

# Tamper Proof Air Quality Management System using Blockchain

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**Abstract**—One of the most important concerns facing urban regions across the world is air pollution. As a result, it's critical to monitor pollution levels and notify the public on the state of the air. An indicator called the Air Quality Index (AQI) does this by mapping the concentration of different contaminants into a single number. Because the examination of pollutant data is frequently opaque to outsiders, poor environmental control judgments may result. This has led to a need for a tamper-proof pollution management system for use by authorities, like the state and central pollution boards. To address these challenges, a model using machine learning algorithms to predict the air quality and store that information in the blockchain is proposed. Machine learning algorithms are used to categorize the air quality, and blockchain technology guarantees a permanent, tamper-proof record of all air quality data. Such a system might address the persistent issues with data dependability, immutability and trust in pollution control. The execution time of two main operations on blockchain are measured. The execution time of the put block is measured as 10 ms and the get block gets executed in 1 ms that fetches data from the blockchain ledger.

**Keywords**—Air pollution; air quality index; machine learning; blockchain technology

## I. INTRODUCTION

Air quality refers to how well the air is suited for breathing by people, animals, and plants. An average healthy person breathes approximately 14,000 liters of air each day. As a result, poor air quality may have an effect on the quality of life for both the present and future generations by hurting human well-being, the environment, the economy, and urban sustainability.

AQI Category (Range)	PM <sub>10</sub> (24hr)	PM <sub>2.5</sub> (24hr)	NO <sub>2</sub> (24hr)	O <sub>3</sub> (8hr)	CO (8hr)	SO <sub>2</sub> (24hr)	NH <sub>3</sub> (24hr)
Good (0-50)	0-50	0-30	0-40	0-60	0-1.0	0-40	0-200
Satisfactory (51-100)	51-100	31-60	41-80	51-100	1.1-2.0	41-80	201-400
Moderately polluted (101-200)	101-250	61-90	81-180	101-168	2.1-10	81-360	401-800
Poor (201-300)	251-350	91-120	181-280	169-208	10-17	361-800	801-1200
Very poor (301-400)	351-430	121-250	281-400	209-748	17-34	801-1600	1200-1800
Severe (401-500)	430+	250+	400+	748+	34+	1600+	1800+

Fig. 1. Air quality index (AQI) category range

The government keeps an eye on the air quality in various locations to determine the pollution level and to ensure that pollutant levels are within acceptable limits for human health. Air quality agencies can better plan how and when they will take action to safeguard the public's health by identifying how much pollution is present in a given location. Fig. 1 shows the AQI category range of the major pollutants.

The current technique for tracking industrial pollution is centralized, with a lack of openness and the possibility of data falsification. As a result, a consistent and tamper-proof mechanism must be utilized, such as secure software with data encryption and simultaneous data transfer directly to the regulator. Blockchain delivers Distributed ledger technology (DLT), which possesses the potential to solve many of the present system's open issues. Blockchain nodes are a network of multiple storage and computing devices that replicate data over a highly available and fault-tolerant infrastructure. Thus, blockchain facilitates the operation of a distributed database that is transparent and tamper-resistant. There is a need to design and develop an application using machine learning to predict Air quality category and store it on the blockchain that ensures it is tamper-proof and secure. The proposed system has three modules namely machine learning model, Blockchain network and Client application

The machine learning model is trained using industrial air pollution data. Supervised learning algorithms such as random forest classifier, decision tree classifier and Naive Bayes are used to predict the air quality index and the quality range of the given input data. The design of the ML model has these phases. The dataset comprises pollutant concentration information from over 15 industrial areas across India. This data set has around 37-40 pollutants, but the seven most appropriate pollutants are considered. The dataset is cleaned and partitioned into training and testing data. On comparing the results, best results were obtained from decision tree classifier with an accuracy of 99.6%.

The next module is the Blockchain network. The chaincode contains the ML model deployed in it. Once the client supplies the data to the blockchain, the chaincode that has the ML



# Malware Detection on Android Apps using RSLBO based Dense Network in Internet of Things

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744

## Abstract

Malware that poses a variety of cybersecurity risks is rapidly growing in both type and number as the IoT devices, which support a wide range of services including factories in smart cities, continue to grow in number and type. The ever-increasing popularity of Android applications has drawn a lot of attention from those who write malicious software. Research involving the use of identification of malware is now being carried out as part of efforts to safeguard Internet of Things devices from assaults. On the other hand, as a result of the proliferation of malicious software designed to target internet-connected devices and the many evasion strategies it employs, the likelihood of mistakenly classifying malware as harmless has also increased. Traditional techniques for detecting malware have a number of drawbacks, such as being computationally costly, having inadequate performance, or being insufficiently resistant. The research offers an answer to this badly-behaved in the form of a powered malware detection system that is both effective and efficient. For the final model, the software implements a cross entropy loss function to gain considerable performance increases while classifying malware. In addition, the Random Selected Leader Based Optimizer decides which hyper-parameter values should be optimized in DenseNet (RSLBO). In point of fact, the algorithm population update does not have to depend on a select few members, every ordinary associate of the population has the potential to be a leader in directing and informing the algorithm population. RSLBO is first explained, then theoretically modelled, and then used to the resolution of optimization issues. The consequences of the experiments reveal that the Android malware detection model based on the suggested method has a greater detection accuracy when compared to the classic techniques, and it also has a better detection impact when applied to obfuscated malware).

**Keywords:** Internet of Things; Random Selected Leader Based Optimizer; Android apps; DenseNet; Malware Detection; Imbalance Data.

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Review Article

# Text Based and Image Based Recommender Systems: Fundamental Concepts, Comprehensive Review and Future Directions

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**Abstract** - The exponential growth of data on the Internet leads to the information overload problem, wherein users are presented with a huge mixture of irrelevant and relevant data, making their decision-making process complicated and time-consuming. Recommender Systems are software agents that learn the preferences of individual users and give recommendations accordingly. The availability of exploitable data, including implicit and explicit user feedback, decides these systems' performance. Machine learning algorithms have increased the efficiency of recommender systems by providing recommendations to users based on the users' visual preferences. This paper reviews and classifies recommender systems based on their application domains and provides insights into the underlying concepts, including selecting features and algorithms under each classification. The challenges in developing recommender systems are discussed, considering which e-commerce marketplaces can be transformed to provide better customer satisfaction.

**Keywords** - Feature extraction, Similarity, Precision, recall, Prediction, Recommendation, Convolutional Neural Network (CNN), Deep learning.

## 1. Introduction

With the spike in the usage of web services, software agents providing a recommendation of relevant items play a significant role in our lives. Recommender Systems (RS) are powerful tools that help users find useful information regarding the items that might interest them, making their decision-making quick and easy. Considering the revenue generated from e-commerce business, by knowing the individual user's preferences, there is an increase in the chance of purchase of the recommended items and also a decrease in the probability of losing a customer. The underlying filtering algorithm determines the accuracy of recommendations given by RS. The major objective of an RS is to give users exposure to items that can be interesting to them and get the users to purchase those items. Users' interaction with Recommender System consists of input from the user in item ratings and the output to the user in the form of recommendations. The number of ratings the user has to provide, the time taken to register, detailed information about the item to be rated, the rating scale, and user control in setting preferences are some issues related to taking input from the user. Number of good and relevant recommendations, number of recommendations which improve the trust, number of unknown recommendations, the information provided about each recommended item, techniques of generating more recommendations and confidence in prediction are some factors deciding the output to the user [1].

Several research studies have reviewed the different types of recommendation techniques. [2], [3], [4], [5], [6], [7], [8], [9] Studies reveal that the choice of features/attributes and algorithms for information retrieval impact the performance of RS. The other challenge faced in RS is the understanding of dynamic user preferences.

Table 1 gives a summary of the reviewed past surveys. This survey contributes to the existing knowledge of RS by providing a different perspective on the various applications of recommender systems by categorizing them into text- and image-based recommender systems.

The various concepts, methodology/algorithms and various metrics used for the performance evaluation of the different categories of the services provided by recommender systems are reviewed in this paper.

The major points discussed in this paper are as follows:

- Recommender Systems fundamentals: Important techniques with algorithms and the different performance evaluation metrics used in RS are presented.
- Review of the various Text-based and Image-based Recommender systems: RS are categorized into text-based and image-based, depending on the input query



# Analysis of Content Based Image Retrieval using Deep Feature Extraction and Similarity Matching

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**Abstract**—Image retrieval using a textual query becomes a major challenge mainly due to human perception subjectivity and the impreciseness of image annotations. These drawbacks can be overcome by focusing on the content of images rather than on the textual descriptions of images. Traditional feature extraction techniques demand for expert knowledge to select the limited feature types and are also sensitive to changing imaging conditions. Deep feature extraction using Convolutional Neural Network (CNN) are a solution to these drawbacks as they can learn the feature representations automatically. This work carries out a detailed performance comparison of various pre-trained models of CNN in feature extraction. Features are extracted from men footwear and women clothing datasets using the VGG16, VGG19, InceptionV3, Xception and ResNet50 models. Further, these extracted features are used for classification using SVM, Random Forest and K-Nearest Neighbors classifiers. Results of feature extraction and image retrieval show that VGG19, Inception and Xception features perform well with feature extraction, achieving a good image classification accuracy of 97.5%. These results are further justified by performing a comparison of image retrieval efficiency, with the extracted features and similarity metrics. This work also compares the accuracy obtained by features extracted by the selected pre-trained CNN models with the results obtained using conventional classification techniques on CIFAR 10 dataset. The features extracted using CNN can be used in image-based systems like recommender systems, where images have to be analyzed to generate item profiles.

**Keywords**—Convolutional neural network; deep learning; feature extraction; accuracy; similarity

## I. INTRODUCTION

Image retrieval systems browse, search and retrieve visually similar images from large image databases. Traditional image retrieval methods utilize the image annotations for obtaining the metadata that help in finding the similar images, but this is a laborious process and is subjective to human perceptions. Efficient image retrieval is the backbone of most of the search engines and recommender systems. Search engines may not be able to retrieve relevant information according to user's preferences due to imperfect textual query, less knowledge about the search query or due to wrong tagging of the database images. This gap between real intention of a user's search and his understanding of the object is called as semantic gap [1]. With the large amount of image data encountered in social networks, online e-commerce website, medical imaging, etc., it is a challenging problem to search the

humongous databases for similar images, especially when it comes to real time image retrieval. Feature extraction techniques help in getting a representation of the attributes of an image, which gives information about the image contents and hence helps in efficient retrieval of visually similar images. Feature extraction transforms data into more informative forms with efficient representation for analysis and classification [2]. Advantages of feature extraction include:

- Reduction of redundancy.
- Reduction in the number of processing resources.
- Helps in avoiding overfitting problem in machine learning models.
- Increase in accuracy.

**Motivation:** Any image recognition or image retrieval task requires a good feature representation in order to achieve high performance. However, since it is not feasible to define a good feature set manually, feature extraction plays a major role in image retrieval tasks. Features obtained using traditional methods of feature extraction are not capable of expressing the semantic information of the image. Deep Learning techniques make the task of feature extraction automatic and more efficient. Since deep learning techniques require a large amount of labelled training data, transfer learning can be used to reduce this overhead [3]. Fine tuning a CNN allows pretrained models to be used in a new task with a new dataset.

CNN models have two stages, of which, the first is feature extraction and the second is classification. This paper focusses on feature extraction using pretrained CNN and comparing their performance.

The open research questions which are addressed in this work include:

- i) How effective are deep learning methods for learning good feature representations from images for Content Based Image Retrieval?
- ii) How do the feature extraction and image retrieval time vary with the different models?

### A. Contributions:

- This work contributes to the existing knowledge of feature learning by exploring feature extraction and transfer learning techniques using the five selected pre-trained CNN architectures.

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AQI Category Range	0-50	51-100	101-150	151-200	201-300	301-500
Good	0-50	51-100	101-150	151-200	201-300	301-500
Moderate	51-100	101-150	151-200	201-300	301-500	301-500
Unhealthy for Sensitive Groups	101-150	151-200	201-300	301-500	301-500	301-500
Unhealthy	151-200	201-300	301-500	301-500	301-500	301-500
Very Unhealthy	201-300	301-500	301-500	301-500	301-500	301-500
Extremely Unhealthy	301-500	301-500	301-500	301-500	301-500	301-500

Fig. 1. Air quality index (AQI) category range

The government keeps an eye on the air quality in various locations to determine the pollution level and to ensure that pollutant levels are within acceptable limits for human health. Air quality agencies can better plan how and when they will take action to safeguard the public's health by identifying how much pollution is present in a given location. Fig. 1 shows the AQI category range of the major pollutants.

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# Survey on Institution Accreditation and Automation System

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**Abstract:** Education refers to the knowledge, insights, and skills inherited by students from teachers. An Outcome Based Education (OBE) system can measure the students' capabilities and performance. The National Board of Accreditation (NBA) is the supreme accreditation body for Engineering and Management Programs in India. This paper is based on Criteria 3 of the Self Assessment Report (SAR) for NBA. Criteria 3 is focused on the attainment of Course Outcomes (COs) and Program Outcomes (POs) by a department and its courses as a part of Outcome-based Education (OBE).

## 1 INTRODUCTION

In Higher Education, particularly in technical institutions, Outcome Based Education (OBE) is deemed to improve the quality of education, allowing graduates to compete against global counterparts. OBE is an educational approach that concentrates and organizes the entire academic curriculum and instructional efforts around a clearly defined set of program outcomes all students should exemplify after completing the program. It is a student centered instruction model that focuses on measuring student performances through outcomes. A combination of skills, abilities, knowledge, attitudes and understanding that a student will attain as an effect of their successful engagement in a particular set of higher education experiences constitute these outcomes.

The Washington Accord in 2014 inducted India with the permanent signatory status of The National Board of Accreditation (NBA). The induction of India allows any Engineering graduate from NBA-accredited universities to be eligible for employment in any other country that has signed the accord. For an Indian Engineering Institution to get accredited by NBA according to the pacts of the 2014 accord, engineering institutions must follow the Outcome Based Education (OBE) model.

The OBE model measures the progress of graduates through Program Outcomes (PO), Program Educational Outcomes (PEO) and Course Outcomes (CO). Program Outcomes (POs) describe the qualities, skills, abilities and understandings that the students should develop as a consequence of engaging with the curriculum in the institution. Program Educational Outcomes (PEO) describe the career and professional accomplishments the program prepares the graduates to accomplish. Course Outcomes (CO) are the measurable parameters which evaluate students' performance in Bloom's Taxonomy levels (Remembering, understanding, Applying, Analyzing, Evaluating, and Creating) for each course that the student undertakes every semester.

For NBA accreditation, an institution has to satisfy 7 Criteria. The institution should submit documents for the evaluation and assessment of reaching each criterion. Generating these documents is a lengthy, tedious process that has to be manually done by the institution's staff, which is time-consuming. It is also required to collect and maintain all the necessary data for generating these documents.

To address these problems, we propose an automation system that manages all the procedures required for Criteria 3 attainment of the NBA accreditation process. This automated system uses an unstructured database to collect and store information from the faculty. Faculties can enter the required information through an easy-to-use web-based UI. After all necessary data is uploaded, the Institute's staff overlooking the process can generate the required reports using the system.

## Deep Learning Technique for Object Detection from Panoramic Video Frames

Kashika P. H. and Rekha B. Venkatapur

**Abstract**—The objective is to train a YOLOv3 algorithm with necessary enhancements to accurately detect the safety helmet from the video frames which can be used to find the people working in the construction site or riding bike without helmet in the traffic. During the recent past the dominance of deep learning algorithms increased in solving problems in the field of computer vision especially for image classification and object detection. The available algorithms can be divided in to two major categories, 2-stage detection (based on region proposal network) and 1-stage detection. For real time detection of objects from surveillance videos, YOLO based detection is considered to be more suitable approach due to its high speed detection. The loss function and other factors pose few challenges and limitations as the detection accuracy degrades especially when the training dataset is unbalanced. The loss function is modified to overcome the effect of different scale of the object of the same category. This paper utilizes the DarkNet-53 approach, a 53 layered deep convolutional neural network to extract features. The proposed YOLOv3 based safety helmet detector especially the feature extractor is trained on a custom built dataset. The detector achieves a higher detection speed and accuracy with higher generalization ability. The performance of the trained model is tested on panoramic images generated by stitching multiple video frames captured from the surveillance videos. The results demonstrate that the trained model can be utilized to detect the safety helmets from the video frames in real time. The presented approach will be an effective alternate solution for detecting the safety helmets and enhance the safety practices at construction site and road traffic.

**Index Terms**—Region proposal network, real time detection, one stage detection, Darknet-53, safety helmet detection, panoramic images.

### I. INTRODUCTION

Object detection is an interesting and more challenging problem in the field of computer vision, which is being explored by many researchers. The objective of object detection is identifying and localizing the object (single or multiple instances) in an image or sequence of images / video. In specific the object detection algorithm output bounding box and a corresponding class label for each of the objects detected within the given input image which is useful particularly in surveillance applications. Deep learning algorithms based object localization/ detection approaches are gaining more importance and they are more accurate when compared to the conventional machine learning based approach. The deep learning algorithms generated more abstract high level feature

representation for the given input based on the low-level features [1].

In general the object detectors based on deep neural architectures can be classified as either one stage or two stage detectors. The two stage approach includes methods like R-CNN, Faster R-CNN [2], and Fast R-CNN [3] which uses a region proposal network in the first stage to generate candidate bounding boxes. The second stage contains a fully convolutional neural network which extracts features from all the selected candidate bounding boxes. Later these features are used for classification and bounding box regression. The other approach is termed as one stage detectors or single shot detectors which include algorithms like YOLO, SSD [5], and Squeeze Det [4]. The one stage detection methods are more suited for real time applications as their inference speed is higher. They use regression methods to identify target locations and utilize anchors with fixed-position. The anchors help to constrain the aspect ratio and prevent detection of irregular shapes. The detection accuracy will be affected by the number of anchors (which is a hyper parameter). The non max suppression used in the post processing stage to resolve the overlapped detection is prone to error in many situations [6].

The region based CNN are the preliminary approaches which utilize deep CNN to solve the object detection problem. Based on R-CNN, the initial method proposed for object detection, Fast R-CNN, and Faster R-CNN were proposed with an aim of reducing the training time and increasing the mean average precision. Even though these methods yield high detection accuracy they suffer due to complex architecture and more time consuming training process.

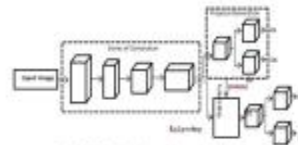


Fig. 1. Schematic view of two-stage detector.

The one shot detectors directly detect the location information of the objects and the respective class probabilities from the given input image with a full convolutional neural network. They don't require an initial region proposal network and a post classification network. The unified pipelined architecture is simple and capable of detecting objects quickly.

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## SURVEY ON AUTOENCODER BASED DETECTION OF NUTRITIOUS LEAVES

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**Abstract:** Several studies have been made on identifying diseases in mulberry leaves, however, identifying nutrient deficiency in mulberry leaves has not been accomplished. The silkworms that feed on nutrient-deficient mulberry leaves produce low-quality silk. There is a great need for identifying nutrient-rich and healthy mulberry leaves for feeding the silkworm to get good quality silk yield. This paper is focused on segregating nutritious mulberry leaves for feeding the silkworms for cocoon formation. The process involves image acquisition, processing, segmentation, feature extraction, and classification. Auto-Encoder is used for feature extraction from mulberry leaves and for discrete them into nutritious and nutrient-deficient leaves. The real-valued feature vectors are passed to machine learning algorithms like the Naive Bayes classifier algorithm, Support Vector Machine (SVM), and K-Nearest Neighbour (KNN) for classification. Among them KNN provides higher accuracy for segregating the leaves.

**Keywords:** Nutrient deficiency, Support Vector Machine (SVM), K-Nearest Neighbour (KNN), Naive Bayes Classifier Algorithm, Auto-Encoder.

### I. INTRODUCTION

Mulberry leaf quality directly affects the growth and food consumption of larvae. It also significantly influenced the weight of the shell and pupal. Silkworms should be repeatedly fed with quality leaves. According to the explanation given, due to repeated contact with food, the time taken for conversion of assimilants into body tissue is reduced so that more of the digested food is stored to be silk fibers. Feeding high quality mulberry leaves throughout the growing phase lowers mortality rate of the silkworms (FAO 1990). So, the ultimate factor that affects the growth and development of the silkworm and also the overall silk production is the quality of the mulberry leaves. Feeding deficient mulberry hampers silkworm growth and its economic value. It also results in bad cocoon formation, and hence lowers the quality of the silk produced. So, there is a need to segregate leaves, and feed only good and healthy leaves.

### II. RELATED WORK

#### Paper 1: Segregation of Mulberry Leaves using Image Processing [8]

This paper is designed to segregate these leaves using an intelligent monitoring platform framework. Image pre-processing, segmentation, feature extraction and classification are the steps performed. Color sensor is used to detect the leaf. K-Nearest Neighbor (KNN), Support Vector Machine(SVM) and Naive Bayes classifier algorithms for classification. Images are captured by Raspberry camera. Servo motor is connected to Raspberry camera and it does segregate the leaves by rotating the plates attached. Segregation is done based on the class specified by the Raspberry Pi.

#### Paper 2: Mulberry Leaf Disease Detection using Deep Learning[9]

This paper briefs about mulberry leaf diseases and their detection. In this project different algorithms and techniques are used in classification based on the different criteria for image segmentation. This system uses CNN to identify and classify mulberry leaf diseases.

#### Paper:3 Mulberry leaf disease detection using YOLO [10]

This paper proposes a model that detects the infection in mulberry leaves using Convolution Neural Networks (CNN) and You Look Only Once (YOLO). Before image processing, the image is divided into several grids. Accuracy and speed of detection are relatively high.





## SURVEY ON AUTOENCODER BASED DETECTION OF NUTRITIOUS LEAVES

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**Abstract:** Several studies have been made on identifying diseases in mulberry leaves, however, identifying nutrient deficiency in mulberry leaves has not been accomplished. The silkworms that feed on nutrient-deficient mulberry leaves produce low-quality silk. There is a great need for identifying nutrient-rich and healthy mulberry leaves for feeding the silkworm to get good quality silk yield. This paper is focused on segregating nutritious mulberry leaves for feeding the silkworms for cocoon formation. The process involves image acquisition, preprocessing, segmentation, feature extraction, and classification. Auto-Encoder is used for feature extraction from mulberry leaves and for discrete them into nutritious and nutrient-deficient leaves. The real-valued feature vectors are passed to machine learning algorithms like the Naive Bayes classifier algorithm, Support Vector Machine (SVM), and K-Nearest Neighbour (KNN) for classification. Among them KNN provides higher accuracy for segregating the leaves.

**Keywords:** Nutrient deficiency, Support Vector Machine (SVM), K-Nearest Neighbour (KNN), Naive Bayes Classifier Algorithm, Auto-Encoder.

### I. INTRODUCTION

Mulberry leaf quality directly affects the growth and food consumption of larvae. It also significantly influenced the weight of the shell and pupal. Silkworms should be repeatedly fed with quality leaves. According to the explanation given, due to repeated contact with food, the time taken for conversion of assimilate into body tissue is reduced so that more of the digested food is stored to be silk fibers. Feeding high quality mulberry leaves throughout the growing phase lowers mortality rate of the silkworms (FAO 1990). So, the ultimate factor that affects the growth and development of the silkworm and also the overall silk production is the quality of the mulberry leaves. Feeding deficient mulberry hampers silkworm growth and its economic value. It also results in bad cocoon formation, and hence lowers the quality of the silk produced. So, there is a need to segregate leaves, and feed only good and healthy leaves.

### II. RELATED WORK

#### Paper 1: Segregation of Mulberry Leaves using Image Processing [8]

This paper is designed to segregate these leaves using an intelligent monitoring platform framework. Image processing, segmentation, feature extraction and classification are the steps performed. Color sensor is used to detect the leaf. K-Nearest Neighbour (KNN), Support Vector Machine(SVM) and Naive Bayes classifier algorithms for classification. Images are captured by Raspberry camera. Servo motor is connected to Raspberry camera and it does segregate the leaves by rotating the plates attached. Segregation is done based on the class specified by the Raspberry Pi.

#### Paper 2: Mulberry Leaf Disease Detection using Deep Learning[9]

This paper briefs about mulberry leaf diseases and their detection. In this project different algorithms and techniques are used in classification based on the different criteria for image segmentation. This system uses CNN to identify and classify mulberry leaf diseases.

#### Paper:3 Mulberry leaf disease detection using YOLO [10]

This paper proposes a model that detects the infection in mulberry leaves using Convolution Neural Networks (CNN) and You Look Only Once (YOLO). Before image processing, the image is divided into several grids. Accuracy and speed of detection are relatively high.



## Prediction of Star Rating based on DeepLearning

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**Abstract** The rating of an online product is a crucial indicator of how users feel about it. The rating is used by consumers to assess the superiority and calibre of an online purchase. It helps a customer to make an online purchase decision. Additionally, it enhances the producer's ability to modify the product in the future as it is being reproduced and updated. There are instances when someone would purchase a product online and then further write a text review of it without giving it a number rating, most often a star rating. To analyse their business, however, producers need to know how well the products are rated. This rating can help producers analyse their businesses and increase their revenue.

In order to predict ratings based on customer text reviews, we applied some supervised machine learning techniques. We then compared the performance of the Random Forest Classifier, XGBoost, and Logistic Regression algorithms with TF-IDF Vectorizer. On the dataset titled

"Grammar and Product Reviews" provided by Datafiniti, we used the aforementioned methods. We evaluated each algorithm's performance using its accuracy, precision, recall, and f1-score. The study found that the Random Forest algorithm, as well as precision, recall, and f1-scores, respectively, performed better when compared to other methods.

### INTRODUCTION

An examination of text reviews submitted by online shoppers is used to forecast star or numerical ratings. Online shopping is a growing aspect of our lives on a daily basis. People are growing accustomed to online purchasing as the days pass. Product ratings and reviews are the most crucial factors that consumers consider when making an online purchase. Business reviews are crucial since they aid organisations in determining excellence and quality in a number of areas that influence how well a company will do in the



## Privacy-preserving Search over Encrypted Personal Health Records in Multi-Source Cloud

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**Abstract.** Cloud-based Personal Health Record systems (CB-PHR) have great potential in facilitating the management of individual health records. Security and privacy concerns are among the main obstacles to the wide adoption of CB-PHR systems. Multi-source CB-PHR system in which multiple data providers such as hospitals and physicians are authorized by individual data owners to upload their personal health data to an untrusted public cloud. The health data are submitted in an encrypted form to ensure data security, and each data provider also submits encrypted data indexes to enable queries over the encrypted data. We propose a novel Multi-Source Order-Preserving Symmetric Encryption (MOPSE) scheme whereby the cloud can merge the encrypted data indexes from multiple data providers without knowing the index content. MOPSE enables efficient and privacy-preserving query processing in that a data user can submit a single data query the cloud can process over the encrypted data from all related data providers without knowing the query content. We also propose an enhanced scheme, MOPSE+, to more efficiently support the data queries by hierarchical data providers. Extensive analysis and experiments over real datasets demonstrate the efficacy.

**Keywords:** Security, SMS (Short Message Service), Cloud, Authentication, Cryptography, Confidentiality.

### I. INTRODUCTION

Cloud-based Patient Health Record System (CB-PHR) is an electronic medical record that offers advantages for storing and accessing patient health information in a multi-source cloud. Patient recording management is an integral component of the modern-day health care management system.

Technology is always been the savior that workaroud for over coming major health care industry challenges, which may improve the management of patient care. However, the features that make electronic records desirable are accessibility, transferability and portability of patient health information, cloud computing is transforming the health care industry.

Different levels with features like collaboration, scalability, efficiency, reachability and security. Health care sector is one such that has been at the forefront of adopting cloud technology. Health care in many other countries is confronted with growing demand for medical treatment and services. The medical records must appropriately have all the patient's medical history. In this paper we propose such a system where the patient's data is protected with high confidentiality to beat the paper based hospital data, the system will meet the necessary important role.

