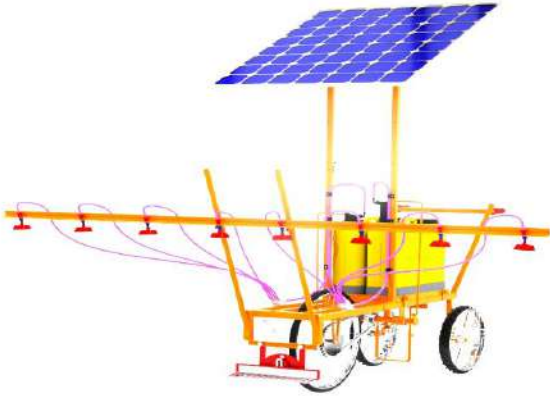


Fig. 6. Pictorial representation of Solar Sprayer

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Arduino Based Seven-Stage Multi-Level Inverter

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Abstract—Multi-Level Inverter technology has been proven various industrial applications like static var compensation, variable speed motor drives etc. Multi-Level voltage source inverter presents various advantages such as a smoother output voltage waveforms with lesser total harmonic distortion (THD), operates at lower switching frequency by reducing the switching losses and also produce common mode voltage which will reduce the stress on the AC loads like motor etc. This paper presents the application of Seven-Level H-Bridge inverter feeding a 10Watt LED bulb. This paper compares total harmonic distortion values of voltage waveforms of 10Watt LED Bulb with the conventional five-level inverter. In this study both voltage and current values has been measured using multimeter as well as CRO to determine the THD and output power. This study helps to identify most suitable Multi-Level Inverter to convert DC voltage into AC voltage, which meant for AC Domestic Lighting load application.

(Keywords—Seven level inverter, Multilevel inverter, Total Harmonic Distortion, THD, Inverter)

I. INTRODUCTION

Multilevel power conversion was first introduced more than two decades ago. The general concept involves utilizing a higher number of active semiconductor switches to perform the power of active semiconductor switches to perform the number of active semiconductor switches to perform the power conversion in small voltage steps [1]. Multilevel inverters are promising; they have nearly sinusoidal output voltage waveforms, output current with better harmonic profile, less stressing of electronic components owing to decreased voltages, switching losses that are lower than those of conventional two-level, three-level and five-level inverters, a smaller size, and lower Electromagnetic Interference (EMI), all of which make them cheaper, lighter, and more compact [2][4]. One clear disadvantage of multilevel power conversion is the higher number of semiconductor switches required. It should be pointed out that lower voltage rated switches can be used in the multilevel converter and, therefore the active semiconductor cost is not appreciably increased when compared with the five level cases [3] [4] And this disadvantage of multilevel power converters is that the small voltage steps are typically produced by isolated voltage sources or bank of series capacitors. Isolated voltage sources may not always be

readily available, and series capacitors require voltage balancing. To some extent, the voltage balancing can be addressed by using redundant switching states, which exist due to the high number of semiconductor devices [5]. In general, three main types of multilevel inverters, i.e. diode clamp, flying capacitor, and cascade inverter with separated dc sources, have been developed. Recent research has involved the introduction of novel converter topologies and unique modulation strategies. [5] There are also some combinations of the mentioned topologies as series combination of a two-level converter with a three-level NPC converter which is named cascade 3/2 multilevel inverter.[5] there is also a series combination of a five level cascade converter with a seven-level NPC converter which is named cascade 5/7 multilevel inverter.[6][7].

The multilevel output is generated with a multi winding transformer. For dc to AC converter, multilevel inverter is good choice for PV system application. This is because it provide quite a lot of advantages. In this study we can improve the switching losses, Total Harmonic Distortion (THD) and getting smoother waveform as comparing to five level inverter in seven level.[8].

According to IEEE standards of THD limits, total harmonic current distortion shall be less than 5% of the fundamental frequency current at rated inverter output.[9][10].

In this paper seven-Level Inverter and comparison of total harmonic distortion presented. By using Seven-Level Inverter THD has been reduced to 1.23% from 1.53% of Five-level Inverter by increasing the voltage level. Project model testing has been carried out on 10Watt LED Bulb.

II. OBJECTIVES

The main objective of this project is as follows:

- A. The main objective of this project is to increase the number of level with a lower numbers of switches at the output without adding any complexity to the power circuit.
- A. Using PWM technique for a switching MOSFET.
- B. The main purposed of this method are reduced THD, the lower order harmonics and electromagnetic interference and to get high output voltage.
- C. To minimize the THD equal area criteria (EAC) switching technique is presented and it can be enhanced the output voltage from proposed work
- D. The inverter is operated by using Arduino controller which generates PWM pulses.

III. METHODOLOGY

The project seven level inverter using Arduino UNO micro-controller was design a seven level inverter. Step-down transformer output is given to the battery though charging circuit this 24V DC output given to the H-Bridge circuit. In this we are using three H-Bridge circuit for a seven level inverter. This seven level inverter output is connected to a step-up which converts the 24V to 230V AC. Micro-controller will generates the PWM signals to H-Bridge circuit with 50Hz frequency at a particular duration of time.

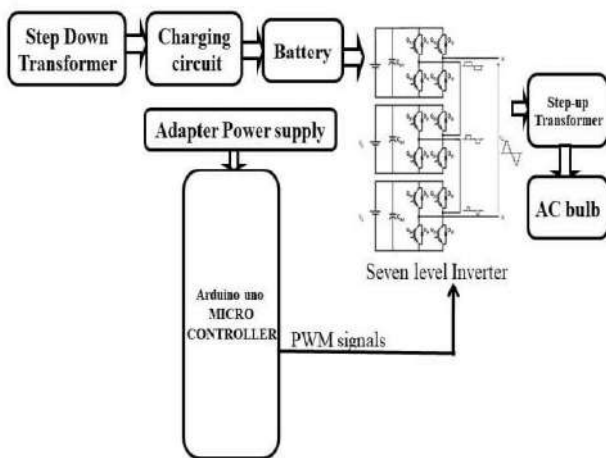


Fig. 1. Block diagram of cascaded seven level inverter.

A seven level inverter designed using an arduino uno micro-controller with a cascade multilevel inverter has no. of H - bridge inverter units associated in series and they are sustained from discrete and they are sustained from discrete DC sources. As the yield is taken in series, the DC source must be isolated from each other. Therefore, cascaded H-bridge multilevel inverters is additionally been used to be utilized with energy components to accomplish higher voltage levels.

The step- down transformer output is given to battery, through the charging circuit, the 24V DC output, is given to H- bridge circuit. In this we are using three H-bridge circuit for a seven level circuit. This seven level inverter output is connected to step up transformer which converter the 24V to 230V AC. The micro controller will generate PWM signal

to the H-bridge circuit at 50 Hz frequency at a particular duration of time. In this project to develop a multilevel inverter, we are using MOSFET to reduce harmonics constraints

Devices used in this project are:

A. Transformer :

1. Step-down Transformer: We used step-down transformer at about to convert 230V to 24V. It is a device that transfers electrical energy from one circuit to another through inductively coupled conductors without changing its frequency. Assume a perfect transformer, the power provided by the primary must equal the power taken by a load on the secondary. If a 24-watt lamp is connected across a 24 volt secondary then the primary must supply 24 watts.
2. Step-up Transformer: In case of step-up transformer, primary windings are very less compared to secondary winding because of having more turns secondary winding accepts more energy, and it releases more voltage at the output side.

B. MOSFET :

A metal-oxide-semiconductor field-effect transistor (MOSFET) is a field effect transistor where the voltage determines the conductivity of the device. It is used for switching or amplifying signals. The IRFZ540N is an N-Channel MOSFET. This MOSFET can drive loads up to 23A and can support peak current up to 110A. It also has a threshold voltage of 4V, which means it can easily be driven by low voltages like 5V. Hence it is mostly used with arduino and other microcontrollers for logic switching

C. Resistor (10K) :

This 10K ohm resistor makes excellent pull-ups, pull-downs and current limiters.

D. Diode (1N4007) :

The 1N4007 is the most commonly used rectifier diode. It is commonly used in rectifier circuits, protection and regulator circuits.

E. Capacitor (1000MF) :

It is used for noise filtration, charge storage. Its operating voltage is at 25V.

F. Battery :

Nominal output voltage of this battery 24V
Capacity is about 576 watt-hour.

G. AC Bulb (10 W) :

Used 10watt AC Bulb as an output half and hour.

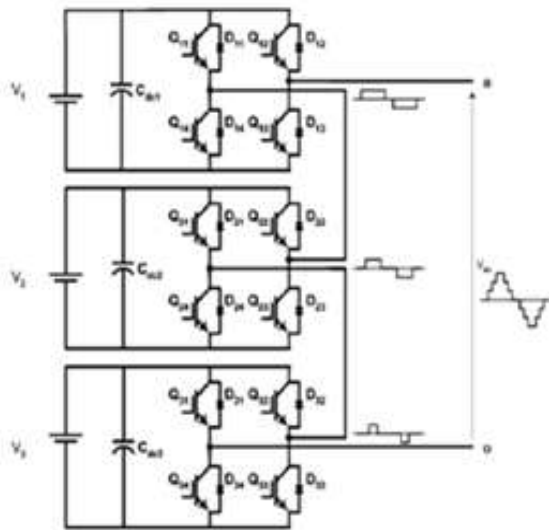


Fig. 2. Seven level topology of cascade-bridge multilevel inverter

In this circuit diagram each H-bridge has the property to create three voltage level as +Vdc, 0, -Vdc by associating the DC source to the AC by various mix of four switches where Vdc is the input voltage of the H-bridge. This topology is utilized for getting seven-level cascade multilevel inverter is acquired by cascading three H-bridge nourished from a different DC source. The quantity of yield level 'm' is every stage is identified with the no. of H-bridge inverter units 'n' by equation (1)

$$m = 2n + 1 \quad (1)$$

where, m is no. of level of inverter and n is no. of full bridge connected in series.

To get seven level yield, the above switching pattern is utilized. The yield voltage waveform of seven level inverter is as appeared in below fig no (3) with 3Vdc, 2Vdc, Vdc, 0. Speaking to the switching angles which are utilized for harmonic reduction. By phase shifting the switching time of the positive and negative phase legs of the inverter, a quasi square waveform is generated by each full bridge as shown in fig no. 3. Here number of level (m) is seven thus number of full bridge inverter circuit associated in series is three which known from the equation from the equation(1). The seven-level topology of cascade H-bridge multilevel inverter is as appeared in fig no (2). As each H-bridge is as nourished with the same estimation of DC voltage is called as symmetrical cascade multilevel inverter. The seven-level yield waveform is acquired by various switching combinations. The switching pattern for seven-level inverter topology of cascade H-bridge is appear in table (1).

TABLE I. SWITCHING PATTERN FOR SEVEN LEVEL CASCADED H-BRIDGE MULTILEVEL INVERTER.

VOLT Van	SWITCHING STATES											
	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8	S 9	S 10	S 11	S 12
+V	1	1	0	0	0	1	0	1	0	1	0	1
+2V	1	1	0	0	1	1	0	0	0	1	0	1
+3V	1	1	0	0	1	1	0	0	1	1	0	0
0	0	1	0	1	0	1	0	1	0	1	0	1
-V	0	0	1	1	0	1	0	1	0	1	0	1
-2V	0	0	1	1	0	0	1	1	0	1	0	1
-3V	0	0	1	1	0	0	1	1	0	0	1	1

H. Total Harmonic Distortion (THD) :

Total Harmonic Distortion is an measurement of the harmonic distortion is defined as the ratio of the sum of the power of all harmonic components to the power of the fundamental frequency. It can be presented by expression below :

$$THD = \frac{\sqrt{I_2^2 + I_3^2 + I_4^2 + \dots + I_n^2}}{I_1}$$

The above formula is for current waveform.

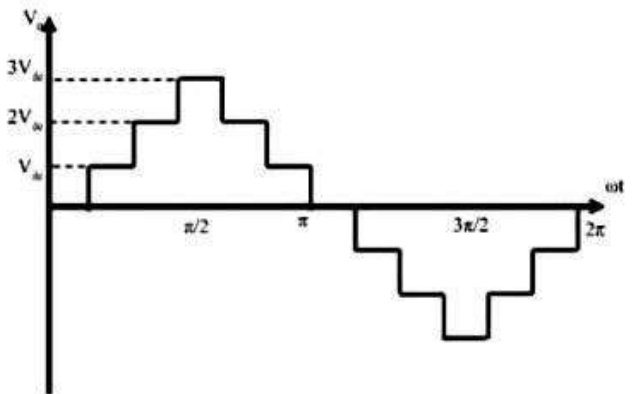


Fig. 3. Yield voltage waveform of seven level cascaded multilevel inverter.

IV. RESULT

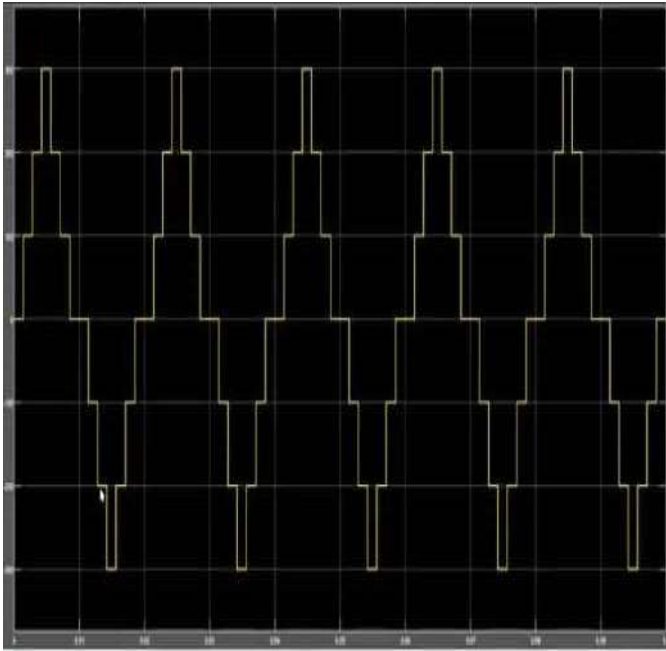


Fig. 4. Output of proposed seven level cascaded H-bridge multilevel inverter topology.

V. PROJECT SETUP

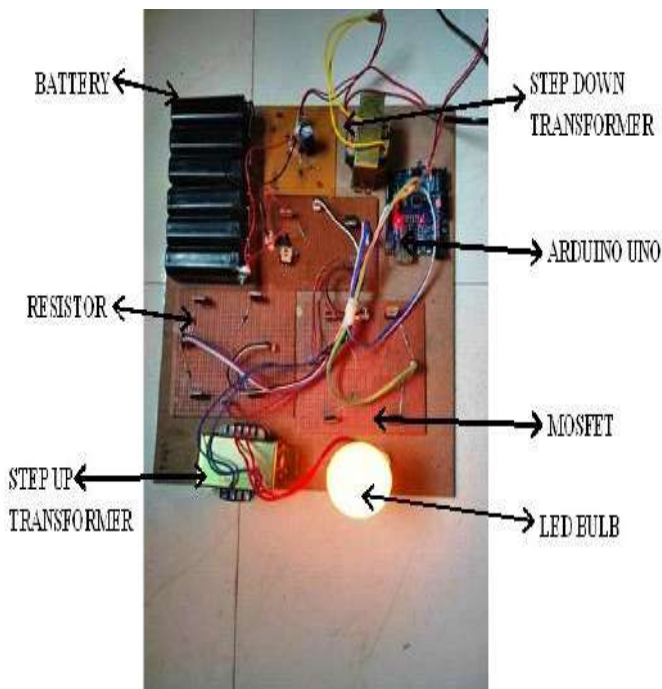


Fig. 5. Pictorial representation of the Seven-Level Inverter.

VI. CONCLUSION

The overall design of Arduino Based Seven Stage Multilevel Inverter is much more compact and economical as compared to conventional inverter available in the market. Firstly, all the inverters available in the market are five level inverter that have much THD in the output signal and these type of inverters can damage the inductive motors and the

devices that are sensitive to frequency of signal applied to them. Secondly, all these inverter use bulky transformer on the output side which make the design and overall product much bulky and heavy. Thirdly, the price of these available inverter is not much less than seven level inverter. The implemented product of this project has seven level on output side that makes it a pure sine wave having a THD value less than 5%. This signal use not only favourable for motor drive but can also be used for grid tying. This inverter do not use more than 230 V DC input for getting sinusoidal signal output. This project has been successfully tested in the laboratory on 10 watt LED bulb by using CRO and multimeter and the measured output phase voltage is 34 Volts and the current value is 0.61Amps. So the total power output is 20 Watts. In this study the %value of THD has been reduced from 1.53% (Five Level) to 1.23% (Seven Level).

ACKNOWLEDGMENT

It is our privilege to acknowledge the sense of gratitude to our guide Prof. Somesha Naik S.R. from Electrical Engineering Department at Arvind Gavali College of Engineering, Satara for his valuable suggestions and guidance throughout our degree course and the timely help given for completion of our project work.

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Finally, we wish to express our sincere thanks to all the staff members of Arvind Gavali College of Engineering, Satara for their direct and indirect help during the course of our project.

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Design and Manufacturing of Hydraulic Cutter

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ABSTRACT

The firm is developing new mechanical method for finishing of vacuum forming. This Hydraulic cutter method is very fast and productive as compare to rolling cutter. So we have design and manufacture this attachment for finishing of Vacuum formed products. It is economical method for finishing process and easy maintenance.

The vacuum formed product is placed in a hydraulic cutter tool with shaped vertical blades and a plastic cutting board is placed on top of it and cutting board are pushed through the roller cutter machine together. The moving rollers inside the roller cutting machine press the product, cutter and cutting board together to punch out the shape and any other features. The finished product is then removed from the roller cutter tool

Introduction

In its simplest form the process consists essentially of inserting a thermoplastic sheet in a cold state into the forming clamp area, heating it to the desired temperature either with just a surface heater or with twin heaters and then raising a mould from below. The trapped air is evacuated with the assistance of a vacuum system and once cooled a reverse air supply is activated to release the plastic part from the mould.

In its advanced stage pneumatic and hydraulic systems complimented with sophisticated heat and process controllers allow high speed and accurate vacuum forming for those heavy duty and high end volume applications.

This results in comparatively short lead times. It provides the perfect solution for prototype and low quantity requirements of large parts as well as medium size runs utilising multiple moulds. (Moulds are discussed in greater detail in section) The typical process steps can be identified as follows: clamping, heating with sheet level activated, pre-stretch, forming with plug assist, cooling with air and spray mist, release and trimming They are examined more closely under the following sub headings.

I. RELATED WORKS

In its simplest form the process consists essentially of inserting a thermoplastic sheet in a cold state into the forming clamp area, heating it to the desired temperature either with just a surface heater or with twin heaters and then raising a mould from below. The trapped air is evacuated with the assistance of a vacuum system and once cooled a reverse air supply is activated to release the plastic part from the mould. The process is shown in diagram form on fig.

In its advanced stage pneumatic and hydraulic systems complimented with sophisticated heat and process controllers allow high speed and accurate vacuum forming for those heavy duty and high end volume applications.

The thermoforming industry has developed despite two fundamental shortcomings. Many other thermoforming processes use a resin base in powder or pellet form. Vacuum forming begins further down the line

with an extruded plastic sheet which occurs an additional process and therefore an extra cost to reach this stage. In addition, there is generally an area of material which is cut away from the formed part which unless reground and recycled has to be considered as waste and accounted for in any costings made. However these problems have been invariably resolved by strict control of sheet quality and by clever mould design to minimise the amount of waste material. Throughout this manual you will find useful hints and techniques to assist in maximising the potential from this process.

Despite the above disadvantages vacuum forming offers several processing advantages over such others as blow, rotational and injection moulding. Fairly low forming pressures are needed therefore enabling comparatively low cost tooling to be utilised and relatively large size mouldings to be economically fabricated which would be otherwise cost prohibitive with other processes. Since the moulds witness relatively low forces, moulds can be made of relatively inexpensive materials and mould fabrication time reasonably short.

Vacuum forming involves pushing a mould into a heated TP sheet and evacuating the air from between mould and sheet, so that atmospheric pressure pushes the sheet onto the mould, making the forming. There are many different kinds of vacuum forming machine available from small, manually operated units to fully automatic, in-line production machines, but no matter what the differences between units might be, they are all variations on the same them.

1. The sheet is clamped in place on a heat proof air-tight seal.
2. The heater system moves under or over the sheet, or vice versa, and begins heating.
3. Once the sheet has reached it's thermoforming temperature the vacuum pump is energised.
4. The heater moves back to it's resting position (or the sheet moves from the heating position to the moulding position)
5. The mould, mounted on a moving platen, moves up into the sheet which drapes over it.
6. Once the platen reaches the top of its stroke, the space between the underside of the sheet and the upper surface of the mould forms an air-tight pocket connected to the vacuum pump, which then pumps air from between

the two. This removes air which is preventing atmospheric pressure from pushing the sheet down over the mould.

7. As the sheet cools it contracts, gripping the mould. Hence the next step is to reverse the airflow, using air pressure to force the forming off the mould and prevent it sticking, this step has become known as the 'blow cycle'. Blow cycles are short - just long enough for the forming to release from the mould and immediately followed by another vacuum cycle.
8. Vacuum/blow cycling continues until the sheet is rigid once more. At this time, the vacuum is switched off or the mould lowered and the forming is released from the clamp.

PROJECT SPECIFICATION-HYDRAULIC CUTTER

In our project, The firm is developing new mechanical method for finishing of vaccum forming. This Hydraulic cutter method is very fast and productive as compare to rolling cutter. So we have design and manufacture this attachment for finshing of Vaccum formed products.

WORKING PRINCIPLE:

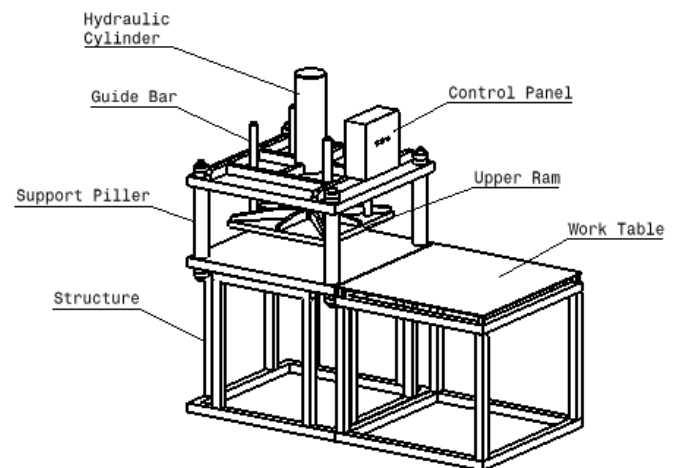


Fig 5.1 Hydraulic Cutter Drawing

DESIGN AND DEVELOPMENT

TYPES OF CYLINDERS:

Although pneumatic cylinders will vary in appearance, size and function, they generally fall into one of the specific categories shown below. However there are also

numerous other types of pneumatic cylinder available, many of which are designed to fulfill specific and specialized functions.

1. Single-acting cylinders

Single-acting cylinders (SAC) use the pressure imparted by compressed air to create a driving force in one direction (usually out), and a spring to return to the "home" position. More often than not, this type of cylinder has limited extension due to the space the compressed spring takes up. Another downside to SACs is that part of the force produced by the cylinder is lost as it tries to push against the spring. Because of those factors, single acting cylinders are recommended for applications that require no more than 100mm of stroke length.

2. Double-acting cylinders

Double-acting cylinders (DAC) use the force of air to move in both extends and retract strokes. They have two ports to allow air in, one for outstroke and one for in stroke. Stroke length for this design is not limited; however, the piston rod is more vulnerable to buckling and bending.

3. Multi-stage, telescoping cylinders

Telescoping cylinders, also known as telescopic cylinders can be either single or double-acting. The telescoping cylinder incorporates a piston rod nested within a series of hollow stages of increasing diameter. Upon actuation, the piston rod and each succeeding stage "telescopes" out as a segmented piston. The main benefit of this design is the allowance for a notably longer stroke than would be achieved with a single-stage cylinder of the same collapsed (retracted) length. One cited drawback to telescoping cylinders is the increased potential for piston flexion due to the segmented piston design. Consequently, telescoping cylinders are primarily utilized in applications where the piston bears minimal side loading.

- Cutting load requirement- 490 N for plastic pp sheet
- Direct Stress- 3.85 N/mm² for plastic pp material
- Sheet Compression after rolling- 0.001 mm for plastic pp material

CYLINDER DESIGN

- The basic, rod-style industrial cylinder consists of a tube sealed by end caps. A rod attached to an internal piston extends through a sealed opening in one of the ends. The cylinder mounts to a machine and the piston rod acts upon the load.
- A port at one end of the cylinder supplies to one side of the piston, causing it (and the piston rod) to move. The port at the other end lets air on the opposite side of the piston escape — usually to atmosphere. Reversing the roles of the two ports makes the piston and rod stroke in the opposite direction. Rod-style cylinders function in two ways:

A. SELECTION OF HYDRAULIC CYLINDERS

- B. • Single or Double acting
- C. • Dimensional standards like ISO, VDMA, CETOP, AFNOR.
- D. • Constructional details like – Piston rod, tie rod, square tube, rodless etc.
- E. • Force to be exerted (Bore dia)
- F. • Distance to be moved (stroke)
- G. • Surrounding medium (special material of construction / type of seals)
- H. • Oil pressure available.
- I. • Cushioned / Non cushioned.
- J. • Ambient temperature for selection of seal material.
- K. • Speed of actuation
- L. • Position detection (Reed switch type)
- M. • Mountings
- N. • Stop tube length for long stroke cylinders.

OTHER SPECIFICATION

ADVANTAGES:

TIME EFFICIENT

- This is fast and efficient way of cutting vacuum formed items from the original sheet of vacuum forming material. The cutter can also cut any holes for cables, euroslots or any other shape of holes at the same time.
- The hydraulic cutting process is excellent for fairly large items, where precision alignment isn't required - the tray to the right was roller cut out of the plastic sheet, with the cutter used to punch the holes at the same time.

PRODUCTION SPEED

- Production speed is considerably high as compared to roller cutter.

COST EFFECTIVE

- A second benefit is that running cost is also cooperatively less.
- Easy Maintenance of machine reduces maintenance cost.

DISADVANTAGES:

PRECISION

- Skill Operator require for hydraulic cutter operation.

APPLICATIONS:

1. For cutting Blisters.
2. Corrugation.

CONCLUSION

RESULT/CONCLUSION:

This machine is reliable for trimming operation as well as production purpose. Cost effectiveness is major factor with this machine. And also advantages over other methods as maintenance, operation, flexibility The sponsored company is going to use this project for continuous production activities with minimum investment.

10.2 FUTURE WORK:

A hydraulic cutting machine is developed for the purpose of trimming as well as cutting holes which is not available in today's market. It is economical method for finishing process and easy maintenance.

The machine is capable of cutting about 15 to 75mm thickness wood die thus it gives an advantage to the purchaser of using the same machine for cutting the product as well as holes and he doesn't have to buy two different machines for this purpose.

In future there can be arrangement for automatic feeding of the drive with time interval The sponsored company is use this project as benchmarking and after that we established new plant for manufacturing this hydraulic cutter with minimum cost.

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Design and development of 360 degree rotating fire protection system

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ABSTRACT

Fire hazards are a common phenomenon in developing countries like India causing loss of lives and property every year. Fire emergencies occur where either a human cannot reach on time or location of fire is hazardous and life threatening for humans to approach and douse the fire. The Design and development of a Fire Fighting Robot will provide an impactful solution for society and help save lives. The solution uses Flame sensors to detect the fire hazard, Microcontroller to analyse data from sensors and decide the right course of managing the fire hazard. After analysing it uses WIFI module as a communicating device to alert a human being in charge of the control by raising an alarm through activation of the LED. The user activates the Fire extinguisher robot using the Blynk application to spray water with the help of a pump onto the fire guided by servo motor to synchronize the direction of water output.

INTRODUCTION

The increasing occurrence of large-scale fires in modern society significantly impacts society and communities in terms of remarkable losses in human lives, infrastructures and properties. Depending on burn severity, wildfires also impact environment and climate change, increasing the released quantity levels of CO₂, soot and aerosols and damaging the forests that would remove CO₂ from the air. This results in extremely dry conditions, increasing the risk of wildfires. Furthermore, forest fires lead to runoff generation and to major changes to the soil infiltration. To this end, computer based early fire warning systems that incorporate remote sensing technologies have attracted particular attention in the last decade.

Usual fire protection systems installed in buildings have the following limitations, as they

spray small amounts of water from each sprinkler which may not be enough to put out the fire. The sprinklers are not targeted and spray an entire floor or building ruining computers, furniture and paperwork. While this sprayer gun can spray water in desired qty only at fire outbreak point to stop fire without ruining complete office furniture and electronics. This demo version is made to be remote controlled from few meters but future version will operate remotely from fire dept.

modelling of the chaotic and complex nature of the fire phenomenon, in the separation of the fire-emitted radiance from the reflected background radiance and in the occurrence of large variations of either flame or smoke appearance.

I. PROBLEM STATEMENT

Fire outbreaks are known to cause significant loss of life (victims and rescuers) and property. Due to high temperature and presence of potentially hazardous material fire-fighting robots will be useful for extinguishing fire, particularly in places where fire-men cannot reach and work. It can thus reduce human injury from a burning fire.

II. OBJECTIVES OF PROJECT

The main objective of this project is to develop fire fighting system to decrease involvement of humans or fire fighters and operate the system remotely in this project.

The main work on sprayer gun or nozzle can spray water in 360 degree rotating with up and down mechanism.

Fire monitors and sprayers are an aimable and controllable high-capacity water jet used to deal with large fires.

III. METHODOLOGY

Proper selection of various components

1. Water pump motor :



Fig. water pump motor

It is a Single pump that is used for pumping water. This product works at a speed of 2880 rpm. The power rating of this pump is 0.5 kW. Its dimensions are 315x190x250 mm. This pump weighs 7 kg. It comes with a warranty of 1 year. With a discharge of 2100-400 LPH, this product can pump water up to 10-25 m head height. This pump has a suction capacity of 25ft. The material used in the motor body is cast iron. It is operated at the voltage of 180-240V single phase energy supply. This range of centrifugal pumps is ideally suited for the supply of water to domestic & industrial places.

2. DC motor :



Fig. DC motor

DC 12V 55RPM 8.5Kg.cm Self-Locking Worm Gear Motor With Encoder And Cable, High Torque Speed Reduction Motor Specification: Voltage: DC 12V No-Load Speed: 55rpm Reduction Ratio: 1:72 Torque: 8.5Kg.cm

3. Battery

An electric battery is a device consisting of one or more electrochemical cells that convert stored chemical energy into electrical energy For Pump -230V AC For Motor-12V DC For Automation kit -5V DC. Each cell contains a positive terminal, or cathode, and a negative terminal, or anode. Electrolytes allow ions to move between the electrodes and terminals, which allows current to flow out of the battery to perform work.

4. RF Control Remote :

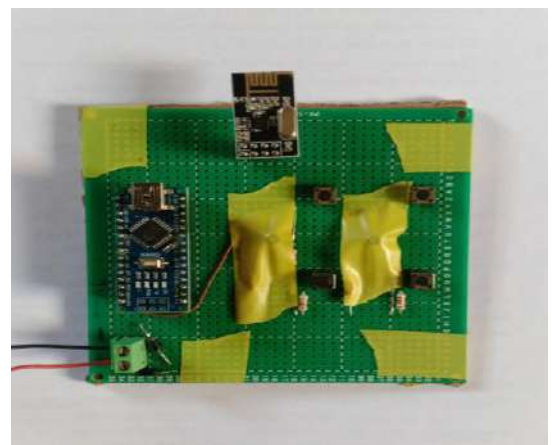


Fig. RF Control Remote

Transmission through RF is better than IR (infrared) because of many reasons. Firstly, signals through RF can travel through larger distances making it suitable for long range applications.

5. Jet Nozzle



Fig. Jet Nozzle

Dramm Brass Nozzle Water Spray Gun Water Jet Hose Nozzles Hose Pipe Spray Gun suitable for 1/2" Hose Pipe For Gardening And Washing. Easy adjust water spray hose nozzle, multiple spray patterns and flow volume are at your fingertips

Powerful rotating spray barrel adjusts water from fan to cone to powerful flow. Leak proof equipped with O-rings at the back and front for a tight connection that prevents any leakage. Multiple uses watering the plants, washing the car, cleaning the sidewalk or spraying the drain, the pressure hose nozzle works wonders.

6. Receiver circuit



Optical receivers can be classified as high-impedance, fransimpedance, and low impedance depending on the pre-amplifier design. When the timing of the optical signal is known, an integrate-and-dump pre-amplifier design can be used Low-impedance receivers have a broad bandwidth, but poor sensitivity. High impedance receivers have much better sensitivity, but they fail to achieve a useful bandwidth.

7. Base Frame

Most of the larger high speed compressor models are mounted on Base frames. Compressors are mounted on the Base frame to carry its weight, to maintain its

alignment and to assist in carrying the dynamic loads which every compressor generates. Compressors base frame needs an effective design technology to ensure that the base frame as designed performs the required functions, and maintains its integrity. There is also a need to maximize the life of the compressor base frame under the loads to which it is exposed. One of the main reasons for the failure of base frame is lack of rigidity and the stress concentrations.

IV. 3D MODEL USING AUTO CAD

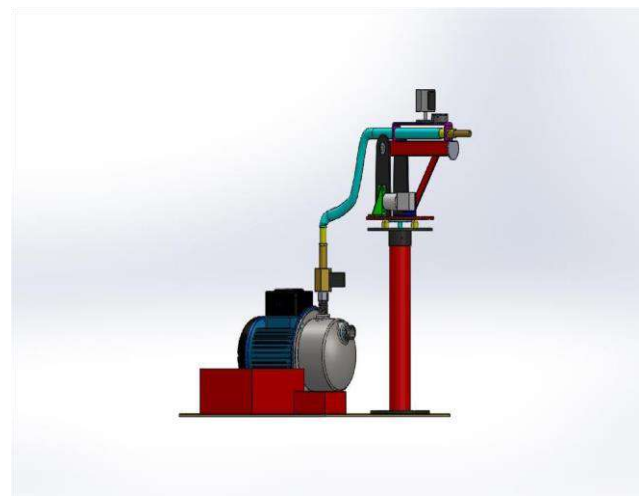


Fig. 3D VIEW

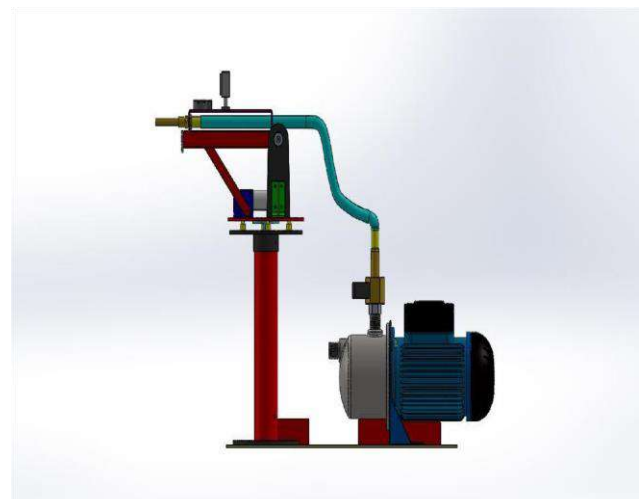


Fig. SIDE VIEW

V. CALCULATION

1. For ½ HP water pump calculation –

$$\text{Water pump horse power} = \frac{\text{TDH} \times Q \times \text{Specific gravity}}{360}$$

TDH = Total dynamic Head + Friction losses

Assume, overall TDH = 70

Q = discharge of water

Q = 10 gpm

Specific gravity = 1

$$\begin{aligned} \text{Water pump horse power} &= \frac{70 \times 10 \times 1}{360} \\ &= 0.18 \text{ HP} \end{aligned}$$

$$\begin{aligned} \text{Horse Power of motor} &= \frac{\text{Horse power of water}}{\text{Pump Efficiency}} \\ &= \frac{0.18}{0.5} \\ &= 0.36 \text{ HP} \end{aligned}$$

From these value we will use ½ HP water pump motor

2. For dc motor calculation :

$$F = \text{force} = 9.81\text{N}$$

$$D = \text{displacement} = 0.152 \text{ m}$$

$$W = \text{workdone} = ?$$

$$W = F \times D$$

$$= 9.81 \times 0.152$$

$$\text{Work} = 1.49112 \text{ N.m}$$

$$P = \text{mechanical power} = f \times d/t$$

$$\text{Mechanical power} = 149.112 \text{ nm/s}$$

3. Factor of safety

$$\text{Factor of safety} = \frac{\text{maximum stress}}{\text{Working stress}}$$

$$= 100/50$$

$$\text{Factor of safety} = 2$$

VI. FUTURE SCOPE

- In future work, an efficient approach for early fire detection from images by combining a powerful deep learning technique with multidimensional texture analysis using Linear Dynamical Systems (LDS) is proposed.
- To design and develop a robotic vehicle which has rover controls. (I.e., Forward movement, Backward movement, sideways movement, etc).
- To program the flame sensors such that they detect the fire and move the robot manually towards it using the WIFI Module.
- To douse the fire using water by spraying it using a pump after detection.

VI. CONCLUSION

- To reduce the involvement of fire fighters thereby
- Decreasing the risk of physical injuries and life threats.
- Comparing this prototype with the existing technology we implement the sensor and wireless technology. Nowadays the fire fighting technologies are fully manual. In scope of future we implement wireless technology to control the fires.
- To improve the current robot, more research is needed.
- It can only extinguish fire in the room where it is now installed, however this can be remedied by adding sensors in different rooms that would inform the robot when it senses fire.
- The robot will next proceed to the location to put out the fire.
- A more efficient fire extinguisher can alternatively be used in place of the water carrier.

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DESIGN AND FABRICATION OF AUTOMATIC GROUND CLEARANCE MACHINE

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Abstract: *The handling of a vehicle depends upon the various parameters, center of gravity of the vehicle is one of them. For better handling of the vehicle, we need to keep the center of gravity as low as possible. For sport cars it is always kept low but for the passenger cars it compromises with its ground clearance. The designers prefer to maintain fixed ground clearance and design the system to acquire requisite suspension parameters. For different types of tracks, the ground clearance of vehicles is designed accordingly and that is why this is a subtle reason which also differentiates the vehicles as on-road (Sedan/Hatchback cars) and off-road Sports utility vehicles (SUV). Off-road vehicles have to face the rough terrain, where we need the high ground clearance of the vehicle, on the other hand we run the same vehicle on a road where high ground clearance is not necessary. Whereas a sedan car or hatchback has to run on smooth roads as well as on rough terrains sometime with its fixed lower ground clearance which tends to create dents on the bottom portion of the car*

known and static environments. In factory environments, a sudden arrival of obstacle could block the AGV path. To deal with this, several obstacle avoidance algorithms were proposed such as curvature velocity method, dynamic window approach, moving obstacle avoidance, and obstacle avoidance based on obstacle geometric. However, as the calculated area are limited, the goal position reachability condition is not guaranteed. After an optimal path is generated, a trajectory tracking control algorithm is need for the AGV to track the optimal path. Among these controllers, although the stability of the system is guaranteed, it might not be easy to find an appropriate control law. To solve these problems, this paper proposes a obstacle avoidance and trajectory tracking in partially known environmen

Keywords: *Ultrasonic Sensor, AGV*

I. INTRODUCTION

The use of AGV is the one of the most preferred means to reduce the operation costs by helping the factories to automate a manufacturing facility or warehouse. The common challenging problems related with AGV operation are positioning, path planning, obstacle avoidance and trajectory tracking. The commonly used

II. LITERATURE REVIEW

[1] *Aroon Das P, Rakesh S., et al.*

The Author studied, The issues of designing and installing a system of Automated Guided Vehicles (AGVs) in a Flexible Manufacturing System (FMS) are examined in this work. The development, advantages and future trends of AGVS are briefly reviewed.

[2] *Jobi Paulose, Vignesh Gopal Raja, et al.*

The Author studied, The thesis covers the information about internal industrial logistics that are carried out in automotive industries and warehouses

[3] Pathik Pate, Rudresh Parekh, Rutvik Panchal, Vivek Solanki, et al

The Author studied, Material Handling is an important activity within the larger system by which material is moved, stored, and tracked in our commercial Infrastructure.

[4] Aman Sharma, Hina Akhtar, et al

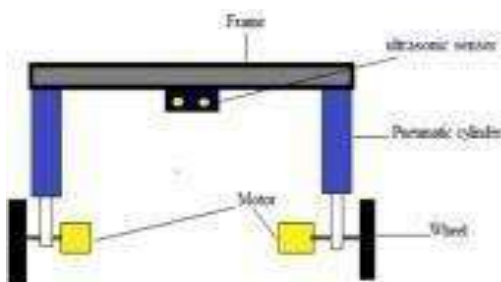
The Author studied, In this paper the chassis of vehicle is lifted by the use of hydraulic pressure. Due to this lift of chassis the ground clearance of vehicle is increased so that it is able to overcome all the obstruction during drive like speed breaker, broken roads etc.

[5] Jagadeesh H, Navinesh B C, et al

The Author studied Author concluded that the pneumatics jacks can act in the place of hydraulic jacks efficiently. The air Compared with other jacks. As our jack is in built the fatigue is less. If made in the lot the cost could be less. It serves better than hydraulic jacks which is used for lifting.

III. BASIC WORKING

Our whole system is mounted on frame which is moved with the help of wheels. On the front end of the system there is sensor. We have used ultrasonic sensor here. The main function of sensors is that they sense the object in front of frame. Ultrasonic sensor uses transducer and receiver to send and receive signal. When there is an object in front of the system, sensor detects it and gives signal to controller. If there is an object ahead of the frame, controller actuates the pneumatic valve. The valve connects compressor to actuators. For smooth, efficient and uninterrupted operation of the Automated Guided Vehicle the controller actuates the actuator for overcoming the obstacle. After lifting the frame with the help of the actuator, the gap between floor and frame increases and it becomes easy to pass that way.



In this operation of lifting the frame, there is certain time period we have given to the controller so that it can keep the system lifted, which can be varied accordingly and after that it again lowers back to its original position. We have given 9 seconds time period for this one. For this given time period vehicle get lifted by distance equal to stroke length of cylinder which is 50mm. We have manufactured this machine so that, all these processes happen simultaneously without any human interruption or without stopping o the AGV

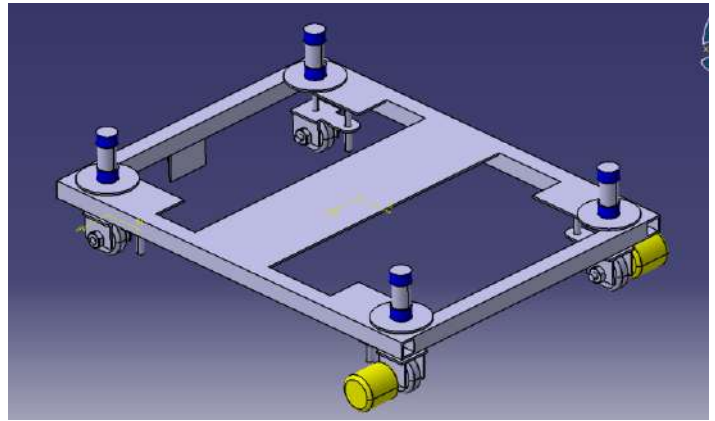


Fig. 2: 3D Model of Assembly

VI. DEVELOPMENT AND FABRICATION

We started the work of this project with literature survey. We gathered many research papers which are relevant to this topic. After going through these papers, we learnt about Automatic Guided Vehicle. We came to know about the problem that was faced by automated guided vehicles and material handling vehicles. After that the components which are required for our project were decided. After deciding the components, the 3 D Model and drafting will be done with the help of CATIA software. The components will be manufactured and then assembled together. The experimental observations will be taken, calculations will be done and then the result will be concluded

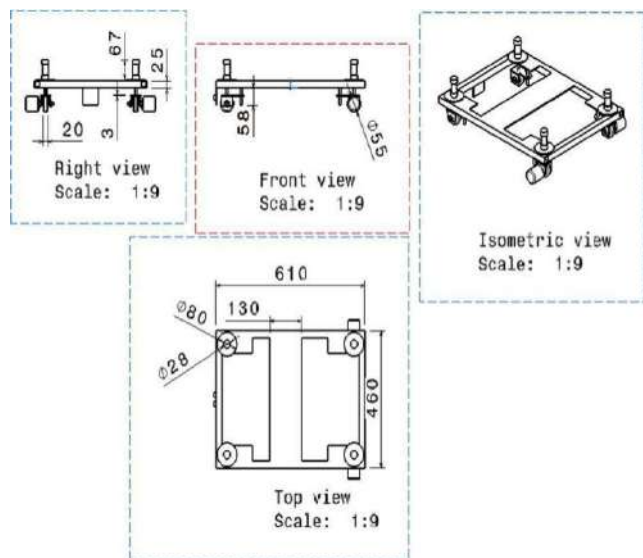


Fig. 3: Drafting of Model

V. MATERIAL REQUIRMENT

Sr No	Components	Quantity
1	Pneumatic Cylinder	4
2	DC Motor	2
3	Pneumatic Valve	1
4	Frame	1
5	Arduino Board	1
6	Ultrasonic Sensor	1
7	Wheel	4
8	Electronic Relay	1
9	Pneumatic Hose	1
10	Wires & plug	1

VI. MAIN HARDWARE REQUIRMENT

1. Ultrasonic Sensor –



Fig. 3. Ultrasonic sensor

The ultrasonic sensor measures the distance of the nearest object, sending the result to the serial port. It can work from 2 cm to 3 m. It measures the time spent by the signal to reach the object and return to the sensor.

2. Pneumatic cylinder-



Fig. 4. Pneumatic cylinder

Pneumatic cylinder is mechanical devices which use the power of compressed gas to produce a force in a reciprocating linear motion. Like hydraulic cylinders, something forces a piston to move in the desired direction. The piston is a disc or cylinder, and the piston rod transfers the force it develops to the object to be moved

3. Motor-



Fig. 5. D.C. Motor

A motor is an electrical machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor's magnetic field and electric current in a wire winding to generate force in the form of rotation of a shaft. Electric motors can be powered by direct current (DC) sources, such as from batteries, motor vehicles or rectifiers, or by alternating current (AC) sources, such as a power grid, inverters or electrical generators. An electric generator is mechanically identical to an electric motor, but operates in the reverse direction, converting mechanical energy into electrical energy.

4. Arduino Uno-



Fig 6. ARDUINO UNO

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller (MCU) and developed by Arduino.cc and initially released in 2010. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by a USB cable or a barrel connector that accepts voltages between 7 and 20 volts, such as a rectangular 9-volt battery. It has the same microcontroller as the Arduino Nano board, and the same headers as the Leonardo board

VII. ARDUINO UNO PROGRAMMING

/*

* Ultrasonic Sensor HC-SR04 and Arduino Tutorial

*

* by Dejan Nedelkovski,

* www.HowToMechatronics.com

*


```

*/
// defines pins numbers
const int trigPin = 9;
const int echoPin = 10;
// defines variables
long duration;
int distance;
void setup () {

pinMode(5, OUTPUT);
pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
pinMode(echoPin, INPUT); // Sets the echoPin as an Input
Serial.begin(9600); // Starts the serial communication

}
void loop () {

// Clears the trigPin
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
// Sets the trigPin on HIGH state for 10 micro seconds
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
// Reads the echoPin, returns the sound wave travel time in
microseconds
duration = pulseIn(echoPin, HIGH);
// Calculating the distance
distance= duration*0.034/2;
// Prints the distance on the Serial Monitor
Serial.print("Distance: ");
Serial.println(distance);

if(distance<=25)
{
digitalWrite(5, HIGH);
delay(7000);
digitalWrite(5, LOW);

}

else

digitalWrite(5, LOW);

```

VIII. FUTURE SCOPE

1. Problem of path changing faced by automated guided vehicles due to obstacles is eliminated.
2. Portable setup.
3. Can be used for different vehicles by little modification.
4. By changing size of actuators desired lift can be achieved.

IX. CONCLUSION

This reduces the time in supply chain management process. We have concluded that this project model can be heavily commercialized in various industries. By using this mechanism obstacles can be avoided with minimum effect on stability. We can conclude that this mechanism can also be useful for off-road vehicles for better obstacle prevention.

X. REFERENCE

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“RADIAL AND AXIAL RELIEF GRINDING MACHINE”

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- **Abstract** — Cam operated radial and axial grinding machine is a technique for grinding a form on the cutting edges of cutting tools. This technique utilizes a cam relief radial and axial machine fixture to advance the cutting tool toward the grinding wheel at a constant rate, while it is rotating to produce a relief behind the cutting edge. This creates a radial or axial relief, as opposed to an angular relief, which maintains the same rate of advancement over the entire cutting form. The advantage of Cam relief grinding is that when the tool is re-sharpened, there is no change in the relative shape and dimensions of the form.

The machine has a mounting base on a sharpening machine, a body for supporting and guiding a tool receiving a terminal and a carriage for mounting and guiding the body of the base. The terminal cooperates with a displacement unit for the axial and radial displacement of the body. The carriage has a lower part with a bore cooperating with a stud of the base and a recess separated with respect to the bore.

1. Introduction

Cam operated radial and axial Relief grinding machine is a technique for grinding a form on the cutting edges of cutting tools. This technique utilizes a cam. Cam operated radial and axial Relief grinding machine is a technique for grinding a form on the cutting edges of cutting tools. This technique utilizes a cam relief feature to advance the cutting tool toward the grinding wheel at a constant rate, while it is rotating to produce a relief behind the cutting edge. This creates a helical or spiral relief, as opposed to an angular relief, which maintains the same rate of advancement over the entire cutting form. The advantage of Cam relief grinding is that when the tool is re-sharpened, there is no change in the relative shape and dimensions of the form. When conventional cutter sharpening techniques are used to grind a form, the necessary relationships between form geometry are not maintained when the tool is re-sharpened. Conventional cutter sharpening techniques require additional reforming of surfaces to reproduce the original

geometric relationship. Because of the complexity of these additional operations, similar equipment and skills used to produce the tool originally are necessary to re-sharpen the tool.

Cam relief grinding, however, overcomes the shortcomings of conventional cutter techniques, particularly in cutting tools with complex form geometry. The technique of Cam Relief grinding removes less material from the tool in the grinding process. This only enables the cutting tools to be re-sharpened numerous times as compared to conventional cutter sharpened tools, which may only be re-sharpened once or twice, but gives the cutting tool a greater included angle at the cutting edge, hence a stronger tool. Also, with less material ground away, additional mass is left behind the cutting edge. This additional mass serves to dissipate heat away from the cutting

edge preventing annealing-softening of the tool base material due to exposure to excessive heat-of the cutting edge under grinding condition. This creates a helical or spiral relief, as opposed to an angular relief, which maintains the same rate of advancement over the entire cutting form. The advantage of Cam relief grinding is that when the tool is re-sharpened, there is no change in the relative shape and dimensions of the form. When conventional cutter sharpening techniques are used to grind a form, the necessary relationships between form geometry are not maintained when the tool is re-sharpened. Conventional cutter sharpening techniques require additional re-forming of surfaces to reproduce the original geometric relationship. Because of the complexity of these additional operations, similar equipment and skills used to produce the tool originally are necessary to re-sharpen the tool. In many cases, production companies have neither the set up specialized equipment, nor time necessary to re-sharpening cutting tools geometry. This forces the end user to return the tools to the original manufacturer for Cam relief grinding, however, overcomes the shortcomings of conventional cutter techniques, particularly in cutting tools with complex form geometry.

2. LITERATURE REVIEW

The present invention relates to the field of machines for the manufacture and sharpening of tools, in particular cutting tools made in small series or individually, and relates to a machine for balancing for axial and radial machining. The cutting tools of the forest or reamer type are generally made from a bar made of steel or tungsten carbide, by cutting to the length and subsequent machining of their cutting faces and their profile. In the case of large series of tools, these are machined using numerically controlled machines implementing specific tools for each cutting surface and for each profile, in the case of complex profile tools. The setting of such machines is, however, very complex and requires a very long preparation time, which is incompatible with the production of small series of tools or individual tools, because the cost price of the latter would be too much heavily burdened by the cost of the preparatory work.

[1] Mr. Orlie Dawson/Royal Oak Grinders/ 1967/The R-O Form Relief Grinder has been technologically updated continuously and manufactured here ever since, along with a number of enhancements of the Royal Oak Grinders product line

[2] Dr. Jeffrey Badger grinding relief Geometry 1967 The cleaner cut achieved by relief grinding gives a higher standard of after-cut appearance, which also reduces the stress on components because less horsepower is needed to drive the cylinder

[3] Mr. Orlie Dawson R-O Form Relieving Fixture 1959 offers improved grinding control through its master drive and stepless speed control. The Power unit is a D.C., 110 volt gear reduction motor with stepless speed control Gear reduction is 40:1 giving 44 inch pounds of torque. Speeds from 0 TO 80 RPM at the dial, through a timing belt drive.

