

## Reinforcing optimization enabled interactive approach for liver tumor extraction in computed tomography images

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### ABSTRACT

Detecting liver abnormalities is a difficult task in radiation planning and treatment. The modern development integrates medical imaging into computer techniques. This advancement has monumental effect on how medical images are interpreted and analyzed. In many circumstances, manual segmentation of liver from computerized tomography (CT) imaging is imperative, and cannot provide satisfactory results. However, there are some difficulties in segmenting the liver due to its uneven shape, fuzzy boundary and complicated structure. This leads to necessity of enabling optimization in interactive segmentation approach. The main objective of reinforcing optimization is to search the optimal threshold and reduce the chance of falling into local optimum with survival of the fittest (SOF) technique. The proposed methodology makes use of pre-processing stage and reinforcing meta heuristics optimization based fuzzy c-means (FCM) for obtaining detailed information about the image. This information gives the optimal threshold value that is used for segmenting the region of interest with minimum user input. Suspicious areas are recognized from the segmented output. Both public and simulated dataset have been taken for experimental purposes. To validate the effectiveness of the proposed strategy, performance criteria such as dice coefficient, mode and user interaction level are taken and compared with state-of-the-art algorithms.

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## 1. INTRODUCTION

The liver [1] is the second-largest internal organ in human body. It helps to keep the human body free of toxins and toxic substances, helps to maintain body's metabolic balance. It is found in the abdomen upper right quadrant and weighs one and a half kilograms. The liver has many activities, including blood filtration, synthesis of protein, processing nutrients and fats, storing carbohydrates and transforming harmful substances into water solvable compounds. It is additionally inclined to a few kinds of liver ailments. The World Health Organization (WHO) [2] conducted statistical research on liver illnesses and concluded that it is one of India's most common ailments. Liver diseases can be identified with different colors for example brown for fibrosis yellow for fatty liver and blue for cyst.

Medical imaging [3] is a well-known technology used to view and examine the internal parts of the human body. This imaging provides a detailed informative mapping of a subject's anatomy. Because this imaging is primarily utilized for diagnosis, it is also known as diagnostic imaging. To diagnosis a specific problem in the human body, medical experts have used therapeutic hardware tools for image analysis. But

# VOICE CONTROLLER, OBSTRACLE AVOIDANCE AND METAL DETECTION CAR USING ARDUINO

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**Abstract** - The Voice Controller, Obstacle Avoidance and Metal Detection Car using Arduino Uno is a smart car that can be controlled using voice commands, avoid obstacles on its path, and detect metal objects. The car is based on the Arduino Uno board, it is equipped with a voice recognition module that recognizes specific voice commands such as "forward", "backward", "left", "right", and "stop". The module converts the voice commands into digital signals that are sent to the Arduino Uno board. The car also features an obstacle avoidance system that uses an ultrasonic sensor to detect obstacles on its path. When an obstacle is detected, the car changes its direction to avoid the obstacle. In addition, the car is equipped with a metal detection system that uses a metal detector sensor to detect metal objects. The metal detector sensor generates an electromagnetic field that interacts with metal objects and produces a voltage signal. This signal is then amplified and processed by the Arduino Uno board, which triggers an alarm or buzzer to alert the user of the presence of metal objects. The car is powered by a rechargeable battery that provides the necessary power to the Arduino Uno board and the various sensors and motors used in the car. The car is designed to be compact, portable and easy to operate. Overall, the Voice Controller Obstacle Avoidance and Metal Detection Car using Arduino Uno is a versatile and intelligent car that can be used for a variety of purposes such as surveillance, exploration and entertainment.

**Index Terms** Arduino Uno, Voice Controlled Robotic Vehicle (VCRV), Dual Tone Multi Frequency (DTMF), DC Motor, Transmitter, Receiver

## I. INTRODUCTION

Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing. The transducer of the sensor acts as a microphone to receive and send the ultrasonic sound. Our ultrasonic sensors, like many others, use a single transducer to send a pulse and to receive the echo. An ultrasonic sensor necessarily consists of a transducer for conversion of one form of energy to another, a housing enclosing the ultrasonic transducer and an electrical connecting.



Figure 1: HC-SR04 Ultrasonic Sensor Pinout

**Ultrasonic Transmitter:** It is used to transmit the ultrasonic wave towards a road surface to find out the obstacle. The range of the obstacle detected depends on the range of ultrasonic sensor that is used.

**Ultrasonic receiver:** It is used for receiving the ultrasonic waves reflected from the road surface to generate a reception signal. This signal is then amplified by an amplifier.

# 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> (8hr)	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	0-50	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	81-380	401-800
Poor (201-300)	251-350	91-120	181-280	169-208	10-17	381-800	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



# Lung cancer CT image classification using hybrid-SVM transfer learning approach

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## Abstract

Lung cancer is a leading deadly form of the illness that is the cause of one million deaths around the world every year. Identification of lung nodules on chest computed tomography (CT) scans has become an extremely necessary procedure in modern medicine as a result of the present state of things in the field of medicine. This occurs as a result of the fact that lung cancer does not display symptoms until it has progressed. Early detection and precise diagnosis of suspected malignant lung nodules will improve therapy and lower lung cancer mortality. This paper proposes a transfer learning-based approach to classify lung CT images and detect the cancer. The input images are first sent to the pre-trained hybrid model consisting of AlexNet, VGG and GoogleNet. The model extracts features from the images, and these features are sent to the multi-class support vector machine (SVM) for classification. As in any deep learning model, the data are first trained and then tested on real-time images. The training of the model is done with the help of IQ-OTH/NCCD dataset which contains 1190 images belonging to three categories, normal, benign and malignant. The data are divided into different ratios while training and validation stages to test the efficiency of the proposed model. The proposed model obtained a superior accuracy of 97% which is much higher than the existing models.

**Keywords** Lung cancer · CT scan · AlexNet · VGG and GoogleNet · SVM · Transfer learning

## 1 Introduction

Lung cancer is the most common kind of cancer to end in mortality, and this is mostly attributable as the disease is diagnosed at a very later stage (Asuntha and Srinivasan 2020). There is presently no possibility that a therapy will be discovered that will be effective. Lung cancer is commonly acknowledged to have one of the highest mortality rates among all types of cancer, regardless of whether a country is classified as developed or developing (Travis

2020). An increase in the rate of urbanization, an increase in the average life expectancy, and the adoption of western lifestyles are some of the reasons that are contributing to the rise in the prevalence of lung cancer in emerging countries. Both the early diagnosis of cancer and the continued health of those who already have the illness are crucial to the prevention and treatment of lung disease.

Worldwide, lung cancer is among the most prevalent forms of the disease and ranks among the leading causes of mortality due to the disease. It is responsible for thirteen percent of all newly diagnosed instances of cancer and nineteen percent of all deaths caused by cancer globally. It is anticipated that 1.8 million new cases of lung cancer were diagnosed in the year 2021. In India, 6.9 percent of all new instances of cancer and 9.3 percent of all fatalities linked to cancer are attributable to lung cancer. This percentage applies to people of both sexes. In terms of new cancer cases, lung cancer accounts for 6.9 percent (Malik and Raina 2015 Jan).

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# Motion Estimation using Optical Flow Through A CNN based Pyramidal Warping and Cost Volume Approach: An Optimized PWC-Net Model

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**Abstract**— The use of video in our everyday digital interactions is on the rise. With the advancement of higher-resolution content analysis and displays, the substantial volume of video content presents considerable challenges in terms of acquisition, transmission, compression, and display while maintaining high quality. Video compression is very crucial to manage the resources as well as ensure smooth transmission and playback of digital videos across different platforms and devices. In our work, we introduce an optimized PWC-Net (Pyramidal Warping Cost Volume-Net) architecture for motion estimation, which is a computationally intensive initial component present in codecs for video compression, such as H.264 and H.265/HEVC. Proposed approach utilizes a CNN (Convolutional Neural Network) based PWC-Net architecture to estimate the optical flow between the frame sequences, which is considered as the motion information. Our model, compresses the video sequences efficiently without computing the motion vectors unlike the traditional motion estimation techniques using block-based methods. It demonstrates its effectiveness with the experimental results when performing compression on various H.264 codecs. It learns efficient video compression without the need for motion computation unlike the traditional motion estimation techniques and our experiments show that an optimized PWC-Net outperforms good compression ratio by performing motion estimation through optical flow when compared with existing motion estimation schemes on H.264 and H.265 codec.

**Index Terms**— Video compression, Motion estimation, CNN, Optical flow, Optimized PWC-Net.

## I. INTRODUCTION

Motion Estimation occupies a significant portion in the process of video compression. It eliminates the temporal redundancy in video frames through inter-frame prediction. Previously, motion estimation was performed using a conventional block-based motion estimation algorithm to estimate the motion between consecutive frames. Specifically, in order to provide motion compensated prediction, each frame is divided into macroblocks and their motion vectors are determined using a block matching technique. Later this data is harnessed to minimize redundancy and encode the video data with optimal efficiency. Techniques for motion estimation determine pixel or block displacements between frames, empowering the encoder to express motion as vectors. These motion vectors, coupled with residual data are subsequently compressed, transmitted or stored. Obtaining the motion

## Land Registration System Using Blockchain Technology

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**Abstract:** Any government system would be incomplete without the Land Registry system, which is responsible for maintaining vital data on the ownership, history of transactions, and other aspects of land. The current system has many flaws that increase the likelihood of dishonesty and disagreements. The proposed system deals with this problem by integrating blockchain technology into the land register system. The use of blockchain technology has been predicted to create a safe and trustworthy land register system. Blockchain is being used in this instance as a cryptographically encrypted electronic ledger for digital documents and transactions. To close the gaps in the current land register, this system attempts to create a model for a secure and reliable land registration system enabled by blockchain technology.

**Keywords:** Block chain technology, distributed ledger

### I. Introduction

The use of blockchain technology enables the creation of a decentralized and continuously expandable list of bookings, where proper state documentation is necessary due to the involvement of multiple participants in the bookkeeping process. This technology is known as Distributed Ledger technology, which can be used to book and document any kind of transaction. The key feature is that subsequent transactions rely on the correctness of past transactions and validate them. It is not limited to property transfers but can also involve formal confirmation of document existence by a notary for the creation of a notarized land purchase agreement. This technology allows for faster and more transparent processing of individual steps in the transfer of ownership process, giving all parties involved a real-time overview of the progress. A continuously growing record of transactions that are securely maintained and stored in decentralised manner can be made using blockchain technology, a sort of distributed ledger technology [6]. Blockchain technology offers a reliable and impenetrable record of transactions when it comes to reservations and bookkeeping, making it a desirable alternative for businesses that demand a high degree of security and transparency [2,3]. The proposed method provides a way for secure trading of land and the privacy is not compromised at any point. Documents provided by each user are verified directly by land survey department and on successful verification of documents, the landowner will provide with the unique ID which is attached with the land ownership document, and which will be passed on to the next user after selling that land. This avoids reselling of same land. And by this being the online platform removes the need for a middleman or broker to sell or buy the land. This also records all the transaction history of each land and is secure[4].

# 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 of 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 are 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 results in benefits of consuming less space on hard disk drives and requires comparatively less time to upload or share it over network/Internet.

# A Contemporary Survey on advancements in Adversarial Attacks and Defense Mechanisms in the field of Machine Learning

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**Abstract**—Over the past ten years, machine learning, deep learning, and artificial intelligence technologies have found ever-wider applications in a variety of disciplines, including cyber security. current digital world has wealth of data, such as Internet of Things (IoT) data, cybersecurity data, mobile data, business data, social media data, health data, etc. A plethora of applications are utilizing machine learning systems due to their growing accuracy. Attack strategies for machine learning models evolved together with the models themselves. Since machine learning algorithm designers are typically more concerned with creating effective and efficient models than they are with ensuring security and durability, models constructed using machine learning and deep learning approaches now confront a new issue. These techniques' weak modeling eventually makes them more vulnerable to adversarial attacks. Adversarial attack is a strategy an attacker utilizes to deceive and command machine learning and deep learning models. Goal of an adversarial attack is to fabricate inaccurate predictions or classifications by taking advantage of vulnerabilities in the model's decision-making process. With the speed at which machine learning (ML) and artificial intelligence (AI) applications are evolving, it is imperative that the stability and security of the deployed algorithms be ensured. Therefore, evaluating the effectiveness, robustness and resistance to adversarial attacks of a machine learning system is essential. This paper offers a thorough, methodical literature review of this recently-emerging discipline along with potential countermeasures. The several adversarial attack types that are looked at in this survey include Evasion, Data poisoning and Model extraction attacks based on how the attack environment perceives them. This review also emphasizes many strategies mainly adversarial training, ensemble learning and model configuration as the possible countermeasures for defending against these attacks.

**Keywords**—Adversarial Machine Learning, Adversarial Attacks, Cyber Security, Data poisoning attacks, Evasion attacks, Ensemble learning and Adversarial training.

## I. INTRODUCTION

To intelligently analyse data and develop corresponding smart and automated applications, the knowledge of artificial intelligence (AI), particularly, machine learning (ML) is the key [1]. The ubiquity of applications in AI and ML are fostered by increase in availability of data, advances in computing technology and new robust techniques [2]. Machine Learning (ML) algorithms with Deep Neural Networks (DNNs) have been able to solve a wide range of problems, particularly very complex ones. They have been able to achieve results that are on par with or better than those of humans in a number of tasks, including object recognition, face recognition, natural language processing, speech recognition, wireless communications, networking, finance, and e-commerce also these algorithms have been used in critical fields including healthcare, cyber security, malware detection and self-driving cars [3], where their misuse or malfunction can have catastrophic consequences for users. Adversarial risks are becoming more frequent in machine learning enabled systems [4]. Security is a major concern because these systems are widely used in society. Attacks on these systems have the potential to result in disastrous errors since communities are depending more and more on machine intelligence. Weak modelling of Machine learning technique has number of drawbacks that might negatively impact a system and lead to system failures when applied in different fields. Adversaries have noticed these weaknesses and have taken advantage of them for iniquitous purpose. For instance, attackers may insert fake data into the system and use machine learning algorithms to process it, or they may enter the system to seize control. Thus, the actions of adversaries may decrease the reliability of a system and may compromise the confidentiality and the availability of the system. Organizations are finding that protecting machine learning is becoming perceptibly important as it quickly becomes a core component of their



# Insights into Air Quality and Mixed Gas Analysis: A Machine Learning and Visualization Approach

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**Abstract:** The widespread threat of air pollution looms over our cities, silently endangering both human health and the environment. In response, this project delves into a comprehensive analysis of air quality metrics and pollutant data sourced from the CPCB website of India. By meticulously examining these datasets, we aim to uncover crucial insights into pollution trends and identify the primary pollutants contributing to environmental degradation. Our approach extends beyond analysis, as we strive to translate these insights into actionable information accessible to the public, policymakers, and stakeholders through an intuitive website interface featuring interactive dashboards. In the realm of air quality prediction, we leverage advanced machine learning algorithms, including Random Forest, Linear Regression, Decision Tree, XGBoost, K-nearest neighbours (KNN), and Lasso Regression. These models empower us to forecast air quality trends with precision and assess the environmental impact of mixed gas reactions. Furthermore, our study delves into the intricate dynamics of mixed gas interactions in chemical reactions, focusing particularly on five key gases, carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), methane (CH<sub>4</sub>), and ammonia (NH<sub>3</sub>). Through rigorous analysis and visualization techniques, we explore how varying proportions of these gases influence the formation of diverse chemical products and their potential harmfulness. By combining empirical data analysis with sophisticated modeling techniques, our project aims to provide valuable insights and tools for combating air pollution and safeguarding both human health and the environment.

**Keywords:** Air quality, Mixed gas analysis, Machine Learning models, Visualization, Predictions, CPCB (Central Pollution Control Board)

## I. INTRODUCTION

Air pollution presents a widespread and escalating issue in the modern age, arising from various anthropogenic sources, including industrial operations, transportation, and the combustion of fossil fuels. This widespread contamination of the atmosphere results in the emission of hazardous pollutants, encompassing carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), particulate matter (PM), nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>), and more. These pollutants not only pose a threat to human health but also cast a shadow on the ecological balance, impacting both animals and plants. The far-reaching implications of air pollution range from respiratory diseases like bronchitis and lung cancer to broader environmental concerns such as global warming, acid rain, and climate change. Furthermore, it exacts a heavy economic toll on societies and leads to an array of contemporary environmental issues, including reduced visibility, smog, aerosol formation, and premature deaths.

Scientists and researchers have recognized that air pollution extends its adverse effects even to historical monuments. Emissions from vehicles, industrial facilities, agricultural practices, and power plants contribute to the emission of greenhouse gases, which, in turn, exacerbates climate conditions and disrupts plant-soil interactions. These climatic fluctuations have repercussions not only on human and animal populations but also on agricultural productivity, leading to significant economic losses.