### II. RELATED WORKS

#### Type A. Secured Electronic Health Record Management System

The paper [1] An electronic health record is an E-medical version which provides the medical reports in accessible way. EHRs as the flexibility to supply information about the patient care. The workflow of the cloud service is presented from the perspective of private and public cloud communication scenarios. The essential functionalities involved in this workflow are authentication, authorization, data persistence, Data integrity and data confidentiality.

The paper [2] Recently, privacy preserving in PHRs have drawn researchers' attention [2]-[6]. In this section, we review three categories of work: searchable encryption, order-preserving symmetric encryption and other related work. Search encryption schemes guarantee that the untrusted entity gains nothing about what data owners are searching for, and order-preserving symmetric encryption can guarantee the order of the ciphertexts following with that of the plaintexts. There has been a lot of works for searchable encryption [5], [10]-[15], [30], order-preserving symmetric encryption [34], [23], [29], [30], and other related work [40]-[45].

# BLOCKCHAIN TECHNOLOGY APPLICATION FOR EFFECTIVE ORGAN DONATION

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## Abstract

We come across many people around the world who are ready to donate their organs while alive, after death or even in situations of brain death. Whether from an illness or an injury, organ failure or damage happens. In some situations, it causes mortality and has an impact on quality of life. The noblest of deeds, organ donation, calls for revolution. People who want to donate, however, are concerned about the validity, security, and privacy. The donor and recipient of the organ must match for the transplant to be effective, and the organ's removal must not endanger the donor's life. The paper aims to make organ donation procedure more secure and transparent using Block chain technology. Through this work, we aim at attempting to put a limit to the unlawful access to the personal and medical details of the donor and the patient by making this procedure between the two parties (patient and donor) more secure and private. An intruder in this system wanting to get the details will not be able to make alterations or get access to the data. The proposed system allows the user who can be a donor or a recipient to register for either an organ donation or an organ transplant.

**Keywords:**-Block chain technology, donor, receptor, admin, security

## I. INTRODUCTION

Organ donations an applauded act of service that saves the lives of the people under serious medical conditions or worse, in case of organ failures. Organ failures can be an outcome of various factors like cancerous infections, diseases, lifestyle, or even underlying health conditions. This may result in dysfunction of kidneys, liver, lungs, pancreas, intestines, and the heart. Any individual can become a victim of an organ failure or an organ disfunction. According to the sources available and existing statistics, the increase in this phenomenon has resulted in patients being added to organ donation/transplant waiting lists every ten minutes, thereby showing how this is a crucial procedure for innumerable people to be able to survive and lead a quality life.



# A TWO-STAGE CONVOLUTIONAL NEURAL NETWORK FOR LUNG NODULE DETECTION

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**Abstract:** A malignant tumor with quick development and early metastatic dissemination is known as small-cell lung cancer (SCLC). Improved survival depends on early and accurate SCLC diagnosis. Accurate cancer segmentation helps medical professionals better comprehend the location and scope of cancers and make more accurate diagnoses. The YOLO framework is being utilized in this effort to both locate and categorize a lung tumor that is connected to the edge of blood vessels. The R-CNN methods presented in Part I mainly employ regions to localise objects within images. The network only looks at the areas of the image that are most likely to contain an item, not the complete picture. The biggest benefit of employing YOLO is how quick and precise it is.

**Keywords:** Convolutional Neural Network, Image Processing, Pooling, Median

## I. INTRODUCTION

The lungs resemble two sponge cones on the outside. While the right lung has three lobes, the left has two. The right lung is substantially larger than the left one. Inhalation delivers oxygen to the lungs. Oxygen is introduced into the circulation by lung tissue. Small cell lung cancer and non-small cell lung cancer are the two primary subtypes of lung cancer, respectively, with carcinoma, adenocarcinoma, and squamous cell carcinoma being its three subtypes. Image processing in medicine has a variety of applications, including the detection of lung cancer. The proposed system description for the diagnosis of lung cancer has four basic stages. In the initial stage, a number of CT images from the IMBA Home Database are utilised. These pictures can either be abnormal or normal (via ILCAP Public Access).

The second stage employs a number of picture enhancement techniques to produce the best level of quality and clarity. The third stage of image processing employs picture division methods, which are essential for the phases that follow. Enhanced partitioned images are employed in the fourth stage to extract generic features that serve as indicators of an image's normality or abnormality. Patients with stage I lung cancer are said to have a better prognosis than those with more advanced disease. CT scan images are classified as malignant or non-cancerous using deep learning. The algorithm examines the features and patterns in the input data and, for training data, creates a set of parameters and feature extraction with related permutations. By giving a common value to a collection of matrix pixels, the convolution filter will create a spatially dense output. These values determine the image's output.

## II. RELATED WORK

### 1. Using Methodology Classification Based on Deep Learning, Effectively Identifying Lung Cancer on Computed Tomography Images

Deep learning is an AI characteristic that imitates how the human brain learns for higher cognitive processes including object detection, speech recognition, language translation, and object detection. In recent years, it has become essential to forecast cancer at an earlier stage in order to increase the likelihood that the patient would survive. The most terrible variety is lung cancer, which is one of the most common diseases affecting people globally.

### 2. Deep Learning Network for Lung Cancer Detection

A Comparative Analysis An influential and emerging technique for feature learning and pattern identification is deep learning. In our study, we contrast the classic Computer-Aided Diagnosis scheme with the Deep Learning Technique Computer-Aided Diagnosis scheme. In this research, we compare a number of deep neural networks for lung cancer detection.



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## IDENTIFICATION OF MEDICINAL PLANTS BY IMAGE PROCESSING OF LEAF SAMPLES

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### ABSTRACT

It takes time and effort to develop an automated system for classifying medicinal plants. There are many different plant species in India, each with its own special set of medicinal properties. The names of all plant species and their uses are difficult for humans to remember, thus prior information is crucial for manual identification and categorization. It is essential to preserve these medicinal plants because doing so will benefit a wide range of fields, including medicine, botanic research, and plant taxonomy studies, among others. The variety of medicinal plant species that are present in India cannot be replicated by current technologies. The suggested method makes it easier to classify medicinal plants by utilising textural characteristics that are essential for recognising and identifying leaves. The suggested method's three main steps are feature extraction, classification, and picture improvement. The traits that can be compared between the leaves' images were extracted using digital image processing algorithms after the leaves' photos were taken with cellphones. Finally, a machine learning classifier is created using the CNN classifier.

**Keywords:** CNN(Convolution Neural Networks), Deep Learning, Deep-CNN, Pre-Processing, Feature Extraction, Classification, Segmentation.

### I. INTRODUCTION

Ayurveda is a traditional medical system with roots in the Vedic era, or roughly 5000 years ago. It is still used today in India. It is believed that Ayurveda is the earliest system of medicine. According to Sanskrit Ayurveda is known as "The Science of Life". Despite of repressed for years under non-native rule, Ayurveda is still extensively practised both in its country of origin and around the globe. Plant leaves, roots, bark, fruits, seeds, etc. make up the majority of the constituents in ayurvedic medications. There are allegedly 8000 plants of Indian provenance that have therapeutic properties. This Ayurvedic system's foundational principles hold good for all ages and may be simply modified. As a result, Ayurveda is one of the very few medical systems that was created in antiquity and is still in use today.

Ancient Tibetan, Traditional Chinese, and Early Greek medicine incorporated many concepts that were recorded in the ancient Ayurvedic literature that stretches back thousands of years. Ayurveda is known as the "mother of healing" due to its extensive and wide application in the medical profession. These Ayurvedic botanicals are prepared into pharmaceuticals on a commercial scale.

Due to this, the manufacturing and distribution of ayurvedic medicines has grown into a booming sector with an annual revenue of about Rs 4000 crores. As a result, India today has more than 8500 certified Ayurvedic medication manufacturers. The Ayurvedic industry is becoming more commercialised, which raises a number of concerns about the quality of the raw materials used in their manufacture. These species are typically harvested by large tribal groups who lack formal training in plant identification.

Even the production facilities occasionally get the wrong or a different kind of medicinal plant. The majority of these industrial facilities lack effective quality control systems that can inspect these plants.

Additionally, it can have some unexpected adverse effects. As a result, it is necessary to develop a smart system that can correctly identify the ayurvedic plant from leaf samples. As a result, the medication's quality and reliability will both be maintained.



## Survey on Food Adulteration for Toor Daal

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**Abstract:** Food adulteration is a serious issue plaguing the health and safety of many individuals. It is the process of deliberately changing, adding, or removing a food ingredient without the consumer being aware, thus altering the nutritional value of the product. It can occur on purpose or inadvertently due to poor hygiene, and can greatly increase the likelihood of serious illnesses such as food poisoning and more.

Furthermore, food adulteration can occur through the use of substandard ingredients. For example, many food manufacturers are known to use lower quality ingredients in order to cut costs, leading to compromised nutritional values and taste.

Though food adulteration can be difficult to detect, there are some telltale signs of adulterated food. Food that has been adulterated may smell strange or have an unusual taste, colour, or texture. Additionally, food labels should alert consumers to the presence of unhealthy additives, expired ingredients, and other dangerous components.

In conclusion, food adulteration is a serious issue that affects both the health and safety of individuals as well as the quality of food products. While it can be difficult to detect, understanding the signs of adulteration can help consumers stay aware and make healthy choices when purchasing food items.

**Keywords:** Daal, adulteration, colour and size data, sorting, image pixels.

### I. INTRODUCTION

From the Great Olden Ages, the population of India residing mostly in the rural areas and urban cities, consume a lot of food grains on a daily basis. There are around 26 types of food grains (06 cereals, 08 millets and 12 pulses) consumed in India. For the maintenance of human health, the grains we consume should be unadulterated, pure and nourishing. Any grain substance consumed is done so for the purpose of gaining sustenance. The nourishment in the grain items is deflated since it goes through a series of production, processing, and distribution steps. The quality of the sold grains has greatly reduced by the various unethical and illegal practices of adding adulterants to these food grains in order to increase the supply. An adulterant is a foreign substance added to the existing food grains.

Adding an adulterant causes problem to a human body when consumed. In the process of adulteration, minute quantities of the foreign non-nutritious substances are added knowingly in order to improve its appearance, number and storage properties of the group. It is observed that the bag of Toor Daal is adulterated with Khesari Daal. In terms of grain production, India comes in second place to China. In India, all pre- and post-harvest procedures are carried out manually with the assistance of skilled or unskilled labour. Because of these manual processes take a long time and are inefficient, automation is required in the agriculture sector to produce precise results. Sorting and grading of grains are steps in the post-harvest process.

Toor daal, commonly known as Arhar daal, is a staple diet among Indian households. It is a good source of minerals, vitamins and dietary fibers and is considered a wholesome food with rich nutritional density. Due to its nutritional value, Toor daal is frequently used in a number of food products such as soups, gravies, snacks, etc. As a result, it has become increasingly vulnerable to adulteration. Moreover, a variety of synthetic dyes are also used for adulteration. These dyes can range from food grade dyes to industrial dyes which have not been approved by food safety regulatory boards. The consumption of such dyes can be detrimental to health as they can lead to severe food allergies and can also cause neurological and gastrointestinal disorders.

Similarly, adding wheat and barley grains in the toor daal can pose the risk of denaturing proteins in the daal, causing health issues such as allergy, indigestion and other gastrointestinal problems. Considering the potential hazards, it is



## BONE AGE DETECTION

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**Abstract:** In the work, an automated skeletal maturity recognition system is proposed. It first accurately detects the distal radius and ulna (DRU) areas from hand and wrist X-ray images by a faster region-based convolutional neural network model. Then, a well-tuned convolutional neural network (CNN) classification model is applied to estimate the bone ages. We discussed the model performance according to various network configurations. After parameter optimization, the proposed model finally achieved 92% and 88% accuracy for radius and ulna, respectively.

**Keywords:** convolutional neural network; skeletal maturity; classification

### I. INTRODUCTION

This paper proposes an automated system for predicting skeletal maturity using X-ray images of the hand and wrist. The system uses a faster region-based convolutional neural network (R-CNN) to detect the distal radius and ulna areas from the images, followed by a well-tuned CNN classification model to estimate the bone ages. The proposed model achieved 92% and 88% accuracy for radius and ulna, respectively, after parameter optimization. The paper provides a literature survey on the use of deep learning neural networks for predicting bone age from X-ray images and discusses various approaches proposed in the literature. The paper also describes the methodology used to develop the proposed system, which involves data collection, data preprocessing, data augmentation, and CNN training. The proposed system offers an automated and efficient alternative to manual assessment of bone age using X-ray images, which can save time and improve accuracy.

### II. LITERATURE SURVEY

Automated approaches for bone age assessment using artificial intelligence have been proposed to address the limitations of manual assessments using X-ray examination of the left hand, such as the Tanner-Whitehouse (TW) or Greulich and Pyle (G&P) methods. These automated approaches typically use Convolutional Neural Networks (CNN) and are based on hand and wrist X-rays, which are applicable for candidates aged 18 years or younger. One such approach is proposed by Matthew Chen, who trained a model using CNN methods to predict developmental bone age using X-ray images. Previous methods involved a pipeline of segmentation and handcrafted feature extraction, but CNNs proved effective for image classification due to recent advances. The largest jump in accuracy was observed through augmenting the dataset with random distortions, indicating that performance is largely dependent on the number of training examples.

Antonio Tristán-Vega and Juan Ignacio Arribas suggested an approach based on a revised version of an adaptive clustering segmentation algorithm, which semi-automatically segments the data and extracts 89 features using bone contours drawn near the ulna and wrist. A Generalized Softmax Perception (GSP) neural network and the recently developed Posterior Probability Model Selection (PPMS) algorithm evaluate the bone age, focusing on the different development stages in both radius and ulna. This method is faster than CNN, but it misses out on the fingers portion of the hand scan, which is also a key feature in determining the bone age. The semi-automatic nature of contour plotting in this method might decrease the chances of the algorithm to predict the bone age correctly, due to the fact that sometimes the contours might not be drawn accurately.

### III. METHODOLOGY

#### A. GENERAL BLOCK DIAGRAM

Although bone age prediction models based on convolutional neural networks have shown promising results, there are still limitations and areas for improvement. One limitation is that the models may not be as accurate for individuals outside the age range of the training data. Additionally, the models may be less accurate for individuals with rare bone diseases or anomalies.



## A comparative study on different Video Compression Standards: characteristics, working mechanism, performance analysis and applications

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**Abstract:** Digital videos are the most significant communications medium currently. It is because of their attractive nature in expressing a lot of information in smaller package. Every year modern innovations are made in the way videos are being captured, rendered, and displayed, leading to exponential growth of quantity of videos being generated day by day. At the same time, many content providers of videos face user expectation challenges of better-looking videos (higher quality) at equivalent or reduced cost. High-quality videos turn-out to be massive in size, with longer uploads, unreasonable hosting costs and need high-speed bandwidth from users/viewers. Therefore, digital videos need to be processed before transmitting as they contain lot of redundancies, in order to make efficient use storage and bandwidth requirements. Video Compression is a redundancy reduction technique that eliminates redundancies in visual data by identifying and representing them through much fewer binary digits or bits. It deals with removing different types of redundancies present in the video frames by reducing the total number of bits necessary to represent that frame. Currently, many video compression standard techniques and codec are available with structured and logical mechanism. This review presents a comparative study of such existing video compression standards and techniques based on several aspects.

**Keywords:** Video Compression, Video Compression standards, Codec, Redundancies.

### I. Introduction

Video is one of the most prominent mediums in the modern technology. The reason modern digital videos going so attractive is because of the absolute volume of information digital cameras can record with clear details and brilliant chromaticity. But the problem is that it takes loads of data to capture videos which lead to fast filling of computer hard drives because of the massive storage demands of videos and needs notably long wait time to transmit videos on online platforms. Video Compression provides the solution of converting huge amounts of video files generated by cameras into new files having fractional percentage of file size compared to that of original file making it easy to save, send, upload and stream full video contents by compressing it. The strategy is to compress the video streams in such a way that only the file size will be minimized as much as possible by removing elements like non-essential or non-functional data from video files with minimal amount of reduction in visual clarity.

Video Compression [1] is the process of transforming large, raw video streams into smaller video files by minimizing the total count of bits essential to display the video streams without disturbing the visual quality. Video streams can be examined as a collection of still images/frames which contains identical and repetitive frames. Video Compression methods retain only those frames which are essential and abolish the redundant frames shrinking the size of a video file. If there are two almost similar frames in the sequence, Compression will eliminate the data for one unnecessary frame and replace it with a reference for the other. Thus, the encoded video result in benefits of consuming less space on hard disk drives and requires comparatively less time to upload or share it over network/Internet.

## Intelligence Surveillance System to Detect Moving Drones Equipped with Weapon Payloads

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**Abstract-** In several application areas, including the defence industry, drone detection technology is a new frontier. Detecting unlicensed drones is essential for law enforcement agencies to quickly take action against the rising number of crimes and terrorist operations that integrate or link commercial drones with weaponry. Using data augmentation, this paper seeks to provide data sets of a sample drone and enhance the YOLOv5s architecture-based drone and/or payload detection accuracy. Drone payload is the weight or UAV can carry. Generally counted outside of the weight of the drone itself and includes anything additional to the drone – such as sensors, extra cameras, weapons/explosives or packages for delivery. The trained models efficiently detected drones, and the fitness and generalization of the trained detection models can be verified by precision-recall curves. The attained results specify that they can be utilized by law enforcement organizations to detect illegal unauthorized drones and its payload.

**Keywords-** Artificial Intelligence, Deep Learning, Drone Detection, Object Detection, YOLOv5

### 1. Introduction

Commercial UAV(unmanned aerial vehicle) use, often known as drone use, has increased recently among businesses and industry. This is due to their ductility, usability, and cost. These drones can be utilised for illicit actions despite receiving widespread attention in numerous business applications. This involves the smuggling of illegal goods, unlawful target and person surveillance, and electronic and kinetic attacks in the most dangerous situations [1–3]. Many nations are putting a lot of effort into regulating drone use [4], but while legislation can deter criminal or terrorist acts, they cannot stop reckless or incompetent drone use. As a result, it is critical to create practical and economical countermeasures to report an unlawful drone flying over prohibited locations. There is no benchmark dataset for drone detection using computer vision, despite numerous attempts accessible to the scholarly community in collaborating and Comparing the outcomes.

Over the past few years, drones are widely used in various industry applications including agriculture, tourism, traffic monitoring etc.,. A lot of data is also available for artificial intelligence. Drones capture data, such as pictures of faces and licence plate both numerical and spatial goals. There are increasingly more. Drones for use in commerce that has cameras. This may lead to several issues, such as those that interfere with an aircraft's regular takeoff, neighbour privacy rights being violated, etc. As a result, Drone usage needs to be controlled, and owners shouldn't fire anywhere they want to watch videos. Figure 1 illustrates how this objective can be successfully achieved by means of drone object detection. Object detection is one of the most fundamental issues in the field of computer vision. As a solution to this issue, deep learning is currently gaining popularity and has already replaced the traditional target detection method in a number of projects. There are many excellent deep learning models in this area such as You Only Look Once v3 (YOLOv3) [7], Faster Region-based convolutional neural network (Faster R-CNN) [5-6], the You Only Look Once v5 (YOLOv5) model and Single Shot MultiBox Detector (SSD) [8]

These techniques have shown excellent results in the shared data set, and their detection accuracy is substantially greater than that of conventional techniques. Furthermore, transfer learning helps a new model train by transferring previously learnt and refined model parameters. Taking into consideration most of the task or data is correlated, therefore, it is likely to share with the new model to speed up and optimize the learning efficiency. Transfer learning can be further divided into inductive Transfer Learning, Transductive Transfer Learning, and Unsupervised Transfer Learning [9]. At present, there are many ways to merge transfer learning and deep learning to target classification, among which multi-task Learning and self-taught Learning can obtain good results[10]. On this basis, Qi carry out a few-shot detection algorithm through Attention-Based Region Proposal Network (Attention-RPN), which is a found to be a significant advancement over the previous algorithm [11].



## Automatic tracking of objects using improvised Yolov3 algorithm and alarm human activities in case of anomalies

P. H. Kashika<sup>1</sup> · Rekha B. Venkatapur<sup>1</sup>

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**Abstract** Detection of anomalies into surveillance recordings is gaining in its popularity. The term "abnormal data" refers to data that deviates greatly from the data's typical behaviour. Fraud detection, fault detection, and intrusion detection are some of the uses of anomaly detection. You Only Look Once (YOLO) Convolutional Neural Network (CNN) is a object detection system that works in real time. It is a real-time object identification system that recognizes certain objects in streams, live broadcasts, and photographs. CNNs are classifier-based systems which could identify patterns in input pictures by interpreting them as organised arrays of data. YOLOv3 is also fast and exact in regards of mean average precision (mAP) as well as intersection over union (IOU) values. In comparison to other detection technologies that provide equivalent findings, it's really significantly faster. This study proposes utilising an improvised YOLOv3 algorithm to track objects automatically and alert humans in the event of irregularities. In addition, the performance of the algorithm was compared to that of other algorithms such as CNN and decision trees. In the proposed system, the live video is captured continuously and detecting the anomaly objects like handbag, mobile, bottle, knife, scissors. Also, It is utilized to detect things like bag stealing and lock-breaking, among other things. The suggested system does have very fast processing rate and a high detection accuracy.

**Keywords** Automatic tracking · YOLO (You Only Look Once) · Mean average precision (mAP) · CNN (Convolutional Neural Network) · Intersection over Union (IOU)

### 1 Introduction

Video surveillance is valuable tool in enforcement agencies, transport, environmental monitoring, and other areas, particularly for boosting security and public safety. These days, it's an essential part of preventing crime, catching drivers who violate the law, and keeping the streets flowing smoothly. When it comes to automated video surveillance, one of the most challenging and time-sensitive responsibilities is to identify anomalous events, such as traffic accidents, criminal activity, natural disasters, etc. This has led to a rise in interest in video anomaly detection. It is a vast academic topic that focuses with recognizing data instances that differ from nominal patterns. It may be used in a variety of industries, including healthcare, cyber security, hardware security, aviation, spacecraft monitoring, and more. Stating essential role which video anomaly detection might provide in assuring security, safety, also into few instances even preventing potential catastrophes, is most important results of video anomaly detection system has capability for making real-time choices. Occurrences at remote locations, like robbery, fire and traffic accidents it helps for detecting abnormal events in real-time. The process of detecting a event in a video is known as video event detection. A subcategory of Video Event Detection is Video Anomaly Detection. The video anomaly detection procedure generates a large amount of data and displays it.

This type of software that can detect movement and record it in video is always in demand. There are three

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## Prediction of Chronic Kidney Disease using Fine Tune Based SVM in Internet of Things

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### Abstract

These days, many healthcare apps make advantage of cloud Internet of Things (IoT). Instead of relying on the limited storage and compute resources present in the mobile devices, the massive amount of data created by the IoT sector may be evaluated on the cloud platform. In this piece, we provide an AMDSS for chronic kidney disease (CKD) forecast as a means of providing more precise medical services. Gathering, preprocessing, and classifying medical data are the three main steps in the described approach for predicting CKD. This research introduces a novel approach to illness prediction by enhancing the detection efficiency and accuracy of Fine tune-based Support Vector Machine (FT-SVM). Wrapper and embedding approach, an efficient feature selection method, is used to eliminate most of the superfluous features. The presented model is tested against a standard CKD data set to evaluate its efficacy. Superior features of the provided model on the used dataset were seen in the experimental results. Comparison of findings demonstrates that conventional methods reach about 95% to 97% accuracy on the CKD dataset, whereas the proposed model achieves 98.25% accuracy.

7430

**Keywords:** Internet of Things; Automated Medical Decision Support System; Fine tune-based Support Vector Machine; Wrapper Technique; Chronic Kidney Disease.

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### Introduction

The modernization of healthcare infrastructure, including hospitals, clinics, and the management of patients' health records, has contributed to a rise in the average lifespan [1]. However, important challenges in advanced healthcare development [2] include avoidable mistakes, transmission delays, security concerns, a lack of appropriate medical data, and a lack of fault detection. Therefore, novel methods are required to safeguard patients' data from unauthorized disclosure. In addition, there has been a significant uptick in the usage of Internet of Things-based wearable sensor technologies in healthcare applications for illness prediction [3]. In addition, IoT gadgets

have similar users since they are coupled with cloud computing components. Data collected by IoT devices from patients in far-flung locations may be stored on the cloud. Moreover, this may disseminate patient data from the system without needing patients to communicate through computer [5]. So, the availability of computing makes it possible to use analytical and predictive techniques to improve the precision with which diseases may be predicted. Affected patients' big data consists of unstructured medical statistics, semi-structured medical statistics, and structured medical records stored in the cloud through the Internet of Things [6]. Because of its usage in disease prediction applications, patient record management, data recovery from massive data sources, and telemedicine.





## Malware Detection on Android Apps using RSLBO based Dense Network in Internet of Things

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7432

### Abstract

Malware that poses a variety of cybersecurity risks is rapidly growing in both type and number as the IoT devices, which support a wide range of services including factories in smart cities, continue to grow in number and type. The ever-increasing popularity of Android applications has drawn a lot of attention from those who write malicious software. Research involving the use of identification of malware is now being carried out as part of efforts to safeguard Internet of Things devices from assaults. On the other hand, as a result of the proliferation of malicious software designed to target internet-connected devices and the many evasion strategies it employs, the likelihood of mistakenly classifying malware as harmless has also increased. Traditional techniques for detecting malware have a number of drawbacks, such as being computationally costly, having inadequate performance, or being insufficiently resistant. The research offers a answer to this badly behaved in the form of a powered malware detection system that is both effective and efficient. For the final model, the software implements a cross entropy loss function to gain considerable performance increases while classifying malware. In addition, the Random Selected Leader Based Optimizer decides which hyper-parameter values should be optimized in DenseNet (RSLBO). In point of fact, the algorithm population update does not have to depend on a select few members, every ordinary associate of the population has the potential to be a leader in directing and informing the algorithm population. RSLBO is first explained, then theoretically modelled, and then used to the resolution of optimization issues. The consequences of the experiments reveal that the Android malware detection model based on the suggested method has a greater detection accuracy when compared to the classic techniques, and it also has a better detection impact when applied to obfuscated malware.

**Keywords:** Internet of Things; Random Selected Leader Based Optimizer; Android apps; DenseNet; Malware Detection; Imbalance Data

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## Malware Detection on Android Apps using RSLBO based Dense Network in Internet of Things

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7452

### Abstract

Malware that poses a variety of cybersecurity risks is rapidly growing in both type and number as the IoT devices, which support a wide range of services including factories in smart cities, continue to grow in number and type. The ever-increasing popularity of Android applications has drawn a lot of attention from those who write malicious software. Research involving the use of identification of malware is now being carried out as part of efforts to safeguard Internet of Things devices from assaults. On the other hand, as a result of the proliferation of malicious software designed to target internet-connected devices and the many evasion strategies it employs, the likelihood of mistakenly classifying malware as harmless has also increased. Traditional techniques for detecting malware have a number of drawbacks, such as being computationally costly, having inadequate performance, or being insufficiently resistant. The research offers a answer to this badly behaved in the form of a powered malware detection system that is both effective and efficient. For the final model, the software implements a cross entropy loss function to gain considerable performance increases while classifying malware. In addition, the Random Selected Leader Based Optimizer decides which hyper-parameter values should be optimized in DenseNet (RSLBO). In point of fact, the algorithm population update does not have to depend on a select few members, every ordinary associate of the population has the potential to be a leader in directing and informing the algorithm population. RSLBO is first explained, then theoretically modelled, and then used to the resolution of optimization issues. The consequences of the experiments reveal that the Android malware detection model based on the suggested method has a greater detection accuracy when compared to the classic techniques, and it also has a better detection impact when applied to obfuscated malware.

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# FRUIT CATEGORIZER USING pH SENSOR

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**Abstract:** The process of grouping or sorting fruits that is carried out at this time is still using the manual method by humans, basically humans have properties that make the process of grouping or sorting can take a long time. Based on these conditions, a sorting machine is needed that has the ability to detect and group fruits based on image classification and pH sensor. The main objective of this project is to determine the type of Fruit based on the image detected using CNN and categorize the fruits based on its ripeness. This system effectively classifies and sorts the fruits using Arduino module with the help of pH sensor and concepts of CNN.