3. METHODOLOGY

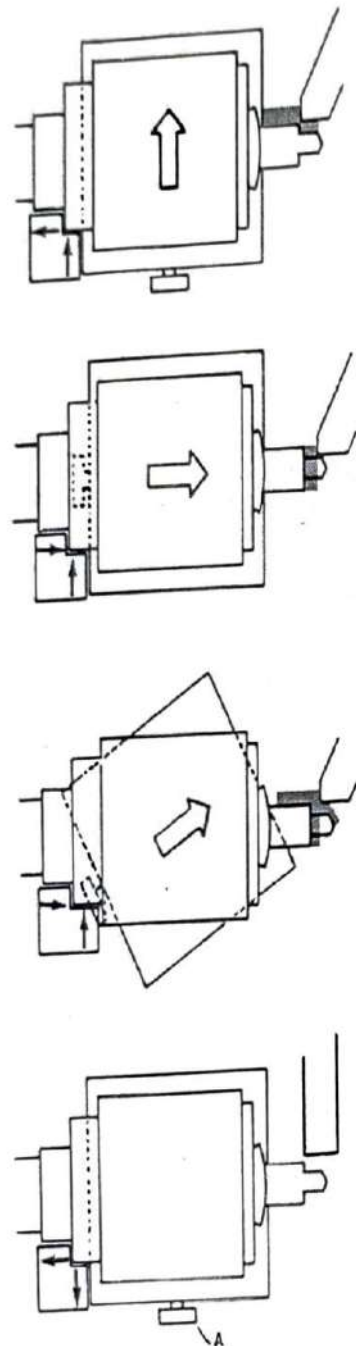
Identification of problem while working on a tool grinding operation :

- Search for suitable ideas for research paper.
- Selecting the concepts related to our aims of projects from research papers.
- Combining them all and creating best project design.
- Collecting the materials required for constructing projects.
- Applying some modification in design if necessary.
- Working on fixture design and sliding mechanism.
- Complete design model
- Assembling the parts as per the design.
- Analyzing the working of project on the machine.
- If some problem causes, applying few modification in design and remaking

1. Planning for project work
2. preparing on tool geometry and fundamentals
3. Concept diagram
4. 2D/3D Drawing
5. Design model and Fixture
6. Software and hardware requirement.
7. Design of Sliding displacement Mechanism
8. Manufacturing operations
9. Finishing operation

10. Assembly of design
11. Working of fixture
12. Grinding tool setting.
13. Testing of the project on Radial and axial relief Grinding Machining operation
14. Submit the project.
15. Study to collect industry survey

4. IMPLEMENTATION



1. For radial relief only - Both carriage and spindle indicators should read 90. At this setting carriage is at right angle to the grinder table and the spindle is parallel with the table. The tool moves into the wheel as illustrated in the diagram. Set-up used to grind cutters with teeth on periphery, milling cutters, keyway cutters, etc.

2. For axial relief only - Both carriage and spindle indicators should read 0. At this setting both are parallel with the grinder table. The tool moves into the wheel as illustrated in the diagram. Set-up used to grind circular pilots, with end cutting teeth: counterbores, etc.

3. For radial and axial relief - Turn carriage to angle necessary to obtain required combination of radial and axial relief, Spindle remains parallel with grinder table. The tool moves into the wheel as illustrated in the diagram. Set-up used to grind step drills, center drills, etc. Carriage setting is easily determined by a simple formula and charts in operational handbook.

4. For cylindrical grinding Turn knurled thumb screw A - compressing carriage return spring which releases pressure on plunger and cam follower. Spindle turns free for cylindrical grinding. Circular grind can be performed at any position 0 to 90. Grinding to index can also be accomplished by use of index plate and index plunger.

When drilling and countersinking are done with the same tool, since if the countersinking is not centered with the hole, the tap follows the eccentricity as it starts and then has to correct its position as it gets deeper into the work for this reason among other making their own combination centering and chamfering tools for the same work. Without disturbing drill location switch to cam control on the front of relieving fixture and give toll a combination of radial and axial relief. If this is just circularly ground it has no axial or endwise clearance no matter how well it is backed off radially there is always chance it will rub. You can solve this by swinging the base of the fixture while keeping the tool in the line.

V. ACKNOWLEDGMENT

We would like to show our sincere gratitude towards Prof. Dr. A.B.Gholap Sir, HOD, Department of Mechanical Engineering, Mr. Sangram Nikam for his valuable guidance and encouragement. We would also like to thank our Sponsor, Nisaka Engineering PVT. LTD. for their support and continuous guidance throughout the development of this project.

VI. CONCLUSION

As a result, small series or single parts are generally produced by means of manually controlled shearing machines. At present, existing manual marking machines only allow the production of tools that can only be machined along their longitudinal axis. As a result, a machining of can not be achieved with precision and in a perfectly reproducible manner, the necessary adjustments to be made empirically. The object of the present invention

is to overcome these disadvantages by proposing a machine for offsetting for axial and radial machining which makes it possible to produce tools of complex shape, such as stepped tools, by making the tool simultaneously perform three movements, namely radial, axial and rotary. For this purpose, the lapping machine,

which essentially consists of a mounting base on a sharpening machine, a support body and guide receiving pin of a tool to be machined and by a carriage for mounting and guiding the body on the mounting base, is characterized in that the receiving pin of a tool to be machined cooperates with a means of axial and radial displacement of the support and guide body of said pin of receiving a tool to be machined.

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Design and Fabrication of a Section Bending Machine

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Abstract— The objective of this research is to create a roller bending device that can be used in the workshop to bend metal strips and pipes. This project aims to design and build a movable roller bending device. This equipment is used to bend metal strips and steel pipes into the desired curve shapes. The machine's size makes it ideal for mobile work. It is made entirely of steel. Additionally, it is portable and simple to use at any time. It requires less human work and talent to operate this machine, which further reduces human effort. We lean forward while utilising a hand-operated roller-bending machine that uses a support (frame), motors, gears, and a block. Power is the machine that bends pipes; otherwise, everything is done manually. Our goal is to increase precision at a reasonable cost while maintaining the productivity of pipe bending. Instead of using a subtle fashion, this machine uses a straightforward kinematic approach. It is typically used by workshops or fabrication searches due to its mobility. Another common tool in the workshop used to bend metal is a bending machine.

Keywords—Roller bending, Hydraulic, bending, manual, bottle jack.

I. INTRODUCTION

Metal can be plastically deformed and given a different shape through the process of bending. The material is under stress below the ultimate tensile strength but above the yield strength. The material's surface area does not significantly alter. The term "bending" typically refers to axis-specific deformation. Bending is a versatile process that allows for the creation of a wide variety of shapes. Numerous forms can be produced using common die sets. Press brakes are used to bend. For this project, we are bending the metal pipe using hydraulic force. Because of the strong load capacity and efficiency of this hydraulic system. Additionally, this project uses no electricity. Therefore, the price is lower than for hydraulic systems using electrical power.

The important objectives of this project are given as follows

- Design of the manual roller bending machine.
- Design of the components required for this machine.
- The design of the machine should be cost efficient and easy to handle.
- Design the machine so that it performs its work efficiently with minimum effort.

II. LITERATURE REVIEW

A pipe bending system with numerous components and a wide range of shapes and sizes was developed by H. Yang et al. [1] Bent tube components satisfy the expanding demand for lightweight and strong components from a material and structural perspective. One of the fundamental engineering advancements for the creation of lightweight items has been tube bending. By examining bending characteristics and various defects, such as wrinkling instability at the intrados, wall thinning (cracking) at the extrados, springback phenomena, cross-section deformation, shaping limit, and process/tooling configuration, advances in understanding the common issues in tube bending are summarised. Hiroyuki [2] describes a brand-new, adaptable bending machine and its uses. The suggested computer takes a fresh approach. As tubes are placed into the fixed and mobile dies, the mobile die's relative direction is changed, causing the tubes to twist. The bending radius is also determined by the movable die's position in relation to the tube as well as their relative orientation. The fed conduit's length affects the bent angle. This shaping technique offers a substantial advantage. H. A. Hussain [3] designed and created an integrated bicycle pipe bending system. The machine can bend steel pipe with an outer diameter of 25 mm and a thickness of 2 mm thanks to a chain drive and a compound gear train. The kinematic synthesis of the bending mechanism is finished. An analysis of dimensions was chosen. The integrated bicycle pipe bending mechanism's effectiveness is predicted by the deduced relationships, and all of the parameters must be changed to optimise machine performance. P. P. Khandare et al. [7] built a project to design and construct a compact pipe bending system that could turn steel pipes into curves and other shapes. It was simple to transport and use at any time and in any place, requiring less human labor and requiring a less trained workforce. It can bend pipes with a thickness of up to 4-5 mm, but it is only suitable for use in a small workshop or welding shop.

III. DESIGN ASPECTS OF BENDING MACHINE

Design aspect of Bending machine

To develop the necessary specifications for how our system should operate and outcomes to carry out precise calculations of our system design appropriately, some theoretical considerations have been taken into consideration. We took into account elements like the frictional force, the force applied to the rollers, and the torque imparted to the

rollers. Undoubtedly, the computation at the bottom would be used to help define the specifications and performance standards for our prototype. After a quick shearing operation on sheet metal, components can be rolled to identify the material characteristics that affect component bending.

Design chain drive:

$$Lm = 2\left(\frac{a}{p}\right) + \left(\frac{z_1+z_2}{2}\right) + \left(\frac{z_1+z_2}{2\pi}\right)^2 \frac{p}{a} \quad \text{Eq. 1}$$

$$z_1 = \text{Number of the teeth of sprocket} = 27$$

$$z_2 = \text{Number of the teeth of sprocket} = 27$$

$$a = \text{distance between driving sprocket} = 200 \text{ mm}$$

$$p = \text{pitch} = 4 \text{ mm}$$

Design of power screw:

$$d = \frac{d_0+d_c}{2} = \frac{7.4+6.04}{2} = 6.72 \text{ mm} \quad \text{Eq. 2}$$

$$d_c = \text{major diameter} = 7.4 \text{ mm}$$

$$\mu = \text{co-efficient of friction} = 0.15$$

$$d_0 = \text{minor diameter} = 6.04$$

$$w = \text{weight of the roller} = 2.5 \text{ kg} = 24.54 \text{ N}$$

$$\text{lead} = \text{pitch} = 6.35 \quad \alpha = \text{Helix angle}$$

$$\phi = \text{Friction angle}$$

Force analysis:

Maximum torque required for a cylinder rolling Specifications

$$\sigma_s: \text{material yield limit} = 218 \text{ N/mm}^2$$

$$B: \text{maximum width of rolled shield} = 40 \text{ mm}$$

$$\delta: \text{Thickness of rolled sheet in mm}$$

$$1) \text{ For thickness } \delta = 2 \text{ mm}$$

There is reinforcement when considering the deformation of the material, and the reinforcement co-efficient K is added to change the equation.

$$\text{For thickness } \delta = 2 \text{ mm}$$

There is reinforcement when considering the deformation of the material, and the reinforcement co-efficient K is added to change the equation.

$$M_t = K\sigma_s \frac{B\delta^2}{4} = 1.15 \times 218 \times \frac{40 \times 2^2}{4} = 10028 \text{ N-mm} \quad \text{Eq. 3}$$

$$\text{For thickness } \delta = 3 \text{ mm}$$

$$M_t = K\sigma_s \frac{B\delta^2}{4} = 1.15 \times 218 \times \frac{40 \times 3^2}{4} = 22563 \text{ N-mm} \quad \text{Eq. 4}$$

$$\text{For thickness } \delta = 4 \text{ mm}$$

$$M_t = K\sigma_s \frac{B\delta^2}{4} = 1.15 \times 218 \times \frac{40 \times 4^2}{4} = 40112 \text{ N-mm} \quad \text{Eq. 5}$$

Force Condition:

The force condition when rolling steel plate is depicted in the preceding figure. The following formula can be used to determine the supporting F2 on the roll plate based on the force balance.

$$F_2 = \frac{M}{R \sin \phi} \quad \text{Eq. 6}$$

a = lower roller centre distance in mm.

$$d_{min} = \text{mini. diameter of the rolling plate in mm} = 388 \text{ mm}$$

$$d_2 = \text{lower roller diameter in mm} = 62 \text{ mm}$$

$$\phi = \text{Sin}^{-1} \frac{a}{d_{min} + d_2} = \text{Sin}^{-1} \frac{200}{388 + 62} = 26.5^\circ \quad \text{Eq. 7}$$

1) For thickness $\delta = 2 \text{ mm}$

$$F_2 = 115.63 \text{ N}$$

$$F_1 = 206.91 \text{ N}$$

2) For thickness $\delta = 3 \text{ mm}$

$$F_2 = 260 \text{ N}$$

$$F_1 = 461 \text{ N}$$

3) For thickness $\delta = 4 \text{ mm}$

$$F_2 = 462 \text{ N}$$

$$F_1 = 828 \text{ N}$$

R = neutral layer's radius of the rolling in mm

$$R = 0.5 d_{min}$$

$$R = 0.5 \times 388 = 194 \text{ mm}$$



Fig. 1. Section bending machine

IV. EXPERIMENTATION AND DATA ACQUISITION

In the output test, tests were conducted using GI pipe that was 15 mm and 20 mm in diameter. The test with a 25 mm pipe was abandoned since this size pipe could not be used in the lab. The pipes' diameters were measured at various midpoint deflections. The lead screw's lever was used to deliver torque to the lead screw, which created the bending force. The middle roller's handle was then used to push and pull the pipe, and by progressively increasing the bending pressure, the required bending diameter was achieved. Through repetition, the required bending was accomplished, and a smooth bending was discovered. The table below displays the diameter of pipes with different values and their deflection:

Pipe Diameter (mm)	Deflection (mm)	Bending Diameter (mm)	Remarks
15	31.755	457.20	Initially, 15 mm pipe suffered minor damage.
	38.100	412.75	
	50.800	330.20	
20	31.755	495.30	However, there is no harm to the 20 mm pipe.
	38.100	444.50	
	50.800	361.95	

Table 1: Data for bending test of 15- and 20-mm pipe

In the case of simply supported beam deflection, the radius is given by:

$$R = \frac{c^2 + 4d^2}{8d} \quad \text{Eq. 6}$$

Were,

R= Bending radius

C= Distance between two fixed rollers

d= Deflection in the middle roller

In the present case, the value of c= 254 mm.

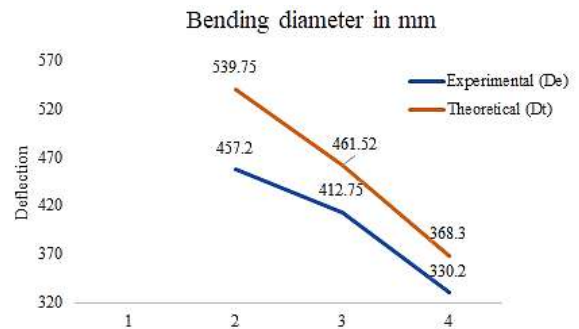
From the above formula, the value of theoretical bending radius has been calculated which has been given in the table below:

Pipe Diameter (mm)	Deflection (mm)	Bending diameter in mm		Deviation	
		Experimental (De)	Theoretical (Dt)	(De - Dt) / Dt	% (De - Dt) / Dt
15	31.755	457.20	539.75	82.55	15.30
	38.100	412.75	461.52	48.77	10.56
	50.800	330.20	368.30	38.10	10.34
20	31.755	495.30	539.75	44.45	8.24
	38.100	444.50	461.52	17.02	3.69
	50.800	361.95	368.30	26.35	1.72

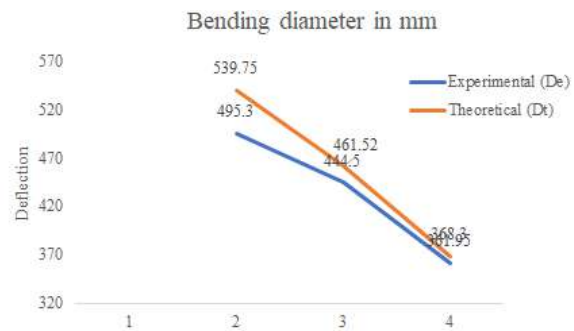
Table 2: Comparison between theoretical and experimental bending radius values

V. RESULTS:

There are two ways to adjust the bending angle and radius in a three-roller bending machine: one is to change the distance between two fixed rollers, and the other is to change the vertical displacement in the middle roller. In this initiative, the above is taken into account in order to reduce design complexity. As a result, the bending radius is solely determined by the middle roller's bending power. The bending radius is calculated using the above-mentioned equation.



Graph 1. Comparison between theoretical and experimental bending radius values for 15 mm pipe diameter



Graph 2. Comparison between theoretical and experimental bending radius values for 20 mm pipe diameter

Since the distance between the two rollers is set, the distance 'd' is the only one that can be changed.

The findings are showing deviation in results. This deviation could be minimized by using a steady and smooth operation. Also, the variation is decreased as the middle roller displacement increases. The theoretical value is significantly higher than the experimental value, as seen in charts 1 and 2.

- The curves in 15 mm pipe are parallel.
- For 20 mm tubing, though, the two curves appear to converge, resulting in greater deflection.

It can be concluded from the results that there is no difference between theoretical and experimental values. The variance may be minimized by ensuring a proper bending procedure and smooth operation.

A graphic comparison of the theoretical and experimental bending radius (diameter) values is shown for 15- and 20-mm tube. The variance reduces with increasing bending radius, as seen in the table.

When the pipe is bent, the bottom roller balances it while the middle roller creates friction. It's possible that the two ends aren't bending properly in any case.

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“DESIGN AND FABRICATION OF SEMI-AUTOMATIC MULCHING MACHINE”

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Abstract — During the past few decades, the agriculture sector has shown great progress in automatic control of different system. The conventional mulch paper laying results in requiring lot of man power and ultimately increase in cost. so, we had designed a semi-automatic mulching machine which reduces the man power and cost.

The conventional mulch paper laying method is time consuming, requiring man power, and costly. Now there are multipurpose agricultural machines also in market, but the cost that machine is very high. So small land acquired farmers are not able to purchase these machines.

In order to improve growing condition of crops there are various methods that improve productivity, reduce water require growing up the crops. But mulching paper which is also known as agriculture film is one of the best methods to cover the soil and maintain require atmosphere around the crop. This mulching paper is available in different types but plastic mulching is famous require less

1. Introduction

In this era of automation, the term is used to refer to any degree of automation where mechanical power replaces manual labor. Although the system's needs for physical input are decreasing as mechanization levels rise, the operation is still a crucial component of the system. By addressing labor issues, the automated system reduces costs, improves accuracy, and reduces human error.

This will be one of the strategies used to help enhance it in order to meet the increasing demands of the farmers who want to consistently increase the profitability of their farming by employing more efficient materials and equipment. A machine that can both lay mulching paper and make holes in it will be able to complete these tasks at once.

Making holes and laying mulching paper need a lot of labor and time. Farmers will exert less effort since it will take less money and time to lay the mulching paper using the most

practical manner and punch holes in it in a single pass of the machine. By covering the soil's surface with various materials, farmers and horticulturists can employ mulching to improve the state of agricultural soils.

1. LITERATURE REVIEW

1) "Advance Mulching Paper Laying Machine" by Prof. Amay Tipayale, Mayur S. Salunke, Samadhan U. Thete, Tushar S. Thete, Sandip B. Thete.

In this literature author explain about mulching paper laying machine. Mulching the plastic paper film near the root area of plants is for eliminating the rise of weeds also to retaining water and avoid de-moisturizing the soil but this process requires lots of capital and time. So „Drip irrigation pipe and Mulching paper laying machine“ will reduce the labour cost and time, it will do both the jobs i.e., laying irrigation pipe and mulching paper on the ground at a time. By using various mechanisms, this machine will lay the irrigation pipe and mulching paper at the same time it will make the holes on the paper to provide plantation area after laying the drip irrigation pipe and mulching paper.

To meet the growing needs of the farmers who wish continuously to improve the profitability of their farming by using more efficient materials and machineries this will be one of the methods which will help for improving it. „Drip irrigation pipe and Mulching paper laying Machine“ will be able to do the laying the irrigation pipe as well mulching paper simultaneously. “A pneumatic dibbling machine for plastic mulch”, American society of agricultural and biological engineers, applied engineering in agriculture.

2. METHODOLOGY

3) Scope and methodology

Problem Statement

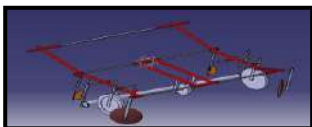
In the past, the bed was covered with mulch paper and drip line using human labour. It takes 6 to 8 persons to lay the mulching paper and poke holes in it. The availability of workers is a major issue in today's atomized environment. The procedure to remedy this issue takes more time right now, however a machine has been invented that operates when coupled to a tractor. When compared to the prior state, 2 to 4 employees are no longer needed, but the process has increased operating costs because the tractor requires more time to adjust with the bed each time.

Even though this technology is highly established and adaptable, its application in India is still constrained by the challenge of physically laying the mulching paper. This is a result of the scarce workforce supply and high cost of labor. There are automatic machines, but either India cannot access them or they are only used in large-scale agriculture. Therefore, we must construct the machine in such a way that it can operate semi-automatically with only one or two workers, in the shortest amount of time, and at the lowest possible operating expense.

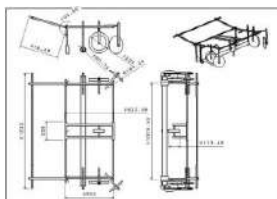
4. Project Design

V. ACKNOWLEDGMENT

It is our privilege to acknowledge



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Engineering at Arvind Gavali College of Engineering, Satara for his/her valuable

suggestions and guidance throughout our degree course and the timely help given to us in completion of our project work.

We are thankful to **Dr. V. A. Pharande**, Principal, Arvind Gavali College of Engineering, Satara and **Dr. Gholap. A.B.**, Head of Mechanical Engineering department for their kind co-operation & morale support.

VI. CONCLUSION

Laying plastic mulch film requires a lot of time, labour, and effort and is very taxing. By using machinery to lay plastic mulch film, efficiency is increased and labour costs are reduced. It has become essential for us to produce more produce of high quality in order to compete in the global market due to the rising demand for horticulture products and people's increased awareness of their health. In light of the evolving technology landscape, plastic culture is essential to Indian agriculture in order to increase crop yields and production. It requires the right technology to boost efficiency while reducing time and financial requirements throughout the laying operation. An effort has been made to design a manual plastic mulch laying machine because the majority of farmers are small and marginal farmers who rely on the manual as a source of power. For the purpose of installing mulch film on the already-prepared bed for various vegetable crops, a manual plastic mulch laying machine was designed.

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9TH INTERNATIONAL CONFERENCE ON ADVANCES IN ENERGY RESEARCH

12TH TO 14TH DECEMBER 2023

ABSTRACT BOOKLET



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Preface

The Department of Energy Science and Engineering at the Indian Institute of Technology Bombay is one of the first dedicated departments in India to focus on energy science, engineering technology, and policy. The department is expected to provide critical manpower and research outputs that are crucial for the growth of India's energy sector and provide innovative technologies and systems to mitigate the global challenge of climate change. Keeping the vision of the department, "To develop sustainable energy systems and solutions for the future" in mind, the need to provide a common platform to the researchers in the field of Energy and allied domains, the Department organises the bi-annual conference: International Conference on Advances in Energy Research, since 2007, to provide an excellent forum to present new findings, exchange novel ideas, discuss new developments, and finally reflect on the challenges that lie ahead.

This book is a collection of all the abstracts of the papers selected for presentation at the 9th International Conference on Advances in Energy Research, organised from 12th to 14th December 2023 by the Department of Energy Science and Engineering, Indian Institute of Technology Bombay, Mumbai. A total of 220 papers were received. After an academic review by subject experts, 153 papers were selected for presentation at the conference. Out of the selected papers, 93 papers have been scheduled for oral presentation and 60 papers have been scheduled for poster presentation. The conference is organised in 20 oral and 2 poster sessions in the fields of photovoltaics, solar thermal, wind energy, biomass and combustion, energy storage, energy efficiency and modelling, energy policy, fuel cells, and buildings, to name a few. The conference will also have 10 invited talks, a panel discussion and a workshop on technical writing by Springer. Selected papers will be considered for publication in *Advances in Clean Energy and Sustainability (Green Energy and Technology)*, Springer Nature.

We would like to take this opportunity to thank all the invited speakers, delegates, sponsors, the members of the organising and academic committee and most importantly the students of the department for their dedicated efforts in organising this conference.

Prof. Sankara Sarma V Tatiparti
Organizing Secretary, ICAER 2023

Prof. Srinivas Seethamraju
Organizing Secretary, ICAER 2023

Contents

Scientific Advisory Committee.....	4
Local Organising Committee	5
Student Organising Committee	6
Conference Schedule.....	7
Invited Talks.....	17
Abstracts.....	37
Our Sponsors	135

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Optimization of biodiesel synthesis parameters of waste cooking oil through response surface methodology

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Abstract

As increase of cost of crude oil and exhaust emission. The research is focused on production of biomass blended fuel having similar combustion property of diesel. It achieves the required energy demand and also reduces the exhaust emission formation. In the present study waste cooking oil (WCO) is use for making of bio fuel through response surface methodology (RSM) based transesterification process. The Box-Behnken design is used to explore the impacts of the primary operating factors including methanol, catalyst concentration, and reaction time on the production of biodiesel. The results revealed that the most crucial parameter is the catalyst concentration. The maximum bio- diesel yield under optimal condition is 98.75 wt %. An empirical quadratic equation has also been developed to demonstrate the relationship between biodiesel conversion with its viscosity.

ROAD POWER GENERATION BY USING FLIP-PLATE MECHANISM

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ABSTRACT

In the present day scenario, power is a major need for human life. There is a need to develop non- conventional sources for power generation due to the reason that our conventional sources of power are getting scarcer by the day. This paper emphasizes on the idea that the kinetic energy getting wasted while vehicles move can be utilized to generate power by using a special arrangement called “power sliding generator”. This generated power can be used for general purpose applications like streetlights, traffic signals. In addition, we could also have solar panels, which would satisfy our power needs, when there is no vehicular movement. The generated power can be used for the lamps, near the generator.

INTRODUCTION

The automotive industry in India is one of the largest in the world and one of the fastest growing globally. India's passenger car and commercial vehicle manufacturing industry is the seventh largest in the world, with an annual production of more than 7.9 million units in 2020. We every day mesh up with these vehicles give us headache. But this mesh up could be answer of new type power generation. Road Power Generation (RPG) is one of the most recent power generation concepts. This device is engineered as a practical and useful alternative energy technology for generating clean electricity from the millions of vehicles on our road ways. Once fully optimized and installed, engineers anticipate that devices may be used to augment or replace conventional electrical supplies for powering roadway signs, street and building lights, storage systems for back-up and emergency power, and other electronics appliances, and even devices used in homes and businesses.

In the present-day scenario power has become the major need for human life.

Energy is an important input in all the sectors of any countries economy. The day-to-day increasing population and decreasing conventional sources for power generation, provides a need to think on non-conventional energy resources.

Here in this paper we are looking forward to conserve the kinetic energy that gone wasted, while vehicles move. The number of vehicles passing on road is increasing day by day. Beneath RPG, setting up an electro-mechanical unit known to be power hump, could help us conserving this energy and use it for power generation. This generated power can be stored, by using different electrical devices.

I. PROBLEM STATEMENT

A engineer is always focused towards challenges of bringing ideas and concepts to life. Therefore, sophisticated machines and modern techniques have to be constantly developed and implemented for economical manufacturing of products. At the same time, we should take care that there has been no compromise made with quality and accuracy.

OBJECTIVES OF PROJECT

The main purpose of this project is to help to reduce problems of energy crisis to some extent, promote use of free source of energy and various other problems

1. To generate electricity and to store in a battery.
2. With the help of battery various applications to be achieved such as :
 - I. Use of led bulb as street light.
 - II. Charging of mobile phones.
3. To generate Electricity without any harm to nature

With the help of a professional setup these device can be capable of achieving multiple application globally such as

- Charging of EV's
- Maintenance of highways by selling the stored electricity. With will led to increase in economy of the country.

III. METHODOLOGY

Proper selection of various components

1. Flywheel:

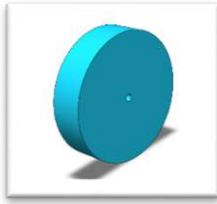


Fig. Flywheel

The primary function of flywheel is to act as an energy accumulator. It reduces the fluctuations in speed. It absorbs the energy when demand is less and releases the same when it is required.

2. Ratchet Sprocket



Fig. Ratchet Sprocket

A ratchet is a mechanical device that allows continuous linear or rotary motion in only one direction while preventing motion in the opposite direction. Ratchets are widely used in machinery.

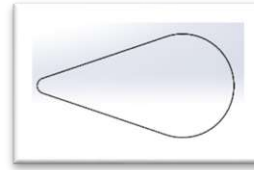
3. Shaft



Fig. Shaft

A shaft is a rotating machine element usually circular in cross section, which is used to transmit power from one part to another, or from a machine which produces power to a machine which absorbs power.

4. Belt



A belt is a loop of flexible material used to link two or more rotating shafts mechanically, most often parallel. Belts may be used as a source of motion, to transmit power efficiently, or to track relative movement.

5. Bearing



Fig. Bearing

In these project we have use pedestal bearing. A pedestal bearing is used to provide support for a rotating shaft and makes all movements easier and also helps to reduce friction. The block is mounted to a foundation and a shaft is inserted allowing the inner part of bearing/shaft to rotate.

6. Dynamo



Fig. Dynamo

It is a device, which converts mechanical energy into electrical energy. The dynamo uses rotating coils of wire and magnetic fields to convert mechanical rotation into a pulsing direct electric current through “faraday’s law of electromagnetic induction”. A dynamo machine consists of a stationary structure, called stator, which provides a constant magnetic field, and a set of rotating winding called the armature which turns within that field

IV. CALCULATION

5.7 ANALYTICAL CALCULATIONS

- Material = C 45 (mild steel)

Taking Fos as 2

$$\sigma_t = \sigma_b = 540/\text{fos} = 270 \text{ N/mm}^2$$

$$\sigma_s = 0.5 \sigma_t$$

$$= 0.5 \times 270$$

$$= 135 \text{ N/mm}^2$$

5.7.1 DESIGN OF LEVER :

The length of lever is 400 mm

$$t = \text{thickness of arm in cm. } F_b = 270 \text{ N/mm}^2$$

Cantilever bending moment will act when pulled by human hand

W = maximum force applied by human = 30 kg

- $M = W \times L$

$$M = 300 \times 400 = 120000 \text{ N-mm}$$

This link may fail under bending

And Section Modulus = $Z = 1/6 bh^2$

$$Z = 1/6 \times 5 \times 25^2$$

$$Z = 1/6 \times 3125$$

$$Z = 520.8 \text{ mm}^3.$$

Now using the relation,

$$F_b = M / Z$$

$$F_b = 120000 / 520.8 = 23.04 \text{ N/mm}^2$$

Induced stress is less than allowable 23.04 N/mm²

So design is safe

5.7.2 TORQUE GENERATED:

Torque generated will be

$$T = F \times R$$

$$T = 300 \times 400 = 120000 \text{ N-mm}$$

This torque will remain same of flywheel shaft because same sprocket is used on both the shaft

5.7.3 CALCULATIONS FOR FLYWHEEL

The dynamo used in our project is of 300 rpm

Diameter of pulley used in dynamo shaft is 50mm

Diameter of Flywheel is 350 mm

Width of flywheel is 90 mm

As we know 300 rpm is required to generate electricity by dynamometer so we design diameter of FLYWHEEL

$$\frac{\text{Diameter of FLYWHEEL (dynamometer)}}{\text{Diameter of Dynamometer Pulley (Flywheel)}} = \frac{N}{N}$$

$$\frac{350}{50} = \frac{300}{N}$$

$$N = \frac{300 \times 50}{350}$$

$$N = 42.85$$

Hence speed of flywheel = 42.85 rpm

5.7.4 CALCULATE THE WEIGHT OF FLY WHEEL

$$m = \rho \times V \quad (\rho = \text{density of concrete} = 2400 \text{ kg/m}^3)$$

$$V = (3.14 \times d^2 \times t)$$

$$V = (3.14 \times 0.35^2 \times 0.09)$$

$$V = 0.0346 \text{ m}^3$$

$$m = 2400 \times 0.0326$$

$$m = 83.04 = 84 \text{ kg}$$

5.7.5 DESIGN OF SHAFT FOR FLYWHEEL

The flywheel shaft will fail under combine twisting and bending

$$W = 769 \text{ N}$$

Load is like simply supported beam

$$M = F \times L/4$$

$$M = 769 \times 750 / 4 = 144187 \text{ N-mm}$$

$$T = 12000 \text{ N-mm}$$

$$T_e = \sqrt{(M^2 + T^2)} = \sqrt{144187^2 + 12000^2}$$

$$T_e = 144685 \text{ N-mm}$$

$$T_e = \pi/16 \times \sigma_s \times d^3$$

$$d^3 = 144685 \times 16 / \pi \times 135$$

$$d = 17.60 \text{ mm}$$

d=18 mm

But standard size available is 20mm, therefore we will select 20mm diameter
Therefore, shaft size will be 20mm.
Hence design is safe.

5.7.6 SELECTION OF BEARING

For 20mm Shaft diameter we take standard breaking no. P204

P=pedestal bearing

2=spherical ball

=04=5 * 4 = 20mm

Bore diameter of bearing

We know that the mean kinetic energy of the flywheel,

$$E = 1/2. I.\omega^2$$

$$= 1/2.m k^2.\omega^2(\text{in N-m or joules})$$

M=Mass of the flywheel in kg,

k = Radius of gyration of the

flywheel in meters, the radius of gyration (k) may be taken equal to the mean radius of the rim $I = 340 = 340/2 = 170 \text{ mm}$

I = Mass moment of inertia of the flywheel about its axis of rotation in $\text{kg-m}^2 = m.k^2$

$$= 1/2 \times 78 \times 0.170 \times (2\pi \times 44/60)$$

$$= 39.78$$

$$= \mathbf{40 \text{ N-m/sec}}$$

5.7.7 DESIGN OF LEG FOR FRAME

Let the total weight (P) of our machine be 60 kg, now this 60 kg weight is kept on four angles,

$$P = 60/2 = 30 \text{ kg.}$$

$$P = 30 \times 9.8 = 300 \text{ N.}$$

$$L = 620 \text{ mm.}$$

$$M = WL/4 = 300 \times 620/4$$

$$= 46500 \text{ N-mm}$$

$$Z = B^3/6 - b^4/6 \times B$$

$$Z = 30^3/6 - 26^4/6 \times 30$$

$$Z = 1961 \text{ mm}^3$$

$$= M/Z = 46500/1961 = 23.71 \text{ N/mm}^2$$

As induced bending stress is less than allowable bending stress i.e., 270 N/mm^2 design is safe.

5.7.8 DESIGN OF TRANSVERSE FILLET WELDED JOINT ON SHAFT

$$\text{Perimeter} = \pi \times \text{diameter} = 3.14 \times 20 = 62.83 \text{ mm}$$

Hence, selecting weld size = 3.2 mm

$$\text{Area of Weld} = 0.707 \times \text{Weld Size} \times L$$

$$= 0.707 \times 3.2 \times 63$$

$$= 142.5 \text{ mm}^2$$

$$\begin{aligned} \text{Force Exerted} &= 100 \text{ kg} \times 9.81 \\ &= 1000 \text{ N} \end{aligned}$$

$$\begin{aligned} \text{Stress induced} &= \text{Force Exerted} / \text{Area of Weld} \\ &= 1000 / 142.15 \\ &= 7.15 \text{ N/mm}^2 \end{aligned}$$

For filler weld:

$$\begin{aligned} \text{Maximum Allowable Stress for Welded Joints} &= 210 \text{ Kgf/cm}^2 \\ &= 21 \text{ N/mm}^2 \end{aligned}$$

Hence safe.

5.7.9 DESIGN OF FILLET WELDED JOINT

Hence, selecting weld size = 3.2mm

$$\text{Area of Weld} = 0.707 \times \text{Weld Size} \times L$$

$$\begin{aligned} &= 0.707 \times 3.2 \times 30 \\ &= 67.87 \text{ mm}^2 \end{aligned}$$

$$\begin{aligned} \text{Force Exerted} &= 100 \text{ kg} \times 9.81 \\ &= 1000 \text{ N} \end{aligned}$$

$$\begin{aligned} \text{Stress induced} &= \text{Force Exerted} / \text{Area of Weld} \\ &= 1000 / 67.87 \\ &= \end{aligned}$$

$$14.7 \text{ N/mm}^2$$

For filler weld:

$$\begin{aligned} \text{Maximum Allowable Stress for Welded Joints} &= 210 \text{ Kgf/cm}^2 \\ &= 21 \text{ N/mm}^2 \end{aligned}$$

Hence Safe.

V. FUTURE SCOPE

In coming days, this will prove a great boon to the world, since it will save a lot of electricity of power plants that gets wasted in illuminating the street lights. As the conventional sources are depleting very fast, then it's time to think of alternatives. We got to save the power gained from the conventional sources for efficient use. So this idea not only provides alternative but also adds to the economy of the country. Now, vehicular traffic in big cities is more, causing a problem to human being. But this vehicular traffic can be utilized for power generation by means of new technique . It has advantage that it does not utilize any external source. Now the time has come to put forte these types of innovative ideas, and researches should be done to upgrade their implication.

VI. CONCLUSION

In this project, we have discussed a sliding plate mechanism for RPG (Road Power Generation). It has been shown that this type of system utilizes very small place and can be installed anywhere, unlike SBPG (Speed breaker generation system) system which cannot be installed everywhere. The power generated by this machine can then be stored in batteries for use. This makes it convenient since power can be supplied even if there are no vehicles passing over the sliding plate.

The utilization of energy is an indication of the growth of a nation. One might conclude that to be materially rich and prosperous, a human being needs to consume more and more energy.

In coming days, this will prove a great boon to the world, since it will save a lot of electricity of power plants that gets wasted in illuminating the street lights. As the conventional sources are depleting very fast, then it's time to think of alternatives. We got to save the power gained from the conventional sources for efficient use. So this idea not only provides alternative but also adds to the economy of the country. Now, vehicular traffic in big cities is more, causing a problem to human being. But this vehicular traffic can be utilized for power generation by means of new technique . It has advantage that it does not utilize any external source. Now the time has come to put forte these types of innovative ideas, and researches should be done to upgrade their implication.

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“Multipurpose Agriculture 3 – Wheel Pesticides Sprayer”

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Abstract—

In order to meet the food requirements of the growing population and rapid industrialization, modernization development of agriculture is inescapable. Mechanization that enables the conservation of inputs through the precision in the metering ensuring the better distribution, reducing the quantity needed for better response and prevention of losses or wastage of inputs applied. Mechanization reduces unit cost of production through higher productivity and input conservation. Farmers are using the same methods and equipment for the ages. In our country farming is done by traditional way, besides that there is large development of industrial and service sector as compared to that of agriculture. The spraying is traditionally done by labour carrying backpack type sprayer which requires more human effort. So to overcome these above problems a machine is developed which will be beneficial to the farmer for the spraying operations.

•

Introduction

India is set to be an agricultural based country approximately 75% of population of India is dependent on farming directly or indirectly. Our farmers are using the same methods and equipment for the ages. e.g. seed sowing, spraying, weeding etc. There is need for development of effective spraying machine which fulfill the requirement of not only the rich farmer but also the middle & lower level farmer. A Status of the agricultural mechanization in India & most off the developing countries of Asia have the main reasons for low productivity is insufficient power availability on the farms and low level of farm mechanization. This is especially true for India.

It is now realized the world over that in order to meet the food requirements of the growing population and rapid industrialization, modernization developing of agriculture is inescapable. It is said that on many farms, production suffers because of improper seedbed preparation and delayed sowing, harvesting and threshing. Mechanization enables the conservation of inputs through precision in metering ensuring better distribution, reducing quantity needed for better response and prevention of losses or wastage of inputs applied. Mechanization reduces unit cost of production through higher productivity and input conservation.

Agricultural implement and machinery program of the government has been one of selective mechanization with a view to optimize the use of human, animal and other sources of power. In order to meet the requirements, steps were taken to increase the availability of implements, irrigation spray pumps, tractors, power tillers, combine harvesters and other power operated machines and also to increase the production and availability of improved animal drawn implements. Special emphasis was laid on the later as more than 70% of the farmers fall in small and, marginal category.

It is generally said that mechanization of small farms is difficult. But the Japan having average land holding even smaller than ours, with proper mechanization has led agriculture to great heights. In order to minimization the drudgery of small farmers, to increase efficiency and save farmer's time for taking up additional and supplementary generating activities, the use of modern time saving machines/implements of appropriate size needed to be suitably promoted the productivity as compared to the developed nations

I. RELATED WORKS

We conducted a survey of various applications related to our project and tested various systems that follow the same principle. We also conducted a walkthrough of various We conducted a survey of various applications related to our project and tested various systems that follow the same principle. We also conducted a walkthrough of various farms and real life problems farmers has been facing. which is almost a helpful activity for all of us to know and understand the true problems and the practical solutions we could do on. Moreover, we also studied the health related issue arising from the traditional fertilization for instance back pain, pain in arm walking problems etc. which are only because of the method farmers has been following.

Furthermore, we also studied the types of sprayer , selection and exact use in our model for which we have gone through internet, books, some manuals and suggestions taken from farmers.

Also we had many responsibilities and works as given

Prepare a requirement document to reach expectations of project and to come up with functionalities which are needed to be implemented.

Documentation of expected output for various aspects with accepted margin error was also documented.

To design overall system based on workflow requirements.

Discussion with the project guide and Head of Department on ways to improve the design and to optimize performance.

Choosing suitable components and methods based on the configurations availability and requirements.

Testing and remedies, Recommendations

The types of sprayer –

1. Backpack Sprayer:

One type of backpack sprayer is a compressed air sprayer with a harness that allows it to be carried on the operator's back. Another type of backpack sprayer has a hand-operated hydraulic pump that forces liquid through a hose and one or more nozzles. The spray pump is usually activated moving the lever of pump which controls the piston movement. The mechanical agitator plate may be attached to the pump plunger. Some of these sprayers can generate pressures of 100 pounds per square inch (psi) or more. Capacity of both these types of backpack sprayers is usually 5 gallons or less.



2. Lite-Trac :

Lite-Trac is a trading name of Holmen Farm Supplies Ltd, a manufacturer of agricultural machinery registered in England and based in Peterborough. The Lite-Trac name comes from "light tractor", due to the patented chassis design enabling the inherently very heavy machines manufactured by the company to have a light footprint for minimum soil compaction. A Lite-Trac crop sprayer, or liquid fertilizer applicator, mounts onto the SS2400 Tool Carrier centrally between both axles to maintain equal weight distribution on all four wheels and a low centre of gravity whether empty or full



3. Motorcycle Driven Multi-Purpose Sprayer:

In the 1994, Mansukhbhai Jagani, developed an attachment for a motorbike to get a multi-purpose tool bar. It which addresses the twin problems of farmers in Saurashtra namely paucity of labourers and shortage of bullocks. This motor cycle driven plough (Bullet Santi) can be used to carry out various farming operations like furrow opening, sowing, inter-culturing and spraying operations. The Mansukhbhai's intermediate-technology contraption proved efficient and cost-effective for small sized farms



III. DESIGN AND DEVELOPMENT

1. Drawbacks In Existing Sprayer Pumps:

The Indian farmers (small, marginal, small and marginal, semi-medium) are currently using lever operated backpack sprayer. A backpack sprayer consists of tank 10 -20 litre capacity carried by two adjustable straps. Constant pumping is required to operate this which results in muscular disorder. Also, the backpack sprayer can't maintain pressure, results in there is equate pressurise the laborious and also time consuming. Pumping to operating the pressure is also time consuming. Moreover, very small area is covered while spraying. So, more time are required to spray the entire land. Back pain problems may arise during middle age due to carrying of 10-20 litre tanks on back.

2. High Cost Sprayer:

Presently farmers are using knap-sack sprayer for spraying pesticides on crops in their farms which costs for's 1800-4500/-. Pesticides are the most diverse and omnipresent. This sprayer has wide limitations and thus farmers can use the other sprayer also like bullock driven

sprayer pump and tractor mounted sprayer. Cost of bullock driven is about Rs 28000/ But though this these sprayer has high advantages but are not affordable by farmers of developing nation. So, it's a need to find out a golden mean among these.

But though this these sprayer has high advantages but are not affordable by farmers of developing nation .So, it's a need to find out a golden mean among these. The height factor also play a key role in spraying .For cotton, about 5 to 6 times spraying of pesticides is done. Cotton is one of the important commercial crops grown extensively in India. Over 4 million farmers in India grow cotton as their main source and income & livelihood. The textile sector, is primarily based on cotton fibre, is the largest employer & income provider in India, second only to agriculture. It employs close to 82 million people – 35 million in textile & 47 million in allied sector flashes the light on No. of crops on which spraying is done and their horizontal, vertical distances and maximum height.

Objectives

- Decrease the operational cost by using new mechanism.
- Work reliably under different working conditions.
- Decrease the cost of machine.
- Decrease labour cost by advancing the spraying method.
- Machine can be operated in small farming land (5 acre).
- Making such a machine which can be capable to perform both the operation (spraying and weeding).

So considering points related to spraying and weeding an attempt is made to design and fabricate such equipment which will able to perform both the operations more efficiently and also will results in low cost.



Pump :-

A pump is a piece of equipment used to move fluids, such as liquids or slurries, or gases from one place to another.

Tank:-

It is the storage place of chemical solution. It is made up of PVC, Brass, etc.

Agitator:-

It is the devices which stirs the solution and maintain the contents in homogenous state.

Air chamber:-

In a reciprocate type pump, an air chamber is provided on the release line of the pump to level out the pulsations of

the pump and thus given that an invariable nozzle pressure.

Pressure gauge :-

It is a dial gauge which shows the pressure at which the liquid is delivering from the pump.

Pressure regulator :-

The pressure regulator use for some important functions. It is the means of adjust the pressure is necessary for any spray job within the pressure choice of the pump.

Strainer :-

It is a little circular plastic ring with nylon wire mesh to filter any dust element coming with the chemical solution it is included in the suction line connecting the chemical tank and the check valves.

Nozzles :-

It is the part which pull the fluid in to fine droplet. Mechanization of spray fluid is usually achieved by releasing the liquid through lips called nozzle under pressure.

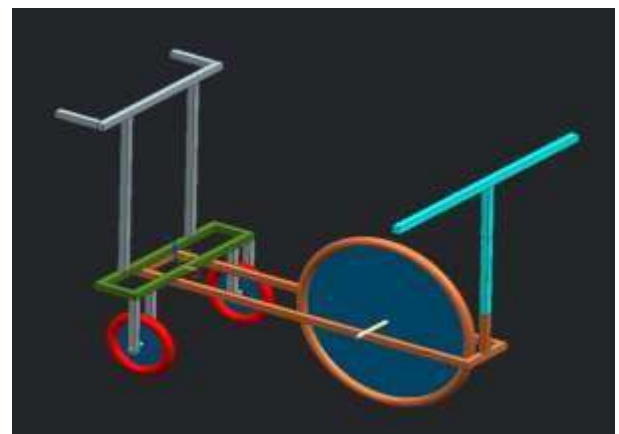
IV.IMPLEMENTATION

Concept Generation:-

Five concepts were generated considering various factors which meet the PDS like functionality, safety and cost. Final concept was selected and the working prototype model was build.

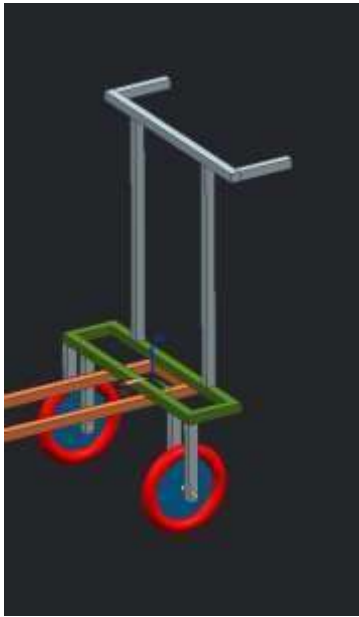
Push Type Sprayer:-

Features of this concept like hand operated hydraulic pump and lever is connected to crank by link. The existing tank (10-16 liters) focusing on new mechanism is to be used as shown in Fig.



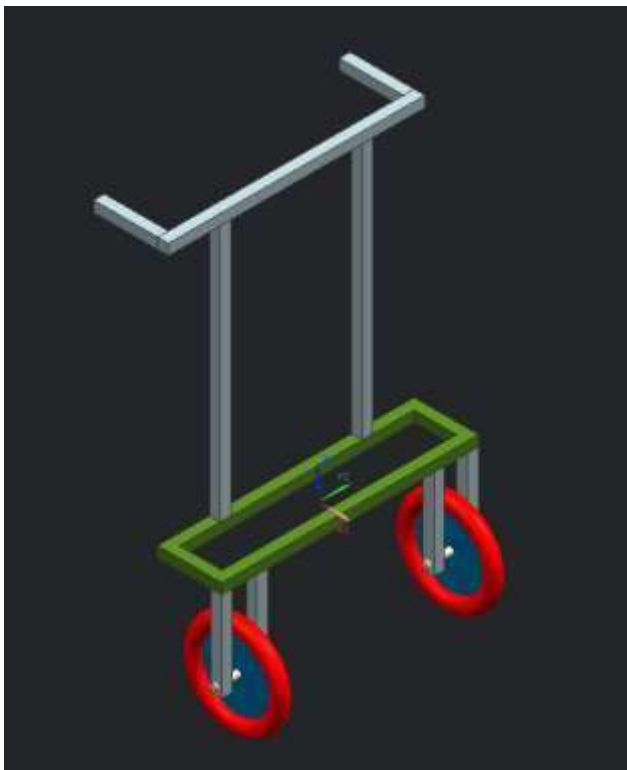
Tank Carrying Sprayer:-

In this concept to solve the existing problem like back ache and shoulder pain. The height adjustable stand with two support wheel to was designed to pull forward easily as shown in Fig.



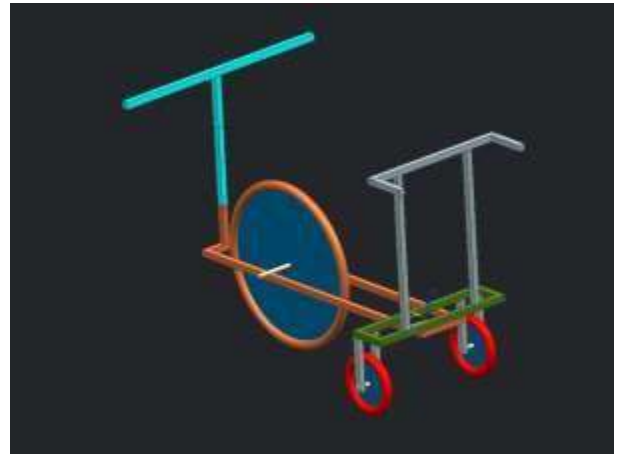
As a trolley With Out Sprayer:-

The frame design is to changed increase aesthetic look of the product and adjustable height support stand as shown in Fig.



Multi Nozzle Operated Sprayer:-

Concept 4 look like concept 3 but for easy movement and support two small wheels were included. It is easy to spray for any height crops because Adjustable height support stand will included as shown in Fig. The product can spray pesticide over multiple rows of plants in one pass there by reducing manual effort.



V. ACKNOWLEDGMENT

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We extend our sincere thanks to all teaching staff of mechanical engineering department, those who helped us in completing this project successfully.

Lastly we also thank the people who directly or indirectly gave us encouragement and support throughout the project.

VI. CONCLUSION

1. Spray pump of capacity 40 Liters can be fabricated.
2. Its components can be designed.
3. Components used are easily available in the market or manufactured.
4. Components cost is not too high.
5. The suggested model has removed the problem of back pain, since there is no need to carry the tank (pesticides tank) on the back.
6. The c.f. valves can also be applied which help in reducing the change of pressure fluctuation and c.f. Valves helps to maintain pressure.
7. Proper adjustment facility in the model with respect to crop helps to avoid excessive use of pesticides which result into less pollution.
8. Imported hollow cone nozzles should be used in the field for better performance.
9. Muscular problems are removed an there is no need to operate the lever.

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WEBSITES:-

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“ROBOTIC ARM WITH VEHICLE”

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Abstract — Robotic arms are widely utilized in industries to enhance operational efficiency, productivity, and precision while minimizing human errors. An important advantage of robotic arms is their ability to operate in challenging conditions, such as high temperatures and pressures, where human presence is risky. These manipulators fall under the category of Flexible Automation, allowing for easy updates and modifications. In response to security concerns posed by terrorist attacks involving harmful devices like bombs and landmines, a project was initiated to develop a robotic arm integrated with a vehicle. This innovative solution aims to reduce human threats by enabling remote operation and offering enhanced adaptability. Additionally, robotic arms are capable of operating in extreme environments, such as radioactive areas, which are hazardous for human beings. The integration of cameras and ultrasonic sensors allows for environmental reconnaissance. Extensive research papers, including DRDO Daksh, were reviewed to gain insights into various control strategies and methodologies employed by different authors in determining the degrees of freedom necessary for object manipulation and precise placement. The knowledge acquired from these papers contributes to the design of the robotic arm system.

1. Introduction

Robotic arms transformed industrial automation, indispensable across manufacturing, healthcare, defense and space exploration. Equipped with sensors, actuators, and components, these arms perform diverse tasks. Their utilization boosts productivity, accuracy, and safety, providing an appealing substitute for human labor.

Advancements in materials science, AI, and robotics have facilitated the creation of sophisticated robotic arms. Soft robotics offer flexibility and adaptability for delicate tasks, while biomimetic designs enhance agility and

dexterity by imitating animal movement.

The control system of robotic arms is vital for executing complex actions. Different strategies, including joint-level, task-level, and hybrid control, have been developed with unique pros and cons. The ongoing research focuses on intelligent control systems that can adapt to diverse tasks and environments.

Robotic arms have demonstrated their versatility in various industries. In manufacturing, they excel at tasks like welding, painting, and assembly, contributing to increased efficiency. In healthcare, robotic arms have been instrumental in surgical procedures, enabling enhanced precision and less invasive techniques. In the realm of space exploration, robotic arms play a crucial role in performing maintenance tasks and conducting scientific experiments, aiding in the exploration and understanding of our universe.

This review aims to cover recent research on robotic arm design, control, and applications. We will explore advancements in arm design, control strategies, and applications in defense & surveillance. Additionally, future research directions will be outlined. The automation industry in India is experiencing rapid growth, and but we have continues treat of terrorist & naxalite with ongoing two border conflict its necessary to overcome this type of challenges by robotic technology in most efficient, and cost-effective way. Robotic automation has also improved safety by eliminating risks and potential dangers to human during the process.

Robotics explores the development of robotic arms with multiple DOF. Control systems, including Arduino Uno microcontrollers, are used. Servomotors are commonly employed for joint motion. Manufacturing of parts can be done by 3D printing for Surveillance purpose camera used.the arm is mounted on remotely operated vehicle (ROV). Can be operated by remote as well as mobile.