# Cyber Sentry: A Chatbot Solution for Tackling Cybercrime

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**ABSTRACT:** Cybercrime is becoming an increasingly widespread issue in India, leaving individuals struggling to navigate the complex legal system surrounding these violations. To address this problem, a Cyber Crime Chatbot Generator for Indian Law has been developed. This innovative technology aims to bridge the legal knowledge gap by providing an easy-to-use, readily accessible educational resource for dealing with cybercrime-related problems. The chatbot generator is built on a robust platform that provides detailed guidance on recognizing, understanding, and addressing cybercrime concerns under Indian legislation. The system promotes transparency and trust in the legal system by providing a wealth of legal resources, articles, and frequently asked questions on cybercrime to enhance users' knowledge and understanding. In addition to empowering individuals, this innovative approach aims to enhance the effectiveness and efficiency of India's legal system in combating cybercrime and promote a more equitable and knowledgeable society. The Cyber Crime Chatbot Generator for Indian Law is poised to have a significant impact on the fight against cybercrime in India by utilizing technology to bridge the legal knowledge gap.

**Keywords:** Cybercrime, Legal System, Chatbot, Resource, Legal knowledge.

## I. INTRODUCTION

In an era of boundary-breaking legal assistance, a visionary initiative arises, offering empowerment and reshaping the legal landscape. Legal understanding becomes universally accessible, transcending the confines of attorney offices. This interactive platform offers pre-emptive solutions, addressing users' needs before formal consultations. Its core philosophy lies in empowering individuals with legal knowledge for confident decision-making. The multifaceted design caters to various services, from common legal queries to guiding initial legal steps, fostering legal literacy and societal participation. Beyond traditional challenges, the platform addresses cybercrime, offering guidance on online fraud, data breaches, and

# Survey on Multi-Modal Medical Image Fusion

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**Abstract:** Multi-modality medical or clinical image fusion is a field of study aimed at enhancing diagnostic accuracy and aid in decisions to be taken by medical professional. Various fusion techniques such as pixel-based, region-based, and transform-based approaches are applied in image fusion to provide accurate fusion. Different devices which take scans of body such as MRI, CT, PET, SPECT, Ultrasound hold and carry different features, and different medical sensors obtain different information of the particular part of the body. Each of these imaging modalities offer only specific information that is used for the detection and analysis of specific problem. The idea behind fusion is to achieve and get better contrast and better fused image. The algorithm is making use of the common pyramid type and similarity type fusion algorithm with the neural networks model to achieve a better and more flexible fusion method. The advantages of image fusion medically are widespread. It plays a pivotal role in tumour localization, surgical planning and in treatment assessment.

**Keywords:** Image fusion, Multimodal medical image, Convolutional neural network (CNN), Image Decomposition, Feature Extraction

## I. INTRODUCTION

Medical image modalities are Computed Tomography known as the CT scan, Magnetic Resonance Imaging known as the MRI scan, Positron Emission Tomography known as the PET scan, and Single-Photon Emission Computed Tomography known as the SPECT have provided medical professionals with overview of the body's structural features like bones, soft tissue characteristics and many other characteristics. As each of these modalities use a different imaging principle, they have different advantages which can be used in the domain. Image fusion combines the diagnostic features of two or more modalities to provide a reliable basis for diagnosis of the human body. The composite image will be of better quality and help in achieving a much suitable platform for medical professionals in diagnosing the part of human body. This can be very helpful in various fields such as image recognition in medical imaging or helps in combining different perspectives from different data sources to improves analysis accuracy.

Image fusion is usually of three types, they are pixel-level fusion, feature level fusion, and decision level fusion. If the fusion is through considering each pixel information from input modality images, fusion is considered to be pixel-level. If the fusion is through considering the features from the input images, then the fusion is considered to be of feature level. If the image fusion is through considering the decision parameters from the each source images, then the fusion is considered to be decision level.

Multi scale transform (MST) technique is one of the highly used methods in the image fusion. The MST fusion technique is based on three fundamental steps. Initially the source images are converted into MST domain by the inbuilt tools from the software. After that the parameters of different scales are merged using a special fusion strategy. At last, composite image is rebuilt through the originally used inverse MST transformation. The MST techniques uses the laplacian pyramid (LP), The wavelet transform (WT), the non subsampled contourlet transform (NSCT) and the non-subsampled shearlet transform (NSST) . It is observed that if the MST method used compared to other fusion measures, some phenomena knows as the block effect is observed. To overcome this disadvantage, some fusion measures along with the MST method is used together. Taking the example, spatial frequency (SF), local variance (LV), the energy of image gradient (EIG) and sum-modified-Laplacian (SML) are commonly used as fusion measures along with MST method. The other disadvantage of these measures applied in the space domain or low-order gradient domain, the fusion map may not be always precise which is expected in the industry. Except for traditionally used MST methods, the edge preserving filtering (EPF) is used along with MST image decomposition are also used frequently. In the EPF-MST techniques, Gaussian filtering and EPF are used to decompose the original image modality into two detailed layers and one base layer components. These three layers are then fused based on suitable fusion techniques. Finally, the fused composite image is represented by a reconstruction algorithm used as the medical fusion algorithm.

As the images used are by the biological nature, artificial neural networks (ANN) has the ability to learn from input image modalities in order to make decisions and fusion through feature processing.

A training dataset is used to adjust a set of parameters to provide accurate predictions without relying much on complex mathematical models and calculations .



# MACHINE LEARNING APPROACH TO ANOMALY DETECTION IN CLOUD INFRASTRUCTURE

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**Abstract:** The need for secure communication and data protection has become increasingly important in the digital age. As the use of digital technologies continues to grow, the need for secure communication and data protection also increases. Anomaly detection is a crucial aspect of data analytics that can identify suspicious behavior and detect malicious activities. This is particularly crucial in the cloud computing environment, where data is stored on multiple servers and accessed remotely by various users. The Local Pollination Grey Wolf Optimizer (LPGWO) is a global optimization algorithm that has been utilized in various applications. It is based on the concept of "cognitively guided exploration," which is a form of local search that utilizes an individual's experiences to direct the exploration. It has been successfully used to solve optimization problems in various fields, such as image processing, communication networks, and cryptography. The proposed algorithm is evaluated using various parameters, including the number of iterations, time complexity, and success rate. The performance of the proposed algorithm is then compared to existing RSA algorithms to determine its superiority. This paper presents a Local Pollination Grey Wolf Optimizer (LPGWO)-based RSA algorithm for anomaly detection in heterogeneous cloud data using machine learning techniques.

**Index Terms - LPGWO, Grey Wolf Optimizer, RSA algorithm, Cloud computing, Machine learning, Anomaly Detection.**

## I. INTRODUCTION

In recent years, cloud computing has rapidly gained popularity due to its potential to offer numerous services and applications. The global cloud computing market is estimated to reach \$331.2 billion by 2022 (Harvey, 2017). However, managing resources for heterogeneous cloud data poses a challenge for cloud providers. Heterogeneous cloud data refers to data that is stored in different formats, including structured, unstructured, and semi-structured data, and can be sourced from various origins. Jyothi S et. al. proposes the managing heterogeneous cloud data resources requires the ability to efficiently and effectively identify and allocate resources [14] [15] [16]. Anomaly detection is the process of identifying unusual behavior or patterns in a dataset. It is used to detect suspicious behavior and malicious activities. Anomalies can be divided into two categories: point anomalies and background anomalies. A point anomaly is an individual data point that significantly differs from the rest of the data points in the dataset. Text anomalies are patterns of data that are unusual in the context of the entire dataset.

# Smart Personal Protective Equipment in Ambulance Services with IoT Integration for Safety

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**Abstract**— Internet of Things (IoT) technology has improved ambulance safety and efficiency. In ambulance services, Smart PPE (Personal Protective Equipment) improves patient and healthcare worker safety via IoT connectivity. In crises, ambulances are vital. However, healthcare professionals risk contagious infections and physical damage. Though vital, traditional PPE lacks real-time monitoring and communication, leaving healthcare workers exposed. These issues are addressed with Smart PPE using IoT. This novel invention adds sensors and communication devices to paramedic and EMT PPE. These sensors measure air quality, temperature, and the wearer's heart and body temperature. A centralized system can remotely monitor healthcare personnel's safety and well-being using real-time data. Smart PPE has two-way communicators and emergency alert systems. Emergency coordination is improved by ambulance crews and dispatch centers communicating seamlessly. The Smart PPE can automatically inform the team and dispatch in urgent situations, increasing response times and patient outcomes. IoT enables predictive maintenance and data analytics. Trends and dangers may be identified from gathered data, allowing proactive risk mitigation. Smart PPE can measure use and remind users to maintain and replace equipment, assuring dependability when required most. By continually monitoring conditions, allowing real-time communication, and enabling data-driven decision-making, this unique technology improves ambulance services and reduces dangers to devoted personnel.

**Keywords**— Ambulance Services, Real-time Alerts, Emergency Healthcare, Efficiency Improvement, Safety Enhancement

## I. INTRODUCTION

PPE is a widely established guarantee to decrease losses and retain military combat efficiency as ordnance technology advances, posing a major danger to the lives and safety of individual warriors in high-tech warfare [1]. The unique protective equipment system is inevitably headed toward full protection, multifunction, and information technology as technology and the nature of war continue to advance, and the potential for individual PPE to reduce soldier risk and enhance combat capabilities becomes clearer.

The ambulance is cleaned after every journey. Clean rescuers also dispose of bio-waste and other discarded gear [2]. At the exit base, infectious ambulances have their own entry and hygiene facilities to avoid interaction with other staff. Nowadays, when individuals are going from one continent to another by aircraft in a few hours, and the virus is spreading, special ambulances must be prepared and used to carry infected patients.

The COVID-19 epidemic has greatly affected manufacturing. Manufacturers with flexible, diversified, and specialized equipment changed their production emphasis and approach to meet demand [3]. Competitors frequently cooperate to achieve a goal, or companies with complementary capabilities combine to handle problems more efficiently. As various parties tried to fix PPE technology's inability to be reused and lack of viable alternatives, research and invention increased. Innovative mask designs and manufacturing processes have increased PPE supply, while strategies for retaining mask viability after disinfection have reduced demand and waste.

The number of telehealth programs and the quality of existing telemedicine solutions have increased due to the epidemic [4]. Telemedicine has been used to stop the spread of COVID-19 and safeguard healthcare personnel, particularly in emergency rooms (EDs). The most significant novel approaches to providing emergency treatment during the COVID-19 epidemic are the topic of this narrative review. It describes the broad types of telehealth that are presently being used and will be used in the future to treat patients with COVID-19. Additionally, both the advantages and disadvantages of telemedicine are covered.

Port safety system design and implementation for Montenegro's expanding Port of Bar, which has operated for decades in a transitional context, is discussed in [5]. An RFID safety model using PPE clothes with active/passive RFID devices has been presented based on secondary literature research. Such ready-made alternatives are also proposed to the Port of Bar administration. Also shown are the outsourcing model that appears most suited to this scenario and ideas for future analysis.



# Restoration of Obscured Images

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**Abstract:** For the aim of exploring the deep undersea world map, a picture of high quality without interfering objects is preferred. However, within the water, the image quality tends to be hampered by light scattering, water density, and light attenuation effects. Besides, the dynamic interference may affect the important underwater map. During this paper, we proposed a multi-step and all-around underwater image processing system, especially for the underwater images taken in succession to enhance the image quality, remove the dynamic interference, and reconstruct the image. The first step involves utilizing the dark channel approach together with the improved gray world algorithm for brightness adaptation and color correction. Initially, it identifies and removes a dynamic interference regarding image enhancement. Secondly, we applied an upgraded total variation model to patch the blank at the value of resolution. Finally, the super-resolution of the small print is realized by applying an improved BP network. After simulation and experiments, our system proved to realize ideal results of image enhancement and reconstruction.

**Index Terms:** Maximum Intensity, Light, Image, Contrast.

## I. INTRODUCTION

The oceans are home to a variety of enigmatic and unidentified species as well as a vast supply of energy-producing resources, which contribute significantly to the sustainability of life on Earth [1]. Since the turn of the 20th century, high-tech maritime exploration initiatives have been undertaken globally [2]. Because of its ability to hold large amounts of data, vision technology has received a lot of attention [3]. In several undersea applications, including robotics [4], rescue operations, man-made structural inspection, ecological monitoring, tracking marine life [5], and real-time navigation systems [6], [7], researchers and scholars seek to obtain high-resolution underwater photographs. Academics and researchers are looking for high-resolution underwater photos. However, the underwater environment severely degrades image quality, causing problems that are easier to fix in terrestrial imaging. Images taken underwater consistently exhibit color casts, such as green-bluish hues, which are brought on by varying degrees of red, blue, and green light attenuation. Particles in suspension also have Images with a lot of blur and haze are caused by the fact that submerged objects absorb most photon energy and shift the direction of light before it reaches the camera [8]. Artificial light sources are widely employed in underwater imaging to extend their effective range. However, scattering and absorption have an impact on artificial light [9]. Simultaneously, an uneven lighting pattern is applied, leading to luminous areas in the center of the underwater picture and inadequate lighting in the direction of the boards [10]. Shadowing is one of the other phenomena that degrades quality. For underwater photographs to yield meaningful details, trustworthy methods for color correction, sharpening, and background scattering removal are therefore required. These are especially difficult because of the complicated underwater environment, where turbidity, light absorption, and scattering—all of which can vary widely cause lower-quality photographs.

## II. UNDERWATER IMAGE ENHANCEMENT METHODS

We approach the handling of specific problems in specific images using different algorithms. Many things are not perfect in the images taken underwater like the color attenuation, dark channels, intensity of the image, and adequate light to capture the image. We propose to use different algorithms for different problems to get the desired results. Underwater image enhancement is crucial to improve the visibility and quality of images in aquatic environments, where factors like attenuation, color distortion, and poor lighting significantly degrade image quality. Several methods and techniques are employed for underwater image enhancement

### A. Contrast Limited Adaptive Histogram Equalization

Contrast Limited AHE (CLAHE) is a kind of adaptive histogram equalization designed to lessen the issue of noise amplification by limiting contrast amplification. In CLAHE, the modification of discrepancy in the vicinity of a pixel value is given by the pitch of the metamorphosis function. The value of the histograms at this pixel value, which is connected to the value of the pixel in this picture, equals the pitch of the original CDF. CLAHE restricts amplification by cutting off or "clipping" the histogram, setting its highest point before computing the CDA.



# Safeguarding Connections: Machine Learning Powered Intrusion Detection

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**Abstract:** *It's crucial to have reliable intrusion detection systems. a cutting-edge method of machine learning-based intrusion detection. Our solution uses cutting-edge algorithms to detect and eliminate any threats instantly, acting as a preventative measure against a wide range of cyberattacks. Since the model has been trained on a large number of datasets, it can eventually strengthen network security by evolving and adapting to new threats. Naive Bayes (NB) classifiers and correlation-based feature selection (CFS) methods are used to reduce the amount of data. For attack classification, the Intrusion Detection System recommends using an Instance-Based Learning algorithm (IBK) in combination with a Multilayer Perceptron (MLP).*

**Keywords:** *Support Vector Machine (SVM), Multilayer Perceptron (MLP), Correlation Based Feature (CFS), Classifier subset evaluation, Intrusion Detection System (IDS), and Instance-Based Learning algorithm (IBK).*

## I. INTRODUCTION

The dynamic and expansive nature, has revolutionized the way we connect, communicate, and conduct business. With this paradigm shift, the security of networks and the data they handle has become a critical concern. The influx of smart devices, coupled with the constant exchange of information, underscores the imperative need for a sophisticated security infrastructure.

### A. Machine Learning

Machine Learning is a type of data analysis that falls under Artificial Intelligence. It's like teaching a system to learn, make decisions, and recognize patterns without needing a lot of human instructions. Mainly two types: Supervised and Unsupervised. There are also other methods like Semi-supervised and Reinforcement Learning. Machine Learning is like training a computer to be smart on its own. Where the system learns from data, makes decisions, and figures out patterns without being explicitly told everything. Think of it as two main types: one where it learns from examples with labels (Supervised), and the other where it explores data to find patterns without labels (Unsupervised). There are also other ways, like using a bit of labeled 2 data with lots of unlabeled data (Semi-supervised), or learning through trial and error for the best outcomes (Reinforcement Learning). The end goal is to make the system smart enough to make good decisions on its own.

### B. Intrusion Detection System

Intrusion, where unauthorized access can steal or damage computer and network data quickly, is a big problem in network security. It can even harm the hardware. While many techniques try to detect intrusion, getting it right all the time is tough. Accuracy, which depends on how well it detects real intrusions without giving false alarms, is a big challenge. Naïve Bayes and Support Vector Machine (SVM) are examples of clever algorithms that are used. This also offers feature reduction and normalization approaches so you can compare and determine which performs the best.