**Keywords:** Image classification, CNN, pH sensor, grouping, sorting.

## I. INTRODUCTION

India is the second largest fruit producer after China. Due to the lack of skilled workers, 30-35% of harvested fruits are thrown away. Again, due to the subjectivity of human perception, the identification, classification and grading of fruits is not done accurately. Therefore, the introduction of an automation system in the fruit industry is required. Machine learning methods with appropriate concepts and pH measurements have great potential to develop automated systems to provide intelligence to discriminate fruits based on type, variety, maturity and integrity. By the usage of Convolutional Neural Network, the identification of the fruit can be done. A pH sensor can measure the pH values of the given various fruit sample input. Using this data, the type of fruit and their ripeness can be identified. All of the above process is done on a conveyor belt. There are certain pH values for healthy fruits and if it drops below or increases beyond that, it can be considered that the fruit is not edible. Based on the pH sensor and CNN, the listed information is displayed on the LCD display:

- 1) Determining the type of fruit
- 2) pH level
- 3) Categorizing the fruit based on ripeness.

## II. LITERATURE SURVEY

[1] In the proposed study, fruit recognition is performed using image processing techniques. The study created a classification process for Convolutional Neural Networks (ConNN)\* deep learning models. The proposed model is developed on the Keras platform. To implement the study in real life, 20 different fruits are tested on 2 different datasets. The latest model developed is being tested in real time on the Jetson Nano card. \* Convolutional Neural Network is an abbreviation of Cooperative Neural Networks because it has been used for a long time in the literature.

[2] In this paper, we propose a new deep-learning-based Fruit-CNN architecture to identify types of fruit and evaluate real-world image quality under different visual variations, yielding 99.6% test accuracy. Compared to current deep learning models, the proposed architecture demonstrates broad applicability in precision agriculture, as it requires minimal time to train large data sets and test fruit images. It also allows you to train more images belonging to different classes with fewer parameters, which speeds up model training and reduces processing time.

[3] So, they used computer vision (CV) and deep neural network (DNN) to sort tomatoes by ripeness color. 300 tomatoes were selected and their maturity determined by an expert method. Tomato images are captured, processed, and fed into a DNN classifier to determine tomato cultivars. The proposed DNN classifier achieved a mAP percentage of 95.52%.



# IoT based School Bus Monitoring System

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**Abstract:** An IoT-based school bus monitoring system is a technology solution that utilizes the Internet of Things (IoT) to monitor and track school buses in real-time. These systems use Internet of Things (IoT) devices and sensors to track the location, speed, and safety of school buses in real-time, allowing schools and parents to monitor their children's travel to and from school. In this literature survey, we will explore the past studies on IoT-based school bus monitoring systems, including their benefits, challenges, and areas for future research. Through a review of the existing literature, we aim to provide a comprehensive overview of the state of the art in this field and identify opportunities for further study.

**Keywords:** Fingerprint, GSM, GPS, Monitoring

## I. INTRODUCTION

An IoT-based school bus monitoring system is a technology solution that utilizes the Internet of Things (IoT) to monitor and track school buses in real-time. The system can be used to improve safety, reduce operating costs, and enhance the efficiency of school bus transportation. It typically consists of sensors, GPS tracking devices, and communication infrastructure that are installed on the school buses and connected to a centralized management platform.

The system enables real-time tracking of the location, speed, and route of school buses, as well as the identification of any potential safety issues such as sudden stops, collisions, or breakdowns. It also allows parents and school administrators to monitor the location and status of the school bus in real-time, and to receive notifications in case of any delays or emergencies. The use of an IoT-based school bus monitoring system can provide numerous benefits, including improved safety and security for students, reduced fuel consumption and maintenance costs, and enhanced communication and coordination between parents, school administrators, and bus drivers. It can also help to improve the overall efficiency and effectiveness of school bus transportation, by enabling more accurate scheduling and routing, and by providing valuable data for decision-making and continuous improvement.

## II. LITERATURE SURVEY

RFID tag is used as a first stage of verification. Only after successful RFID identification the students are made to undergo the 2nd stage of verification using camera. Here, the camera captures the student's image and verifies it with the image that is previously stored and also checks if the student is wearing the mask or not. This system also monitors the temperature of the student using IR sensor. Only if the temperature is found to be lesser than the threshold, the student is allowed. If the student doesn't meet all the criteria, then he/she is not permitted to board the bus and the status is sent to school website as well as the parents [2]. For monitoring the transport of children to and from school using IoT technology, the system uses RFID and GSM technologies to track the entry and exit of students on the bus and sends SMS notifications to parents when the student's travel is successful. The system also aims to detect students who may board the wrong bus or be absent, and to monitor the sobriety of the driver. The system is intended to provide greater safety and security for children during their daily travels to and from school, and to allow the driver to communicate with the management in the event of any delays or issues. The system for monitoring and tracking a school bus using various IoT components, including an Arduino uno controller, an alcohol sensor, a GPS module, a GSM module, and an RFID module. The system is designed to prevent the bus from starting if the alcohol sensor detects the presence of alcohol in the driver's system, and to send a warning message to the authorities if this occurs. The system also uses the GSM module to send messages to parents when the bus is approaching their station, and to track the bus's location using GPS. The RFID module is used to verify the identity of students entering the bus, and to open the door if the student's RFID code matches the system's records. The system also includes an LCD display to show relevant information and messages [1]. The school bus consists of the RFID module fitted in it. The RFID reader reads the tags and sends the tag number to the android phone of the driver in the bus via a Bluetooth device. The driver side application receives the tag number and sends it to the database where the details required to send the message are selected and returned. The SMS is sent from the driver's phone to all parents and also the location details are sent to the system parallelly.





# WIRELESS NOTICE USING BLUETOOTH MODULE HC-05

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**Abstract:** The proposed method consists of electronic notice board that is controlled by an android device and displays message on it. Traditionally, there were notice boards where any information or notice had to be stick daily. This becomes tedious and requires daily maintenance. The project the overcomes this problem by introducing an electronic display notice board interfaced to an android device through Bluetooth connectivity. The Bluetooth receives the message from the android device that is sent to an Arduino. Notice board is a primary thing in any institution/organization or public utility places like bus stations, railway stations and parks. But sticking various notices day-to-day is a difficult process. The Notice board is a common display for effective mode of providing information to the people, but this is not easy for updating the messages instantly. This project deals about an advanced Hi-Tech wireless Notice Board. This system is enhanced to display the latest information through an Android application of smart phones or tablet.

## I. INTRODUCTION

The usage of paper is the superlative reason for forest degradation and notice is an indispensable requirement for public places, organization to get connect/ communicate with people in one way or both. Since there are many easy configurable, low power consuming wireless technologies are available, a wireless electronic notice board system can be easily realized by using any of them replacing the need of paper notice board. Since the world is stepping towards digitization the need for wireless digital notice board is found. Wireless e-notice board is a perfect replacement of paper notice board providing easy maintenance, portability and access. Also, the wired communication faces a lot of shortcomings such as high cost, high maintenance and short coverage. Bluetooth and WI-FI are easily available wireless technologies suitable for short, medium and long range wireless communication. Android based Application programs available for Bluetooth and Wi-Fi communication for personal digital assistant (PDA) devices are used for transmitting the alpha-numeric text messages. Using the Bluetooth or Wi-Fi based serial data communication technique, the corresponding transceiver module has been interfaced with microcontroller board at the receiver end. For this purpose, a low- cost microcontroller board (Arduino Uno) is programmed to receive alphanumeric text messages in any of the above selected communication modes.

## II. LITERATURE SURVEY

“Wireless E-notice board using Bluetooth technology”<sup>1</sup>. In this paper explains E-notice board with the help of Bluetooth technology. This paper deals with an innovative rather an interesting manner of intimating the message to the people using a wireless electronic display board which is synchronized using the Bluetooth technology. This will help us in passing any message almost immediately without any delay just by sending a SMS which is better and more reliable than the old traditional way of passing the message on notice board. This proposed technology can be used in colleges many public places, malls or big buildings to enhance the security system and also make awareness of the emergency situations and avoid many dangers.

“Small and medium range wireless electronic noticeboard using Bluetooth and ZigBee”. This paper introduces Notice Board using Bluetooth and ZigBee technology<sup>2</sup>. When information exchange occurs between people via a network, then authentication and security of data have more priority. This paper introduces a low cost, handheld, wireless electronic notice board by using Atmel’s ATmega32 microcontroller and different wireless technologies (Bluetooth and ZigBee) and their performance analysis based on the parameter such as range, BER (bit error rate), RSSI (Received signal strength indicator), signal attenuation and power consumption. The notice board receives serial data from wireless module receiver and displays it on the graphical liquid crystal display. We have realized a common communication receiver hardware for notice board having compatibility with both wireless modules i.e., Bluetooth and ZigBee. We used KS0108 based 128x64 graphical LCD as display element.

“GSM based wireless noticeboard using Arduino”<sup>3</sup>. This paper explains the design of wireless noticeboard using GSM technology. The GSM based notice board is aimed at the colleges and universities for displaying day-to-day information



# Color Sorting Robotic Arm

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**Abstract:** Color sorting is a labor-intensive process that can be automated using a robotic arm. This paper presents the design and implementation of a color sorting robotic arm that can detect the color of an object and then pick it up and place it in a designated bin. The robotic arm is controlled by a microcontroller board, which receives input from a color sensor. The color sensor is used to detect the color of an object, and the microcontroller board then controls the servo motors in the robotic arm to pick up the object and place it in the correct bin. The robotic arm has been tested with a variety of objects, and it has been shown to be able to accurately sort objects by color.

**Keywords:** color sorting, robotic arm, microcontroller, color sensor, servo motors

## I. INTRODUCTION

Technology is a very big part of our day-to-day life has a very important role. This increases the high level of mobility in developing more efficient machines. A robotic arm has human hands like arm, shoulder, wrist and elbow and for pick and places a gripper. This project is used to design and implement a pick-up machine that is based on a colour sensor. Basically the robotic arm is programmed to pick up the object from one place and drop accordingly into respective coloured box. The colour sensors are used to sense the colour of the object to be picked and dropped. The voltage and intensity of the colour sensed is converted into the frequency which is given as input to the microcontroller. The microcontroller enables the motors of robotic arm to grip the objects and drop them in the specified location according to the colour.

## II. LITERATURE SURVEY

### *Colour Sorting Robotic Arm<sup>1</sup>.*

In this paper presents the design and development of a robotic arm with the application of colour sorting of spherical objects using advanced sensors. Basically, the robotic arm is programmed to pick the spherical object from one place and drop accordingly into the respective coloured box. Here, the colour sensors are used to sense the colour of the object to be picked and dropped, and the voltage i.e., the intensity of the colour sensed is converted into frequency which is given as input to the microcontroller. The microcontroller enables motor driver circuit which drives the motors of the robotic arm to grip the objects and drop them in the specified location according to the colour.

The disadvantage of the given report is that the robotic arm can sense only 3 colours (Red, Blue and Green) and if any other colour is encountered, the arm won't function as desired.

### *Development of Colour Sorting Robotic Arm Using TCS3200 Sensor<sup>2</sup>.*

In this paper sorting objects or products is done manually in industries using human labour consumes time and energy, especially when it involves large volume of products. Human sorting operations could be replaced with robotic implementation, which would save time and effort while producing better results. Robotic arm is a type of programmable mechanical arm, almost similar to the human arm which is programmed to faithfully carry out repetitive actions with a high degree of accuracy. However, creating an artificial sense of touch that is comparable to human's has been challenging. One of the challenges is the detection of objects with different colours. In this work, a light intensity to frequency converter method is used to detect colour. The robotic arm is controlled by a DC servo motors microcontroller-based system. An IoT platform is being used to monitor the detection process, especially the counting for each sorted colour block. Furthermore, the study also performed a comparison of the robotic arm indoor and outdoor efficiency. The chosen TCS3200 sensor operates by distinguishing different generated frequencies for different light intensities. It could distinguish the colours at 95% in a bright condition and 91% in a dimmer condition, based on object detection at 5 cm away from the sensor. The disadvantage of the above paper is that the robotic arm travels only in  $180^\circ$  direction.

# Challenges of Deep Learning in Medical Image Analysis—Improving Explainability and Trust

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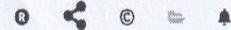
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### Abstract



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Deep learning has revolutionized the detection of diseases and is helping the healthcare sector break barriers in terms of accuracy and robustness to achieve efficient and robust computer-aided diagnostic systems. The application of deep learning techniques empowers automated AI-based utilities requiring minimal human supervision to perform any task related to medical diagnosis of fractures, tumors, and internal hemorrhage; preoperative planning; intra-operative guidance, etc. However, deep learning faces some major threats to the flourishing healthcare domain. This paper traverses the major challenges that the deep learning community of researchers and engineers faces, particularly in medical image diagnosis, like the unavailability of balanced annotated medical image data, adversarial attacks faced by deep neural networks and architectures due to noisy medical image data, a lack of trustability among users and patients, and ethical and privacy issues related to medical data. This study explores the possibilities of AI autonomy in healthcare by overcoming the concerns about trust that society has in autonomous intelligent systems.

Authors

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### CLAHE Enhanced Hybrid Feature Descriptors for Classification of Acute Lymphoblastic Leukemia in Blood Smear Images

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# Tracking of Mobile Phones for Piracy Detection

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**Abstract:** The film industry has faced challenges with unauthorized reproduction and distribution of movies. To combat this issue, we propose an innovative system that employs IP cameras, Python, and a regular computer to detect instances of piracy in real-time and inform the relevant parties. Our solution uses a specialized object detection model trained with a set of images of the item to be detected, particularly mobile phones, which are associated with piracy. We utilized the YOLOv5 repository to construct the model, which can provide precise bounding box data to indicate the object's exact location in the frame. Additionally, the system includes a mail service that notifies the theater owner or other authorized individuals of piracy occurrences and provides them with an image of the incident. This allows them to take prompt action. The system operates in real-time and can monitor live feeds from multiple cameras at once to detect any piracy instances immediately.

**Keywords:** MoviePiracy, Yolov5, IP camera.

## I. INTRODUCTION

Movie piracy is the unauthorized acquisition of copyrighted content without the authorization of film makers. This is a new epidemic that is economically impacting the film industry on a global level. According to a survey, pirated movies gain around 230 billion views every year. It was also reported that Indian media loses about US\$2.8 billion to piracy. As per the study conducted by the US-India Business Council (USIBC), the Indian film industry experiences a loss of 11% in employment due to piracy. It also influences content creation by discouraging filmmakers, directors, and producers from making sequels and remakes. Consequently, the national government and entertainment firms have come up with effective strategies and tools to combat piracy. The Indian government implemented one such strategy by passing the Cinematograph Act in 2019. This act declares piracy a crime and penalizes pirates with three years of imprisonment and a fine of 10 lakh rupees [1].

The illegal copying of movies for the purpose of selling them at a lower market price is referred to as movie piracy. Some of the ways in which piracy can occur are camera recording, DVD and VOD ripping, tele sync, digital distribution copy, telecine, and WEB-DL. Camcorder piracy can be classified into pre-release and post-release piracy. In pre-release piracy, the movie is pirated during exclusive screenings for sponsors, reviewers, and VIPs. During this



# TAMPER PROOF RATION DISBURSEMENT SYSTEM FOR RURAL AREAS

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**Abstract:** Traditional ration card system has evolved as a system of management of scarcity of food grains through the distribution of food grains at affordable prices. Over the years ration distribution has become an important inseparable unit of the government’s policy to ensure that sufficient food grains have been supplied. However, Traditional units have undergone significant turnovers in terms of fraud, theft, and interference from middlemen. To overcome the above scenarios, we have initiated the development of our project that will contribute to digitizing the entire distribution unit such that there will be no room for fraud. The operation facility includes allocation within the state, identification of eligible families, issue of ration cards according to the database, and supervision of the functioning of fair price shops. Presently under the distribution system commodities namely wheat, sugar, oil, and kerosene are being allocated to the states for distribution.

**Keywords:** RFID, OTP, Firebase, MIT App Inventor.

## I. INTRODUCTION

The government provides food, oil, and fuel to economically challenged people at subsidized rates, distributed to the public through ration shops. They also fix an upper limit on the consumption per head. For this, they get a form filled out that looks something like the Figure. Also, a sample form has been attached to this document, which must be filled out to get the ration card issued. Here the personal details of the family are noted and then they are issued a ration card which also acts as nationality and address proof for the citizens of India. The modus operandi for these ration shops is that the material is bought from the farmers and then sold at subsidized rates. Every month fresh stock arrives. these shops and that needs to be disbursed to the public. Typically, the ration shop owners play foul, and the right amount is not disbursed or disbursed to unauthorized people or sold out at higher rates. To counter these fouls government is taking some measures like introducing smart cards. However, this can also be circumvented by the wrongdoers and use the same card for issuing to unauthorized people as the card owner need not be present at the time of the ration disbursement.

New Ration Card Application Form

**Head of the Household Details**

Card Type\*:  APL  BPL  AAY  AAP

ID\*: \_\_\_\_\_ UID\*: \_\_\_\_\_

Name of Head of the Family\*: \_\_\_\_\_

Name of Head of the Family (in local language)\*: \_\_\_\_\_

Mother's Name\*: \_\_\_\_\_

Mother's Name (in local language)\*: \_\_\_\_\_

Father's Name\*: \_\_\_\_\_

Father's Name (in local language)\*: \_\_\_\_\_

Gender\*:  Male  Female

Spouse's Name\*: \_\_\_\_\_

DOB\*: \_\_\_\_\_ Age\*: \_\_\_\_\_

**Professional Details**

Occupation\*: \_\_\_\_\_

Annual Income\*: \_\_\_\_\_

**Gas Connection Details**

Gas Connection Status\*:  Deepam  Double  Single  No Cylinder

Gas Company Name\*: \_\_\_\_\_ Gas Agency Name\*: \_\_\_\_\_

Consumer No\*: \_\_\_\_\_

**Residence Address**

Door No\*: \_\_\_\_\_ Locality / Land Mark\*: \_\_\_\_\_

State\*: \_\_\_\_\_ District\*: \_\_\_\_\_

Mandal\*: \_\_\_\_\_ Village / Ward\*: \_\_\_\_\_ Pin Code: \_\_\_\_\_

FP Shop No\*: \_\_\_\_\_

**Permanent Address**

Door No\*: \_\_\_\_\_ Locality / Land Mark\*: \_\_\_\_\_

State\*: \_\_\_\_\_ District\*: \_\_\_\_\_

Fig 1.1 New ration card application



# AUTOMATED AND MOVABLE WASTE SEGREGATOR

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**Abstract:** The problem of improper waste management is becoming increasingly critical in many urban areas around the world. To address this issue, an automated and movable waste segregator is proposed. The segregator can be moved to different locations to collect waste from various sources, such as households, offices, and public places. This project presents Smart Dustbin-Separation of metal and non-metal by using IOT and ROBOTICS. Now a day, due to the busy work schedule people are not able to separate metal and non-metal waste. As we know, metals get corroded due to moisture, these moisture's are naturally obtained by decaying process of fruits and vegetables. This leads to diseases. Finally, we are step forward to keep the environment hygienic and clean. In this project, we are using conveyor belt along with the robotic arm assembly for separating the metals and non-metal wastes. These wastes are stored in different bins. When the dustbin is about to reach the full capacity this frame work sends a message to the operator. This process is done by using telegram application. The proposed automated and movable waste segregator offers a promising solution to the growing problem of improper waste management. By automating the waste segregation process, it can significantly reduce the amount of waste that ends up in landfills and improve the efficiency of waste collection and management.

**Keywords:** Robotics, IOT, Robotics, Dry, Wet and Metal.

## I. INTRODUCTION

Ten million ton of garbage is generated in metropolitan cities. The landfills of most of these cities are overflowing with no space for fresh garbage waste. The philosophy of "waste management hierarchy" has been adopted by most nations as the step for developing municipal solid waste (MSW) management strategies. So we decided to separate waste in the home itself with the help of using sensors. Here we are going to use ultrasonic sensor and inductive sensor. In this project we are separating the waste at our home itself with the use of sensors. By separating the waste at home itself we can reduce the work done by the our municipality. This helps our government to recycle our waste in very simple manner.

According to a sanitation survey called ministry of urban development under the mission, it was found that about 50% people in India face the problem of improper waste collection and management. According to center of science and environment, innovative disposal and recycling methods must be introduced instead of landfill sites. Waste segregation and recycling are effective ways of reducing dumped trash. Unfortunately, these practices are not widely implemented in the country. People have been negligent when it comes to proper waste disposal, ignoring labels and throwing recyclables that can still be reused. Most of the people are unaware or ignore the fact the waste segregation and recycling can reduce cost, reduce drain in our resources, and lessen the waste being produced. Typical composition of garbage people throw in are 5.8% metals, 3.5% glass, 1.6% plastic, 12.9% papers, 1.8% textiles and 53.7% biodegradables which means only the remaining 20.7% of the wastes should really be going to our landfills. In our country, recycling centers do manual process of sorting wastes so it increase human interface. For this we implement a system which minimizes human interference in the waste collecting and segregation process. Materials such as paper, glass and metals are the wastes that need to be segregated in this project.

## II. LITERATURE SURVEY

Increasing urbanisation, fast rate of migration to cities and development have resulted in a steady growth in consumerism. An inevitable side effect of this is exponential increase in waste generation. Different types of waste needs to be handled differently for reasons like hygiene, non-spreading of disease, cleanliness and toxicity. The model[1] consists of Node MCU(ESP8266) as a microcontroller, Ultrasonic sensor, Servo motor and Blynk app. Blynk app is used for referring attentive messages to the disturbed authorities thereby speedy act would be taken to vacant the bins. Blynk app requires high internet connectivity on both the sides. The model[2] consists of DC motor, Stepper motor for the robot to move if it detects a metal, it collects it and rotate 180 degrees with servo and drop it in a bin. From this work we came to know that metals can also be segregated by a sensor called metal proximity. The components used in this work[3] is Arduino UNO, ultrasonic sensor, GSM module, PIR sensor, LED's, Servo motor. Here we came to know that PIR sensor detects the human motion whereas ultrasonic sensor detects only object. They have implemented LED's to know the dust level instead of LCD. LED's can't sustain for longer periods compared to



# Smart Gloves For Individuals with Speech Impairment

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**Abstract:** The Smart Gloves designed for individuals with speech impairment provide a transformative solution to the challenges they face in communication. By capturing hand gestures and movements, these gloves enable individuals to express themselves effectively, overcoming limitations in verbal expression. This abstract introduces the concept of Smart Gloves designed for individuals with speech impairments. It highlights the challenges faced by individuals with speech impairments in communication and the limitations of traditional communication aids. The abstract then describes the components used in the Smart Gloves, It explains how these components work together to provide a seamless and intuitive communication solution. The abstract also emphasizes the empowering capabilities of the Smart Gloves, enabling individuals to express themselves confidently and independently.

It discusses the applications of gloves in various contexts such as everyday conversations, education, employment, and social interactions. Moreover, Smart Gloves enhance social interactions by enabling individuals to engage in conversations with friends, family, and new acquaintances. They reduce social isolation, promote empathy, and encourage meaningful connections. Telecommunication integration allows individuals to make phone calls and engage in video conferences, extending communication possibilities beyond physical boundaries.

In conclusion, Smart Gloves for individuals with speech impairments offer a revolutionary communication solution. By leveraging advanced technology, these gloves empower individuals to express themselves confidently, independently, and inclusively. The potential impact of the gloves in bridging the communication gap, fostering equal participation, and enhancing the quality of life for individuals with speech impairments is immense. With these gloves, we are opening doors to a world where communication knows no limitations and everyone's voice can be heard.

**Keywords:** Teensy 4 microcontroller, Organic-LED (OLED) display, MPU6050 gyroscope,

## I. INTRODUCTION

Speech impairment is a condition that affects individuals' ability to communicate verbally, making it challenging for them to express themselves effectively. To address this issue, technological advancements have led to the development of smart gloves specifically designed to assist individuals with speech impairments. These gloves utilize advanced sensors and communication technology to enhance communication capabilities and empower individuals to express themselves more easily. The gloves incorporate sensors that detect hand movements and gestures accurately. These sensors capture fine motor movements and translate them into corresponding digital signals. Smart gloves often provide the flexibility to customize the vocabulary and gestures according to the user's specific needs.

This ensures that the gloves can adapt to the user's preferences and accommodate their unique communication style. The gloves are integrated with text-to-speech technology, allowing the user's selected gestures to be converted into audible speech. This enables individuals to convey their messages or commands effectively. , smart gloves can be connected to other devices wirelessly, such as smartphones or tablets. This allows users to transmit their messages or commands to other people or control external devices. Smart gloves for individuals with speech impairment are innovative devices that leverage technology to overcome communication barriers. By capturing hand gestures and converting them into speech, these gloves provide a practical and empowering solution for individuals who struggle with verbal communication. With continued advancements in this field, smart gloves hold the potential to improve the quality of life and social interactions for individuals with speech impairments





# LITERATURE SURVEY ON WOMEN SAFETY DEVICE

DR. Chanda V Reddy<sup>1</sup>, Sabarish I J<sup>2</sup>, Samiksha S<sup>3</sup>, Sathvik U M<sup>4</sup>, Swagath Aithal P G<sup>5</sup>

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**Abstract:** In the present-day scenes women safety is considered to be the major problem in both urban and rural areas. Women's safety is a very important issue due to rising crimes against women these days. To help resolve this issue we propose a women's safety system that provides self-defence and also consist of a device with salient features. This device consists of a system that ensures alerts in case a woman is harassed or she thinks she is in trouble. Also, we have a watch which has a camera which captures the image for surveillance. We are also working on an Android application that will serve as a backup for the device and will make use of the mobile's built-in features.

**Keywords:** Women Safety, Self-defence, GPS, GSM, Watch, Application.

## I. INTRODUCTION

India, which sees itself as a promising superpower and economic hub, can only achieve its goal if and only if a large number of women participate in the development process to reduce the possibility of physical violence (robbery, sexual assault, etc.) by keeping all aid tools ready to safely escape from violent situations. This reduces risk and brings help when it is needed. Specially designed security device for women in times of emergency and distress. It is simple to use and transport, and it has a variety of functionalities. It is a personal safety device that is designed to keep you and your friends safe at all times. The issue of women's safety has long been a concern in society. With the increasing instances of violence and harassment against women, it is imperative that effective measures be taken to ensure their safety. One such measure is the implementation of a woman safety system.

A woman safety system is a set of technologies and processes that aim to provide women with a sense of security and protection. These systems can range from simple emergency hotlines to more complex systems that use GPS tracking and other advanced technologies. In this paper, we will explore the various types of woman safety systems that are currently available, their features and benefits, and how they can be implemented in various settings. We will also discuss the challenges and limitations of these systems and suggest potential solutions to address them. Overall, the goal of this paper is to provide a comprehensive overview of woman safety systems and to highlight their importance in promoting the safety and well-being of women. Our goal is to provide you with the quickest and easiest way to contact your local assistance. The basic approach (single click) is to intimidate the instant location and a distress message to the cops and the pre-set numbers, thereby averting an unfortunate incident and providing real-time evidence for action against the perpetrators of crime against women.

## II. LITERATURE REVIEW

GPS Based Women Safety Device [1] is women's safety gadget described in this paper is intended for usage in India. For ladies who might be in danger, this device serves as an emergency device. An SMS with the location's latitude and longitude will be sent to a list of pre-fed cell phone numbers when the woman clicks the panic button on the device. In this manner, anybody who receive the message will be able to utilise the coordinates to locate the woman in need and offer assistance. The purpose of this device was to reduce India's rising rate of crime against women. The use of hardware elements such an Arduino Uno microcontroller and a GSM module, as well as the usage of a money-saving gadget, are the key strategies covered in the article.