2. LITERATURE REVIEW

In the field of robotics, the development of robotic arms with multiple degrees of freedom (DOF) has been an active area of research. Various control systems have been implemented for such arms, including microcontrollers such as the Arduino Uno. The use of servomotors has also been a popular choice for providing rotary motion to the joints of the arm. In addition, the manufacturing and sharpening of cutting tools, including those with complex profiles, has been a challenge for small-scale or individual production due to the complexity and cost of machine setup. Techniques such as Cam relief grinding have been developed to address this issue.

[1] Farooq Ahmad et al. (2018) evaluated robotic arms applications in the healthcare domain, with their applications in rehabilitation, prosthetics and surgery. Thoughts were exchanged on the probable crisis and challenges of using robotic arms in healthcare.

[2] Waseem Khan et al. (2019) evaluated the use of robotic arms in the manufacturing industry, including their applications in assembly, material handling, and welding. Also they discussed the advantages and limitations of using robotic arms in manufacturing.

[3] Zhihui Li et al. (2020) evaluated the use of robotic arms in the field of agriculture, including their applications in harvesting, pruning, and spraying. Also they shared views on the challenges and opportunities of using robotic arms in agriculture, specifically in improvement of efficiency and reducing labor costs.

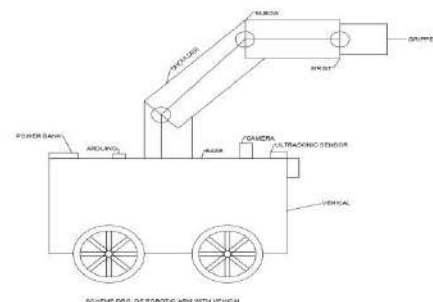
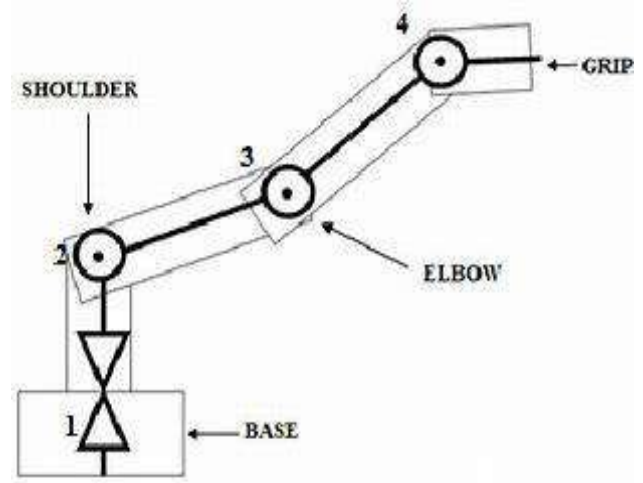
3. METHODOLOGY

- **Problem and Requirements Identification:** Analyze constraints and requirements for the robotic arm, including degrees of freedom, motion range, payload capacity, accuracy, and precision. Develop an optimal project design by combining all these factors.
- **Literature Review:** Conduct an extensive review of existing research papers and literature on robotic arm development. Identify relevant concepts, components, and technologies to be incorporated into the robotic arm's design.
- **Conceptual Design:** Based on the requirements analysis and literature review, create the conceptual design for the robotic arm. This involves selecting appropriate joints, actuators, sensors, and control systems.
- **Detailed Design:** Generate a detailed 2D/3D design of the robotic arm, encompassing all components and subsystems. Consider material selection and manufacturing processes during this phase.
- **Fabrication and Assembly:** Utilize suitable manufacturing techniques to fabricate the robotic arm's components. Assemble the arm according to the design specifications.
- **Testing and Validation:** Thoroughly test the robotic arm to ensure it fulfills the requirements and specifications.

This includes evaluating motion range, payload capacity, accuracy, and precision.

- **Evaluation and Refinement:** Evaluate robotic arm's performance, make modifications to enhance capabilities.
- **Documentation and Reporting:** Document design, fabrication, testing outcomes, and modifications for the robotic arm. Prepare a comprehensive final report summarizing the entire project.

4. IMPLEMENTATION



1. Determining the design of a robotic arm is reliant on its intended application. This encompasses selecting the suitable arm size, reach, and payload capacity, as well as determining the required number and type of joints. In industrial environments, a popular choice is the six-axis robotic arm due to its versatility and capacity to maneuver in multiple directions.

2. During the assembly process, a meticulous approach is taken to choose and integrate the various components of the

robotic arm. This involves incorporating motors, sensors, and actuators that empower the arm to execute its assigned tasks. The motors are responsible for controlling the movement of the arm's joints, while sensors play a crucial role by providing essential feedback to ensure precise and accurate operation.

3. Programming the robotic arm's movements is a crucial step in the implementation process. This entails creating a sequence of commands that define specific patterns, such as grasping objects or relocating them. Typically, programming is done using a computer, and the commands are then sent to the robotic arm's control system.

4. At the end, robotic arm is then integrated into the larger system it will operate in, connecting it to other machines or systems like a conveyor belt or control panel. Rigorous testing ensures accurate and efficient task performance by the robotic arm.

V. ACKNOWLEDGMENT

We would like to show our sincere gratitude towards Prof. Mr. Alatkhar M.N Sir, HOD, Department of Mechanical Engineering, Mr. Sangram Nikam for his valuable guidance and encouragement. We would also like to thank our Sponsor, Nisaka Engineering PVT. LTD. or their support and continuous guidance throughout the development of this project.

VI. CONCLUSION

Overall, the objectives of this project are achieved which are developing the hardware & software for wireless mobile robotic arm, implementing the pick and place system operation and testing the robot that meets the standards of purpose project. From the analysis that has been made, it's clearly shows that its movement is accurate, simple to control and user friendly. The mobile robot has been developed successfully because the movement of the robot including mobile and arm robot can be controlled wirelessly. This robot is expected to beat the problem like placing or picking object that away from the user, pick and place hazard- us object in the fastest and easiest way.

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HYBRID ELECTRIC VEHICLE

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Abstract - This system is designed to prevent green-house effect caused due to the burning of fossil fuel and reduce pollution for the environment. The designing, construction and implementation of the Solar and Electric Powered Hybrid Vehicle (SEPHV) are expressed in this paper. The power supply of the SEPHV can be charged by the solar and normal AC power source too. In this system, the series combination of 12V six lead-acid batteries is used for the driving motor power supply (40~60V DC). The 50W six solar panels are used for charging each of batteries. The charge controller is designed to be the supply batteries with the minimum amount charge possible and to protect from overcharge by the solar panels as well as over discharge by the driving motor. In this SEPHV, wireless message display system is also designed by Arduino software. The weight of the car without load is 300kg. As the results, this SEPHV is capable of accommodating at least four persons (250kg) with an average speed of 57km/hr. By using this, we can be able to reduce the all kind pollutions and fuel economy.

Key Words: Keywords: BLDC motor, Solar Panel, Charge Controller, Batteries, Speed Controller

1. INTRODUCTION

This is a proposal of the project of developing Conversion kit for a conventional auto rickshaw to convert it into e-rickshaw and further convert into solar panel based hybrid electric vehicle / e-auto. As per more stringent environmental norms for CO₂ and NO_x emission, it is better to aim at Zero Emission Vehicle (ZEV) and that is possible by switching to electrical vehicles. Hence this project is taken. For Provide Retrofitting solution to Auto Rickshaw from existing petrol engine to electrical solution. by adding solar panel heat converts to hybrid electric vehicle. To increase the efficiency of Rickshaw by giving renewable energy solution. Using solar panel for better performance of battery & long range of battery. Because most of rickshaw wait for passenger in line in open area where sunrays can charge battery which

will improve range of battery. Three-wheeler auto rickshaws are the most commonly used transportation systems for short-range transport especially as taxi service due to its small size and low maintenance. However, the majority of these vehicles are part of the unorganized sector resulting in higher emissions and low efficiencies. A solar powered electric rickshaw can provide a none polluting and a very silent transport system for urban and rural areas of India. Besides it is Avery energy efficient and cost-effective vehicle.

2. LITERATURE REVIEW:

[1] Priscilla Mulhall, Srdjan M. Lukic, Sajanka G. Wirasingha^[1]

by following we got that solar assisted electric auto rickshaw which indicates importance of use of natural resources like solar panel. This study details the overall development of an advanced solar-assisted electric auto rickshaw.

[2] Rounak Mehta, Preet Shah, Harsh Gupta;^[2]

by following conversion of CNG powered auto rickshaw to an electric rickshaw designed for Indian condition. We got that the solution developed here is a design for low total ownership cost for short-range transport.

[3] Ajit B. Bachche and N. S. Hanapure^[3]

as we all know the fuel prices especially the petrol is rising steadily day by day. Again the pollution due to vehicles in metro cities & urban areas is increasing continuously. To overcome these problems, an effort is being made to search some other alternative sources of energy for the vehicles. Again, it is also not affordable to purchase vehicles (mopeds, scooters or motorcycles) for all the class of society. Keeping this in mind, a search for some way

to cater these economically poor people as well as to provide a solution for the environmental pollution was in progress.

[4] Piyush Kapila, Gaurav Puri, Manish Gaur^[4]

this research paper relates to the functioning of an electric car with self-charging from the alternator to the battery. The alternator produces the electricity while the wheel is moving, allowing the alternator to move with the wheel friction.

3. Methodology

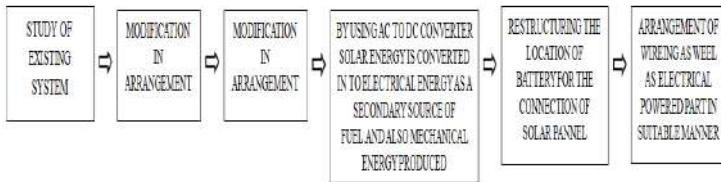


Fig.1 Flow Diagram

EV charging involves supply of direct current (DC) to the battery pack. As electricity distribution systems supply alternate current (AC) power, a converter is required to provide DC power to the battery. Conductive charging can be AC or DC. This self-powered electric vehicle aims to create a platform using multiple green energy systems to which every individual parameter of the vehicle can be self-controlled. This method challenges the purpose of an electrical vehicle, which helps to reduce environmental pollution using renewable energy. Here, we are using solar panels for as a secondary source of fuel, hence Solar panel is that is converts the light energy into electrical energy. Basically solar panels are made up of semiconductors and converts light energy into electrical by photovoltaic phenomenon. In this when the sunlight falls on the photovoltaic cells photons of light or bundles of protons fall on the atom it release or excite the electron from the atoms.

4. Results:-

	Auto Rickshaw (Bajaj RE)	Retro fitted Vehicle (Bajaj RE)	Solar Vehicle
Power Input	Fuel Operated	BLDC Motor using battery	BLDC Motor using battery & solar energy
Power train	IC Engine	BLDC Motor	BLDC Motor
Emission	Emits Hydrocarbon gases	No Tail-pipe Emission	No Tail-pipe Emission
Power	7.5 KW	1 KW	1 KW
Top Speed	70 km/h	40 km/h	40 km/h
Max Torque	19.2 Nm	38 Nm	38 Nm
Capital Cost (Rs)	2,27,000 /-	58,115 /-	83,115 /-
Running Cost	2.85 Rs Per Km	0.48 Rs Per Km (Household)	0.48 Rs Per Km (Household)
Range	35 Km in 1 Liter	80-90 Km in 1 Charge	80-90 Km in 1 Charge

Table No 2 : Result table

1. When we trying to charge battery with electricity input it will take 7 to 8 hours to fully charge.
2. When we trying to charge battery with only solar input it will take 14 to 15 hours to fully charge.
3. When battery is fully charged and vehicle is in running condition and the solar panels generating electricity with their full intensity at that time vehicle does not take input from battery and runs only on power generated from solar panels.
4. In rainy season or when solar panels does not receive sunlight with required intensity at that time solar panel create electricity with 60% of their efficiency.

5. CONCLUSIONS

The concept of solar hybrid e-rickshaw is an important step toward sustainable green transportation system. Now-days, government has a number of schemes for clean and green technologies and therefore solar hybrid e-rickshaw is a viable solution. In this work, E-rickshaw with solar photovoltaic panel is simulated both with single and simultaneous battery packs. It was observed from the simulation results that solar hybrid E-rickshaw with heterogeneous shows

that Li-ion battery pack shares higher energy when simultaneously used with Lead acid battery pack. The results signify the possibility of implementing simultaneous battery packs at a reasonable cost price.

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Metal or Non-metal Sorting Using Metal Detection

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- **Abstract— Metal or non-metal sorting is a crucial task in various industries, including recycling, mining, and manufacturing, where the efficient separation of metallic and non-metallic materials is essential. Traditional methods of sorting, such as manual labor and visual inspection, are time-consuming, error-prone, and not suitable for large-scale operations. In recent years, automated sorting systems based on metal detection technology have gained significant attention due to their accuracy, speed, and cost-effectiveness.**

This abstract highlights the application of metal detection technology for metal or non-metal sorting. The proposed system utilizes electromagnetic induction principles to detect and differentiate metallic and non-metallic objects. A metal detector, consisting of a search coil and a signal processing unit, is employed to detect the presence of metal in the scanned materials.

Introduction

With the ever-growing industry, the efficiency of work is also expected to increase. In countries where the markets have moved onto automation in their industries, the efficiency of those industries has increased remarkably. Keeping this in mind, we are developing a system that will reduce the burden of manual labor along with the errors that can be caused by it. This system would help spend less energy and effort, so that there would be a definite increase in efficiency. There are many such systems that can help in metallic property, etc. We have selected the situation of metal detection on the basis of their metallic characteristics. This system of sorting products is optimized to differentiate between products on the basis of their metallic property, which is done with the help of a metal detector. It uses sensors in order to sort them accordingly and into their respective boxes. Though it can be achieved using a microcontroller, using a PLC guarantees higher speed, performance and reliability. A continuous conveyor belt carries the products and a pair of pneumatically actuated pistons pushes them into the sorting bin..

Our main aim is to build a system that can effectively sort metals from nonmetals. Since such systems can form an integral part of industrial processes,

I. RELATED WORKS

"Automated Metal/Non-Metal Separation in Recycling" by Smith et al. (2018): This study proposes a metal/non-metal

separation system based on metal detection technology. The authors present a conveyor belt system equipped with metal detectors and an intelligent algorithm for real-time sorting. The system demonstrates high accuracy and efficiency in separating different materials.

"Machine Learning Approaches for Metal/Non-Metal Classification" by Chen et al. (2019): This research investigates the application of machine learning techniques for metal/non-metal classification using metal detection signals. The authors compare different algorithms, including support vector machines (SVM) and random forests, to determine the most effective approach. The study highlights the potential of machine learning in improving sorting accuracy.

"Advanced Signal Processing for Metal Detection in Non-Ferrous Material Sorting" by Li et al. (2020): This work focuses on signal processing techniques for metal detection in non-ferrous material sorting. The authors propose an advanced algorithm that enhances the detection and classification of metallic objects in complex environments. The results demonstrate improved accuracy and robustness in metal/non-metal separation.

"Integration of Metal Detection and Robotic Sorting for Waste Management" by Johnson et al. (2021): This study explores the integration of metal detection technology with robotic sorting systems for waste management. The authors present a combined system that utilizes metal detection sensors to identify metallic objects, followed by robotic arms for sorting. The integration improves the efficiency and precision of the sorting process.

III. DESIGN AND DEVELOPMENT

System architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of

the system. This is the system architecture model that we will be focusing on.

3.1 System Context/Level Diagram

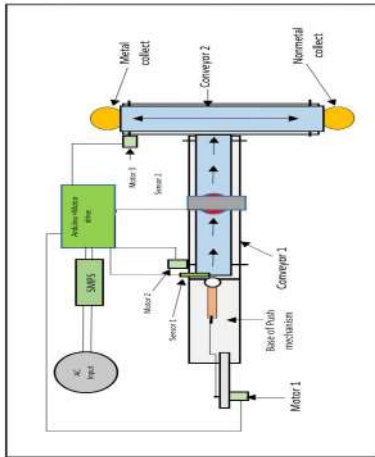


Figure 1: Block/Structural Diagram

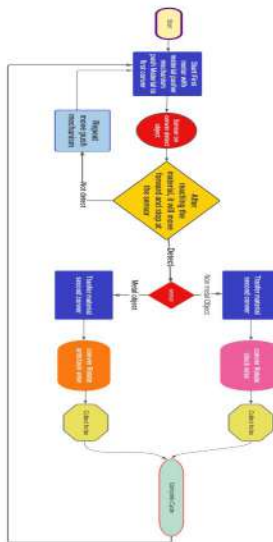


Figure 2: Flowchart

3.2 Component Design

The metals or non-metal sorting system based on metal detection technology consists of several key components designed to perform efficient and accurate sorting. The following components are typically involved in the design:

1. **Arduino Uno R3:** Arduino Uno R3 is a microcontroller board that serves as the brain of the system. It provides the necessary processing power and control to interact with other components.

2. **SMPS (Switch Mode Power Supply):** The SMPS is used to provide a stable power supply to the system, ensuring reliable operation.
3. **L293D Motor Driver:** The L293D motor driver is utilized to control the gear motor responsible for driving the conveyor belt. It allows for precise motor control and direction.
4. **IR Sensor:** IR sensors are employed for object detection on the conveyor belt. They detect the presence of objects and send signals to trigger the metal detection process.
5. **Gear Motor - 100 or 60 RPM:** The gear motor is responsible for moving the conveyor belt, ensuring a continuous flow of materials for sorting.
6. **Electronic Metal Detector DIY Kit:** The electronic metal detector DIY kit is an essential component that detects metallic objects based on electromagnetic induction principles. It generates signals upon detecting metal, which are then analyzed for classification.
7. **Flange 6mm and Dowel wheel 6mm:** These components are used for the mechanical assembly of the conveyor belt system, providing support and smooth movement.
8. **Conveyor Belt:** The conveyor belt is the medium through which objects are transported for sorting. It ensures a consistent flow of materials through the system.
9. **PVC Pipe:** PVC pipes are used to construct the framework and structure of the sorting system, providing stability and support.
10. **Aluminum Sheet:** The aluminum sheet is used to create a surface for the conveyor belt, allowing smooth movement of objects.
11. **Male to Female Jumper Wires:** These jumper wires are used for connecting various components together, ensuring proper electrical connections.

These components form the basis of the metal or non-metal sorting system using metal detection technology. They work together to detect metallic objects, analyze signals, and control the conveyor belt and sorting mechanism for efficient and accurate sorting operations.

3.3 Module Analysis and Design

- I. **Power Supply Module:** This module provides the necessary power to operate the system components. It includes a

switch mode power supply (SMPS) to ensure a stable and reliable power source for the system.

- II. **Control Module:** The control module is responsible for coordinating and controlling the overall operation of the system. It utilizes an Arduino Uno R3 microcontroller board as the central control unit. The control module receives signals from various sensors and implements the logic for sorting decisions.
- III. **Conveyor Belt Module:** This module handles the movement of objects through the sorting system. It consists of a gear motor (100 or 60 RPM) controlled by an L293D motor driver. The conveyor belt, constructed using PVC pipes and an aluminum sheet, provides a smooth surface for object transportation.
- IV. **Metal Detection Module:** The metal detection module detects metallic objects passing through the system. It employs an electronic metal detector DIY kit, which utilizes electromagnetic induction principles for metal detection. Signals from the metal detector are sent to the control module for further analysis.
- V. **Object Detection Module:** The object detection module utilizes IR sensors to detect the presence of objects on the conveyor belt. IR sensors provide signals to trigger the metal detection process when an object is detected.
- VI. **Signal Processing and Classification Module:** This module analyzes the signals received from the metal detection module and performs classification. It can incorporate advanced signal processing techniques to enhance the accuracy of metal/non-metal differentiation. Machine learning algorithms, such as support vector machines (SVM) or neural networks, can be implemented for classification.
- VII. **Sorting Mechanism Module:** The sorting mechanism module is responsible for diverting metallic objects from non-metallic objects. It can employ various methods, such as air jets, electromechanical diverters, or robotic arms, to achieve the separation. The sorting decision is based on the classification output from the signal processing and classification module.

Each module plays a crucial role in the overall functionality of the metal or non-metal sorting system. They work together to detect, analyze, classify, and sort objects based on their metallic or non-metallic nature, ensuring efficient and accurate separation.

IV. IMPLEMENTATION

The implementation of the metal or non-metal sorting system involves assembling the hardware components, including Arduino Uno R3, SMPS, L293D motor driver, IR sensors, gear motor, electronic metal detector DIY kit, and conveyor belt. The Arduino is programmed to control the system, including object detection, metal detection, signal processing, and sorting mechanism. The metal detector is calibrated for accurate detection, and testing is conducted to optimize performance. Once optimized, the system is deployed, monitored, and maintained for efficient sorting operations.



SOFTWARE IMPLEMENTATION

1. Obtain an Arduino board and USB cable.
2. Download the Arduino IDE software from the official website and unzip the file.
3. Power up your Arduino board either via USB or an external power supply.
4. Launch the Arduino IDE software.
5. Create a new project or open an existing example from the provided library.
6. Select the appropriate Arduino board from the "Tools" menu.
7. Choose the correct serial port from the "Tools" menu.
8. Upload your program to the Arduino board by clicking the "Upload" button.
9. Wait for the upload to complete, indicated by the "Done uploading" message.

V RESULTS AND ANALYSIS

The results and analysis of the metal or non-metal sorting system using metal detection would require conducting experiments and evaluating the system's performance based on specific criteria such as accuracy, speed, and efficiency. It would involve testing the system with different metallic and non-metallic objects, analyzing the classification results, and comparing them against expected outcomes. Furthermore, the analysis would include assessing the system's performance under various conditions and evaluating its effectiveness in real-world sorting applications.

For Metal Sorting

The object received from the pusher mechanism on the conveyor belt is passed over a metal detector located underneath the belt. The metal detector senses the presence of the object and identifies it as a metal. After a delay of 2 seconds, a mechanism is triggered to shift the object to another conveyor belt. The second conveyor belt rotates in a clockwise direction, moving the detected metal object towards a specific destination or sorting area.



For Non-Metal Sorting:

If the object is not detected as a metal by the frontier metal detector, it is considered to be a non-metal. In this case, the system waits for 2 seconds before moving the object forward onto another conveyor belt. Once on the second conveyor belt, it rotates in an anticlockwise direction, presumably to transport the non-metal object to a designated location or sorting area. This process ensures that only metallic objects are detected and treated differently from non-metallic objects in the sorting system.



VI. ACKNOWLEDGMENT

We would like to express our gratitude to all the individuals and organizations who have contributed to the successful completion of the metal or non-metal sorting project using metal detection technology. We extend our thanks to the research advisors and mentors for their guidance and support throughout the project. We are grateful for the resources and facilities provided by our institution, which facilitated the implementation and testing process. We also acknowledge the invaluable assistance from fellow team members who collaborated on various aspects of the project. Lastly, we appreciate the participants who provided feedback and support during the testing phase.

VII. CONCLUSION

The metal or non-metal sorting system using metal detection technology has been successfully implemented with the specified components. The Arduino Uno R3 serves as the central microcontroller, controlling the various components and processes. The SMPS provides the necessary power supply, while the L293D motor driver enables motor control for the gear motor. The IR sensor detects the presence of objects, and the electronic metal detector DIY kit accurately identifies metallic objects. The system utilizes a flange, dowel wheel, conveyor belt made of PVC pipe and Wood for object transportation. The male to female jumper wires ensure proper electrical connections.

Through the integration of these components, the system effectively sorts objects based on their metal or non-metal properties. The metal detector accurately detects metallic objects, triggering the sorting mechanism to divert them accordingly. The gear motor and conveyor belt facilitate the movement of objects, enabling efficient sorting operations.

Overall, the metal or non-metal sorting system demonstrates reliable performance and enhances automation in industrial processes. It offers a cost-effective and practical solution for sorting objects based on their material composition, improving efficiency and productivity in various applications.

VIII FUTURE SCOPE

It is very useful in wide varieties of industries, especially in the sorting process. It

ensures remarkable processing capacity as well as peerless performance including Many conveyor Works applications Of course, we need to add high speed DC Motors and

sensors with appreciable response to speed up the system for industrial application.

The model can be improved by making some changes in the program and components. Some suggestions are given below:

1. We can add a load cell for measurement and control of weight of the product.
2. We can also add a counter for counting the number of products.
3. Speed of the system can be increased accounting to the speed of production.
4. The system can be used as a quality controller by adding more sensors.
5. The sensor can be changed according to the type of product.
6. The DC motor can be replaced with a stepper motor.
7. Next generation in used in D Mart Activities

XI. REFERENCE

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Kadiyam Sasidhar¹, Shaik Faiz Hussain², Syed Ali Safdar³, Mohd Aleem Uddin⁴ Assistant Professor, Dept. of EED, Muffakham Jah College of Engineering & Technology, Hyderabad, India 1 Student, EIE, Muffakham Jah College of Engineering & Technology, Hyderabad, India 2,3,4

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[1] Amey Dunakhe, [2] Prinal Sakhe, [3] Anjali Sangale, [4] Mr Anup Dakre [1][2][3] Bachelor Degree in Electronics and Telecommunication Engineering, MMCOE Pune, India [4] Teacher and Guide, MMCOE E&TC Dept. Pune, Maharashtra, India

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[4] PLC based Sorting System using Metal Detection

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[5]

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Zero Energy Water lifting Technology In Rural India

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Abstract- The availability and cost of electricity are significant problems for the common person. Many environmental issues are brought up by convectional energy. The use of non-traditional energy sources is getting more attention from the general population. The water pump, which is also the second most used industrial equipment after electric motors, is the item that is most useful today. The kinetic energy of moving water drives the mechanical pump utilised in water lifting technology. This kind of pump has significant advantages for farmers and rural areas. The design, building, and analysis of a water-lifting device that doesn't require fuel or power are covered in this study. A number of parameters have been adjusted in the investigation in order to examine flow rate and delivery head.

Keywords- (Water Pump, Kinetic Energy, Delivery Head)

I. INTRODUCTION

A device that converts pressure energy from mechanical energy. Based on how they transfer fluid, pumps can be categorised into three basic groups direct lift, displacement, and gravity pumps. Pumps employ an energy-consuming device to move fluid, often one that rotates or reciprocates. Pumps come in a wide range of sizes, from microscopic ones used in medical applications to enormous industrial pumps, and they can be propelled by electricity, human labour, engines, or wind power, among other things. A hydraulic ram is a kinetic energy-powered device that elevates water without the aid of a prime mover by utilising the kinetic energy of flowing water. With this technique, the water contact results in shock waves, or "water hammer." With the help of this energy, water is raised.

II. LITERATURE REVIEW

(Ozturk & Demirbas, 2006).

This study has demonstrated the benefit of producing electricity utilising water lifting power as well as its

practical application .The environmentally friendly and low-cost water lifting force for electricity generating is expected to be a significant factor in electricity production and make a significant contribution to the future economy of electricity generation. A device that generates electricity using gravity and buoyancy can reduce power generation costs, stop environmental pollution, and preserve ecosystems.

(Fuller & Aye., 2012).

In India, the income of the rural population is lower than that of the urban population. Human drudgery is ubiquitous in the workplace, and physical labour is king.

(Chandio et al., 2022).

For agricultural purposes, a lot of water is needed, and moving that water from nearby water bodies to high-altitude locations demands a lot of energy in one way or another. Because electrical energy and energy derived from fossil fuels are both abundant, THIS research was done to design and construct a water wheel to address this issue.

(Mei et al., 2022).

Flue gas water extraction method currently has limited engineering applications, and extensive research based on real-world application is still absent. This paper thoroughly examines the trial operation and water-saving capability of the flue gas water extraction technology project and summarises it, which serves as a reference for related work in the industry.

(Namara et al., 2014).

We examine the adoption trends and barriers for water lifting technology in Ghana and make recommendations for initiatives that would promote greater implementation.

III. OBJECTIVES

In general, hydraulic pumps lift water using either people, fuel, or electricity. Many technologies are being researched to elevate water without the use of power. One of the biggest energy crises in the globe is related to fossil fuels. Designing some of the parameters that affect flow rate, fabrication, and experimental analysis is the project's major goal.

The following factors to be considered:-

Reservoir: The role of a reservoir or storage tank it establishes flow rate. The location of the reservoir affects the supply head. Water is raised to elevated heights by the force of gravity, and this is where supply head comes into play.

Drive pipe: An essential part of a water pump installation is the driving pipe. The waste valve closing will result in a high pressure that the driving pipe must be able to withstand. A crucial element is the right material choice for the pipes. As it affects the flow rate, some factors, including pipe length and diameter, are carefully considered and chosen.

Air chamber: When a cutoff closes quickly, the water pressure slams into the valve, making a slamming noise. This is known as water hammer. Installing air chambers or mechanical water hammer arresters are two methods for removing water hammer sounds.

Delivery head: The delivery of the head at an effective flow rate is a crucial factor. The supply head and flow rate of the drive pipe define the flow rate at delivery in this type of situation. Analysis of flow rates at various delivery heads in comparison to supply heads is required. The delivery pipe also controls the flow rate and subsequently the delivery head.

Maintenance: The operation of the pump setup is straightforward, and there are no moving elements to cause wear and tear.

Portable: This pump is relatively small & lightweight. As a result, transporting this pump from one place to another is very easy.

IV. WORKING

Operation Principle:-

Gravity causes water to fall downhill, which provides the energy needed to propel a Ram to a higher elevation. The ram employs the inertia of a moving portion rather than water pressure to work in a cycle based on the following steps, unlike a water wheel or turbine, which use water pressure.

Working Sequence:-

The waste or "impulse" valve allows water to start leaving the ram pump body after it has filled it to capacity through the drive pipe from the source. The accompanying spring, water pressure in the delivery pipe and tank, and the regular closed positions of the

check valve are all present. At this initial point, there is no pressure in the tank and no water is moving through the exit line to the holding tank site.

Sequence II:-

High velocity and pressure water is forced out of the waste valve of the pump through the drive line.

Sequence III:-

A "shock wave" created by the "water hammer" is now flowing back up the drive pipe to the settling tank after the water flow in the drive pipe has stopped. The waste valve is closed.

Sequence IV:-

When the shock wave hits the holding tank, it causes a "gasp" for water in the drive pipe. Water from the drive line enters the pump and escapes through the waste valve when the waste valve opens. The check valve remains closed until both the air volume in the pressure tank and the water flow leaving the delivery pipe have stabilised. Sequence 1 now restarts from the beginning.

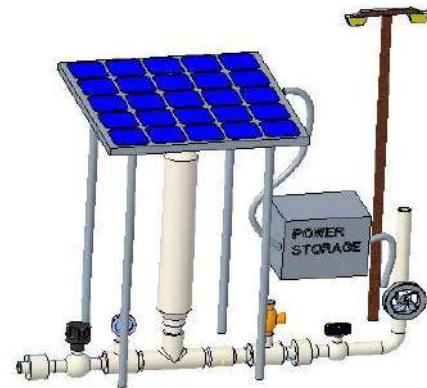


Fig 1. Concept design of model

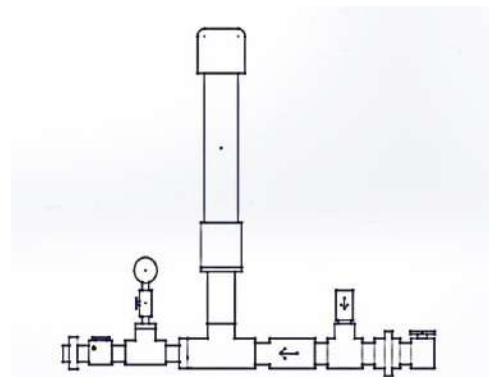
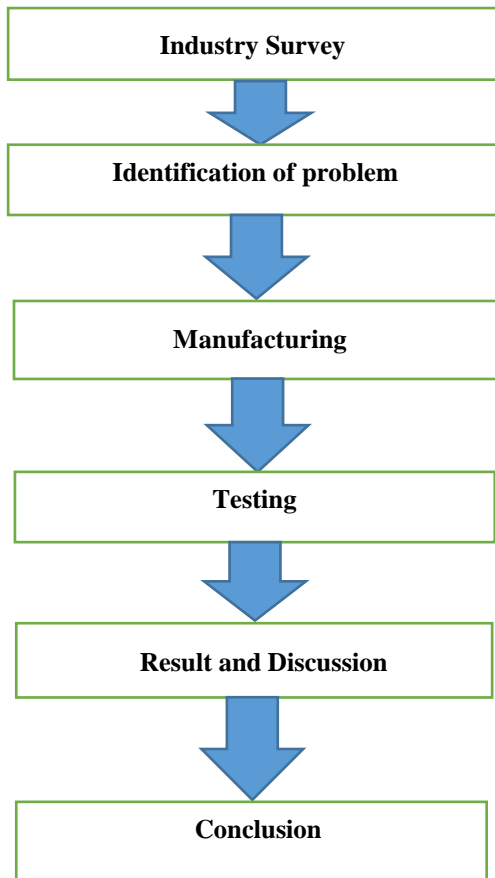


Fig 2. 2D design of model

V. METHODOLOGY



VI. Ideal Experimental Calculations:-

The effectiveness of the built ram pump model is calculated at various input heads.

1.] Input head- 0.5ft.

Output Head- 5ft. 1 inch

$$H_s = 0.1524\text{m}$$

$$H_d = 1.54\text{m}$$

$$Q_s = 2.5 \text{ L/min}$$

$$Q_d = 0.21 \text{ L/min}$$

$$n = 54$$

$$\begin{aligned} Q_w &= Q_s - Q_d \\ &= 2.5 - 0.21 \\ Q_w &= 2.29 \text{ L/min} \end{aligned}$$

$$\begin{aligned} \text{Efficiency } (\eta) &= \frac{(Q_d \times H)}{(Q_d + Q_w) \times H_s} \times 100 \\ &= \frac{.21 \times 1.3876}{(0.21 + 2.29) \times 0.152} \times 100 \\ &= 76.48 \% \end{aligned}$$

2.] Input head- 1 ft.

Output Head- 6ft. 5 inches

$$H_s = 0.3048\text{m}$$

$$H_d = 1.96\text{m}$$

$$Q_s = 1.8 \text{ L/min}$$

$$Q_d = 0.24 \text{ L/min}$$

$$n = 47$$

$$\begin{aligned} Q_w &= Q_s - Q_d \\ &= 1.8 - 0.24 \\ Q_w &= 1.56 \text{ L/min} \end{aligned}$$

$$\begin{aligned} \text{Efficiency } (\eta) &= \frac{(Q_d \times H)}{(Q_d + Q_w) \times H_s} \times 100 \\ &= \frac{0.24 \times 1.6552}{(0.24 + 1.56) \times 0.3048} \times 100 \\ &= 72.41 \% \end{aligned}$$

3.] Input head- 1.5ft

Output Head- 6ft. 10 inches

$$H_s = 0.4572$$

$$H_d = 2.08\text{m}$$

$$Q_s = 1.9 \text{ L/min}$$

$$Q_d = 0.28 \text{ L/min}$$

$$n = 49$$

$$\begin{aligned} Q_w &= Q_s - Q_d \\ &= 1.9 - 0.28 \\ Q_w &= 1.62 \text{ L/min} \end{aligned}$$

$$\begin{aligned} \text{Efficiency } (\eta) &= \frac{(Q_d \times H)}{(Q_d + Q_w) \times H_s} \times 100 \\ &= \frac{0.28 \times 1.6228}{(0.28 + 1.62) \times 0.4572} \times 100 \\ &= 52.31\% \end{aligned}$$

VII. RESULTS AND DISCUSSION

The findings demonstrated that the water pump could lift water without the use of fuel or energy. The supply head, drive pipe length, and air chamber volume all had an impact on the flow rate and delivery head. In comparison to other electric pumps and conventional pumps, it was discovered that the pump was efficient and affordable. The technique for elevating water is a long-term answer for farmers and those who live in rural areas.

The pump is inexpensive and simple to maintain due to its design and manufacturing using materials that are readily available locally. The results of the experimental investigation demonstrated the pump's effectiveness and dependability as a source of water. The performance of the pump can be improved, and the usage of renewable energy sources to power the pump can be investigated.

VIII. ADVANTAGES

- 1) No power requirements are necessary.
- 2) Less moving parts are present.
- 3) Price is less.
- 4) Over a considerable amount of time, there is constant flow.
- 5) This pump is also referred to as "green" and is pollution-free.
- 6) Its installation and assembly are both straightforward.
- 7) Minimal maintenance expenses.
- 8) Utilizing a renewable energy source guarantees reduced operating costs.
- 9) The rural villages have good potential for homegrown manufacturing.
- 10) Low maintenance requirements are provided by simplicity and dependability.
- 11) Continuous, automatic operation doesn't need oversight or human involvement.

IX. LIMITATIONS

- 1) The impulse valves only waste a small quantity of water.
- 2) It needs to be supplied continuously from a minimal height.
- 3) It is unable to lift viscous fluids higher.
- 4) They are constrained in locations with year-round water sources that are mountainous.

X. FUTURE SCOPE

Remote Monitoring and Control:

Explore the integration of remote monitoring and control systems for the hydraulic ram pump. This could involve incorporating sensors to gather data on pump performance, water levels, and system health. Implement a communication system that allows users to remotely monitor and control the pump, optimizing its operation and facilitating proactive maintenance.

Water Purification and Treatment:

Investigate the possibility of incorporating water purification and treatment mechanisms within the hydraulic ram pump system. This could involve integrating filtration, disinfection, or desalination technologies to provide clean and potable water directly from the pump. This would have significant implications for areas with limited access to clean water sources.

XI. APPLICATION

- 1) It would be able to pull water from a location above the settlement or irrigation site and feed it there using gravity in terrain where streams are falling very quickly.
- 2) Turbine pump sets may be the best option if there is a significant local supply of falling water (head and flow rate) and there is a high local water demand. To get the required output, many water pumps could be

used in combination, however at powers over 2kW, turbine pump systems are typically less expensive.

- 3) Water pumps on streams or cleaner groundwater are commonly options when providing residential water on a small basis. Surface water frequently needs to be filtered or treated for human use, increasing system costs.
- 4) The ideal water source for a hydraulic ram to use to supply water is rainwater that has been collected.

XII. CONCLUSION

An impulse pump is a machine that raises water to a desired height using the force of water falling. Installing and purchasing hydraulic rams is comparatively inexpensive. One can be constructed using precise blueprints, and if put correctly, they will provide many years of trouble-free service with no pumping expenses. These factors make the hydraulic ram an appealing option where there is a significant gravity flow. Contraction in the driving pipe can be used to enhance flow rate and delivery head. Delivery head and flow rate are influenced by the supply head, a crucial component. Parallel pumping can enhance flow rate. Only a sequence of pumps can provide higher delivery head at a given supply, but in order to provide continuous flow and supply head, a reservoir must come before the second pump.

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Design Of Modular Multi-Storied Steel Frame Building

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Abstract- Recent deadly 7.8-magnitude earthquakes in Nepal on April 24, 2015, destroyed numerous homes and claimed many lives. Poor building practises and the use of heavy building materials are to blame for these numerous losses. Earthquakes in wealthy nations like China, Japan, and others do not claim lives or devastate homes. This is due to the fact that they forgo using bulky concrete building structures in favour of pre-fabrication building methods and steel or aluminium frame structures.

The prefabricated house is built using a light steel frame, sandwich panels for the building envelope, a standard module for space series combination of components, bolt connections and a new idea in prefabricated housing for environmental protection. The prefabricated parts are delivered to the location, where they are assembled using building blocks. Work can be finished in 30 to 45 working days and is never delayed by curing time or a lack of supplies. According to additional research, it can also reduce project costs overall by 12% when compared to typically built homes made of CHBs (Concrete Hollow Blocks).

This essay contains an examination of pre-fabricated and steel constructions. Many people were asked about the types of homes they want in a broad poll, and earthquake-resistant and affordable homes were frequently mentioned as preferences. This essay also compares and contrasts conventional versus prefabricated buildings in terms of cost, quality, strength, environmental friendliness, and cost. The study intends to introduce and provide more information on modular homes to the market and to satisfy the need for a lovely, reliable, and inexpensive shelter shared by all facets of society, especially those in economically disadvantaged places.

Keywords: *pre-fabrication, aluminum frame structures, earthquake resistant structures, economical houses, environment friendly, CHB, affordable shelter*

I. INTRODUCTION

Steel buildings are now a significant part of the construction industry. Because of its adaptability, steel is frequently used to create massive structures such as buildings, malls, convention centres, hospitals, bridges, underground works, railway stations, stadiums, industrial buildings, multi-level parking complexes, etc.

The availability of cutting-edge design software, technology, and equipment for fabrication and erection has tipped the scales in favour of using steel structures more and more, creating new difficulties. One immediate example is the use of pre-engineered buildings everywhere in the world. This allows flexibility in shape and size to the appropriate degree while also saving time.

For those who need affordable housing quickly, modular construction is quite popular. This technique may also be very helpful for the rapid design and construction of emergency healthcare facilities. Building multi-story buildings using the modular concept is a current trend. In order to meet the enormous housing and commercial needs.

The term "modular construction" is used to indicate the usage of factory-produced Pre-engineered building units are transported to the construction site and combined to form huge volumetric components or important building components. The modular modules can make up entire rooms or stand alone, heavily maintained units like bathrooms or lifts. The collection of discrete modular parts typically comes together to form a self-supporting structure, while distant buildings could rely on a separate structural framework.

The preliminary, transportation, and erection stages are all a part of modular construction. We can categorically state that modular construction has the advantage of being quick. The time required to build a unit of structure can be cut in half with effective planning of the entire construction process. For instance, modular construction allows for the construction of 300 homes as opposed to the conventional construction method's limit of 200. This reduces overhead costs associated with the employees' idle time at the project while also decreasing worker wages as the task is completed piecemeal. In traditional building, the walls cannot be built until the roof is installed, and the floor cannot be finished until the walls are installed. All of this work may be finished quickly and affordably by using modular construction.

II. EASE OF USE

Benefits of Modular Construction Compared to Traditional Construction:

- Modular construction offers several advantages over traditional construction techniques. These include:
- Construction delays due to adverse weather and other onsite issues are not an issue with factory manufacture, eliminating many potential delays to project completion dates.
- Factory conditions allow for a higher quality product with improved operating procedures and monitoring, while employees are able to work in a more comfortable environment. Construction can also more easily be extended 24/7 if required to complete a project.
- Material supplies are easier to control in a factory setting, reducing wastage and thereby cost, as well as lowering the environmental impact of a build. The UK group WRAP, estimates that this can equate to up to a 90% reduction in material use as compared to traditional builds.
- Manufacture of the modules can begin before onsite preparations, such as foundation complete, speeding up the whole build process.
- Modular construction allows for different parts of the building to be built at the same time - further reducing the time taken to complete a project
- Modular construction is highly suited to remote locations where onsite building could prove difficult or expensive. Building away from these locations also means that staff can work in places where medical and sanitary provision is more readily available if required
- Modular structures can be added to over time or even be treated as a relocatable building which can also be readily refurbished to meet a new need
- Because modular units need to meet regulations for travel and assembly, the final product can end up being more durable than a traditional build that didn't have to be assessed part by part
- Many modular units use Structural Insulated Panels which are light yet durable and provide improved thermal insulation as well as damp and cold resistance when compared to materials like timber. The factory construction also removes the potential for high levels of moisture being trapped inside the construction, improving the quality of the product
- Modular constructions have been shown to offer time savings of more than 50% when compared to traditional builds, with the inherent cost savings this provides.

• Applications:

- Where modular building used to be associated with design and unit sizes mean that this type of construction continues to find new applications. From offices to homes and even larger builds like sports

halls, the uses of modular construction are constantly growing.

- No longer associated with small, low cost structures, the modern wave of modular buildings are proving that they can be used for any number of applications while offering cost and time savings along with comparable levels of quality to traditional builds.

III. ANALYSIS OF G + 4 MULTI-STORIED MODULAR STEEL FRAME BUILDING STRUCTURE

• GENERAL

The analysis of design of modular multi-storied steel frame building is done through three stages which are Transportation, Erection and In-field stage.

In transportation the steel structure is transported from factory to the site. The process is carried out further by next stage that is Erection, and the steel structure is erected. In the in-field stage the steel structure is analysed for service loads like usual structures so this stage is also known as service stage. Further all the stages will be discussed in detail.



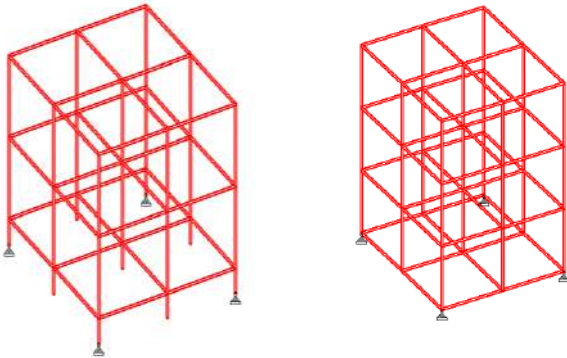
TRANSPORTATION STAGE

In transportation stage, modules are premanufactured in a factory miles away from the job site where they need to be transported either directly to the job site or staged at a place nearby and then set in place. Modules sizes are usually limited first by allowable sizes on road (may be 10m wide by 10m long) and capacity available crane (to lift as much as 25 tonnes) across the depth of a project site.

While in transportation stage, the structure is divided module by module and then the module is uplifted with the help of crane, the lifting is done.

The lifting is done according to the following span, horizontal span of 8m, vertical span of 10m and the width of 8m.

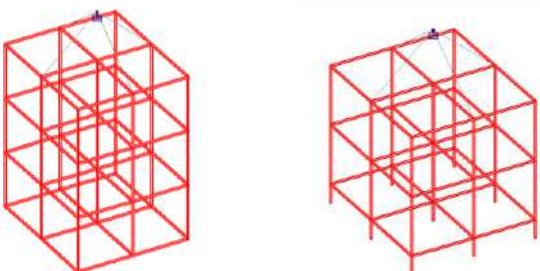
Transportation analysis is carried out using STAAD.pro software. Module is considered to be transported in horizontal position. It is assumed that all equipments and cables are tied suitably during transportation. Hinge supports are considered at four points. While travelling, self-weight and acceleration loads are considered.



ERECTION STAGE

Erection of structural steelwork consists of an assembly of steel components into a frame on site. The processes involves lifting and placing components into position then connecting them together. Generally this is achieved through bolting but sometimes site welding is used.

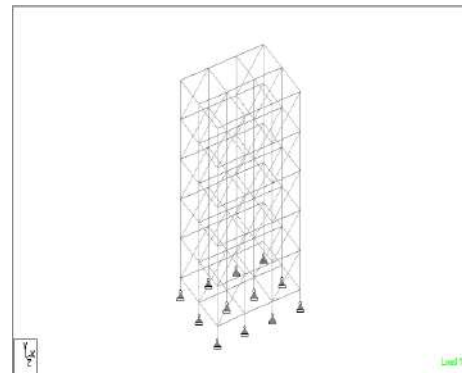
While erection, module is erected according to the following span, horizontal span of 8m, vertical span of 10m and the width of 8m.



Module is suspended from the top with the help of cables and tied with one fixed support. There is no horizontal movement while erection. Self weight and gravity loads are considered.

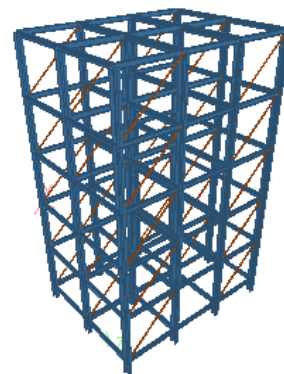
IN-FIELD STAGE

In In-field stage, analysis of steel structure is carried out after transportation and erection just like other in-situ structures for gravity and other loads. Sizes of beams and columns are assigned on the basis of preliminary design based on simple analysis. The end conditions for a steel frame structure at the base are assumed to be hinged as shown in the fig No.5.7. The sizes assigned to staad model will be finally checked next for max. values of actions or forces from all three stages.



STRUCTURAL MODELLING

The structural Modelling deals completely with the modelling aspects of the building using software STAAD.Pro. Various facilities available in STAAD are utilized along with process of modelling structural component.



IV. RESULT AND DISCUSSION

In this chapter, after carrying out the Modular Erection of steel structure of G +4 steel building by limit state method. The results obtained by these methods will be presented and compared. Also compared at first are the results obtained by hand calculations and by software. It is necessary to use software for this kind of structures. Here an attempt is made to analyse such structures by softwares to insure whether the use of software is reliable to provide desired results for this kind of structures.

Modular steel buildings are fast evolving, as an effective alternative to conventional onsite steel buildings but knowledge of their behaviour is limited at this time. There is also no record on the performance of Modular steel building under past earthquakes since it is a relatively new technique. The main assumption that governs the use of this approach may hold for this

Frame type but special vertical connections of units of the MSB frame seem to impose additional demand on columns located at lower levels of the frame. It is shown that the use of the direct summation approach, where vertical components of yielding/buckling brace forces are added directly to determine brace induced column actions for design may compensate this additional demand. The analysis also revealed that care must be taken in the ductility design of beams in braced frame configurations with non-braced bays. For such beams within non braced bays, the effect of redistributed loads due to brace buckling or yielding cannot be reliably accounted for in their designs unless the complete failure mechanism on the entire frame including the sequence of plasticization is known. This can be possible only after a complete nonlinear analysis to failure is conducted. Assigning these beams with sections obtained from the capacity design of beams in braced bays, although appear convenient, may lead to undesirable response of the entire frame since such beams could be more critical and govern the design of floor beams at any level.

V. CONCLUSION

The primary benefit of modular construction is time saving and faster return on investment. Since modular construction allows for industrialized assembly that happens concurrently with site preparation, the total time it takes to build a structure can be dramatically reduced.

The modular construction institute reported that modular construction allowed projects to be completed in a half the time of the conventional construction, with the conclusion that the modular construction eliminated weather delays because 60%–90% of the construction work was achieved inside the factory.

Modular construction technique is a technique that uses prefabricated modules/units and it is a technique that has perfect solution in remote, rural and urban areas where conventional or traditional construction may not be

possible. Modular construction technique should be adopted for construction of buildings such as churches building, temple, mosque, medical and healthcare facilities and retail shops, fast food joints, etc. also the modular construction technique generate less waste on-site because building elements are prefabricated in the factory and then transported to the site for their final installation; therefore, saving time and money. Therefore modular construction technique is much more efficient and sustainable.

The module-to-module combination of the units appears to have provided an inherently rigid system that performed much better than conventional buildings. Modular

construction is a construction method in which all of the pieces of a building, known as modules, are manufactured in a factory and then delivered to a job site to be put in place by a crane. Modular construction incorporates skilled labour, assembly line production, high efficiency, consistent quality, and speed. Modular construction is not a new building method. It has been used to manufacture prefabricated homes, temporary offices, and mobile homes. Manufacturing takes place in a large factory where each module is sent down an assembly line. Work is completed at each station along the assembly line by skilled professionals. Division of labour amongst skilled laborers ensures that all work is done quickly and with great precision. Modular construction generates a lot less waste than stick-built construction. Because modular construction is completed inside a controlled environment, there is no risk of having materials damaged by moisture penetration. This gives modularly built projects an interior air quality that is greatly superior to stick-built construction. Because of all of these things, modular construction is considered much "greener".

In the Design of modular multi- stored steel frame building we have used STAAD PRO V8i software to design the steel frame then we have done the calculation by using limit state method and then further checks are done. This modular construction is done by three stages and design is also done stage wise firstly preliminary design is done.

Then the transportation is done of the entire structure by using crane. Then comes the service stage the final stage, and the erection is done of the structure.

The conclusion may be generalized and then reported

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AUTOMATED HIGHWAY SYSTEMS

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Abstract - Automated highway system (AHS), which promises an increase in traffic capacity. The core of this protocol to achieve a fully automated highway system is four-layer hierarchical control architecture. Automated Highway System, abbreviated as AHS is newly developed idea which uses different sensors and microprocessors for automatic design process. The management and control of traffic system using roadside controllers and intelligent vehicles is innovative technique for the design of highway system. The Automated Highway System is the design concept introduced to enhance safety, efficiency and many other vehicular as well as user characteristics of highways. This concept has introduced for the improved architectural layout of highway design and also helped in reducing the environmental effects of the vehicles running on the highways

Key Words: AHS Functional Evolution, Incremental Deployment, Reducing Accident Rate, Smart Highway.

1. INTRODUCTION

The Automated Highway System (AHS) concept defines a new relationship between vehicles and the highway infrastructure. AHS refers to a set of designated lanes on a limited access roadway where specially equipped vehicles are operated under completely automatic control. AHS uses vehicle and highway control technologies that shift driving functions from the driver/operator to the vehicle.

Throttle, steering, and braking are automatically controlled to provide safer and more convenient travel. AHS also uses communication, sensor and obstacle-detection technologies to recognize and react to external infrastructure conditions. The vehicles and highway cooperate to coordinate vehicle movement, avoid obstacles and improve traffic flow, improving safety and reducing congestion. In sum, the AHS concept combines on-board vehicle intelligence with a range of intelligent technologies installed onto existing highway infrastructure and communication technologies that

2. LITERATURE REVIEW

[1] Shivam B. Gawande, Prof. Y. S. Khandekar, Prof. Ashish R. Bijwe

In this paper author discuss about the problems associated with the annual growth of automobile transport start spreading from large metropolitan cities to small towns. For many years, scientists and engineers have envisioned building an automated highway system (AHS) to increase both the safety and efficiency of the nation's highways. In such a system, the vehicles become driving robots, capable of sensing and reacting to the surrounding environment while the driver is free to do other tasks. Automating the vehicle has significant potential it can reduce accidents caused by driver error and can potentially increase

trafficking capacity and fuel economy by eliminating human driver inefficiencies.