### C. Naive Bayes

Bayesian classifiers are like statistical wizards in the computer world. They can predict the chance that a certain model belongs to a specific group.

They rely on something called Bayes' theorem, which is a bit like a math magic trick. The idea behind Bayesian classifiers is that, for a certain group, the characteristics of the thing we are looking at don't depend on each other. It's like assuming that different features don't really influence each other in a group. This assumption is called class conditional independence. So, these classifiers use the probability of features to figure out the likelihood of something belonging to a particular category. It is a smart way of making predictions in the world of data.



# Survey on Air Pollution in India: Insights, Predictions, and Mixed Gas Analysis for an Improved Future

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**Abstract:** The sustenance of life on Earth is intricately tied to the quality of our air. But this precious resource is facing mounting threats from the harmful consequences of rapid industrialization, transportation networks, and the everyday practices of modern living. This research paper addresses the pressing issue of rising air pollution in India, with a strong emphasis on environmental well-being. Utilizing data from the Central Pollution Control Board of India (CPCB), our project focuses on air quality visualization, pollution prediction, and mixed gas analysis. We have developed an intuitive web-based platform for visualizing air quality data, offering a valuable tool for the public and policymakers. Additionally, predictive models are employed to anticipate pollution levels, facilitating timely intervention and mitigation. Our mixed gas analysis sheds light on the composition of atmospheric gases, enhancing our understanding of pollution sources. Through this interdisciplinary approach, our research aims to provide a comprehensive solution to combat air pollution, fostering environmental sustainability and public health improvement in India.

**Keywords:** Air quality, Mixed gas analysis, Machine Learning models, Visualization, Predictions

## I. INTRODUCTION

Air pollution is a pervasive and escalating issue in the modern age, arising from various anthropogenic sources, including industrial operations, transportation, and the combustion of fossil fuels. This widespread contamination of the atmosphere results in the emission of hazardous pollutants, encompassing carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), particulate matter (PM), nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>), and more. These pollutants not only pose a grave threat to human health but also cast a shadow on the ecological balance, impacting both animals and plants. The far-reaching implications of air pollution range from respiratory diseases like bronchitis and lung cancer to broader environmental concerns such as global warming, acid rain, and climate change. Furthermore, it exacts a heavy economic toll on societies and leads to an array of contemporary environmental issues, including reduced visibility, smog, aerosol formation, and premature deaths. Scientists and researchers have recognized that air pollution extends its adverse effects even to historical monuments. Emissions from vehicles, industrial facilities, agricultural practices, and power plants contribute to the emission of greenhouse gases, which, in turn, exacerbates climate conditions and disrupts plant-soil interactions. These climatic fluctuations have repercussions not only on human and animal populations but also on agricultural productivity, leading to significant economic losses.

Furthermore, contemporary environmental research has expanded its focus to encompass mixed gas analysis, recognizing that the complex cocktail of gases present in the atmosphere has multifaceted effects on both human health and the environment. These mixed gases include volatile organic compounds (VOCs), heavy metals, and other chemical constituents. The monitoring and analysis of mixed gases are essential for gaining a comprehensive understanding of air quality and its impact on public health.

The Air Quality Index (AQI), a critical parameter for assessing air quality, is closely linked to public health. A higher AQI level signifies greater exposure to dangerous pollutants, underscoring the urgency of predicting and monitoring air quality. This is particularly crucial in urban areas undergoing rapid industrial and motorized development. While many air quality studies and research initiatives are directed towards developing countries, where concentrations of deadly pollutants like PM<sub>2.5</sub> are disproportionately high, limited attention has been devoted to air quality prediction in Indian cities. Therefore, there is a compelling need to bridge this gap by analysing and predicting AQI for India.

In response to this pressing issue, our research project takes a comprehensive approach to address the multifaceted problem of air quality.



# Human Illness Classification Using Ayurvedic Tongue Diagnostic System

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**ABSTRACT:** *Clinically, doctors mostly rely on their own knowledge and experience when determining major lesions of a patient by observing the coloration, overall modalities, and volume of sputum of different parts of the tongue. Different doctors may come to drastically different judgments on the same tongue presentation with little overlap. Therefore, it is important to develop scientific methods that can help doctors diagnose based on standardized differentiation procedures and render reliable diagnoses in order to enhance the clinical application value of Ayurvedic medicine. To obtain quantitative and objective diagnostic results based on tongue properties, first tongue image acquisition and initial tongue area segmentation algorithm is proposed, second, the important feature to be extracted to train the intelligent system is identified and selected, and finally, using those extracted features supervised machine learning algorithms is developed to classify tongue images based on their diagnosing characteristics. Then the implemented training algorithm is verified with sufficient amount of test data using standard performance benchmarks.*

## 1. INTRODUCTION

The evaluation of tongue colour has been an important approach to examine human health in ayurveda because the change in tongue colour may suggest physical or mental disorders. The reliable tongue colour analysis results among test persons are limited because of a lack of quantitative evaluation of tongue colour. We aimed to use advances in digital imaging processing to quantify and verify clinical data tongue colour diagnosis by characterising differences in tongue features.

Image segmentation is a fundamental task in image analysis responsible for partitioning an image into multiple sub-regions based on a desired feature. Active contours have been widely used as attractive image segmentation methods because they always produce sub-regions with continuous boundaries, while the kernel-based edge detection methods, e.g., Sobel edge detectors, often produce discontinuous boundaries. The use of level set theory has provided more flexibility and convenience in the implementation of active contours. However, traditional edge-based active contour models have been applicable to only relatively simple images whose sub-regions are uniform without internal edges.

In order to analyse the distribution characteristics of tongue colours, a tongue image database satisfying three requirements needs to be built. Firstly, it should include as many images as possible to make the obtained results statistically significant and convincing. Secondly, acquired images should be of high and consistent quality. Since images captured from the same tongue body by different cameras or under different illumination conditions may vary from each other, our developed high level tongue image acquisition device and its associated colour correction process would be necessary to meet this demand. Finally, the database should be “complete” enough, i.e., it needs to cover samples captured from subjects of different genders, ages and especially various health-statuses.

Although we believe this work is the most comprehensive and detailed study on the tongue colour space to date, this work can be further extended along the following two directions. Firstly, the tongue image database still needs to be enlarged to cover as many kinds of tongue images as possible. Secondly, applications of this tongue colour space, such as the development of a dedicated tongue image acquisition device or tongue image analysing algorithms, can further be studied to promote the development of computerized tongue image analysis.



# A Survey on Yoga Posture Correction

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**Abstract:** Yoga is a holistic practice that combines physical postures, breath control, and meditation to promote physical and mental well-being. Yoga can be learnt by attending classes at a yoga center or through home tutoring. Books, podcasts, and videos can also be used to gain the knowledge. A good deal of people prefer self-learning, but without assistance and feedback, they may find it difficult to identify the inaccurate portions of their yoga poses and could not be able to determine whether they were executed correctly. Poor yoga practice might result in health problems including strokes and nerve damage. In order to help users practice yoga, we have proposed in this study a system that can track the movements of various body parts in yoga positions. By merging the deep learning intelligence with Google's MediaPipe's real-time detection of various human body joint points and the ability to infer the precision of specific postures in yoga from those joint points

**Keywords:** Yoga Posture, Deep learning, MediaPipe

## I. INTRODUCTION

Yoga, an ancient practice that combines physical postures, breathing exercises, and meditation, has gained widespread popularity for its numerous physical and mental health benefits. As yoga continues to attract a diverse and growing community of practitioners, there is an increasing demand for tools and technologies that can aid individuals in their practice, particularly in terms of posture estimation and correction. In response to this demand, the fusion of computer vision and machine learning has opened up a new dimension in the field of yoga by providing innovative solutions for real-time assessment and improvement of yoga postures. The practice of yoga traditionally relies on human instructors to guide practitioners in achieving proper alignment, balance, and form. While the guidance of experienced instructors is invaluable, it is not always readily available to all, and maintaining consistent feedback can be challenging. This is where technology steps in, offering the potential to democratize access to high-quality yoga instruction and personalized feedback. Yoga posture estimation and correction systems employ computer vision techniques and capabilities of Google's MediaPipe we detect different joint points of human body in real time and determine the precision of particular yoga poses for an individual by evaluating different angles. These technology-driven solutions hold significant promise in enhancing the overall yoga experience. They empower practitioners, from novices to advanced yogis, to develop a deeper understanding of their practice and refine their postures with precision. Moreover, these systems can help mitigate the risk of injury by identifying and correcting misalignments, promoting safer and more effective yoga sessions. In this survey paper, we delve into the rapidly evolving landscape of yoga posture estimation and correction. We explore the cutting-edge techniques and tools that are transforming the way people engage with yoga, examining the various methods and technologies employed, their advantages and limitations, and the potential for their widespread adoption. Additionally, we highlight the broader implications of this field in promoting health and wellness, as well as its relevance in the context of modern lifestyles where access to in-person yoga instruction may be limited. By providing an in-depth overview of the current state of research and development in yoga posture estimation and correction, this survey aims to shed light on the exciting advancements in the field and inspire further exploration. As technology continues to merge with the ancient practice of yoga, we are witnessing a dynamic synergy that has the potential to revolutionize how individuals engage with their physical and mental well-being through yoga, ultimately enriching their lives and promoting a more balanced and harmonious existence.

## II. EXISTING SYSTEM

In the realm of yoga posture estimation, several notable research endeavors have paved the way for innovative solutions. This section provides an overview of these significant contributions, highlighting their key findings and methodologies, which serve as the building blocks for the evolving landscape of yoga posture estimation and correction.

### A. Pose Classification Using PoseNet

In this system, individuals can choose a yoga pose they wish to practice and submit a photo of themselves in that pose. The system employs PoseNet, a deep learning framework, to identify and extract 17 key points from the uploaded photo, representing different joints in the body. These key points are labeled by "Part ID" and come with a certainty score ranging from 0.0 to 1.0, indicating the accuracy of the detection.



# A Survey on: Legal Chain Vault Using Blockchain

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**Abstract:** In the face of escalating crime rates accompanying rapid urbanization, traditional criminal record systems face challenges of tampering and inefficiency. The Paper proposes a blockchain-based solution, leveraging the decentralization and immutability of blockchain to create a secure and transparent network for legal records. By utilizing peer-to-peer networks, this system ensures easy accessibility while safeguarding data integrity through the immutability feature of blockchain. The decentralized nature of the blockchain reduces corruption risks, allowing third parties to monitor tamperproof transactions and promoting objectivity in criminal record management. The blockchain-based approach not only enhances transparency and accountability in criminal record keeping but also facilitates timely access to authentic records for law enforcement authorities. The Paper aims to revolutionize record management, making it more efficient, secure, and conducive to effective law enforcement in evolving urban environments.

**Keywords:** Blockchain, Smart Contracts, Decentralized System, Metamask Wallet.

## I. INTRODUCTION

Blockchain functions as a collaborative and unalterable ledger, streamlining the recording of transactions and monitoring assets within a business network. These assets encompass both tangible items like houses, cars, cash, and land, as well as intangible elements such as intellectual property, patents, copyrights, and branding.

Blockchain comprises a digital framework that enables electronic record-keeping, validation, and verification, eliminating the necessity for intermediaries. This technology ensures that data are accessible to all involved parties, making all information transparent and unalterable, effectively preventing any tampering or deletion of records. Blockchain adheres to a set of guiding principles, including governance, accountability, transparency, flexibility, availability, usability, manageability, and sustainability.

Blockchain holds considerable Significance are Blockchain lies in its pivotal role in the realm of business information management. Rapid and precise information dissemination is crucial for operational efficiency, and blockchain emerges as an ideal solution by offering instantaneous, shared, and entirely transparent data stored on an unalterable ledger accessible exclusively to authorized network participants. Through a blockchain network, diverse facets such as order tracking, payment processing, account management, and production oversight can be seamlessly monitored. The collaborative nature of this technology ensures that all network members possess a unified and unambiguous perspective of each transaction, instilling confidence while unlocking novel efficiencies and opportunities. Blockchain Functionalities are Blockchain operates by recording each transaction as a "block" of data, capturing the movement of assets, whether tangible (such as a product) or intangible (like intellectual property). Within the data block, various information can be documented, including details like who initiated the transaction, what occurred, when it happened, where, how much was involved, and even specific conditions, such as the temperature during a food shipment. These blocks are interconnected sequentially, forming a chain of data that traces the journey of an asset as it changes location or ownership. Importantly, the blocks validate the precise timing and order of transactions, and their secure linkage prevents any tampering or insertion of blocks between existing ones. Benefits of blockchain are Operational inefficiencies stemming from redundant record-keeping and reliance on third-party validations demand a transformative shift. Existing record-keeping systems are susceptible to fraud and cyber threats, impeding transparency and hampering data verification. The surge in transaction volumes due to the advent of IoT further exacerbates these challenges. This impediment not only hampers business agility but also erodes the bottom line, necessitating a more effective solution. Enter blockchain.

- 1) **Enhanced Trust:** As part of an exclusive members-only network in blockchain, confidence in the accuracy and timeliness of data is paramount. Confidential blockchain records are selectively shared only with network members explicitly granted access, fostering a heightened sense of trust.
- 2) **Heightened Security:** Blockchain mandates consensus on data accuracy from all network participants, ensuring immutability of validated transactions recorded permanently. Notably, no entity, including system administrators, can delete a transaction, reinforcing the security framework.

# A Survey on Alzheimer's Disease Recognition in MRI Images Deep Learning Approach

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**Abstract:** Alzheimer's disease is a neurodegenerative condition that has a aging population. Early diagnosis and intervention are critical. A valuable tool for the detection .This research aims to develop a deep learning-based approach for the automatic recognition in MRI images. In this study, architecture is employed to extract meaningful features from MRI images. Alzheimer's and non-Alzheimer's MRI images is utilized. The proposed deep learning approach in Alzheimer's disease recognition. The model achieves a high level of accuracy, sensitivity, and specificity in classifying MRI images. Potential to assist medical professionals in the early diagnosis and monitoring of Alzheimer's disease, ultimately contributing to improved patient care and outcomes.

**Keywords:** Alzheimer's disease, MRI images, deep learning, convolutional neural network, diagnosis, neurodegenerative condition.

## I. INTRODUCTION

The brain is considered one of the most important organs in our body. The brain controls and facilitates all the actions and reactions that enable us to think and believe. It also strengthens our senses and memories. Alzheimer's disease is a brain dysfunction that cannot be corrected and is progressive in nature. It intensifies slowly and destroys the memory cells, thus destroying the individual and the ability to think. It is a degenerative nerve disease that causes nerve cells to lose function or even die. Diagnosis of Alzheimer's disease is only about four to eight years. On average, one in ten people suffer from the disease, but it can sometimes strike at a younger age and has been found in several 20-year-olds. This disease is the main cause of dementia in the elderly. Dementia causes a decrease in cognitive abilities used in daily activities, 60-80% of dementia cases are Alzheimer's disease. This disease is associated with the accumulation of plaques and tangles in the brain, which involve brain cells and #039; injury and death. This was first noticed by Dr. Alois Alzheimer, where he saw a woman dying from internal changes in her brain tissue. After her death, the doctor scanned her brain and while doing so, he noticed the formation of various lumps. Therefore, people with this condition find it difficult to perform daily activities such as driving, cooking, etc. In the early stages, symptoms are not obvious and may include difficulty remembering names, misplacing important objects, and planning problems, things etc. The middle stage of Alzheimer's disease is the longest, and some symptoms can include severe mood swings, confusion, impulsivity, short attention span, poor object recognition, etc. The last stage is the most difficult. The most obvious symptoms are the inability to properly communicate with others, susceptibility to infections, poor judgment, poor sense of direction, short-term memory loss and visual disturbances. According to a recent study, there are about 50 million people worldwide with Alzheimer's disease. This disorder presents an enormous challenge to researchers and clinicians today, as it is often not recognized until patients reach the end stages of the disease, as their cognitive symptoms are often due to aging. Without better treatment, the risk of this disease will continue to increase. Therefore, the elderly have a high risk of contracting this disease. But early treatment can help slow the progression of dementia. Several factors have been linked to reducing the risk of Alzheimer's disease, including a healthy diet, physical activity, socialization, protecting the head from injury, reading, playing musical instruments and intellectual activity; Such activities can improve overall brain health and cognitive performance.

## II. RELATED WORKS

A. [Predicting cognitive decline from brain metabolism and amyloid imaging]

The paper [1] proposes a Predicting cognitive decline from brain metabolism and amyloid imaging Alzheimer's disease (AD), it is important to identify those individuals most likely to experience rapid cognitive decline. Using fluorodeoxyglucose and florbetapir positron emission tomography (PET). PET images of 139 AD patients, 171 MCI patients, and 182 normal subjects obtained from the Alzheimer's Neuroimaging Initiative database were used. A deep CNN was trained using AD 3D PET volumes and normal controls as inputs.