The GSM module is utilised for connectivity, and the Arduino Uno microcontroller is used to integrate hardware and software. The GSM module employs Global System for Mobile Communications (GSM) technology, which combines Time Division Multiple Access (TDMA) signalling over Frequency Division Duplex (FDD) carriers with Phase Shift Keying (PSK) modulation. The cost of production needs to be maintained low because the device is intended to be inexpensive for the typical Indian user. By offering the idea of a tool that can assist Indian women who find themselves in danger, this paper has made a contribution to the field of



# Guardian Gadget - Human Safety Device

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**Abstract**— In the present-day scenes human safety is considered to be the major problem in both urban and rural areas. Human safety is a very important issue due to rising crimes against human these days. To help resolve this issue we propose a human safety system that provides self-defense and also consist of a device with salient features. This device consists of a system that ensures alerts in case a human is harassed or the person thinks they are in trouble. Also, we have a watch which has a camera which captures the image for surveillance. We are also working on an Android application that will serve as a backup for the device and will make use of the mobile's built-in features.

**Keywords**—Human Safety, Self-defense, GPS, GSM, Watch, Application.

## I. INTRODUCTION

India, which sees itself as a promising superpower and economic hub, can only achieve its goal if and only if a large number of women participate in the development process to reduce the possibility of physical violence (robbery, sexual assault, etc.) by keeping all aid tools ready to safely escape from violent situations. This reduces risk and brings help when it is needed. Specially designed security device for women in times of emergency and distress. It is simple to use and transport, and it has a variety of functionalities. It is a personal safety device that is designed to keep you and your friends safe at all times. The issue of women's safety has long been a concern in society. With the increasing instances of violence and harassment against women, it is imperative that effective measures be taken to ensure their safety. One such measure is the implementation of a woman safety system. A woman safety system is a set of technologies and processes that aim to provide women with a sense of security and protection. These systems can range from simple emergency hotlines to more complex systems that use GPS tracking and other advanced technologies. In this paper, we will explore the various types of woman safety systems that are currently available, their features and benefits, and how they can be implemented in various settings. We will also discuss the challenges and limitations of these systems and suggest potential solutions to address them. Overall, the goal of this paper is to provide a comprehensive overview of woman safety systems and to highlight their importance in promoting the safety and well-being of women. Our goal is to provide you with the quickest and easiest way to contact your local assistance. The basic approach (single click) is to intimidate the instant location and a distress message to the cops and the preset numbers, thereby averting an unfortunate incident and providing real-time evidence for action against the perpetrators of crime against women.

## II. LITERATURE SURVEY

GPS Based Women Safety Device [1] is women's safety gadget described in this paper is intended for usage in India. For ladies who might be in danger, this device serves as an emergency device. An SMS with the location's latitude and longitude will be sent to a list of pre-fed cell phone numbers when the woman clicks the panic button on the device. In this manner, anybody who receive the message will be able to utilise the coordinates to locate the woman in need and offer assistance. The purpose of this device was to reduce India's rising rate of crime against women.

SMARISA: A Raspberry Pi based Smart Ring for Women Safety Using IoT [4] is to create a wearable gadget that will enable women to defend themselves against sexual assault and harassment. With the help of this very portable and simple-to-use tool, women may effectively and affordably defend themselves from offenders. The article also covers the use of GPS monitoring of the smart phone to obtain the device's coordinates, an alarm message to notify the family and law enforcement, GSM and GPRS elements, and methods for photographing the assailants to help with criminal identification. Women Self Protecting System Using Internet of Things [5] is to provide safety for women and to reduce the crime rate. Nowadays, an individual's safety is jeopardized, whether due to illness or rising crime rates such as sexual assaults, molestation, and abuse. So, to prevent these to a certain extent, this paper proposes an automated wearable smart device to prevent the above-mentioned cause that has access to the internet (IoT). This smart band is connected to the



# Wireless Notice Board Using Bluetooth HC-05 and Arduino Uno-R3

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**Abstract:** This paper presents a survey of the existing literature on the topic of wireless notice boards using Bluetooth HC-05 and Arduino Uno. Wireless notice boards provide an efficient and convenient means of displaying information in real-time, enabling seamless communication and updates. The objective of this survey is to examine the various research works, methodologies, and applications related to wireless notice boards implemented using Bluetooth HC-05 and Arduino Uno. The survey encompasses a comprehensive analysis of the hardware and software components involved, including the Arduino Uno board, HC-05 Bluetooth module, and display technologies such as LCD or LED. It explores the methodologies employed in developing such notice boards, including the establishment of Bluetooth communication, message processing, and display techniques. Furthermore, the paper examines the diverse applications of wireless notice boards in public spaces, educational institutions, retail stores, and other domains. Additionally, it identifies future directions and potential advancements in the field, such as enhanced user interfaces, integration with IoT devices, cloud connectivity, and advanced display technologies. The survey concludes that wireless notice boards using Bluetooth HC-05 and Arduino Uno present promising opportunities for effective information dissemination and communication, with the potential to revolutionize various industries and improve user experiences in both public and private settings.

**Keywords:** Arduino Uno, Bluetooth Module Hc-05, Lcd Display, Power Supply, Mobile Source.

## I. INTRODUCTION

In this world Mobile Phones and the related technologies are becoming more and more prevalent. Various technical arenas in the field of Telecommunication and Embedded Systems are becoming omnipresent in the people. The use of cell phones has rapidly increased over the last decade and a half. Upgradation in networking technologies has encouraged the development and growth of very dense networks. Notice boards are one of the widely used ones ranging from primary schools to major organizations to convey messages at large. A lot of paper is been used and which is later wasted by the organizations. This in turn leads to a lot of deforestation thus leading to global warming. Small innovative steps in making use of technology for regular purposes would have an adverse effect on the environment issues which we are presently concerned about. In this world Mobile Phones and the related technologies are becoming more and more prevalent.

Various technical arenas in the field of Telecommunication and Embedded Systems are becoming omnipresent in the people. The use of cell phones has rapidly increased over the last decade and a half. Upgradation in networking technologies has encouraged the development and growth of very dense networks. Notice boards are one of the widely used ones ranging from primary schools to major organizations to convey messages at large. A lot of paper is been used and which is later wasted by the organizations. This in turn leads to a lot of deforestation thus leading to global warming. Small innovative steps in making use of technology for regular purposes would have an adverse effect on the environment issues which we are presently concerned about.

The whole process can be described from the transmitter and receiver section. The Bluetooth module receives a message from the authorized mobile phone and the message is extracted by the microcontroller from the Bluetooth module and is displayed on the matrix display board. Serial to parallel communication is used for the entire process from Bluetooth module to Microcontroller and from microcontroller to the matrix display. And for the acknowledgement LCD display is used. The proposed system "Bluetooth based Wireless Notice Board using Arduino" is cheap, quick reliable and secured for any organization that requires to circulate notice regularly and reduce physical efforts. We are using Bluetooth technology. We can send notice from any location. This proposed system in this project has many upcoming applications in educational institutions and organizations, crime prevention, traffic management, railways, advertisements etc. Been user friendly, long range and faster means of conveying information are major bolsters for this application. By using this proposed methodology, we can enhance the security system and make awareness of the emergency situations and avoid many dangers.



# LINE FOLLOWER ROBOT WITH OBSTACLE AVOIDING

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**Abstract:** This project focuses on developing a line follower robot with obstacle avoiding capabilities. The robot utilizes line follower sensors to track a predetermined path and incorporates obstacle detection sensors to identify obstacles. It operates in a continuous loop, analyzing sensor data to make informed decisions. When the line is detected, the robot follows it, while monitoring for obstacles. If an obstacle is detected, the robot stops and takes evasive action. In the absence of a line, the robot searches or rotates to locate it. The objective is to create an autonomous robot that can effectively navigate a path while avoiding obstacles, ensuring safe and reliable operation.

**Keywords:** Line follower, Robot, Obstacle detection, Autonomous navigation

## I. INTRODUCTION

The main aim of any robot is to reduce human effort. According to the purpose different types of robots are designed for practical applications. The workers can be used for other tasks instead of transporting goods from one place to other. Adding the features of obstacle avoiding robot to a traditional line follower robot prevents any damage to the robot. A traditional obstacle avoiding robot cannot help in transportation of goods because there is no particular path for the robot. This improves the working of the line follower robot. This smart and intelligent line follower robot can be used in industries for carrying goods from one place to another. This conventional line follower robot can be made smart and intelligent by giving it the ability to detect obstacles. This intelligent robot can also be installed for health care management in hospitals.

## II. LITERATURE SURVEY

line follower robot with obstacle detection involves an in-depth review of research papers, articles, and publications related to the topic. The survey aims to gather knowledge on existing approaches, algorithms, and technologies used in line following and obstacle detection for robots. It examines various sensor technologies such as infrared, ultrasonic, and lidar, along with computer vision techniques for object detection. The survey identifies trends, challenges, and advancements in the field, helping researchers understand the current state-of-the-art and potential areas for improvement in developing an effective line follower robot with obstacle detection capabilities.

The first paper we referred was "DEVELOPMENT AND APPLICATION OF LINE FOLLOWING ROBOT BASED HEALTH CARE AND MANAGEMENT SYSTEM", This paper describes the line following robot using arduino for surveying, The development and application of a line-following robot-based healthcare and management system offers an innovative approach to enhance healthcare services. This system integrates autonomous robots with healthcare technology, enabling efficient patient transportation, medication delivery, monitoring, and data analysis. By automating tasks and optimizing workflows, it streamlines operations, improves patient management, and contributes to infection control efforts in healthcare settings. [1]

The second paper we referred is "DESIGN OF AUTONOMOUS LINE FOLLOWER ROBOT WITH OBSTACLE AVOIDANCE" The design of an autonomous line follower robot with obstacle avoidance involves integrating sensors, such as infrared or ultrasonic, to detect and track a line while simultaneously detecting and avoiding obstacles. The robot's control system uses algorithms to interpret sensor data and make real-time decisions for navigation. It employs motor control mechanisms to adjust its movement based on line tracking and obstacle detection, enabling autonomous operation without human intervention. The design ensures efficient and safe navigation while following a predetermined path.[2]



# Hybrid Power Grid Based On IOT

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**Abstract:** With the growing energy demand, there is a requirement for an efficient and effective power grid management system. The use of Electric vehicles has also increased the requirement for a hybrid microgrid infrastructure. The conventional grid structure doesn't have the ability for data collection and data interpretation. Therefore, in this project we aim to develop a hybrid microgrid infrastructure that can cater the modern day needs by providing a solution to trade energy between neighbors, advanced electricity distribution system and hybrid grid for renewable sources.

**Keywords:** Micro grid, IoT, SCADA, Protocol, Smart Meter, Power theft

## I. INTRODUCTION

There are various combination of energy and all of them are alternative to each other like solar energy, wind energy, fuel cell, etc. But the need of controlling of hybrid energy system arises when it is installed for domestic or commercial purpose. At this point IoT plays an important role in controlling system. The main criteria being switching between the two sources of energy i.e., solar and wind energy without any inconveniences through a website using ESP8266 module which controls the sources of energy. The transmitted data is controlled remotely using IoT. This enables user to have flexible control the sources of energy, manually and remotely using smart phone or personal computer. This system is very efficient, cheaper and flexible in operation.

## II. LITERATURE SURVEY

The energy sector has evolved over the time. Industrial revolution has always played a key role in the energy sector development. Integrating renewable sources into the existing grid and to manage the energy consumption is the key factor to be achieved. IoT - Internet Of Things enables us to monitor the sensor data and automate the system. IoT uses sensors to collect real time data, process the data and control the actuators. IoT can be applied to different industries and sectors, this paper is a survey of how IoT is integrated within the energy sector. Architecture of the smart grid using IoT has been discussed. Data Centre acts as the central IoT hub that communicates between the Power plant, Distribution networks and Smart buildings. The challenges in integrating IoT into power grid is also discussed. Privacy, security, decision making optimization and energy consumption are few of the challenges that has to be solved in order to integrate it. The consumption of electricity can be mainly classified into two domestic usage and industrial usage [1] One of the challenges in IoT based smart grids is the cloud computing limitations. The latency in the system causes slow response from the IoT system. This paper proposes few ways to overcome the limitations of present cloud computing infrastructure. The new technologies like 5G, AI – Artificial Intelligence, IoT – Internet of things support the development of the smart grid. The architecture uses these technologies in order to provide fast and reliable communication between the smart devices. The micro grid systems, metering systems, surveillance systems are all connected to the Cloud. The algorithms for edge computing in the cloud has been discussed. Laplace Mechanism, Gaussian Mechanism and pre-process level mechanism are few of the algorithms proposed for use in edge computing. Data security in this model is improved by the Laplace mechanism and gaussian mechanism. Even when an attack takes place the leakage of data is minimal [2].

This paper proposes a smart energy management system based on the IoT framework that can be integrated into the smart grid structure. This system is called as Smart Energy Management system. Each appliance is connected by a smart meter and these meters are connected to a smart gateway that acts as an access point and a server. The smart meters collect data from the respective appliance using Hybrid Power Grid Based On IoT 2 the sensor module. The communication module takes care of the transmission and receiving of data between the smart meter and smart gateway. The control module controls the ON/OFF state of the appliance. It consists of relay circuit in order to control IARJSET the appliance. The algorithm used in this system considers the factors like cost optimization, Decision making and demand response. Smart sockets are nothing but the smart meters integrated into the electrical sockets. These sockets collect data and send it to the smart gateway. The communication technology used here is Zigbee between the smart meter and smart



# LITERATURE PAPER ON VIRTUAL PEN

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**Abstract:** The basic idea of virtual pen is to develop an interface or the connection between the user and computer screen. Human interaction with the computer is not just bounded to keyboard, there are many other means like gesture, speech, expressions etc. Virtual pen is a system that serves on Arduino and machine learning process. This virtual pen is the model where user can enter text on the screen by holding the device in the hand which is a constituent of Arduino and accelerometer, thus making a motion or moving it in specific direction in air is read and displayed on the screen with

**Keywords:** Arduino, Accelerometer, Button switch, Vector machine algorithm, pyGARL.

## I. INTRODUCTION

The keyboard plays a vital role in the computer system to enter the data via typing or pressing number of keys. Nowadays screen touch keyboards are often used and gesture keyboards are used in cases for physically challenged people or for the special use. There are numerous varieties in design of the physical keyboard such as AZERTY, QWERTY, Dvorak, Colemak, Maltron, and JCUKEN. [1], Not only the virtual keyboard gets illustrious and in this era of mobile and networking technology devices generally people use voice to text technology, but under most of the cases the output is not much accurate.

Virtual pen is one of the electronic devices based on machine learning algorithms and organized by Python programming language. It is a system that transforms gesture movement into text defined by the accelerometer in the air. It is being deliberate to help the user for entering text without using a standard or specific design. This model will also be suitable for multi-linguistics operations or functionality so the user doesn't need to use the certain kinds of keyboard for entering data. It is similar to writing in a notebook using a pen where a remote act as a pen and notebook will be a text editor. The advantage of this project is users don't need any specific conditions for using the device, and also doesn't need to use various functional keys for different languages.

One of the important procedure for designing this system is to create the motion tracking device that is based on 3 major components such as accelerometer, Arduino and switches. The Arduino serial monitor is configured and set the baud rate to 38400 at Arduino IDE, now the overall module will work on sci-kit learn's a library that converts signals into letters through accelerometer and every single character and digit will store in data set. When the data set is ready it will train the module through a machine learning algorithm.

The keyboard isn't a new device in the matrix of computer, as time evolves computer and its supportable or related devices also changes. User comes from the typewriting system to touch screen keyboard and not only these, but keyboard operation or its functionalities also change based on the customer requirements such as design, technology, and also some special case. The screen touch keyboard is a device by which typing on any available surface is possible. It is a wearable device that enables us to type on any surface. The device has incorporated five extensions for each finger and a sensor attached which is used to sense the value through the motion of the finger. At the first stage, the user will be provided with the typology application. From this application, the user will be able to learn all the required values for typing. Once a user is familiar with the typology, then a user will be able to use the device effectively. This device is also flexible which is to say that the user can fix the values according to individual requirements. Movement plays a vibrant role in this device as the values or the readings are to be gathered by sensors via the motion of fingers. This will enable the user to type on any surface. Hence this provides ease and comfort for the user to use this device. [2]

An air mouse model is a wireless device manufactured by Protokart, and been worked by a rechargeable lithium battery. This model can easily be connected by Personal Computers, televisions, and also smartphones through Wi-Fi and USB. This is a non-direction device which uses an anti-shake algorithm, it provides accurate and smooth mouse experience along with supporting motion gestures. It can also be used as a remote for playing games. This model has built-in physical keyboard which can be easily connected to TV, smartphone, and PCs for data or text input. The working distance from the screen is approximately ranged within 5 meters. It is compatible with MAC, OS, Windows, Android, and Linux. [3]



# Power Grid Based on Internet of Things

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**Abstract:** The widespread popularity of smart meters enables an immense amount of fine-grained electricity consumption data to be collected. Meanwhile, the deregulation of the power industry, particularly on the delivery side, has continuously been moving forward worldwide. How to employ massive smart meter data to promote and enhance the efficiency and sustainability of the power grid is a pressing issue. To date, substantial works have been conducted on smart meter data analytics. To provide a comprehensive overview of the current research and to identify challenges for future research, this paper conducts an application-oriented review of smart meter data analytics. Following the three stages of analytics, namely, descriptive, predictive and prescriptive analytics, we identify the key application areas as load analysis, load forecasting, and load management. We also review the techniques and methodologies adopted or developed to address each application. In addition, we also discuss some research trends, such as big data issues, novel machine learning technologies, new business models, the transition of energy systems, and data privacy and security.

**Keywords:** Communication technology, deployment, design, issues, protocols, smart meters.

## I. INTRODUCTION

Digitization of the energy industry is the key to a successful energy transition. To this end, all consumers and generators should be able to communicate permanently with each other so that the energy system as a whole function safely and efficiently. Smart meter technology can make a contribution to this. Unfortunately, the rollout selected in Germany initially affects only about 11% of all consumers. The objective of this paper is therefore to determine the current status of this technology in companies and to pursue the research question of which factors influence acceptance and use. For this purpose, an extensive literature search with more than 50 keywords was conducted in scientific databases. After reviewing and cleaning the literature, 47 papers were selected for the literature review and considered in detail. The literature review was conducted using eight evaluation criteria: Origin and year of publication, identification of trends with Big Data and AI (artificial intelligence), type of organization, type of data, collection method, number of participants, type of data collection, and analysis method. In order to evaluate the main statements and results of the considered works, we also performed a Strengths–Weaknesses–Opportunities–Threats Analysis (SWOT).

Smart meter is an advanced energy meter that measures consumption of electrical energy providing additional information compared to a conventional energy meter. Integration of smart meters into electricity grid involves implementation of a variety of techniques and software, depending on the features that the situation demands. Design of a smart meter depends on the requirements of the utility company as well as the customer. This paper discusses various features and technologies that can be integrated with a smart meter. In fact, deployment of smart meters needs proper selection and implementation of a communication network satisfying the security standards of smart grid communication. This paper outlines various issues and challenges involved in design, deployment, utilization, and maintenance of the smart meter infrastructure. In addition, several applications and advantages of smart meter, in the view of future electricity market are discussed in detail.

This paper explains the importance of introducing smart meters in developing countries. In addition, the status of smart metering in various countries is also illustrated. Reducing the power supply-demand gap and increasing reliability of power supply are the challenges of current energy management. Implementation of smart grid, smart meters and smart metering can be a possible solution for power demand reduction, efficient power supply management, and optimization of management resource usages. Smart meters include sophisticated measurement and calculation hardware, software, calibration and communication capabilities. For interoperability within a smart grid infrastructure, smart meters are designed to perform functions, and store and communicate data according to certain standards. In this work we discuss smart meter and various elements of smart metering, current state of the technologies related to smart grid, advanced metering infrastructure (AMI), and meter data flow in smart grid. We also discuss standards related to smart meter, meter data format and data transmission, functions of smart meter, and functionalities of smart meters, currently deployed by utilities around the world.



# VIRTUAL PEN

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**Abstract:** The basic idea of virtual pen is to develop a interface or the connection between the user and computer screen human interaction with the computer is not just bounded to keyboard , there are many other means like gesture,speech, expressions etc. Virtual pen is a system that serves on arduino and machine learning process. This virtual pen is the model where ,user can enter text on the screen by the holding the device in the hand which is a constituent of arduino and accelerometer, Thus making a motion or moving it in specific direction in air is read and displayed on the screen with

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## I. INTRODUCTION

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Virtual pen is one of the electronic devices based on machine learning algorithms and organized by python programming language. It is a system that transforms gesture movement into text defined by the accelerometer in the air. It is being deliberate to help the user for entering text without using a standard or specific design. This model will also be suitable for multi linguistics operations or functionality so the user doesn't need to use the certain kinds of keyboard for entering data. It is similar to writing in a notebook using a pen where a remote act as a pen and notebook will be a text editor. The advantage of this project is users don't need any specific conditions for using the device. and also doesn't need to use various functional keys for different languages. One of the important procedure for designing this system is to create the motion tracking device that is based on 3 major components such as accelerometer, Arduino and switches. The Arduino serial monitor is configured and set the baud rate to 38400 at Arduino IDE, now the overall module will work on sci-kit learn's a library that converts signals into letters through accelerometer and every single character and digit will store in data set. When the data set is ready it will train the module through a machine learning algorithm.

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A air mouse model is wireless device manufactured by protokart, and been worked by a rechargeable lithium battery. This model can easily be connected by Personal Computers, televisions, and also smartphones through Wi-Fi and USB. This is a non-direction device which uses an anti-shake algorithm, it provides accurate and smooth mouse experience along with supporting motion gestures. It can also be used as a remote for playing games. This model has built-in physical keyboard which can be easily be connected to TV, smartphone, and PCs for data or text input. The working distance from the screen is approximately ranged within 5meters. It is compatible with MAC, OS, Windows, Android, and Linux. [3]





# Water and Air Pollution Monitoring System

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**Abstract:** The developed system is a device that measures and displays air and water pollution. Nowadays, water and air pollution is increasing day by day. The factors responsible for this pollution are industrialization, growing population, urbanization and so on. This has become a big problem that needs to be worked on. The air quality sensor is used to detect the pollution level in ppm with the help of Arduino. The water sensors are used to detect the water quality and indicate whether the water is harmful due to physical and chemical factors. This will help people to monitor the level of pollution anywhere and anytime.

**Keywords:** Arduino UNO, LCD, Industrialization, Turbidity, TDS sensor.

## I. INTRODUCTION

Pollution of the air and water resources happens as society's development and a variety of human activities progress more quickly. Therefore, to provide real-time safety, it is important to periodically monitor changes in these parameters. Low-cost air and water quality monitoring systems with simplified installation and quick and simple configuration can be created using sensor technology.

The suggested system is accurate, low-cost, and labor-intensive. It uses a number of sensors to measure the quality of the air and water in real-time so that appropriate action can be taken. The Arduino platform serves as the project's foundation. The values from the sensors are taken by the Arduino IDE software scripts and shown on LCDs. Every person in the community will be able to determine.

## II. LITERATURE SURVEY

[1] A.B. Choude Ms. Kshitija Tanaji Kamble, Ms. Arpita Vijaykumar Khatake, Ms. Aishwarya, Chandrakant Ghandyalji, Prof

The operation of the IOT-based air pollution monitoring system using Raspberry Pi. The MQ2 and MQ7 gas sensors are used in this project. These sensors are used as analog sensors that are connected to an ADC. The ADC is also connected to the Raspberry Pi. The Raspberry Pi is supplied with a power supply. The output from the Raspberry Pi is sent to the ThingSpeak IOT platform for graphical monitoring. We can use ThingSpeak in cell phones, laptops as well as in computer systems via an internet application that can be operated from anywhere.

[2] Anumandla Kiran Kumar, A. Sri Lakshmi, P. Janaki Nivas Roa

According to measurements of the ambient air quality, a gas monitoring aids in determining the pollution level. This work uses the Raspberry Pi Internet of Things (IOT) platform to create an IOT-based air quality monitoring system. To detect gases like CO, ammonia, smoke, alcohol, etc., a MQ135 sensor is employed. To minimize using duplicated data samples, the associated data will be processed using the moving average approach and saved in a database for later study and air pollution prediction. This will make it easier for future generations to practise safety practises.

[3] Komang Try Wiguna, Adhitya Primantara, Putu Wira Bhuana, Kyle Doran

Three primary pollutants—carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), and dust particles (PM<sub>10</sub>)—are used to calculate the ISPU value. PH, temperature, turbidity, and total dissolved solids (TDS) are the factors used to assess the quality of water. A TDS sensor to measure total dissolved solids, a PH sensor to detect acidity, and a DS18B20 sensor to measure water temperature. A DHT11 sensor for temperature and humidity, a MQ-7 sensor for carbon monoxide concentration, and a MQ-135 sensor for nitrogen dioxide content make up the sensor nodes used to measure air quality.

[4] Zaky Wahyu Oktavianto, Anton Breva Yunanda.

Air is a mixture of gasses found in the layers surrounding the earth. The gas mixture's composition is not always constant. The element whose concentration varies the greatest is water, specifically in the form of water vapour (H<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>). Pollutants are always discharged into the air as byproducts in the production of various air pollutants, such as gaseous sulphur dioxide (SO<sub>2</sub>), hydrogen sulphide (H<sub>2</sub>S), and carbon dioxide (CO). Examples of natural processes include the eruption of volcanoes, the decay of plant waste, and forest fires, among others.



# Surveillance Robot Using ESP32 CAM Module

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**Abstract:** In recent years robots have become a vital part of technology. Surveillance robots play a important role in enhancing security and monitoring capabilities in various domains, ranging from public safety and military applications to industrial facilities and private premises. These robots are equipped with advanced sensors, cameras, and communication systems to gather real-time data and provide situational awareness in both indoor and outdoor environments. This abstract highlights the key features and benefits of surveillance robots, focusing on their capabilities, deployment scenarios, and potential challenges. Surveillance robots are designed to navigate through complex environments autonomously or remotely, collecting visual and auditory information while transmitting it to a control center or human operators. They leverage technologies such as computer vision, machine learning, and sensor fusion to detect and track objects, recognize faces, identify anomalies, and monitor critical areas. These robots can be deployed in diverse settings, including public spaces, transportation hubs, critical infrastructure, and hazardous environments where human presence may be risky or impractical.

The use of surveillance robots offers numerous advantages. They can provide persistent surveillance without fatigue or distractions, cover large areas efficiently, and respond rapidly to security incidents or emergencies. Their ability to operate in challenging conditions, such as low-light environments or areas with restricted access, enhances overall security and threat detection capabilities. Additionally, surveillance robots can be equipped with additional functionalities, such as two-way communication, integration with existing security systems, and the ability to carry out routine patrols or inspections.

However, the deployment of surveillance robots also presents challenges. Ensuring reliable navigation and obstacle avoidance, maintaining continuous power supply, optimizing data transmission and storage, and addressing privacy concerns are among the key considerations. Ethical and legal frameworks must be established to define the boundaries of surveillance activities and protect individual privacy rights.

**Keywords:** Arduino UNO, ESP 32 CAM Module, Sensors, Metal detector, LDR, Surveillance.

## I. INTRODUCTION

The advent of new high-speed technology and the growing computer Capacity provided realistic opportunity for new robot controls and realization of new methods of control theory. This technical improvement together with the need for high performance robots created faster, more accurate, and more intelligent robots using new robots control devices, new drivers and advanced control algorithms.

A surveillance robot is an advanced technological device designed to perform surveillance and monitoring tasks autonomously or under human control. These robots are equipped with various sensors, cameras, and communication systems that enable them to collect and transmit real-time data from their surroundings. Surveillance robots are utilized in a wide range of applications across industries such as security, law enforcement, industrial monitoring, search and rescue operations, environmental monitoring, infrastructure inspections, agriculture, event security, and border surveillance.

The primary purpose of surveillance robots is to enhance situational awareness, improve operational efficiency, and mitigate risks. By deploying these robots, organizations can monitor and secure areas that are difficult or dangerous for humans to access. They serve as reliable and efficient alternatives, complementing the capabilities of human personnel. ESP 32 Cam module is used for Surveillance. Where as Arduino UNO is used for controlling the robot where the UNO is connected to ESP 8266 WIFI module and serial communication takes place between these two which makes it easier to control the robot with the help of commands. Sensors such as metal detector and LDR are used.