[2] T. Ajay Kumar Dayma , Arihant Verma , h way System Mr. Arun Bihani

In this paper author proposed Automated highway system (AHS) is an intelligent transportation system, which removes human drivers from the operation of vehicles during driving. AHS includes control problems from the vehicle level to the highway network and its challenging opportunities for intelligent mechatronics. This technology requires extreme accuracy in vehicle location within the least times. AHS refers to a set of designed lanes on a limited access roadway where specially equipped vehicles are operated under completely automatic control. It can help reduce fuel consumption and individual vehicle discharge. The AHS designed requires advanced sensors, actuators, and communication technologies. It managed transportation systems for traffic problems in big cities, congestions, accidents, delays.

[3] Shivam B. Gawande, Prof. Y. S. Khandekar, Prof. Ashish R. Bijwe

Automated highway system (AHS), which promises an increase in traffic capacity. The core of this protocol to achieve a fully automated highway system is four-layer hierarchical control architecture. Automated Highway System, abbreviated as AHS is newly developed idea which uses different sensors and microprocessors for automatic design process. The management and control of traffic system using roadside controllers and intelligent vehicles is innovative technique for the design of highway system. The Automated Highway System is the design concept introduced to enhance safety, efficiency and many other vehicular as well as user characteristics of highways. This concept has introduced for the improved

architectural layout of highway design and also helped in reducing the environmental effects of the vehicles running on the highways.

[4] Namratha M M, Navya M N, Niharika R, Namitha N V

Road safety is a concern of everyone in the current scenario of increased vehicular traffic. Internet is part of our daily life and available in most of the places because of revolution of electronic communication. It has become an integral part of our lives. We are living in a world of automation. Almost everything around, us is automated. Automation plays an important role in the field of transportation. As of now, vehicles are just monitored but not automatically controlled pertaining to the road safety rules. In this work a system is designed for automatic control of vehicles in restricted areas, where the safety signage boards are installed. The four applications namely speed control, hump detection, no parking and no horn zone are implemented using IoT.

3. Methodology.



Fig 1. A concept drawing of an Automated Highway System with dedicated lanes in the center of the

highway.

As shown in figure, a driver electing to use such an automated highway might first pass through a validation lane, similar to today's high-occupancy-vehicle (HOV) or carpooling lanes. The system would then determine if the car will function correctly in an automated mode, establish its destination, and deduct any tolls from the driver's credit account. Improperly operating vehicles would be diverted to manual lanes. The driver would then steer into a merging area, and the car would be guided through a gate onto an automated lane. An automatic control system would coordinate the movement of newly entering and existing traffic. Once travelling in automated mode, the driver could relax until the turnoff. The reverse process would take the vehicle off the highway. At this point, the system would need to check whether the driver could retake control, then take appropriate action if the driver were asleep, sick, or even dead. The alternative to this kind of dedicated lane system is a mixed traffic system, in which automated and non-automated vehicles would share the roadway. This approach requires more-extensive modifications to the highway infrastructure, but would provide the biggest payoff in terms of capacity increase. In fact, a spectrum of approaches can be envisioned for highway automation systems in which the degree of each vehicle's autonomy varies. On one end of the

range would be fully independent or "free-agent" vehicles with their own proximity sensors that would enable vehicles to stop safely even if the vehicle ahead were to apply the brakes suddenly. In the middle would be vehicles that could adapt to various levels of cooperation with other vehicles (platooning). At the other end would be systems that rely to a lesser or greater degree on the highway infrastructure for automated support. In general, however, most of the technology would be installed in the car.

4. Control design of an automated highway System

The Control design of an Automated Highway system can be looked upon the basis of a 5 layer theory which together comprise the two systems viz. the On-board Vehicle System and the Roadside System. The control design is explained with the aid of the figure :

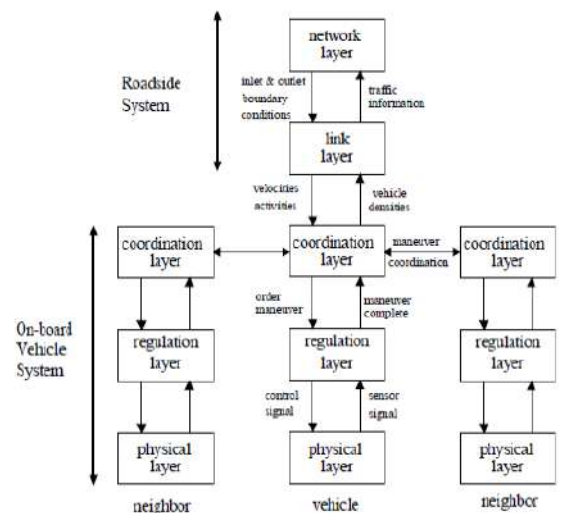


Fig 2. The Control Design of an Automated Highway System

The Five Layer Theory

The physical layer comprises all the on-board vehicle controllers of the physical components of a vehicle.

These include the engine and transmission, brake and steering control systems, as well as the different lateral and longitudinal vehicle guidance and range sensors. The main function of the physical layer is to decouple the longitudinal and lateral vehicle guidance control and to approximately linearize the physical layer dynamics. The regulation layer is responsible for the longitudinal and lateral guidance of the vehicle, and the execution of the manoeuvres ordered by the coordination layer. The regulation layer must carry out two longitudinal control tasks. The first task is that of a vehicle follower in a platoon and consists in maintaining a prescribed constant spacing from the preceding vehicle. The second task is that of a platoon leader or free agent and consists in safely and efficiently executing a manoeuvre commanded by the coordination layer. The coordination layer is responsible for selecting the activity that the vehicle should attempt or continue to execute, in order to realize its currently assigned activity plan. It communicates and coordinates its actions with its peers—the coordination layers of neighbouring vehicles—and supervises and commands the regulation layer to execute or abort manoeuvres. It also communicates with the link layer roadside control system, from which it periodically receives an updated activity plan. There is one link layer controller for each 0.5 to 5 km-long segment of the highway, called a link. Its task is to control the traffic flow within the link so as to attain its full capacity and minimize vehicle travel time and undesirable transient phenomena, such as congestion. A link is itself subdivided in sections, one per lane. A link receives

and discharges traffic flow from and to neighbouring links, as well as AHS entrances and exits. The controller measures aggregated vehicle densities in each of the link's sections. These densities are specific to vehicle type, including origin and destination, and whether the vehicle is a platoon leader, follower or is changing lanes. It broadcasts commands in the form of a specific activity plan for each vehicle type and section, to the vehicle coordination layer controllers. The link layer controller receives commands from the network layer in the form of demands on the inlet traffic flows at the AHS entrances, and outlet flow constraints at the AHS exits, as well as desired inlet-to-outlet traffic flow split ratios, in case a vehicle can take more than one route to each the same destination, while travelling in that highway link. The task of the network layer is to control entering traffic and route traffic flow within the network of highway links that constitute the AHS, in order to optimize the capacity and average vehicle travel time of the AHS and minimize transient congestion in any of its highway links.

5. CONCLUSION

Automated Highway Systems brings major transportation benefits in terms of safety, efficiency, affordability and usability, and environment in order to achieve its development goals. A key feature of the control design architecture is the separation of the various control functions into distinct layers with well-defined interfaces. Each layer is then designed with its own model that is suited to the functions for which it is responsible. The models at the various layers are different not only in terms of their formal structure (ranging from differential equations to state machines to static graphs), but also in the entities that have a role in

them. The AHS is a complex large-scale control system, whose design required advances in sensor, actuator, and communication technologies (not discussed here) and in techniques of control system synthesis and analysis. It is a measure of the advanced state of the art that these techniques have reached a stage that they could be successfully used in the AHS project. Though it has been said so, the reasons why many federal programs like the National Automated Highway System Research Program (NAHSRP) failed was that the program was trapped in technology-optimism. Several U.S. DOT reports on AHS show that there are no technical and non-technical showstoppers. However, legal, institutional, and societal challenges just as critical as technical issues. Moreover, these institutional and societal issues cannot be settled in one day, because they are much to do with people's perception, behavior, consensus and social changes based on those.

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Utilization of plastic waste for making plastic bricks

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Abstract— *The plastic waste is the hazardous problem in today's world. This is most dangerous problem in front of humanity. These plastic mixed in the soil, it directly effects on fertility of the soil. Nowadays, the large amount of plastic is deposited into sea. This plastic wastes gives hazardous effect on the aquatic life . So, we try to finding efficient way to solve this problem of plastic waste. So, we added this plastic wastes into the bricks and create the bricks by using plastic wastes. It is most economical solution present in the construction industry and it is also economical and environment friendly solution of the plastic wastes.*

INTRODUCTION — 1) General - Plastic is a very common material that is now widely used by everybody in the world. Plastic plays a predominant role in reusable in this era, as it is compact and light in weight. Common plastic items that are used are covers, bottles, and food packages. The great problem with plastic is its decomposition. Plastic is made of polymer chemicals and they are non-biodegradable. This means that plastic will not decompose when it is placed in earth. Though plastic is a very useful material that is flexible, robust and rigid they become waste after their use and they pollute the air and land. Recycling is processing use waste materials into new products to prevent waste of potentially useful materials. Thus disposal of waste plastic is a serious problem globally, since they are non biodegradable and also researchers have found that the plastic materials can remain on earth for 4500 years without degradation. Plastic have many good characteristics which include versatility, lightness, hardness, and resistant to chemicals, water and impact There is considerable imbalance in the conventional building materials; there is a great demand in recent past years. In quarries while cutting out the lateritic stone with help of cutting machines which produces 15- 20% of soil wastes which poses a problem of disposal & utilizing the quarry waste. The quantity of plastic waste in municipal solid waste collection is expanding rapidly ,the rate of expansion is double for every 10 years .
.. 2) Present scenario of waste generation in India - Growth of population has increased our urbanization as a result rising standard of living due to technological

innovations have contributed to an increase both in the quantity and variety of solid wastes generated by industrial, agricultural activities, mining and domestic. Globally the estimated quantity of wastes generation was billion tones in the year 2002 of which 11 billion tones were industrial wastes and 1.6 billion tones were municipal solid wastes (MSW). About 19 billion tons of solid wastes are expected to be generated annually by the year 2020. Annually, Asia alone generates 4.4 billion tons of solid wastes and MSW comprise 795 million tons of which about 48 (6%) MT are generated in India. MSW generation in India, is expected to reach 300 Million tones and land requirement for disposal of this waste would be 169.6 km² as against which only 20.2 km² were occupied in 1997 for management of 48 Million tones. As it is studied that apart from municipal wastes, the organic wastes from agricultural sources alone contribute more than 350 million tons per year.

LITERATURE REVIEW

- 2.1 Critical review on types of bricks type 14: Plastic sand bricks: 1) Manish Kumar Sahu, 2) Lokesh Singh: volume- 5, issue-11, nov.-2017)
- 2.2 Manufacturing and Testing of Plastic Sand Bricks 1) Mr. N. Thirugnanasambantham, 2) P. Tharunkumar, 3) R. Sujithra, 4) R. Selvaraman, 5) P. Bharathi
- 2.3 Utilization of Waste Plastic in Manufacturing of Plastic Sand Bricks Mohammad sultan 1) Rahul jaiswal, 2) Roshan Jaiswal, 3) Falgunee Ram Sahu, 4) Devannand, 5) Megha Sahu
- 2.4 Utilization Of Waste Plastic In Manufacturing Of Bricks 1) K.B. Manjunath, 2) Dasharatha T H, 3) Mahendra H N, 3) Sneha K R, 4) Bhavani G T, 5) Keerthi H
- 2.5 Fabrication and Testing of Plastic Sand Bricks S S Chauhan, Bhushan Kumar, Prem Shankar Singh, Abuzaid Khan, Hritik Goyal, Shivank Goyal Department of Mechanical Engineering, G.L. Bajaj Institute of Technology & Management, Greater Noida, India

Objective

- 1) To develop an efficient way to utilize the waste plastic.
- 2) To produce cost-effective material.
- 3) To reduce the disposal problem of plastic waste.
- 4) To prevent the consumption of natural resources.

Methodology 1 The Methodology Adopted :-

- Collection of Materials.
- Preparation of brick mould.
- Batching.
- Melting.
- Mixing.
- Moulding.
- Curing.

Collection of materials :-

The process is incredibly simple. Put the dustbin in the canteen for collection of waste bottles. Select the plastic bottles of cold drinks and water from canteens. Bring river sand for plastic brick. IS2386 (Part- I) The more you collect the more plastic you will divert from the landfill or clean up out of the environment.



Plastic



Sand

Preparation of brick mould :- The moulds used are wooden moulds and are made in the carpentry shop. All the sides and surfaces of the mould should be even for the brick to have a better surface finish. Both fixed and movable moulds can be used for the purpose. Wooden mould will be cost-effective and serve the purpose whereas if a better surface finish is needed then cast iron moulds can be used.



Mould

size would be (230*100*75) mm.

Batching :-

Measurement of materials for making brick is called batching. After collection of materials we separate the types of plastic and remove any other waste presented in the collected material and check that any water content in the sample collected then proceed for burning.



Mechanical



Manual

Sand Sieving Process



Burning of waste plastic : - After completion batching the plastic waste were taken for burning in which the plastic bags are drop one by one into the container and allowed to melt. These would be done in closed vessel because to prevent the toxic gases released into atmosphere. These will be at the temperature of 90-110 degrees centigrade.



Mixing :-

Mixing of materials is essential for the production of uniform and strength for brick. The mixing has to be ensure that the mass becomes homogeneous, uniform in colour and consistency. Generally, there are two types of mixing, Hand mixing and mechanical mixing. In this project, we adopted hand mixing. until the entire plastic content required for making plastic brick of one mix proportion is added into it. then these plastic liquids thoroughly mixed by using trowel before it hardens. The mixture has very short setting bags are turned to molten state; the river sand is added to it. The sand added is mixed time. Hence mixing process should not consume more time.



Moulding :-

After completion of proper mixing we place mix into required mould. In these projects we use the normal brick sizes (19x9x9 cm). after 2 days remove the brick from the mould and then done curing



. Curing :-

The test specimens after moulding were allowed to dry for a period of 24 hours. The specimens were kept in curing tank and allowed to cure for a period of 24 hours.

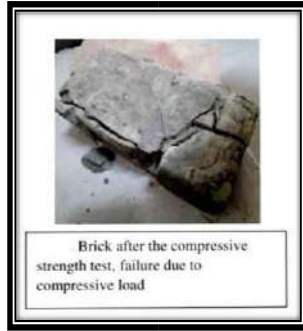


1 Tests carried on plastic bricks :-

1. Compressive strength
2. Water absorption
3. Soundness
4. Colour
5. Efflorescence
6. Hardness

Compressive strength :-

In this test, the cubical brick specimen is placed in the compression strength testing machine. After placing it we will apply the load on the brick without any shock. The load will be increased at a rate of 140kg/cm² min continuously till the specimen's resistance to increasing load breaks down and it cannot withstand any greater load further. Recording the maximum load applied to the brick specimen and the appearance and type of failure is also noted along with any unusual features.



Result of compressive strength

Plastic Sand ratio	Compressive Strength (N/mm ²)	
	Plastic Sand brick	Normal burnt clay brick
1 : 3	7.7	7.9
1 : 4	10.6	7.9
1 : 5	9.8	7.9

In this test at first the bricks are weighed in total dry conditions. Then they will be allowed to be dipped in fresh water for about 24 hours in a container. The bricks are taken out of the water after 24 hours and are wiped with a cloth. The wet brick is weighed using a weighing machine. For the calculation of water absorption, the difference between wet brick and dry brick is done. The difference is the amount of water absorbed by the brick. After that the percentage of water absorption is calculated using the data.



3

Soundness :-

The soundness test is also done in the field. After the manufacturing of the brick are allowed to dry in air for 2 days. Then the bricks are made to hit each other the ring sound produced during the process, which denotes the quality of the brick that it is good. Good quality bricks produce the clear ringing sound. In our project both fly ash bricks and plastic sand bricks clear ringing sound produced.

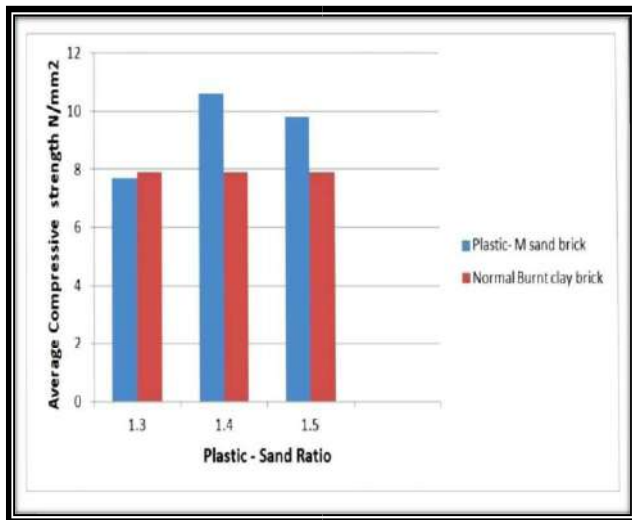
Result of soundness test :-

Ringing sound produced and bricks are not break.

Colour Test :-

Result of colour test :-

Mud colour as present on plastic pieces and present even after 24 hours in water.



Water absorption :-



6 Hardness : -

In this test a scratch is made on brick surface with steel rod (any hard material can be used) which was difficult to imply the bricks or blocks were hard. This shows the brick possess high quality.

Result of hardness test : - little bit scratch visible



Conclusion : -

- 1) Waste plastic, which is available everywhere, may be put to an effective use in brick/tiles making.
 - 2) Plastic sand brick possesses more advantages which includes cost efficiency, resource efficiency, etc.
 - 3) Plastic sand bricks/tiles can help reduce the environmental pollution, thereby making the environment clean and healthy.
 - 4) Plastic sand bricks/tiles reduce the usage of clay in making of bricks/tiles.
 - 5) Plastic sand bricks/tiles give an alternative option of bricks/tiles to the customers on affordable rates.
 - 6) Water absorption of plastic sand brick is 2 %.
- Compressive strength of plastic sand brick is more when 1 : 4 ratio of plastic to sand is taken i.e 20 % plastic and 80 % sand.
- 7) We conclude that the plastic sand bricks are useful for the construction industry when we compare with Fly Ash bricks and 3rd class clay bricks.
 - 8) This method is suitable for the countries which has the difficult to dispose /recycle the plastic waste.
 - 9) Owing to numerous advantages further research would improve quality and durability of plastic sand bricks.

Future scope : -

The plastic bricks used for further in construction projects due to its light weight and economic purpose. It give us hope and a way to work on innovative things related to the plastic and to try to invent some new civil engineering materials which shows some remarkable response

in future industry and Changes the thoughts of the researchers, users and industries. Such as, in going for plastic sand wall in framed structures as a partition wall, plastic sand benches in the parks, plastic sand tracks for running and jogging in place of concrete or stone tracks.

Plastic sand bricks give us hope and a way to work on innovative things related to the plastic and to try to invent some new civil engineering materials which shows some remarkable response in future industry and changes the thoughts of the researchers, users and industries. Such as, in going for

Plastic sand wall in framed structures as a partition wall.

Plastic sand benches in the parks.

Plastic sand tracks for running and jogging in place of concrete or stone tracks.

Research on Composition of plastic with fly ash, Quarry dust etc.

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STUDY OF E- WASTE DISPOSAL

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Abstract— Waste electrical and electronic equipment (WEEE) is becoming major thread to the whole world. Its toxic emissions mixed with virgin soil and air and causing harmful effects to the entire biota either directly or indirectly. Direct impacts include release of acids, toxic compounds including heavy metals, carcinogenic chemicals and indirect effects such as bio magnification of heavy metals. Many private firms are involved in collecting, dismantling, separation and exporting e-wastes for recyclers. However, strict regulations are currently being followed as on approval of such firms such as e-steward certification by Basel action network in US, they also involved in public awareness programs; this review is based on collected information from various journal articles, websites etc

It consists of a wide range of elements and compounds including both valuable and hazardous materials. E-waste can contaminate the environment and threaten human health through its improper recycling and disposal methods. Moreover, E-waste represents a significant potential source of valuable materials to make the recycling of this waste economically fascinating. This chapter presents an overview of E-waste treatment technologies including sanitary landfill and recycling of precious metals, non metal elements, plastics, and glasses. The recycling of E-waste has become a significant issue because of the strange growth in the production of E-waste and increased awareness among people regarding environmental protection. Consequently, the primitive treatment technologies cannot reach the future obligations of industry because of the potential risk of environmental contamination, high cost, and low efficiency. An effective utilization of the reusable resources is therefore a prerequisite for developing new technologies to treat E-waste.

INTRODUCTION

E-waste is an abbreviation for electronic waste. The term is applied to discarded electrical or electronic equipment that is unfit for further use because of malfunctioning, lack of repair or spare parts, or is too outdated to be sold commercially efficiently. E-waste has a major impression on the environment. Every year millions of tons of e-waste enter landfills, and some of them end up in the waterways, seas , and oceans. The e-waste emits toxic substances such as mercury, lead, cadmium, polychlorinated biphenyls, benzene, and dioxins, polluting soil and water, threatening water and air quality, and harming the health of humans and the environment. What is e-waste: E-waste consists of devices and appliances that are no longer needed or are malfunctioning. It includes the materials that are no longer used or are obsolete.

PROBLEM STATEMENT

E Waste can be nand onsudefined as business cmer electronic equipmet that is not working, unwantedr has reached the end of its useful life. E Waste is a persistent and significant issue that is prevalent in today's technologically inclined society .E-waste is broadly divided into three types:

- 1 .Cooling equipment such as fridges and freezers
- 2.Telecommunications and communication equipment
- 3.Consumer electronics devices (Phones, Laptops , Monitors, and TV's)

Each of these categories require a personalized method of disposal due to the differences in thematerials that they constitute. In this proposal, we will highlight the types of

e waste that will be found in an educational community and what we can do to minimise it

An educational community is a significant source of E-waste as we have a prevalent need of multiple electronic devices that are up to date and functioning properly. E-waste is not generated only by the personal devices of each of the students but also includes the large number of printers, fax machines, optical fibres (for wireless communication) and various other devices that are available for use for the general public. A typical college student, in their 4 years of undergraduate studies, have at least 2 electronic devices - smartphone and laptop. Along with that public printers and charging wires are used. With a laptop or smartphone, once their lifespan ends, they are typically either sold for spare parts or stay on a shelf in the house collecting dust. But old charging cables tend to find their way to the bottom of a dustbin where they prove to be environmentally hazardous. Looking at this example and magnifying it to other electronic devices we use in our daily lives, we can see how E-waste is a huge problem - and spread awareness on the detrimental effects of E-waste, within people over a range of velocities. Landslides may be triggered by earthquakes, rain, permafrost thaw, deforestation, and by other factors. Damaging wildfires, floods, volcanic eruptions, and earthquakes are often made worse by subsequent landslides. Submarine landslides, or surface landslides, that move into water may trigger tsunamis. Although landslides can result in significant human and economic losses, they also play a role in maintaining ecological diversity. A number of landslide mitigation techniques are explored.

OBJECTIVES OF PROJECT

The objective of e-waste management is to safely and responsibly dispose of or recycle electronic devices and components that are no longer in use. This helps to prevent pollution and conserve natural resources by reducing the need for mining new materials for new products. Additionally, many electronic devices contain valuable materials like gold, silver, and copper which can be recovered and reused through proper e-waste management.

METHODOLOGY

1) Recycling

Recycling is an essential element of e-waste management. Properly carried out, it should greatly reduce the leakage of toxic materials into the environment and

mitigate against the exhaustion of natural resources. However, it does need to be encouraged by local authorities and through community education. One of the major challenges is recycling the printed circuit boards from the electronic wastes. The circuit boards contain such precious metals as gold, silver, platinum, etc. and such base metals as copper, iron, aluminium, etc. One way E-waste is processed is by melting circuit boards, burning cable sheathing to recover copper wire and open-pit acid leaching for separating metals of value. India has emerged as fifth largest electronic waste producer in the world. Computer devices account for nearly 70% of E-waste, with the contribution of telecom sector being 12%, medical equipment being 8%, and electric equipment's being 7% of the annual e-waste production.

2) Repair

One of the factors which compound the e-waste problem is the diminishing lifetime of many electrical and electronic goods. There are two drivers (in particular) for this trend. On the one hand, consumer demand for low cost products mitigates against product quality and results in short product lifetimes. On the other, manufacturers in some sectors encourage a regular upgrade cycle, and may even enforce it through restricted availability of spare parts, service manuals and software updates, or through planned obsolescence. Consumer dissatisfaction with this state of affairs has led to a growing repair movement. Often, this is at a community level such as through repair cafés or the "restart parties" promoted by the Restart Project. The "Right to Repair" is spearheaded in the US by farmers dissatisfied with non-availability of service information, specialised tools and spare parts for their high-tech farm machinery. But the movement extends far beyond farm machinery with, for example, the restricted repair options offered by Apple coming in for criticism. Manufacturers often counter with safety concerns resulting from unauthorised repairs and modifications.

3 Landfilling

This refers to the practice of essentially digging a massive hole in the ground, filling it with waste and then covering it back up with soil. While the pits are lined with clay or plastic with a leachate basin to prevent toxic waste from leeching into the surrounding environment, some substances such as cadmium, lead, and mercury inevitably find their

way into the soil and groundwater, causing contamination.

4 Acid Bath

Soaking electronic circuits in powerful sulphuric, hydrochloric, or nitric acid solutions separates metals from the electronic pathways. The metals can then be recycled and used in the manufacture of new products. However, the highly hazardous acid waste needs to be very carefully disposed of to prevent it from finding its way in...

5 Burning

Commonly referred to as smelting. Although the process is quite dangerous, if done correctly, it can be done very cleanly and produces the most valuable of the metals in the most efficient way

6 Dumping:

This involves filling old containers, making a hole in the ground, and dumping the material there. Usually, the location is not chosen carefully and may contain several contaminants. ➤ Disposal: Several companies in the UK offer a collection service and disposal, or do it for you, either in a safe manner or with others who are less careful

CONCLUSION

The disposal of electronic waste is hazardous to people and the environment. In addition, it is a significant source of pollution. However, if you recycle electronic waste properly, there will be many benefits. The disposal of electronic waste can also pose a health risk to humans. Although most electronic wastes can be recycled, only a limited amount of electronic waste can be recycled. Thus, it is necessary to ensure that electronic wastes are recycled appropriately and safely. For instance, certified electronic waste facilities can safely dispose of electronic waste. In addition, the certified electronic waste facilities are equipped with the equipment required to recycle the electronic waste. As a result, the certified electronic waste facilities will reduce pollution in the environment and keep humans safe. Therefore, you can rest knowing that you safely dispose of electronic waste.

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- 3) Carrying out laboratory tests to find out geotechnical parameters of the rock samples.
- 4) Design mountain slopes identified for the study and delineating the critical sections.
- 5) Study of various remedial techniques and suggesting best suitable measures for the prevention in the study area.

Abbreviations

Landslides affect many regions around the globe. There are many types of landslides – occurring in a variety of materials and traveling over a range of velocities. Landslides may be triggered by earthquakes, rain, permafrost thaw, deforestation, and by other factors. Damaging wildfires, floods, volcanic eruptions, and earthquakes are often made worse by subsequent landslides. Submarine landslides, or surface landslides, that move into water may trigger tsunamis. Although landslides can result in significant human and economic losses, they also play a role in maintaining ecological diversity. A number of landslide mitigation techniques are explored.

REMEDIAL MEASURES

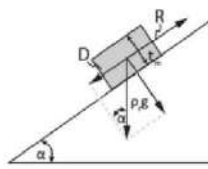
- **Remedial measures not implemented due to low feasibility**
- **Restraining Structures**

Restraining structures such as masonry walls, concrete retaining walls, gabion/sausage walls are generally used to control slope stability problems where the height is less than 4 meters. In case of the Mumbai Pune Expressway, the rock slopes have a height of even more than 30 meters. Also the road width at the highway is restricted by steep valleys and hence, the restraining structures cannot be constructed at the cost of the road width. Construction of rigid structures requires a great deal of manual and skilled labour, expensive planking and formwork leading to stopping of vehicular traffic. They are very costly as concerned with cost/m of the project. (Ref: IS 14680:1999 Landslide Control- Guidelines Pg.8)

- **Construction of piles.**

The Piles for remediation are metal beams that are driven into the soil or placed in drill holes. They are driven into the competent bedrock layer below the landslide occurs. But the necessary condition for driving the piles is that the material in which it is driven should be elastic in nature. Then the piles hold the entire material as a block. The pile construction in the strong basaltic rocks is itself so difficult and it will induce fractures and cracks in the basaltic layers leading to a weak material. Hence the construction of piles in basaltic rocks is not feasible. (Ref: IS 14680:1999 Landslide Control- Guidelines Pg.8)

Factor of safety



$$FS = \frac{R}{D} = \frac{C}{t_m (\rho_r g) \sin(\alpha)} + \frac{\tan(\phi)}{\tan(\alpha)} - \frac{m(\rho_w g) \tan(\phi)}{(\rho_r g) \tan(\alpha)}$$

D are driving forces
 R are resisting forces
 ϕ is the internal angle of friction
 α is local hillslope gradient
 C is cohesion
 t_m mean landslide thickness
 ρ_r density (rock)
 ρ_w density (water)
 m The ratio of saturated thickness to total landslide thickness

Geological Investigation

The ground conditions in the study area are dominated by basalt, which is an extrusive rock created by the outpouring of volcanic magma. The magma cools quickly, allowing only small crystals to form. Basaltic lava flows for great distances before solidifying. Successive eruptions of basalt have formed the Deccan plateau region of southwest India, including the current study area. The area is conspicuously uniform, consisting of series of Deccan Trap flow (Upper Cretaceous to Lower Eocene age), which are occasionally intruded by a number of basic intrusive. The basalts are mainly capped by lateritic .

NECESSITY OF STUDY

Prediction of rockfall hazard is very complex because a number of factors contribute to mass movements. The understanding of this phenomenon requires a large number of input parameters and analysis techniques which are also costly and time consuming. In the present study a scientific approach has been taken to evaluate the triggering factors which cause rockfall and save the human population in the affected areas. For a long time, rockfalls have had disastrous consequences causing enormous economic losses and affecting the social fabric, due to the complexity in prediction of the hazard as a result of a number of contributing factors

(Types of technique to avoid landslides)

SR NO.	HAZARDS TYPE	TECHNIQUE
1	ROCK SLOPE PROTECTION	1.GROUTING 2. PROVISION OF ROCK COLLECTING TRANCES
2	PASSIVE PROTECTION SYSTEM	1.TRANCHES AND ROCK FENCES 2.ROCK FALL PROTECTION
3	EMBANKMENT	1.SURFICIAL REVETMENTS 2.TIE BACK ANCHORS
4	BENCHING OF SLOPES	1.PROVISIONOF ROCK FALL FENCES 2.PROTECTION SHADES
5	WALL	1.LIVE CRIB WALL 2.VEGETATED ROCK GABIONS

(Affected area of tunnel)



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“Analytical Investigation on Mitigation of Short Column Effect in Partial Infilled Frames”

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ABSTRACT

The usage of the unreinforced masonry infills between the column frames has been in practice from a long time even if the area is seismically active. Masonry infills are provided within a structure without realizing that during the seismic action they act as single unit i.e., a combination of brick elements and the concrete. The masonry infills provides enough stiffness and strength to the structure. Hence, helps in reducing the drift. The infills up to certain height are sometimes unwittingly removed for different purpose such as window, better ventilation purpose etc. due to which, the resistance against the lateral loads is reduced. From earthquake history it is seen that the partial infilled frames do not behave as expected and undergo short column effect. The present study is dedicated towards reducing the shear force in columns of the partial infilled frame.

Here the building models with variation in their masonry infills are considered as basic models. The percentage of the infills are varied only on the outer periphery of the models. The infills are modelled as masonry infill panels. To mitigate the short column effect, four different structural forms i.e. building with additional infills to the adjoining columns, structure with bracing, frame-shear wall structure and composite column structure with partial infilled masonry are considered to assess their performance in reducing the shear force in the column.

The G+7 storied buildings considered are modelled and analyzed using ETABS20 by response spectrum method as per IS 1893:2016. The behaviour is studied in terms of shear force in column, storey shear, base shear, storey displacement, storey drift and time period of the structure. The results show that when compared to the other methods, the method of providing additional infills adjoining to the short column in the partial infilled frames mitigates the shear force effectively. The reduction in shear force for varying (25,50,75) percentage of infill models are 283.82%, 536.54%, 835.85% respectively.

CHAPTER 1

INTRODUCTION

1.1 GENERAL

The term "masonry infill" refers to the process of using masonry to fill openings in R.C. structural frames. In multistorey buildings, they are employed as exterior walls and interior partitions to constitute a portion of the building envelope. Typically, masonry infills are added to reinforced concrete structures without considering them to be a composite of brick and concrete elements, even though they actually function as a unit during earthquakes. The infills are important in increasing the overall structure's lateral rigidity [3].

When the gravity loads are applied, there is addition in the infills' self-weight. When exposed to seismic forces, an infill wall usually interacts with the frame. The strength gained from the masonry infills can improve the performance of structures; however, this strength gain also results in increase of the structure's initial stiffness, which may draw in more lateral inertia forces from earthquakes. The structures' strength and rigidity are significantly increased by the infill walls, and failure to maintain them will result in many failure of multi-storey buildings. Infills are generally not provided for all frame components because they depend on the functional and architectural requirements. According to the requirements for the provision of partitions, doors, and windows, infills are provided fully or with openings. The types of frames - bare frame, fully infilled frame, partial infilled frame and window opening in the infilled frame.

To build partial infill frames, the bare frame is filled with masonry of brick to a specific height along its entire length. In many different types of buildings, partial infilled walls are widely employed, with the incomplete height typically being attributed to window apertures. For example- Hospitals, Academic Institutions, Business Buildings, etc.

1.2 SHORT COLUMN EFFECT

As the name suggests, a column that is prevented from moving laterally over a portion of its height is known as a short column. This might happen if a column's lateral deformation is restricted over a portion of the column's height by non-structural features [21]. According to the historical experience of various earthquakes, structures with partially filled frames are negatively impacted. These walls are seen to play a paradoxical role in

increasing the lateral rigidity of the structure while also having a negative effect known as the "short column effect"[3]. A short column might experience substantial damage at the time of an earthquake if it is not properly built to withstand such a powerful impact. These short columns frequently sustain X-shaped cracking damage, which results from shear failure.

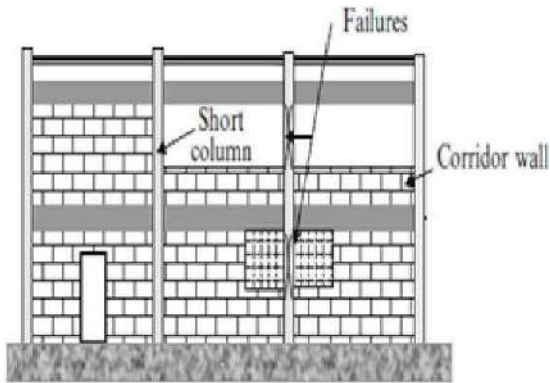


Figure 1.1: Short column [21]



Figure 1.2: Partial infilled wall - short column formed [21]

Causes for the formation of the short column are listed below.[21]

- The addition of partially-height walls between the columns to make room for slit windows that give in natural light. An example of this is when small windows are added to a basement wall that rises above ground level as shown in figure 1.2.
- Partial height walls are provided along the corridors.
- Foundations at various levels.
- A column's height is divided by a beam supporting a stair landing; or the addition of a mezzanine floor.

Some examples of building constructions that have suffered damage as a result of short column effect shown in the figure 1.3- figure 1.6. By looking at these photographs, the need to study on short column effect for lateral loading may be justified.



Figure 1.3: Shear failure in short column [20]



Figure 1.4: Partial infilled frame [3]



Figure 1.5: Short column failure [2]



Figure 1.6: Damaged column [3]

1.3 SHORT COLUMN BEHAVIOUR

Consider a partial height wall that is constructed to allow for a window to fill the rest height. As the walls are present, the adjacent columns function as short columns. Because there are no adjacent walls, other columns in the same storey are frequently of standard height. During an earthquake, the floor slab vibrates, displacing the upper ends of the columns. However, the rigid walls prevent the lower portion of a short column from moving horizontally and deform completely across the short height next to the opening of the window. [19]

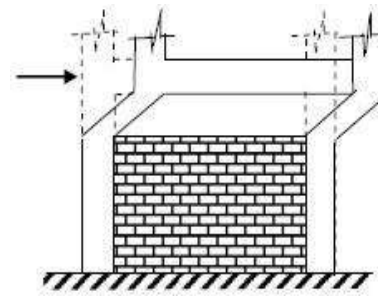
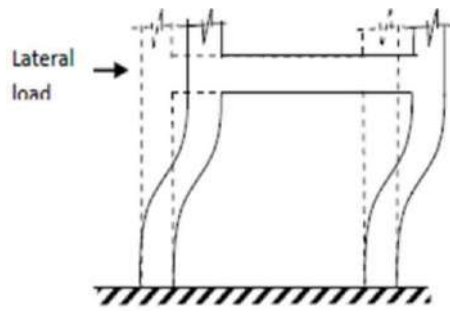


Figure 1.7: Lateral deformation in bare frame[3] **Figure 1.8:**Lateral deformation in partial infilled frame[3]

Over their entire height, regular columns are deformed. A short column provides more resistance to horizontal ground motion and attracts a greater force than a regular column since the effective height across which the column could freely bend is constrained (Figure 1.9). The entire column height is considered while calculating stiffness. The lowered column's lateral stiffness varies with the cube of their effective height ($12EI/L^3$ for both ends fully fixed). A column's stiffness, however, increases if it is later stiffened by deep spandrel beams, intermediate bracing, partial height infill walls, stairs, etc. This causes the column to attract stronger shear pressures, which can lead to shear failure.[21]

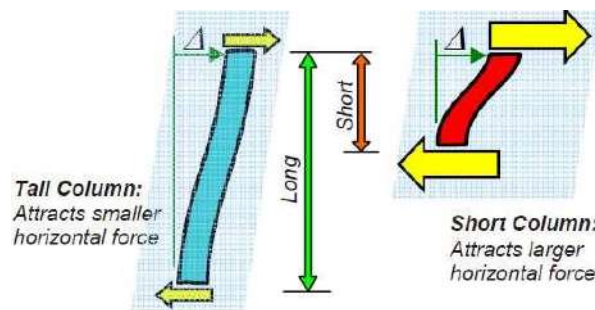


Figure 1.9: Short Column attract large lateral forces [19]

In comparison to the shear needed to produce a flexural yield in a full-length column, the shear needed to develop flexural yield in an effectively shorter column is significantly larger. Shear failure may begin before flexural yield and frequently fail in a brittle way if this influence of the infill is not taken into account.[20].

1.4 STRUCTURAL FORMS

Various structural forms have evolved and are commonly adopted to resist gravity and seismic forces. Few of the structural forms can be modified so as to reduce or eliminate the short column effect. A detailed study on such forms is required. Few such structural forms taken into consideration in the current study are discussed here.

1.4.1 ADDITIONAL INFILLS

It has been customary to fill the spaces between frame columns with inflexible, unreinforced masonry to create a building envelope. Even though the nonstructural masonry walls may have a lesser strength than the column, during lateral deformations, the resulting "nonstructural" walls frequently have enough stiffness to change the behaviour of the column. As a result of this type of building envelope's significant contribution to frame rigidity, drift. Since the nonstructural walls effectively restrict the lower portion of the column, damage to the short upper segment of the column typically occurs before the failure of confining wall.

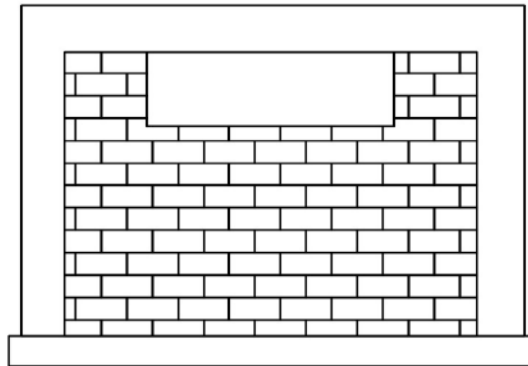


Figure 1.10: Additional infill frame

1.4.2 BRACING

When a structure is subjected to lateral loads, bracings are used. These bracing are resistive to earthquake forces and wind loads. They improve the structural strength. Here, the foundation receives the lateral loads from the bracing. Bracing creates a laterally very rigid construction with the least amount of weight addition. As a result, they are regarded as a particularly cheap structural type for buildings of any height.

Steel bracing improves the stiffness, strength, and bending capabilities of the R.C. multistorey construction. They increase the stability of the structure [22].

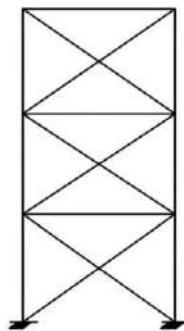


Figure 1.11: X-Bracing

The type of bracing adopted is based on the architectural requirements.

The bracing types are:

- a) Concentric type bracing: the ends of the diagonal brace join at the beam-column connection which creates a stiff frame.
- b) Eccentric type bracing: the ends of the diagonal brace joins at an offset from the connection between beam and column.

Of the various kinds of bracings, X bracings are frequently utilized.

It should be highlighted that the bracings are beneficial as they: avoid weak columns thereby increasing strength; Boost the building's stiffness and capacity. They don't require a lot of labor, offer the structure good stabilization, and are cost-effective.

1.4.3 SHEAR WALL

A shear wall is a structural element in reinforced concrete frame construction that resists lateral loads. They minimize lateral displacements and can sustain the majority of the lateral shear forces produced by earthquakes. To lessen the torsional loads, shear walls are normally symmetrically positioned in both directions in the building's layout. Shear wall systems are more cost-effective up to 35 stories and more rigid horizontally than rigid frames [23].

Shear wall systems are one of the most well-liked and dependable lateral load resisting techniques in medium- to high-rise buildings. Shear walls are substantially more earthquake resistant than columns. They are a component that resists lateral forces, sustains vertical loads, shear forces parallel to the length of the wall, and bending moments about the strong axis of the wall.

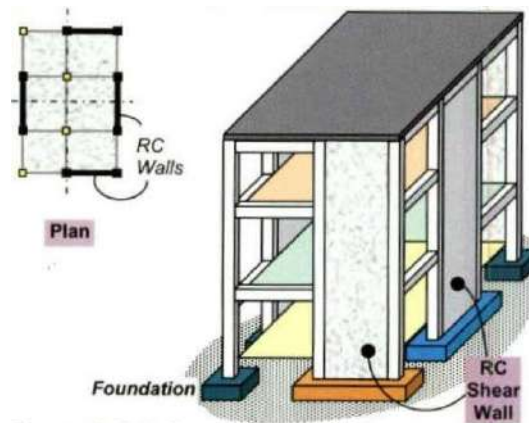


Figure 1.12: Shear wall

It can give the building the necessary strength and stiffness to withstand seismic and wind loads. It is commonly known that stiffer structures absorb more seismic forces as long as a good design is taken into account i.e. both strength and ductility [23]. Shear walls are divided into the following categories: plain rectangular kind and flanged walls, Coupled walls that shear, walls with a rigid frame, walls supported by columns, walls of the core kind.

Shear walls provide several benefits – Provides significant stiffness, stability, and strength in the direction of orientation, considerably lessens lateral sway, effective in reducing earthquake damage and is efficient in terms of cost of construction, Structural and non-structural damage is minimized.

1.4.4 COMPOSITE COLUMN

A composite column is a compression member which consists of concrete and structural steel. They are typically employed as a load-bearing part in a framed structure. Composite columns can support significantly more loads than conventional reinforced concrete columns because of the composite effect involved. Concrete and steel interact with one another through bond and friction to resist external loads.

The different types of R.C.-Steel composite columns that are commonly found are : Completely encased sections; Partially encased sections and; Concrete filled section.

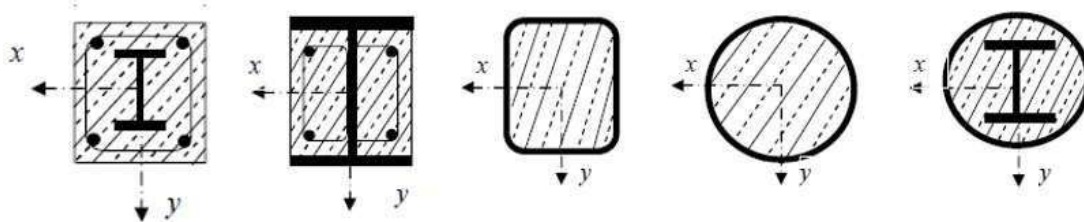


Figure 1.13: Types of composite column

Some of the advantages of composite sections are,

- They have a high load-carrying capacity for a given section dimensions
- They have high structural stiffness,
- There is exceptional ductility under powerful dynamic excitations,
- There is overall reduction in the weight of the structure.
- They are an economised building material.
- The concrete encased column shows good resistance against fire and corrosion protection.

CHAPTER 2

LITERATURE REVIEW

2.1 GENERAL

Studies on the short column effect have been investigated experimentally and through analytical models as the occurrence of such failures during earthquakes are severe. The various work on the short column effect in a multi-storey building located in earthquake prone regions is studied, and the brief review is presented here.

- **Alqatamin et.al. (2009)** This paper studies the response of short columns in R.C. buildings to seismic forces in buildings with intermediate floors, mezzanines, partial masonry infills, as well as buildings constructed on sloping ground. Further, suggests solution short column effect according to which in new buildings, extra care should be given during the architectural design stage and structural design by providing special confining reinforcement, and in existing buildings, strengthening measures such as retrofit techniques which are well-known should be employed.
- **Ismail Hakki Cagatay et.al. (2010)** To avoid short column effect, this research demonstrates an economical approach of placing segments of additional infill wall bounding the short column. A study is conducted out for a single-storey infilled frame with a number of bays ranging from one to five, using the number of spans and additional infill wall percentage bounding the short column as the parameters, to demonstrate the role of adding an infills in the effective reduction of the shear force in the short column. The investigation is broadened to include a case study of a G+1 building in Turkey that was damaged by the short column effect in the Adana-Ceyhan earthquake,1998. The findings demonstrate that adding additional infill walls to a structure is an efficient technique to reduce shear force.
- **P. M. Pradhan et.al. (2012)** This work represents the importance of interpreting partially filled frames. It summarises the results of various academic studies on how partially infilled frames behave under lateral loads. It is noticed that the structural strength is improvised by the addition of infills. To realise the combined action of the frame and masonry infill, it is necessary to fully comprehend the

contribution of partial infill walls while analysing models for real constructions. Furthermore, it is important to identify a strategy to model such structures to reduce the structure's earthquake risk. The ductile detailing might be provided to columns over their whole height that are prone to be subjected to the short column effect. Additionally, it underlines the necessity for more research on the short column effect.

- **Md Irfanullah et.al. (2013)** Analysis is on G+10 R.C.C. framed building is modelled using on ETABS to investigate the outcome of masonry infills on the bare frame, fully infill, soft ground floor, soft basement and infill in swastika pattern in the ground floor. The structural parameters, Base Shear, Storey displacement, inter storey displacement are considered. According to the results, the introduction of the infills improves the performance in terms of storey displacement and drift control.
- **Mohammed Tosif Ahmed et.al. (2014)** To understand the right procedure and impact of masonry infill panels, an analysis was performed on several models of G+10 R.C. framed buildings with the soft storey and shear walls. The equivalent double diagonal strut method and modelling of infill wall panels are carried out. According to the findings, the double diagonal strut has a greater value of storey drift and storey displacement than models with an infill panel. Also, the fundamental time period is reduced when the R.C. shear wall and the masonry infill stiffness are considered. It has been discovered that models with masonry infills show more strength and stiffness than double diagonal strut models, suggesting that masonry infill panels could be a useful way to simulate masonry infill.
- **Mohammad H. Jinya et.al (2014)** The paper's major goal is to make the building industry's analysis idea simpler. Additionally, carry out the static linear analysis and time history analysis of G+9 R.C.C. building using a single diagonal strut technique in using IS 1893:2002 and IS 456:2000, which are modelled in ETABS. In this instance, peripheral walls have varying percentages(15% and 25%) without strut and with strut of infill wall of centre openings. The factors considered in the current study are storey displacement, base shear, storey drift, and axial force with

and without soft stories while taking into account the effects of infill walls with various opening percentages. In this study, conclusions are drawn after discussing the outcomes of the bare frame, soft story, and infill wall panel. According to which the diagonal strut will impact the seismic performance in the R.C. building. There is an increase observed in axial force in the column and also due to the higher stiffness of infill the base shear increases, and storey drift and storey displacement decreases. Also, there is a reduction in the lateral stiffness due to an increase in percentage of opening.

- **Chidananda HR et.al. (2015)** Infill walls without openings, infill walls with central opening in the outer periphery and partial opening are all subject to analysis. Models of G+14 R.C. framed buildings are analysed in ETABS software using the Equivalent Static Lateral Force method and the Response Spectrum method using IS 1893: 2002, which includes p-delta effects. The criteria considered in this study include storey displacement, storey shear, and storey drift with soft storey. The strut width has been determined for modelling purposes using FEMA 273, utilising the equivalent diagonal strut approach. The P-delta effect results from the investigation revealed very little variance in which time period had considerable changes, and it might be taken into consideration for higher-storey buildings. The reduction is indicated on measurements for displacement due to the addition of infill whereas displacement is increased due to the openings.
- **Sristi Gupta et.al. (2016)** This research is a study of general seismic behaviour resulting from a change in level on sloping lots, particularly in hilly places. As a result of the increased rigidity of the structure, infill panels have a significant impact on the behaviour of frames under seismic events. When compared to an infilled frame, the bare frame has a larger deflection. Shear walls braced frames, and composite columns could also be useful in preventing excessive shear in columns.
- **Mehrzad Mohabbi Yadollahi et.al. (2016)** The influence of the infill wall on the formation of a short column at the G+3 military aid watchtower in Turkey was investigated. The collected data is compared to the consequence of earthquakes that have been seen following an earthquake. Structural drift and shear force are

among the parameters investigated. The results reveal that the insertion of infills reduces structural drift due to reduced column ductility, and the presence of infills increases the shear force in the short column, causing the structure to fail. Due to partially infilled structures, incorrect shear flow during lateral loads will damage the short column, resulting in structural failure.

- **Md. Rokanuzzaman et.al. (2017)** An Analysis of G+15 model is carried out by using the equivalent static method in ETABS 9.6.0. Models without shear wall and with shear wall at the central portion on the periphery sides and with shear wall at corners in the form of L-shape are considered. The parameters considered are base shear and displacement under lateral loading. According to the results, the model with a shear wall placed at the central portion on the periphery sides performs better.
- **Rakshith K L et.al. (2017)** An investigation of G+9 regular and vertically irregular buildings, both with and without bracing systems, was carried out. A response spectrum analysis for the models that use different bracing strategies are employed. The results of ETABS in terms of displacement, storey shear, storey drift in seismic zones III and V are considered. In R.C. frame construction with different kinds of bracing systems, displacement and storey drift are reduced, while base shear increases. When X-bracing is compared against regular R.C. frame and irregular R.C. frame systems, it is proven to perform better.
- **Mouzzoun Mouloud et.al. (2019)** The strut model is used in the study to analyse the seismic response of multistorey R.C. frames with masonry infill and capture the overall impact of the infill. The seismic behaviour of two eight and ten-storey R.C. Building models have been assessed using nonlinear pushover analysis in ETABS20. The outcomes of numerical simulations demonstrate that the infill walls significantly impact the seismic response. It would not be prudent to avoid these impacts, and these factors should be considered while designing and evaluating seismic systems. The reinforced concrete frame's time period with bare frames is decreased by the use of infill panels. A bare frame idealisation results in an overestimation of natural periods and an underestimating of the design lateral forces. Pushover analysis findings indicate that the infilled frame has greater

energy dissipation, initial stiffness and strength, than the bare frame. Under various earthquake intensities, it was found that entirely masonry infill panels performed noticeably better than the bare frame.

- **Sachin Patel et.al. (2019)** In the present study, a method is developed in which seismic analysis of R.C. frame structures is carried out while complete infills, without infills, and partially infills are all taken into consideration. Software called STAAD PRO is employed in this investigation. In this study, linear static analysis in zone IV is utilized to examine floating column constructions with and without bracing systems and infill walls under seismic parameters as per IS-standards in STAAD PRO. From the analysis above, the following conclusions are be made: An increase in lateral stability of the structure is demonstrated by infill wall structure, which aids in resisting high storey displacement and huge storey drift.
- **Preetha V et.al. (2020)** The linear static and response spectrum analysis of a G+10 building with a R.C.C. column, an encased column, and an infilled rectangular tube is performed in ETABS. The study's characteristics include displacement, storey drift, and time period. According to the findings, storey shear and storey drift decrease in the composite column, the time period is reduced in the R.C. column, and storey displacement increases in the composite column.

2.2 SUMMARY AND LITERATURE GAP

Numerous research has been done to understand the behaviour of masonry infills. It was noted that the buildings with partial in-filled masonry frames undergo short column effect. To understand the behaviour of the structure undergoing short column effect it is important to rightly represent the masonry in-fills in the building model. Therefore, masonry infills are modelled as panels. In order to mitigate the short column, effect the addition infill walls around short column are provided in above research papers. In the present study an attempt is made to study various other methods to mitigate this short column effect.

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CHAPTER 3

PROBLEM STATEMENT, OBJECTIVES & SCOPE OF THE STUDY

3.1 PROBLEM STATEMENT

From the reference of various above papers, we understand the behavior of masonry infills in the structures under the action of seismic forces. The papers conclude that the partial infilled frames undergo short column effect. As there is reduction in the height of column due to partial infills there is increase in the stiffness. When this column deforms laterally under seismic forces they attract larger shear forces. Therefore, it becomes necessary to understand the behaviour of such column and reduce the shear force in them. Hence in the present study, it is attempted to reduce the shear forces in partial infilled columns affected by short column effect.