# Savoring Success: Enhancing Restaurant Recommendations with Videos

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**Abstract:** "Foodie-Finds" is an innovative application dedicated to showcasing the unique culinary experiences found in local communities. This project aims to immerse its audience in the diverse tapestry of gastronomy through engaging visuals and storytelling. By uncovering hidden culinary treasures ranging from quaint cafes to bustling food markets, the series, produced in collaboration with local chefs, artisans, and passionate individuals deeply rooted in their culinary traditions, aims to unveil the essence and cultural significance of each dish. Through a blend of immersive food preparation footage, interviews with culinary experts, and narratives exploring the historical and cultural context of dishes, Foodie-Finds seeks to captivate and educate viewers. Additionally, the application strives to foster a sense of connection and appreciation for various culinary heritages, encouraging viewers to embrace new flavors, cooking techniques, and cultural nuances. Interactive features within the movies further engage viewers, inviting them to actively explore regional dining options. Ultimately, Foodie-Finds takes its audience on a journey that transcends mere food enjoyment, cultivating a deeper understanding and respect for the cultural diversity and significance inherent in cuisines worldwide.

**Keywords**–Culinary experiences, Local communities, Cultural significances, Interactive features, Cultural diversity, Regional dining.

# Human Illness Classification Using Ayurvedic Tongue Diagnostic System

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**ABSTRACT:** *Clinically, doctors mostly rely on their own knowledge and experience when determining major lesions of a patient by observing the coloration, overall modalities, and volume of sputum of different parts of the tongue. Different doctors may come to drastically different judgments on the same tongue presentation with little overlap. Therefore, it is important to develop scientific methods that can help doctors diagnose based on standardized differentiation procedures and render reliable diagnoses in order to enhance the clinical application value of Ayurvedic medicine. To obtain quantitative and objective diagnostic results based on tongue properties, first tongue image acquisition and initial tongue area segmentation algorithm is proposed, second, the important feature to be extracted to train the intelligent system is identified and selected, and finally, using those extracted features supervised machine learning algorithms is developed to classify tongue images based on their diagnosing characteristics. Then the implemented training algorithm is verified with sufficient amount of test data using standard performance benchmarks.*

## 1. INTRODUCTION

The evaluation of tongue colour has been an important approach to examine human health in ayurveda because the change in tongue colour may suggest physical or mental disorders. The reliable tongue colour analysis results among test persons are limited because of a lack of quantitative evaluation of tongue colour. We aimed to use advances in digital imaging processing to quantify and verify clinical data tongue colour diagnosis by characterising differences in tongue features.

Image segmentation is a fundamental task in image analysis responsible for partitioning an image into multiple sub-regions based on a desired feature. Active contours have been widely used as attractive image segmentation methods because they always produce sub-regions with continuous boundaries, while the kernel-based edge detection methods, e.g., Sobel edge detectors, often produce discontinuous boundaries. The use of level set theory has provided more flexibility and convenience in the implementation of active contours. However, traditional edge-based active contour models have been applicable to only relatively simple images whose sub-regions are uniform without internal edges.

In order to analyse the distribution characteristics of tongue colours, a tongue image database satisfying three requirements needs to be built. Firstly, it should include as many images as possible to make the obtained results statistically significant and convincing. Secondly, acquired images should be of high and consistent quality. Since images captured from the same tongue body by different cameras or under different illumination conditions may vary from each other, our developed high level tongue image acquisition device and its associated colour correction process would be necessary to meet this demand. Finally, the database should be "complete" enough, i.e., it needs to cover samples captured from subjects of different genders, ages and especially various health-statuses.

Although we believe this work is the most comprehensive and detailed study on the tongue colour space to date, this work can be further extended along the following two directions. Firstly, the tongue image database still needs to be enlarged to cover as many kinds of tongue images as possible. Secondly, applications of this tongue colour space, such as the development of a dedicated tongue image acquisition device or tongue image analysing algorithms, can further be studied to promote the development of computerized tongue image analysis.

# A Contemplating Survey on Diverse Recommender Systems

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**Abstract** — The importance of recommendation systems has increased dramatically in the modern age of varied user preferences and information overload. In a variety of industries, such as social media, ecommerce, and entertainment, these systems are essential for enabling tailored user experiences, raising user satisfaction, and enhancing content engagement. This paper offers a thorough introduction to recommendation systems, emphasizing their foundational ideas, working methods, and effects on user behaviour and content consumption. From collaborative filtering and content-based filtering to hybrid and context-aware recommendation techniques, the abstract explores the core ideas and varieties of recommendation systems. It draws attention to the complex processes these systems utilize to examine past behaviour, contextual information, and user preferences in order to create recommendations that are relevant and customized. Moreover, it emphasizes how important feature extraction, algorithmic optimization, and data processing are to improving the precision and effectiveness of recommendation systems. The paper also addresses the difficulties and moral dilemmas surrounding recommendation systems, stressing the significance of tackling problems like algorithmic bias, user privacy, and openness in recommendation creation. In order to guarantee fair and objective suggestions for everyone, it examines the necessity of ongoing monitoring, assessment, and optimization of recommendation algorithms.

**Keywords**— Content-based filtering, collaborative filtering, hybrid recommendation, recommendation systems, personalization, and user experience, user privacy, and transparency.

## I. INTRODUCTION

The role of recommendation systems in influencing user experiences and consumer decision-making processes has grown in significance in the age of massive digital content repositories and information overload. Referred to as recommender systems, recommendation systems have become essential resources for helping users make their way through a plethora of options, whether in social media networks, e-commerce platforms, content streaming services, or other online domains. By applying sophisticated algorithms and data analysis methods, these systems act as intelligent middlemen, offering users tailored recommendations based on their individual needs and preferences. Recommendation systems aim to improve user satisfaction, expedite the content discovery process, and increase user engagement through the provision of relevant and compelling suggestions that are customized to each user's tastes, preferences, and past behaviour. These systems use a variety of techniques, such as content-based filtering, collaborative filtering, and hybrid approaches, to examine user behaviour, contextual data, and historical data in order to produce recommendations that are accurate and suitable for the given context. This paper offers a thorough examination of the fundamental ideas, procedures, and uses of recommendation systems, highlighting their critical function in promoting wise choices and improving user experiences on a variety of digital platforms. This research attempts to highlight the revolutionary influence of recommendation systems in creating a more personalized and interesting user experience by investigating the fundamental ideas, difficulties, and ethical issues related to these systems. This paper aims to illustrate the potential of recommendation systems in optimizing user engagement and promoting a more user-centric digital ecosystem through a critical analysis of recent developments and emerging trends.

## II. OBJECTIVES

- **Improved User Experience:** The main goal of recommendation systems is to improve user experience by offering tailored and pertinent suggestions that take into account personal preferences. This makes it easier for users to navigate and explore content without difficulty.



# Unusual Event Detection

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**Abstract:** *The protection of privacy against covert video recordings presents a considerable societal challenge. Our objective is to develop a computer vision system, such as a robotic device, that can identify human activities and improve daily life, all while ensuring that it does not capture video content that may violate individuals' privacy. In this paper, we propose a fundamental approach to reconcile these seemingly conflicting goals: the recognition of human activities using highly anonymized videodata with extremely low resolution (e.g., 16x12). We introduce a new concept called "inverse super resolution" (ISR), which entails learning the optimal set of image transformations to generate multiple low-resolution (LR) training videos from a single high-resolution source. Our ISR framework learns diverse sub-pixel transformations that are specifically optimized for activity classification, enabling the classifier to leverage high-resolution videos, such as those found on platforms like YouTube, by generating multiple LR training videos tailored to the specific activity recognition task. Through empirical experimentation, we demonstrate that the ISR paradigm significantly enhances activity recognition from extremely low-resolution video data.*

## I. INTRODUCTION

Numerous initiatives aimed at the intelligent recognition of human actions have emerged as a result of recent developments in the disciplines of computer vision and pattern recognition. A comprehensive understanding of human activity is crucial in a wide range of applications, including surveillance systems and human-computer interactions. Notably, a system for recognizing human activities has the potential to distinguish between unusual activities and regular activities performed by individuals in public spaces, such as airports and subway stations. The automated recognition of human activities is particularly valuable for real-time monitoring of elderly individuals, patients, or infants. Specifically, human action recognition aims to automatically identify and categorize the activities performed by a person, whether it involves walking, dancing, or engaging in other actions. This capability is essential for numerous applications, including surveillance, content-based image retrieval, and human-robot interaction. The complexity of this task arises from the variability in the appearance of individuals, the intricate articulation of poses, changing backgrounds, and the possibility of camera movements. In practical applications, tracking a target in low-resolution video poses a formidable challenge as a result of the loss of discernible visual features in objects in motion. Existing methodologies typically rely on the augmentation of low-resolution (LR) video through super-resolution techniques, albeit at a high computational cost. This cost escalates further when dealing with event detection tasks. This paper introduces an algorithm tailored for the detection of unusual events without resorting to such conversions, making it well-suited for enhancing College/University security, where cost-effective, low-resolution cameras are commonly utilized. The proposed algorithm employs morphological operations with a disk-like structuring element during preprocessing to address the limitations of low-resolution video. It separates dynamic backdrops from foreground elements in a scene using a rolling average background subtraction algorithm. The algorithm is noteworthy for its ability to recognize infrequent occurrences in low-resolution video, like fighting or crowding, based only on statistical analysis of moving objects' standard deviation. Its efficiency stems from its ability to process low-resolution frames swiftly, making it a valuable tool for enhancing College/University surveillance systems that continue to rely on conventional, low-resolution cameras. Importantly, the algorithm obviates the need for classifiers and initial system training.

Various techniques have been employed for scenario recognition, including Bayesian approaches and Hidden Markov Models (HMM) to detect both simple and complex events within scenes. However, this paper demonstrates that a simpler alternative, based on a control rule-based scheme, can be equally effective in recognizing activities in a given context. The action recognition system leverages silhouettes of objects extracted from video sequences for action classification, involving two primary phases: offline manual creation of silhouette and action templates, and real-time automatic action recognition. Actions performed by humans, such as walking, boxing, and kicking, are classified on the basis of temporal signatures of different actions represented by silhouette poses. This paper predominantly focuses on rule-based activity recognition, drawing inferences about action classes based on the recognition of individual atomic actions or sequences of recognized poses. The identified action classes are often considered as atomic or primitive actions, with more intricate activities being perceived as sequences of these fundamental actions.





# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

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## GALACTICAL IMAGE DETECTION AND IDENTIFICATION - A SURVEY REPORT

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**Abstract** The human visual system effortlessly recognizes and identifies objects within its field of view, showcasing remarkable speed and accuracy in tasks such as object detection and identification. Valuable clues regarding the origin and evolution of the universe are intricately woven into the shapes and formations of galaxies. However, automating the classification of galaxies from their images poses challenges due to the faintness of the galaxy images, interference from bright background stars, and inherent image noise. To address these complexities, we propose a method for the automatic detection and classification of galaxies. This method incorporates a data augmentation procedure, enhancing the robustness of trained models against data variations arising from different instruments and contrast-stretching functions. This innovative approach is a pivotal component of an expanding open-source computer vision repository dedicated to processing and analyzing extensive galactical datasets. The repository integrates high-performance deep learning algorithms, specifically leveraging the You Only Look Once (YOLO) model and other advanced techniques in image processing and computer vision. The underlying model, trained through deep learning methodologies, exemplifies the intersection of cutting-edge technology and the exploration of the cosmos.

**Keywords** – Galaxy Identification, You Look Only Once (YOLO), Deep Learning, Image Recognition.



# Prime-Grade Assessment of Tomato Fruit

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**Abstract:** *Tomato quality assessment is a critical task in the agricultural sedulity, impacting product, distribution, and consumer satisfaction. This study presents a new approach for the quality assessment of tomato fruits using deep knowledge ways. By employing convolutional neural networks(CNNs) and a dataset of annotated tomato images, we have developed a robust model suitable of assessing various quality parameters, including size, color, shape, and scars. The deep knowledge model offers high delicacy and effectiveness in distinguishing between decoration and sour tomatoes, furnishing precious perceptivity for farmers and stakeholders throughout the force chain. Our findings demonstrate the eventuality of deep knowledge in automating and optimizing tomato quality assessment processes, thus enhancing overall productivity and consumer experience.*  
**Keywords:** *Tomato Quality Assessment, Deep Learning, Convolutional Neural Networks(CNNs), Agricultural Industry, Fruit Evaluation, Image Recognition, Size, Color, Shape, defect Discovery, automation, Agricultural Technology.*

## I. INTRODUCTION

Quality assessment of agricultural yield, analogous as tomatoes, plays a vital part in icing food safety, optimizing force chains, and meeting consumer demands for high- quality products. In this study, Image processing and machine knowledge technology are used. In this way, an image of a tomato is taken, and the presence of scars is automatically detected in a computer vision system to distinguish healthy from damaged tomatoes, using the generality of a advanced system. Every day, intelligent systems with artificial operations are adding. The most important natural processes in the product of crops are the type of vegetables and fruits. Still, analogous processes are done manually in a country like Egypt predicated on a database. The global product of tomatoes is reported to be about 159 million tons for 144 countries. The performance, quality, and weight of the products are excellent in five countries including the United States, China, India, Turkey, and Egypt. Although truly important in the product of previously mentioned tomatoes, there is truly little literature on the factory. In recent times, tomato grading has come truly important, especially with the discovery of conditions, due to new request restrictions. therefore, the need for new technologies in the process of separation and product quality monitoring has increased. Daily, millions of people use tomatoes and vegetables, that's why it's one of the most popular food products in mortal life. still, labor costs have increased as the pool ages, making multitudinous ranches less profitable. As mentioned, tomato is a popular food product among people, so with the increase in population, tomatoes need to be produced more. An effective result to control quality and reduce costs is to use a robot rather of mortal labor to crop tomatoes. therefore, utmost researchers have spent the formerly numerous decades erecting robots to gather fruits and vegetables. Tomato color is the main indicator for the discovery of growing. Different way are taken to produce tomato fruit. These stages change the tomato's color from green to light pink, also to pink, also to bright red, and ultimately to red, which categorizes them into different orders. The near the tomato isto red, the better its quality. The storage time for a quality crop is about 70 to 75 days in total. The time stages of tomato growing include 21 to 28 days. the operation of deep knowledge ways for the quality assessment of tomato fruit is an arising and provocative area of disquisition. Tomatoes are a chief in the global diet, and their quality is a critical factor for both directors and consumers. Quality assessment encompasses various attributes, including size, color, shape, youth, and the presence of scars. Traditionally, mortal visual examination has been the standard for analogous assessments. still, it's a time- consuming and labor-ferocious task that can be prone to crimes and subjectivity. Deep knowledge offers the implicit to automate and meliorate this process. In this prolusion, we will explore the significance of quality assessment in the tomato sedulity, the challenges associated with traditional styles, and the promising part of deep knowledge in revolutionizing tomato fruit quality assessment. We will also claw into the pivotal objects and benefits of exercising deep knowledge ways, as well as the implicit impact on the agricultural sector and consumers likewise. This arising field not only has the implicit to enhance the effectiveness and delicacy of tomato quality assessment but also contributes to reducing food waste and icing that consumers enjoy high- quality yield. farmers generally separate healthy and damaged tomatoes according to their size and quality. The respectable quality of tomatoes makes separating the healthy from the bad more accessible, and it prevents the spread of rotten tomatoes among healthy bones. Damaged tomatoes are also sold at a lower price, or discarded. Sorting tomatoes in the traditional way are still done by old people, which takes a lot of time. counting on a product defect alone can lead to a fundamental error by counting on mortal.

# Predicting Pancreatic Cancer using AIML Techniques

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**Abstract:** *The late diagnosis and low survival rates associated with pancreatic cancer make it a substantial global health challenge to detect at an early stage. The aim of this study is to explore the potential of deep learning methods in enhancing the early identification of pancreatic cancer. To build a convolutional neural network (CNN) model to detect early indications of pancreatic malignancies, we employed medical images from a computed tomography (CT) scan dataset. By illuminating the potential of deep learning as a tool, our discoveries bring hope for enhanced patient survival rates by aiding in the early diagnosis of pancreatic cancer. The importance of artificial intelligence in medical imaging and its revolutionary effects on cancer diagnosis are emphasized by this research. Pancreatic Tumor stands as a global leader in responsible death rates caused by cancer. Curing pancreatic cancer is possible when detected early.*

**Keywords:** *Pancreatic cancer, Deep learning, Convolutional neural network, Medical imaging, Early detection, CT scans, Cancer diagnosis, Artificial intelligence, Survival rates*

## I. INTRODUCTION

The application of convolutional neural networks (CNN) in the field of visual data analysis has led to advances in deep learning, computer vision, and medical imaging. In particular, the ability to use deep learning to analyze medical images, such as detecting tumors, holds great promise. Pancreatic cancer is a rare cancer and the 5-year survival rate is around 7%. One of the biggest problems encountered in the fight against these diseases is the location of the pancreas, a small organ located deep in the body. This anatomical complexity increases the difficulty of early diagnosis.