These robots are equipped with high-resolution cameras that capture visual data, enabling real-time video feeds and recordings. Additionally, they may feature sensors such as infrared or thermal imaging to detect objects or individuals



# LITRETURE REVIEW ON SMART RESTAURANT USING E-MENU AND WAITER ROBOT

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**Abstract:** An electronic menu (e-Menu) and server robot system can potentially enhance the dining experience and improve the efficiency of a restaurant. The e-Menu which uses a TFT display provides customers with an interactive and visually appealing platform to browse and order dishes, including detailed information about ingredients and allergies. The server robot which uses line follower technique assists in taking orders and delivering food, allowing human staff to focus on other tasks such as cooking and customer service. The main aim is to automate and improve the ordering and billing processes in restaurants along with real time customer interaction and feedback.

**Keywords:** e-Menu, TFT display, server robot, line follower.

## I. INTRODUCTION

Traditionally, restaurants have relied on paper menus and human waitstaff to facilitate the ordering and delivery of food and drinks. However, there are several drawbacks to this approach. Paper menus can be cumbersome and difficult to update, and waitstaff can be subject to human error or inconsistency in service quality. In addition, the increasing demand for convenience and personalization in the food service industry has led to the development of alternative solutions such as electronic menus and waiter robots.

The use of technology in the food service industry has increased significantly in recent years, with the introduction of electronic menus and waiter robots being among the most notable advancements. Electronic menus allow customers to browse and place orders on touch screen devices, while waiter robots are designed to deliver food and drinks to tables, as well as assist with tasks such as taking orders and making payments. In this paper, we present a smart restaurant concept that combines these two technologies to create a more efficient and convenient dining experience for customers.

Electronic menus allow customers to browse and place orders on touch screen devices, which can be more convenient and easier to use than paper menus. They also enable restaurants to offer a wider range of options, as well as personalized recommendations based on past orders and customer preferences. Waiter robots, on the other hand, can assist with tasks such as delivering food and drinks to tables, taking orders, and making payments. They can also improve efficiency by reducing the workload of human staff and enabling restaurants to operate at higher capacity.

## II. LITRETURE REVIEW

In this paper titled, "Intelligent Restaurant -Menu Ordering System" they have stated that In the present restaurant system, there is more reliance on humans for the complete process from ordering to serving food. In this proposed system the complete process is automated. The system uses modern methods/techniques like a multi-touch module for ordering & receiving bills, and an RF module for communication between the user and chef. A meal-serving robot is used for serving food that follows a designed path to provide a unique & completely automated dining experience. An android app PayPal is used for payment purposes. [1]

In the paper titled, "Smart Food Service System for Future Restaurant Using Overhead Crane" the main aim is to reduce the initial operating costs of smart restaurants. The most common method used in this kind of restaurant is to use a line follower robot for the delivery of food. This method has its drawbacks, like the initial cost of installation is very high and it consumes a lot of space as it needs a dedicated line for its working. Hence an overhead crane is used to overcome all these drawbacks. This overhead crane is capable of serving food directly from the Kitchen to the customer's table without



# SMART RESTAURANT USING E-MENU AND WAITER ROBOT

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**Abstract:** An electronic menu (e-Menu) and server robot system can potentially enhance the dining experience and improve the efficiency of a restaurant. The e-Menu which uses a LCD display with a 4X4 keypad provides customers with an interactive and visually appealing platform to browse and order dishes, including detailed information about ingredients and allergies. The server robot which uses line follower technique assists in taking orders and delivering food, allowing human staff to focus on other tasks such as cooking and customer service. The main aim is to automate and improve the ordering and billing processes in restaurants along with real time customer interaction and feedback.

**Index Terms - e-Menu, LCD display, 4X4 keypad, server robot, line follower.**

## I. INTRODUCTION

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Electronic menus allow customers to browse and place orders on LCD screen, which can be more convenient and easier to use than paper menus. They also enable restaurants to offer a wider range of options, as well as personalized recommendations based on past orders and customer preferences. Waiter robots, on the other hand, can assist with tasks such as delivering food and drinks to tables, taking orders, and making payments. They can also improve efficiency by reducing the workload of human staff and enabling restaurants to operate at higher capacity.

## II. PROBLEM STATEMENT

Inefficient ordering and food delivery processes leads to long wait times and frustrated customers. Dependence on human staff to provide information and recommendations, which may be prone to error or bias. Difficulty in gathering customer feedback and data to improve operations. Difficulty in competing with other restaurants that offer more modern and convenient dining experiences.

## III. LITERATURE SURVEY

Bankar et al. [1] have discussed in the present restaurant system, there is more reliance on humans for the complete process from ordering to serving food. In this proposed system the complete process is automated. The system uses modern methods/techniques like a multi-touch module for ordering & receiving bills, and an RF module for communication between the user and chef. A meal-serving robot is used for serving food that follows a designed path to provide a unique & completely automated dining experience. An android app PayPal is used for payment purposes.



# Navigation system and speech assistive device for visually impaired people

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**Abstract:** One of the biggest problems faced by the visually impaired is navigating from place to place, be it indoors or outdoors. They have to be alert at all times to avoid consequences like colliding with stable or moving obstacles, ascending or descending staircases. Also, at times they may be in distress and might want to send an alert message to their relatives or friends about their whereabouts. These problems of blind people can be addressed with the intervention of technology. Although efforts have been made to provide innovative solutions for the blind, these solutions' shortcomings mean that the issues faced by those who are visually impaired remain unresolved. Hence, one of the competent solutions is to use embedded system. The proposed solution employs the WSN to provide a medium between the blind and the environment. Several sensors can be used to detect anomalies like obstacles, staircases.

**Keywords:** Ultrasonic Sensors, Arduino Uno, Global Positioning System, Global System for Mobiles, Speech assistance, Visually impaired.

## I. INTRODUCTION

The survey of WHO (World Health Organization) carried out in 2011 tells us that in world about 1% of the human population is visually impaired and amongst them about 10% is fully blind.

The main problem with blind people is mobility. This paper proposes a tool for visually impaired people that will provide them navigation. Long white cane is a traditional mobility tool used to detect obstacles in the path of a blind person. We are modifying this cane with some electronics components and sensors so that cane can become smart cane. We noticed that normally blind canes used by blinds have certain limitations like detecting pot-holes, stairs, distant objects, above knee obstacles, etc. So, we came up with the idea of developing an economical sensor equipped cane capable of assisting blind to navigate easily.

In this project, we are using ultrasonic sensors, GSM module, GPS, voltage regulator, APR9600 module, Arduino Uno. Ultrasonic sensor is used to detect any obstacle. It has detection distance of 9cm-14cm so whenever the obstacle is in this range it will alert the person. The speech output is provided through speaker. Whenever the person is in danger, he can press the provided switch and his location will be sent to his relatives or friends.

## II. PROBLEM IDENTIFICATION

Generally Blind People use a Cane Stick to detect the object in their path which is difficult for them to identify the distance of the objects.

Drawbacks:

- It is a limited source
- It cannot find the object from a few feet distance
- Cane sticks can be heavy and cumbersome to carry.
- They can only detect obstacles at ground level.
- It is difficult to navigate in unfamiliar environments using cane stick.
- Cane sticks don't provide any information about the height, width, or distance of obstacles, which can make it difficult to navigate in unfamiliar environments.
- Cane sticks sometimes miss obstacles or fail to detect them accurately.
- It can be dangerous for blind people who rely on them for mobility.



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### LITERATURE SURVEY ON HEALTH MONITORING SYSTEM

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**ABSTRACT**-- One of the most significant technological developments, particularly in the realm of medicine, is the Internet of Things (IoT). Medical gadgets are connected to the internet, which makes it simpler to spot issues and allows for adaptation to changing patient needs. The advanced technologies can either be worn on the users' bodies or implanted there to continuously monitor their wellbeing. But with so many sensors and communication technologies on the market, standardization has emerged as a major problem. The state-of-the-art study on the various sensors and communication models utilized to deliver home-based monitoring is presented in this survey paper. It is being examined how the Internet of Things tiny sensor nodes affect each patient's life by lowering their risk aversion when they cannot contact medical assistance. The state-of-the-art study on the various sensors and communication models utilized to deliver home-based monitoring is presented in this survey paper. It is being examined how the Internet of Things tiny sensor nodes affect each patient's life by lowering their risk aversion when they cannot contact medical assistance. The results of this study assist the researchers in selecting the optimal protocols for use in medical equipment. Data from home or the workplace for smart health care is considered, as well as its contribution to the creation of smart cities. Given that 4G has been the most frequently used communication method in the literature to date, the main conclusions of this study are the advantages of 5G technology for smart health care.

**KEYWORDS** – Sensors, SPO2, ECG, Temperature sensor

#### I. INTRODUCTION

Smart health care has emerged as one of the most significant developments in the medical industry in the current digital age. Traditional medicine, which is founded on bioengineering, has gradually started to digitalize and information in response to the development of technology and scientific theory. An example of a technological innovation is the Internet of Things (IoT). The term "Internet of Things" describes the integration of hardware, software, sensors, and network connections that enhances the ability of various entities to gather and share data. The continuous monitoring of a patient by looking at a variety of parameters and extrapolating a positive outcome from the history of such continuous monitoring is what sets the Internet of Things apart in the healthcare

routinely used to continuously monitor patients and share the information with clinicians. This aids in the fast provision of support and the early diagnosis of defects in patients.

IOT is used in homes to remotely monitor patients in a similar way. Real-time monitoring made possible by the Internet of Things helps prevent diseases like diabetes, heart failure, asthma attacks, and high blood pressure from taking lives. Smart medical devices connect to smart phones to easily transmit clinicians the pertinent patient data. These sensors also record data on blood pressure, weight, blood sugar, and oxygen levels. The goal of this study is to determine whether home monitoring can save lives by reducing the amount of time patients must spend travelling to hospitals for examinations. Additionally, it can be used to detect many diseases sooner. Health monitoring



# HEALTH MONITORING SYSTEM

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**Abstract:** Healthcare is given the extreme importance now a days by each country with the advent of the novel corona virus. So in this aspect, an IoT based health monitoring system is the best solution for such an epidemic. Internet of Things (IoT) is the new revolution of internet which is the growing research area especially in the health care. With the increase in use of wearable sensors and the smart phones, these remote health care monitoring has evolved in such a pace. IoT monitoring of health helps in preventing the spread of disease as well as to get a proper diagnosis of the state of health, even if the doctor is at far distance. In this paper, a portable physiological checking framework is displayed, which can constantly screen the patient's ECG, heartbeat, temperature, oxygen levels. We proposed a nonstop checking and control instrument to screen the patient condition and store the patient information's in server utilizing Wi-Fi Module based remote correspondence. A remote health monitoring system using IoT is proposed where the authorized person can access these data stored using any IoT platform like Thing-speak mobile application and based on these values received, the vitals are monitored and analysed by the doctors from a distance.

**Keywords:** Sensors , AD8232, LM35, ECG, Waveforms.

## I. INTRODUCTION

Health is always a major concern in every growth the human race is advancing in terms of technology. Like the recent corona virus attack that has ruined the economy of China to an extent is an example how health care has become of major importance. In such areas where the epidemic is spread, it is always a better idea to monitor these patients using remote health monitoring technology. So Internet of Things (IoT) based health monitoring system is the current solution for it. Remote Patient Monitoring arrangement empowers observation of patients outside of customary clinical settings (e.g. at home), which expands access to human services offices at bring down expenses. The core objective of this project is the design and implementation of a smart patient health tracking system that uses Sensors to track patient health and uses internet to inform their loved ones in case of any issues. The objective of developing monitoring systems is to reduce health care costs by reducing physician office visits, hospitalizations, and diagnostic testing procedure. Each of our bodies utilizes temperature and also pulse acknowledging to peruse understanding wellbeing. The sensors are linked to a microcontroller to track the status which is thus interfaced to a LCD screen and IOT platform . There is a significant capability between SMS based patient flourishing viewing and IOT based patient checking framework. In IOT based framework, subtle parts of the patient flourishing can be seen by different clients. The explanation behind this is the information should be checked by passing by a site or URL. In most of the rural areas, the medical facility would not be in a hand reach distance for the natives. So normally the people neglect any kind of minor health issues which is shown in early stages by variation of vital elements like body temperature, heartbeat rate etc. Once the health issue has been increased to a critical stage and the life of the person is endangered, then they take medical assistance, which can cause an unnecessary waste of their earnings. This also comes into account especially when certain epidemic is spread in an area where the reach of doctors is impossible. So to avoid the spread of disease, if a smart sensor is given to patients, who can be monitored from a distance would be a practical solution to save many lives.



# FOREST MONITORING SYSTEM

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**Abstract:** Newspaper articles about the global smuggling of trees like teak, sandal, and others are frequently read. These trees are more in demand, hence their price is higher. As a result of the huge profit that may be made from selling the wood of these trees, it is possible that they are being smuggled, which is against the law. Some actions must be made in order to restrict the smuggling of these trees. This system's primary goals are to minimize deforestation and limit smuggling in order to preserve precious trees and maintain a healthy eco-system.

**Keywords:** Tilt sensor, fire sensor, forest, trees microcontroller.

## I. INTRODUCTION

Newspaper articles about the smuggling of trees are common. These trees are very pricey and are frequently used in the fields of medicine and cosmetics. Due to the enormous amount of money involved in selling their timber, these trees are increasingly being smuggled. It is not just India that is struggling with this problem; other countries are as well. Even with the costs involved, these priceless trees should be protected. Even though the Indian government is working to stop this illegal smuggling, the same title is still displayed on some newspaper corners. As can be seen, the problem is that there is no system or method in place to detect illegal tree cutting. limiting their smuggling and preserving forest.

These trees are very pricey and are frequently used in the fields of medicine and cosmetics. The illegal trade due to the enormous sum of money involved in selling their timber, whose number is perpetually increasing. It is not just India that is struggling with this problem; other countries are as well. Even with the costs involved, these priceless trees should be protected. Even though the Indian government is working to stop this illegal smuggling, the same title is still displayed on some newspaper corners. As can be seen, the problem is that there is no system or method in place to detect illegal tree-cutting. limiting their smuggling and preserving forests. II. RASPBERRY PI The newest model of the well-known Raspberry Pi line of computers is the Raspberry Pi 4 Model B. In comparison to the Raspberry Pi 3 Model B+ of the previous generation, it offers revolutionary improvements in processor speed, multimedia performance, memory, and connectivity while maintaining backward compatibility and a similar level of power consumption. Raspberry Pi 4 Model B offers desktop performance for users that is on par with budget x86 PC systems.

The Raspberry Pi Zero, RPi1A, RPi3A, and RPi4 can be used as a USB device or "USB gadget" by connecting them to another computer using a USB port on that computer. It can be set up to operate in a variety of ways, such as as a serial or Ethernet device. This was incorporated into the primary Raspbian distribution in May 2016 despite initially requiring software patches. Models of the Raspberry Pi with more recent chipsets can boot from USB mass storage, like a flash drive. The original Raspberry Pi models, the Raspberry Pi Zero, the Raspberry Pi Pico, the Raspberry Pi 2 A models, and the Raspberry Pi 2 B models with versions lower than do not support booting from USB mass storage

## II. LITERATURE SURVEY

Pooja Baraddi, Ritika Jadhav, Nanda Hanchinal, Shushma. developed IoT based Anti- Poaching Alarm System for Valuable Trees. According to the proposed plan a system that can be applied to limit smuggling. Three sensors—a tilt sensor, a temperature sensor, and a sound sensor—are used in the design system. The Blynk App is used to continuously monitor the data produced by these sensors. Regarding the sensors, a relay switch is used to turn on their output devices. A buzzer is actuated for the tilt and sound sensors, and a water pump is turned on for the temperature sensor. Over the Wi-Fi module, generated data is stored in Blynk Server. Any incidence that occurs is reported to forest officials so that necessary action can be taken[1].

A constant economic hazard, forest fires often result in human casualties as well as significant economic loss. Early fire detection is one of many safety measures. The importance of detection cannot be stressed. Fire detection employs observation methods such as moving observers, putting fixed observers on land, and aerial observations. Satellite recording is one of the most effective methods. The technology of wireless sensor networks (WSNs) holds great promise for the early detection of fires. The use of WSN in preventing forest fires has a variety of distinct elements..





# AUTOMATIC WATER DISPENSER USING IR SENSOR

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**Abstract:** Water is one of the important natural resources. About 71% of the earth is covered with water, yet 2.3% of it is drinking water. With the rise in population, contaminants, and changes in the environment, it is normal that in the coming years, we will be facing a water deficit. Water dispensers are electronic appliances that are commonly used in offices, schools, colleges, and households. These days we want every machine of ours to be automatic. There is an upswing in the search for people to get their devices automatically. On the off chance that we supplant all manual taps with a brilliant one that opens and closes without anyone's help, we can save water. In this paper, a non-contact, convenient, and low-price automatic water dispenser system is presented using IR sensor, transistor, and water pump that will give water whenever a glass is placed before IR sensor.

**Keywords:** IR sensor, water pump, automatic, water dispenser, low-price

## I. INTRODUCTION

The development of technology in various fields of life is purposive to advance human work. The automatic water dispenser is one of the technical advancements that purpose as drinking water storage. Besides being able to store water, the primary purpose of an automatic water dispenser is to provide access to drinking water. As we all know of COVID-19, our hands are the root cause of this virus's spread because we touch various kinds of things. To maintain a healthy lifestyle, we need to maintain our hygiene. In our daily life, there are many numbers of water dispensers used in various places. Water scarcity is one of the main concerns of pestilence in the world. Nowadays dispensers are commonly used in schools, offices, colleges, and in many public places. Many times, in public places as well as in houses we turn on the tap and forget to turn off taps which leads to wastage of water. This wastage of drinking water can be controlled by using an automatic water dispenser using IR sensor. This automatic water dispenser provides easy access to clean, hygienic, and contact free drinking water when compared to conventional dispensers. It allows a small vessel like a glass to be automatically filled when it is brought close to the dispenser. The main goal of our paper is to control the wastage of drinking water by implementing automatic water dispensers that use IR sensors to detect the glass or tumbler in front of it and pumps water. Hence, we can replace hand-operated taps with these smart ones which 'ON' and 'OFF' automatically, and there is no need for us to operate them with our hands. And these hand operated taps get damaged after long periodic usage and again we need to fix it with a new tap, we can avoid this by using automatic water dispenser that pumps water only when it detects glass or tumbler in front it i.e., IR sensor and automatic water dispenser is non-contact and budget friendly is proposed in the paper.

## II. LITERATURE SURVEY

Yudi Kristyawan and Zahid Eaizal Kholil proposed a model of an Automatic water dispenser based on Hand Gesture detection method using Arduino, this model dispenses two types of waters, one is hot water and another one is cold water, as per the requirement of the user. According to user's hand gesture, it dispenses water when the glass or tumbler is within a 5 – 15 cm distance. [1]

Ms. M Saritha and Ms. U Abinaya proposed a model of automatic water tap controlling system that uses entirely IR sensors to control water taps. It replaces habitual taps with automatic ones and is easy to mount, and also is cost efficient. [2]

Abhishek Srivastava, Shubham Dwivedi, Saurabh Bhardwaj, and Mr. Hem Chandra Joshi proposed a Study of Automatic Water Dispenser that uses a microcontroller to automate the process of dispensing water which is used by human beings, and



# SMART CAR PARKING SYSTEM

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**Abstract:** The smart car parking system is an innovative solution designed to address the growing challenges of urban parking management. It utilizes advanced technologies and automation to optimize the utilization of parking spaces, enhance user convenience, and improve overall parking efficiency. The system leverages real-time data collection, analysis, and smart communication infrastructure to provide drivers with real-time information about parking availability, guiding them to the nearest vacant parking spot. Furthermore, the system incorporates intelligent sensors, computer vision, and machine learning algorithms to monitor parking spaces, detect occupancy, and ensure proper enforcement of parking regulations.

Through a user-friendly mobile application and integrated payment systems, drivers can easily locate, reserve, and pay for parking spaces, eliminating the hassle of searching for parking and enabling a seamless parking experience. Moreover, the smart car parking system offers administrative tools for parking operators, enabling them to monitor and manage parking operations efficiently, optimize revenue generation, and implement dynamic pricing strategies based on demand patterns. Overall, this system aims to alleviate congestion, reduce environmental impact, and enhance user satisfaction by transforming traditional parking into a smart and connected ecosystem.

**Keywords:** Smart car parking, Parking management, Urban parking, Intelligent sensors, Automation.

## I. INTRODUCTION

The increasing urbanization and growing number of vehicles have led to a significant rise in the demand for efficient car parking systems. Traditional parking management methods often result in congestion, wasted time, and frustration for drivers searching for available parking spaces. To address these challenges, a smart car parking system has emerged as an innovative solution that leverages advanced technologies and automation to optimize parking space utilization, enhance user convenience, and improve overall parking efficiency.

The smart car parking system utilizes a combination of real-time data collection, analysis, and smart communication infrastructure to provide drivers with up-to-date information about parking availability. By employing intelligent sensors, computer vision, and machine learning algorithms, the system can monitor parking spaces, detect occupancy, and ensure proper enforcement of parking regulations. This real-time monitoring enables drivers to quickly locate the nearest vacant parking spot, reducing the time spent searching for parking and alleviating congestion in urban areas. A key component of the smart car parking system is the user-friendly mobile application. Through this application, drivers can easily access information about available parking spaces, reserve parking spots in advance, and make convenient payments. The integration of payment systems simplifies the payment process and eliminates the need for physical cash or ticket-based transactions, enhancing the overall parking experience.

## II. LITERATURE SURVEY

More than half of the world population lives in the urban areas so the cities have reached its full occupancy. As a result number of vehicles in the cities is also increased. Due to this most of the people spend their valuable time on searching parking slots to park their vehicles. It is hectic job to find parking space to park their vehicles. Work proposed in this paper is an attempt to solve above mentioned problem. The system developed here is an integration of internet of things (IoT), cloud technology, android application and user authentication for ADAS system. Internet of things is the internetworking of physical device embedded with electronics that enables those physical devices to connect to internet. IoT was first introduced in 1999 at auto ID center and first used by Kevin Aston. In this system IoT technology is used to connect parking slots in parking area to the internet.



# SURVEY ON ANTI CORRUPTION TRAFFIC MANAGEMENT SYSTEM

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**Abstract:** Present day, technology has emerged in such a way that it can provide solutions to any real-life problems but in our daily life, traffic is the major issue, parking the vehicle in no parking place is the one of the major reasons for increasing traffic. We do not have a perfect system which finds the vehicle standing in no parking place. One such solution to the problem of towing vehicles is done efficiently by using embedded systems and IoT Technology. When a vehicle is parked at NO PARKING ZONE knowingly or unknowingly the owner is punished with a penalty and a notification will be sent to the consignment officer for registering a complaint against the vehicle.

Every day public and traffic police wasting their time just for verification of documents. Helmet is mandatory but people neglect to wear the helmet, so every time traffic police must monitor this operation. Here penalty part is done manually so there may be a chance of misuse which leads into corruption. The role of traffic police is very helpful for the society. They are meant to be controlling the heavy traffic flow but, they control the drink drive, they control without helmet ride to save the lives. They always try to bring traffic awareness to the people. But unfortunately, some of our traffic police became corrupted, they always try to find different ways to hold people accountable for money in the name of traffic rules. Many time Traffic police stop us to verify our documents, so we have to carry our documents. Which is not feasible and it is also waste of time and will disrupt the traffic flow. Hence, we need a system which can overcome all the major imperfections in the present traffic control system.

**Keywords:** RFID, GSM, LIMIT SENSOR, IR sensor, Embedded C

## I. INTRODUCTION

According to the World Health Organization (WHO), about 1.24 million people die and 20 to 50 million are injured in traffic crashes each year. Traffic is the eighth leading cause of death on a global scale, and is expected to reach the fifth position by 2030. The WHO defined major behavioural contributors to road crashes are alcohol or sleep deprivation combined with vehicle operations, inappropriate speed, and non-use of protective equipment like seatbelts, child restraints, and helmets. A survey that has been done recently, said that nearly 70% of road accidents occur due to drunken driving, with a range of 44% to 67% in small cities. They also conveyed that overall, 56 accidents and 14 to 15 deaths occur on our roads per day due to not wearing helmets and seat belts. Traffic police is an important department within the police force all over the world. The key responsibility of the traffic police is to maintain law and order within road networks. They need to manage and control traffic.

Effective enforcement of traffic safety policies is important for traffic fatalities reduction but is often diminished by police corruption. Corruption is defined as the misuse of authority for personal advances, most common acts of corruption in traffic police are bribery and extortion. These are usually overlapping actions, representing corrupt payments either given or taken, to influence officials' operations. To overcome such problems "Anti-corrupted traffic monitoring system" is useful. Our day-to-day life in a metropolitan city is always presented with an obstacle, not financial or climate, but the kind of obstacle that can be overcome with meticulous planning and execution. Commute, which includes travel, parking and safety are three things that should be made simpler and hassle free. In a bustling city like ours, the heavy fines that are charged for breaking rules are often never tracked, making the rules in place negligible. Unauthorized stops have always been misled to breaking of rules and unnecessary fines or delays. Finding a designated area to park your vehicle has always been a task in residential areas, parking in the no parking zones can always lead to getting the vehicle towed away or a standard fine being charged for that number plate. The vehicles that are towed away have an hour-long procedure of their own to get it released from the authorities, meanwhile the authorities are not liable for the damages caused to the vehicle whilst towing it. There is no system in place that can indicate no parking zones. If only there was a system to notify us when we park the vehicle in no parking zone it would prevent the inconveniences caused whilst paying the fine or the time wasted in order to retrieve the vehicle from higher authorities.



# BLUETOOTH ROBOT CONTROL USING SMART PHONE

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**Abstract:** In This project aim is to design a Robot Control by Bluetooth. The functioning is based on Arduino microcontroller, Bluetooth module, dc motors and motor drivers. Arduino uses ATmega328 microcontroller. Our plan is to code the entire functioning using programming. Then the code will be simulated on software and later it can be interfaced with the hardware. Android app controls movement of the robot.

We have chosen this for our mini project as robotics played a major role in our day-to-day activities. The gap between Robot and human beings are reducing with the introduction of new technologies. This paper will give the detailed explanation of motion technology through android smart phone with built in Bluetooth module to control the movement of a robot. Microcontroller controls the speed and direction of the Bluetooth module. The remote is android app. Bluetooth is used for the communication between microcontroller and android app. Bluetooth is an example for wireless communication.

**Keywords:** Arduino UNO, Bluetooth Module, DC Motors, Motor drivers.

## I. INTRODUCTION

In recent years, the field of robotics has experienced significant advancements, with various applications emerging in different sectors. One exciting aspect of robotics is the ability to control robots wirelessly, allowing for greater mobility and flexibility in their operations.

Bluetooth technology, commonly found in smartphones, offers a convenient and accessible means of controlling robots remotely. In this introduction, we will explore the concept of a Bluetooth-controlled robot using a smartphone and highlight its key components and functionalities.

## II. LITERATURE SURVEY

The author-Ronny Mardiyanto heri suryantmojo[1] “controlling of operated robots in the underwater by developing a hand gesture recognition sensor which works based on accelator and gyroscope”.

Dr. R. V Dharaskar S.A.Chabria Sandeep ganorkar[2] proposed the design of “human robot voice interface”. It plays a very important role in controlling a robot by the human voice in various situation and for different kinds of applications.

Jorge kazacos winter[3] has developed the design of robot automation controlled by android. The main aim of this design is to control the robot wirelessly. The information is transferred between the smart phone and the robotic device.

According to ‘Everton Rafael da Silva and Breno list Ramano[4]. In this paper, the robot is designed using arduino and controlled by software. The researches have analysed the simulation of experiment and believed to use this kind of prototype to perform the desired operation.

In this design[5], The robotic car controlled by infrared TV remote was implemented. The car can be controlled in all the four directions but the IR remote limits its distance and efficiency as it cannot be controlled the object blocking line-of-sight from the operator. So, it cannot be controlled from a far distance.

In this design[6], the authors have worked based on the IR remote controlled car which user IR remote system for controlling of robotic car.