3.2 OBJECTIVES

With the main objective to reduce the shear in the column affected by **short column effect**, the following objectives are framed:

1. To model RC bare-frame and frame with masonry infills of varying height using ETABS20.
2. To assess the short column effect in RC bare-frame building and building with masonry infills of varying height.
3. To evaluate and compare the performance of the following structural forms in mitigating the short column effect in buildings with masonry infills of varying height.
 - i. Additional infills adjoining the short column
 - ii. RC frame with bracing
 - iii. RC frame and shear-wall structure
 - iv. Composite column construction

3.3 SCOPE OF THE STUDY

The analytical study is carried out on building frames with masonry infills. Masonry infills are modelled as panels instead of representing the masonry by diagonal strut method. The plan area of 20m x 20m having G+7 stories using ETABS20. The building with additional infills adjoining the short column, bracings, shear wall and composite column construction were modelled and analyzed. The parameters evaluated in the present study are Shear force in column, Storey shear, Base shear, Storey Displacement, Storey Drift and time period parameters are evaluated.

3.4 ORGANISATION OF THE DISSERTATION

- Chapter one titled “Introduction” consists of an introduction to the topic.
- Chapter two titled “Literature review” consists of work done on the masonry infills, short column effect, additional infills, bracing, shear wall and composite column by researchers composed from diverse journals.
- Chapter three is “Problem Statement, Objectives and Scope of study” which includes problem statement, objectives, scope and organisation of the dissertation
- Chapter four is “Methodology” describes the problem, the approach followed, Seismic Analysis using software, loading parameters, Measures/structural forms investigated.
- Chapter five is “Modelling and Analysis” deals with the procedure for modelling and analysis used in the study.
- Chapter six “Results and Discussion”
- Chapter seven “Conclusions” deals with the final concluding remarks.

CHAPTER 4

METHODOLOGY

4.1 GENERAL

With the objective to study the behaviour and to mitigate the short column effect, an analytical study was taken up on partially infilled masonry frames. The analytical study is carried out on a building frame with plan area 20m x 20m with G+7 stories using ETABS20.

ASSESSMENT OF SHORT COLUMN EFFECT:

To evaluate the short column effect in buildings with partially infilled masonry, R.C. frame buildings with 25, 50 and 75 percentage of infills are investigated. The partial infills were considered on outer periphery of the building

Since it is difficult to predict the failure of a structure due to the short column effect, however the short column effect can be assessed by the shear force in the column members. In the present study Shear force in column, Storey shear, Base shear, Storey Displacement, Storey Drift and time period parameters are evaluated.

MITIGATION OF SHORT COLUMN EFFECT

A building with infill walls of varying height, is vulnerable to the short column effect. Elimination or reduction of short column effect in such buildings is very challenging and various methods have been suggested.

In the present study, various measures of modifying the structure such as additional infills adjoining the short column, bracings, shear wall and composite column construction are studied.

The extent of mitigation of each type is evaluated and results compared with respect to the various parameters i.e., Shear force in column, Storey shear, Base shear, Storey Displacement, Storey Drift and time period parameters are evaluated.

4.2 SEISMIC ANALYSIS:

The seismic analysis as per IS:1893-2016 is done by Response Spectrum method and the parameters considered for the the study include shear force, storey shear, base shear, storey displacement, storey drift and time period. The Equivalent static method evaluates the

linear seismic behaviour of the building. The linear static method is used for regular structures where height is limited. It is the simplest method with less computations as per IS:1893-2016. It can be applied for regular buildings with height less than 15m in the seismic zone II. In the present study, the building is 24 m and is located in seismic zone IV. Hence, the linear static method cannot be applied. Hence, linear dynamic analysis is carried out. The linear dynamic analysis is performed by response spectrum method (mode superposition method). The response spectrum method plots the response of the structure for displacement, velocity and acceleration.

4.3 ETABS20

General-purpose civil engineering software ETABS20 is excellent for structural system analysis and design. A practical and user-friendly object-based modelling environment that streamlines and simplifies the engineering process can be used to model, analyze, design, and optimize basic and advanced systems, spanning from 2D to 3D, of simple geometry to complex.

As part of the modelling process, ETABS20 is used for gravity and lateral load analysis in accordance with the IS codes that are available. Here, an effort is made to comprehend how partially infilled masonry frames behave and reduce the Short Column effect that develops in them as a result of the accumulation of significant forces in the column.

After analysing the structure by adding gravity and lateral loads with the proper load combination, Excel is used to represent the graphs and results of shear force in column, storey shear, base shear, storey displacement, storey drift and time period.

4.4 LOADING PARAMETERS

The loads on the structure include gravity and seismic loads. The load consideration for the structure is carried out in accordance with IS:875(part I, part II), IS:1893-2016. Here, load combinations are incorporated for design as per IS:1893-2016.

4.5 MEASURES / STRUCTURAL FORM INVESTIGATED

Various structural forms have evolved and commonly adopted to resist gravity and seismic forces. Few of the structural forms can be modified so as to reduce or eliminate the short column effect. A detailed study on such forms is required. Few such structural forms considered in the present study are discussed here.

4.5.1 ADDITIONAL INFILLS ADJOINING THE SHORT COLUMN

Here, In the study an additional infill of length of 20% of the bay length is considered referring to a literature. The additional infills are provided adjoining the column of partial infilled frame models with varying height of masonry infill in the outer periphery as shown in Figure 3.8, 3.12, 3.16.

It is seen that, though the masonry do not have strength as much as the columns they still have enough strength to impact the column behaviour during seismic tremors. It is known that the masonry infills improve the stiffness of the structure, here their contribution for the same in the models with partial infilled frame are checked.

4.5.2 R.C. FRAME WITH BRACING

In this study, X- bracings are offered for the models with partially infilled frames with varied infill heights in the alternative bay in both the X and Y directions. By using the trial-and-error process, the bracing section selected are ISA 130x130x12 and ISA 150x150x12. As far as lateral load resisting systems go, bracing is acknowledged to be one of the most popular techniques. It can be observed that bracing increases column strength since it connects at the joints where the beam and column intersect, improving the overall stiffness of the frame. It is also a cost-effective solution since it offers good resistance even with only a slight increase in the structure's weight.

These bracing system characteristics were some of those discovered to be beneficial in lowering the high shear force concentration seen in the columns of the partial infilled frames as a result of the short column effect on the structure's outer periphery.

4.5.3 R.C. FRAME AND SHEAR - WALL STRUCTURE

In this study, shear wall of 180 mm was placed orthogonally in both X and Y direction in the central bay. The shear wall is assigned as a shell element. And is provided with reinforcement in both the direction i.e. longitudinally and transversely. It is the most used lateral load resisting system and it efficiently transfers load to foundation. It improves the building's serviceability factor. The shear wall functions as a form of fuse, delaying the column's failure.

Therefore, the shear wall are used to check the effectiveness against the reduction of large accumulated forces in the short columns in the models with partial infilled frames with varying height of infills on the outer periphery.

4.5.4 COMPOSITE COLUMN CONSTRUCTION

In this study All the R.C.C columns are substituted by steel concrete composite column. The sectional dimensions of the column are reduced from 450x450mm to 380x380mm with encasement of structural steel section of ISMB 300.

The composite sections have good ductility which helps the structure to undergo larger deformations without any failure, stiffness helps in limiting the demands of deformation in the structure and are known for the better overall performance of the structure.

Therefore, in order to check the improvement in resistance against the larger forces attracted in the short columns the composite columns are used.

CHAPTER 5

STRUCTURAL MODELLING AND ANALYSIS

5.1 DESCRIPTION OF STRUCTURE:

The aim of the present study is to develop and evaluate a 3D model on an eight-storey building with a symmetrical layout in the X-Y direction using the ETABS20 software. The model does not depict any specific real-world construction that has been designed or constructed. However, the dimensions and other features were chosen to depict a building where it would be simple to study the masonry in-fills. The storey height under consideration is 3 m. Models considered include bare frames, frames entirely filled with masonry infill, and frames partially filled with masonry in-fills (i.e., 25%, 50%, or 75%) on the outer periphery.

In the present study R.C. frame building is considered having 8 stories with a total height of 24m and of plan size 20m x 20m. The height considered for each storey is 3m. The frames are placed in 4m x 4m bays, having 5 nos. of bays in each orthogonal direction. A foundation level of 1.2m below the ground is considered. The supports are assigned to be fixed. Analysis carried out are equivalent linear static analysis and response spectrum analysis (mode superposition method). The study takes into account the loads caused by gravity and earthquakes.

An important objective of the present study is to study different structural forms to reduce the short column effect, and accordingly, the partial in-filled frames with Additional in-fills, Bracings, Shear Wall and Composite Column respectively are modelled to reduce the large forces attracted in the partial in-filled frames due to short column effect.

For the basic building model, a beam of size of 300 mm x 450mm, and column size of 450mm x 450mm and a Slab thickness of 150 mm is considered. The masonry are modelled as shell elements with a thickness of 230mm.

For the braced frame, the bracings considered are ISA 130x130x12 and ISA 150x150x12 as per the requirement. Shear force reduction for the various sections of bracing are checked initially. Similarly, for the RC frame shear-wall, the shear wall are was checked from a minimum value of 150mm as per the IS code and the section provided is 180mm, orthogonally in the central bay of the RC building. For the Composite Column structural form, the composite column made up of ISMB300 encased in a concrete section of 380mm x 380mm was examined as it is one of the commonly used sections.

5.2 PROPERTIES OF MASONRY IN-FILL

As the masonry panels are modelled, it is crucial to understand the precise properties that must be entered in order for them to function as they would in reality.

According to IS 1893(part1):2016, the modulus of elasticity of the infill is given by

$f_m = 550f_m$ where, f_m is the compressive strength of masonry prism (IS 1905-1987),

$$f_m = 0.433f_b^{0.64}f_{mo}^{0.36}$$

f_b = Compressive strength of brick

f_{mo} = Compressive strength of mortar

Table 5.1 : Input values in ETABS20

Density of brick infill	20 KN/m ³
Compressive Strength of brick, f_b (IS:1077-1992)	7.5 N/mm ²
Compressive Strength of mortar, f_{mo} (IS:1905-1987)	3 N/mm ²
Compressive Strength of masonry, f_m (IS:1893-2016)	2.335 N/mm ²
Modulus of elasticity of brick infill, E_m (IS:1893-2016)	1284.25 N/mm ²
Shear Modulus, G	513.7 N/mm ²
Grade of concrete	M25
Grade of steel	Fe 500

5.3 MODEL CONFIGURATION

The structural models with the following variations are investigated.

A) Basic models of building with infill wall

Model 1 - Bare frame [BF]

Model 2 - Fully in-filled frame [F-IF]

Model 3 - 25% Partially in-filled frame [P-IF-25]

Model 4 - 50% Partially in-filled frame [P-IF-50]

Model 5 - 75% Partially in-filled frame [P-IF-75]

B) Models of buildings with additional in-fills adjoining the column

Model 6 - 25% Partially in-filled frame with additional in-fills adjoining the column [P-IF-25-AI]

Model 7 - 50% Partially in-filled frame with additional in-fills adjoining the column [P-IF-50AI]

Model 8 - 75% Partially in-filled frame with additional in-fills adjoining the column [P-IF-75AI]

C) Models of buildings with bracings

Model 9 - 25% Partially In-filled Frame with Bracings [P-IF-25-B]

Model 10 - 50% Partially In-filled Frame with Bracings [P-IF-50-B]

Model 11 - 75% Partially In-filled Frame with Bracings [P-IF-75-B]

D) Models of buildings with shear wall

Model 12 - 25% Partially In-filled Frame with Shear Wall [P-IF-25-SW]

Model 13 - 50% Partially In-filled Frame with Shear Wall [P-IF-50-SW]

Model 14 - 75% Partially In-filled Frame with Shear Wall [P-IF-75-SW]

E) Models of buildings with composite column

Model 15 - 25% Partially In-filled Frame with Composite Column [P-IF-25-CC]

Model 16 - 50% Partially In-filled Frame with Composite Column [P-IF-50-CC]

Model 17 - 75% Partially In-filled Frame with Composite Column [P-IF-75-CC]

Here are some of the views of the R.C building models which are modelled and analyzed in ETABS20

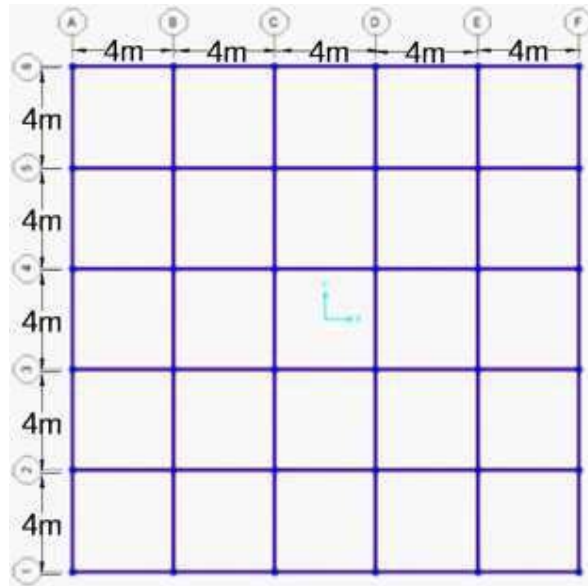


Figure 5.1: Plan of the building

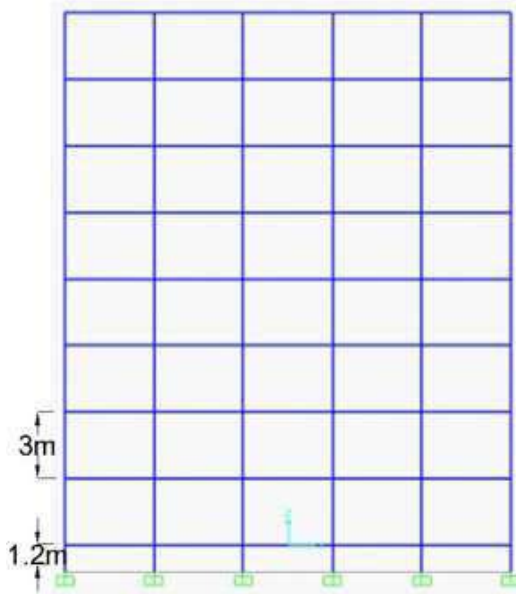


Figure 5.2: Elevation of the bare frame model

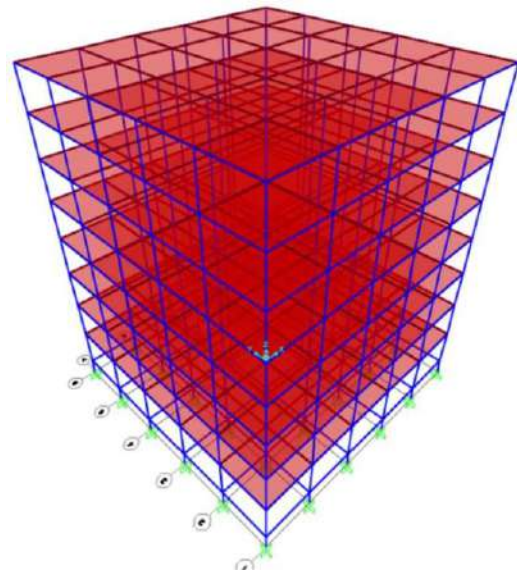


Figure 5.3: 3D View of the bare frame model

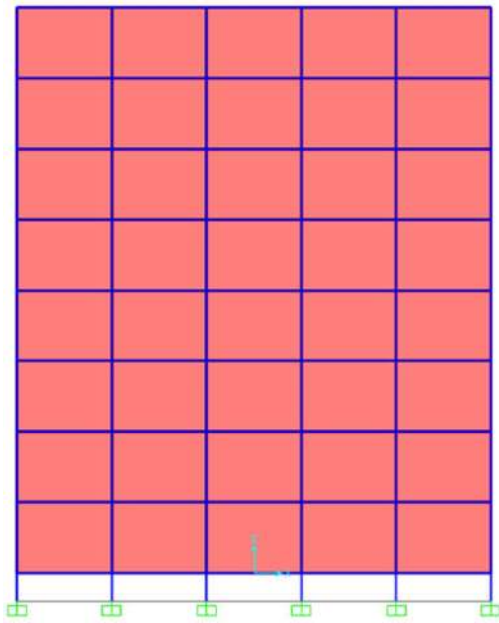


Figure 5.4: Elevation of fully infill model

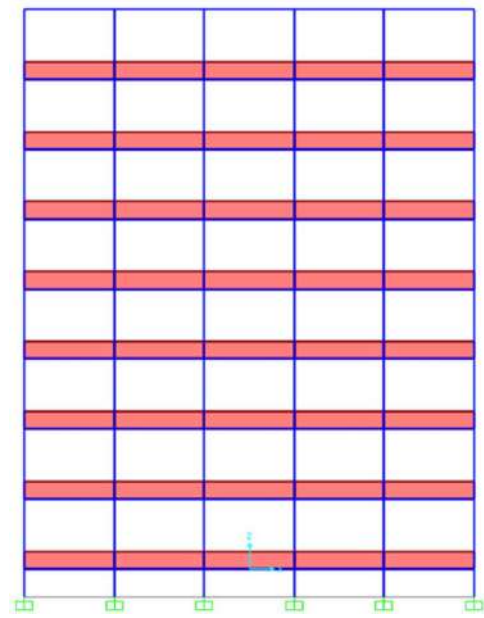


Figure 5.5: Elevation of 25% partial infill model

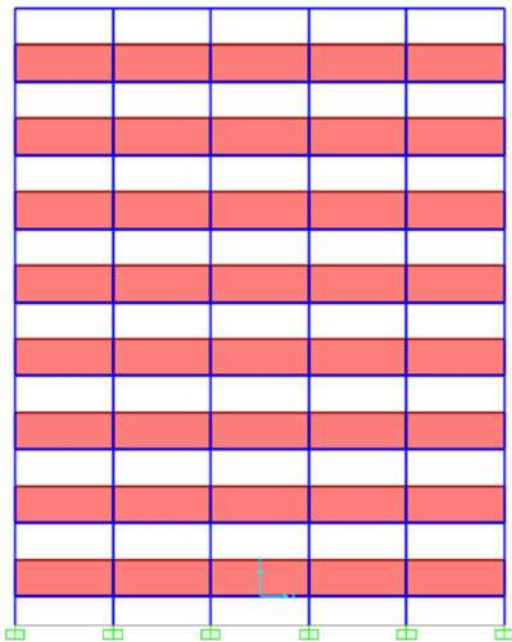


Figure 5.6: Elevation of 50% partial infill model

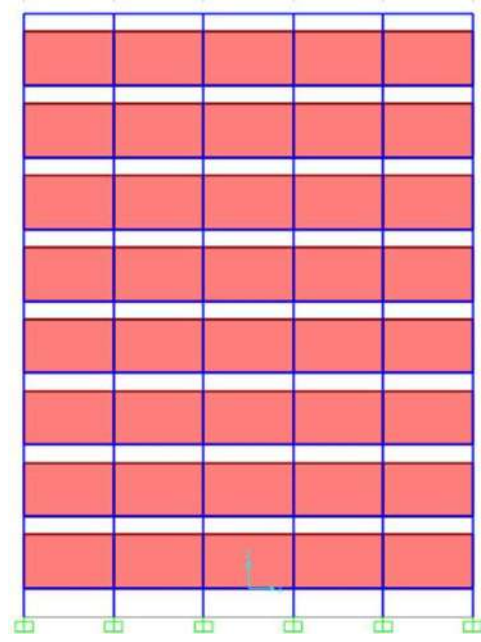


Figure 5.7: Elevation of 75% partial infill model

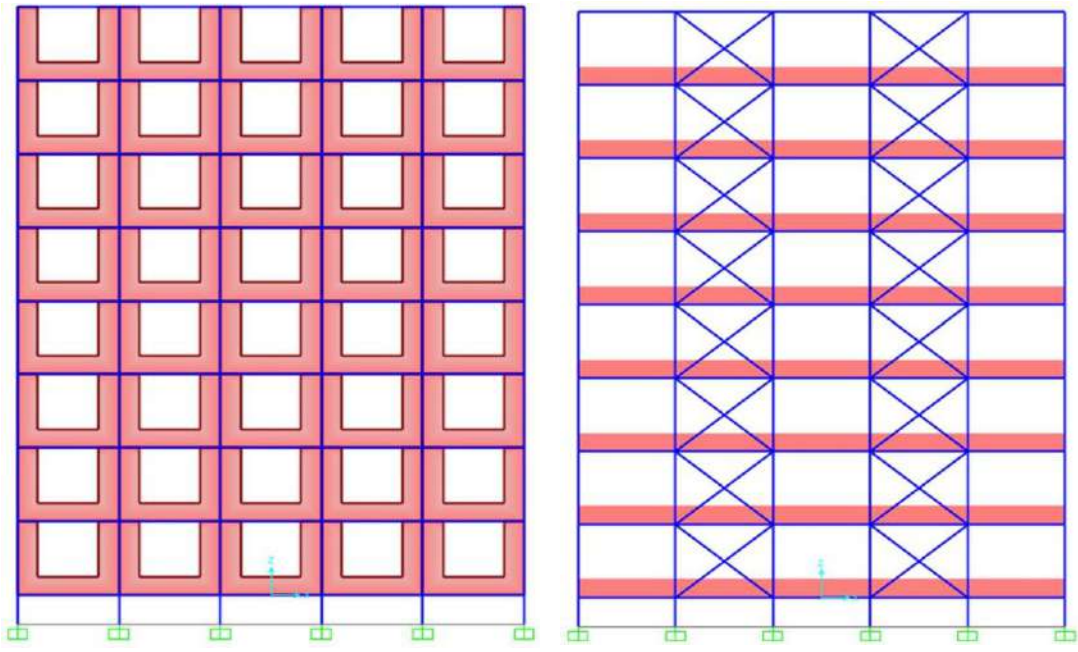


Figure 5.8: Elevation of 25% Partially in-filled frame with additional in-fills adjoining the column

Figure 5.9: Elevation of 25% Partially in-filled Frame with Bracings

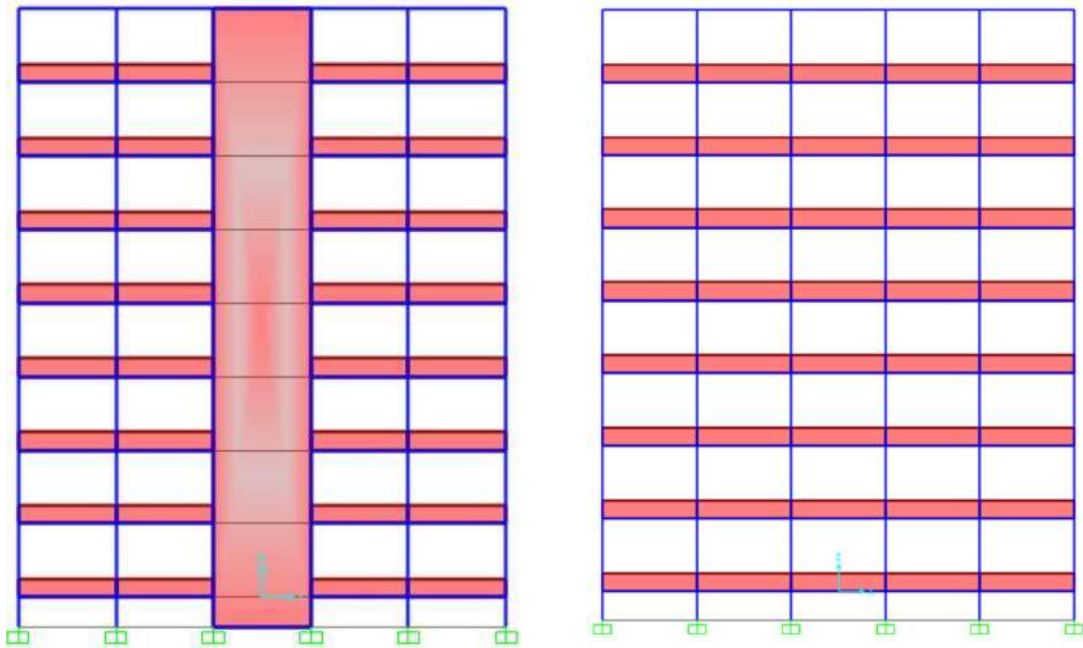


Figure 5.10: Elevation of 25% Partially in-filled frame with shear wall

Figure 5.11: Elevation of 25% Partially in-filled frame with composite column

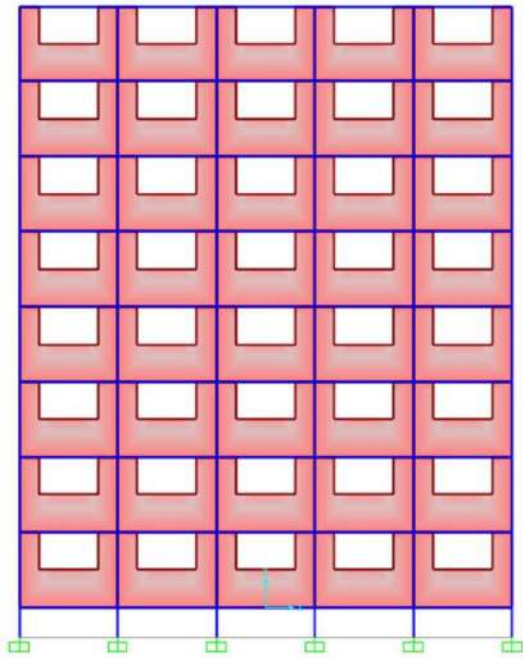


Figure 5.12: Elevation of 50% Partially in-filled frame with additional in-fills adjoining the column

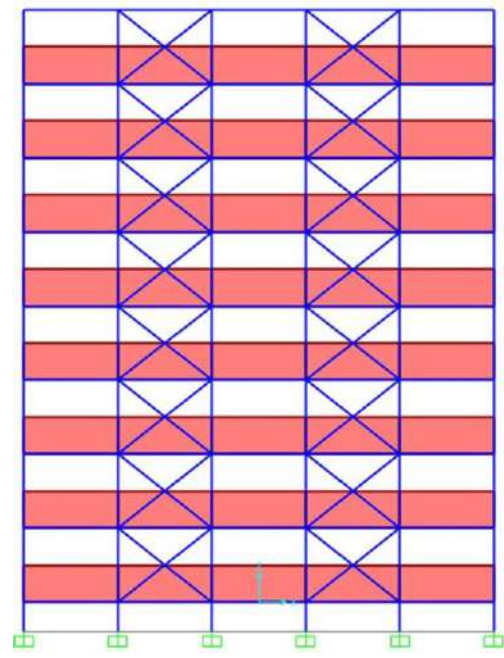


Figure 5.13: Elevation of 50% Partially in-filled Frame with Bracings

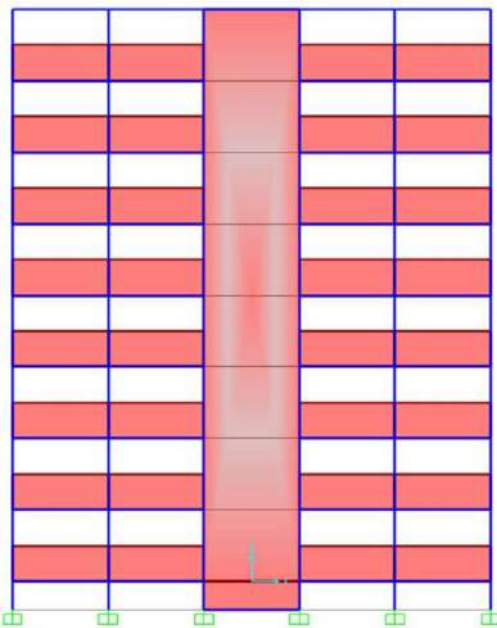


Figure 5.14: Elevation of 50% Partially in-filled frame with shear wall

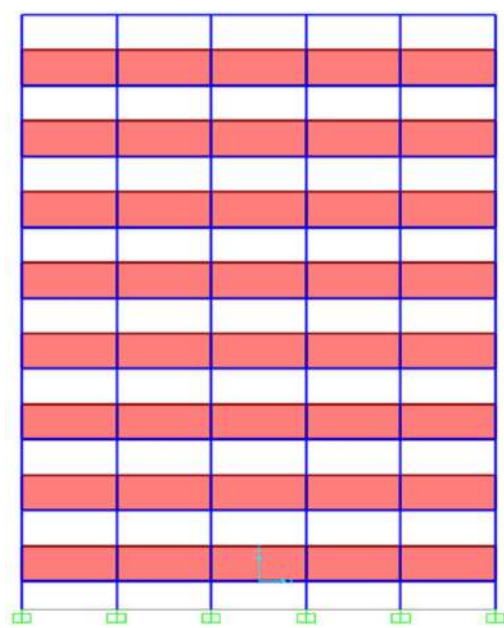


Figure 5.15: Elevation of 50% Partially in-filled frame with composite column

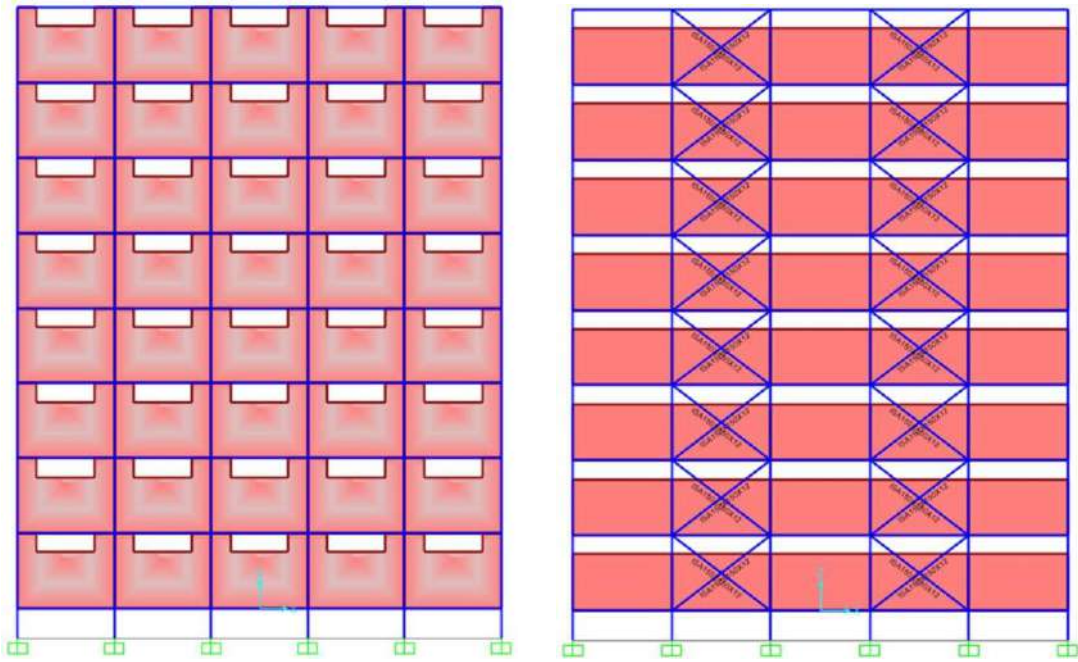


Figure 5.16: Elevation of 75% Partially in-filled frame with additional in-fills adjoining the column

Figure 5.17: Elevation of 75% Partially in-filled frame with bracings

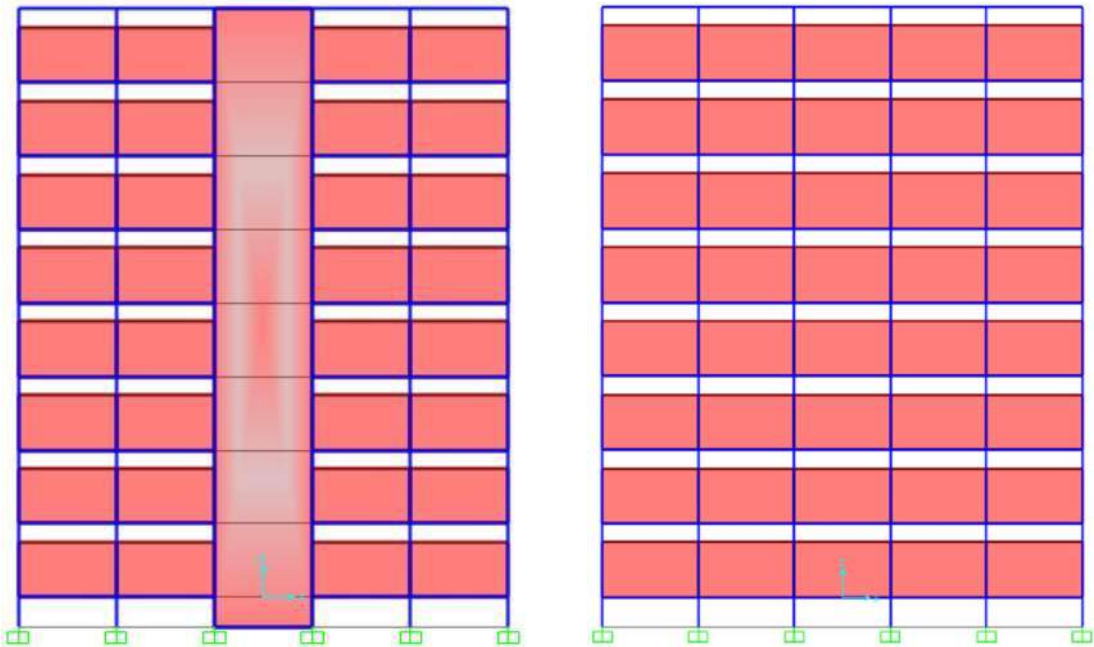


Figure 5.18: Elevation of 75% Partially in-filled frame with shear wall

Figure 5.19: Elevation of 75% Partially in-filled frame with composite column

5.4 LOAD COMBINATION

The loads acting on the structure include gravity and seismic loads. The load consideration for the structure is carried out in accordance with IS:875(part I, part II), IS:1893-2016. Here, load combinations are incorporated for design as per IS:875 (part V). The dead load of the structure is assessed according to the self-weight and floor finish of the structure. Self-weight of the structural members is computed by the software itself.

Table 5.2: Loads considered

1	Dead Load (Floor Finish) - 1 KN/m ²
2	Live Load - 3 KN/m ²
3	Earthquake X
4	Earthquake Y
5	Response Spectrum X
6	Response Spectrum Y

5.5 SEISMIC ANALYSIS:

The Equivalent static method evaluates the linear seismic behaviour of the building. The linear static method is used for regular structures where height is limited. It is the simplest method as it requires less computations as per IS:1893-2016. It can be applied for regular buildings with height less than 15m in the seismic zone II. In the present study, the building is 24 m and is located in seismic zone IV. Hence, the linear static method cannot be applied. Hence, linear dynamic analysis is carried out. The linear dynamic analysis is performed by response spectrum method (mode superposition method). The response spectrum method plots the response of the structure for displacement, velocity and acceleration.

By using a scale factor (SF), the acquired response spectrum values must be transformed to the particular set of units utilized throughout the model. The scale factor in the first run should have the value $SF = I \cdot g / (2R)$, where I is the importance factor, R is the response reduction factor. The base shear should be checked after the first run, and if it is less than the minimum value specified by the code, then increase the scale factor of the first run until the resulting base shear complies with the code's requirements.

The parameters considered in the study are shear force in the column, storey shear, base shear, storey displacement, storey drift and fundamental time period.

Table 5.3: Seismic consideration

Seismic Zone	IV
Seismic Zone Factor, Z	0.24
Importance Factor, I	1.2
Response Reduction Factor, R	5
Soil Type	II (Medium)
Damping ratio	5%

CHAPTER 6

RESULTS AND DISCUSSION

After the analysis of the models for the specified building, the performance of each model was assessed based on six different parameters: the shear force in the column, storey displacement, storey drift, base shear, storey shear, and the time period of the structure. The comparison of parameters was made on the basis of the maximum response of the structure. This chapter provides a brief review of the findings from response spectrum analysis for the specified building models with partial infills as well as the various mitigation approaches used.

6.1 RESULTS FOR BASIC MASONRY INFILL MODELS

6.1.1 SHEAR FORCE IN THE COLUMN

Seismic forces in terms of shear force in each column, at the base and every story level, are considered important parameters in the seismic design stages. The obtained values of shear forces considering and ignoring the effect of different percentages of masonry infill walls with different techniques are presented. The values of shear force presented indicate the maximum shear obtained in the columns. Also, it is noted that the maximum shear force in all the cases is observed in the ground story.

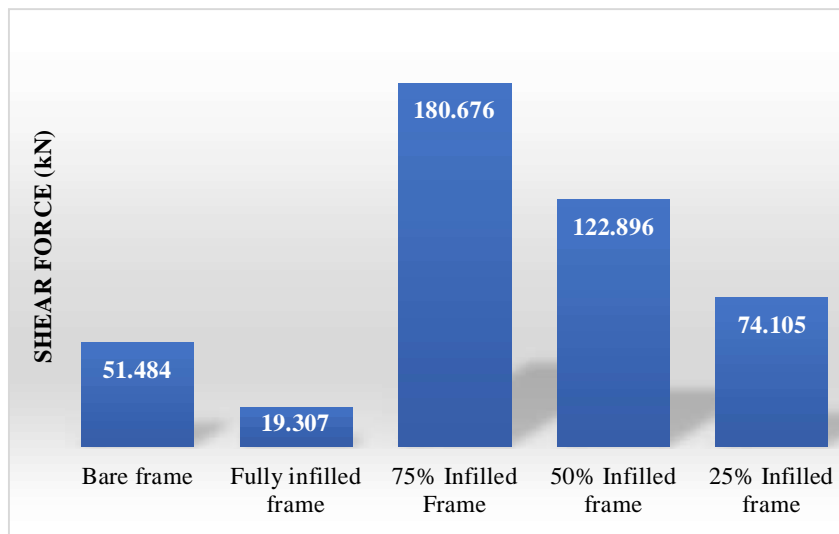


Figure 6.1: Shear Force variation for different percentages of masonry infills

The results show that the completely infilled model has a 62.49 % lower shear force than the model with no infills. In comparison to the fully infilled model, the shear force has increased by 283.82%, 536.54 %, and 835.85 % for the 25%, 50%, and 75% infilled models, respectively.

Now, in the models where the masonry percentage is reduced, there are significant forces concentrated into the columns as a result of the column's restriction to lateral deformation due to the partial confinement of the masonry wall. The rigidity of the columns increases as the overall height of the column decreases. The lowered column's lateral stiffness varies with the cube of their effective height. It is important to reduce such force concentration in the column.

6.1.2 STOREY SHEAR AND BASE SHEAR

The storey shear is the sum of design lateral forces at all the levels above the considered storey. Base shear is the calculation of the maximum lateral force that is anticipated to occur on a structure's base as a result of ground motion during an earthquake. The ground begins to move as a result of seismic activity. The ground's movement causes a lateral force to be generated in the opposing direction of motion. Base shear refers to the lateral force produced by seismic motion at the base of the structure.

Buildings are designed for base shear values. The building is constructed so that it can withstand lateral loads or earthquake-related loads equal to the base shear of the structure. The structure collapses as a result of lateral force that exceeds base shear.

The variation of storey shear and base shear for basic models is tabulated in Table 6.1 and is graphically represented by Figure 6.2 and Figure 6.3.

Table 6.1: Storey Shear variation for models with different percentages of masonry infills

Storey Level (m)	Bare frame	Fully infilled frame	75% infilled frame	50% infilled frame	25% infilled frame
0	1534.410	6034.010	5795.430	5557.160	5318.720
3	1458.869	5976.842	5742.006	5506.448	5270.354
6	1345.364	5814.682	5588.474	5360.661	5131.581
9	1205.994	5489.236	5278.842	5066.026	4851.221
12	1045.003	4944.198	4758.881	4570.609	4379.839
15	854.840	4123.263	3974.362	3822.477	3667.998
18	623.388	2970.126	2871.056	2769.696	2666.263
21	333.879	1428.480	1394.734	1360.333	1325.196

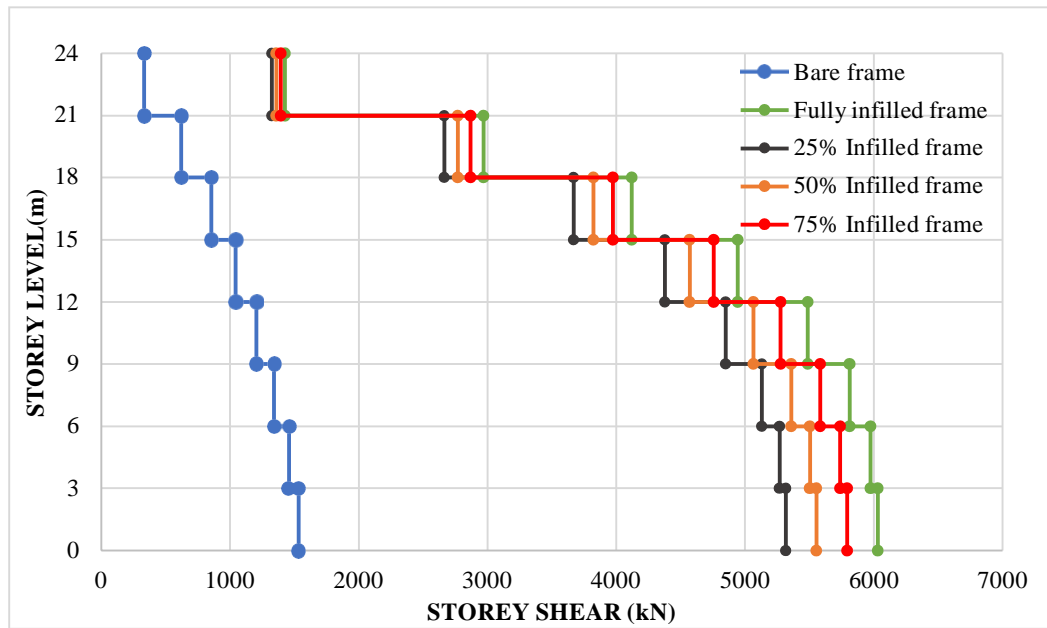


Figure 6.2: Storey shear variation for different percentages of masonry infills

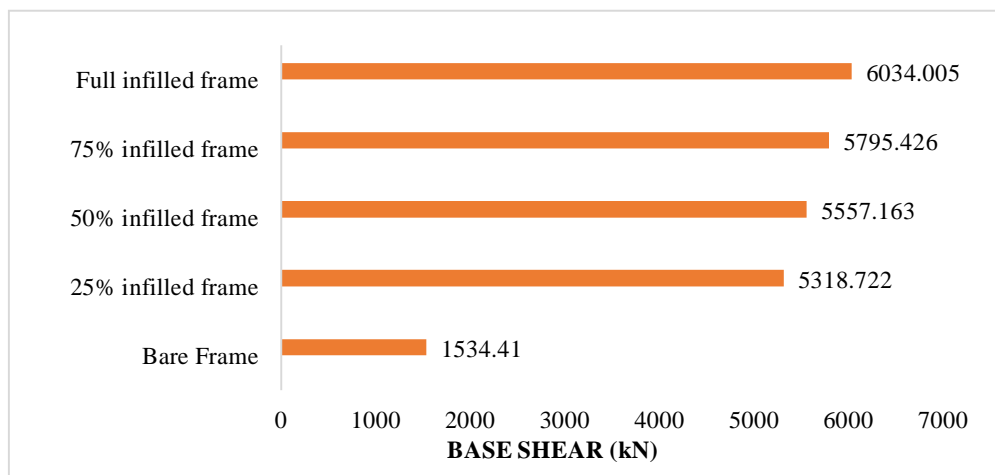


Figure 6.3: Base shear variation for different percentages of masonry infills

From the findings of the model with variation in the percentage of masonry infills in the outer periphery only it is noted that the base shear is minimum for the bare frame model and maximum for the model where there is complete inclusion of the masonry in the frame. The base shear goes on increasing as the percentage of the masonry infills is increased. It increases by 74.57% after the inclusion of the masonry infills.

The base shear reduces by 11.85% for 25% infilled frame, 7.90% for 50% infilled frame, 3.95% for 75% infilled frame when compared to the fully infilled model.

6.1.3 STOREY DISPLACEMENT AND STOREY DRIFT RATIO

It is important to take the storey's deflection in relation to the structure's foundation into account. It depends on how rigid the structure is. As stiffness increases, less displacement will be produced in the building and vice versa. As we proceed further up the structure, we can anticipate increasing total displacement values.

The lateral displacement of the adjacent stories in relation to the storey height is known as "storey drift." A storey drift ratio is defined storey drift divided by the storey height. The variation of storey displacement and storey drift ratio for basic models is tabulated in Table 6.2 and Table 6.3 which is graphically represented by Figure 6.4 and Figure 6.5.

Table 6.2: Storey Displacement for models with variation in percentage of masonry infills

STOREY LEVEL (m)	Storey Displacement (mm)				
	Bare Frame	25% Infilled Frame	50% Infilled Frame	75% Infilled Frame	Fully Infilled Frame
0	0.434	0.364	0.348	0.326	0.562
3	3.986	2.18	2.045	1.907	1.912
6	8.279	3.778	3.567	3.301	3.245
9	12.589	5.373	5.077	4.689	4.586
12	16.706	6.949	6.568	6.062	5.912
15	20.458	8.439	7.975	7.361	7.171
18	23.651	9.765	9.226	8.519	8.295
21	26.066	10.84	10.237	9.459	9.212
24	27.535	11.589	10.937	10.115	9.854

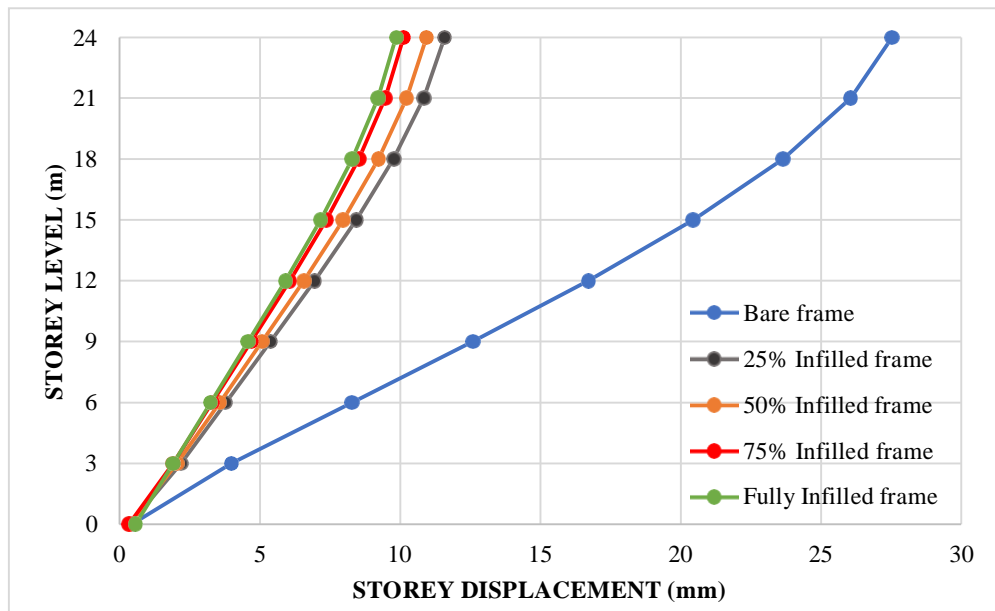


Figure 6.4: Storey Displacement variation for different percentages of masonry infills

From the above findings, it is clear that the displacement in the bare frame model is greater than the models with various infill percentages. Additionally, the model with a fully infilled frame has least displacement as the infills provide enough stiffness. Since the other models' infill percentages have decreased (i.e., for 25%,50%,75% partial infilled frames), it is seen that the displacement is increasing in comparison to the model with fully infilled frame.

Table 6.3: Storey Drift ratio for models with variation in percentage of masonry infills

STOREY LEVEL (m)	Storey Drift Ratio				
	Bare Frame	25% Infilled Frame	50% Infilled Frame	75% Infilled Frame	Fully Infilled Frame
0	0.000000	0.000000	0.000000	0.000000	0.000000
3	0.001184	0.000916	0.000721	0.000480	0.000450
6	0.001431	0.000986	0.000756	0.000501	0.000444
9	0.001437	0.000973	0.000750	0.000500	0.000447
12	0.001372	0.000934	0.000727	0.000491	0.000442
15	0.001251	0.000857	0.000673	0.000462	0.000420
18	0.001064	0.000734	0.000583	0.000408	0.000375
21	0.000805	0.000558	0.000450	0.000325	0.000306
24	0.000490	0.000363	0.000294	0.000222	0.000214

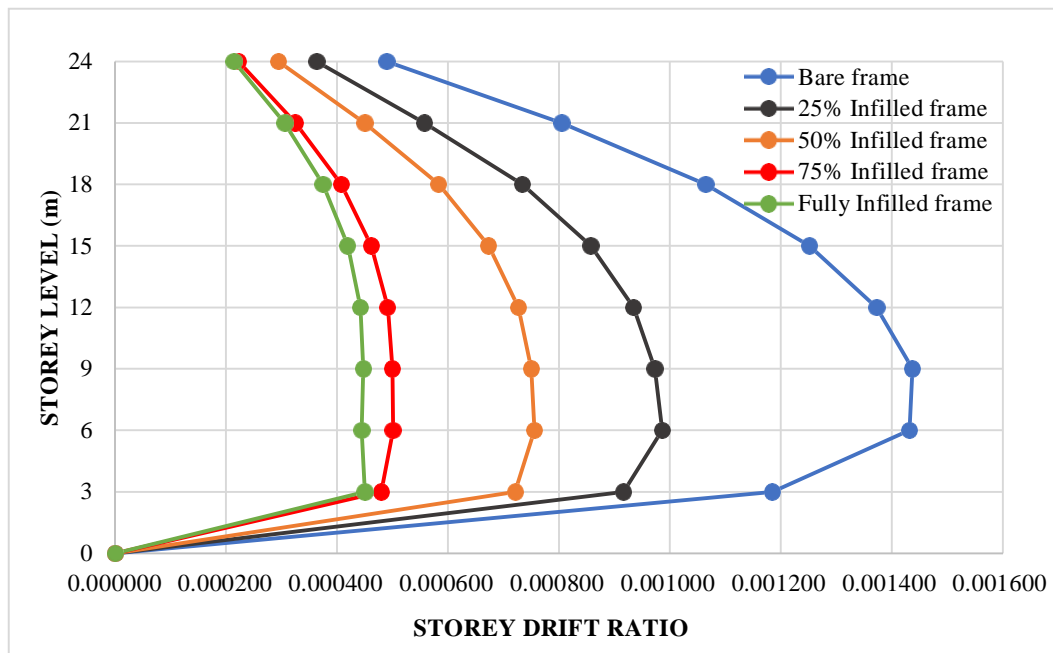


Figure 6.5: Storey Drift ratio variation for different percentages of Masonry infills

Storey drift ratio is observed to be more for bare frame models and less for completely infilled models. As the proportion of masonry infill decreases, the story drift keeps

increasing. According to the results, the inclusion of an infill wall enhances lateral stiffness and drift and displacement control.

6.1.4 FUNDAMENTAL TIME PERIOD

It is the property of the structure which depends on the mass and the stiffness. Here, the approximate method to find the time period proposed by design codes is not used as it provides constant natural periods. This can be due to the approximate method being dependent on an empirical formula influenced by key factors of total height and the type of the structure. The empirical expressions for the approximate method provide computed natural periods of 0.813 sec for bare frame model which is significantly shorter than that the obtained value.

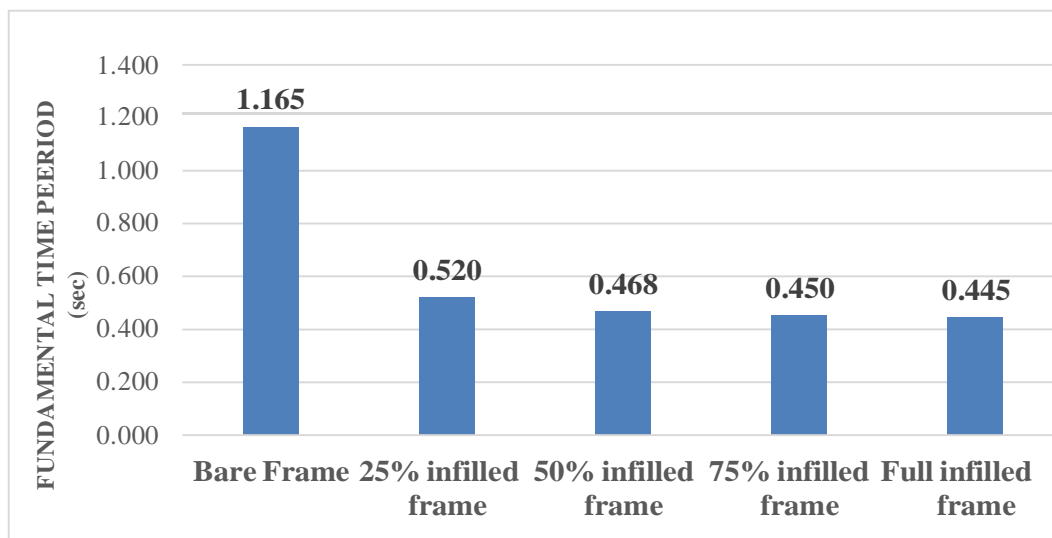


Figure 6.6: Fundamental Time Period variation for different percentages of Masonry infills

In the Bare frame model, as the masonry infill walls are ignored the natural period induced is overestimated compared to the fully infilled model. It can be observed from the numerical results that the bare frame model provides 1.62 times more the value of the natural period provided by the fully infilled frame model.

The results of the partially infilled frame model, provides natural period a bit higher than the corresponding value of the fully infilled frame model. This can be due to the presence of opening at the outer periphery due to the partial infilled frames. That is the masonry infill is ignored at that level leading to a reduction in the lateral stiffness.

It is noted that the time period increases by 16.85%, 5.17%, 1.12% for 25%, 50%, 75% partial infilled masonry frames, respectively.