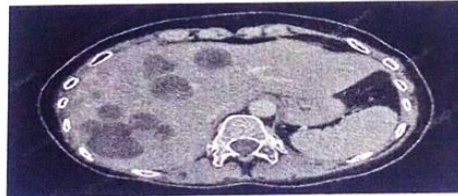


Fig 1. CT Image of an Abdomine

Late diagnosis of pancreatic cancer is the main reason for its high mortality. Detection of tumors at an advanced stage is an important problem that needs to be treated in cases where surgery is not successful. Although cell diagnosis is important, it relies on the expertise of doctors with extensive medical knowledge. The quality of computed tomography (CT) images used for diagnosis may vary between CT scanners and different operators, making further diagnosis difficult. In addition, distinguishing pathological diseases in these images is a difficult and often laborious task. There is therefore an urgent need to develop powerful algorithms based on deep learning to accurately diagnose pancreatic cancer. These algorithms are designed to increase the accuracy of diagnosis, improve detection time, and reduce the burden on doctors; All of which ultimately lead to better outcomes for patients and improve people's lives. The urgency of this challenge is reflected in the very serious and often fatal nature of pancreatic cancer. Early and accurate detection methods play an important role in improving the prognosis of affected individuals. In recent years, the integration of deep learning, especially convolutional neural networks (CNN), has become an effective method to support the early diagnosis of pancreatic cancer. This guide provides an overview of the application of deep learning data and provides conflicting information about different studies on the detection of porcelain cancer. An effort is being made to identify pancreatic tumors using CT images. The detection of the tumor is accomplished by utilizing image processing techniques and a CNN Model Architecture. Pancreatic cancer, also known as PC, is a perilous disease that often goes undetected due to its challenging diagnosis methods. Unfortunately, despite extensive research, no successful treatment has been discovered thus far for this deadly ailment.



# E-Learning Management System with AI Assistance

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**Abstract:** *The demand for effective learning tools and platforms in the field of web development and coding has been steadily rising. This survey paper explores the development of a Learning Management System (LMS) integrated with an AI assistant, like ChatGPT, aimed at enhancing the learning process and efficiency for learners. The LMS includes innovative features such as document-based and video-based learning modules, comprehensive step-by-step project guides, career roadmaps, and problem-solving and interview preparation resources.*

*The primary objective of this project is to assess the impact of AI chatbots like ChatGPT in accelerating the learning process for coding and app development. It evaluates the LMS's capability to equip learners with the skills and knowledge required to build web applications and secure employment in the field. The study examines the effectiveness of each feature within the LMS, contributing to a holistic understanding of how technology can be leveraged to expedite the learning journey and improve learners' employability.*

**Keywords:** *Learning Management System, AI Assistance, ChatGPT, Web Development, Coding, Document-Based Learning, Video-Based Learning, Project Guides, Problem Solving, Interview Preparation, Accelerated Learning, Employability.*

## I. INTRODUCTION

The rapid evolution of technology has significantly transformed the landscape of education and learning. As we enter the digital age, there is an increasing demand for innovative and effective learning solutions, particularly in the realm of web development and coding. Learning Management Systems (LMS) have become central to the educational process, providing a platform for learners to access content, interact with instructors, and progress in their studies. In recent years, the integration of Artificial Intelligence (AI) has further revolutionized the learning experience, promising to expedite the process and enhance efficiency.

This survey paper delves into the development and evaluation of an LMS empowered by an AI assistant, inspired by the capabilities of ChatGPT, a prominent language model. The project aims to explore how AI can be harnessed to optimize the learning process, ultimately empowering learners to develop web applications and secure employment opportunities more efficiently. By combining advanced AI capabilities with an LMS, we embark on a journey to transform the educational paradigm, striving to equip learners with not only theoretical knowledge but also practical skills and problem-solving abilities.

The objectives of this study are multifaceted. We seek to assess the impact of AI-powered chatbots in facilitating the learning process and improving learner efficiency. Additionally, we will scrutinize the effectiveness of document-based and video-based learning modules, analyzing their suitability for various learner profiles. The comprehensive step-by-step project guides within the LMS will be a focal point, as they offer a unique approach to guiding learners from the rudiments of project setup to the intricacies of deployment. Furthermore, we aim to evaluate the resources dedicated to problem-solving and interview preparation, understanding their role in enhancing learners' employability.

Through this investigation, we aspire to shed light on the immense potential of AI in education and the pivotal role it can play in accelerating the acquisition of skills and knowledge. By harnessing the power of AI chatbots, we endeavor to redefine the learning process, making it more engaging, efficient, and geared toward real-world success.

The subsequent sections of this paper will provide a detailed analysis of each feature within the LMS, presenting findings, conclusions, and recommendations that will contribute to the ongoing discourse on AI-enhanced learning environments.

## II. LITERATURE SURVEY

### 1) Ways and Means of Employing AI Technology in E-Learning Systems

Employing state-of-the-art artificial intelligence (AI) technology in current e-learning systems can bring personalized, adaptive, and intelligent services to both students and educators.



# A Survey on Deep Learning Technique for Sugarcane Disease Detection

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**Abstract:** *Sugarcane is a vital crop, and its health directly impacts agricultural yields and the sugar industry. To address the challenges associated with disease detection in sugarcane, we propose an approach using deep learning techniques. Our study leverages convolutional neural networks (CNNs) and image analysis to accurately identify and classify various sugarcane diseases. By analyzing high-resolution images of sugarcane leaves and stems, our deep learning algorithm provides remarkable accuracy in disease detection, offering a promising solution for early diagnosis. This research contributes to sustainable agriculture and aids in preserving the economic viability of sugarcane cultivation.*

**Keywords:** *Deep learning, Convolutional Neural Networks (CNN), Image analysis, Computer vision, Machine learning, Model optimization, Pre-processing, Segmentation, Feature Extraction.*

## I. INTRODUCTION

Sugarcane is a vital crop that is essential to the global agriculture industry, serving as a primary source of sugar production and bioenergy. However, the cultivation of sugarcane is constantly challenged by the appearance of numerous diseases that can significantly reduce yield and quality. Timely and accurate disease detection is necessary for sustainable sugarcane farming and efficient disease control. Traditional methods of disease diagnosis in sugarcane rely on visual inspection by experts, which may require a lot of time, subjective and prone to errors. To address these challenges, the integration of deep learning algorithms has emerged as a promising solution for automating and increasing the accuracy of sugarcane disease detection.

In recent years, deep learning has revolutionized the field of computer vision, enabling machines to automatically learn and identify complex patterns and features within images. This technology has found applications in various domains, including agriculture, where it has the potential to enhance crop disease detection. Deep learning algorithms can be used to build reliable and effective systems for the automatic diagnosis of sugarcane diseases, thus reducing the reliance on manual inspection and improving the overall health and productivity of sugarcane crops. In this paper, we delve into the exciting field of sugarcane disease detection using deep learning. We explore the challenges associated with traditional disease diagnosis methods, highlight the advantages of deep learning, and present recent developments in the application of this technology for identifying sugarcane diseases. Furthermore, we discuss the potential impact of this innovative approach on the sugarcane industry, emphasizing the benefits of early disease detection, improved resource management, and enhanced crop sustainability. By leveraging the capabilities of deep learning, we aim to pave the way for a more efficient, accurate and sustainable future in sugarcane cultivation.

## II. PROBLEM STATEMENT

The cultivation of sugarcane plays a pivotal role in the global sugar industry, contributing significantly to the world's sugar supply. However, the occurrence of various diseases in sugarcane plants poses a significant threat to crop yield and quality. Detecting these diseases early is crucial for effective disease management, but traditional methods are often labor-intensive and time-consuming. This project aims to deal with the issue by developing a deep learning-based solution for the automated and accurate detection of sugarcane diseases. The challenge is to produce a robust and effective model that can categorize and identify these diseases in real-time, aiding farmers in timely intervention and minimizing crop losses.

## III. EXISTING SYSTEM

The Sugarcane Disease Detection system makes use of machine learning methods to identify and classify diseases affecting sugarcane crops. It relies on image recognition algorithms that analyze images of sugarcane leaves to identify common diseases like rust, smut, and mosaic virus. The system employs a dataset of labeled images for training and validation, and it continuously learns and updates its disease detection models. This technology aids farmers to detect diseases in advance, allowing for timely intervention and improved crop yield. It contributes to sustainable agriculture by reducing the usage of pesticides and enhancing crop management practices.



# Intuitive Perception - Speech Recognition using Machine Learning

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**Abstract:** Machine Learning is widely used to detect the movement of lips. It has been observed that the data generated through visual stir of mouth and corresponding audio are largely identified. This fact has been exploited for lip reading and for perfecting speech recognition. We propose a system that uses a CNN( Convolutional Neural Network) which is trained and used to descry the movement of lips and prognosticate the words being spoken. This trained CNN will be suitable to descry the words that are spoken within the videotape and display it in a textbook format. The CNN may also calculate on fresh information handed by the environment, knowledge of the language, and any residual hail. We hope to learn whether the application of machine literacy, more specifically the DNN( Deep Neural Network), could also be an applicable seeker for working the problem of lip reading. The main end of our design is to directly honor the expressions being spoken through automated lip reading  
**Keywords:** Visual Speech Recognition, Lip reading, OpenCV, neural network, CNN, DNN, 3D convolutions, object detection, data pre-processing, Python, Keras.

## I. INTRODUCTION

Visual lip- reading plays an important part in mortal- computer commerce in noisy surroundings where audio speech recognition may be delicate. The art of lip reading has colorful operations, for illustration it can be used to help people with hail disabilities, or conceivably by security forces in situations where it's necessary to identify a person's speech when the audio records aren't available. still, like audio speech recognition, lip- reading systems also face several challenges due to dissonances in the inputs, similar as with facial features, skin colours, speaking pets, and intensities, it's insolvable to manually produce a computer algorithm that will be reading from the lips. Indeed mortal professionals in this field can rightly estimate nearly every other word and can do so only under ideal conditions. thus, the complex task of lip reading is suitable seeker for expansive exploration in the field of deep literacy. Lip reading is also an extremely delicate task because several different words can be spoken with nearly indistinguishable lip movements. thus, the problem of lip reading provides unique challenges. This has led to multitudinous advancements in the field of automated speech recognitions systems using machine literacy.

Several models have been developed to ameliorate hail aids, for silent dictation in noisy public surroundings, identification for security purposes etc. still not until the use of Deep Learning did the delicacy of these models increase. The use of Deep Learning and deep neural networks has revolutionised the quality of automated lip- reading systems due to the large quantities of data sets that can be used.

There are mainly four stages involved in the technique used to perform automated lip reading [1][6]. Namely, face detection, cropping module, feature extraction and text decoding. The primary goal of face detection algorithms is to check whether there is any face in an image or not. The cropping module is used to crop out the region of interest (in this case the lips) and feature extraction helps in extracting the required features. This is represented in the figure (Fig 1) given below:

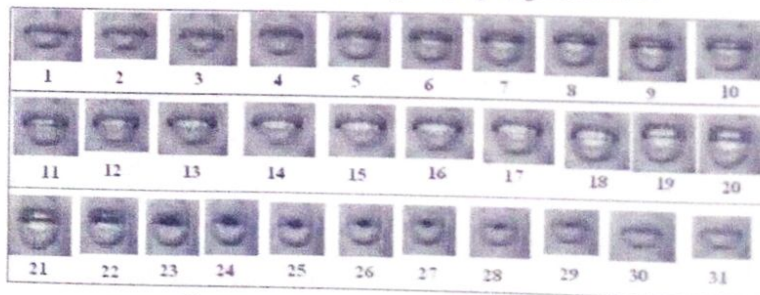


Fig. 1. Visualization of Lip Reading

# Automated Dashboard for AWS Services Monitoring

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**Abstract:** Cloud computing has become an integral part of modern business operations, offering flexibility, scalability, and cost-efficiency. However, the migration to the cloud brings forth a new set of challenges, with security being a top concern. Organizations need to continuously monitor and audit their cloud environments to identify vulnerabilities, detect threats, and ensure compliance with security standards. In today's digital landscape, cloud computing has become the backbone of many organizations, offering scalability, flexibility, and cost-effectiveness.

However, with the increasing reliance on cloud services comes the crucial need for robust security measures to protect sensitive data and ensure compliance with industry regulation. Traditional security audits and monitoring processes are often manual, time-consuming, and prone to human error. They lack the agility and real-time insights required to effectively protect cloud assets. To address these limitations, the Automated Reporting and Dashboards for Cloud Security Audits project leverages Artificial Intelligence (AI) and Machine Learning (ML) technologies to revolutionize cloud security management.

**Keywords:** Cloud Computing, Auditing, Cloud Security, User-friendly Dashboard, AWS(Amazon Web Services), S3(Simple Storage Service), EC2(Elastic Compute Cloud), Amazon CloudWatch, Isolation Forest, AI(Artificial Intelligence, ML(Machine Learning), Python, API(Application Programming Interface), Microsoft Power BI

## I. INTRODUCTION

This project, "Automated Reporting and Dashboards for Cloud Security Audits," seeks to revolutionize cloud security auditing by harnessing the capabilities of Artificial Intelligence (AI) and Machine Learning (ML). The primary objective is to automate the auditing process within cloud environments, alleviating the time-consuming and error-prone nature of manual audits.

This automation involves collecting data from cloud service providers through APIs, subjecting it to AI and ML analysis to detect anomalies and potential threats, and presenting the findings through user-friendly dashboards and reports. Real-time alerts and notifications are integrated to enable proactive responses to security incidents, while compliance monitoring ensures adherence to industry regulations and internal security policies. The project's ultimate aim is to enhance cloud security, reduce operational overhead, and provide organizations with actionable insights into the health of their cloud infrastructure.

## II. RELATED WORKS

1) [Intelligent Role-Based Access Control Model and Framework Using Semantic Business Roles in Multi-Domain Environments]

This paper [1] introduces an access control framework, utilizing semantic business roles and intelligent agents in an Intelligent RBAC (I-RBAC) model. Occupational entitlements from real-world roles are integrated, while intelligent agents automate ontology creation. The model's efficiency is validated through implementation results in dynamic multi-domain environments.

2) [A Lightweight Identity - Based Remote Data Auditing Scheme for Cloud Storage]

The paper [2] introduces an identity-based data auditing (IBDA) scheme for secure cloud storage. The scheme utilizes data owner generated tags and data blocks, while the CSP ensures data integrity by concealing data during the challenge-proof phase, preventing TPA data theft. The proposed scheme's security is proven in the random oracle model, and efficiency analysis demonstrates its superiority over other schemes.

3) [An Efficient Data Auditing Protocol With a Novel Sampling Verification Algorithm]

The paper [3] elucidates that existing data auditing schemes, following Ateniese et al.'s framework, face challenges like repeated sampling leading to detection delays and data loss risk. This paper presents an efficient sampling verification algorithm that optimizes the scheme, enhancing data integrity in the cloud. The proposed scheme is secure, swift in detecting corrupted blocks, and offers dynamic auditing capabilities.



# Advancements in Grain Adulteration Detection and Quality Assessment - A Survey

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**Abstract:** Food security and public health are severely compromised by food adulteration and quality deterioration, which have become pressing concerns. Unfavourable food quality is caused by a multitude of factors, including but not limited to the widespread adulteration of food. Food quality is heavily influenced by environmental variables, such as poor storage conditions, pest infestations, and contaminant exposure. Furthermore, food products may be exposed to adverse circumstances due to the complexities of transportation and distribution, which can result in microbial spoilage and a loss of nutritive value. Consumers are thereby subjected to a decreased level of nutritional quality from their diet in addition to health hazards. In the context of food grains, such as rice and wheat, the challenges are particularly noteworthy. As these grains form the essence of sustenance in regions like India, ensuring their quality is paramount. Grain quality evaluation has traditionally been done by hand using labour-intensive, human error-prone procedures. However, the prospect of automation and computer vision gives a glimmer of optimism in today's technologically advanced society. Systemic research and developments concerning the evaluation of grain quality have demonstrated that image processing techniques may be employed to automate the procedure. Such advancements give rise to the potential for more accurate, efficient, and scalable grain quality assessment.