# Home Automation For Disabled Using Voice Tag

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**Abstract:** Since the emergence of the Automation is a trending in the 21st century making it to play an important role in our daily lives. The main attraction of any automated system is reducing human labor, time and errors due to human negligence. With the development of modern technology, smart phones have become very important for all humans. Applications are being built on android systems that are useful to us in various ways. Another upcoming technology is natural language processing which enables us to use command and control devices with our voice.

Combining all of these, our paper presents a microcontroller based voice controlled home automation system using smart phones. Such a system will enable users to have control over every appliance in his/her home with their voice. All that the user needs is an android smartphone. When the first computers came around, achieving the level of sophistication so as to narrate commands using voice to a machine was only realised in science fiction and movies. However with tremendous evolution in this field, we are at great enthusiasm using voice to interface with devices.

**Keywords:** Bluetooth Hc05, Audino UNO, DC Motor, 12V 4Channel Relay Module.

## I. INTRODUCTION

The Automation plays a key role in human life. Home automation allows us to control household electrical appliances like light, door, fan, AC etc. It also provides home security and emergency system to be activated. Home automation not only refers to reduce human efforts but also energy efficiency and time saving.

The main objective of home automation and security is to help handicapped and old aged people who will enable them to control home appliances and alert them in critical situation. Smart Homes systems are somewhat different from ordinary homes, where the different smart devices in the presence of communications network being installed that allows the devices to communicate with each other. Integrated communication systems provide the facility for monitoring and managing the performance of the home, and offer the choice support to the occupants for available facilities.

The varieties of systems are installed in today's modern home such as central air conditioned and heating, fire and security alarms, and different other devices, such as home theater, televisions, lights etc. These systems and devices usually exist in total isolation from each other. Smart home provides the facility of passing information and commands among different installed devices and systems. Such facility and control not only provide better control locally and remotely but also supports special needs, particularly services that support the elderly.

Smart home technology also greatly improves the usability and functionality of any home. It also allows to potentially reducing power consumption by preventing occurrences such as lighting and air conditioning being left on longer than necessary. A smart Home Automation system allows saving money and the environment. Voice controlled wireless smart home system has been presented for elderly and disabled people. The concept of controlling home appliances using human voice is interesting. The proposed system has two main components, they are voice recognition system, and wireless system. This system is used to control home appliances with the help of voice controlled android application.

## II. LITERATURE SURVEY

- The title of the literature survey is Home System for Disabled and Elderly People, authored by A. Naeem, M. A. Khan, and M. Arshad, published in the Journal of Healthcare Engineering in 2021[3]. Advantages are Increased independence for disabled and elderly people. The final conclusion is High installation and maintenance costs



# FIRE FIGHTING ROBOT

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**Abstract:** Expanding human populace and innovative improvement has prompt increment in flame mishaps and dangers. Unavoidable conditions and physical constraints of person make fire extinguishing a testing and demanding assignment. Fire extinguishing is an exceptionally unsafe undertaking and it might likewise include death toll. Robotics is the rising answer to ensure the safety of the surroundings and human lives. Fire extinguishing robot is an equipment model which can be utilized for extinguishing the fire amid flame mischances. It can decrease the blunders and constraints confronted by the people during the extinguishing process.

**Keywords:** Fire-fighting Robot, camera, sensors.

## I. INTRODUCTION

Now-a-days, Robotics is used in each and every field of science and had gained much importance in day to day life. Recently, more and more research takes interest in the robot which can help people in our daily life, such as service robot, office robot, security robot, and so on. We believe that robot will play an important role in our daily life in the future, especially security robot, The main use of robots has so far been in the automation of mass production industries, where the same definable tasks must be performed repeatedly in exactly the same fashion. Also, domestic robots are now available that perform simple tasks such as vacuum cleaning and grass cutting.

Thus we can operate a robot over a very long distance and there is no need for human to go even near the area on fire.

## II. LITERATURE SURVEY

Ligang Chen [1]. Ligang Chen proposed a model using stm32f103zet6 MCU as the main control chip, which is suitable for low power consumption and powerful. This model is equipped with the portable fire extinguisher. The robot head is equipped with a camera which help is capturing image and collection of data. NRF24L01 wireless transmission module is used in the robot.

A. Hassanein et.al.,[2], proposed a model uses a PIC micro controller and Arduino Mega micro controller with an additional Bluetooth module. A digital compass GY-26 was used to guide the robot with the degree of rotation from their original position. The Bluetooth module used is Kootek BT2s which is interfaced with MATLAB. The major issue with this model is that there was no accurate movement of the robot.

M.A. Hossain et.al., [3] proposed a model which includes a camera for collecting the data and sensors. These sensors and camera collects the data and sends the information to the NodeMCU which inturn sends the information to the server. The situation is analysed according to the program and sends the information to the controller.

M. Kanwar and L. Agilandeewari, [4] proposed a model where the robot sends a fire alert to the cloud. This sends the location of the fire so that with the help of application the person will receive a exit route out of the building. Additionally the sensors gives the level of carbon dioxide so that the authorized person can select water or co2 for extinguishing the fire manually.

L. Mingsong and L. Tugan, [5]. This model is equipped with a 360 degree rotatable camera for video streaming, and IR sensors for detecting the obstacles during movement. This model can be controlled either manual or automatic.

Ambadkar,et.al.,[6], In this proposed model Arduino is the main controlling unit of robot .it is connected with fire sensing unit fire sensing unit consist of temperature sensor and gas sensor .the robot consists of wireless camera which is controlled by user which transfer the front view of robot to the receiving unit .receiving unit consists of XBEE Arduino computer and camera receiving unit .by operating GUI and looking at front view of camera operator can take the decision and operates robot as per the decision in addition to this ,robot also consists of motor driving unit which is controlled by Arduino ,sprinkler pump which sprinkle water to extinguish fire and relay and relay driver circuit.



# Fire Fighting Robot

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**Abstract:** Expanding human populace and innovative improvement has prompt increment in flame mishaps and dangers. Unavoidable conditions and physical constraints of person make fire extinguishing a testing and demanding assignment. Fire extinguishing is an exceptionally unsafe undertaking and it might likewise include death toll. Robotics is the rising answer to ensure the safety of the surroundings and human lives. Fire extinguishing robot is an equipment model which can be utilized for extinguishing the fire amid flame mishaps. It can decrease the blunders and constraints confronted by the people during the extinguishing process. Our outlined robot can seek the zone, find the fire and extinguish it before it turns out to be out of control. It can explore the building while effectively checking for fire. It can be operated remotely by any individual from anyplace on the planet using mobile phone or a laptop. The robot which we have proposed in this paper has discovered its application in flame dousing operations amid flame mishaps where the likelihood of the servicemen to enter the fire inclined region is less.

**Keywords:** Fire Fighting Robot, sensors, pump, robotics, fire extinguishing, Raspberry Pi, camera.

## I. INTRODUCTION

Now-a-days, Robotics is used in each and every field of science and had gained much importance in day to day life. Recently, more and more research takes interest in the robot which can help people in our daily life, such as service robot, office robot, security robot, and so on. We believe that robot will play an important role in our daily life in the future, especially security robot. The main use of robots has so far been in the automation of mass production industries, where the same definable tasks must be performed repeatedly in exactly the same fashion. Also, domestic robots are now available that perform simple tasks such as vacuum cleaning and grass cutting.

The FIRE FIGHTING robot made under this project can move in both forward and reverse direction and can turned in left and right directions. Thus we can operate a robot over a very long distance and there is no need for human to go even near the area on fire. We have used the light dependent resistors for detection of fire. It is the highly sensitive device and is capable for detecting very small fires too. The robot accommodates a water tank and sprinkler on itself to extinguish fire. The main aim of the project will be to design a RF controlled, Fire Fighting

Robot toolkit which can replace the traditional Fire This project uses BCM2836/2837 as its controller. This Robot is also used as a fire extinguisher i.e. it sprinkles the water on to the fire in case of fire accidents. At the same time even if any fire accident occurs the damage can be avoided by sprinkling water. If the fire is detected then the motor gets switched on which in turn switches on the water sprinkler (pump).

The RF modules used here are Transmitter, Receiver, RF Encoder and RF Decoder. The switches are interfaced to the RF transmitter through RF Encoder. The encoder continuously reads the status of the switches, passes the data to the RF transmitter and the transmitter transmits the data. This project uses 12V battery. This project is much useful for mines detection and surveillance applications.

## II. LITERATURE SURVEY

Ligang Chen [1]. Ligang Chen proposed a model using stm32f103zet6 MCU as the main control chip, which is suitable for low power consumption and powerful. This model is equipped with the portable fire extinguisher. The robot head is equipped with a camera which help is capturing image and collection of data. NRF24L01 wireless transmission module is used in the robot.

A. Hassanein et.al.,[2], proposed a model uses a PIC micro controller and Arduino Mega micro controller with an additional Bluetooth module. A digital compass GY-26 was used to guide the robot with the degree of rotation from their original position. The Bluetooth module used is Kootek BT2s which is interfaced with MATLAB. The major issue with this model is that there was no accurate movement of the robot.



# DISTANCE BASED COLLISION AVOIDANCE WITH AUTOMATIC ACCELERATION & STOPPING IN AUTOMOBILES

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**Abstract:** This project builds the break and acceleration automatically in a vehicle which can be sensed by IR sensors, which are installed in a vehicle, this initially requires a voice command move forward and backward which acts as driver of the vehicle, when the obstacle is detected while moving forward the vehicle automatically applies break, like wise the obstacle is detected the vehicle automatically accelerates. Automatic breaking and acceleration system that based on time controlled Arduino operates based on the coding. Coding is written and designed to accelerates and apply the break, it stops and move as per the circuit.

**Keywords:** IR sensors, Arduino uno, Accelerates, Breaking

## I. INTRODUCTION

Sensors used with electronic devices have been used in many areas to facilitate life. Sensors are devices that convert energy forms into electrical energy. The sensors serve as a bridge connecting the environment and various electronic devices. IR sensor, which stands for Infrared sensor. IR sensors are typically utilized for short-range detection, complementing other sensor technologies such as radar and cameras. They operate by emitting infrared light and measuring the reflection or the absence of reflection from nearby objects. The sensor emits infrared light pulses and analyses the reflected signals to determine the presence and distance of objects in the vehicle's path. the system can analyse the reflected signals and calculate the time it takes for the light to travel to the object and back. Once an obstacle is detected within the predefined distance range, the system can provide various warnings or interventions to prevent a collision. This refers to automatic breaking and acceleration when the obstacle is detected.

## II. LITERATURE SURVEY

Once an obstacle is detected within the predefined distance range, the system can provide various warnings or interventions to prevent a collision. This may include visual or audible alerts to the driver, activation of braking systems, or steering assistance to avoid the obstacle. This survey explores the existing literature, highlighting the key concepts, methodologies, and technological advancements in this field. The survey also identifies the challenges, limitations, and potential future directions for research and development in distance-based collision avoidance system.

The first paper we referred was "A DEEP REVIEW AND ANALYSIS OF DATA EXCHANGE IN VEHICLE TO VEHICLE COMMUNICATIONS SYSTEMS" the author is Hussein Ali, he defined that

- comprehensive review and analysis of data exchange in vehicle-to-vehicle (V2V) communication systems.
- It establishes a coherent taxonomy, highlights challenges, motivations, and recommendations, while offering substantial analysis.
- The paper also outlines future directions for V2V communication

The second paper we referred is "ARDUINO BASED FORWARD COLLISION DETECTION WARNING SYSTEM" is the author the Orji. E.Z , he defined that

- The system detects potential collisions in real-time and alerts the driver through warnings.





# PETROL BUNK AUTOMATION AND SECURITY USING RFID

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**Abstract:** Recently, fuel stations have been manually controlled. These fuel stations take more time to operate and require more manpower. The number of vehicles on the road is rapidly increasing. In today's advanced and automated world, fuel consumption is also increasing as vehicles become more reliant on it. When there is a rush at the fuel station, customers must wait in line. Our country's fuel stations are more time-consuming. In this paper, we developed an automated fuel station management system to address the shortcomings of the current system. This methodology's output prioritizes authenticated systems and cashless transactions. It will have a positive impact on our nation's financial situation. Additionally, it will aid in reducing fuel station corruption and could make fueling quicker and less time-consuming.

**Keywords:** Arduino Microcontroller, RFID Card, RFID Reader

## I. INTRODUCTION

The automation of petrol bunks using RFID technology is a modern solution that aims to improve the efficiency and safety of petrol dispensing systems. RFID stands for Radio Frequency Identification, and it involves the use of wireless communication technology to transfer data between an RFID tag and an RFID reader. This technology is widely used in various industries, including supply chain management, retail, and transportation. In the context of petrol bunks, RFID technology is used to automate the process of fuel dispensing. By attaching an RFID tag to a vehicle, the petrol bunk can identify the vehicle and authorize it to access the fuel dispenser. This eliminates the need for manual intervention, reduces the risk of errors, and ensures that only authorized vehicles can access the fuel dispenser. The automation of petrol bunks using RFID technology also improves safety. By providing real-time information about fuel levels, the risk of overfilling or underfilling a vehicle's tank is significantly reduced. Additionally, the use of RFID technology can help to detect and prevent fuel theft, which is a common problem in many petrol bunks.

Overall, the automation of petrol bunks using RFID technology is a modern solution that improves efficiency and safety while reducing the risk of errors or hazards. By integrating this technology into petrol dispensing systems, petrol bunks can provide a better experience for customers and ensure the safety of their operations.

## II. LITERATURE SURVEY

In this paper, they are using 2 units that are placed in the petrol stations that will take care of the end user needs and continuously monitors the fuel level, fuel temperature, or any other accidents occurring at the petrol station. Another system that takes care of the databases like customer's id, passwords, and account balance. The link between the customer and the petrol industry is taken care of by the GSM module. The software part basically takes care of the security and manages the data. There is a provision fingerprint scanner that provides security. The scanned finger impression is compared with that of the data stored in the PC if there is a match the authentication process is successful. Once the authentication phase is successful the customer has to enter the amount as per the requirement of the fuel to be injected into the vehicle <sup>[1]</sup>.



# OTP BASED SMART WIRELESS LOCKING SYSTEM USING ARDUINO

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**Abstract:** The OTP-Based Smart Wireless Locking System using Arduino is an innovative solution designed to enhance the security and convenience of traditional locking mechanisms. This system leverages the capabilities of Arduino microcontroller and wireless communication technologies to create a secure and user-friendly lock system that operates based on One-Time Password (OTP) authentication. To unlock the system, users need to generate an OTP using a designated mobile application. The OTP is securely transmitted to the central control unit via a wireless communication protocol such as Bluetooth. Upon verification of the OTP's validity, the central control unit sends the corresponding command to the designated wireless lock module, instructing it to unlock. The system incorporates several advanced features to enhance security and functionality. Firstly, the OTP ensures a higher level of security by utilizing unique passwords for every authentication attempt, minimizing the risk of unauthorized access. The OTP-Based Smart Wireless Locking System using Arduino offers a reliable, secure, and user-friendly solution for modern access control needs.

## I. INTRODUCTION

In today's technologically advanced world, security plays a crucial role in safeguarding our belongings. Traditional mechanical locks are no longer sufficient to meet the increasing demands for enhanced security and convenience. As a result, innovative solutions like the OTP (One-Time Password) based smart wireless locking system have emerged. The OTP based smart wireless locking system utilizes the power of Arduino, a popular open-source electronics platform, to create a secure and efficient locking mechanism.

This system eliminates the need for physical keys and instead relies on a unique one-time password generated for each access attempt. By leveraging wireless communication technologies such as Bluetooth or Wi-Fi, the smart locking system enables users to control and monitor their locks remotely. It is connected to a reliable and secure OTP generation algorithm that generates a unique password for each access attempt, ensuring maximum security against unauthorized access. To operate the system, users simply need to enter the generated OTP through a smartphone application or a dedicated control panel. The Arduino verifies the OTP and triggers the locking or unlocking mechanism accordingly. Furthermore, the smart wireless locking system offers additional features such as real-time notifications, access logs, and the ability to grant temporary or time-limited access to authorized individuals.

## II. LITERATURE SURVEY

➤ Pradnya R. Nehete, J. P. Chaudhari, S. R. Pachpande [1] have proposed door lock systems based on Biometrics Techniques and Password Based Systems are studied and their problems and as per their knowledge, not a single system is suitable for all types of applications. Day by day technologies are developing and techniques of robbery are also developing. So, need is to develop a new smart and unbreakable technique in further studies.

➤ Mr. Patil Bhushan, Mr. Mahajan Vishal, Mr. Pawar Mayur [2], have concluded that Smart-Lock-System will open the door leading to a wide range of innovations in the world of lock systems wherever they may be. With its ease of installation and use, minimum complexity, wide applicability options, and strong feasibility guarantees a huge aspiring step forward into a better future lock system. All of the above can't be considered authentic or even possible without considerably taking into account one of the most vital aspects to the innovation: security.

➤ S. Umbarkar, G. Rajput, S. Halder, P. Harnane and S. Mendgudle [3], have understood that for all the three modules i.e., the keypad, Bluetooth and gsm module they successfully operate the servo motor to open and close the door lock. If know person enters wrong password wrong for three consecutive times then the digital door lock system generates alert messages to the gsm mobile number and also start the buzzer alarm for security alert.



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## SURVEY ON ROBOTIC NURSE

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### ABSTRACT

Technological advancements had led to the use of robots in many fields. So, in our model we are using robots in health care segment. We are proposing the model that helps nursing community to reduce their work load. This model helps to monitor the patients help time to time and make sure that patient is taking the medicine in correct dosage and helps for better recovery. The technology used in this model is embedded systems and robotics. The microcontroller used in this model is raspberry pi and we are using the Spo2 sensor, temperature sensor and pulse rate sensor to measure the health parameters. The robot is operated in the defined path or it can be operated manually also, robotic nurse is feed with the data according to patients prescription and the face of the patient is also stored in the data base by recognizing the face of patient the medicines are dispensed. The model is made to reduce the work load of nurse and it also be used in households for the elderly people. This paper deals with the problem related to health care departments like hospitals, nursing homes, isolation wards. Where the nurse is over loaded with work. So, to make their work easier we are coming up with this model the robotic nurse which monitors the health of the patients collects the health parameters of patient like oxygen rate, pulse rate, temperature.

**Keywords:** Raspberry PI, Temperature Sensor, Oxygen Sensor, Pulse Rate Sensor.

### I. INTRODUCTION

The world is full of automatic systems now a days, and they can be found in almost every where. A good system provides not only the convenience but also the curiosity and interest about the technology. The robots make our life easier, they are efficient as they are designed to do the work in certain way and they are trained for it. They are reprogrammable, multifunctional, specialized devices they are programmed to perform the various tasks.

As we know health care plays a major role in the global environment, so advancement in technology have led to development of robot which can be used for nursing practices as a efficient partner to tackle the understaffing problem in the health sector. The work efficiently with elderly people, person with disabilities, children with health issues. By the use of technology we can build a robot that can assist in surgery, and other aspects of health care. The potential use of this kinds of robots improves the health care segment, the robots maintain to the disciplines that could be improvement in accuracy, speed in detection of illness, reduces the stress of nurse. This model helps nurse to maintain the patients health updated and keep track of it.

### II. LITERATURE SURVEY

[1] Ridwan, F., S. Syamsuddin, A. Fathan, A. A. Ananta, G. A. Bintang, A. Jordan, Eka M. Ningsih, and M. Fadel. "Andalus medical robot assistance (AMIRA) serves Covid-19 isolation patients." As we saw last year there was covid breakout in china at the of the year 2019, then it has spread across the globe at the year 2020. In hospitals the covid was affected to doctors and nurse, with this scare the team from a university have developed a robot called AMIRA it is also called as the AGV (Automated Guided Vehicle) which is called as the robot assistant is used for detecting patients to reduce the contact between the medical team and the patients. To check the patients temperature they have installed the temperature sensor in that robot has to check the patients temperature in which the sensor is kept at the patient's forehead at a distance of 10-20cm. For materials and methods the AGV vehicle has played a major role in distributing the vehicles at the desired location. In that AGV vehicle the sensors, controller and actuators have been build in the AMIRA AGV robot. The AGV AMIRA can operated manually with the help of joystick which is at the nurse location. For navigation a wifi has been installed using Raspberry pi 4 which detects the location and sends the message to Arduino Uno. IR sensors was installed at robot to track a person or object which is at 60cm. An anti collision system has been installed with the help of IR and vibration sensors in which the IR sensors is located around the robot and vibration sensor at the bottom part. Hands free disinfectant also has been installed in robot for cleaning up the microorganisms which is placed at the objects and surfaces in which this device is located at upper part of left



# Literature Survey of Robot with Different Applications

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**Abstract:** In this research paper, a system is proposed that focuses on the concept of how to control a robot with a human voice. Voice-controlled robots are just a practical example of controlling simple robot movements by giving routinely-used voice commands. The system uses his Android app as his medium for sending human commands to the microcontroller. The controller can connect to the Bluetooth module using the UART protocol. Audio is received by Android app and processed by the speech engine

**Keywords:** Robot, DC Motor, Robotic Arm, Stepper Motor, Gripper, Camera, ARDUINO UNO, ARDUINO IDE

## I. INTRODUCTION

As we all know in today's world, one of the most powerful and rapidly developing devices is a smartphone, and all credit goes to powerful processor chips and their mode of communication. Here in our research also we used one such method for communication i.e., Bluetooth. This technology was created by Ericsson telecom vendor in 1994. Bluetooth provides connectivity between devices for file transferring. It's so powerful that it can connect almost seven other devices at the same time and can transfer data simultaneously. It is best suited for the home environment as its working area has a range of about 8-10m. This is the reason why smartphones are becoming so powerful in recent years as it turned smartphones into an all-purpose portable device.

Using an android phone as a center for communication between robots and humans is already a very active field of research with several opportunities. Till now, speech recognition proved to be one of the ideal methods for controlling a robot. The system we designed is also based on the same technology as it is the easiest and very efficient way of giving commands. It's simply a technology where the system has to understand words, not its meaning, thus reducing the computational time. In our system, speech recognition is separately handled by the android smartphone i.e., it functions independently from the robot's main intelligence. Speech recognition also allows the user to perform multitasking by letting him/her concentrate on other stuff and giving the command to the machine simultaneously. Furthermore, it's even more robust as anyone can control the robot with their command providing you, even more, convenience to household people. Just giving directions for controlling a robot just by talking to it makes it simpler to operate while improving the efficiency and efficiency of working with that device. Robotics is one of the fastest-growing technology in the science field. The main reason behind this is robots act as cheap labor that gives high accuracy of output. Robots also proved to surpass the human limits; thus, those tasks which seem impossible for the humans are now within their reach. There is no limit to the applications where robots can work.

## II. LITERATURE SURVEY

[1] To control a robot we are using our voice we a very simple approach 1st all the human commands gets converted into text and for this we use Google's speech to text converter, it's all implemented in the android app that we are using next the text form of command is being transmitted to the Bluetooth module of the robotic arm.

## Robotic Nurse

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**Abstract** — The technology advancements has led to rise in robots in many fields such as we used in healthcare applications. The microcontroller used in this is Arduino in which input pins are the APR33A3 module, SPO2 sensor, pulse rate sensor, temperature sensor, emergency switch for emergency condition, the motor drivers is given for the movement of the robot and dispensing of the medicine. The robot attends every patient in which the instructions is sent from the mobile app through wifi module to Arduino, it stores the health parameters of patient and send it to the doctor through sms. It also helps the patient in taking the medicine in time to time. The model of robotic nurse is to reduce the workload of nurses and doctors and not making them not to get infected, this robotic nurse helps in health care departments like hospitals, emergency wards, isolation wards.

**Keywords:** Oxygen Sensor, Pulse rate Sensor, Arduino, SPO2 Sensor

### I. INTRODUCTION

In today's world we are using robot for other purposes which helps them in finishing their work but to take care of their health and the environmental conditions we go to hospitals for checkup but the doctors and will be not be able to attend each and every patient and some of the patients will be affected with diseases which affects the nurses and doctors as well and there would be lot of stress and too much of work load to reduce all of these the robotic nurse came into being which helps delivering the patients time to time the medicine.

In the past years we have seen a dangerous disease which is called as the covid19 in which many people died this robotic nurse has helped them especially in hospitals, nursing homes and isolation ward as the nurses and doctors are getting affected to get rid them robotic nurse has come up the Arduino which is used in this as the 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.

It also helps the doctors and give the health updates and also helps the nurses by not getting infected and reduces their stress and pressure. These robots helps in detecting the patients it detects and it controls through voice command which is called as the APR33A3 module and the controller is Arduino. This controller is used to make gaming devices, fitness gadgets, weather stations, and much more. Among these models, the Arduino boards are able to read This electronic platform contains microcontrollers, connections, LEDs and many more. There are various types of Arduino boards present in the market that includes Arduino UNO, Red Board, LilyPad Arduino, Arduino Mega, Arduino Leonardo.

This robotic nurse will also help in emergency situations especially in covid 19 pandemic these robots has

been used for their needs and it also helped the doctors to get their daily of each and every patient health report and it also helped them to not to get affected for them not getting attracted to diseases and it reduced the stress work of nurses and doctors.

[1] Abdelbaset Elghriani, Younis A. Younis, Abdelsalam M. Maatuk, "Assessment of Healthcare Workers' Level of Knowledge and Practices of Using Robotics During Covid-19", 2022 IEEE 2nd International Maghreb Meeting of the Conference on Sciences and Techniques of Automatic Control and Computer Engineering (MI-STA), pp.199-203, 2022.

Nursing robots are getting into the people life gradually because of the huge assistance they can provide both to patients and nurses. Human nurses can have peace of mind. Their jobs are secure but a little help has come to the rescue to do most of the boring nursing tasks for them. Robot nurse helps nurses in hospitals. Larger robotic machines can be used to carry-out laborious physical tasks like moving patients, and smaller interactive robots are being used to combat loneliness and inactivity in the elderly population. An increasing elderly population paired with an insufficient amount of healthcare workers able to care for it makes revolutionary inventions like nurse robots incredibly helpful.

[2] John A. Stankovic, Meiyi Ma, Sarah Masud Preum, Homa Alemzadeh, "Challenges and Directions for Ambient Intelligence: A Cyber Physical Systems Perspective", 2021 IEEE Third International Conference on Cognitive Machine Intelligence (CogMI), pp.232-241, 2021.

In this paper, it is that present Hstar Technologies' 2 nd generation Robotic Nursing Assistant (RoNA) systemRoNA. Compared to the 1 st generation RoNA system released in 2011, the RoNA has more powerful arms which can lift up to 500 pounds patient. The RoNA has been equipped with many intelligent sensors that allow nurse easily and intuitively guide it performing the patient lifting. The paper also discusses the design improvement, control system as well as the software architecture of the RoNA system.

Nursing has ranked as one of the top 10 occupations for causing the work-related musculoskeletal injuries in U.S. Constantly and manually lifting and repositioning patients around bed and transferring them from bed to bed have been recognized as the major reasons causing nurses' workrelated musculoskeletal injuries. We believe that advanced robotic technologies can assist nurses in performing the labor intensive tasks and preventing the musculoskeletal injuries among medical workers and nurses.

[3] Hsieh-Yu Li, Lay Siong Ho, Achala Athukorala, Wan Yun Lu, Audelia Dharmawan, Jane Li Feng Guo, Mabel May Leng Tan, Kok Cheong Wong, Nuri Syahida Ng, Maxim Mei Xin Tan, Hong Choon Oh, Daniel Tiang, Wei Wei Hong, Franklin Tan, Gek Kheng Png, Ivan Khoo, Chau Yuen, Pon Poh Hsu, Chen Ee Lee, U-Xuan Tan, "Towards a Manipulator System for Disposal of Waste from Patients Undergoing



# VOICE CONTROLLED PERSONAL ASSISTANT ROBOT

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**Abstract:** In this paper, a system is proposed that focuses on the concept of how to control a robot with a human voice. Voice-controlled robots are just a practical example of controlling simple robot movements by giving routinely-used voice commands. The system uses his Android app as his medium for sending human commands to the microcontroller. The controller can connect to the Bluetooth module using the UART protocol. Audio is received by Android app and processed by the speech engine. The speech is converted to text. The microcontroller further processes this text and takes appropriate measures to control the robotic movement.