6.2 RESULTS FOR 25% PARTIAL INFILLED FRAME

6.2.1 SHEAR FORCE IN THE COLUMN

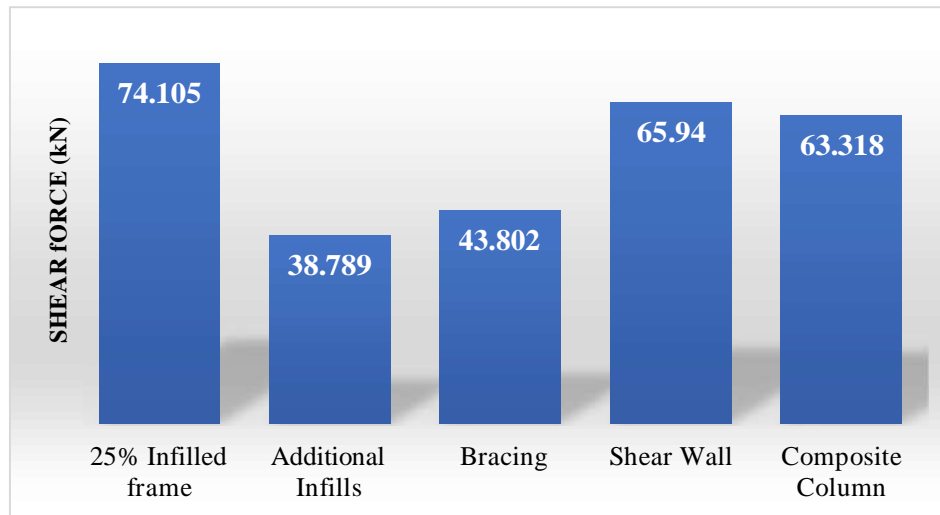


Figure 6.7: Shear Force variation for 25% partial infilled frames with different methods adopted

From the above findings, it is clear that the availability of various techniques aids in the decrease of shear force in the column with a 25% partial infilled frame. It should be noted that compared to the 25% partial-infilled frame, there has been a reduction in the shear force for the provision of additional infill frame by 47.65%, bracing by 40.89%, shear wall by 11.02%, and composite column by 14.56%.

6.2.2 STOREY SHEAR AND BASE SHEAR

The variation of storey shear and base shear for models with 25% partial infilled frames with different methods adopted is tabulated in Table 6.4 and is graphically represented by Figure 6.8 and Figure 6.9.

Table 6.4: Storey Shear variation for models with 25% partial infilled frames with different methods adopted

Storey Level (m)	25% infilled frame	Additional infills	Bracing	Shear Wall	Composite Column
3	5318.720	5604.660	5334.363	5415.439	5207.190
6	5270.354	5412.888	5286.127	5366.255	5159.863
9	5131.581	5280.462	5147.022	5224.723	5023.861
12	4851.221	5122.113	4865.928	4939.006	4749.29
15	4379.839	4631.303	4393.248	4458.828	4287.828
18	3667.998	3888.241	3679.384	3733.916	3591.154
21	2666.263	2840.711	2674.739	2713.997	2610.948
24	1325.196	1436.497	1329.714	1348.795	1298.888

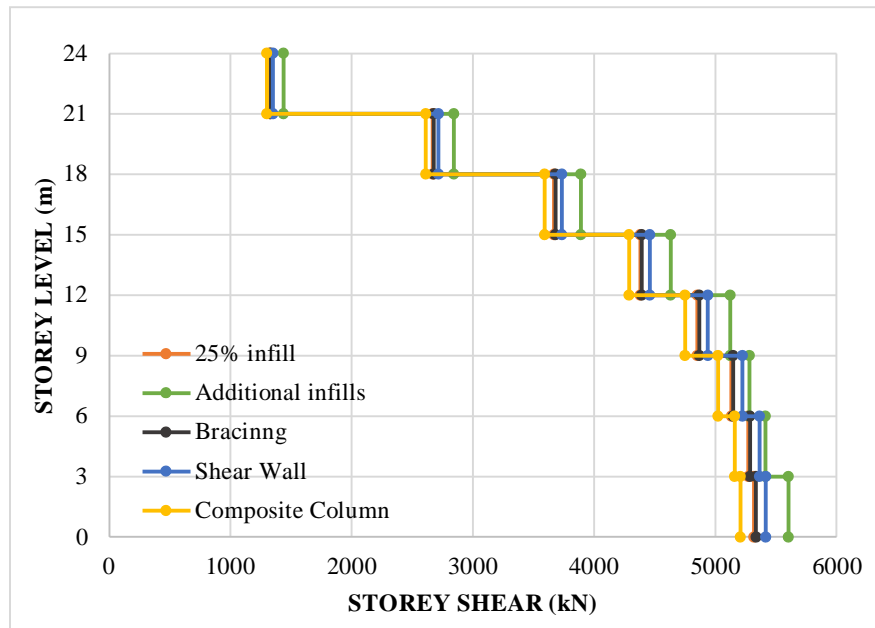


Figure 6.8: Storey Shear variation for models with 25% partial infilled frames with different methods adopted

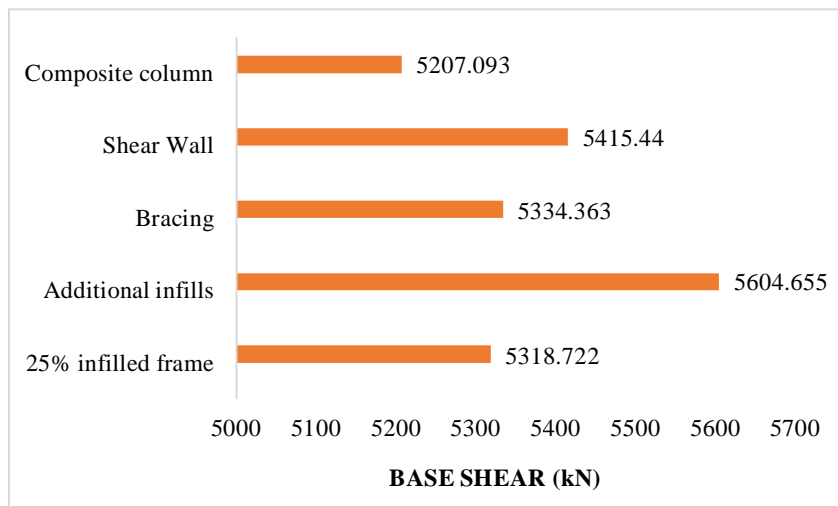


Figure 6.9: Base Shear variation for models with 25% partial infilled frames with different methods adopted

From the results obtained it is noticed that the base shear value when compared to the 25% partially infilled frame, increases by 5.38% for additional infill frames, 0.29% for bracing, 1.82% for shear wall and 2.09% for composite column.

6.2.3 STOREY DISPLACEMENT AND STOREY DRIFT RATIO

The variation of storey displacement and storey drift ratio for basic models is tabulated in Table 6.5 and Table 6.6 which is graphically represented by figure 6.10 and figure 6.11.

Table 6.5: Storey displacement Variation For models with 25% partial infilled frames with different methods

STOREY LEVEL (m)	STOREY DISPLACEMENT (mm)				
	25% Infilled Frame	Additional infill	Bracing	Shear Wall	Composite Column
0	0.364	0.373	0.361	0.241	0.286
3	2.180	2.323	1.890	1.954	2.378
6	3.778	3.976	3.310	3.370	3.995
9	5.373	5.652	4.729	4.766	5.615
12	6.949	7.305	6.138	6.124	7.220
15	8.439	8.866	7.476	7.378	8.740
18	9.765	10.253	8.673	8.454	10.097
21	10.840	11.374	9.654	9.262	11.204
24	11.589	12.146	10.352	9.768	11.979

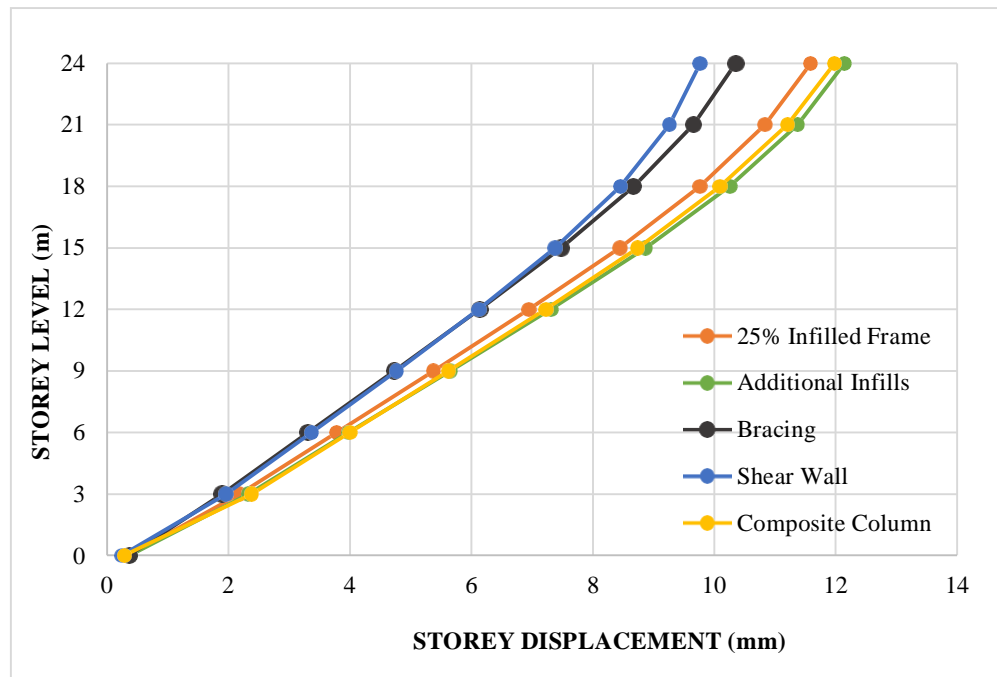


Figure 6.10: Storey displacement variation for 25% partial infilled frames with different methods adopted

The results show that when compared to the 25% partially infilled frame model, the maximum displacement for models with 25% Partially infilled Frame with Additional infills adjoining the column and composite column increased by 4.8% and 3.36% and decrease in models with bracing, shear wall by 10.67% and 15.71% respectively.

Table 6.6: Storey drift ratio variation For models with 25% partial infilled frames with different methods adopted

STOREY LEVEL (m)	Storey Drift Ratio				
	25% Infilled Frame	Additional infill	Bracing	Shear Wall	Composite Column
0	0.000000	0.000000	0.000000	0.000000	0.000000
3	0.000916	0.000650	0.000510	0.000510	0.000697
6	0.000986	0.000551	0.000473	0.000472	0.000539
9	0.000973	0.000559	0.000473	0.000465	0.000540
12	0.000934	0.000551	0.000470	0.000453	0.000535
15	0.000857	0.000520	0.000446	0.000418	0.000507
18	0.000734	0.000462	0.000399	0.000359	0.000452
21	0.000558	0.000374	0.000327	0.000269	0.000369
24	0.000363	0.000257	0.000233	0.000169	0.000258

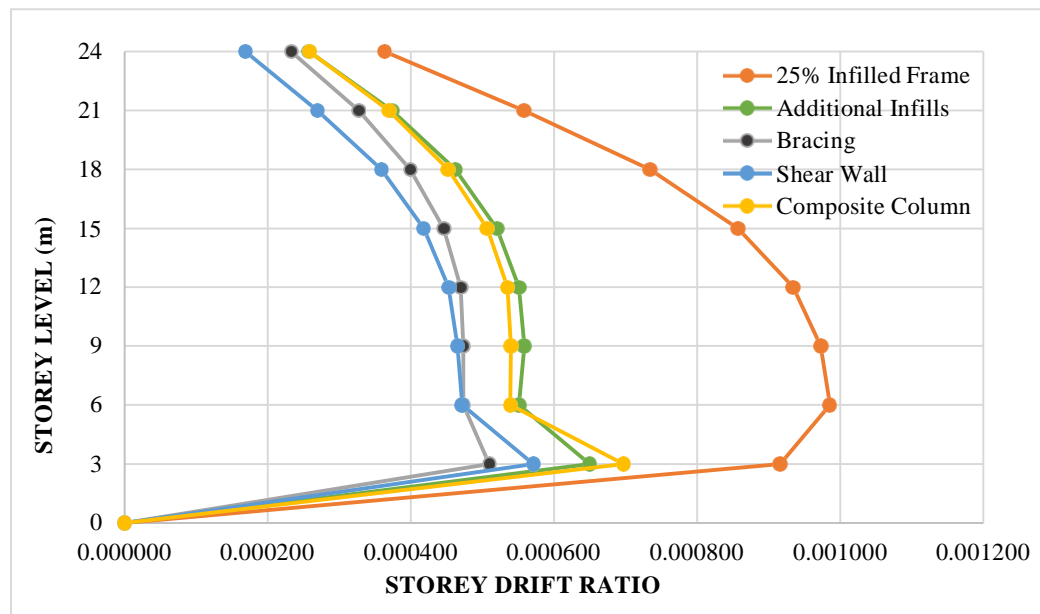


Figure 6.11: Storey drift ratio variation for 25% partial infilled frame with different methods adopted

It is observed that the maximum drift is due to the 25% partially infilled frame model.

The minimum drift is observed due to the addition of shear wall in the 25% partially infilled frame model.

6.2.4 FUNDAMENTAL TIME PERIOD

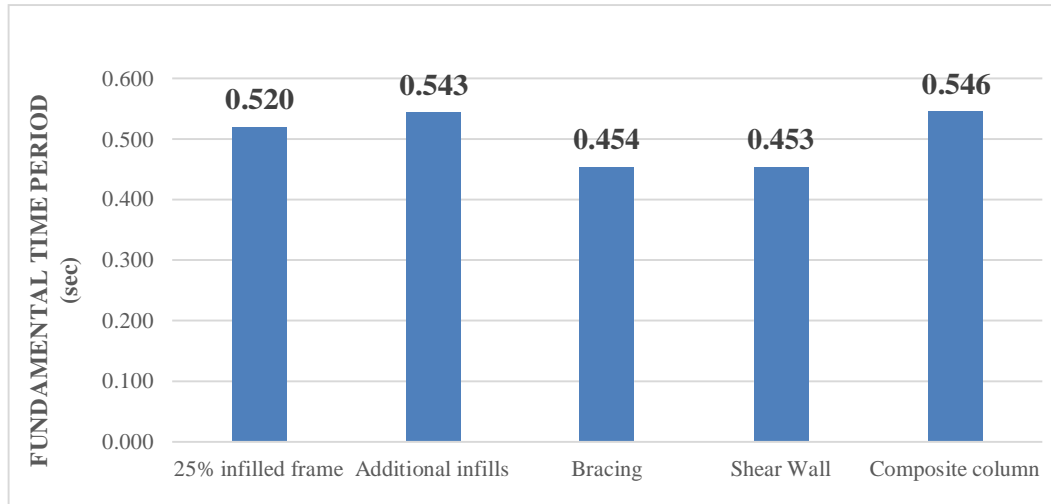


Figure 6.12: Time Period variation for 25% partial infilled frames with different methods adopted

According to the results, when compared to the 25% partially infilled frame model, the time period has increased by 4.42% and 5% for models with additional infills and composite column, and reduced by 12.69% and 12.88% for models with bracing and shear wall respectively.

6.3 RESULTS FOR 50% PARTIAL INFILLED FRAME

6.3.1 SHEAR FORCE IN THE COLUMN

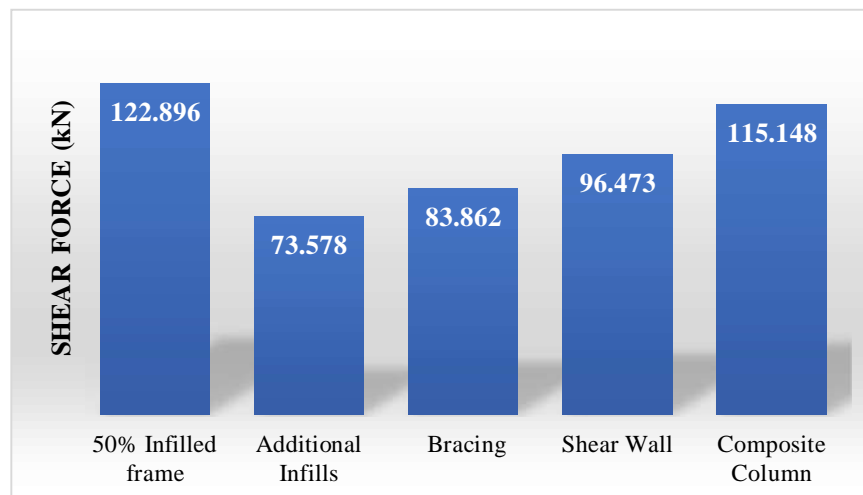


Figure 6.13: Shear Force variation for 50% partial infilled frames with different methods adopted

From the above findings, it is clear that the availability of various techniques aids in the decrease of shear force in the column with a 50% partial infilled frame. It should be noted

that compared to the 50% partial-infilled frame, there has been a reduction in the shear force for the provision of additional infill frame by 40.13%, bracing by 31.76%, shear wall by 21.5%, and composite column by 6.31%.

6.3.2 STOREY SHEAR AND BASE SHEAR

The variation of storey shear and base shear for models with 50% partial infilled frames with different methods adopted is tabulated in Table 6.7 and is graphically represented by Figure 6.14 and Figure 6.15.

Table 6.7: Storey Shear variation for models with 50% partial infilled frames with different methods adopted

Storey Level	50% Infilled Frame	Additional infills	Bracing	Shear Wall	Composite Column
3	5557.160	5747.73	5575.365	5606.21	5445.56
6	5506.448	5551.175	5524.725	5555.075	5396.018
9	5360.661	5347.085	5378.514	5407.821	5253.132
12	5066.026	5196.872	5082.969	5110.508	4964.491
15	4570.609	4748.539	4585.97	4610.865	4479.276
18	3822.477	3985.087	3835.399	3856.619	3746.672
21	2769.696	2908.59	2779.137	2795.5	2715.86
24	1360.333	1461.889	1365.066	1375.235	1336.025

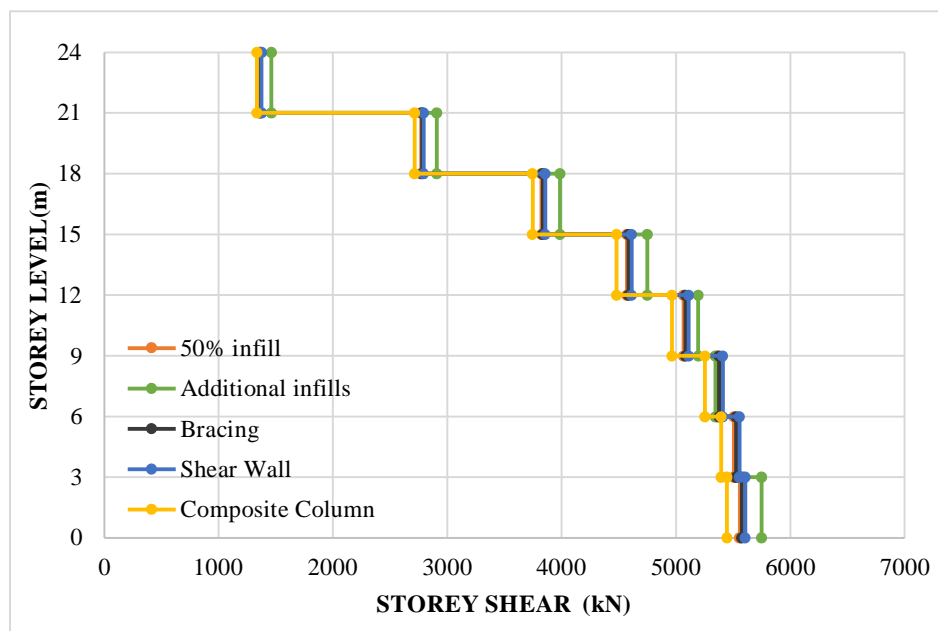


Figure 6.14: Storey Shear variation for models with 50% partial infilled frames with different methods adopted

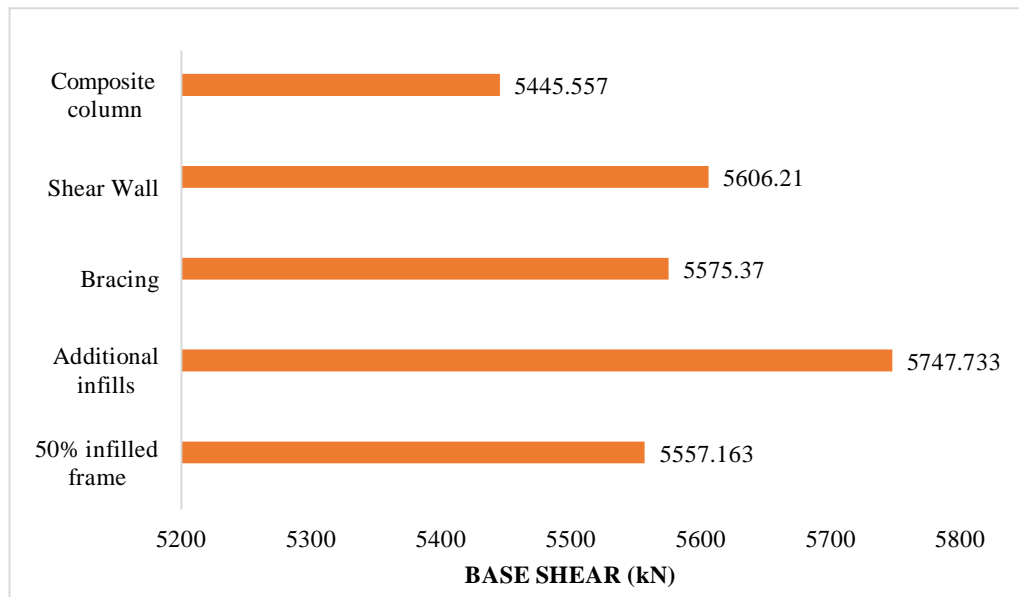


Figure 6.15: Base Shear Variation For 50% partial infilled frames with different methods adopted

From the results obtained it is noticed that the base shear value when compared to the 50% partially infilled frame, increases by 3.43 % for additional infill frames, 0.33% for bracing, 0.88% for shear wall and 2.01% for composite column.

6.3.3 STOREY DISPLACEMENT AND STOREY DRIFT RATIO

The variation of storey displacement and storey drift ratio for basic models is tabulated in Table 6.8 and Table 6.9 which is graphically represented by Figure 6.16 and Figure 6.17.

Table 6.8: Storey displacement variation for models with 50% partial infilled frames with different methods adopted

STOREY LEVEL (m)	Displacement (mm)				
	50% Infilled Frame	Additional infill	Bracing	Shear Wall	Composite Column
0	0.348	0.414	0.426	0.313	0.409
3	2.045	2.146	1.852	1.849	2.228
6	3.567	3.73	3.226	3.209	3.776
9	5.077	5.307	4.593	4.545	5.315
12	6.568	6.862	5.947	5.843	6.836
15	7.975	8.33	7.231	7.038	8.276
18	9.226	9.634	8.377	8.058	9.558
21	10.237	10.687	9.31	8.812	10.599
24	10.937	11.414	9.967	9.276	11.323

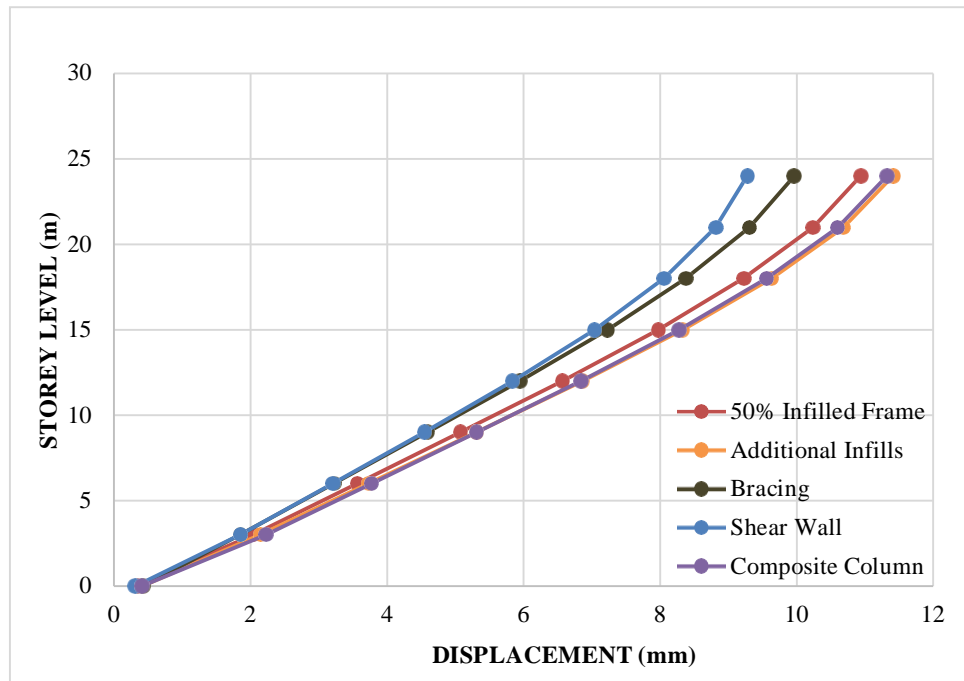


Figure 6.16: Storey displacement variation for models with 50% partial infilled frames with different methods adopted

The results show that when compared to the 50% partially infilled frame model, the maximum displacement for models with 50% Partially infilled Frame with Additional infills adjoining the column and composite column increased by 4.36% and 3.53% and decrease in models with bracing, shear wall by 8.87% and 15.21% respectively.

Table 6.9: Storey drift ratio Variation For models with 50% partial infilled frames with different methods adopted

STOREY LEVEL (m)	Storey Drift Ratio				
	50% Infilled Frame	Additional infill	Bracing	Shear Wall	Composite Column
0	0.000000	0.000000	0.000000	0.000000	0.000000
3	0.000721	0.000577	0.000475	0.000512	0.000606
6	0.000756	0.000528	0.000458	0.000453	0.000516
9	0.000750	0.000526	0.000456	0.000445	0.000513
12	0.000727	0.000518	0.000451	0.000433	0.000507
15	0.000673	0.000489	0.000428	0.000398	0.000480
18	0.000583	0.000435	0.000382	0.000340	0.000427
21	0.000450	0.000351	0.000311	0.000251	0.000347
24	0.000294	0.000242	0.000219	0.000155	0.000241

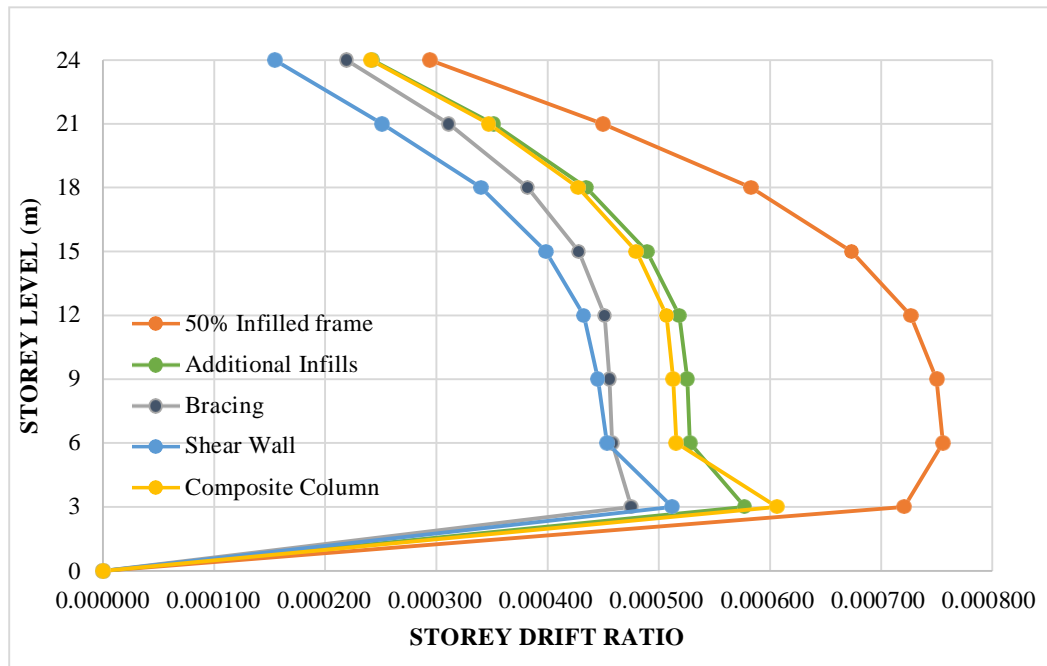


Figure 6.17: Storey drift variation for 50% partial infilled frames with different methods adopted

It is observed that the maximum drift is due to the 50% partially infilled frame model.

The minimum drift is observed due to the addition of shear wall in the 50% partially infilled frame model.

6.3.4 FUNDAMENTAL TIME PERIOD

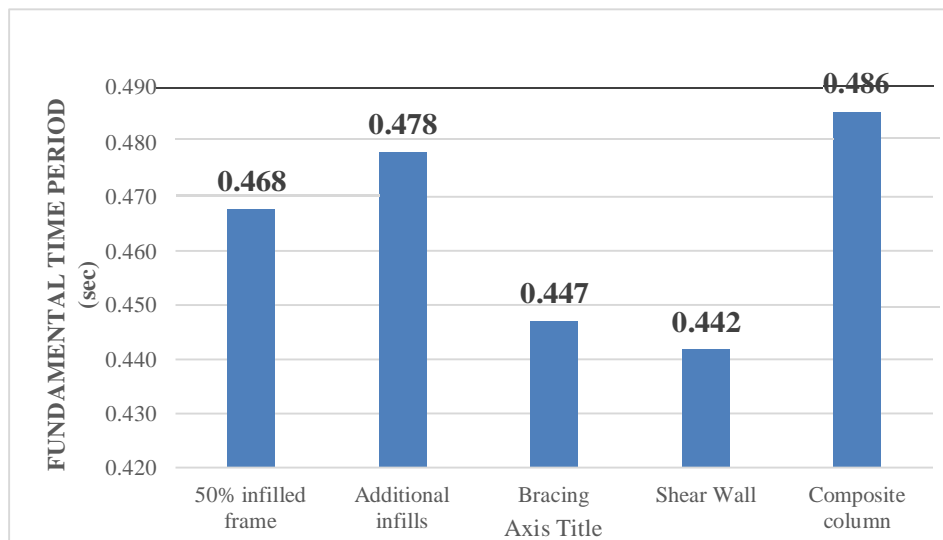


Figure 6.18: Time Period variation for 50% partial infilled frames with different methods adopted

According to the results, when compared to the 50% partially infilled frame model, the time period has increased by 2.14% and 3.85% for models with additional infills and

composite column, and reduced by 4.48% and 5.55% for models with bracing and shear wall respectively

6.4 RESULTS FOR 75% PARTIAL INFILLED FRAME

6.4.1 SHEAR FORCE IN THE COLUMN

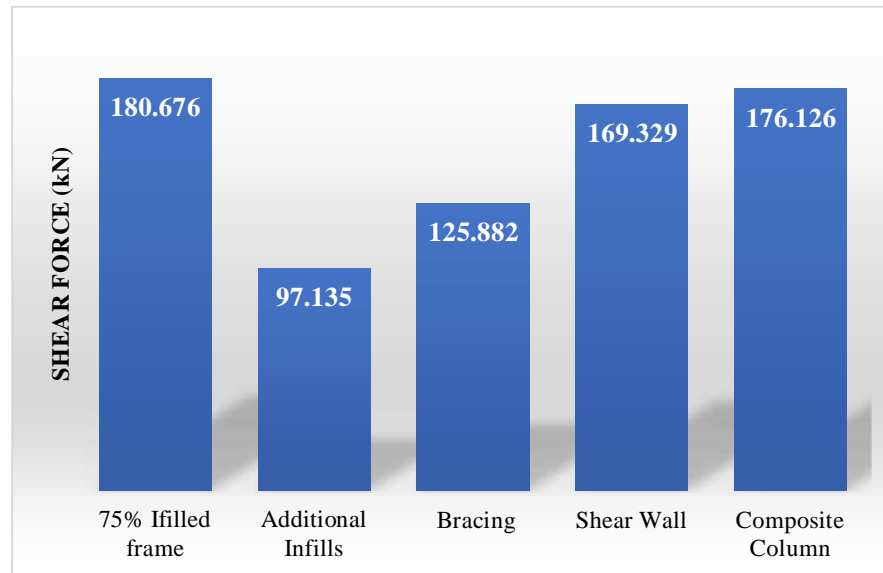


Figure 6.19: Shear Force variation for 75% partial infilled frames with different methods adopted

From the above findings, it is clear that the availability of various techniques aids in the decrease of shear force in the column with a 75% partial infilled frame. It should be noted that compared to the 75% partial-infilled frame, there has been a reduction in the shear force for the provision of additional infill frame by 46.23%, bracing by 30.33%, shear wall by 6.28%, and composite column by 2.52%.

6.4.2 STOREY SHEAR AND BASE SHEAR

The variation of storey shear and base shear for models with 75% partial infilled frames with different methods adopted is tabulated in Table 6.10 and is graphically represented by Figure 6.20 and Figure 6.21.

Table 6.10: Storey Shear variation for models with 75% partial infilled frames with different methods adopted

Storey Level	75% Infilled Frame	Additional infills	Bracing	Shear Wall	Composite Column
3	5795.430	5890.81	5813.83	5796.216	5684.02
6	5742.006	5840.57	5760.588	5743.455	5631.656
9	5588.474	5691.939	5607.173	5589.882	5481.171
12	5278.842	5388.34	5297.425	5280.389	5177.75
15	4758.881	4830.985	4776.926	4760.869	4668.278
18	3974.362	4095.813	3991.261	3977.215	3899.644
21	2871.056	2996.675	2886.012	2875.32	2818.735
24	1394.734	1522.14	1406.761	1401.075	1372.437

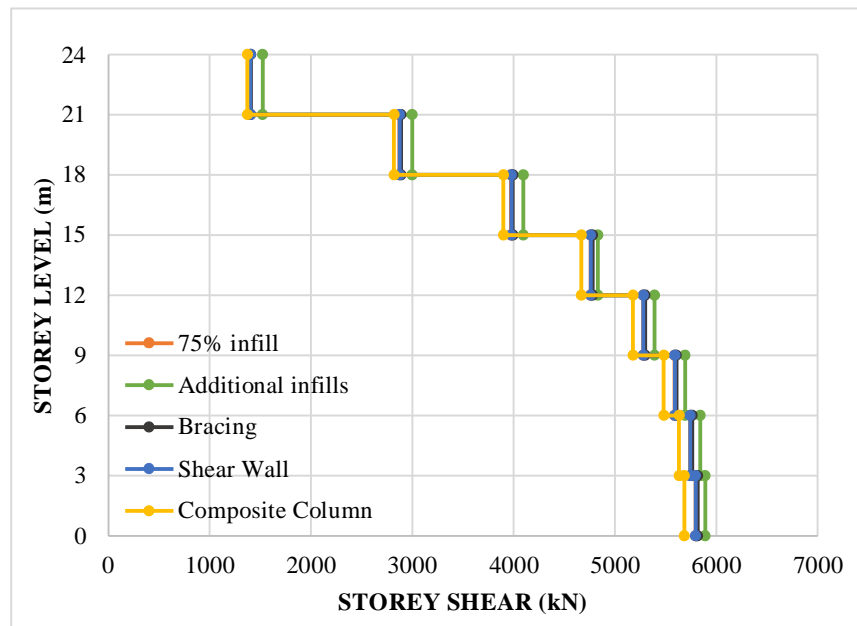


Figure 6.20: Storey Shear variation for models with 75% partial infilled frames with different methods adopted

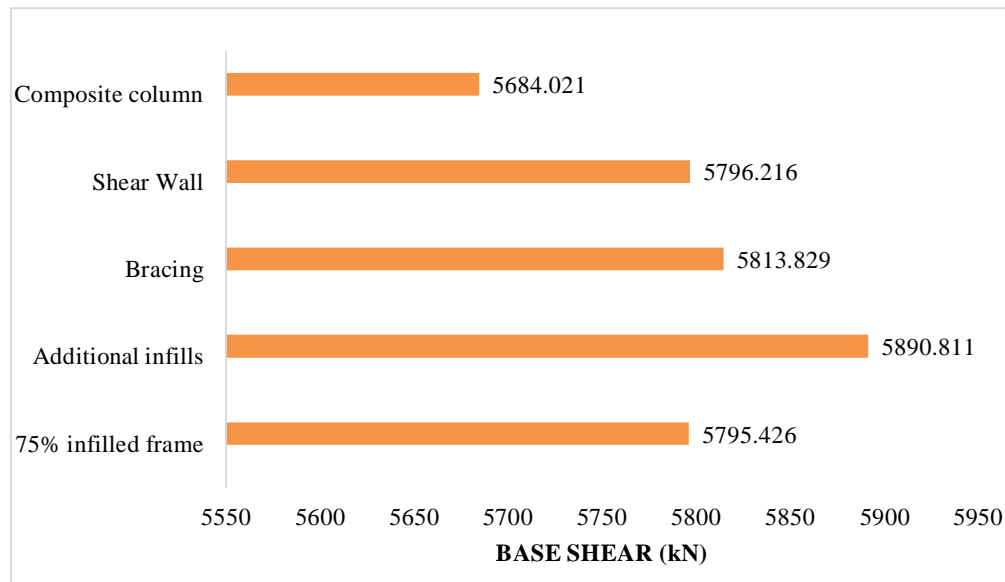


Figure 6.21: Base Shear Variation For 75% partial infilled frames with different methods adopted

From the results obtained it is noticed that the base shear value when compared to the 75% partially infilled frame, increases by 1.65% for additional infill frames, 0.32% for bracing, 0.13% for shear wall and 1.92% for composite column.

For additional infills since the mass of the structure is increased by adding the infills adjoining to the column, increase in the base shear is observed

In Bracing, steel angle sections are added in the second and fourth bay of the models. Shear wall of size less than the masonry infill is placed orthogonally on the central bay of the model. Therefore, no much increase in the mass is observed. The Sections of the composite column are reduced, thereby reducing the mass of the structure. Hence, a considerable decrease is observed.

6.4.3 STOREY DISPLACEMENT AND STOREY DRIFT RATIO

The variation of storey displacement and storey drift ratio for basic models is tabulated in Table 6.11 and Table 6.12 which is graphically represented by Figure 6.22 and Figure 6.23.

Table 6.11: Storey displacement Variation For models with 75% partial infilled frames with different methods adopted

STOREY LEVEL (m)	Displacement (mm)				
	75% Infilled Frame	Additional infill	Bracing	Shear Wall	Composite Column
0	0.326	0.494	0.534	0.43	0.605
3	1.907	2.028	1.781	1.747	2.061
6	3.301	3.506	3.117	3.028	3.468
9	4.689	4.984	4.459	4.292	4.869
12	6.062	6.444	5.787	5.522	6.258
15	7.361	7.825	7.042	6.655	7.575
18	8.519	9.055	8.157	7.619	8.752
21	9.459	10.051	9.06	8.328	9.712
24	10.115	10.742	9.692	8.752	10.385

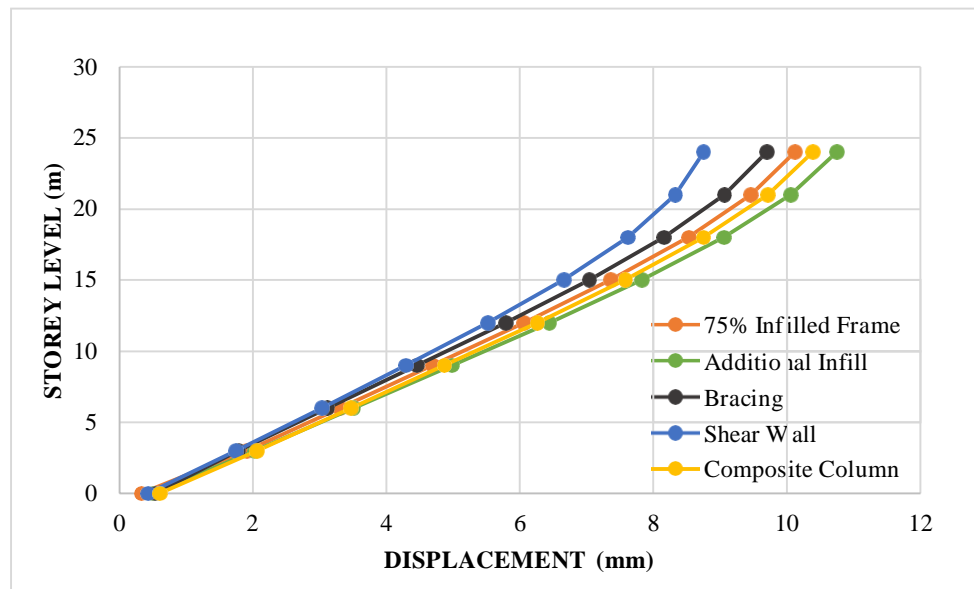


Figure 6.22: Storey displacement Variation For models with 75% partial infilled frames with different methods adopted

The results show that when compared to the 75% partially infilled frame model, the maximum displacement for models with 75% Partially infilled Frame with Additional

infills adjoining the column and composite column increased by 6.19% and 2.67% and decrease in models with bracing, shear wall by 4.18% and 13.47% respectively.

Table 6.12: Storey drift Variation For models with 75% partial infilled frames with different methods adopted

STOREY LEVEL (m)	Storey Drift Ratio				
	75% Infilled Frame	Additional infill	Bracing	Shear Wall	Composite Column
0	0.000000	0.000000	0.000000	0.000000	0.000000
3	0.000480	0.000511	0.000416	0.000439	0.000485
6	0.000501	0.000493	0.000445	0.000427	0.000469
9	0.000500	0.000493	0.000447	0.000421	0.000467
12	0.000491	0.000487	0.000443	0.000410	0.000463
15	0.000462	0.000460	0.000418	0.000378	0.000439
18	0.000408	0.000410	0.000372	0.000321	0.000392
21	0.000325	0.000332	0.000301	0.000236	0.000320
24	0.000222	0.000230	0.000211	0.000141	0.000224

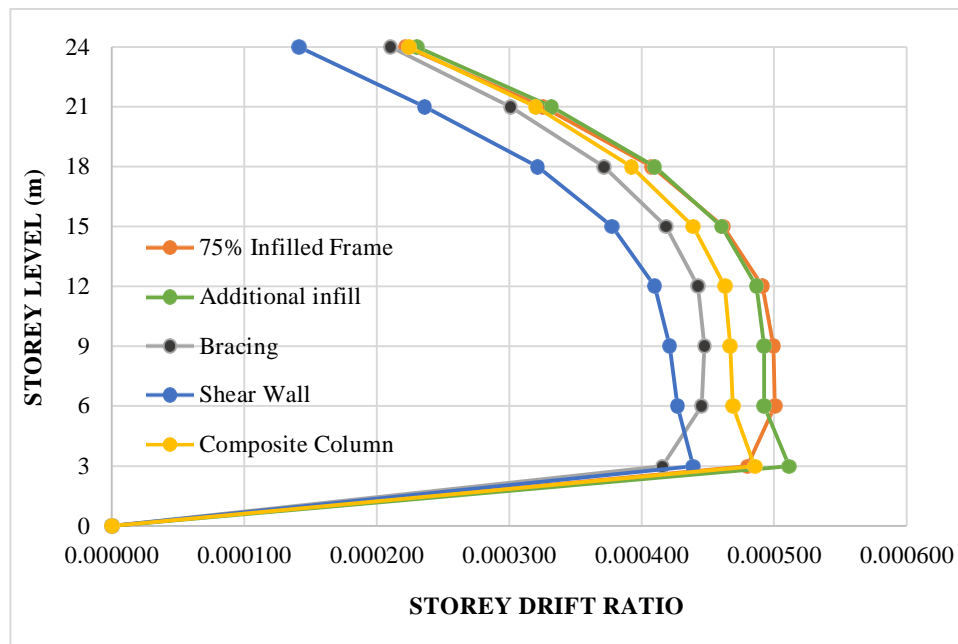


Figure 6.23: Storey drift ratio variation for 75% partial infilled frames with different methods adopted

It is observed that the maximum drift is due to the 75% partially infilled frame model. The minimum drift is observed due to the addition of shear wall in the 75% partially infilled frame model.

6.4.4 FUNDAMENTAL TIME PERIOD

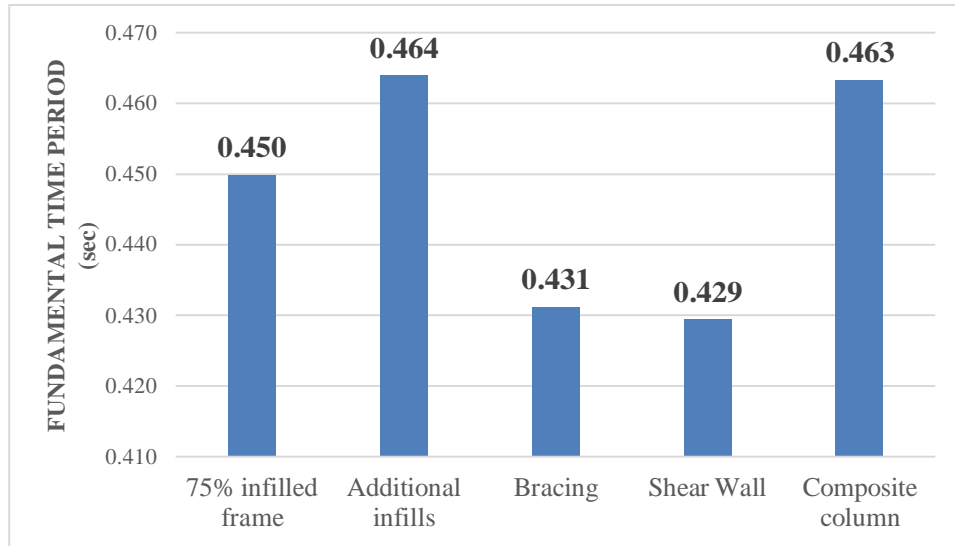


Figure 6.24: Time Period variation for 75% partial infilled frames with different methods adopted

According to the results, when compared to the 75% partially infilled frame model, the time period has increased by 3.11% and 2.88% for models with additional infills and composite column, and reduced by 4.22% and 4.67% for models with bracing and shear wall respectively.

CHAPTER 7

CONCLUSIONS

In the present analytical study, a G+7 storied building model with varying percentage of masonry infills are considered as the basic models. The aim is to mitigate the short column effect in the columns due to the partial infilled masonry. Therefore, several common methods such as providing additional infills to the adjoining columns, bracing, shear wall, composite column are provided in the models with partial infills. The results are obtained from the response spectrum analysis. With the help of various parameters like shear force in column, storey shear, base shear, storey displacement, storey drift and time period the following outcomes can be listed.

The results of partial infill frames with varying percentage of infills reveal that maximum shear force in the structure with 75% infill is 835.85% greater as compared to fully infilled frames. Similarly for structure with 50% and 25% infill, it is greater by 536.54% and 283.82% respectively. The magnitude of increase in the shear force for Partial infill frames make it vulnerable for failure due to short column effect. This behaviour confirms with similar investigations on short column effect [21]

Partial infill structure with 25% infill masonry:

The increase in shear force in the columns is 283.82% when compared to fully infilled structure and 43.94% when compared to bare frame structure.

As compared to the fully infilled structure, the shear force is reduced for the four different types of structural forms. The percentage reduction in shear force was:

Structure with additional infill adjoining to the column = 47.65%.

Structure with Bracing = 40.89%

Structure with Shear Wall = 11.018%

Structure with Composite column = 14.56%.

The other parameters when compared with that of fully infilled structure indicate that the base shear increases and storey drift ratio decreases for all the four types of structural forms. The storey displacement are higher for Structure with additional infill (4.8%) and Structure with Composite column (3.36%), whereas lower in the case of Structure with Bracing (10.67%) and Structure with Shear Wall (15.71%). Similarly, Time

period of the building is higher for Structure with additional infill (4.42%) and Structure with Composite column (5%), whereas lower in the case of Structure with Bracing (12.69%) and Structure with Shear Wall (12.88%).

Partial infill structure with 50% infill masonry:

The increase in shear force in the columns is 536.54% when compared to fully infilled structure and 138.7% when compared to bare frame structure.

As compared to the fully infilled structure, the shear force is reduced for the four different types of structural forms. The percentage reduction in shear force was:

Structure with additional infill adjoining to the column = 40.13%.

Structure with Bracing = 31.76%

Structure with Shear Wall = 21.5%

Structure with Composite column = 6.31%.

The other parameters when compared with that of fully infilled structure indicate that the base shear increases and storey drift ratio decreases for all the four types of structural forms. The storey displacement are higher for Structure with additional infill (4.36%) and Structure with Composite column (3.53%), whereas lower in the case of Structure with Bracing (8.87%) and Structure with Shear Wall (15.21%). Similarly, Time period of the building is higher for Structure with additional infill (2.14%) and Structure with Composite column (3.85%), whereas lower in the case of Structure with Bracing (4.48%) and Structure with Shear Wall (5.55%).

Partial infill structure with 75% infill masonry:

The increase in shear force in the columns is 835.85% when compared to fully infilled structure and 250.94 % when compared to bare frame structure.

As compared to the fully infilled structure, the shear force is reduced for the four different types of structural forms. The percentage reduction in shear force was:

Structure with additional infill adjoining to the column = 46.23%.

Structure with Bracing = 30.33%

Structure with Shear Wall = 6.28%

Structure with Composite column = 2.52%.

The other parameters when compared with that of fully infilled structure indicate that the base shear increases and storey drift ratio decreases for all the four types of structural forms. The storey displacement are higher for Structure with additional infill (6.19%) and Structure with Composite column (2.67%), whereas lower in the case of Structure with Bracing (4.18%) and Structure with Shear Wall (13.47%). Similarly, Time period of the building is higher for Structure with additional infill (3.11%) and Structure with Composite column (2.88%), whereas lower in the case of Structure with Bracing (4.22%) and Structure with Shear Wall (4.67%).

CONCLUSION IN NUTSHELL

- On comparing the partial infill structures with additional infills, bracings, shear wall, and composite column respectively, for different structural parameters, it is clear that the additional infills mitigate shear force effectively.
- In the models with additional infills base shear increases due to the addition of mass to the structure. The storey displacement and storey drift ratio are observed to be comparatively more but are within the permissible limit (0.004). Also, there is increase in the time period when compared to other models.

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RETROFITTING OF RC STRUCT

nURE

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Abstract- Retrofitting is a technique of modification of existing structure to make them more resistant to seismic activity, ground motion or soil failure due to many reasons such as earthquake, bad quality of workmanship, design, environmental effects, etc. This project addresses methods of Analysis & methods of retrofitting. The safety of non-engineered structures against many reasons is a great concern because most losses of lives during earthquakes have occurred in such buildings. It is used to improve the structural capacities including strength, stiffness, ductility, stability of a building found to be deficient. Retrofitting is a special challenge if the structure is a historically significant. So many expansive methods are available for retrofitting & choice is a challenge. The fibre reinforced polymer composites has embraced by construction industry as alternate of repairing & strengthening of rcc structures. The research summarise the methods of retrofitting & behaviour of rc elements after they retrofitted with FRP.

(*Keywords—RC, Retrofitting, FRP*)

I. INTRODUCTION

A . General Concept :

In the current scenario, deterioration of rc structures is a worst problem. Many buildings are informally constructed in a traditional manner without formal design by qualified Engineers or Architects. Such buildings involve stone, brick, concrete blocks, rammed earth, wood posts and thatch roof or combination of some or all the above materials. They are built with mud, lime or cement mortar. Some times combination. of mortars having a mix is also used., The safety of these non-engineered buildings against earthquakes is of great concern especially because because most losses during earthquakes occurred in such a buildings.

Modification of existing structure to make them more resistant to seismic activity,ground motion or soil failure due to many reasons such as earthquake bad quality of workmanship design environmental effects and etc. The purpose is to make the building safer and less prone.

Retrofit strategy refers to options of increasing the strength, stiffness and ductility of the elements or the building as a whole. In retrofitting, the structure must be designed so it is in keeping with its purpose of use and is both safe and durable, with consideration given to the ease of retrofitting construction and post-retrofitting maintenance,as well as overall economy and environment-friendliness.It aims to strengthen a structure to satisfy the requirements of the current codes for seismic design. In respect , seismic retrofit is beyond conventional repair or even rehabilitation, refer to the goals, objectives and steps such as condition assessment of the structure, evaluation for seismic forces The extent of modification has to be determined based on the principle of introducing sufficient anchorage of all elements, providing bracing to vertical load carrying members in order to avoid premature mode of failure and to ensure continuity of all structural components in a building. The seismic resistance of buildings is lowered with passage of time due to material property degradation and structural strength loss.

Many options for retrofitting a structure are possible; the ones which are used traditionally for a long time now such as Addition Of New Shear Walls. Addition Of Infill Walls, Addition Of Wing (Side) Walls, Addition Of Buttresses, Jacketing Of Reinforced Concrete Members, Propping up, Steel collars, Casing, Building up, Bonding Steel Plates or Steel Jacketing. However, with increase in research and introduction of new materials and technology there are new ways of retrofitting the structure with many added advantages. Introduction of Fibre Reinforced Composites being one of them.

TERMINOLOGY

Buildings decay due to weather, load effects and foundation settlement etc. The types of intervention necessary to enhance the performance of the building can be broadly grouped under three categories Repair, Restoration and Strengthening..

REPAIR:

The purpose of repairs is to rectify the observed defectrs and bring the building to reasonable architectural shape so that all services start functioning Repairs do not improve structural strength or stability. I t may hide the structural defects. Outwardlyand it may appear good. It may suffer from structural weakness.

Repairs include following interventions:

i) Patching cracks and plastering, ii) Fixing doors, windows, broken glass panes. i) Setting right electrical installation, wiring etc. iv) Fixing services such as gas lime, plumbing services including water pipes, sewerage line etc. v) Rebuilding non- structural walls, partition walls, plastering etc. vi) Re-fixing roof tiles vii) Repair to flooring and correcting slope for drainage etc. viii) Providing decorative finishes, white washing, ix) Painting wood work. x) Attending to root leakage during rain etc.