**Keywords:** Adulteration, Automation, Computer Vision, Contaminant Exposure, Grain Quality, Image Processing.

## I. INTRODUCTION

Food grains have intricately woven themselves into the rich tapestry of India's culinary heritage, acting as the very foundation of sustenance that has nurtured generations and established the core of India's dietary culture. This is reflected in the Economic Survey for the fiscal year 2022-23, which was formally presented to the Parliament by the Union Minister of Finance and Corporate Affairs, Smt. Nirmala Sitharaman, on January 31st, 2023 [18]. The Economic Survey highlighted a significant achievement despite the formidable challenges posed by climate change. In the agricultural year 2021-22, India reached a milestone by achieving a record production of food grains, totalling 315.7 million tonnes [18]. Moreover, the Second Advance Estimates [23], released by the Ministry of Agriculture and Farmers Welfare in February 2023, offer valuable insights into the projected production of major crops for the fiscal year 2022-23. These estimates are illustrated in Fig. 1.[22]

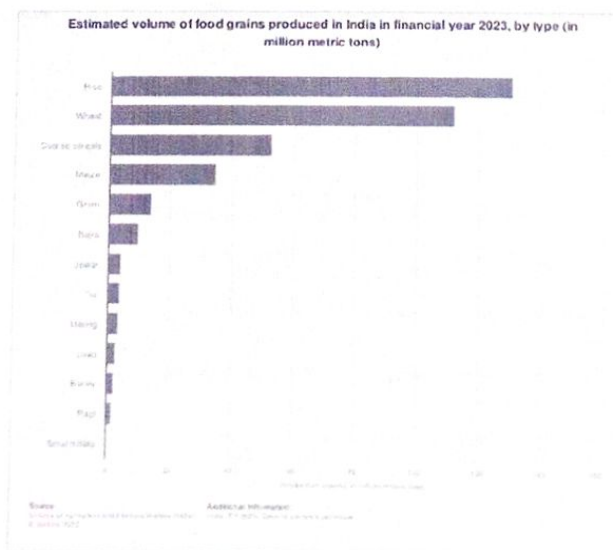


Fig. 1 Estimated volume of food grains produced in India (2023) by type (in million metric tons)





# Vitamin Deficiency Detection Using Image Processing

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**Abstract:** This research paper introduces an innovative Web application that utilizes Artificial Intelligence (AI) to identify vitamin deficiencies in individuals by analyzing images of specific body organs. This novel approach eliminates the need for costly laboratory tests, enabling users to detect potential vitamin deficiencies without requiring blood samples. Users can easily capture photos of their eyes, lips, tongue, and nails, and the application will analyze these images to identify possible deficiencies. Furthermore, the application provides a list of recommended nutritional sources to address the identified deficiency and outlines potential associated complications.

The AI software has been meticulously trained to accurately distinguish and classify vitamin deficiencies by analyzing images of these specific body parts, which exhibit distinct symptoms when the body experiences nutritional deficits. Additionally, healthcare professionals can contribute to and validate visual data from their patients, enhancing the application's accuracy and expanding its detection capabilities. This application serves as a valuable tool in addressing the global issue of insufficient nutritional awareness, ultimately assisting healthcare workers in delivering more precise diagnoses.

Vitamins are essential components of our diet, and their deficiency can lead to a range of health problems. The primary objective of this AI system is to identify vitamin deficiencies at an early stage, helping to prevent severe consequences such as infectious diseases, anemia, maternal mortality, and impaired cognitive and physical development.

**Keywords:** Vitamin Deficiency, Early Detection, Machine Learning, Image Processing, Convolutional Neural Networks, and customized recommendations.

## I. INTRODUCTION

Vitamin deficiencies pose a significant global health challenge, impacting various aspects of our well-being. Health issues often arise from inadequate intake of essential minerals and nutrients. Accurately monitoring our nutritional needs can be complex, especially when individuals are unaware of potential deficiencies without seeking guidance from healthcare professionals. On a global scale, more than 2 billion people grapple with vitamin deficiencies. For instance, over 1.2 billion individuals suffer from Zinc deficiency, leading to around half a million annual deaths. Similarly, over 100,000 people succumb to Anemia caused by iron deficiency. The easy accessibility of cheap processed junk foods has made nutrient-rich foods financially inaccessible for many, transforming them into symbols of luxury rather than dietary essentials. Research has shown that even the soil itself lacks essential micronutrients. In 2003, researchers conducted a comparative analysis of data on vegetable nutrient content from 50 years ago and the present, revealing significant declines in the mineral content of cabbage, lettuce, spinach, and tomatoes, regressing from 400 milligrams to less than 50 milligrams. This trend highlights a concerning decrease in nutrient availability. Even with what might appear to be a perfect diet, it's likely that something crucial is missing. Approximately 50% of Americans lack sufficient vitamin A, vitamin C, and magnesium, while 70% of elderly Americans and 90% of Americans of color experience a deficiency of vitamin A. Recently, a survey involving 100 university students was conducted to gauge their awareness of vitamin deficiencies, with 67% responding negatively. Although the sample size is limited and does not represent the entire population, it provides an estimate of the current state of public awareness. Vitamin deficiency is a global concern affecting more than 2 billion individuals. According to the World Health Organization (WHO), one in three children is deficient in essential vitamins. Approximately 33% of children under the age of five experience a deficiency in vitamin A, leading to compromised immunity and night blindness. Vitamin deficiencies affect individuals of all age groups and often co-occur with mineral deficiencies such as zinc, iron, and iodine. Vulnerable groups, particularly pregnant women and children, are particularly susceptible to vitamin deficiencies due to their elevated nutritional requirements and heightened vulnerability to these deficiencies. The most common deficiencies involve vitamins A, B, folate, and D. Supplementation programs have been successful in reducing the prevalence of diseases like scurvy and pellagra.

# A Comprehensive Review of ECG-Based Sleep Apnea Detection

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**Abstract:** Sleep apnea (SA) is a typical rest problem which could disable the mortal physiological frame. Hence, early determination of SA is of extraordinary interest. The conventional fashion for diagnosing SA is a short-term polysomnography (PSG) assessment. At the point when PSG has confined availability, programmed SA webbing with a lower number of signs ought to be allowed of. The main part of this study is to produce and assess a SA position model in view of electrocardiogram (ECG) and blood oxygen absorption (SpO<sub>2</sub>). We embraced a multimodal way to deal with immingle ECG and SpO<sub>2</sub> signals at the include position. also, highlight determination was led exercising the recursive element disposal with cross-approval (RFECV) computation and random forest (RF) classifier used to insulate between apnea and typical occasions. Tests were led on the Apnea- ECG information base. The presented computation got a perfection of 97.5, a responsiveness of 95.9, an explicitness of 98.4 and an AUC of in per-section grouping, and beat once workshop. The issues showed that ECG also, SpO<sub>2</sub> are complementary infeting SA, and that the mix of ECG and SpO<sub>2</sub> improves the capacity to dissect SA. Accordingly, the proposed fashion can conceivably be an option to traditional discovery strategies.

**Keywords:** CNN (Convolution Neural Networks), Deep learning, SVM (Support Vector Machine), KNN (K-Nearest Neighbor), ABCD (Asymmetry, Border, Color, Diameter), Dermoscopic, Pre-processing, Feature Extraction, Segmentation, ApEn (Approximate Entropy).

## I. INTRODUCTION

Sleep apnea (SA) is a common sleep complaint, also generally known as obstructive sleep apnea (OSA). The clinical presentation of SA is a conclusion of nasal airflow or a drop in airflow intensity by further than 30 compared to the base position, but the corresponding breathing movements are maintained. At the same time, oxygen desaturation decreases by further than 4 for further than 10 s. The prevalence of OSA in adults ranges from 9% to 38%, increasing with age. Low-quality sleep accompanied by apnea generally leads directly to poor attention, memory loss, slow response, and depression. In addition, OSA is an implicit trouble to numerous physiological systems of the mortal body, especially the cardiovascular system. It can induce hypertension, heart failure, coronary roadway complaint, diabetes, and other conditions, which seriously hang the health of cases. If patients are diagnosed and treated at an early stage of OSA, the health risks can be mitigated. Thus, timely diagnosis of cases with OSA is essential. Clinically, polysomnography (PSG) is the reference standard for the diagnosis of SA. PSG is effective in covering sleep conditions by collecting colorful physiological signals similar to an electrocardiogram (ECG), electroencephalogram (EEG), electromyogram (EMG), blood oxygen desaturation (SpO<sub>2</sub>), airflow signals, respiratory trouble still, wearing too numerous detectors during physiological signal collection can beget discomfort to the case. In addition, the diagnosis of OSA requires sleep specialists to spend a lot of time manually assaying PSG data. Thus, automatic discovery of SA using smaller signals is necessary.

Experimenters have generally developed SA discovery algorithms using ECG signals. ECG is a non-invasive fashion for recording the electrical exertion of heart and the physiological exertion of heart is regulated under the autonomic nervous system (ANS). Clinically, heart rate variability (HRV) is an important index of the outgrowth of ANS regulation. Thus, it's doable to screen for apnea by covering ECG during sleep. Yet, ECG signals are fluently told by cardiovascular complaint status. This makes the diagnosis of SA more grueling. piecemeal from ECG signals, SpO<sub>2</sub> signals are also extensively used to descry SA as the lack of respiratory effort due to SA events can lead to a drop in SpO<sub>2</sub>. repetitious oxygen desaturation is largely specific for apnea. still, the perceptivity of oximetry is generally low, as not all apnea events lead to perceptible desaturations. Therefore, SpO<sub>2</sub> alone or ECG alone can be used as an implicit individual means of SA, but not as a dependable means. With technological advances in detectors and low-power bedded systems, the collection of physiological signals has come easier and further provident. Thus, we consider using multiple signals to develop a further dependable discovery algorithm of SA, rather than being limited to a single signal.

This study explores the effectiveness and trust ability of a multimodal approach to the automated discovery of SA events using a combined channel of ECG and SpO<sub>2</sub>.



# A Smart Device with Hand Gesture using Webcam

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**Abstract:** Over time, Human-Computer Interaction (HCI) has experienced tremendous growth. An entirely new era in the AI domain of human-computer interaction was ushered in by hand gesture recognition technologies. One of the easiest and most natural forms of communication is hand gestures. It might be challenging for novice. With hand gestures, the user can control cursor functions on the system. The input device for the suggested system is a camera. this application, HCI deployment for educational purposes will enter a completely new age.

## I. INTRODUCTION

This design will become more portable and tiny as Bluetooth and other wireless technologies advance, along with AR and other everyday gadgets. This research develops a virtual mouse system powered by AI simulate mouse movements on a computer. Gesture Controlled Virtual Mouse over conventional input techniques are also covered in the study, including how user-friendly and more natural the interaction is. T

he information provided in this article will benefit academics, developers, and everyone else interested in the most recent developments in gesture-based interface technologies, as well as the expanding.

The implementation of the system is based on models like the Convolutional Neural Network (CNN) implemented by Media Pipe running on top of Python, and it doesn't require any additional hardware.

## II. RELATED WORKS

### A. Gesture with Hands

The user's hand gestures are recorded via the webcam.

Ying and Thomas (2001) have identified various gestures that fulfill distinct functions. "Controlling gestures" are the gestures used for pointing and navigation in virtual environments and other display control applications. The virtual mouse interface (Tsang et al., 2018) is one application of gesture control that allows users to move the cursor with their hands in place of a conventional mouse. Conversational gestures, like pointing to emphasize a point, are essential to human connection.

### B. Neural Networks

The Neural networks are a powerful tool for modelling complicated relationships between input and output using non-linear statistical data. Using non-linear statistical data, An effective tool for modeling intricate relationships between input and output. Sakr (2000) The neural network is a popular option for pattern recognition classification due to its superiority in noise immunity. One well-known method for training a feed forward neural network is the back propagation learning algorithm. Two more learning algorithms train a neural network are the Perceptron and Delta Rule. Alsmadi et al.'s 2009 study examined temporal hand gestures.

### C. Palm Detection Model

In this a single shot detector model it is a single shot detector model for hand recognition and position like detection utilizing face mesh. The initial stage is to train a palm detector rather than a hand detector, because identifying hands with moveable fingers is much more difficult to do than estimating the bounding boxes of stiff objects like fists and palms.

Because the hands involved are little, the non-maximum suppression strategy works particularly well in social and self-scenarios like handovers.

Reducing the number of anchors by 4-5 is possible by modeling palms with square anchor boxes (connections in machine learning terminology) and disregarding other aspect ratios. Furthermore, to understand the entire scene context, even for little objects, a feature extractor based on a codec pair is employed (similar to the Retina Net technique).



# Contextual AI Transformer: A New Chapter in Higher Education

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**Abstract:** The "Colloqui AI Transformer: A New Era for Higher Education" presents a novel process that revolutionizes the production and distribution of educational materials. By combining text and images, the workflow utilizes ChatGPT's amazing powers to create PDFs that are beautifully formatted and cross-platform compatible while also seamlessly integrating AI-generated material. This innovative method represents a substantial advancement in document generation, providing efficacy, time-saving advantages, and efficiency in the professional and academic domains. This method opens up new possibilities for creativity and productivity in higher education by combining textual and visual aspects.

**Keywords:** Artificial Intelligence (AI), Document Creation, Workflow Automation, ChatGPT, PDF Compatibility, Higher Education Innovation

## I. INTRODUCTION

A revolutionary shift is taking place in the ever-changing field of higher education, where the quest for knowledge meets with technological advancements. The innovative "Colloqui AI Transformer" is poised to completely rewrite the fundamentals of document generation and distribution. This creative process transforms the ideation, creation, and distribution of educational publications by utilizing the potential of cutting-edge AI integration. We explore the origins, workings, ramifications, and significant influence of this innovative system on the fields of professional documentation and academics in this three-thousand-word essay. The conventional approach to document creation, which was formerly dependent on human input and design, has undergone a radical transformation. "Colloqui AI Transformer" employs an advanced process that begins with a combination of textual and visual components.

This revolutionary procedure is based on a complex orchestration of content supplied by artificial intelligence. With incredible skill, ChatGPT incorporates well-prepared content into the document's overall design. This clever combination results in a beautifully designed, cross-platform PDF that is ideal for sharing with people of all backgrounds and devices. Combining textual and visual components is the perfect example of how intelligence and art can coexist together, resulting in a fast, easy, and very productive way to create documents. The benefits that this procedure provides are not limited to academic settings; they also apply to professional areas. It signals the beginning of a transformative era by pushing past the limits of creativity and production and taking them to previously unimaginable heights.

The importance of "Colloqui AI Transformer" extends beyond its ability to expedite document development procedures. It is a disruptive force that changes the fundamentals of how knowledge is shared. This cutting-edge approach forces a fundamental rethinking of conventional methods by fusing the genius of artificial intelligence with the rich soil of education. It clears the path for a more streamlined and inclusive educational system in which knowledge is shared across national boundaries and geographically distant locations.

This investigation seeks to analyze the complex workings of "Colloqui AI Transformer," outlining its many effects on the field of education. It aims to disentangle the subtleties of this revolutionary workflow, tackling its consequences, prospects, and difficulties as it redraws the boundaries between knowledge exchange and document production.

In the following parts, we will take a closer look at this cutting-edge workflow's development, explain its technical foundations, and go through its enormous potential for professionals, educational institutions, and the public.

The "Colloqui AI Transformer" is a sign of a new era and a driving force behind progress in the field of higher learning. It invites us to venture into the undiscovered regions where the fusion of artificial intelligence and human creativity transforms the core principles of information generation and sharing. This investigation aims to illuminate the beginning of this revolutionary era and reveal the infinite opportunities it offers to higher education, marking a new phase in the history of learning and knowledge sharing.



# A Survey on Campus Companion

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**Abstract:** Chatbots are expert systems designed to understand and respond to user queries in their own language, engaging in conversations similar to human interactions. This chatbot offers two modes of interaction, text and audio, enhancing user experience, particularly in answering through voice messages. College bot project addresses the challenges faced during the academic admission procedure at our institute, especially for parents residing in different locations. The system aims to provide a platform for students and parents to ask questions and resolve doubts using simple English text messages or audio commands, reducing the need for physical visits to the inquiry window.

Chatbots, powered by Artificial Intelligence, gather responses with each user interaction, continuously improving their accuracy. This project's primary goal is to implement a chatbot feature and API for K S Institute of technology, demonstrating the application of Artificial Intelligence and Machine Learning in enhancing service delivery. The chatbot selects responses by matching input to known statements using WordNet and a database of predefined responses. It leverages Natural Language Processing and Machine Learning techniques to communicate with users in natural language and generate relevant responses.

**Keywords:** Chatbot, College chatbot, Artificial intelligence, Machine learning, WordNet, Natural language processing, Natural language understanding, Pattern matching technique.