**Keywords:** Robot, DC Motor, Robotic Arm, Stepper Motor, Gripper, Camera, ARDUINO UNO, ARDUINO IDE,

## I. INTRODUCTION

As we all know in today's world, one of the most powerful and rapidly developing devices is a smartphone, and all credit goes to powerful processor chips and their mode of communication. Here in our research also we used one such method for communication i.e., Bluetooth. This technology was created by Ericsson telecom vendor in 1994. Bluetooth provides connectivity between devices for file transferring. It's so powerful that it can connect almost seven other devices at the same time and can transfer data simultaneously. It is best suited for the home environment .

This is the reason why smartphones are becoming so powerful in recent years as it turned smartphones into an all-purpose portable device. Using an android phone as a center for communication between robots and humans is already a very active field of research with several opportunities.

Till now, speech recognition proved to be one of the ideal methods for controlling a robot. The system we designed is also based on the same technology as it is the easiest and very efficient way of giving commands. It's simply a technology where the system has to understand words, not it's meaning, thus reducing the computational time. In our system, speech recognition is separately handled by the android smartphone i.e., it functions independently from the robot's main intelligence.

Speech recognition also allows the user to perform multitasking by letting him/her concentrate on other stuff and giving the command to the machine simultaneously. Furthermore, it's even more robust as anyone can control the robot with their command providing you, even more, convenience to household people. Just giving directions for controlling a robot just by talking to it makes it simpler to operate while improving the efficiency and efficiency of working with that device. There is no limit to the applications where robots can work. Hence, the need to accurately and efficiently controlling the robots is also increasing.

There exist hundreds of methods for controlling robots. This research paper aims to focus on one method out of those hundred i.e., audio channels based closed-loop systems, which is again one of the best and most efficient methods to control the robot as it uses speaking to communicate with the devices.

This system is not similar to any other system in which robots are fed with lots of words that in the future, they can recognize words with themselves. In this paper, built a system which let a simple voice controlled personal assistant robot to move in all four possible directions i.e.; the robot can do the following tasks. It can move forward, backward, turn left and right and can stop at any time.



# DENSITY BASED ON TRAFFIC SIGNAL CONTROL AND MANAGEMENT

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**Abstract:** Traffic congestion has become a critical issue in urban areas, leading to increased travel times, fuel consumption, and environmental pollution. Effective traffic signal control and management systems play a vital role in mitigating congestion and improving traffic flow. Traditional traffic signal control approaches rely on fixed timing plans, which may not adapt well to dynamic traffic conditions and varying demand patterns. In recent years, density-based traffic signal control methods have gained prominence as a promising solution to address these challenges.

This abstract presents an overview of density-based traffic signal control and management systems. The fundamental principle behind these systems is to dynamically adjust signal timings based on real-time traffic conditions and the density of vehicles at intersections. By utilizing advanced sensor technologies, such as loop detectors, cameras, and vehicle-to-infrastructure communication, these systems gather comprehensive data on traffic flow and queue lengths.

**Keywords:** Arduino UNO, IR Sensors, LED'S, Connecting wires

## I. INTRODUCTION

Density-based traffic signal control and management is an innovative approach to optimizing traffic flow at intersections. Traditional traffic signal control systems operate on fixed time intervals or pre-programmed signal plans, which may not adapt well to changing traffic patterns and congestion levels.

Density-based control, on the other hand, takes into account real-time traffic conditions to dynamically adjust signal timings and prioritize traffic movements based on the density of vehicles at the intersection.

## II. LITERATURE SURVEY

Uthara E. Prakash[1] "Density based traffic control system using Density image processing" a webcam used in each stage of the traffic light in order to take pictures of the roads where traffic is bound to occur.

Adwait sharma [2] "Density based traffic signalling system using Adwait image processing" Use of binary images captured at real-time and references images will be stored in the system.

Pallavi H.B, Aishwarya Shrikanth [3] Density based automatic traffic junction synchronization

The traffic congestion has become a predominant problem due to the rapid increase in the demand of vehicles.

Er. Faruk Bin Poyen [4] Density based traffic control Designed a density based dynamic traffic signal where the timing of signal will automatically on sensing traffic density Signals may increase delay both overall interaction with delay



# Arduino Based Fire-Fighting Robot

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**Abstract:** In recent years, there has been an increasing focus on the development of autonomous systems to assist in emergency situations, particularly in firefighting scenarios. This abstract presents an overview of an Arduino-based fire fighting robot, designed to detect and extinguish fires while ensuring the safety of human personnel. The Arduino-based fire fighting robot combines the power of the Arduino microcontroller platform with advanced sensors and actuators to provide an efficient and reliable solution for fire suppression. The robot's primary objective is to detect and locate fires in an indoor environment using a combination of flame and smoke sensors. Once a fire is detected, the robot autonomously navigates through the environment using sensors and sprays water over it.

**Keywords:** Arduino UNO, Sensors, Fire detection, Water pump, Motor driver

## I. INTRODUCTION

In recent years, the development of autonomous robotic systems has revolutionized various industries, including emergency response and firefighting. The need for efficient and effective fire suppression techniques has led to the exploration of innovative solutions, such as the integration of Arduino microcontrollers with advanced sensors and actuators to create Arduino-based fire fighting robots. These robots offer promising capabilities in detecting and extinguishing fires while minimizing human exposure to hazardous environments. The Arduino-based fire fighting robot represents a significant advancement in the field of firefighting automation. It combines the power of Arduino, an open-source electronics platform, with specialized sensors and actuators to create a versatile and adaptable firefighting solution. The integration of Arduino allows for flexibility in design, programming, and customization, making it an ideal choice for developing sophisticated robotic systems. The primary objective of an Arduino-based fire fighting robot is to autonomously detect, locate, and suppress fires in various environments, including indoor spaces. This is achieved through the integration of sensors, such as flame and smoke detectors, which enable the robot to identify fire incidents accurately. The development of an Arduino-based fire fighting robot involves a multidisciplinary approach, combining aspects of mechanical design, electronics, sensor integration, and software programming. Researchers and developers can leverage the open-source nature of Arduino to collaborate, share knowledge, and build upon existing designs. This encourages innovation and continuous improvement in the field of firefighting robotics.

## II. LITERATURE SURVEY

Tawfiqur Rakib, M. A. Rashid Sarkar proposed a fire fighting robot model which consists of a base platform made up of 'Keosene wood', LM35 sensor for temperature detection, flame sensors to detect the fire and a water container of 1 litre capacity which is made up of a strong cardboard that makes it water resistant. The robot has two wheels for its movement [1].

S. Jakthi Priyanka.R. Sangeetha proposed an android controlled fire fighting robot which uses Arduino UNO R3. The robot consists of gas sensor for fire detection, gear motor and motor drive for the movement of robot, a bluetooth module to connect the robot with the android device and to control the robot with the smartphone as well [2].

Nagesh MS, Deepika T V, Stafford Michahial, Dr M Sivakumar proposed a fire extinguishing robot which employs DTMF (Dual Tone Multi Frequency Tones) technology for the navigation of the robot and uses a flame sensor for fire detection that is capable of sensing flame of the wavelength range 760 to 1100nm and sensitivity varies from 10cm to 1.5feet [3].

Shang Gao, Zhiyang Zhang, Zihan Zhao, Mohsin M. Jamali "Vision and Infra-Red Sensor Based Fire Fighting Robot". The authors describe the design and architecture of their fire-fighting robot. The robot is equipped with vision sensors, which enable it to detect fires based on visual cues such as flame color and intensity. Additionally, it incorporates infrared sensors to detect heat sources associated with fires. The integration of these two sensor modalities enhances the accuracy and reliability of fire detection.[4]





# Passport verification using RFID and IoT

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**Abstract:** The technique of passport verification which is currently used in the airports involves manual checking and it is time consuming. Another major issue with the conventional paper passport is that, it can be forged or duplicated easily. The proposed system consists of two level of authentication. In the first level of authentication, the RFID (Radio Frequency Identification) module is used which involves both RFID tag and RFID reader. The second level of authentication is the face recognition. In this the passport holder's face is captured and is verified. The two levels of authentication increase the level of security and safety. This system is proposed in order to decrease the duplicating of the passports which leads to various illegal activities. Also, the verification duration is reduced with the use of e-passport. The face recognition is implemented which increase the efficiency of the e-passport. The technologies such as RFID, IoT and face recognition can be used effectively to replace paper passports by portable e-passports.

**Keywords:** Authentication, e-passport, face recognition, IoT, RFID.

## I. INTRODUCTION

RFID is a technique which makes use of the principle of electromagnetic fields for transferring the data from an electronic tag usually known as the RFID tag. The RFID technology is used in various applications such as monitoring the attendance in schools, industries etc, in shopping malls for pricing purpose and in metro. In order to save the time involved in manual technique of verifying RFID cards are used which are contactless based on the type of readers. RFID module comprises of two units that is the tag and the reader. The card is provided to the passport holder which is swiped against the reader and the contents of the card is verified. The e-Passport provides the legitimate possessor with significant advantages by offering a more advanced method of verifying identity. It authenticates the passport, if it is valid and belongs to the individual named on it, without putting privacy at risk. The integrity of passports is improved by the need to match the information on the chip to the information stored in the database and to the physical characteristics of the holders like the face. It makes it possible for verification which is assisted by the machine and biographic information to confirm the identity of travellers. Paper passports have the disadvantage of having no privacy and being physically accessible by everyone. The current study assists the passport examiner in automatically check the passenger's passport using electronic passport validation system. When the RFID tag is used, when a passport bearer approaches an RFID scanner, data is read from and displayed on the LCD(Liquid Crystal Display). If the information matches then it shows a valid message based on the data in the programme memory. Otherwise, an invalid message will be displayed. Suppose, the face does not match, the LCD will show an error and a message will be sent to authorities through GSM(Globally System for Mobile communication ).

## II. LITERATURE REVIEW

Vignesh et al [1] In this paper explains about the cutting-edge framework. The predominate risks in this framework is extra documentation and less security. The proposed system makes use of an eager card which has the name, date of birth, ethnicity and UID range for identify confirmation. The passenger's locations the cardboard into the cardboard peristerite UID is perused and later on checked. The advantages of the proposed framework is less documentation work, visa obstacle data is predicted appropriately, no compelling motive to deliver each one of the files .The proposed system eliminates the drawback of documentation overall performance of e- passport is increased.

Ayesha Sarwar et al [2] In the proposed study, biometric verification of passports is done using RFID. The study aims at increasing the security and privacy of a passport holder. It stores data electronically therefore avoiding forging of data and can also avoid illegal entry of travellers. They make use of an antenna, transponder and a transceiver which in turn uses radio waves to communicate with each other. When a transponder enters the zone, the RFID reader captures the information and sends it to the computer or any other host device.

Al-Ajeely [3] In this paper, verification of passport was done using Internet of things (IOT). The proposed system uses fingerprint as the biometric data for the verification. The fingerprint recognition was done by using fingerprint sensors which used to detect the fingerprints based on the level of surface. The fingerprint sensor used in this model was able to store memory of the fingerprints of about 3000 templates. This model was able to avoid forgery and manual work associated with verification of passport. It also updated the traveller's information constantly in the system.

## ALPHA BLENDING IMAGE STEGANOGRAPHY USING DISCRETE WAVELET TRANSFORM AND SINGULAR VALUE DECOMPOSITION

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### Abstract

Steganography is the methodology to conceal confidential facts and secure information during communication over a network. An image steganography scheme is proposed to conceal one color image deep down the other color image to avoid the visibility of the existence of information. The proposed technique is attributed to the 2D-Discrete Wavelet Transformation (DWT) and Singular Value Decomposition (SVD) schemes in conjunction with the alpha blending technique. The Peak Signal to Noise Ratio (PSNR) of the stego images generated by the designed algorithm is significant. The proposed model is suitable for real-time applications, provides elevated concealing capacity, and proves the protected communication and confidentiality of the Payload Image (PI).

**Keywords:** Cover Image, Payload Image, DWT, SVD, Steganography, PSNR

### 1 Introduction

In the era of the fast internet revolutions, different forms of digital communication are used by modern society in daily life to maintain a better lifestyle. The protection of sensitive data is needed for an hour from various attacks. The wide usage of multimedia for interaction through insecure channels is challenging in the network due to the advancement in big data and cloud computing, and information is manipulated on the internet. The focus needs to be on confidentiality and security. The sensitive data transmission through the medium, i.e., the channel, is generally visible to every user connected to that particular channel. This requires real-time information, which needs to be transmitted to provide security. The Various cryptographic techniques to provide information security in the shared medium converts the user specifics into different formats based on a particular mathematical model. However, by visual perception of the enciphered data, someone may comprehend the encrypted content, which leads to unnecessary access to the document by unauthorized users and performs different types of decryptions to retrieve the information [1]. To keep off this issue, the steganography technique has been conceived. The sensitive fact is interposed in the Cover Image (CI) to make it difficult to understand and analyze that something is embedded, which escapes some extent of security attacks.

Srilekha Mukharji et al. [2] manifested the Mid-Position Value (MPV) supported image steganography, progressing masking of the key is examined and Arnold's conversion has been executed on the chosen CI. Barnali and Samir [3] illustrated the Natural Language Processing (NLP) supported text steganography. Liyan Zhu et al. [4] presented robust steganography for

**IMAGE STEGANOGRAPHY USING FAST DISCRETE CURVELET TRANSFORMATION  
FOR SECURE COMMUNICATION**

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**ABSTRACT**–The Recent advancements in digital technology have made it possible for us to share a massive volume of files over the internet. However, the security and integrity of such crucial files become the highest concern in the presence of hostile attackers. The security of these files across the internet is ensured through steganography. Steganography is the art of encoding and embedding secret data in cover file in such a manner so as not to be suspicious for eavesdropper. The aim of the paper is to provide security for the communication between two entities. The cover image is preprocessed; Pixel Value Adjustment (PVA) and Bit Plane Slicing (BPS) are applied to choose the average of four Most Significant Bits (MSB) of Cover Image (CI). The secret image is preprocessed, BPS techniques is applied to choose average of four MSB bits and Forward Discrete Curvelet Transformation (FDCT) is applied on it. The approximation curvelet coefficient i.e., magnitude is embedded in Least Significant Bit (LSB) of CI to produce stego image (SI). The histogram of SI and CI is measured to verify the difference between them. The quality result parameters such as Mean Square Error (MSE) and Peak signal to Noise Ratio (PSNR) are measured, which proves the chance of hidden information being detected is reduced.

**Keywords:** steganography, Bit Plane Slicing, curvelet transformation, PSNR, MSE.

**1. INTRODUCTION:**

The word steganography is originated from two greek words “stegano” means cover and “graphia” means writing, it is covered writing [1]. Steganography's primary goal is to communicate secret information [2] in a way that makes it undetectable to unauthorized users [3]. Each and every one need internet for digital communication [4] and it is challenging to secure [5] the confidential information [6] over the insecure channel and network [7]. Cryptography protects the information and allows using it only for the intended beneficiary [8]. The information hiding technique, steganography is introduced to safeguard the confidential information [9] within the carrier media such as audio, video and image for various applications. The confidential information is concealed and shared in a secure manner using steganography [10]. The classification of data hiding techniques such as reversible and irreversible is introduced. The information is hidden into an image called cover image (CI) and the image in which confidential information is hidden is called stego-image (SI).

The biometric trait is utilized for the identification of human being. Steganography maintains the anonymity and privacy of the biometric data. The main challenge of designing the steganography system is to provide robustness, high embedding data rate and security.

**A. Contribution:** In this paper, Fast Discrete Curvelet transformation technique based image steganography using BPS and MSB is proposed.

**B. Organization:** Section II is Related work; Section III is the proposed steganography technique. Section IV and section V results analysis and conclusion.

**2. RELATED WORK:**



# Anti-Smuggling Alarm systems for Trees in Forest

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**Abstract:** This project is all about safe guarding valuable trees that is “sandal , red sandal ,sag wan and pink ivory from forest fires and smuggling activities. These trees hold immense value and are less in number. This system is designed to prevent the illegal activities taking place in the forest . It is designed to save the forest and the revenue of the nation as most of the trees are used in medical sciences and cosmetics. This proposed system also protects the forest from unfortunate events such as forest fires to prevent the loss of majority forests at once and to prevent such incident, to save forest around the world some inviolability measures need to be set up.

**Keyword:** Smuggling, forest fire, ADXL Sensor, Metal Detecting sensor ,fire sensor and microcontroller.

## I. INTRODUCTION

This system is deployed to prevent the rampant smuggling of trees that has emerged as a grave global concern, threatening the very existence of our precious forests. Recognizing the urgent need to combat this illicit trade, we present the Anti-Smuggling of Trees Project, which consists of trees and three sensors such as metal detecting, ADXL and fire sensor as primary unit of the system . The ADXL and metal detecting are placed on the bark of the trees and the fire sensor is placed at a certain height from where it and sense smoke in the forest. The system consist of these three technologies from preventing the trees from smuggling and forest fires.

The goal of this paper is to procure a system that notifies the illegal activities taking place with the most valuable trees and other valuable medicinal plants. This system ensures to prevent the trees from getting cut down detriment with fire. This system will deploy a unique name for every tree to transit the exact location to the nearest check post and officers on duty in case of any smuggling and forest fires.

## II. LITERATURE SURVEY

1. Forest officials seized 80 logs of khair wood worth around Rs 1 lakh, an air gun, a gold chain, two finger rings, two vehicles, battery powered chain saw and Rs 4 lakh in cash-The Times Of India
2. Forest guard among 6 killed in clash over timber smuggling at Assam-Meghalaya border.-India Today
3. Forest Department officials seized 40 kg of sandalwood from the three persons; all three have been lodged in jail -The Hindu
4. International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 3, Issue 9, September 2014Anti-Smuggling System for Trees in Forest using Sensors and at mega pu 328 controller. The proposed system is about smuggling of the trees like sandal, “Sag wan” etc.
5. Anil Kulkarni, Ajay Khandare, Mandar Malve (2014) Designed a system for wireless sensor networks for Protecting high-cost trees in remote jungles from fire and Poaching. Narhari, Kotkar (2014) implemented a system using Flex sensor and Zigbee which able to restrict the smuggling of trees in a forest where the human being not able to provide security.

## III. METHODOLOGY

Firstly we give 230v AC to a DC female jack with the help of an adapter.

- Power will be given to the esp32 using a USB cable as the power from the adapter is of high voltage.
- We then give a hotspot connection to the esp32 ,for the BLYNK application to start working • After the connection is established we receive a message on the LCD saying “FOREST MONITORING.”
- Whenever there is any metal activity or movement of tress is detected the buzzer will send an alarm to the nearest control room and they will also receive a notification on the BLYNK application saying ‘SANDALWOOD TREE IS BEING CUT”



# AUTOMATIC WALL PAINTING ROBOT

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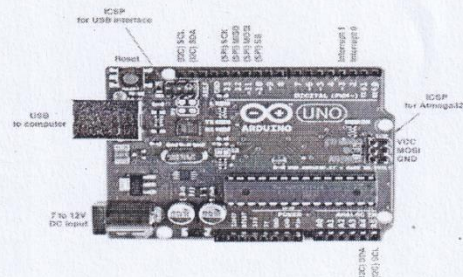
**Abstract:** This paper aims to design and develop an Automated Wall Painting Robot which helps to reduce manual efforts on painting and accomplish cost effective painting accessories. Here we have proposed a robot controlled via Arduino Uno. The autonomous robot can be controlled using simple python program. It is used to eliminate the human exposure in dangerous environments and very effective on time management. Also it completes a painting job without an error. At last, it is expected that the conceptual model of the wall painting robot would be efficiently used in various home and industry applications in wall finishing and maintenance of other giant architectural and civil structures.

**Keywords:** Building Automation, Robotic, Wall Painting, Human Safety

## I. INTRODUCTION

In current era we have multiple technologies to increase the robotic painting automation in various industries. embedded system design is a used for many types of product design by implementing the software and hardware with input and output devices along with microprocessors. the main idea of this automation is to provide exterior wall painting automatically with the help of robot.. the main idea to make the robot to move easily along the walls and apply paint smoothly. people can avoid inhaling the toxic chemical while doing interior painting and also reduce the amount of time taken to complete the entire painting work. the advanced robots are accurate and deliver the results with exact thicknesses. many creators have an idea of inventing robots which will create works of art, instead of usual painting it makes them more creative. others have probe for ways to form the robots economical and used for commercial purpose in places like interior painting.

Automation and robotics have entered various pasture of the construction industry, and painting work. the traditional painting of the wall buildings which is carried out using platform has proved to be expensive. it is very unsafe to involve working preferable heights. the main objectives of the paper are painting chemical can cause severe damage to lever to save human life this robots are preferred, paint the wall automatic in perfect manner, to avoid accident of human while doing external wall painting robot ,to provide user friendly control application, normal painting by human is causing severe accident while doing external wall painting to avoid accident painting robot is used . in existing method they have used the microcontroller of arduino. it is the hardware used to control the all component and it produces the control signal and pwm signals to motors. the sensor used to control the direction of robot and control the moving direction; digital line sensor is used .dc motors can run in bi directions based upon the polarity of current through the motor. it is used in cutting of magnetic flux mechanism. these motor acclimated to move the robot forward and reverse direction. the rechargeable dc battery is used to give the proper voltage to the components and motors. arduino microcontroller runs only one program again and again and it delays the painting process. it does not support advanced programming languages like python or ruby to enable faster development.



The Arduino mega microcontroller board depends on atmega 1280. it consists of multiple digital input/output pins. in i/o pins 14 can be utilized as pulse width modulation outputs, sixteen analog inputs, four uarts, a sixteen mhz crystal oscillator, a usb connection, a power jack, an icsp header, and a reset button as shown in figure 1. to get started the complete support to the microcontroller is simply connect with a usb cable or power is given to ac-to-dc converter.



# SUN TRACKING SOLAR PANEL

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**ABSTRACT:** The demand for renewable energy sources has increased significantly in recent years, and solar energy has emerged as a promising solution to meet these requirements. Solar panels, which convert sunlight into electricity, play a crucial role in harnessing solar energy. However, the efficiency of solar panels heavily depends on their orientation relative to the sun. To address this limitation, sun tracking systems have been developed to optimize the positioning of solar panels throughout the day.

This abstract presents an overview of a sun tracking solar panel system designed to enhance energy efficiency by accurately tracking the sun's position in the sky. The proposed system utilizes advanced sensors and control mechanisms to dynamically adjust the orientation of solar panels to maximize solar exposure.

**KEYWORDS:** Solar energy, PV panel, latitude, Passive, servo motor.

## I. INTRODUCTION

Nowadays the energy deficiency problems faced by the world, more especially the third world countries, are urging researchers to find an alternative energy source that would complement the conventional fossil fuel. The alternative energy sources include solar, nuclear and wind. Solar energy is the energy generated by harnessing the power of the solar radiation. It is the cleanest source of energy which can pollute the climate the least.

The utilization of solar energy as a sustainable and renewable power source has gained immense popularity in recent years. Solar panels, also known as photovoltaic (PV) panels, are the primary devices used to convert sunlight into electricity. However, the efficiency of solar panels is heavily dependent on their orientation relative to the sun. Traditional fixed solar panel installations often fail to optimize solar exposure, resulting in suboptimal energy production.

### SINGLE AXIS SOLAR PANEL

Single-axis solar tracking systems follow the solar by moving in a single axis (vertical or horizontal). Generally, the inclination angle is adjusted manually at certain intervals during the year and automatic movement is provided in the east-west direction. Single-axis solar tracking systems are moved on the vertical or horizontal axis depending on the solar trajectory and the weather condition.

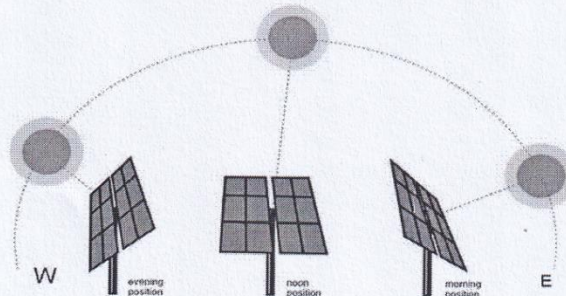


FIG.1

## II. METHODOLOGY

Single-axis solar panels are designed to track the sun's movement along a single axis, usually the horizontal axis. The



# NON-INVASIVE THYROID DETECTION

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**Abstract:** Thyroid gland's ability to perform its functions is impacted by thyroid illness. Thyroid disease often comes in one of two forms: i) Hypothyroidism, which is characterised by (low function) and is brought on by insufficient thyroid hormones. ii) Overproduction of thyroid hormones, which results in hyperthyroidism (high function). Hypothyroidism can cause constipation, dry skin, slow heartbeat, low energy, weight gain, inability to withstand the cold, and weariness. The signs of hyperthyroidism include irritability, weight loss, a rapid heartbeat, heat sensitivity, diarrhoea, and thyroid enlargement. A portion of the neck may bulge, a condition known as a goiter, in both hypothyroidism and hyperthyroidism.

The objective of this work is to create a low-cost smart sensing device that can measure the relative skin temperature, heart rate, and pulse of a human using a non-invasive technique for thyroid detection. It makes use of two separate sensors, one of which measures the patient's heartbeat, pulse rate and the other of which measures the relative difference in skin temperature. The variance detected by the sensors will be processed by the microcontroller. In this work, a heartbeat and pulse rate monitor built on an Arduino ide is used to count heartbeats per minute. Here, a Max30100 sensor is being operated, and when a finger is placed on it, it detects the heartbeat and pulse. This thyroid-detection method uses no pain or force.

**Keywords:** Relative skin temperature variation, Heartbeat monitor, pulse

## I. INTRODUCTION

According to a projection from various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid diseases. The radioactive approach is used in thyroid detection to find out how well the thyroid gland is working. For example, receiving a thyroid diagnosis while pregnant puts the patient at risk for radiation exposure, which also has an impact on the foetus. According to a clinically established fact, a person with a healthy thyroid gland will absorb 65% of the energy that is there and emit 35% of it as heat. According to how the thyroid gland functions, being too cold or too hot are the typical symptoms of poor and high thyroidism, respectively. Thermal imaging is an illustration of a non-invasive technique. This hormone's release is diminished in hypothyroidism. This hormone is secreted more often as a result of hyperthyroidism. In women, hypothyroidism is typical. A congenital abnormality causes hypothyroidism in one in every 4000 new-born. Peripheral temperature rises as a result of hyperthyroidism. Reduced peripheral temperature is a side effect of hypothyroidism. The thyroid is diagnosed in this work using a non-invasive, non-contact smart sensor. To determine the relative skin temperature is the first step in this process. The relative change in skin temperature is detected using an LM35 sensor. This sensor measures the thermal coefficient, and the Arduino microcontroller assists in displaying the temperature reading. The non-contact LM35 sensor can detect changes in both the ambient and skin temperatures, as well as display those changes in both Celsius and Fahrenheit. The MAX30100 sensor is employed in the second portion of this work to detect the thyroid by placing a finger on the sensor and measuring the heartbeat and pulse rates. The heart rate and number of beats per minute are counted and displayed using an Arduino-based heartbeat monitor.

## II. LITERATURE SURVEY

The thyroid disease can be diagnosed by measuring body temperature and pulse rate. The cost of this method is low when compared to previous methods. The temperature and the pulse rate detection is an alternative diagnostic method to monitor the thyroid function. The proposed method has advantages of low cost, simple and non-invasive. A low cost smart sensing system to sense the human relative skin temperature through non-contact and non-invasive method for detecting thyroid. This method can be used by the person to find whether one has any thyroid problem or not. This is one of the simple method for thyroid diagnosis. Developed method tests the medical data that is collected and gives the risk value of the individual. Twelve normal subject and eight abnormal subjects were tested. In case of abnormal subject all parameter range exceeds the normal range. So the subject is considered to be a patient with thyroid disease. The average accuracy of this method is 83.33%. [1]

Multiple short-wave spectroscopy techniques based non-invasive blood glucose monitoring device is proposed and



# Automatic Obstacle Detecting Robot

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**Abstract:** Obstacle avoidance is one of the most important aspects of mobile robotics. Without it, robot movement would be very restrictive and fragile. This project proposes robotic vehicle that has an intelligence built in it such that it directs itself whenever an obstacle comes in its path. So, to protect the robot from any physical damages. In rapidly growing world robotics is used in every division, whether it is in household, industry, transport and many other sectors. In this study, the design and execution of an automated vehicle consider both its hardware and software aspects. We elect this as our project as robotic has become a vital role of our day-to-day life and has a specific application in the engineering sector. It plays an important role in the new technological environment.