Restoration:

The main purpose is to structurally treat the building with an aim to restore its original strength. This intervention is undertaken for a damaged building if one is sure that the original strength provides an adequate level of safety for future earthquake disaster

Some of the common restoration techniques are:

- i) Removal of a partition or defective wall and rebuilding it with richer mortar
- ii) Crack scaling using epoxy to regain the strength of a structural component.
- iii) Adding wire mesh on either side of a cracked component, crack stitching etc, with a view to strengthen

STRENGTHENING IS NOTHING BUT RETROFITTING.



Fig. Retrofitting-for structures by Strengthening

GOALS AND PRINCIPLES :

1. Increasing the lateral strength and stiffness of the building, the ductility and enhancing the energy dissipation capacity.
2. Giving unity to the structure.
3. Eliminating sources of weakness or those that produce concentration of stresses
4. The retrofit scheme should be cost effective.
5. Each retrofit strategy should consistently achieve the performance objective.
6. Many environmental and natural disasters, earthquake being the most affecting of all, has also produced a need to increase the present safety levels in buildings.

Performance objectives :

The goal is to protect human life, ensuring that the structure will not collapse upon its occupants or passers by, and that the structure can be safely exited. Under severe seismic conditions the structure may be a total economic write-off, requiring tear-down and replacement.

Structure survivability - The goal is that the structure, while remaining safe for exit, may require extensive repair (but not replacement) before it is generally useful or considered safe for occupation. This is typically the lowest level of retrofit applied to bridges Structure functionality. A high level of retrofit, this ensures that any required repairs are only "cosmetic" for example, minor cracks in plaster, drywall and stucco. This is the minimum acceptable level of retrofit for hospitals .

NEED OF RETROFITTING :

The retrofitting is one of the best options to make an existing inadequate building safe against future probable earthquake or other environmental forces, following are some deficiencies for which failure & damage is occurred.

BUILDING DEFICIENCIES The building deficiencies can be broadly classified as Local Deficiencies and Global Deficiencies.

Local Deficiencies : Local deficiencies lead to the failure of individual elements of the building. The observed deficiencies of the elements are summarized.

Columns - Inadequate shear capacity, b Lack of confinement of column core. Lack of 135° hooks, with adequate hook length, c. Faculty location of splice just above the floor, with inadequate tension splice length. d. Inadequate capacity of corner columns under biaxial seismic loads. e. Existence of short and stiff columns .

Global Deficiencies : Global deficiencies can broadly be classified as plan irregularities and vertical irregularities, as per the Code. The items left out are listed under miscellaneous deficiencies. Some of the observed irregularities are as follows.

Plan Irregularities a. Torsional irregularity due to plan symmetry and eccentric mass from water tank. b. Frequent re-entrant

comers c Diaphragm discontinuity due to large openings or staggered floors, along with the absence of collector elements. d. Out-of-plane offset for columns along perimeter.

Vertical Irregularities - Stiffness irregularity, soft storey due to open ground storey, b. Mass irregularity c. Vertical geometric irregularity from. set-back towers. d. In-plane discontinuity for columns along the perimeter of the building e. Weak storey due to open ground storey.

ADVANTAGES OF RETROFIT :

Strengthening or Retrofitting Versus Reconstruction

Replacement of damaged buildings or existing unsafe buildings by reconstruction is, generally, avoided due to a number of reasons, the main ones among them being

a) Higher cost than that of strengthening or retrofitting. In most instances. however, the relative cost of retrofitting to reconstruction cost determines the decision. As a thumb rule, if the cost of repair and seismic strengthening is less than about 50 percent of the reconstruction cost-the retrofitting is adopted.

b) Preservation of historical architecture, and

c) Maintaining functional social and cultural environment
This shall also require less working time and much less dislocation in the living style of the population. On the other hand reconstruction may offer the possibility of modernization of the habitat and may be preferred by well-to-do communities.

III. LITERATURE SURVEY

Author Name - Minakshi V. Vagbani, Sandip A. Vasanwala, & Atul K. Desai

Title - Advanced Retrofitting Techniques for RC Building

Publication Year- 2014

Technology Used - the different retrofitting techniques available and its suitability for particular conditions. Jacketing is excellent for column but it may not be too effective for beam or slab Finally, selection criteria for retrofitting technique are briefly discussed. A higher degree of damage in a building is expected during an earthquake if the seismic resistance of the building is inadequate. The decision to strengthen it before structural system of deficient building should be adequately strengthened in order to attain the desired level of seismic resistance.

Author Name - Dr. Gopal Rai

Title - New and emerging technologies for retrofitting and repairs

Publication Year- 2018

Technology Used - To meet up the requirements of advanced infrastructure new innovative materials/technologies in civil engineering industry has started to make its way. Any technology or material has its limitations and to meet the new requirements new technologies have to be invented and used.

Author Name - Giuseppe Oliveto & Massimo Marletta

Title - Seismic Retrofitting of RC buildings using traditional and innovative techniques.

Publication Year- 2005

Technology Used - After an introduction which explains why there are so many vulnerable structures in areas of high or moderate seismic hazard around the world, the authors consider the specific case of Eastern Sicily. The paper proceeds with an illustrative description of the seismic action and then addresses the problem of evaluating the seismic resistance and vulnerability of engineering structures. The application of the methodology presented to reinforced concrete buildings in Eastern Sicily clarifies the concepts discussed. In particular, the concepts of seismic resistance, seismic vulnerability and seismic over-resistance become easily understood and appreciated.

Author Name - Amlan K. Sengupta, Chemuru Srinivasulu Reddy, Badari Narayanan V T and Asokan A

Title - Seismic Analysis and Retrofit of existing multi-storeyed buildings in India - An overview with a case study

Publication Year- 2019

Technology Used - The paper presents a review of the existing retrofit strategies that are applicable for multi-storeyed residential reinforced concrete buildings addressed in the project. It also presents a case study of a three storeyed building, located in an urban area in earthquake zone III. After the earthquake in Bhuj, Gujarat, in 2001, there has been a concerted effort to address the seismic vulnerability of existing buildings in India. This paper is part of a project, whose aim is to evolve methodologies to assess the seismic vulnerability of reinforced concrete three- to ten- storeyed, residential and commercial buildings and to propose retrofit measures for the structurally deficient buildings .

Author Name - E. Brühwiler ,Ecole Polytechnique Fédérale de Lausanne

Title - Rehabilitation and strengthening of concrete structures using Ultra-High Performance Fibre Reinforced Concrete

Publication Year- 2012

Technology Used - An original concept using Ultra-High Performance Fibre Reinforced Concrete (UHPFRC) for the rehabilitation and strengthening of concrete structures has been developed and validated by means of site applications.

IV . PROPOSED METHODOLOGY

METHOD OF ANALYSIS -

components of seismic evaluation methodology:

The evaluation of any building is a difficult task, which requires a wide knowledge about the structures, cause and nature of damage in structures and its components, material strength etc. The proposed methodology is divided into three components:

1] **Condition Assessment** based on :

- (i) data collection or information gathering of structures from architectural and structural drawings.
- (ii) performance characteristics of similar type of buildings in past earthquakes,
- (iii) rapid evaluation of strength, drift, materials structural components and structural details. This component of methodology is primarily based on ATC-14 project and is used basically for undamaged existing structures.

2] **Visual Inspection/Field Evaluation** based on observed distress and damage in structure Visual inspection is more useful for damaged structures however it may also be conducted for undamaged structures.

2] **Non-Destructive Evaluation (NDE)** is generally carried out for quick estimation of materials strength, determination of the extent of deterioration and to establish causes remain out of reach from visual inspection and determination of reinforcement and its location. NDT may also be used for preparation of drawing incase of non- availability.

METHODS OF RETROFITTING

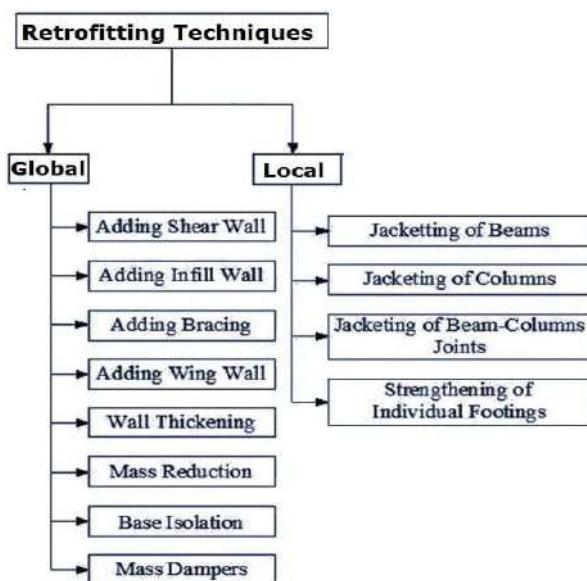


Fig. FLOWCHART

SELECTION OF RETROFITTING METHOD :

In selecting the retrofitting method, the current status of the existing concrete structure as determined through inspection, the performance of the structure, the performance required of the structure after retrofitting. the conditions for retrofitting construction work, the ease of maintenance. economy and other factors shall be considered include the effectiveness of the various retrofitting methods with respect to the required performance improvements, the viability of execution of the retrofitting work, the impact of the retrofitting work on the surrounding environment.



Fig.Retrofitting of a bridge



Fig. Structural-Damage

NEW EMERGING TECHNIQUE :FIBRE REINFORCED POLYMER (FRP)-

Concept Of FRP :

To retrofit or strengthen a sound structural member to resist increased loads due to changes in use of the structure or to address design or construction errors.

Composite material made of fibers in polymeric resin. Le all fibers & resins used to create the composite laminate Commonly used forms of FRC viz. Pre cured CFRC (Carbon Fibre.Reinforced Composite), Glass Fibre Reinforced polymer Composites (GFRC) rebar, glass fibre roll, etc.

-All applicable resins are used to bond it to the concrete substrate .

Fibre Reinforced Polymer (FRP) composites comprise fibres of high tensile strength within a polymer matrix such as vinylester or epoxy. The role of FRP for strengthening of existing or new reinforced concrete structures is growing at an extremely rapid mainly to the ease and speed of construction, and the possibility of application without disturbing the existing functionality of the structure. FRP composites have proved to be extremely useful for strengthening of RCC structures against both normal .

CHALLENGES AND TECHNICAL ISSUES

-The main concern with FRP composites is long-term durability because the materials do not have sufficient historical performance data in bridge applications. There is a concern among bridge engineers for the long-term integrity of bonded joints and components under cyclic fatigue loading There are concerns with improper curing of the resins and moisture absorption and/or ultraviolet light exposure of composites that may affect the strength and stiffness of the structural system. Certain resin systems are found ineffective in the presence of moisture, In the case of a glass fibre composite, moisture absorption may affect the resin and allow the alkali to degrade the fibres.

-It is not recommended to use these system as compressive reinforcement. While FRP materials can support compressive stress, there are numerous issues surrounding the use of FRP for compression, Microbuckling of fibre can occur if any resin voids are present in the laminate, themselves can buckle if not properly adhered or anchored to substrate

-The high strength, high fatigue resistance, lightweight, and corrosion resistance of composites are highly desirable characteristics for bridge applications. Currently, these new materials are a direct technology transfer from the aerospace industry, and they are far more advanced than those required by civil applications. Most of the advanced composite. materials that are cured at high temperature produce high quality components and possess excellent characteristics.



Fig. Carbin Fibre Reinforcement

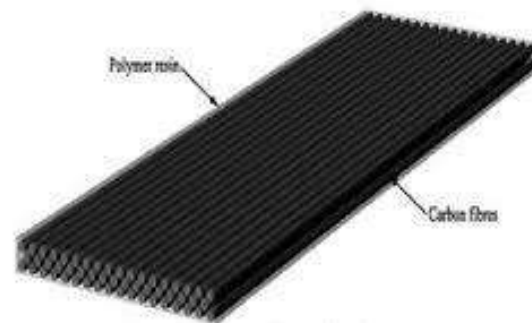


Fig. Carbon Fibre components



Fig. Glass Fibre

CONCLUSION :

Many environmental and natural disasters, earthquake being the most affecting of all, has also produced a need to increase the present safety levels in buildings. The understanding of the earthquakes, world over, is increasing day by day and therefore the seismic demands imposed on the structures get revised frequently. Similarly, the design methodologies value with the growing research in the area of seismic engineering and certain popular old design philosophies, such as multi storey structures, are no longer considered acceptable for earthquake resistant design. Many of the existing lifeline structures were analyzed, designed and detailed as per the recommendations of then prevalent codes. Such structures, pose a need to undergo re-evaluation process, say, every ten years. Such structures frequently may not qualify to current seismic requirements and therefore, retrofitting of the solution.

Any technology or material has its limitations and to meet the new requirements new technologies have to be invented and used. With structures becoming old and the increasing bar for the constructed buildings the old buildings have started to show a serious need of additional retrofits to increase their durability and life.

The retrofitting is one of the best options to make an existing inadequate building safe against future probable earthquake or other environmental forces.

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Rain Water Harvesting

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Abstract—

Water's subsequent in enlargement of weights on the allowed freshwater assets. Old technique for damming waterway and transporting water to urban zone has its own issues of everlasting inconveniences of social and political. Keeping in mind the end goal to save and take care of our day by day demand of water prerequisite, we have to think for elective savvy and generally less demanding mechanical techniques for monitoring water. Rain Water reaping is outstanding amongst other techniques satisfying those necessities.

Keywords – Rain, Borewell, Rainwater.

I. INTRODUCTION

The term Rainwater Harvesting is usually taken to mean the immediate collection of rainwater running off surfaces upon which it has fallen directly. This definition excludes run-off from land Watersheds into streams, rivers, lakes, etc.

It includes water that is collected within the boundaries of a property, from roofs and surfaces.

The Rainwater harvesting is the simple collection or storing of Water through scientific techniques from the areas where the rain falls.

It involves utilization of rain water for the domestic or the agricultural purpose.

The method of rain water harvesting has been into practice since ancient times.

II. AIM & OBJECTIVE

A. Aim & Objective

Aim - Feasibility of rain water harvesting.

Objectives: -

- 1) To modify and develop the Rain Water harvesting system.
- 2) To make aware about our product.
- 3) To implement our product in various states of India.

B. Ways Of Water Harvesting

- 1) Capturing run-off from rooftops, roads.
- 2) Capturing run-off from local catchments.
- 3) Capturing seasonal flood water from local streams.
- 4) Conserving water through watershed management. It involves utilization of rain. Water for domestic or agricultural purpose.

III. ADVANTAGES & DISADVANTAGES

Advantages: -

- 1) Reduces Flooding & Erosion.
- 2) Reduces Water Bills.
- 3) Reduces Demand On Ground Water.
- 4) Can Be Used For Non Drinking Purposes.

Disadvantages: -

- 1) Supplies can be contaminated by bird/ animal droppings on catchment surfaces and guttering structures unless they are cleaned / flushed before us.
- 2) Poorly constructed water jars/containers can suffer from algal growth and invasion by insects, lizards and rodents.
- 3) They can act as a breeding ground for disease vectors if they are not properly maintained.

A. Ways Of Water Harvesting

- 1) Surface Run Off Harvesting: -

It Is A Method In Which Rainwater Flowing As Surface Runoff Is Caught & Used For Recharging Aquifers By Adopting Appropriate Methods.

- 2) Roof Top Rain Water Harvesting: -
In Rooftop Harvesting, Roof Becomes The Catchment & The Rainwater Is Collected From Roof Of The House/Building. It Can Be Either Stored In Tank Or Diverted To Artificial Recharge System

B. Techniques Of Rain Water Harvesting

- 1) Storage Of Rainwater On Surface For Future Use: -
It is a method in which rainwater flowing as surface runoff is caught and used for recharging aquifers by adopting appropriate methods.
- 2) Recharge To Ground Water: -
The collected rainwater is transferred to the ground through suitable means for recharging the depleting aquifers.



C. Process

A rainwater harvesting system has three main stages:

1. Collecting & transporting rainwater:

This is done through catchment areas & conduits. The catchment of a water harvesting system is the surface which receives rainfall directly. It can be a paved area like the terrace or courtyard of a building. Conduits are the pipelines that carry rainwater from the catchment or rooftop to the harvesting system.

2. **Filtration:** A filter unit is a chamber filled with filtering media to remove debris and dirt from water before it enters the storage tank or recharge structure.

Identify applicable funding agency here. If none, delete this text box.

3. Storage in tanks for reuse /

recharging the groundwater levels: The harvested water can now be stored in storage tanks for immediate usage, which are designed according to the water requirements of the society. Existing non-potable water storage tanks in the society can also be used to store the harvested rainwater. The collected rainwater can also be used to recharge the groundwater levels by using structures like dug wells, bore wells, recharge trenches and recharge pits.

D. IMPLEMENTATION OF RAIN WATER HARVESTING

Rainwater harvesting (RWH) system is a technology that focuses on sustainability and support the sustainable environment development. The implementation of RWH systems provides many environments and financial benefits. Some of the environment benefits of RWH system are the reduction of surface runoff, reduce the burden of soil aquifer, and provide the availability of clean water. This study analyzed the RWH system implementation benefits both in environment and financial side. The financial benefits of RWH system implementation are calculated based on a number of rainwaters that can be used to replace the need for clean water. The environment benefits defined by the reduced of main water tap use and the reduced of generated roof runoff volume. This study used a simple RWH system that uses the roof as a catchment area, the pipeline as a distribution system, and tank as the storage system. The water use is for domestic potable and no potable for a household with up

to four occupants in Bandung. The catchment area is taken 70 m². A water balance model for various scenarios was developed to calculate the algorithm of the system. The costs taken in RWH system include the construction, installation, maintenance and operational costs. The analysis shows that the implementation of RWH systems provides advantages over the use of conventional systems. It can save clean water use up to 54.92% and provide runoff reduction up to 71.53%. RWH system applied requires

Additional costs approximately only 0.66% from the value of the house. It was found that it is possible to achieve payback in RWH system implementation under several scenarios.

E. How To Create Rooftop Rainwater Harvesting System for Your Client

- Check the roof surface first. Whether it is suitable to collect quality rainwater.
- Install gutter meshes to prevent blocking gutters from leaves and debris.
- Fit gutter outlets.
- Install first flush water diverters to prevent the first flush of most contaminated rainwater from entering the tank
- Install tank screen to keep mosquitoes and pests out.
- Select the right size of the water tank. Consider annual rainfall, roof catchment area, and water usage.
- Fit insect-proof screen to the end of all pipes and to tank overflow outlets.
- Install a pump system to distribute the water inside and outside of the premises.
- Fit insect-proof screen to the end of all pipes and to tank overflow outlets.
- Fit a water level indicator to help monitor water usage.

IV. DESIGN, PROCESS & IMPLEMENTATION

➤ **Design Of Recharge PIT:**

1) The recharge pit should be filled with the metal, to recharge slit free water.

2) Hence the materials to be filled in the pit are 60 mm metal, 40 mm metal, 20 mm metal, fine sand. The material should be filled depth wise in the pit. The coarser material should be filled at the bottom and finest on the top. The uppermost fine sand layer can be separated from the 20mm metal layer by using non corrosive wire mesh. It will help for the yearly maintenance. Depth of material for recharge pits:

Material to be filled	% Depth of material	Depth (in m)
60 mm metal	30%	0.45m
40 mm metal	30%	0.45 m
20 mm metal	20%	0.30 m
Fine sand	20%	0.30 m

➤ **Result And Discussions:**

Design of the rainwater harvesting system of GECA campus is

done using Geographic Information System (GIS).

For Catchment 1: Runoff potential for one storm of two hours = 5, 09,018 litres

For recharge, Size of recharge pit (1 and 2) is taken as = 10 m X 10m X

1.5 m % of runoff from rainfall obstructed and recharge in pit = 58.9% = 2,99,811 litres

For Catchment 2 :

Runoff potential for one storm of two hours = 2, 36,232 litres Forrecharge, size of recharge pit (3)

is taken as= 5 m X 5 m X 1.5m

% of runoff from rainfall obstructed and recharge in pit = 15.87% = 37,490 litres

Total annual runoff potential from catchment area considered (1 and2): 1, 19, 24,000 litres

Total annual recharge through pits: 53, 96,816 litres

Filter material for filling the recharge the pit is decided as 60mm metal (30% depth), 40 mm metal (30% depth), 20 mm.

Approximate expenditure for:

Recharge pit 1: Rs. 1,

44,637.5/-Recharge pit 2: Rs. 1,
44,637.5/-

Recharge pit 3: Rs. 37,409.375/-

Approximate expenditure for underground storage tank (5m X 5m X 1.5 m) (Optional) is Rs. 1, 82,052.875/-
Recharge pit/ underground tank can be connected to bore wells for bore well recharge.

CONCLUSION

In This Roof Top Rain Water Harvesting Project There Is Small Baby Steps To Be Take Care Of & A lot Of Benefits Can Be Aailed. Water harvesting improves the use of available water from precipitation and run-off by concentrating it for immediate use and storage. The control systems that are implemented can divert water to decrease erosion and flood risk. Under climate change, water harvesting will improve resilience to stresses from droughts and extreme rainfall. Water harvesting can also recharge depleted groundwater sources.

ACKNOWLEDGMENT

We would like to thank Mr.Ranjit Katkar, our Professor-in-charge and our Principal, Dr.Vilas Pharande for their support and guidance in completing our project on the topic (Rani Water Harvesting). It was a great learning experience.

I would like to take this opportunity to express my gratitude to all of my group members Aditya & Aniket.The project would not have been successful without their cooperation and inputs. I Would Also Like To Thank Sai Construction For Sponsoring This Project & Letting Us Work At Their Site “ Sai Shruti “ At Indapur,Dist – Pune – 413108.

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Design of Paving Tile using Industrial Waste Bagasse

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Abstract— The massive sugar industries release high amount of bagasse in the surrounding and study reveals that the bagasse possesses good binding properties so in this project an attempt is made to reduce cement content used during paving tiles production by replacing them with industrial waste Bagasse. During this experimental study, bagasse is used as replacement for cement. Various mix design for paving tiles will be considered and the experiments that will be conducted on paving tiles will be Compressive strength Test, Flexural test, Abrasion test & Water absorption test. Designing paving tiles using industrial waste bagasse is a great way to promote sustainability and utilize renewable resources. Bagasse is a byproduct of sugarcane processing and can be an excellent alternative to traditional paving materials such as concrete or clay.

• Introduction

Bagasse is the fibrous residue that remains after sugarcane or other similar plants have been crushed to extract their juice. It is a byproduct of the sugar and ethanol production industries. Bagasse consists of plant fibers, such as cellulose and lignin, and is typically discarded as waste. However, bagasse has gained attention as a valuable resource due to its potential for various applications. Here are a few uses of bagasse:

1. Energy Generation: Bagasse is commonly used as a biofuel for the production of heat and electricity. It can be burned in boilers to generate steam, which powers turbines to produce electricity. This helps reduce reliance on fossil fuels and promotes renewable energy.
2. Construction and Packaging: Bagasse can be processed and molded into various construction materials and packaging products. For example, it can

be transformed into biodegradable disposable plates, cups, and food containers.

3. Industrial Absorbents: Bagasse can be converted into absorbent materials for industrial applications. Its high porosity and absorbent properties make it suitable for absorbing oil spills, moisture, and other liquids.

It's important to note that bagasse utilization helps reduce waste and contributes to a more sustainable and circular economy. By finding innovative uses for bagasse, we can reduce environmental impact and maximize the value of this agricultural residue

The fibrous residue of sugarcane after crushing and extraction of its juice, known as 'bagasse', is one of the largest agriculture residues in the world. Literature illustrates the versatility of sugarcane residue usages; through its conversion inclusive but not limited to paper, feed stock and biofuel. The utilization of these waste materials in the manufacture of concrete provides a satisfactory solution to some of the environmental concerns and problems associated with waste management. Agro wastes such as rice husk ash, wheat straw ash, hazel nutshell and sugarcane bagasse ash are used as pozzolanic materials for the development of blended cements. Few studies have been reported on the use of bagasse ash as partial cement replacement material in respect of cement mortars. In this project, the effects of bagasse ash as partial replacement of cement on strength and durability properties of hardened concrete paver blocks are studied.

1.2 Effects and Advantages of Sugarcane Bagasse Ash:

Ordinary Portland Cement (OPC) is recognized as a major construction material throughout the world. Researchers all over the world today are focusing on ways of utilizing either industrial or agricultural waste as a source of raw materials for construction industry. This waste utilization would not only be economical, but may also result in foreign exchange earnings and environmental pollution control. Industrial wastes, such as blast furnace slag, fly ash and silica fume are being used as supplementary cement replacement materials. therefore it is possible to use sugarcane bagasse ash as cement replacement material to improve the quality and reduce the cost of construction materials such as mortar, concrete pavers, concrete roof tiles and soil cement interlocking block

A few studies have been carried out on the ashes obtained directly from the industries to study pozzolanic activity and their suitability as binders, partially replacing cement and the results proved to be beneficial. The test results indicate that bagasse ash is an effective mineral admixture, with 20% as optimal replacement ratio of cement. When pozzolanic materials are added to cement, the silica present in these materials reacts with free lime released during the hydration of cement and forms additional calcium silicate hydrate as new hydration products, which improves the mechanical properties of concrete formulation. Partial replacement of cement by sugarcane bagasse ash increases workability of fresh concrete; therefore use of super plasticizer is not necessary. The density of concrete decreases with increase in sugarcane bagasse ash content, therefore low weight concrete is produced in the society with waste materials. The rate of bleeding is reduced and better of-shutter finish is possible without affecting the aesthetics. Improved long term strength and durability performance is observed by replacing cement partially with bagasse ash. Lower shrinkage, lower porosity, lower permeability, better resistance to chloride ingress and sulphate attack and lower heat of hydration in thick sections are some of the advantages for using bagasse ash in concrete paver blocks⁵ Adding sugar cane bagasse ash as a replacement for cement may provide additional enhancements in resistance to chloride ion penetration and water-proofing properties. Reduced alkali silica reactivity is studied by partially replacing cement with sugarcane bagasse ash. The chemical composition of bagasse ash indicates that there is zero lime content and reduced carbon

content. The use of sugar cane bagasse ash as a partial replacement of cement has a beneficial effect to protect the steel rebar from corrosion because it reduced the pore size in the cement paste, which minimized the ingress of aggressive ions into concrete. Another advantage of using this material is the fact that India, especially Tamil Nadu, already has a well-established and growing sugarcane ethanol industry. It also places a significant advantage on the environment, particularly, as the pollution caused due to the manufacturing of cement continues to be criticized from a sustainability perspective. The compressive strength tends to be less at the early stage but increases at later stage, meaning that the bagasse ash can be used as an effective replacement material for cement. In this study the attempt is made to study the use of bagasse ash in production to paver tiles.

Name of content	Percentage
Cellulose	45-55%
Hemicellulose	20-25%
Lignin	18-24%
Ash	1-4%
Waxes	<1%

Table.1: Chemical Composition of Bagasse

One of bagasse's primary uses is in the paper industry.

The method of using bagasse for paper production was invented by Clarence Birdsong in a small laboratory in 'Hacienda Paramonga', a sugar mill in Peru. With this promising discovery at hand, the company bought an old paper mill in New Jersey and shipped bagasse there from Peru in order to test the method's reliability on an industrial scale. The method developed in 1937 and the first paper manufacturing machines were designed in 1938 in Germany.

It wasn't until 1950 that the first successful commercial production of newsprint produced from bagasse was demonstrated by the 'Noble & Wood Machine Company'. The demonstration took place before 100 industrial representatives and officials from 15 different countries. The demonstration proved to be extremely successful. This was mainly due to the economic importance of paper in

countries which did not have easy access to wood.

4.1 MATERIAL

Materials which are used to produce paving tile are:

1. Cement
2. Bagasse ash
3. Crush Sand
4. Fine Aggregate
5. Water

1.2 MIX DESIGN

Concrete mix design is the process of choosing suitable ingredient of concrete and determining their relative quantities with the object of producing as economically

as possible concrete of certain minimum properties, notable workability, strength and durability

M20 grade concrete has a notional cement-to-sand-to-aggregate-to-water ratio of roughly 1:1.5:3, with the water-cement ratio being kept between 0.4 and 0.6. It is composed of a mixture of cement, sand (fine aggregates), and coarse aggregate.

M20 concrete mix ratio: M20 concrete is a 1:1.5:3 mixture of cement, sand, and aggregate, where cement makes up one part, sand makes up 1.5 parts, and aggregate or stone makes up the remaining three parts.

The following data is assumed as per the mix design calculation of M20 grade

Characteristic compressive strength: 20Mpa

Cement type: OPC 53 grade

Exposure condition: Moderate

Specific gravity of cement: 3.15

Specific gravity of fine aggregates: 2.70

Fine aggregates sieve analysis: conforming to zone II of table IS 383

RAW MATERIALS/MOULDING/TESTS:

- Collection of raw materials:
 1. Bagasse ash was brought from AJINKYATARA SUGAR FACTORY SATARA.
 2. Cement was brought from SAHYADRI TREADRES KODOLI SATARA.
 3. Fine aggregates was brought from DESAI STONE CRUSHER SATARA.
 4. Crush sand was brought from DESAI STONE CRUSHER SATARA
- The process of molding was done at KETAN CERAMICS MIDC SATARA.
- The assessment of suitability of such eco-friendly composite tiles was done by tests as follows -
 1. Compressive Strength Test.
 2. Water Absorption Test.

PROCEDURE:

1. Material Preparation:
 - Bagasse was obtained from sugar mills.
 - Bagasse was cleaned and all type of impurities or contaminants were removed.
 - Bagasse thoroughly dried to reduce moisture content.
 - Other raw materials such as cement, aggregate, sand was also obtained and prepared.
2. Mixing and Binding:
 - All raw materials was mixed thoroughly till it bind it properly.
 - Experiment with different ratios of bagasse to binder was done to find the optimal mixture that provides strength and stability.
3. Molding and Shaping:
 - The molding process was done at ketan ceramics.
 - The mixed material was placed in mold.
 - Pressure was applied to compact the bagasse-binder mixture evenly within the mold.
 - The tiles was leaved to set and cure for a specific period of time.
4. Finishing and Surface Treatment:
 - After tiles was hardened, it was removed from the molds.
 - The surface of the tiles was smoothen by using sanding or polishing techniques to ensure a uniform and attractive finish.
5. Testing and Quality Control:
 - The tests was obtained on finished tiles to ensure they meet

required standards.

- Readings was taken for each respective tests.

- Necessary adjustments was done to manufacture best tile based on the test results.

MIX PROPORTION

Mix Proportion for Tile :

Tile No	Cement (gm)	Bagasse Ash(gm)	Crush Sand(gm)	Fine aggregates (gm)
T1	950	50	1500	3000
T2	900	100	1500	3000
T3	850	150	1500	3000
T4	800	200	1500	3000

RATIO – 1:1.5:3 FOR M-20

RESULT

1. The various tests like compressive strength test, water absorption test were performed on various proportion of tiles and we get the best mix design for manufacturing of tiles.
2. The test results obtained are as of follows:
3. The results of compressive strength
4. presented in Table. The test was carried

out to obtain compressive strength of paving tile at the age of 7 and 28 days.

5. The tiles were tested using Compression Testing Machine (CTM) of capacity 2000KN available in structures lab. The maximum compressive strength is observed at 20% replacement of bagasse ash.

Replacement of Bagasse Ash	Compressive Strength	
	7 days	28 days
5%	8.92	-
10%	10.90	-
15%	12.1	17.0
20%	13.92	21.18

6. The results of water absorption test presented in Table. The test was carried out to obtain water absorption of paving

tile at the age of 7 and 28 days.

Replacement of Bagasse Ash	Water absorption (%)
% Used	28 days
5%	-
10%	-
15%	8.6
20%	7.8

Conclusion

The result of study shows that there are good prospects of using bagasse Ash. M-20 grade paving tile is casted and its compressive strength is determined. The combination of 0%, 10%, 15% and 20% cement replacement Mix is prepared by using bagasse ash. Compressive Strength of paving tile increased with increasing percentage mix give good compressive strength.

When bagasse Ash replaces cement in concrete it has been observed that its 15% and 20% mix gives good compressive strength. Cement is a versatile building material which is largely used in

construction. When cement is replaced by these material up to 20%. From the study conducted, it was clearly shown that bagasse ash, are pozzolanic material and can contribute to the sustainability to the construction material.

1. The manufactured tile found suitable as per IS codes as IS 12894 (2002) , IS 4101 (Part 3) (1985)and IS 13801(1993)
2. From test conducted its clear that we can use these products at any type of residential and commercial building.

The product have low cost of manufacturing.

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9TH INTERNATIONAL CONFERENCE ON ADVANCES IN ENERGY RESEARCH

12TH TO 14TH DECEMBER 2023

ABSTRACT BOOKLET



Department of Energy Science and Engineering,
Indian Institute of Technology Bombay
Mumbai-400076



Preface

The Department of Energy Science and Engineering at the Indian Institute of Technology Bombay is one of the first dedicated departments in India to focus on energy science, engineering technology, and policy. The department is expected to provide critical manpower and research outputs that are crucial for the growth of India's energy sector and provide innovative technologies and systems to mitigate the global challenge of climate change. Keeping the vision of the department, "To develop sustainable energy systems and solutions for the future" in mind, the need to provide a common platform to the researchers in the field of Energy and allied domains, the Department organises the bi-annual conference: International Conference on Advances in Energy Research, since 2007, to provide an excellent forum to present new findings, exchange novel ideas, discuss new developments, and finally reflect on the challenges that lie ahead.

This book is a collection of all the abstracts of the papers selected for presentation at the 9th International Conference on Advances in Energy Research, organised from 12th to 14th December 2023 by the Department of Energy Science and Engineering, Indian Institute of Technology Bombay, Mumbai. A total of 220 papers were received. After an academic review by subject experts, 153 papers were selected for presentation at the conference. Out of the selected papers, 93 papers have been scheduled for oral presentation and 60 papers have been scheduled for poster presentation. The conference is organised in 20 oral and 2 poster sessions in the fields of photovoltaics, solar thermal, wind energy, biomass and combustion, energy storage, energy efficiency and modelling, energy policy, fuel cells, and buildings, to name a few. The conference will also have 10 invited talks, a panel discussion and a workshop on technical writing by Springer. Selected papers will be considered for publication in *Advances in Clean Energy and Sustainability (Green Energy and Technology)*, Springer Nature.

We would like to take this opportunity to thank all the invited speakers, delegates, sponsors, the members of the organising and academic committee and most importantly the students of the department for their dedicated efforts in organising this conference.

Prof. Sankara Sarma V Tatiparti
Organizing Secretary, ICAER 2023

Prof. Srinivas Seethamraju
Organizing Secretary, ICAER 2023

Contents

Scientific Advisory Committee.....	4
Local Organising Committee	5
Student Organising Committee	6
Conference Schedule.....	7
Invited Talks.....	17
Abstracts.....	37
Our Sponsors	135

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Optimization of biodiesel synthesis parameters of waste cooking oil through response surface methodology

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Abstract

As increase of cost of crude oil and exhaust emission. The research is focused on production of biomass blended fuel having similar combustion property of diesel. It achieves the required energy demand and also reduces the exhaust emission formation. In the present study waste cooking oil (WCO) is use for making of bio fuel through response surface methodology (RSM) based transesterification process. The Box-Behnken design is used to explore the impacts of the primary operating factors including methanol, catalyst concentration, and reaction time on the production of biodiesel. The results revealed that the most crucial parameter is the catalyst concentration. The maximum bio- diesel yield under optimal condition is 98.75 wt %. An empirical quadratic equation has also been developed to demonstrate the relationship between biodiesel conversion with its viscosity.

Design and Development of Pellet Machine for the Utilization of Biogas Slurry

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ABSTRACT

Biogas slurry is considered good source of organic manure as it contains considerable amount of nutrients that necessary for crop production. The pellet machine was designed and developed for 50 kg h⁻¹ capacity. The power supply for the machine was 1 hp, 1440 rpm, single phase electric motor and 20:1 reduction unit of gear box was attached with the help of power transmission through chain and sprockets to the shaft. The best performance of machine for combination 2 (80:20) 80% BS and 20% CS in terms of pelleting efficiency (76.01%) and pelleting capacity (18.24 kg hr⁻¹) respectively. The economical evaluation in terms of net present worth, benefit cost ratio, internal rate of return and payback period was found to be \$3066.20, 1.40, 108.6% and 0.92 year respectively. The adaption of pelleting machine by small and medium farmers would go a long way in helping them to produce their own fertilizer as an organic manure with locally available material like cow dung and digested slurry from biogas plant.

Keywords: *Biogas slurry, pellet machine, organic manure.*

1. Introduction

India has progressively moved towards development and adoption of cleaner sources of energy. Ministry of New and Renewable Energy (MNRE) is executing the National Biogas and Manure Management Programme (NBMMP) for providing various schemes like installation of biogas plant and management of biogas slurry to the rural area. These biogas plants are giving an estimated annual savings of about 7.09 million numbers of LPG cylinders equivalent and simultaneously producing about 8.84 million tonnes of organic enriched bio-manure per year, which is equivalent to about 31,100 tonnes of urea per annum [1]. The biogas plant is an important source of organic manure. The slurry which come out of a biogas unit as by-product constitutes good quality of manure free from weed seeds, foul smell and pathogens and contains high amount of plant micro nutrients as compared to farm yard manure (FYM) [2-3]. The use of biogas slurry can reduce the application of chemical fertilizers up to 50 %. It

gives benefits to the farmers in their cultivation costs and the soil environment for high fertility [4]. Replacement of chemical fertilizers by biogas plant slurry without affecting the yields automatically helps in reducing both the capital investment and commercial energy input. The utilization of slurry is better way to reduces pollution and helps in recycling valuable nutrients [3]. Use of biogas slurry is providing a sustainable way for agriculture, environment and farming communities [5].

Biogas slurry are by-products of biogas plants generated from cattle dung, which is a good source of plant nutrients and can improve soil properties and crop yield [6]. A present there are major problem in the utilization of biogas slurry. Traditionally, farmers just directly sprayed it as organic manure or submerged seeds in it to stimulate their germination and growth. Biogas slurry supplies essential nutrients, enhance water holding capacity, soil aeration, accelerates root growth and inhibit weed seed germination [7-8]. Biogas slurry is an effective fertilizer as compared to the farmyard manure because of the significant results of N, P, and K have been observed in the treatment plots where BGS was applied. BGS gave better yield as compared to FYM [9]. Solid and semi solid manure products represent potential alternatives to reduce some of the environmental and societal problems that may be associated with liquid manure management [10].

The fresh biogas slurry which contains 90 to 93 % moisture therefore, it is difficult to handle and transport, and therefore it becomes bulky and problem of utilization and handling of slurry and application particularly when the biogas plant is located in the farmer's house. Generally, farmers use the digested slurry to leave in the nearby area of plant and some time it is disposed in nearby watercourse. In many cases, the biogas slurry from the digester cannot be directly used as a fertilizer and thus needs to be stored. The storage of slurry is mainly necessary because it should be applied in specific periods of the growing season. The biogas slurry is generally produced continuously and if its moisture content is reduced, then it can easily handle. But considerable quantity of nutrients is lost from the digested slurry, if sun dried. To minimize the losses of nutrients, easy transportation, decrease the cost of handling and reduce the volume of the biogas slurry by compression in pellet form. These compressed biogas slurry in pellet form mixed with clay soil, which is used as a binder. This is eliminated the use of chemical fertilizer and reduce the cost of management of biogas slurry.

Pelletized of biogas slurry can improve storability, reduce transportation costs, and make these materials easier to handle by using existing handling and storage equipment. For production of composted livestock manure into pellets, there are two types of machine available in the market [11]. The pellet production is able to convert raw material into a

compressed form with advantages in transportation, handling and storage [12]. This technology helpful to reduce the area for storage of biogas slurry become easy in transportation and reduce the transportation cost. The main aim of this research work is to reduce the area for storage of biogas slurry become easy in transportation and reduce the cost of transportation, easily handling of biogas slurry and improvement in manure management. It can fulfil these requirements in the search for simple technology of pelletization using locally available materials like biogas spent slurry and clay soil as binder.

2. Materials and methods

The pellet machine for biogas slurry was developed in Department of Renewable Energy Engineering, CTAE, MPUAT, Udaipur, Rajasthan (India).

2.1. Analysis of raw material

2.1.1. Nutritional analysis of biogas slurry

Assessment of the physio-chemical properties of biogas slurry for pelletization purpose was planned to evaluate its suitability. Properties of biogas slurry like moisture content, total solids content, volatile solids content, ash content, nitrogen content, phosphate content and potash content [13]. In order to use biogas slurry as fertilizer in which higher percentage of nitrogen, phosphate and potash content because this nutrient increase crop productivity.

2.1.2. Clay soil as binder

Soil was collected from the experimental site and characteristics of the soil can be determined in terms of percentage of sand, silt, clay, nitrogen, phosphorous and potassium content. Clays are the main binders of earth and are made up of very small mineral particles (<2 microns) and leached out during erosion of rock [14].

2.1.3. Physical properties of raw (biogas slurry (BS) + clay soil (CS)) material for pelletization

Biogas slurry were obtained from the KVIC biogas plant and clay soil from locally available. Physical properties of raw material were calculated in terms of bulk density, angle of repose, coefficient of friction for designing purpose.

2.2. Design consideration of pellet machine

2.2.1. Design and process of pellet machine

The design of screw is necessary for production of pellets from biogas plant waste to convert it an efficient manure. It is proposed to design and develop a simple, convenient and efficient screw type pellet machine of approximately 50 kg h⁻¹ capacity for combined material like biogas spent slurry and clay soil. The raw material having different feeding ratio can be placed to the hopper such as combinations like 90:10 (90% BS and 10% CS), 80:20 (80% BS and 20% CS) and 70:30 (70% BS and 30% CS). These combinations were pelleted, tested and analysed. The pellet machine consists of a screw, rotating inside a cylindrical barrel. The screw and barrel was placed in the parallel direction and the material to be pressed between the screw and barrel [15-16].

2.2.2. Design parameters

Pellet machine was designed on the basis of design parameters and layout of pellet machine are as shown in **Fig. 1.** and **Fig. 2.**

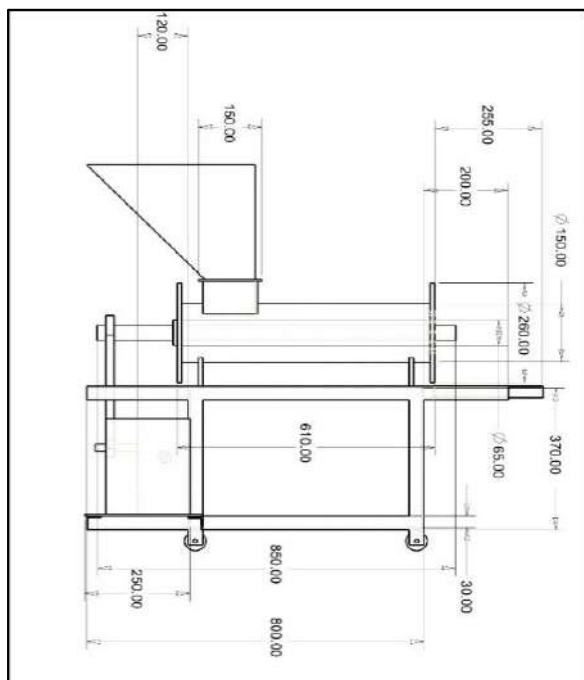


Fig. 1. Layout of fabricated pellet machine with dimension (mm)

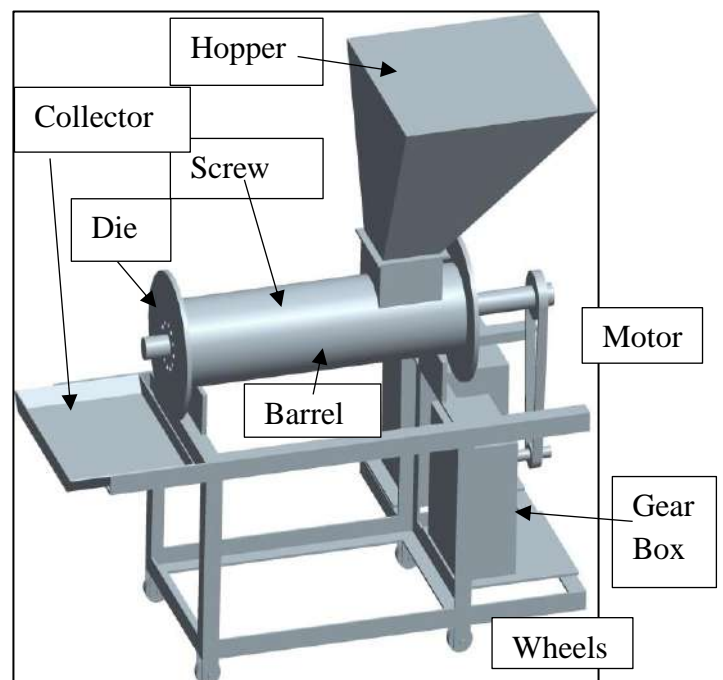


Fig. 2. Pellet machine for handling of biogas slurry

3. Result and discussion

The pellet machine for biogas slurry was developed in Department of Renewable Energy Engineering, College of Technology and Engineering, Udaipur, Rajasthan, (India).

3.1 Analysis of raw material

3.1.1. Nutritional analysis of biogas spent slurry

The nutritional analysis of biogas spent slurry was done in well-equipped microbiology laboratory. The physical and chemical properties like moisture content, total solids content, volatile solids content, ash content, nitrogen content, phosphate content and potash content were calculated [13]. The biogas slurry was analysed having moisture content (82.72%), total solid content (17.28%), volatile solid content (73.52%), ash content (26.47%), nitrogen (1.54%), phosphate (0.77%) and potash (0.84%) and nutritional properties are tabulated in **Table 1** for soil fertility point of view

Table 1 Nutritional analysis of biogas spent slurry

Sr. No.	Properties	Samples			Average
		S ₁	S ₂	S ₃	
1.	Moisture content (%)	85.37	82.45	80.35	82.72
2.	Total solid content (%)	14.63	17.55	19.65	17.28
	i) Volatile solid content (%)	72.35	73.72	74.51	73.52
	ii) Ash content (%)	27.65	26.28	25.49	26.47
3.	Nitrogen content (%)	1.73	1.56	1.25	1.54
4.	Phosphate content (%)	0.83	0.79	0.71	0.77
5.	Potash content (%)	0.90	0.85	0.78	0.84

3.1.2. Properties of soil as binder

The physical and chemical properties of soil having nitrogen (0.746%), phosphate (0.316) and potash (0.746%) are mentioned in **Table 2**. The properties of soil were evaluated and obtained results are good for soil fertility as compared [30].

Table 2 Physical and chemical properties of soil

Sr. No.	Soil properties	Values
A.	Physical properties of soil	
1.	Texture	Clay Soil
	Sand (%)	38.49
	Silt (%)	22.63
	Clay (%)	38.88
2.	pH	7.5
3.	Electrical conductivity (dS m ⁻¹)	0.34
4.	Organic carbon (%)	0.48
5.	Bulk density (g cm ⁻³)	1.33
6.	Particle density (%)	2.36
7.	Porosity (%)	43.8
8.	Water holding capacity (%)	30.4
B.	Chemical properties of soil	
1.	Total nitrogen content (%)	0.746
2.	Available phosphate content (%)	0.316
3.	Available potash content (%)	0.746

3.1.3 Physical properties of raw material (biogas slurry (BS) + clay soil (CS)) for pelletization

The raw material was processed in terms of 90:10, 80:2 and 70:30 ratio. The physical properties of raw material evaluated in terms of moisture content (64.48%), total solid content (35.51%), bulk density (1224.61 kg m⁻³), angle of repose (37.56) and static coefficient of friction (0.57) are depicted in **Table 3**.

Table 3 Physical properties of raw material

Sr. No.	Properties of raw material	Samples			Average
		S ₁	S ₂	S ₃	
1.	Moisture content (%)	65.46	64.51	63.49	64.48
2.	Total solid content (%)	34.54	35.49	36.50	35.51
3.	Bulk density (kg m ⁻³)	1271.93	1206.38	1195.54	1224.61
4.	Angle of repose	37.56	37.56	37.56	37.56
5.	Static coefficient of friction	0.57	0.57	0.57	0.57

3.2 Design parameter for Pellet Machine

Pellet machine consists of driving motor, screw, die, hopper, and power transmission system. Chain drive were used to transmit power from motor to the screw. The raw material was fed to the hopper, which convey it to screw by gravity. The material was pushed, it got compresses and binded material comes out of die in the form of pellets. All the machine designed parameters are depicted in the **Table 4** and developed machine illustrated in **Fig. 3.** and **Fig. 4.**



Fig. 3. Front view of fabricated pelleting machine



Fig. 4. Side view of pelleting machine

Table 4 Design parameter of pelleting machine

Sr. No.	Parameters	Values
1.	Machine capacity (Q)	50 kg hr ⁻¹
2.	Bulk density raw material (p) in kg m ⁻³	1200 kg m ⁻³
3.	Diameter of screw (D) in mm	150 mm
4.	Pitch of the screw (S) in mm	90 mm
5.	Thickness of screw flight	5 mm
6.	Theoretical Screw Volume (V _s)	0.00148m ³
7.	Mass Flow Rate (m)	5.319 kg min ⁻¹
8.	Helix Angle (ϑ)	10 ⁰
9.	Screw Conveyor Length (L)	0.630 m
10.	Number of Screws (N _s)	7
11.	Volume per pitch	0.0416 m ³ hr ⁻¹
12.	Drive power	0.3546 kW
13.	Torque on the Screw	169.28 N-m
14.	Power on Shaft	0.4432 kW
15.	Motor Power	0.832 hp
16.	Volume of barrel on screw (V _b)	0.0119 m ³
17.	Worm gear	20:1
	Pitch circle diameter of warm (D _w)	40 mm
	Pitch circle diameter of warm gear (D _G)	160 mm
	centre distance (x)	100 mm
	Number of teeth on the warm gear (T _G)	54
	Module (m)	3
	Actual pitch (P _C)	9.426 m
	Actual pitch circle diameter of the worm (D _w)	38 mm
	Actual pitch circle diameter of the worm gear (D _G)	162 mm
	face width of the worm gear (b)	28 mm
18.	Chain Drive Mechanism	
	Number of teeth on the large sprocket (T ₂)	40
	Design of power	0.9321 kW
	Load on chain (W)	0.988 N

Centre distance	557.1 mm
Number of chain links	65
Length of chain	1.22 m
19. Torque transmitted by shaft	350.911 N-m
20. Diameter of shaft	40 mm
21. Life of bearing	17.28×10^6 revolutions
22. Volume of hopper (V_H)	0.277 m^3
23. Specific energy consumption (E)	0.744 kJ kg^{-1}

3.3 Performance evaluation of pellet machine

The parameter was considered on the basis of number of treatments and replications for performance evaluation of pellet machine, which is represented in the **Fig. 5** and **Fig. 6**.

The best performance of pellet machine in terms of pelleting efficiency and pelleting capacity was 76.01%, and 18.24 kg h^{-1} respectively for combination 2 with the ratio 80:20.