## I. INTRODUCTION

In recent times, the field of artificial intelligence (AI) has witnessed remarkable progress, particularly in the realms of inter-networking and information technology. These advancements have ushered in a new era of AI systems, demonstrating an increasingly sophisticated ability to understand and interact with human behavior. From decision support networks to robotics and natural language processing (NLP), AI has made significant inroads into various facets of our daily lives. What makes this journey of AI particularly fascinating is the integration of NLP and intelligent systems, enabling them not only to autonomously learn and adapt but also to draw insights from a vast repository of electronic documents available on the web.

Among the standout achievements of AI, chatbots, often referred to as talkers, Bots, or Artificial Conversational Entities, have garnered significant attention, especially in the educational domain. These AI programs are designed to emulate human interactions, engaging in both text-based and voice-based exchanges using sophisticated AI techniques, including NLP, image and video processing, and voice analysis. In educational institutions, the development of chatbots within administrative systems has revolutionized the way students and faculty interact with the institution's services. These intelligent chatbots, empowered by cutting-edge AI algorithms, excel at addressing student queries promptly and accurately, offering a user-friendly platform that simplifies the process of seeking information. Gone are the days of cumbersome searches on institutional websites; these chatbots streamline the entire experience, making it accessible and efficient. To access this virtual assistant, users simply need to register and log in, granting them access to a range of dedicated help services, covering various aspects of institutional life, from admissions to academics and social events. The chatbot interacts with users through an intuitive Graphical User Interface (GUI), ensuring that inquiries related to institutional matters are easily accessible. With its ability to provide timely and relevant information, these chatbots play a pivotal role in keeping students and stakeholders informed about institutional affairs. This not only underscores the remarkable capabilities of artificial intelligence but also significantly enhances the interactions between humans and machine systems, contributing to an improved user experience.

## II. RELATED WORKS

The current assessment of virtual assistants (VAs) revolves around three primary dimensions: user experiences [3-5], performance expectations (references 7-8), and concerns related to privacy [9-10]. It has been observed that users tend to exhibit higher levels of satisfaction when utilizing VAs for simpler tasks rather than complex ones that involve dialogue-based interactions [3]. In another study [4], researchers investigated the usage experiences with VAs in a non-English language context, specifically in a Danish-speaking environment.



# AUGMENTED REALITY APPLICATIONS IN EDUCATION: A COMPREHENSIVE REVIEW

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**Abstract:** Here we explore the transformative potential of Augmented Reality (AR) applications in the field of education. Through an in-depth analysis of existing literature, case studies, and empirical evidence, the paper investigates the multifaceted impact of AR on teaching and learning processes. Key focus areas include the enhancement of student engagement, the development of interactive and immersive educational content, and the integration of AR into various educational disciplines. Additionally, the paper addresses practical considerations, challenges, and future prospects associated with the widespread adoption of AR in educational contexts. By synthesizing current research findings, this paper aims to contribute valuable insights for educators, researchers, and policymakers seeking to leverage technology for more effective and engaging learning environments.

**Keywords:** Technology, IT, learning processes, Augmented reality, mixed reality.

## 1. INTRODUCTION

IT environments for human learning are articulation of work in the complex and technology learning. The incorporation of augmented reality into education has the potential to motivate and inspire students to actively gain knowledge, ultimately resulting in an operational process. Research from the past has identified the issue that if technology is utilized without requiring critical thinking, meaning making, or metacognition, it would result in an unreceptive learning process.

Augmented reality has demonstrated promising potential to enhance the learning process in terms of dynamic, expressive, effective, and meaningful ways. This is due to its cutting-edge technology, which provides users with natural experiences and enables them to interact with virtual and real-time apps. Additionally, research has recently focused on the ways that augmented reality and education might work together. Thus, this concept paper examines the findings that has been carried out with AR. AR should be used in a number of academic subjects, including physics, math, chemistry, biology, medicine, geography, astronomy, and history, according to the review.

This publication attempts to provide an augmented reality application used in the field of safe laboratory practices from this research perspective, so that novices can learn the proper protocol to follow in any laboratory experience that ensures a safe manipulation. The following will be the format of the document: In the related work section, the use of augmented reality in education is discussed along with a comparative analysis of existing realizations in the literature. The proposed application's steps and process are covered in the second part, which is followed by a detailed discussion of the application's benefits and drawbacks in the results and discussion section.

## 2. RELATED WORKS

### Type A) Augmented reality for learning

Technology has permeated every aspect of education; its effects are evident in a significant impact on learning [1] and lead to increasingly creative ways to information and learning. This is due to the fact that employing technology entails addressing real-world problems, using current informational resources, modelling thoughts and ideas, and connecting with subject matter experts. Moreover, it is believed that using technology for education enhances traditional approaches to teaching and learning [2].

The integration of technological resources with academic curricula is increasingly seen as an effective teaching strategy [3]. Utilising the state-of-the-art technologies included into the contemporary educational system requires teachers to be extremely creative and confident in addition to devoting a substantial amount of their own time to utilise technology. As a result, incorporating modern technologies into university mathematics classes offers a way to enhance learning and engagement among students. Therefore, gaining a greater knowledge of learners' perspectives of the applications utilised in lectures—such as multimedia, animations, computer-based simulations, and statistical software—has been the aim of



# Cyber Bullying

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**Abstract:** Cyberbullying involves the use of cell phones or social networking platforms like Facebook and Twitter to harass, threaten, or intimidate individuals, adversely impacting their mental health. Our project focuses on the detection of such harmful comments using a machine learning algorithm, categorizing them into two severity levels: "low" and "high." Given the ubiquitous nature of social media, especially in the post-pandemic era, it has become an integral part of our lives for communication across all age groups. While it facilitates easy communication, social media also presents challenges, such as the escalation of hateful comments beyond the realm of healthy discourse. Recognizing the potential harm caused by these comments, our solution aims to identify and classify them based on severity using machine learning, enabling appropriate intervention.

## I. INTRODUCTION

Bullying of children and teenagers is primarily conducted on social media. In their daily lives, people pay close attention to everything. Social networking is being used by many people to boost their careers. Prefer putting their skills to use and sharing those things on various social media networks. Such as social networking sites like Instagram. Simply leaving abusive remarks on someone else's posts qualifies as cyberbullying. their mental health is so disturbed. Many young people are being impacted by bullying. Cyberbullying is on the rise as social networking usage grows. Our goal is to pinpoint and mitigate hostile remarks by utilizing specific machine learning models. We categorize the severity of these remarks into three levels: High, Low, and Medium. The classification of remarks as hateful or not is contingent on their level of seriousness. Though there are various approaches to tackle media bullying, a considerable number of them have been primarily focused on text. This paper aims to showcase a software solution designed to identify hostile remarks made by individuals engaging in bullying behavior. Creating a false identity and sharing an embarrassing image or video are just two examples of cyberbullying; it also involves spreading unfavorable rumors and making threats. The victim's conduct is altered by the poster of such cruel comments. This has an impact on their emotions, as well as their self-confidence and sensation of terror. A comprehensive solution is therefore needed for this situation. Cyberbullying must be stopped. Using machine learning models, the issue can be resolved by identifying and preventing it.

## II. AIM OF THE PROJECT

Project is to Detect such hateful comments and block them. So, here we use some Machine Learning Models to detect such comments based on the Severity. To find the solution for cyberbullying and detecting such hateful comments and blocking them. The ultimate goal is to put an end to cyberbullying.

Therefore, a comprehensive solution is needed for this issue. Cyberbullying must end. The issue can be resolved by employing a machine learning approach to detect and prevent it, but this needs to be done from a different angle. Our paper's major goal is to create an ML model that can identify and stop social media abuse so that no one has to experience it.

## III. EXISTING SYSTEM AIM OF THE PROJECT

- 1) Identify Cyberbullying in social media through machine learning methods.
- 2) Detects harmful comments with the use of the Deep learning model.
- 3) All the hateful comments are automatically reported upon their detection.

### A. Disadvantages

- 1) No actions are taken to reduce such hateful comments.
- 2) All the comments are detected as hateful comments irrespective of their level of severity.
- 3) Not all hateful comments are required to be reported automatically.



# Automatic Dance Pose Estimation from the Hand Signs using Deep Learning

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**Abstract:** Human activity is the sequential change of the human body. The collection and assessment of multimedia content connected to dance will be beneficial for the preservation of cultural heritage, the creation of video recommendation systems, and the assistance of students through tutoring systems. Indian classical dance (ICD) classification is still a fascinating subject of research because of its intricate hand gestures. Changes in learning habits make automated teaching solutions unavoidable in many fields, from traditional to internet forums. ICD also becomes an essential part of a vibrant legacy and culture that needs to be updated and maintained at all costs. Complex poses including full-body rotation and self-hands-occlusion are part of the dance. The primary goal of this research is to create a framework for Bharatanatyam dancing.

## I. PRESENTATION

Indian classical dance has been practiced and performed worldwide for more than 5000 years. Only an expert can fully comprehend the hand gestures and dancing movements, as well as the complex routines accompanied by recitations of poetry and music. These traditional dance forms are referred to by "Natyam Rasa" in "Natyam Shastra – Indian Classical Dance Form". The hands, feet, and torso movements are described by 108 Karanas (gestures) in Natyam Shastra. These hand motions reflect a variety of physical meanings with deity, nature, and behavior. The stances from the well-known classical dance form Bharatanatyam have been preserved at this temple in Tamil Nadu, named Chidambaram.

## II. RELATED WORKS

### A. Dance Tracking

To extract the link between sound and movement features, they have created a deep learning dance generating method in this study. Coordinates of the major points of human bones taken from dancing movies are employed for training as movement characteristics during the feature extraction phase, while rhythmic features taken from music and audio beat features are used as musical features. The model's generator module is used to create soft dancing gestures and to accomplish a rudimentary mapping of music and dance movements throughout the model-building process. For dancing and music to be consistent, the identification module is utilized. To improve the representativeness of the audio function, the self-encoder module is employed. The Deep Fashion dataset's experimental findings demonstrate that the

## III. PURPOSES

Understanding AI Integration in Dance Pose Recognition: Review recent studies and publications on the use of artificial intelligence (AI) to pose recognition in the creation of visual dance signals. Impact on Professional and Educational Domains: Analyze the established advantages, drawbacks, and potential ramifications of AI-powered dance posture recognition, with a focus on the ways in which it could impact professional and educational environments. Efficiency and efficacy: Compare the efficiency and efficacy of AI-driven processes to traditional methods, highlighting the advantages of time savings and the caliber of the content generated. Dance Sign Recognition Techniques: Look at ways to seamlessly integrate deep learning and open-CV components, and think about how AI fits into this process. Prospective Patterns and Obstacles: Analyze the likely developments,.

## IV. METHODOLOGY

The suggested Convolutional Neural Network-Long-Short Term Memory Network (CNN-LSTM) for hand gesture assessment classification. YouTube videos of a teacher and student performing Bharatanatyam dance are used to illustrate the shloka (poem). After learning the input dataset, the image should first be pre-processed using the traditional scalar methods. Prior to processing the image, it must be rescaled, the noise must be extracted, and the image must be cleared. This noise-extracted image is provided to the hand mudra pose evaluation mode with a feature extraction segment by building the Tensor flow Efficient Net-U Net framework. On the other hand, a similarity index approach is used to extract important points. Lastly, we trained the CNNLSTM framework with the training dataset of the classification system.





# CNN Based Facial Recognition with Age Invariance

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**Abstract :** As the world has seen exponential expansion over the previous decade, there has been an unusual increase in the crime rate as well as an increase in the number of criminals/missing persons. Face recognition can extract the individualistic characteristics of the human face. A straightforward and adaptable biometric technology is face recognition. The technology used to recognize and identify faces in images or videos is called face detection and recognition. The process of removing facial features has gotten easier as technology has advanced. This study describes the use of an automated security camera for real-time face recognition. With this system, we can instantly identify and detect the faces of the criminals in a live video feed captured by a camera. Criminal records typically include the offender's picture and personal information. Thus, we are able to use these photos in addition to his information. The security camera's recorded footage is transformed into frames. After a face is identified in a frame, it undergoes pre-processing and feature extraction. The characteristics of the real-time image processing are compared to those of the images kept in the criminal database.

**Keywords:** CNN (Convolution Neural Networks), Deep learning, Face net, MTCNN, Image Processing, Python, Keras.

## I. INTRODUCTION

The main objective of the age-invariant facial recognition project using convolutional neural networks (CNN) is to develop a system that can reliably and accurately identify people of any age. This means creating a strong facial recognition model that works well for a variety of age groups, guaranteeing and authentication capabilities. One of the most important and pervasive problems in our society is crime/missing of a person, and it is our duty to prevent it. In any society, there are many different kinds of crimes and the protection and safety of its citizens must be taken into full consideration. These are important factors that directly affect the citizens' quality of life. A person's life can be disturbed and stressed out by some criminal incidents, like theft, identity theft, or even pickpocketing.

The increasing concerns about crime and its threat to security and safety have led to the widespread adoption of closed-circuit television (CCTV) systems in both public and private settings. Since a deep learning-based approach outperforms existing methods in terms of performance and speed, it is used to provide real-time data that police forces can use to operate more effectively. In the context of the convolutional neural network (CNN) based age-invariant facial recognition project, the main goal is to build an advanced system that can accurately identify and authenticate people of any age. This entails creating and putting into practice a strong CNN-based model that can manage the various facial traits that people of various ages have, improving the facial recognition system's overall accuracy and inclusivity. The project's main goal is to create a CNN-powered facial recognition system that works for people of all ages

## II. RELATED WORK

Face detection and alignment are necessary for many facial applications, including face recognition and facial expression analysis. Large visual fluctuations of faces, such as occlusions, significant pose fluctuations, and severe lightings, present major challenges for these tasks in real-world applications. A cascade face detector with good performance and real-time efficiency is provided by Viola and Jones. It trains cascaded classifiers using AdaBoost and Haar-Like features. Nevertheless, a number of studies demonstrate that in real-world applications where there are greater visual variations in human faces, this kind of detector may perform significantly worse, even with more sophisticated features and classifiers. Apart from the cascade structure, Mathias offered face detection deformable component models that worked quite well.

They may, however, require expensive annotation during the training phase and are computationally demanding. Recently, convolutional neural networks (CNNs) have achieved notable progress in various computer vision applications such as face recognition and image classification. In order to obtain a high response in face regions and identify candidate face windows, deep neural networks are trained to identify facial attributes. However, because of its intricate CNN structure, this technique takes a lot of time to implement in practice.

# Agriculture Supply Chain Management Based on Blockchain Architecture and Smart Contracts

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**ABSTRACT** : The advent of Distributed Ledger Technology (DLT) has spurred innovation across various industries, with Supply Chain Management (SCM) being one of the primary beneficiaries. Leveraging blockchain technology, SCM processes stand to undergo substantial improvements in efficiency, transparency, and traceability. In particular, the Food Supply Chain (FSC) has witnessed significant enhancements through the integration of blockchain, offering improved product traceability, streamlined coordination among stakeholders, and easier access to funding. This paper introduces FARMSUPPLY, a novel blockchain-based model tailored for the Food Supply Chain. FARMSUPPLY harnesses Ethereum blockchain technology and smart contracts to verify and validate critical attributes at each stage of the food supply chain. Through a comprehensive exploration of FARMSUPPLY's architecture and functionality, this paper elucidates its potential to revolutionize food supply chain management, offering stakeholders a clearer view of farmers, products, and retailers. By facilitating seamless data sharing, trust, and accountability across the FSC, FARMSUPPLY aims to enhance food safety, quality, and sustainability, thereby contributing to the optimization of global food supply chains.

**Keywords:** Distributed Ledger Technology, Blockchain, Supply Chain Management, Food Supply Chain, FARMSUPPLY, Ethereum, Smart Contracts, Traceability, Transparency, Food Safety, Sustainability.

## I. INTRODUCTION

This project aims to modernize the Food Supply Chain (FSC) using Ethereum blockchain, with a primary focus on enhancing efficiency, transparency, and security. By leveraging Ethereum's capabilities, we aim to streamline FSC operations, provide stakeholders with clear insights, and fortify transactional security for a more reliable supply chain. Traditional FSC methods face challenges, including inefficiencies, a lack of transparency, and susceptibility to fraud. Manual processes hinder traceability and compliance verification. Our project addresses these issues, recognizing the need for a more effective and secure approach. To tackle the identified challenges, we integrate Ethereum blockchain and smart contracts. In our case, it's used to store information regarding product origins, verification processes, and authenticity checks. Blockchain functions as a digital ledger, maintaining a secure and transparent record of transactions. These blocks are distributed across multiple computers (nodes), making it much harder for anyone to tamper with the data or compromise the entire system. Blockchain offers several advantages. First, it's decentralized, meaning the data isn't stored in one vulnerable location. Second, it enhances security because the data is stored in encrypted format that's very difficult to alter or hack. Third, it promotes transparency, as all transactions are recorded and visible to authorized users. Fourth, it ensures data immutability, meaning once something is recorded in the blockchain, it can't be easily changed. Finally, it's resilient to failures because even if some nodes go down, others continue to maintain the data. This initiative capitalizes on Ethereum's blockchain, renowned for its smart contract capabilities. These contracts on the Ethereum network not only secure but also meticulously track critical product details, further elevating transparency and reliability in the supply chain.