**Keywords:** Ultrasonic Sensor, Arduino Uno, Motor Driver Shield, and Servo Motor.

## I. INTRODUCTION

Robotics is a part of today's communication & communication is a part of advancement in technology. In this paper, we aim to provide a comprehensive analysis and comparison of these sensor-based approaches for obstacle detection. This project consists of wheeled autonomous robot. Obstacle avoidance is the primary requirement of any autonomous robot. Enabling an autonomous robot to be able to navigate from one place to another without human intervention. The analysis will consider factors such as obstacle detection range, accuracy, response time, robustness to lighting conditions, and ability to detect different types of obstacles.

This ROBOT has sufficient intelligence to cover the maximum area of provided space. It has a ultrasonic sensor which are used to sense the obstacles coming in between the path of ROBOT. It will move in a particular direction and avoid the obstacle which is coming in its path. We have used two D.C motors to give motion to the ROBOT. The construction of the ROBOT circuit is easy and small. The electronics parts used in the ROBOT circuits are easily available and cheap too.

## II. LITERATURE SURVEY

"Obstacle avoiding robot-A promising one" has been developed by Md. Saddam Khan, Rakesh Chandra Kumar, Dinesh Kumar, Sarmistha Mondal, Rajesh Birua and Manas Kumar Parai. They proposed a robot that is able to do the basic walking movements using two gear motors. It is easily capable to sense the obstacle and by processing the signal it perfectly avoids the obstacle coming in between the path [1].

"Obstacle avoidance robot using Arduino" has been developed by Pavithra A C, Subramanya Goutham V. They developed a robot that detects and then avoids obstacles in its path which runs on Arduino platform for data processing. For obstacle detection, three ultrasonic sensors were used that provide wider field of detection. The robot is fully autonomous [9].

"Moving obstacle avoidance of a mobile robot using a single camera" has been designed and developed by Jeongdae Kim and Yongtae Do. They developed a moving obstacle detection method which is based on vision for the safe navigation of a mobile robot. The method can quickly detect movable obstacles like walking humans in an indoor space using a single camera. The camera is mounted on the robot for vision [4].

"Line follower and obstacle avoider robot" has been designed and developed by Darshan S, Chinnapu Charan Teja Reddy. They proposed to design a line follower and obstacle avoiding robot for autonomous navigation along a black line using the concept of IR sensors and Ultrasonic sensors. In case crossover comes, the robot will be able to choose the free path. To control the line follower robot, the only way is to change the path. The proposed can be controlled using WIFI module, but the power will be more consumed. So, there will be chances quick drainage of battery. It can be used for very long-distance applications with a predefined path. [5].





# RC522 and EM-18 Based Attendance Management System

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**Abstract-** Maintaining the attendance of every individual in any organization like an educational institution or corporate workplace is an essential component. Traditionally, attendance systems relied on manual methods such as paper-based sign-in sheets or manual entry into spreadsheets, which were time-consuming, and prone to errors. Our prototype provides a practical approach to solving this problem with modern technology by using the method of Radio Frequency Identification (RFID) as it is a reliable, efficient, simple design, and low cost.

**Keywords** – manual entry, Radio Frequency Identification (RFID), reliable, efficient, simple design, low cost.

## I. INTRODUCTION

The RC522 and EM-18-based Attendance Management System represents an innovative approach to effectively managing attendance in various settings, such as schools, offices, and organizations. This system utilizes two key components: the RC522 RFID reader module and the EM-18 RFID reader module. The RC522 module is responsible for reading RFID tags, while the EM-18 module is designed specifically for reading RFID cards at a distance. By combining these modules, the Attendance Management System offers a seamless and reliable method for tracking attendance, enhancing efficiency, and eliminating manual processes.

With the RC522 and EM-18-based Attendance Management System, users can effortlessly record attendance by simply swiping RFID cards within the range of the EM-18 module. Each RFID card or tag is unique to an individual, allowing for accurate identification and record-keeping. Additionally, the system can generate comprehensive reports, providing valuable insights into attendance patterns and trends. By automating the attendance management process, this system minimizes errors, saves time, and streamlines administrative tasks, ultimately contributing to a more efficient and productive environment.

## II. LITERATURE PAPER

[1] Ankita Agrawal and Ashish Bansal's proposal of RFID based attendance system proposes the idea of using middleware for processing the read data and storing it in the database. This idea highlights the fast counting of RFID Tags/Cards. But this is a tedious process as multiple-read data takes lots of time for storing. There is a possibility that the data might get lost due to this action. Hence this system proves unstable in the long term.

[2] Aditi S. Tiwari and the team proposed a variety of approaches to developing an attendance system. The different approaches were of using a "Bar code Attendance system" where each employee is given an RFID card which has 12-digit Universal Product Code (UPC) that can be identified by the computer and attendance is counted. This system is simple and reliable. The second approach is the "Biometric Attendance System" which uses facial recognition or fingerprint scanner for detection. This approach has a complex design and is of high-cost design. Though the different approaches seem to be useful in their own ways but lack to have a reliable system in the long term.

[3] M. Kamaraju's approach is a two-step verification system as it enhances the security of the system. The first step is to scan the RFID tag/card held by the employee and the second stage is to enter the unique 4-digit pin assigned to the employee and attendance will be given to that employee if the code is correct else an error message is displayed on LCD. This is a unique way of design, but this system is valid if the person can recognize the pin correctly else the employee will not be able to give the attendance.

[4] Anil Kumar Shukla's approach is by use of multiple microcontrollers for assigning work rather than dumping all the inputs into one microcontroller. This approach is useful in its own way as each microcontroller has a specific task, the first controller scans and identifies the card's unique ID, the second controller helps in storing the data, and the third



# AUTOMATIC HAND SANITIZER

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**Abstract:** Automatic hand sanitizers are innovative devices that are designed to provide hygiene and avoid cross contamination. In the context of global health concerns maintaining proper hand hygiene has become a crucial aspect in order to prevent infection. It is a great way to minimize the spread of germs by eradicate the need to use a button .In the pandemic condition the necessary to use the Automatic hand sanitizer is very important The designed touchless sanitizer dispenser can be used commercially to develop a good sanitization approach towards the community In covid pandemic period the hand hygiene play a major role from getting infected and spreading of diseases. Where hand sanitizer is stationed at entrance doors in hotels ,schools, malls etc.

**Keywords:** Automatic hand sanitizer dispensing system, touchless dispensing ,hand hygiene, sensor technology, microcontroller.

## I. INTRODUCTION

The demand for hand sanitizer has come into picture because of coronavirus . Sanitization is referred to as cleaning or sterilizing an object or hands . There are different types of sanitization process like steam sanitization, soap sanitization, flash sanitization, alcohol sanitization but alcohol sanitization is most effective.To avoid the spread of infectious diseases in the wake of the COVID-19 pandemic, it is essential to practice proper hand hygiene. People can sanitize their hands without touching any surfaces by using automatic hand sanitizer dispensers, which are a practical and hygienic alternative. A device known as an automatic hand sanitizer dispenser is one that can automatically deliver disinfection or hand sanitizer solutions. It combines many technologies and elements to offer a touchless and effective sanitization experience. In public settings where lots of people congregate, such as hospitals, schools, companies, malls, and airports, these dispensers are frequently seen.Maintaining good hand hygiene has become more crucial than ever in the present global health scenario.

The continuing COVID-19 pandemic and other bacteria and viruses can be prevented from spreading by using hand sanitizers.Automatic hand sanitizer dispensers are quite popular because they improve hand hygiene habits and reduce contact with frequently touched surfaces. An automatic hand sanitizer dispenser's idea and advantages will be discussed in this introduction.The primary characteristics and advantages of an automatic hand sanitizer dispenser are as follows:

1. Touchless Operation: The touchless operation of an automatic dispenser is one of its main features. By placing their hands under the dispenser, users can cause a sensor to release the right amount of sanitizer. As a result, there is no need to contact any buttons or levers, lowering the possibility of cross-contamination.
2. Safety and hygiene: Automatic dispensers encourage safer practices for hygiene by reducing interaction with potentially contaminated surfaces. In order to promote frequent hand sanitization and stop the transmission of germs and viruses, they make sure that users have access to hand sanitizer at strategic areas.
3. Effectiveness and efficiency: Automatic dispensers are made to dispense the right amount of sanitizer, preventing waste and assuring cost-effective use. In order to deliver a specified amount of sanitizer, the dispensing mechanism is typically calibrated.
4. Simple Maintenance: Automatic hand sanitizer dispensers are made for simple maintenance and refilling. They frequently have transparent reservoirs or indicators that let users or maintenance staff keep an eye on the sanitizer level. With quick and effective refilling, sanitizer is always available.
5. Visual Indicators: To convey essential information, many automatic dispensers include visual indicators like LED lights or screens. These indications may show battery life, sanitizer levels, or operational modes, making it simpler for users.
6. Convenience and Accessibility: People can quickly and conveniently sanitize their hands using an automatic dispenser without having to struggle with manually pumping or squeezing a bottle.



# VOICE-CONTROLLED CAR USING ARDUINO

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**Abstract:** Voice-activated A robotic vehicle (VCRV) is a sophisticated robotic vehicle that can be controlled by user (or client) commands. Our project's goal is to create a Voice control automation automotive mistreatment Arduino. An Arduino microcontroller, motor drivers, and a Bluetooth module are used in the operation. Arduino is an open-source hardware platform (single-board microcontrollers and kits) for creating digital devices. The plan is to first design the hardware of the automated car and then code the full operation using our existing programming knowledge. The code is then emulated on a software package (IDE) before being interfaced with hardware. A Bluetooth gadget is used to coordinate the management unit with the Bluetooth gizmo.

**Keywords:** Arduino, Bluetooth module, Motor driver, DC motor, Battery.

## I. INTRODUCTION

Because we live in an artificial intelligence-driven society where robots execute numerous activities, the voice-controlled automobile was invented to make human labour simpler. The vehicle is driven by the human voice. The fundamental idea behind the project is to operate the car via voice commands. The HC-05 module is used to send commands via the mobile application. Another HC-05 module on the robotic vehicle will receive the signals and operate in accordance with the order. The orders were sent to the mobile app from the Transmitter's side. The Bluetooth Module on the robot side is linked to the Bluetooth application on the mobile device. The voice will be recognised by the smartphone application.

## II. LITERATURE SURVEY

[1]. M Saravanan developed "Arduino Based Voice Controlled Robot Vehicle" published by the International Journal of Engineering Applied Sciences and Technology (October 2020) The main goal of this device is to create a robot vehicle that can be powered by a person's voice order. The abovementioned device is a prototype of our design. The concept is to build a robot that will be controlled by voice commands. A cell phone is used to operate the robot; several articles demonstrate the contact between a robot and a smartphone. The aim of a voice-controlled robotic vehicle (VCRV) is for it to listen to and respond to the user's commands.

[2]. Mrumal K Pathak, Javed Khan, Aarushi Koul, Reshma Kalane Raunak Varshney developed Robot management vogue exploitation humanoid Smartphone, published by the International Journal of Engineering Applied Sciences and Technology. The motivation behind this paper is to furnish very good machine humanoid stages with easier mechanism instrumentation vogue. This paper depicts suggests that thanks to the management of a mechanism utilizing transferable through Bluetooth communication, some highlights regarding Bluetooth innovation, segments of the versatility and mechanism. It presents an associate audit of mechanisms unnatural by smartphones by suggesting that moving the automaton upward, reverse, left and right side by the humanoid application, as an example, Arduino, Bluetooth.

[3]. N Ayush Ubale, Hardik Jethava, Poli Guha Neogi, Pranavya .M U developed Voice controlled vehicle using an MQTT(Message Queuing Telemetry Transport)server, published by the International Journal of engineering applied science and Technology. The car is operated by voice in this project of voice control. A mobile robot that can be managed by voice commands is known as a robot vehicle. The speech recognition program on an Android phone will recognize voice commands such as 'Forward,' 'Stop,' 'Left,' 'Right,' and 'Back,' among others.

The operating principle of the robotic car is based on information sent by phone to the robot. The results demonstrate that by using only one's voice as a method of control, a user can learn to influence real-world objects reliably. The proposed findings show that voice-controlled robotics would be effective in the future. This device could be used for a wide range



# ELECTRIC POWER GENERATION USING PIEZOELECTRIC TRANSDUCER

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**Abstract:** In this project, the main aim is to generate the electricity from wasting human energy and convert that waste or renewable energy into useful light energy. As many developing places in India till today they are facing the problem of lack of electricity. So, our objective is overcome the problem of lack of electricity. Piezoelectric sensors is a sensor which senses the mechanical energy and convert that energy into AC voltage. Then that is given to the bridge rectifier and then to the LED, to indicate that electricity is generated.

**Keywords:** Piezoelectric sensors, renewable energy, mechanical energy, light energy, bridge rectifier.

## I. INTRODUCTION

Human beings basic need for the survival is food, shelter and clothes, but in this generation electricity has become apart of life, without electricity nothing can be done. Karnataka government CM Siddaramaiah is going to implement "Gruha Jyoti" yojana, means free power for the people of Karnataka who uses power below 200unit. This project can help to generate electricity with low cost and environment friendly.

Piezo is a Greek word which means compress or press. Transducer converts one form of energy into another form of energy. Piezoelectric transducer is the device which converts the mechanical energy or the stress applies on it into AC voltage. This piezoelectric sensors are affordable and can be implemented easily.

## II. LITERATURE SURVEY

The authors are Vikram Rathod, Subhada Hanotkar, Nikhil Daundkar, Ajay Mahajan, Anup Chaple<sup>[1]</sup> "Power generation using Piezoelectric material" going through this paper, got to know that by using this method both AC as well as DC loads are able to run.

The authors are R Jai Ganesh.d.b, Shanmugan, S.Munusamy, T. Karthikeyan<sup>[2]</sup> "Experimental study on footstep power generation system using piezoelectric sensor", In this paper ,they proposed that this project is applicable to the rural areas where there is poor electricity or power supplied, as India has huge population.

The authors are Denis O Urroz Montoya, Jeffrey R Alverto-suazo, Julio R Garcia and Cesar H Ortega Jimenez<sup>[3]</sup> "Generation of electricity using piezoelectric material" going through this paper, got to know that this method can be applied in various applications like Economic implementation of energy harvesting, energy collector by traffic, in railways, etc

The authors are Jedol Dayou, Man-Sang.C, Dalimin.M.N.Wang.S<sup>[4]</sup> "Generation electricity using piezoelectric material" going through this paper, got to know that the obtained final Dc voltage can be sitored in bateery for the later use and also connect capacitor to store charge.

The authors are Pravin Wale, Chetna Patil, Aditya Thanka Vinchirkar and Purvi Pagare<sup>[5]</sup> "Generation of electricity from roads by using Piezoelectric sensors" going through this paper, got to know that this method of generation o electricity is eco-friendly and affordable and voltage obtained can be measured.



# Influence of Hot Extrusion Process on Tensile Properties and Microstructures of Aluminium 6061 Hybrid Composite

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## Abstract

In this research, the aim is to investigate the tensile properties and microstructures of Aluminium 6061 hybrid composite before and after extrusion. Aluminium 6061 Hybrid composite was fabricated using Stir casting technique with 6 Weight % silicon nitride ( $\text{Si}_3\text{N}_4$ ) coated with nickel and 1Weight % carbon fiber ( $\text{C}_f$ ) coated with copper as reinforcements followed by extrusion process. The tensile properties and microstructures of extruded hybrid composite was

investigated and compared with as-cast hybrid composite. The microstructure of the hybrid composite showed excellent bonding between matrix and reinforcements interface. The hot extruded hybrid composite exhibited enhanced yield strength (44%), ultimate tensile strength (33%) and % elongation (20%) when compared with as-cast hybrid composite. Scanning electron microscopy (SEM) and Energy dispersive spectroscopy (EDS) techniques were used to observe the fracture surfaces of tensile testing specimens.

## Keywords

Composite, Fiber, Materials development, Hot Extrusion

## 1. Introduction

Metal matrix composites (MMCs) have received significant attention due to their improved properties compared with monolithic alloy. Due to their improved mechanical and tribological properties MMCs are the promising materials used in the aerospace, military and automotive sector [1, 2, 3]. To obtain good mechanical properties, the casting process of MMCs is economically cheaper. However, to achieve excellent interfacial bond between matrix and reinforcements with uniform distribution of reinforcements secondary processing of MMCs is must. Extrusion has been the most sought after among different metal forming processes due to its compressive stresses and axial alignment [4]. MMCs are mixed with reinforcements such as silicon carbide, silicon nitride, aluminium oxide, graphite and carbon fibers to enhance their mechanical properties [5, 6, 7]. The prominent reinforced particles and fibres used to manufacture MMCs are silicon nitride and carbon fibers owing to their excellent mechanical, tribological and corrosion properties [8, 9, 10, 11]. According to the literature, some investigators have been carried out electroless coatings (Nickel and Copper)

on different reinforcements to improve wettability and to reduce reaction between molten alloy and reinforcements [12, 13, 14]. It is claimed that, carbon fibers coated with nickel have low toughness due to the development of brittle-phase nickel aluminide at the interface of matrix-fiber. Carbon fibers coated with copper exhibit superior load carrying capacity together with higher toughness compared with carbon fibers coated with nickel [15, 16]. Hence, to overcome this problem, carbon fibers coated with copper are employed to fabricate the hybrid composite. In recent decades, researchers have been significantly developed MMCs with single reinforcement. However, there are many limitations to be overcome in these MMCs, the main being their low load bearing strength and poor machinability. To improve these drawbacks, currently investigators are focusing on hybridisation of composites with high nominal strength carbon fibers. A number of investigators have claimed an enhancement in tensile properties of hybrid composites in contrast with single reinforced MMCs [17, 18, 19]. Therefore, the current research aims to conduct a study on tensile properties and microstructures of Al6061 based hybrid composite in both as-cast and hot-extruded states.



(REVIEW ARTICLE)



## Design and fabrication of air brake system using IC engine exhaust gas

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### Abstract

The aim of this project is to design and fabricate an Air Brake System based on Exhaust gases of an IC engine. The main objective is to reduce the workloads of the engine drive to operate the air compressor, because the compressor is not operated by the engine drive. A turbine is placed in the path of exhaust from the engine. The turbine is connected to a dynamo by means of coupling, which is used to generate power. Depending upon the airflow the turbine will start rotating, and then the dynamo will also start to rotate. A dynamo is a device which is used to convert the kinetic energy into electrical energy. The generated power can be stored in the battery and then this electric power has loaded to the DC compressor. The air compressor compresses the atmospheric air and it stored in the air tank and the air tank has pressure relief valve to control the pressure in the tank. The air tank supplies the compressed pneumatic power to the pneumatic actuator through solenoid valve to apply brake. The pneumatic actuator is a double acting cylinder which converts pneumatic pressure into linear motion. The generated electric power from the turbine used to compress the air in the DC compressor then supplied the pneumatic power to the air braking system. The exhaust gas was effectively utilized to perform the air braking system in addition to the conventional braking system and found the improvement in the braking performance.

**Keywords:** Air Brake; Exhaust; Pneumatic actuator; Dynamo; Solenoid valve; Kinetic energy

### 1. Introduction

A brake is a mechanical device that inhibits motion by absorbing energy from a moving system. It is used for slowing or stopping a moving vehicle, wheel, axle, or to prevent its motion, most often accomplished by means of friction.

Most brakes commonly use friction between two surfaces pressed together to convert the kinetic energy of the moving object into heat, though other methods of energy conversion may be employed. For example, regenerative braking converts much of the energy to electrical energy.

Friction brakes on automobiles store braking heat in the drum brake or disc brake while braking then conduct it to the air gradually. When traveling downhill some vehicles can use their engines to brake.

An air brake or, more formally, a compressed air brake system, is a type of friction brake for vehicles in which compressed air pressing on a piston is used to apply the pressure to the brake pad needed to stop the vehicle. Air brakes are used in large heavy vehicles, particularly those having multiple trailers which must be linked into the brake system, such as trucks, buses, trailers, and semi-trailers in addition to their use in railroad trains [1].

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## Studies on hardened properties of concrete incorporated with copper slag

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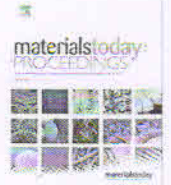
### Abstract

The present study aims to develop sustainable construction aggregates using industrial solid waste material like copper slag which is produced from smelting and refining process of copper. Copper slag contains Fe<sub>2</sub>O<sub>3</sub> [35–60%] and SiO<sub>2</sub> [25–40%] apart from small amounts of CaO, Al<sub>2</sub>O<sub>3</sub> and CuO which makes it a potential solid waste material to be used as replacement to conventional fine aggregates. In this study, an attempt has been made to utilize copper slag as alternative to conventional fine aggregates in engineered way by conducting mix proportioning for M20, M25, M30, M35 and M40 grade of concrete. Initially the dosage of super plasticizer i.e., 0.75% is fixed to get the required workability of 75–100mm by performing various trials. The water to cement ratio for each grade of concrete was found by trial and error method using the ratios 0.4, 0.42 and 0.44. This paper also studies the corrosion behaviour of steel reinforcement embedded in copper slag concrete. Corrosion of steel reinforcement is one of the major causes affecting the long-term performance of reinforced-concrete structures. Hence, the corrosion test was conducted by using thermo mechanical treatment (TMT) steel of 150mm length and 8mm diameter which are embedded in concrete cube of size 150mm×150mm×150mm. On completion of accelerated corrosion, all the concrete samples were removed from all the connections and taken out of tank. Further for reinforced concrete with 40% replacement of copper slag, the percent of decrease in compressive strength is on lower side for nominal concrete as compared to concrete with copper slag. All the concrete specimens were subjected to wetting and drying in alternate way by placing in 3.5% NaCl solution. The findings in the study demonstrate that copper slag addition contributes to less resistance to corrosion attack.



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## Microstructure and tensile behaviour of B<sub>4</sub>C particles reinforced Al6061 matrix composites

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## ABSTRACT

In an ongoing work an exertion is made to get fabrication of aluminium 6061 matrix composites reinforced with 8 μm average size of 7 wt% B<sub>4</sub>C particulates of with two stage melt stirring fabrication technique and are examined under scanning electron microscopy, Energy Dispersive X-ray Spectroscopy, and X-ray diffractometer to characterize the surface morphology, chemical elements and its percentage of distribution in addition to phase elements of composites. Then evaluation of prepared composite for Hardness and Tensile properties using micro hardness testing machine and UTM machine at room temperature are carried as per ASTM standards and found that Al6061-7 wt% B<sub>4</sub>Cp composite material's hardness, Yield stress and ultimate tensile strength are magnified by 24.15%, 15.17% and 23.577% respectively while percentage of elongation is sink by 39.07% as compare to Al6061 alloy. Finally, the tensile fracture surface was examined for micro mechanisms of failure and its surface morphology stipulates ductile kind of fracture and frail interface leading to fracture mechanism.

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### 1. Introduction

Steering knuckle which belongs to automotive suspension that create connection between the tie rod, stub axle and axle housing. Its function is to convert tie rod's linear motion into angular motion of the stub axle. The lighter steering knuckle resulting greater power and less the vibration because of the less inertia. The steering knuckle must be as light as possible, very strong and also rigid. The steering knuckle is subjected to Tension and compression loads, while turning and steering and also torsional load due to the wheel rotation. Grey cast iron, white cast iron or forged steel materials which is having high yield strength are used to manufacture steering knuckle in early days but the weight of these material is more which is the limitation of for its usage. [1]. In recent development, aluminium 6061 alloy is using for manufacturing of steering knuckle due to the good physical and mechanical properties as well as lightweight as compare to cast iron and steel [2,3]. In view of all above said requirements and load

for which it is subjected to, an attempt is performing to select an advance material which should possess lesser weight of steering knuckle without compromising required mechanical properties.

An aluminium Metal Matrix Composite material are the one in which aluminium or aluminium alloys like Al-Si, Al-Cu, Al-Si-Mg is used as the matrix material while SiC, Al<sub>2</sub>O<sub>3</sub>, C, B, B<sub>4</sub>C, AlN, SiO<sub>2</sub> or BN in the form of continuous fibre, discontinuous fibre or particulates are reinforced in matrix material [4]. The engineering applications of these aluminium metal matrix composite materials for the production of many components of automobile (like piston, connecting rod, engine block, brake rotor, calliper, liner propeller shaft), air crafts and aerospace industries etc, [4,5] are gradually increasing because of its magnified mechanical properties like amplified elastic modulus, yield and tensile strength, creep resistance, elevated temperature strength, declined coefficient of thermal expansion, Low density and good wear resistance. [4] Lighter Al6061 matrix can be toughen by reinforcing low weight hard ceramic particles such as SiC, Al<sub>2</sub>O<sub>3</sub>, TiB<sub>2</sub>, B<sub>4</sub>C etc. [6] and are widely used in the production of automobile components.

V Balaraj, NagarajKori, Madeva Nagaral, VAuradi [7] et.al, fabricated Al6061-5 wt% Al<sub>2</sub>O<sub>3</sub> particulate composites utilizing liquid metallurgy process and tested for mechanical properties and found

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## Photocatalytic and antimicrobial activities of biofunctionalized Ag nanoparticles derived from combustion method

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### ABSTRACT

The major global concern for human life is due to the toxic impact of synthetic dyes and hazardous microorganisms (bacteria). In this view, much research is focused on the antimicrobial and photocatalytic activities by preparing metallic-natured metal nanoparticles either through chemical or bio-/green-mediated methods. In this aspect, in the present work, we demonstrate the synthesis of silver nanoparticles (AgNPs) by a simple well-known chemical method, the solution combustion synthesis (SCS) method. The prepared AgNPs were subjected to various structural, optical, antimicrobial, and photocatalytic studies. In particular, we have explored the influence of AgNPs on *S. aureus*, *B. subtilis*, *P. aeruginosa*, and *E. coli* bacteria to investigate antimicrobial behavior activities. Structural studies by XRD and TEM results reveal the formation of crystalline, nano-sized AgNPs by SCS due to the exothermicity of the fuel used in the synthesis. Optical studies by UV-visible spectroscopy reveal the presence of surface plasmonic resonance (SPR) peak at or around 440 nm, which signifies the formation of AgNPs in accordance with the XRD and TEM results. The synthesized AgNPs demonstrated potential antimicrobial activity against the bacteria *S. aureus*, *B. subtilis*, *P. aeruginosa*, and *E. coli*. The zone of inhibition surrounding *B. subtilis* is the most susceptible of the tested bacteria. Furthermore, AgNPs showed remarkable photocatalytic activity in the degradation of indigo carmine dye.

### 1. Introduction

In biomedicine, nanotechnological materials are rapidly being researched for use as antibacterial agents (Mba and Nweze, 2021). Physicochemical methods for making nanoparticles (NPs) have been replaced mainly by environmentally friendly biological processes (Castillo-henr et al., 2020; Das et al., 2017). Multidrug resistance has now impacted the world, posing significant challenges in treating infectious diseases caused by microbial pathogens (Lee et al., 2019; Abadi et al., 2019). This is primarily due to antibiotics' widespread use in human, agricultural, and veterinary drugs. Controlling dangerous bacteria is unavoidable since human existence develops at a rapid pace. Although

many microorganisms coexist peacefully with humans, their fast and uncontrolled growth can cause significant difficulties. Nosocomial infections are just one of those issues that plague the world, and preventing their spread, particularly in hospitals, is a paramount concern (Abbas et al., 2019). Antibiotics are often utilized to prevent microorganisms from growing and breeding.

Nevertheless, the emergence of resistance and side effects has significantly hampered the usage of such drugs (Manyi-Loh et al., 2018). The performance of numerous categories of antimicrobial NPs and nanocarriers has been proven in treating infectious diseases in recent years, owing to the unique physicochemical features of nanoscale biological substances (Siddiqi et al., 2018). In addition, replacing present

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