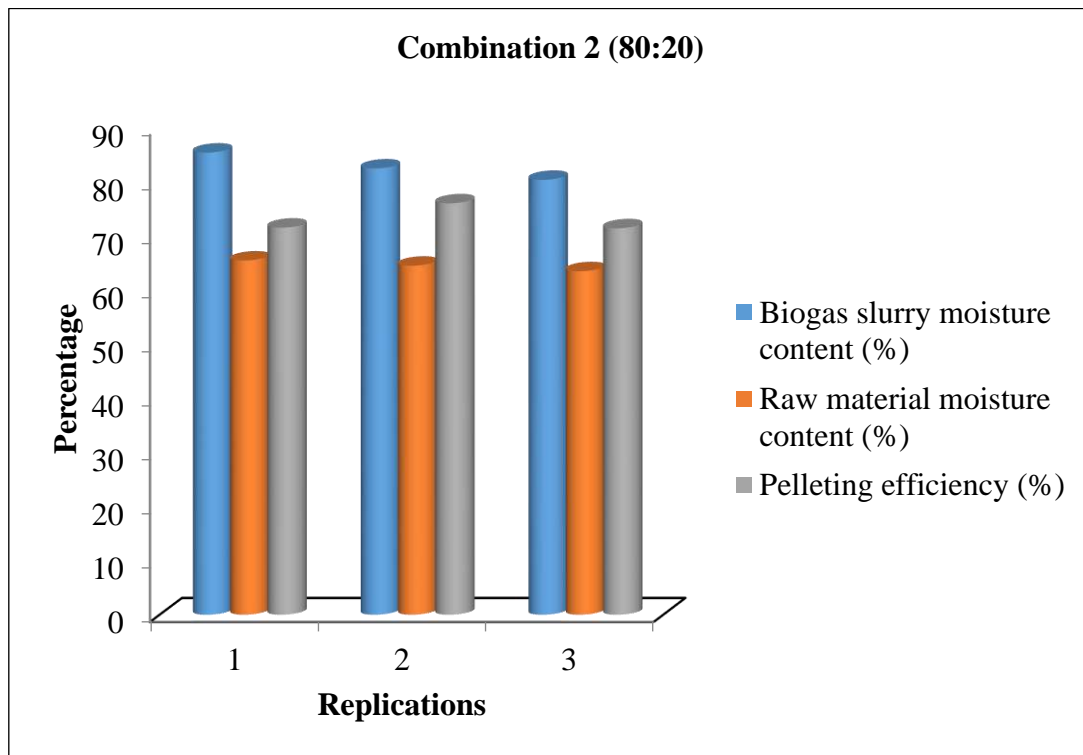


Fig. 5. Performance evaluation of pellet machine for combination 2 (80:20) in term of moisture content of samples, efficiency, percentage of pelleted and un-pelleted

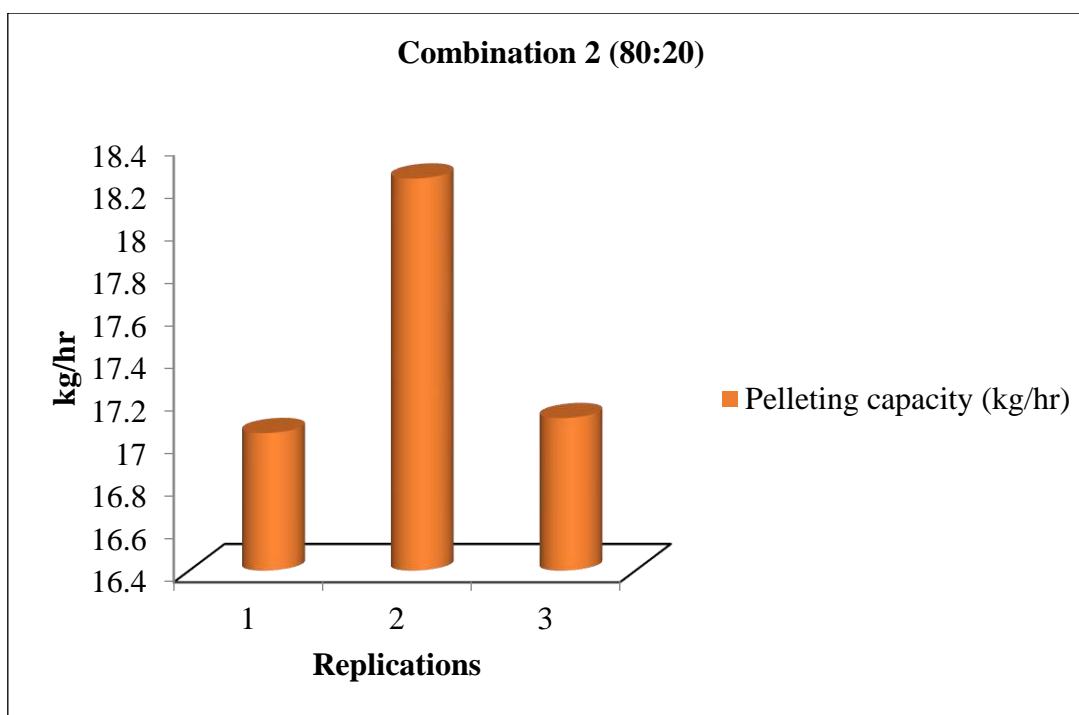


Fig. 6. Performance evaluation of pellet machine for combination 2 (80:20) in term of throughput capacity and pelleting capacity

3.4 Properties of pellets

Table 5 Characterization of pellets

Sr. No.	Characteristics	Combinations		
		C ₁ (90:10)	C ₂ (80:20)	C ₃ (70:30)
1.	Pellet particle density (g cm ⁻³)	0.51	0.53	0.68
2.	Pellets bulk density (g cm ⁻³)	0.34	0.36	0.40
3.	Porosity of pellets (%)	0.31	0.33	0.40
4.	Durability (%)	70.58	74.41	77.93
5.	Radial compressive strength (kgf mm ⁻²)	0.49	0.58	0.71
6.	Shatter index (%)	80.62	85.31	83.15
7.	Resistance to water penetration (%)	68.71	70.50	71.82
8.	Stability (after die) (mm)	80	90	90
	After one week (mm)	80	90	90
	After five weeks (mm)	80	90	90

The properties of pellets were obtained as per the standard method and experimental findings are given in **Table 5**. It is observed that the particle density of pellets varied from 0.21 to 0.68 g cm⁻³, bulk density of pellets varied from 0.34 to 0.40 g cm⁻³, porosity of pellets varied from 0.31 to 0.40%, durability of pellets varied from 70.58 to 77.93%, Radial compressive strength of pellets varied from 0.49 to 0.71 kgf mm⁻² and stability of pellets varied from 80 to 90 mm.

Experimental results of pellets produced from developed pellet machine having nitrogen was presented in **Table 6**. The higher percentage of chemical properties were found in combination 1 with 90:10 ratio in terms of nitrogen, phosphate and potassium was 1.64%, 0.8% and 0.84% respectively. The combination 2 with 80:20 ratio was best for all physical properties having to increasing storing, handling and transportation and also in India plants having only 1.3% N, 0.20% P and 1.0% K. The combination 2, 80% biogas slurry with 20% clay soil (80:20) are better than the farm yard manure (FYM) having nutrient content of 0.5 to 1.0 % N, 0.5 to 0.8 % P and 0.5 to 0.8 % K respectively [5].

Table 6 Chemical properties of pellets

Sr. No.	Ratio	Nitrogen (N), %	Phosphate (P), %	Potash (K), %
1.	90:10	1.64	0.8	0.84
2.	80:20	1.40	0.75	0.78
3.	70:30	1.22	0.69	0.72

3.5 Evaluation of techno-economic feasibility of pelletization process

A cost analysis of a pellet machine is dependent highly on availability of raw material. The analysis was made by considering the present investment [31]. The results obtained were enlisted in the **Table 7** given below for economic analysis of the system.

Table 7 Economic Indicators of the pellet machine

Sr. No.	Economic Indicators	Value
1.	Net present worth (NPW)	\$3066.20
2.	Benefit cost ratio (BCR)	1.40
3.	Pay-back period	0.92 year
4.	Internal rate of return (IRR)	108.6%

4. Conclusion

A pellet machine was designed, constructed and tested for handling of biogas slurry. The screw of machine simple for local fabrication, operation, repair and maintenance and powered by a single horse power, single phase electric motor. The best performance of pellet machine for the ratio 80:20 (80% BS and 20% CS) and efficiency of pellet machine was 76 %. The cost of pellet machine was \$540.36. The machine is conceived as ideal, easy to maintain and economic for commercial uses. The expected capacity of pellet machine is 50 kg per hour.

The best physical and chemical properties of pellets were found in the combination 2 with the ratio 80:20 (80% BS and 20% CS). The higher percentage of chemical properties were found in combination 1 with 90:10 (90% BS and 10% CS) ratio in terms of nitrogen, phosphate and potassium was 1.64%, 0.8% and 0.84% respectively. But overall research study concluded that the combination 2 with 80:20 ratio was best for all physical properties having to increasing storing, handling and transportation and also plants in India having only 1.3% N, 0.20% P and 1.0% K. So, the ratio 80:20 of combination 2 having 1.40% N, 0.75% P, 0.78% K was best for pelletization and its use as an organic manure to maintain soil fertility and reducing extra use of chemical fertilizers.

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INTRODUCING USE OF ULTRA CAPACITOR IN THE ENERGY STORAGE SECTION OF THE EV IN CONJUNCTION WITH A BATTERY BANK

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Abstract— the primary focus of this research will be on extending the service life of fuel cells (FCs) and developing a model of an Ultra capacitor (UC) to create a hybrid energy storage system (HESS). Additionally, the control techniques will be employed to meet the fundamental requirements of our intended energy storage system, including stable DC voltage and an optimal state-of-charge. For best performance and design, the fuel cell will need precise system selection, design, and modeling for prediction of performance. In this work, we provide an efficient online technique for predicting the parameters of the Li-ion battery model using the Universal Adaptive Stabilizer (UAS). The new approach has been thoroughly tested for its viability at the battery cell, pack, and bank levels. This study would not need offline experimentation or post-processing, unlike past UAS-based work on individual battery packs. Self-updating battery parameters in real time is made possible by rapid convergence of estimations of these parameters with little experimental effort.

Keywords—Electrical Vehicle, Energy Storage, Ultra Capacitor

1. INTRODUCTION

The fast depletion of the world's petroleum supplies due to climate change is a major factor driving the rising popularity of electric and hybrid electric vehicles (HEV). Also, the creation of extremely efficient electric vehicles has been at the forefront of automotive research in the last several years. We all know that the battery is the most promising and traditional energy storage element for electric vehicles and hybrid electric vehicles. However, relying only on a battery pack presents problems because of its poor power density, limited charging/discharging cycles, and high cost when damaged. Regenerative braking is the process through which an electric vehicle's kinetic energy is converted back into electricity rather than heat via the friction brakes seen on conventional vehicles. A specialized energy storage element is needed for this, one that can swiftly release the electrical energy it has stored while accelerating. The ultra capacitor is

the only device capable of storing and releasing such a large amount of electricity in such a short amount of time. To that end, a hybrid energy storage system consisting of batteries and ultra capacitors is one of the finest options for EVs. During times of heavy power demand, the combination of a battery with an ultra capacitor may help keep things running smoothly while keeping the battery's peak current to a minimum. By using the most effective pair of methods, we can relieve pressure on the battery and protect it from failure. The cost of a super capacitor add-on is less than the cost of replacing the batteries, making a hybrid energy storage system (HESS) cost-effective (ultra capacitor).

Public transportation has shifted its focus from the internal combustion engine vehicle to more environmentally friendly vehicular systems as a result of concerns about peak oil and global warming. Concerns about the environment in the transportation sector during the last decade have focused on expanding access to alternative fuels or reviving the development of electric-based vehicle systems, which had been mostly shelved by the 1930s. Due to its zero-emission and environmentally-friendly technology, electric vehicles (EVs) have quickly become the focus of sustainable transportation research. Hybrid electric vehicles, which were developed later, use a combination of battery power and various energy sources (HEV). The Plug-in Hybrid Electric Vehicle (PHEV) improves upon the conventional battery EV in every conceivable way by adding an outlet for direct grid connection to its already impressive list of features (BEV). Maintaining a connection between PHEVs and the distribution grid brings to mind the need of deploying charging facilities within the EV's operational range. So, as EVs become a more viable option as a transportation mode in the future, research into charging infrastructure has been developing fast. For the charging infrastructure to function there must be a dependable interface to the distribution grid, which necessitates coordination between the operator and the supplier. The charging infrastructure concept interface calls for cooperation between the ISO/RTO, which is in charge of

the bulk power system, and the ESP, which is in charge of delivering electricity to homes and businesses through the distribution grid. It is important to strategically place public charging stations so that they may serve operating electric vehicles as efficiently as possible, regardless of the kind of charging station the owner uses at home. The charging station, as the major public charging point, has been the subject of much study and development. As the smart grid has evolved to accommodate the V2G transition, charging stations have been the focus of subsequent studies.

The design of an EV's energy storage system has to take into account both the need for high power density to fulfill the acceleration requirement and the necessity for high energy density to achieve the target driving range of the vehicle. Lead-acid, nickel metal hydride (NiMH), and lithium ion (Li-ion) batteries are the most common types of energy storage devices used in automobiles today. NiMH batteries, which are less expensive than Li-ion batteries, have cornered the EV industry. However, Li-ion batteries are becoming the standard for EVs because of their high monomer voltage and high energy density. The ultra capacitor is an energy storage device that may be used in conjunction with a lithium-ion battery because of its superior power density, quicker charging and discharging rates, and longer cycle life. As a result of its poor energy density, an ultra capacitor is not a good choice for use as the only source of power in an EV. As a result of its limited discharge capacity, the lithium-ion battery is unsuitable for delivering a high quantity of power in a short period of time. Additionally, the battery's lifespan is shortened by repeated charging and draining. Thus, using an ultra capacitor in a hybrid electric vehicle (HEV) system may extend the life of the battery. Since ultra capacitors are well-suited for pulse-power applications, their high-power density allows them to satisfy peak power demand during EV acceleration and absorb regenerative braking power. However, lithium-ion batteries excel at tasks that call for a lot of energy to be stored in a small package. The battery and ultra capacitor output in an EV are dynamic and changes in response to the load. In addition, there is a substantial swing in ultra capacitor terminal voltage between charging and discharging. As a result, the HESS's conversion system has to be able to effectively transfer power between two distinct energy storage devices over a broad input voltage range. Multiple input dc-dc converters, both isolated and non-isolated, are often used in HESS. The power switching devices and diodes in the bidirectional dc-dc converters used in the multiple input dc-dc converter design for battery-ultra capacitor HESS regulate the current that flows between the on-board energy storage devices and the load. However, not all power outlets are galvanically isolated. For voltage matching and system safety, galvanic separation is necessary in several applications. As a result, hybrid energy storage

systems may benefit from using multiple-input bidirectional isolated dc-dc converters.

2. LITERATURE REVIEW

Arefin, et al (2018) This study illustrates the positive aspects of including an ultra capacitor into the battery pack of a city-based electric vehicle's powertrain. Both new battery cells and batteries that have been partially discharged are included in the simulations. The simulation results demonstrate that the efficiency of the hybrid system improves as the temperature drops. This investigation makes use of real-world data. The simulations are performed using the adjusted Bangladeshi driving cycle for light automobiles. Many of the problems associated with hybridization are discussed in this study. This method has the potential to cut down on power loss by 5-10%. As a conclusion, hybridization improves not only the power train efficiency but also the battery life span. Researchers looking to learn more about this subject might benefit from this study.

M, Gopikrishnan (2014) In this study, we suggest a battery/ultra capacitor hybrid energy storage system (HESS) for electric cars; this system would be utilized to power a huge dc-dc converter. The dc link is also used to keep the peak voltage constant. They run on power supplied by an ultra capacitor and battery. In the event that the capacitor becomes discharged, the battery is utilized to recharge it. In this instance, the battery is functional. Also, the regenerative braking system stores energy in case of a sudden stop, which would otherwise be wasted. Battery life may be extended by employing an ultra-capacitor. If the ultra capacitor is functioning, the battery will be disconnected from the power source. The outcomes of this experiment validate the suggested system.

Livrieri, Patrizia&Castiglia, V. &Pellitteri, Filippo&Miceli, Rosario (2018) When it comes to managing the power of an electric vehicle (EV), the combination of batteries and ultra capacitors (UCs) offers significant benefits. This is because of the EV's increased energy storage capacity and its improved responsiveness to sudden changes in load. A suitable bi-directional converter is needed to control the charging (or discharging) of the UCs from (or towards) a DC voltage bus. Herein, we present the design and findings of a power simulation study into the operation of a bidirectional DC-DC converter coupled with a stack of UCs. A B2R (buck-boost regulator) style converter is suggested. In accordance with the worldwide standardized Light vehicles Test Procedure, the load is modeled as 40 kW peak power for a period of 3 seconds (WLTP).

Ali, A. (2014) In this study, we suggest a battery/ultra capacitor hybrid energy storage system (HESS) for electric

cars; this system would be utilized to power a huge dc-dc converter. The dc link is also used to keep the peak voltage constant. They run on power supplied by an ultra capacitor and battery. In the event that the capacitor becomes discharged, the battery is utilized to recharge it. In this instance, the battery is functional. Also, the regenerative braking system stores energy in case of a sudden stop, which would otherwise be wasted. Battery life may be extended by employing an ultra-capacitor. If the ultra capacitor is functioning, the battery will be disconnected from the power source. The outcomes of this experiment validate the suggested system.

Tseng, Kuo-Ching & Chang, Yu-Cheng & Cheng, Chun-An (2020) Light rail vehicles (sometimes called tramways or lightly constructed railroads) have generated considerable interest due to the environmental benefits they provide. During their journey, the light rail cars are supplied with energy by hybrid energy-storage systems. In this research, an ultra capacitor charger is integrated into a hybrid energy-storage system for use in electric vehicles, and its performance is evaluated. In addition, a full-bridge DC-DC converter with synchronous rectification and a high charging current is provided as the basis for an ultra capacitor charger. In order to further improve conversion efficiency, the current doublers synchronous rectification used in the proposed converter decreases the secondary circulation current while recycling the energy of the leakage current back to the power source lead. This ultra capacitor charger has been prototyped, and it has been shown to have an efficiency of 92.1% at a full load of 1 kW, with an input voltage of 380 V and an output voltage of 14.6 V. Furthermore, at 600 W of output power, the testing findings reveal an efficiency of 93.4%. In addition, the given converter can charge a 250 F ultra capacitor at a charging current of 65 A, and experimental waveforms show that the charging duration of the ultra capacitor voltage from 0 to 14.6 V is within 1 minute.

Mallika, Sreelekshmi & Raju, Saravanakumar (2011) whether it be a hybrid electric, fuel cell, or all-electric motor train, electrical energy storage is essential. The high cost of replacing exhausted battery banks is a major budgetary concern when it comes to energy storage. To reduce the stress on renewable energy sources like batteries and fuel cells, ultra-capacitors might be used as load-leveling devices. This survey examines the state of the art and some of the challenges with ultra capacitor-Battery interfaces in the context of energy management systems. There is research being done.

Shen, Junyi, and Khaligh, Alireza (2016) The ideal current split between batteries and ultra capacitors (UCs) in electric vehicle applications has been examined using two real-time energy management algorithms in this research. First, the

optimal operating points of the current split in the hybrid energy storage system are determined by formulating and solving an optimization problem subject to Karush-Kuhn-Tucker conditions in real time (HESS). As an alternative, an intelligent controller based on a neural network is used in the second approach. A performance measure based on the battery state-of-health (SoH) is established to disclose the relative influence of instantaneous battery currents on the battery deterioration, allowing for an evaluation of the efficacy of these two real-time techniques. We have created a real-time experimental platform for the validation of energy management controllers, employing xPC Target and National Instrument data gathering system, and we have constructed a 38 V-385 Wh battery and a 32 V-4.12 Wh UC HESS hardware prototype. The two real-time controller designs have been verified to be both practical and efficient via simulation and real-time experimentation. It is shown that, in contrast to a battery-only energy storage system, the battery SoH can be increased by 31% and 38%, respectively, when using the two real-time energy management algorithms under the high speed, high acceleration, aggressive driving cycle US06.

Xiong, Rui & Chen, Huan & Wang, Chun & Sun, Fengchun (2018) To address the high specific power and high specific energy demands of plug-in hybrid electric cars at the same time, a Hybrid Energy Storage System (HESS) is an excellent solution to the challenges presented by alternative single energy storage systems (HEVs). The combination of a battery and ultra capacitor (UC) in a HESS has garnered a lot of interest. Nonetheless, studies of its architecture and methods of energy management are uncommon (EMSs). This study provides an overview of the architectures and EMSs of HESSs that use battery and UC, based on a summary and analysis of the relevant literature. Rules-based control algorithms, optimization-based control algorithms, and intelligent-based control algorithms are all thoroughly discussed, with a focus on their application to the study of energy management. Researchers may choose the best approach for developing EMSs for HESSs by comparing and contrasting the offered techniques, which cover many common implementations and applications. Finally, the study gives potential proposals for the creation of a big data and machine learning-based algorithm for the energy management of the HESSs, highlighting a number of critical elements and obstacles.

Hasan, Md. Zahid & Adnan, Md & Saha, Sabhasachi & Roy, Souvik (2018) the goal of this study is to improve the efficiency of batteries and ultra-capacitors by developing hybrids of the two. This exemplifies the positive effects of incorporating an ultra-capacitor into the battery pack of a city-specific electric vehicle's transmission. MATLAB Both new battery cells and batteries that have been partially

discharged are included in the simulations. The simulations reveal that hybrid system efficiency increases from 25% to 30% when temperatures drop to the low end of the range (25–28 °C). This research makes use of both theoretical frameworks and empirical data. When compared to previous experiments, which only showed a 7% efficiency boost, this system demonstrated an impressive 14% improvement. The simulations are performed using the adjusted Bangladeshi driving cycle for light automobiles. Many of the problems associated with hybridization are discussed in this study. Power loss in the system may be cut by as much as 5–10% with this setup compared to the standard setup. Finally, hybridization improves not just the powertrain's efficiency but also the longevity of the battery. Researchers looking to learn more about this subject might benefit from this study.

Patel, Parth & Patel, Krishna & Mistry, Pavak (2016) To power an electric car, a combination of a battery and an Ultra capacitor is optimal. The Ultra capacitor and the battery are connected via bidirectional converter architecture. The Ultra capacitor may be charged and discharged from the battery with the help of this converter. A variable amount of energy is needed to propel an electric vehicle in accordance with its speed. A simulation circuit is constructed for the charging and discharging process of an Ultra capacitor and battery hybrid system using a power diode and other circuit components. Mechanisms and energy transformations in their many guises are outlined.

Zhao, Chen & Yin, He & Noguchi, Yohei & Ma, Chengbin (2014) Under the JC08 driving cycle, this article compares the energy efficiency of a battery-ultracapacitor hybrid energy storage system to that of a lithium-ion battery-only system. The DC-DC converter efficiency and the battery pack's internal resistance are the two control parameters used for this investigation. Compared to a battery-only system, the research reveals that the hybrid battery-ultracapacitor energy storage system is more robust against variations in battery internal resistance. Meanwhile, the total efficiency of the battery-ultra capacitor hybrid energy storage system is heavily influenced by the energy loss of the DC-DC converter. The efficiency of a battery-ultra capacitor hybrid energy storage system may match or even exceed that of a battery-only system if a high-efficiency DC-DC converter is used.

Embrandiri, Manoj & Isa, Dino & Arelhi, Roselina (2011) In this work, we describe the preliminary results and efficiency of an electric vehicle conversion prototype based on a well-known Malaysian city automobile, the perodualkancil. In lieu of the previous 31 HP (22.1 KW) 660 cc three-cylinder carbureted engine, a 48-72 V series wound DC motor with an 8 KW continuous and 20 KW peak rating was installed. To reach 48 V, the battery pack uses eight T105

Trojan 6 V, 225 Ah deep cycle lead acid batteries. In addition, high power contactors are used to connect a 165 F, 48 V ultra capacitor module in parallel so as to examine the proven improvement in performance criteria such as acceleration, range, battery life, etc. shown in many literatures through simulation studies. On the fly driving data from the electric car is gathered by a data gathering system set up along a predetermined path in the real world. Using MATLAB, we analyze our driving data and compare the EV's performance with and without the ultra capacitor module.

3. OBJECTIVES

1. To study hybrid energy storage system based on a battery and super capacitor.
2. To find out Technologies for Electric Vehicle Batteries.
3. To examine Ultra capacitor Sizing for Electric Hybrid Vehicles.
4. To analyze Real-time adaptive estimation of the parameters of a lithium-ion battery bank.
5. To evaluate modeling and hybrid energy storage systems for fuel cell electric car energy sources.

4. RESEARCH METHODOLOGY

Li-Ion Battery Corresponding Circuit Model

This study will provide a straightforward and precise online adaptive parameters estimate procedure for the Li-ion battery model at the cell, pack, and bank levels of a battery.

Universal Adaptive Stabilization (UAS)

Using a UAS based technique; we will be able to quickly converge on an error-free solution. As a result, we used an adaptive estimating technique based on UASs, which proved to be both fast and precise. Parameters (r_{11} , r_{21}) for Li-ion batteries will be estimated. A high-growth switching function will be necessary for the deployment of a UAS-based approach.

Fuel Sizing and Cell Modelling

Improving fuel cell design by modeling may result in more efficient and cost-effective fuel cells. For fast fuel-cell problem-solving, the model has to be reliable and precise. The performance of a fuel cell may be predicted with a competent model under a broad variety of scenarios. Despite its apparent simplicity, a fuel-cell model may be rather accurate in its predictions. Here will be some examples of rather simple models:

- Mass balances

- Energy balances
- Fick's law of diffusion
- Inequalities for heat conduction and convection

Mathematical model development will begin with the following steps:

- Model selection
- Model fitting
- Model validation.

These three fundamental procedures will be repeated until a suitable model has been created. Plots of the data, prior knowledge of the process, and assumptions about the process will all be employed in the model selection stage to find the best possible model fit.

System Modeling

In order to effectively manage energy, it will be necessary to model the system and determine the optimal size of the hybrid energy source. Our goal will be to propose a design approach of power source in an EV and to identify the number of super capacitor cells and the number of PEMFC cells for hybrid source management of a PEMFC and super capacitor for electric vehicle. The PEMFC and super capacitor hybrid energy source will be coupled with a DC bus that uses DC-DC converters to exchange power.

Hybrid Energy Source Modelling and Sizing

The basic chemical mechanism in hydrogen PEM fuel cells converts chemical energy into electrical and thermal energy. This reaction may generate electricity by separating the oxygen reduction and hydrogen oxidation processes with a membrane that allows protons to flow from the anode to the cathode.

5. EXPECTED OUTCOME

The primary focus of this research will be on extending the service life of fuel cells (FCs) and developing a model of an Ultra capacitor (UC) to create a hybrid energy storage system (HESS). Additionally, the control techniques will be employed to meet the fundamental requirements of our intended energy storage system, including stable DC voltage and an optimal state-of-charge. For best performance and design, the fuel cell will need precise system selection, design, and modeling for prediction of performance. In this work, we provide an efficient online technique for predicting the parameters of the Li-ion battery model using the Universal Adaptive Stabilizer (UAS). The new approach has

been thoroughly tested for its viability at the battery cell, pack, and bank levels. This study would not need offline experimentation or post-processing, unlike past UAS-based work on individual battery packs. Self-updating battery parameters in real time is made possible by rapid convergence of estimations of these parameters with little experimental effort.

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Performance analysis of Solar powered commercial Three-wheel Auto Rickshaw (TAR) with a solar tracking system

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Abstract— The objective of the current investigation is to harness energy from renewable energy sources, such as solar energy, and to develop a commercial autorickshaw powered by an Electrical Drive Train (EDT) Retro kit equipped with a solar tracking system that can improve the performance of the photovoltaic modules in a solar energy system. The device's working idea is to continuously align the photovoltaic modules with the sun's rays in order to maximise the solar panels' exposure to the Sun's energy. The solar panel can therefore provide higher output power. The idea behind working on this project emerged out of the observation of socio-economic conditions of the Three-wheel Auto Rickshaw (TAR) based passenger transport sector, as well as the Intermediate Public Transport (IPT) industry in general.

Keywords—*electrical drive train, solar tracking system, retro kit, three-wheel auto-rickshaw*

I. INTRODUCTION

Among different types of motor vehicles viz. Two three-wheelers (2-3W), Four-Wheeler (4W), Commercial Vehicle (CV), and Special Purpose Vehicles (SPV) all Three-wheel vehicles represent the L5 [1] category of motor vehicles as per Central Motor Vehicle Rule (CMVR) 1989. They are further classified into L5M and L5N vehicles [2] based on their application –the first one is used to carry passengers and the other carries the goods from one place to another. Three-wheel Auto Rickshaw (TAR) represents the first category of the vehicle i.e., L5M, and is being used extensively for passenger transport everywhere in Asian countries and in India also. The C-TAR, which represents three-wheelers, is equipped with Internal Combustion Engine (ICE) as a prime mover and hence it is popularly referred to as an ICE motor vehicle [3]. This vehicle has been used along with quadricycles, Taxis, and Multi Utility Vehicles (MUVs) to extend first and Last Mile Mobility (F&LMM) to people not only in metropolitan areas but also in towns and rural areas and has emerged as an important means of Urban Transport System. Along with many advantages of this

class of vehicles, they are responsible for pollution issues in cities, towns, and metros [4,5,6,7].

As stated earlier, C-TAR is the ICE vehicle equipped with internal combustion engines of different types as a prime-mover. An earlier version of this vehicle used to operate on a two-stroke (2S) petrol engine. In order to make it more fuel efficient and environment-friendly it witnessed some changes over the last two decades –prominent among them are changes in fuel and engine technology. Under National Urban Transport Policy (NUTP) 2006 these vehicles in certain cities of India are converted into Compressed Natural Gas (CNG) and Liquid Petrol Gas (LPG) fueled vehicles to minimize vehicular pollution. Further on the same line 2, this project is about TAR and its' electrification. The electrification of mobility was initiated in India through in the year 2012, the National Electric Mobility Mission Plan (NEMMP) 2020 was created. According to this strategy, 6-7 million EVs will be sold [8] were targeted by 2020. Further under FAME I [9] from 2015 & FAME II from 2019 interventions like offering demand incentives, charging infrastructure development, and Publicity and IEC (Information, Education & Communication) [10] have been and further are being planned and implemented at both national and state levels. The FAME-II scheme is further extended up to 2024 as per the recent GOI notification. The scheme extends a facility of reduced upfront cost over purchasing Hybrid and electric vehicles to customers and end users. Any person or end user can avail of this scheme by purchasing electrical two, three, and four-wheelers and buses. Moreover, government agencies, industry, and public sector undertakings (PSU) are promoted to set up public charging.

Electric Three-wheel Auto Rickshaw is a three-wheeler with an Electric Drive Train (EDT). A drive train [14] is nothing but a set of energy storages, energy converters, and a transmission system using which power is supplied to driving wheels. An energy storage means either a fuel tank, a battery, a hydraulic tank, or an air tank where the

energy in chemical, electrical, Hydraulic, or pneumatic form is stored respectively, and an energy converter is where the said energy is converted into useful mechanical energy that can be supplied to driving wheels either through transmission or directly. There are five main types of drive trains viz. conventional, electrical, hydraulic, pneumatic, and hybrid present in motor vehicles. The Conventional DriveTrain (C-DT) comprises a fuel tank and IC Engine which are respectively an energy storage and an energy converter and energy supplied by the engine is transmitted to the driving wheels via a transmission system. On the other hand, an Electrical

Drive Train (EDT) [11] contains a battery as an Electrical energy storage unit and an electric motor as an energy converter, the energy supplied by the motor is supplied to driving wheels using different types of transmission systems.

Depending upon the types of energy storage - batteries, energy converter –Electrical motors, and transmissions used we can assemble different types of EDTs for attaining distinct vehicle architecture [12, 13, 14] and so E-vehicles in general and E – three-wheel auto rickshaw.

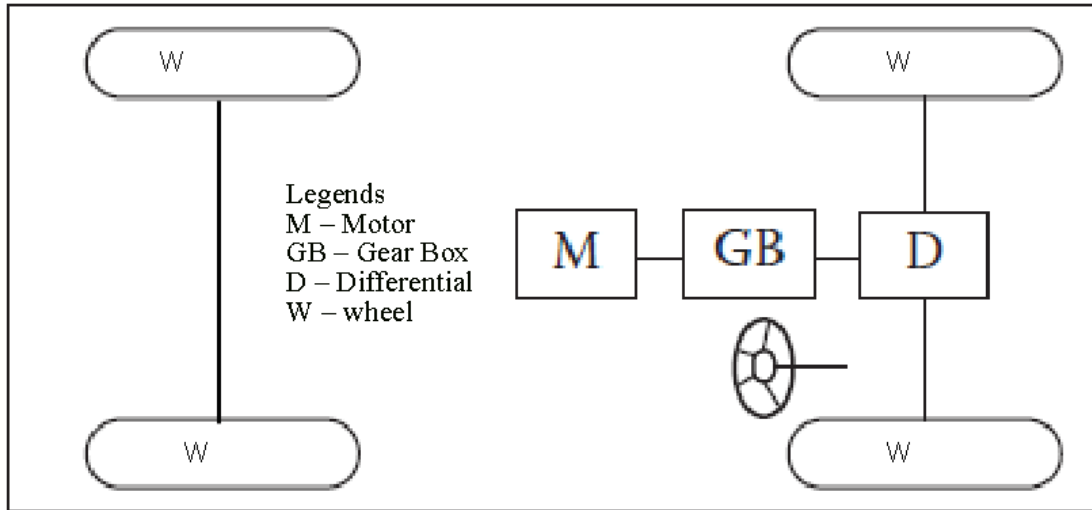


Fig. 1. Single Gear EV Architect

Fig. 1 shows a single-gear transmission architect where a single reduction gearbox or differential is connected to an EDT to form an Electrical Drive Train (EDT). There are many other architects available for designing new EDT or converting CDT into EDT. a conventional power train (CPT) is replaced by an Electrical Power Train (EPT), keeping a transmission system, that comprises a Clutch, a multispeed gearbox, and a differential, as it is. It is a primitive form of architecture tried at the beginning of the electrification program of many Original Equipment Manufacturers (OEM). It is the easiest way of conversion of any ICE vehicle into an electrical vehicle. A photovoltaic installation mounted on a motor-powered support structure is called a solar tracker. It enables the solar panels to be pointed towards the sun all day long to maximise sunlight absorption. As a result, according to the type of control, sensitivity of the sensors, or positioning system they contain, solar trackers can be divided into two main types [15, 16, 17]. The MPPT (maximum power point tracking) method, which relies on an algorithm to find the photovoltaic panel's

maximum power curve, or the sun tracking system, which is based on the orientation of solar panels throughout the day to best utilise the photovoltaic cells, can also be used to distinguish them [4,5].

II. DESIGN AND IMPLEMENTATION

The project work is distinctly divided into three parts. The first section discusses solar energy harvesting utilising tracker-mounted solar panels. The second part is about the conversion of a Conventional TAR into an E-TAR along with the identification and procurement of requisite instrumentation to test the converted vehicle. The second part of the project, which is equally important, is about undertaking test procedures for desired performance of E-TAR and generating data to analyze both the vehicle as well as Electric Drive train together as well as individually. The result based on processing data is vital in further refinement of both.

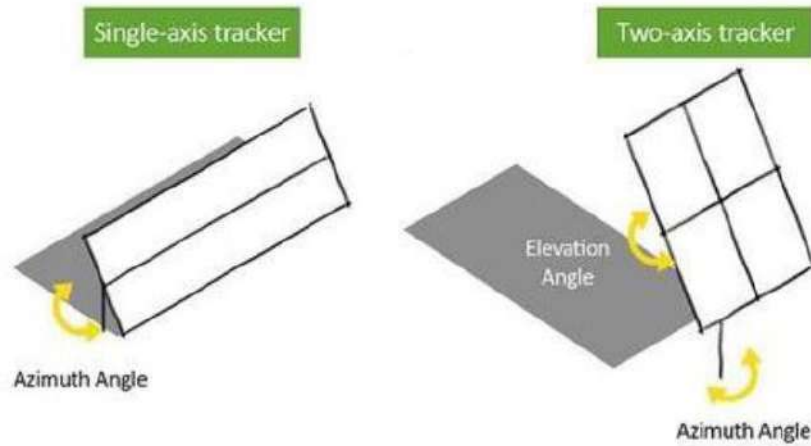


Fig.2. Single Axis and Two axis solar tracking

The tracking system depends on the azimuth angles. Single-axis systems are typically cost-effective. The tracking can be done in a single-axis tracking system either horizontally, vertically, or obliquely. On the other side, dual-axis tracking systems are more effective at catching the most solar energy, but they are more expensive. This type of device tracks the sun by keeping track of both its elevation and its motion.

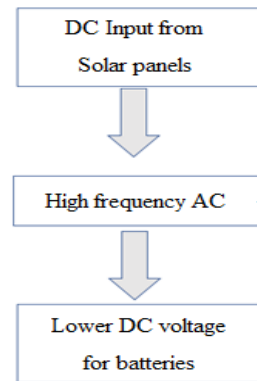


Fig. 3. Conversions taking place inside the Solar charge controller

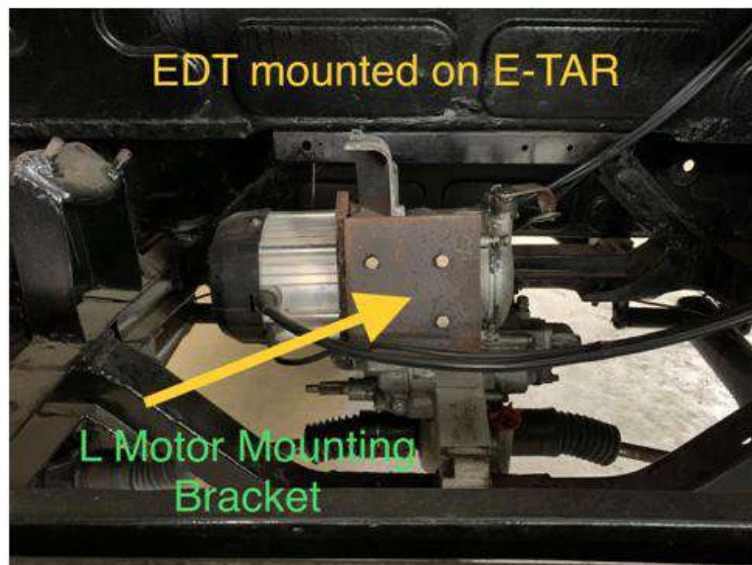


Fig. 4. Snapshot of EDT mounted on a Transaxle Foundation

The conversion is carried out in two stages the first is to assembly modified CDT into EDT by overhauling of modified CDT for its proper performance and then mounting the clutch and the traction motor from both sides using the modified clutch shaft and the L-motor bracket. The proper care regarding the alignment of the motor and the clutch is taken to ensure overall balancing and fitment. Then

the converted EDT is tested for all the related performances like gearing changing, clutch engagement and disengagement, and the sense of rotation first by mechanical motion and then supplying battery power.

III. RESULTS AND DISCUSSIONS

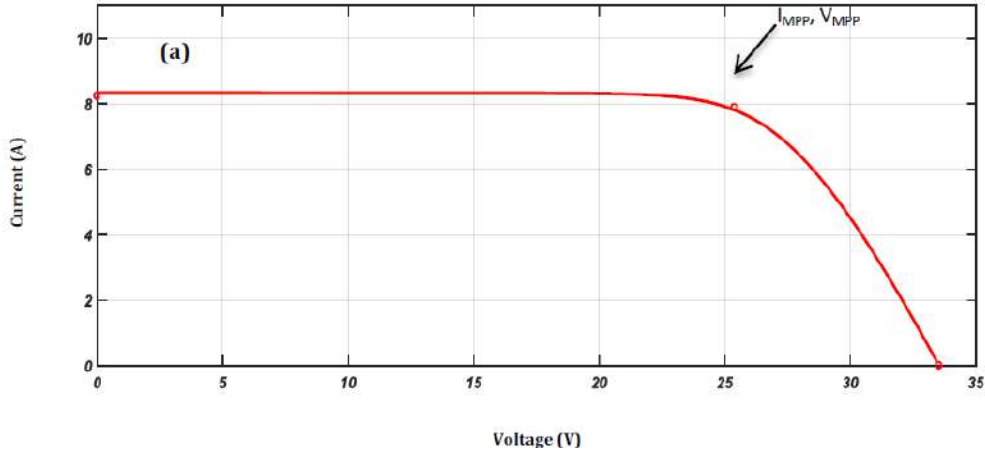


Fig.5. Voltage-Current Characteristics curve for a PV Module

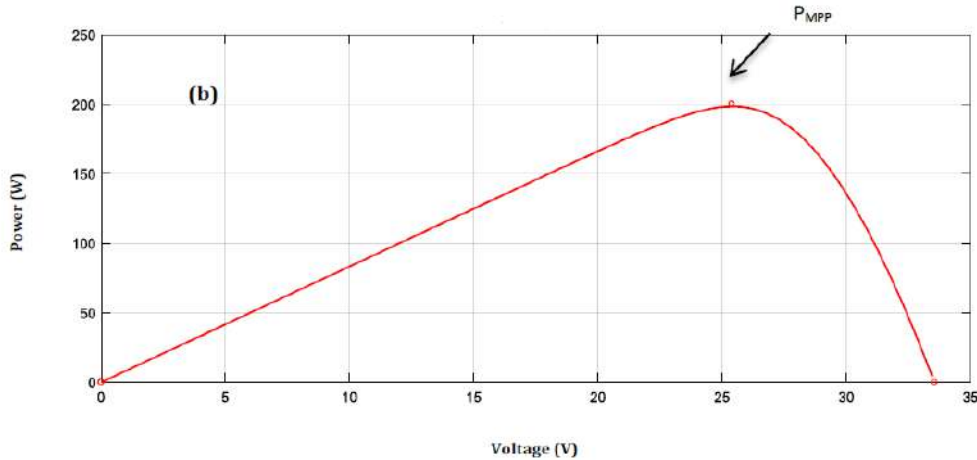


Fig.6. Voltage-Power Characteristics curve for a PV Module

The tracking system was employed in the month of May to July and a comparative study was conducted between tracking solar systems and fixed axis solar systems. Table 1 power values at the same time were recorded at regular intervals of 3 hours starting from 10 a.m. in the morning to 4 p.m. in the evening. The kind of solar panel employed was a 24-watt, 12-volt solar panel delivering approximately 1.89 amperes of average current. The fixed angle was kept towards the South East direction as it was

installed in the city of Satara with an average inclination of approximately 30 degrees.

TABLE 1. COMPARISON CHART FOR POWER HARNESSSED FROM FIXED PANEL AND PANEL WITH TRACKING SETUP

Time	Fixed Panel	With Tracking setup
10:00 a.m.	10 W	15.6 W
1:00 p.m.	11W	16.89 W
4:00p.m.	4W	13 W

As is evident from the data obtained from the experiment tracking can acquire more energy over a given period of time than a fixed solar system. The

test is taken to calculate the power consumed by the vehicle for accelerating it from stationary condition to reaching its max. Speed.

1. TABLE 2. POWER CONSUMED BY THE VEHICLE TO REACH A MAXIMUM SPEED

Gear Engaged	Maximum Speedometer Reading	Time taken in seconds	Voltmeter Reading (V)	Clamp meter Reading (A)	Distance in meters
1st Gear	15	15.96	49.4	1.8	37.6
	14	15.75	49.5	1.7	
	16	16.1	49.3	1.6	
2nd Gear	18	18	49.6	2.3	
	17	17	49.7	2.4	
	19	18.25	46.5	2.2	
3rd Gear	22	10.21	49.6	2.6	
	22	10	49.4	2.5	
	21	9.5	49.5	2.7	
4th Gear	23	11.88	49.2	3.2	
	24	11.5	49.3	3.3	
	24	11	49.4	3.1	

The velocity and time it takes to reach maximum speed are recorded using a speedometer and a stopwatch. The Average max. is shown in Table 2. Without using the throttle, the vehicle can go at 14, 17, 22, and 24 kmph in first, second, third, and fourth gear with a 141 kg payload on a flat surface (0% grade). The speed and gear that a car is in affect how much power it uses. They are positively correlated with one another. The maximum speed attained by the vehicle is 24 kmph with full throttle, plane road, and partial payload. The minimum and maximum speeds attained during this test are 14 kmph in the first gear and 24 kmph in the fourth gear.

IV. CONCLUSIONS

The study was written with the goal of drastically altering how auto rickshaws contribute to urban pollution and offering a workable remedy for it. The main goal is to replace dependence on fossil fuels and achieve zero tailpipe emissions. This aids in the transition to a greener society. Even though capital expenditures are higher, this helps those who rely on auto-rickshaws for a living because it allows them to save more money over time. The purpose of the prototype is to demonstrate practically how this idea may be applied to an auto rickshaw, which is a major component of public transit in most Asian nations. The prototype that was created used solar energy from renewable resources and had zero emissions at the tailpipe. According to the test results, the

manufactured solar-assisted auto rickshaw closely resembles the current conventional auto rickshaws.

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MARINE POLLUTION (OIL SPILLAGE) AND ITS REMOVAL

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ABSTRACT: Recent years have seen a tremendous increase in the need for studying and developing natural absorbents due to the huge negative environmental impact of oil spills. An assessment of the negative effects of oil spills in the past, the effects of oil spills on plants and animals, different methods adopted to control and clean them, including mechanical devices and sorbent materials, is presented in this paper. Additionally, it emphasized the importance of developing available materials in various parts of the world, particularly in tropical areas. As a result, sugarcane waste, corn waste, and tea waste are proposed as promising oil absorbent materials.

KEYWORDS: Marine Pollution, Oil Spillage, Activated Carbon , Adsorbent.

1) INTRODUCTION

All of the oceans on Earth are interconnected. In the year 2000, there were four perceived seas: Indian Ocean, Arctic, Pacific, and Atlantic. The International Hydrographic Organization established a brand-new ocean in the spring of 2000. Called the Southern Ocean, it surrounds Antarctica and reaches 60 degrees latitude. Additionally, there are numerous smaller ocean branches. Land frequently partially encloses seas. The South China Sea, the Caribbean Sea, and the Mediterranean Sea are the largest seas.

The risk of oil spills is rising as a result of the growing industrial activity in many parts of the world and the daily consumption of a large quantity of crude oil from numerous offshore and onshore oil fields and the transportation of crude and its product. One of the most widespread forms of pollution that has a negative impact on marine life and the ecosystem is the oil spill. Among all unique adsorbent, Bio-mass waste is liked as an oil tidy up innovation because of its Profile Debasement and lightness. This study examines the adsorption of raw petroleum by getting ready attractive enacted carbon utilizing sugarcane, corn, and tea squander. The pH, DO, BOD, COD, hardness, and turbidity of the water, as well as oil spillage characteristics, were collected, treated, and analyzed. Results showed that there was very little change in the pH, turbidity esteems but rather there was a slight expansion in the Body and COD qualities. On correlation with the three oil expulsion techniques, the adsorption utilizing the attractive enacted carbon - tea has higher assimilation limit.

2) OBJECTIVE

To learn about the different sorts of marine contamination.
Using magnetic activated carbon, sugarcane waste, tea waste, corn waste, and other waste, and absorption to treat the marine water contaminated by oil spills
To analyze the qualities of treated oil spilled water with the current qualities.

3) RELATED WORK

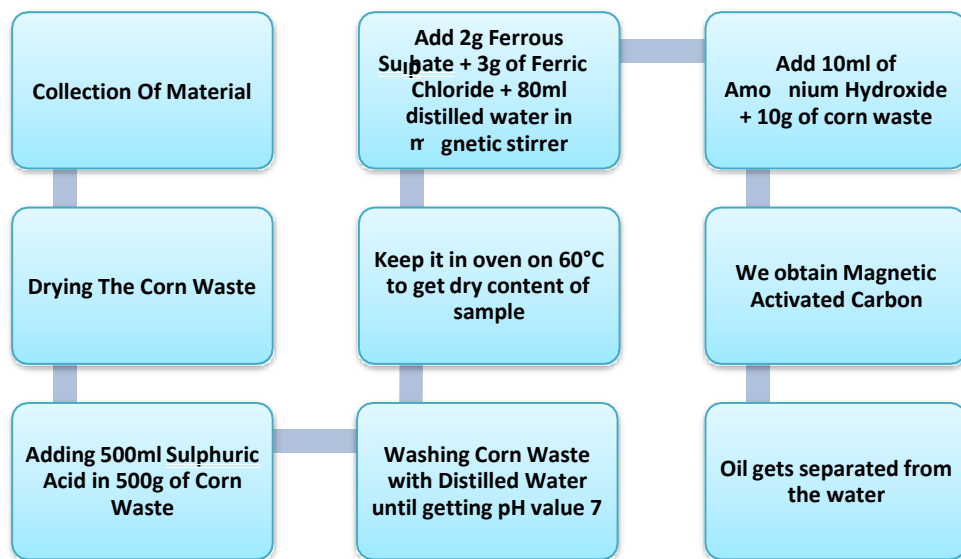
Major environmental issues abound in the vast, dynamic, and complex marine environment. There is proceeding with strain on the marine climate from clashing exercises including hydroponics, horticulture, fisheries, urbanization, modern turns of events, transportation, preservation and the travel industry. There are more and more legal challenges, and the scale and public opinion regarding individual development projects are unprecedented.

Most of the time, management in the marine environment is scattered, complicated, and poorly understood. A survey of logical and famous writing tracked down instances of fantastic, dubious and lacking undertakings in marine and seaside regions.

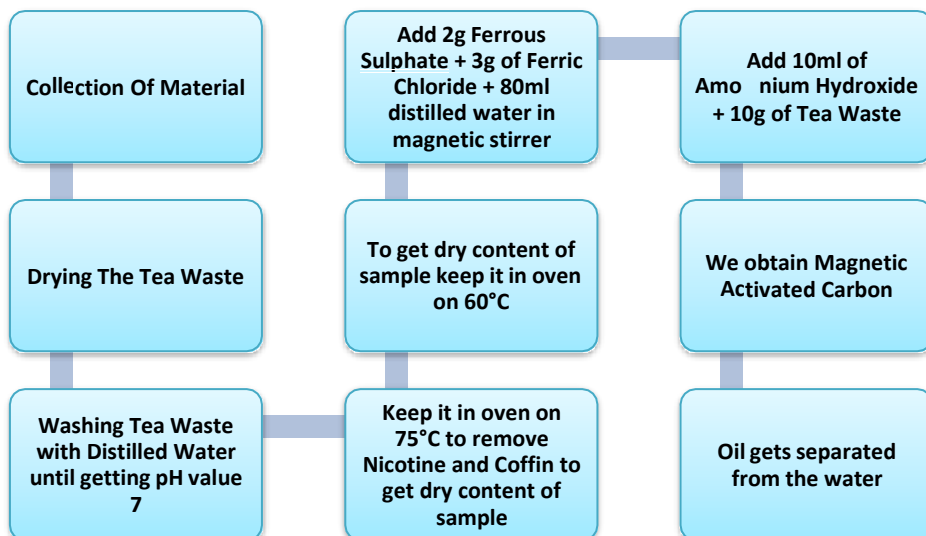
marine environment is a complex web of habitats and species intertwined by intricate physical and ecological processes that interact with humans and their activities on numerous levels. The open ocean, the deep sea, coral reefs, salt marshes, rocky shores, and other marine habitats are frequently grouped into ecosystems. despite the fact that they are all interconnected and the effects of one ecosystem on another. Biological system construction and capability are significant elements while surveying influences. Ecosystem services are the numerous benefits these habitats and communities provide to humans. The clearer of these are the fish, shellfish and different food sources that we eat, and the sporting or tasteful advantages we get from the ocean. In addition, a lot of coastal communities have deep spiritual and cultural ties to the sea. However, there are numerous additional services that are less obvious.

4) METHODOLOGY

1) Perform a sample test with sugarcane



2) Conduct a test on a sample using corn waste and tea waste



5) RESULT

1) Determination of Turbidity: -

Turbidity measured this way uses an instrument called a nephelometer. With the detector set up to the side of the light beam. More light reaches the detector if there are lots of small particles scattering the source beam than if there are few. The units of turbidity from a calibrated nephelometer are called nephelometric Turbidity Units (NTU). Sample is taken and kept in nephelometer to determine turbidity. Thus the turbidity value for sample is as follows.

SR.NO	SAMPLE	TURBIDITY (NTU)
1	Marine Water	6
2	Marine Water + Oil Mixing	8
3	After removing oil by using sugarcane waste	6.32
4	After removing oil by using corn waste	6.67
5	After removing oil by using tea waste	7

2) Determination of pH: -

The pH value of marine water indicates the negative log of hydrogen ion concentration present in marine water. Sample is taken in a beaker and then pH paper was inserted and pH was determined. The value of pH measured for adsorption is as follows.

SR.NO	SAMPLE	pH VALUE
1	Marine Water	7.44
2	Marine Water + Oil Mixing	6.56
3	After removing oil by using sugarcane waste	7.22
4	After removing oil by using corn waste	7.1
5	After removing oil by using tea waste	7.31

3) Determination of Biological Oxygen Demand (BOD): -

Biochemical oxygen demand (BOD) is a measure of organic pollutants, one of the causes of water pollution. In the organic carbon cycle, organic pollutants in water are oxidized by aerobic bacteria using dissolved oxygen.

SR.NO	SAMPLE	BOD (mg/l)
1	Marine Water	26
2	Marine Water + Oil Mixing	130
3	After removing oil by using sugarcane waste	90
4	After removing oil by using corn waste	115
5	After removing oil by using tea waste	80

- The BOD efficiency after treatment using sugar cane is 30.8 %.
- The BOD efficiency after treatment using corn waste is 11.53 %.
- The BOD efficiency after treatment using tea waste is 38.5 %.

4) Determination of Chemical Oxygen Demand

The chemical oxygen demand (COD) is the amount of oxygen consumed to completely chemically oxidize the organic water constituents to inorganic end products. It was carrying out to determine the organic oxidize able matters content of water samples.

SR.NO	SAMPLE	COD (mg/l)
1	Marine Water	234
2	Marine Water + Oil Mixing	550
3	After removing oil by using sugarcane waste	492
4	After removing oil by using corn waste	300
5	After removing oil by using tea waste	224

5) Determination of Dissolved Oxygen: -

Dissolved oxygen is a measure of the amount of oxygen dissolved in the water column, and is a fundamental requirement for the maintenance of balanced populations of fish, shellfish, and other aquatic organisms, in marine water. The value of the Dissolved Oxygen (DO) measured for adsorption is as follows.

SR.NO	SAMPLE	DO (mg/l)
1	Marine Water	4
2	Marine Water + Oil Mixing	3
3	After removing oil by using sugarcane waste	3.4
4	After removing oil by using corn waste	3.6
5	After removing oil by using tea waste	3.72

6) Determination of Hardness:-

The ability of the water to form lather with the soap solution. This is due to the presence of carbonates and bicarbonates of calcium and magnesium.

Hardness in mg/l of CaCO₃ = Volume of EDTA x 1000/Volume of sample. The value of the hardness measured for adsorption is,

SR.NO	SAMPLE	HARDNESS (mg/l)
1	Marine Water	4350
2	Marine Water + Oil Mixing	4370
3	After removing oil by using sugarcane waste	4365
4	After removing oil by using corn waste	4361
5	After removing oil by using tea waste	4355

6. CONCLUSION

- The characteristics of the water collected from the coast were examined. On a laboratory scale, oil spilled into marine water was treated with the help of the preparation of magnetic activated carbon.
- Attractive initiated carbon is ready with the utilization of three kinds of Bio-mass squanders, for example, sugarcane, corn and tea squanders.
- In the wake of treating the oil spilled marine water with attractive actuated carbon (ready with three sort of waste). The pH, BOD, and COD of the treated sample are compared to those of the untreated sample for analysis.
- The system's "use of Bio-Mass Waste" treatment of oil spilled marine water has been demonstrated. In this water lacking world it is so useful to treat the oil spilled marine water.
- In addition to drinking, the treated water can be used for domestic purposes.
- The successful development and implementation of guidelines and regulations for the control of ballast water depends on the early involvement of all parties who are interested. The transfer of non-indigenous species is a problem that affects society as a whole and not just the shipping industry.
- At the moment, turbidity may be the most reliable indirect sign that ballast water may contain living organisms. Automatic inline equipment that provides continuous readouts for subsequent computer storage or direct transmission to the shore can be used to monitor basic parameters of water quality.
- The refinement interaction of water might decrease the grouping of particulate matter including suspended particles, parasites, microorganisms, green growth, infections, organisms; and a variety of dissolved and particulate materials derived from surfaces with which rainwater may have come into contact.

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participated / presented research paper titled

**Virtualization Framework for Securing Cloud to 5G Networks using Ant Lion Optimization
constructed KGMO for Mobility Supervision**

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