## II. LITERATURE SURVEY

1. **Block-chain Technology for Food supply chains:** The technology Block-chain is most emerging and widely used in almost all the applications like supply chain management systems, healthcare, banking industries, business, IT sectors, government organizations, agriculture etc. The food products are more sensitive, and it is very hard to trace the origin, buyers, sellers, farmers with the existing centralized method. The usage of Block-chain technology is proposed and experimented in this work along with the features of decentralization, increased security, immutability, and tamper proof for supply chains. The

# Online Smart Voting System Using Biometrics Based Facial and Fingerprint

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**Abstract:** Despite being a democratic nation, India still uses manual labor and expensive voting machines to conduct its elections web-based program permits voters to cast ballots from any location in the world. An IP address block is included on the website produced for elections by the Indian government objective. Individuals ought to register their name and address on the Internet. The electoral commission shall gather the voter's fingerprints and facial photos. The photos will be kept on a server or database. Once the pictures are acquired on the day of casting, they will be compared to a database and offer a safe voting environment on the day of elections. The system makes use of faces and fingerprints to access the voting apparatus, akin to the cell phones utilized. Many voters find the existing method inconvenient as it requires them to be physically present at the polls. Additionally, the process takes less time. By utilizing facial recognition and fingerprint pictures, the number of phony voters might be decreased. The eyes and the spacing between your eyebrows don't change as you get older. Bolster system security. This study often makes use of print images to identify the voter's correct name.

**Keywords:** Online Website voting, Face Capturing, Face recognition using Haar cascade, pre-processing of fingerprint images, Fingerprints image matching using CNN

## I. Introduction

Every democracy must start with elections, and the essence of democracy is the people electing their own leaders. However, there are flaws and weaknesses in the current electoral system in our nation that are being used by candidates and political parties. Numerous flaws in the current system, such as the potential for duplicate votes, tampering with electronic voting machines, and faking the count, distort the essence of democracy. Most sites use electronic voting machines, which require a lot of time and energy and should only be used in designated locations. The machine is costly and requires additional manpower for monitoring and transportation. This system is a solution that takes care of all of the previously described issues are addressed by the system that is being suggested here. Those who do not live in the same area, the elderly, or anyone unable to stand in line for extended periods will benefit from the smart voting system, which uses fingerprint and face recognition. Voters can conveniently cast their ballots from any location, and doing so also lessens the chance of a duplicate vote. This online voting system uses the Haar Cascade Algorithm in image processing to identify voters' faces precise mouth, face, and eyes from the entire face are compared with a database image of a face. CNN Deep Learning is used to calculate the matching of fingerprint images. CNN shortened the amount of time needed to process the large-scale image. A CNN takes a long time to train. It is divided into two phases: image classification and future detection. The features of fingerprint and face images are extracted and cross-referenced with the database when they line up. The voter is going to permit voting. Any leader may be chosen by the electorate. The other leader slots are then disabled. After the election, the votes are counted and saved on the server. Commission from servers and Clint is crucial to the system. The government website for the election provides the IP address. In comparison to the current approach, counting is quite simple and requires very little time. following the vital data entered into the system to separate legitimate voters from fraudulent ones then compared to database photographs. Voters will be able to cast ballots when they match the input.

# A Contemporary Survey on advancements in Adversarial Attacks and Defense Mechanisms in the field of Machine Learning

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**Abstract**—Over the past ten years, machine learning, deep learning, and artificial intelligence technologies have found ever-wider applications in a variety of disciplines, including cyber security. current digital world has wealth of data, such as Internet of Things (IoT) data, cybersecurity data, mobile data, business data, social media data, health data, etc. A plethora of applications are utilizing machine learning systems due to their growing accuracy. Attack strategies for machine learning models evolved together with the models themselves. Since machine learning algorithm designers are typically more concerned with creating effective and efficient models than they are with ensuring security and durability, models constructed using machine learning and deep learning approaches now confront a new issue. These techniques' weak modeling eventually makes them more vulnerable to adversarial attacks. Adversarial attack is a strategy an attacker utilizes to deceive and command machine learning and deep learning models. Goal of an adversarial attack is to fabricate inaccurate predictions or classifications by taking advantage of vulnerabilities in the model's decision-making process. With the speed at which machine learning (ML) and artificial intelligence (AI) applications are evolving, it is imperative that the stability and security of the deployed algorithms be ensured. Therefore, evaluating the effectiveness, robustness and resistance to adversarial attacks of a machine learning system is essential. This paper offers a thorough, methodical literature review of this recently-emerging discipline along with potential countermeasures. The several adversarial attack types that are looked at in this survey include Evasion, Data poisoning and Model extraction attacks based on how the attack environment perceives them. This review also emphasizes many strategies mainly adversarial training, ensemble learning and model configuration as the possible countermeasures for defending against these attacks.

**Keywords**—Adversarial Machine Learning, Adversarial Attacks, Cyber Security, Data poisoning attacks, Evasion attacks, Ensemble learning and Adversarial training.

## I. INTRODUCTION

To intelligently analyse data and develop corresponding smart and automated applications, the knowledge of artificial intelligence (AI), particularly, machine learning (ML) is the key [1]. The ubiquity of applications in AI and ML are fostered by increase in availability of data, advances in computing technology and new robust techniques [2]. Machine Learning (ML) algorithms with Deep Neural Networks (DNNs) have been able to solve a wide range of problems, particularly very complex ones. They have been able to achieve results that are on par with or better than those of humans in a number of tasks, including object recognition, face recognition, natural language processing, speech recognition, wireless communications, networking, finance, and e-commerce also these algorithms have been used in critical fields including healthcare, cyber security, malware detection and self-driving cars [3], where their misuse or malfunction can have catastrophic consequences for users. Adversarial risks are becoming more frequent in machine learning enabled systems [4]. Security is a major concern because these systems are widely used in society. Attacks on these systems have the potential to result in disastrous errors since communities are depending more and more on machine intelligence. Weak modelling of Machine learning technique has number of drawbacks that might negatively impact a system and lead to system failures when applied in different fields. Adversaries have noticed these weaknesses and have taken advantage of them for iniquitous purpose. For instance, attackers may insert fake data into the system and use machine learning algorithms to process it, or they may enter the system to seize control. Thus, the actions of adversaries may decrease the reliability of a system and may compromise the confidentiality and the availability of the system. Organizations are finding that protecting machine learning is becoming perceptibly important as it quickly becomes a core component of their

## BlockLottery: A Decentralized Lottery System based on Blockchain Technology

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**Abstract:** Lottery systems have for the longest time been faced with concerns related to fairness, transparency and security. Traditional lottery systems are often centralized and faced problems such lack of trust, manipulation and fraud by the organizers of the lottery. This paper proposes a secure, decentralized lottery application centred on Ethereum/Ganache network in blockchain. This decentralized lottery application makes use of smart contracts to certify transparency, fairness and is exempt from fraud and manipulation of outcomes in any sort of favours. The lottery winning process is structured in a way such that only admin's wallet is authorized to pledge the process of randomly picking one address or any count of addressees. Moreover, the smart contract would by definition transfer the prize money to the winner only, thereby creating a secure, decentralized blockchain based transaction.

**Keywords:** Blockchain, Smart contract, Decentralized lottery

### I. Introduction

Lotteries have always been a popular form of fun, entertainment and a potential windfall for participants for centuries, with the prospect of winning substantial prizes, thereby driving widespread interest, which has the potential to change their lives. However, traditional lottery systems have often faced challenges and issues related to transparency, fairness, and trust. With the advent of a revolutionary innovation, Blockchain technology, there is advent scope of transforming the conventional lottery into direct, accountable and tamper-proof experience [1].

Blockchain, best known as basic technology for cryptocurrencies like Namecoin, Litecoin, offers a decentralized, immutable and transparent ledger system. Its core features, including immutability, directness, clarity and smart contract functionality, makes it an ideal contender for addressing inherent issues of traditional lotteries [2, 3].

A blockchain based lottery system utilizes the power of blockchain to design and build a decentralized and tamper free lottery system. Rather than depending on a central authority to conduct draws of lottery tickets and manage funds, blockchain lotteries utilizes smart contracts, which are self-executing contracts written onto Ethereum Blockchain, executed when preordained circumstances are met.

Also, transparency and fair distribution of funds are the most common issues, leading towards distrust in lottery systems. These systems declare winners randomly, without the need for skills. Thereby, the players usually rely on luck, hoping that they could get an opportunity to win the lottery, which would in turn change their economic perspectives. Here, every participant is allowed to purchase atleast one ticket to participate in the process. Furthermore, manual intervention is employed to identify the winner. Moreover, lottery results are declared by an intermediate, under the approval of government involved. These traditional systems are however, plausible for being tampered. Henceforth, there is a need to design secure, decentralized lottery systems which are resistant to the act of tampering [4, 5].

In this direction, blockchain centered lottery systems are a secure alternative towards enabling decentralized transactions. Here, lottery tickets are sold in distributed manner, thereby evaluating the payment also in a distributed fashion. Moreover, blockchain induces no central authority, thereby ensuring transparency in the lottery process. Here, all lottery protocols, including, purchase of tickets, anticipation of termination of lottery process, randomized winner selection and price payment to winner, are decentralized. Blockchain based lottery system ensures secure payment to winner's wallet address, thereby eliminating occurrences of theft and money laundering [6].

# MACHINE LEARNING APPROACHES FOR EXOPLANET EXPLORATION FROM KEPLER-LIGHT CURVES

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## Abstract

There are numerous approaches and technologies that have been used up to this point to discover the presence of these extra-solar planets, or exoplanets, but the developing science and the changing nature of exoplanets constantly call for more advanced methods. This paper employs specific Feature extraction and classification techniques to choose the most appropriate algorithms in successfully identifying the presence of exoplanets. The information considered here is derived from the exoplanet transit approach, which uses the transit events of the planets and stars. The model gets the features it needs to function better classification. The aim of the research is to provide a comparative analysis of the learning models utilized, together with the neural network (RNN), in order to evaluate the prediction rate of the model with combinations of feature extraction and classification techniques acquire a more accurate categorization model.

**Keywords:** - Transit events, feature extraction techniques, and exoplanets

## I. INTRODUCTION

In our solar system, every planet revolves around the Sun. Exo-planets are planets that revolve around other stars. Thousands more planets have been detected orbiting stars outside of our solar system since the first exoplanet was found a little more than 20 years ago. Even the exoplanetary systems' design differs significantly from our own in many of these newly discovered planets from those that orbit our Sun. For some of these far-off worlds, a startling quantity of information has been discovered over time. Even more amazing is how quickly the study of exoplanets has advanced in a comparatively short amount of time.

With telescopes, it is quite difficult to directly observe them. The intense light from the stars they orbit obscures them. Other techniques are employed by astronomers to find and investigate these far-off planets. By observing the impacts that these planets have on the stars they circle, astronomers look for exoplanets. NASA launched the Kepler spacecraft in 2009 to search for exoplanets. Kepler searched for planets with a variety of sizes and trajectories. Additionally, these planets circled variously sized and hot stars. Some of the planets Kepler has found are rocky planets that are quite far from their star. The habitable zone, where life may be feasible, is this ideal region.

**Prediction of Arecanut Disease Severity using Hyperspectral Imaging - Study in Channagiri Region**

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**ABSTRACT**

The Disease known as ‘Hidimundige/ Crown -Choke Disease seen in Arecanut Farm has been spreading across the areas of Channagiri, Davanagere district of Karnataka, India over the past 5-6 years. The disease has caused a decrease in the yield of the area which is related to the downpour of the economic growth of the country as Arecanut is a cash crop. Karnataka’s Channagiri district is “The Arecanut Hub” of India and is responsible for uplifting the economy and the export business of India. The paper focuses on the study of the Disease Severity determination of this area. Comparisons of the Disease Severity for the dataset collected in the month of February 2023 is calculated with that of the dataset collected during the year 2015-16. The comparison was again subdivided based on the age groups of the plants. The age group of below 6 months, less than 5 years, between 5 – 7 Years, above 7 and within 10 years, above 10 years to 15 years and 25 years were taken into consideration for the study. The features considered are spectral reflectance and vegetation indices. The classification models were trained with the samples taken where training and testing ratio were kept in the range of 80:20. Variation in the spectral reflectance was mainly seen in the 500 nm to 2000 nm range. Various classification algorithms were evaluated on the samples collected to get the better accuracy of classification. LightGBM (Light Gradient Boosting Machine) showed better classification with respect to the disease severity in terms of all classification parameters. The data taken of the site are Hyperspectral images of leaf samples from different sites.

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**Keywords:**

Hyperspectral Imaging  
Deep learning  
Machine Learning  
Algorithms  
Disease severity  
determination

# Traffic Aware Routing with Round Robin Technique for Equating the Load in Software Defined WSN

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**Abstract**— Multiple uses of Wireless Sensor Networks (WSNs) in the real world would need the probable dispersion of a large number of sensor nodes. The adaptability and flexibility is very difficult in the traditional WSNs which uses balancing load technology. Software-defined networking (SDN) is a good choice because it lets you see what resources are used and also set up boundaries. In WSN, the highest traffic load causes an overflow of the data queue. As a result, important data should be lost. Also, the sensor node's energy is rapidly drained, and the whole network's lifespan is damaged. Traffic-aware routing with round robin technique (TARR) for equating the load in a software-defined WSN is proposed to solve this problem. The network contains two significant functions, namely, the formation of the network and the action of the network. This approach recognizes the traffic by obtaining or forwarding packets via control and data messages. In this approach, the round-robin technique is used during congestion situations. Thus, the data is forwarded constantly. As a result, the recipient node receives all data packets efficiently. The results of the simulation demonstrate that the TARR technique boosts network throughput while simultaneously reducing both packet loss and latency in a software-defined WSN.

**Keywords**— Traffic aware routing, Software defined networking, Congestion Control, Wireless sensor networks, Traffic-aware routing with round robin technique

## I. INTRODUCTION

WSN contains numerous sensor nodes which are interrelate with the situation via observing significant properties like automotive electronics, smart cities, avionics, industrial automation and building automation. Sensor nodes comprise sensing, computation, actuation and communiqué operations. Avoiding traffic congestion and failing to cooperate with the sensor nodes' energy consumption are the primary issues presented by WSN. The result of congestion is the dropping of packets, a reduction in throughput, and a waste of energy [1]. A method known as round robin is used in order to evenly distribute the load throughout the network. This method ensures that the load is distributed evenly, which results in an increase in efficiency. In particular, the routing algorithms in WSN are concerned not only with the distribution of resources within a single node, but also with

ensuring that the resource problem of the entire network is well balanced. This is because WSNs are comprised of many interconnected nodes, each of which contains its own set of resources. To deal with these disadvantages, a novel idea is recognized as SDN, is introduced. The SDN is a network paradigm with the innovation concept [2]. SDN is a promising network structure, applying that network control can be uncoupled from the conventional hardware devices. As a result, the primary objective of the SDN is to differentiate between the control plane and the data plane in terms of the send devices. Accordingly, sufficient control logic can be enforced on the physical devices, established on the application-specific necessities in real-time. Furthermore, SDN speeds the preparation of new inventions otherwise services and minimizes the execution costs via programmable interfaces. In SDN, the data plane contains transmitting devices which are managed through the controller [3]. Traffic aware routing is minimized the network congestion and improved the routing efficiency.

The purpose of the round robin method is to equitably distribute client requests across several servers. Each of the servers in the cluster receives a request from a client in the order that it was received thanks to the Round Robin (RR) load balancer [4]. After running through all of the available servers and reaching the last one on the list, it then rewinds to the beginning of the list and begins the process of establishing client requests from the very first server. The fact that this algorithm is relatively simple to put into action is the primary benefit that it offers. However, it is unable to effectively distribute loads in situations in which the load demands greatly vary from one another. When applied to a network, load balancing will become an absolute need in the event that the network in question is a busy one that is used by a great number of people. The reason load balance occurs is because it permits imbalances in the network. The term load balancing refers to a method of setup that manages load similarity. Both RR and greedy algorithms produce the exact same results [5]. This is due to the fact that sensors begin with the same amount of energy and also to the fact that RR can be thought of as a greedy algorithm. The strategy of a greedy algorithm is to first consider nodes that have the lowest indexes and the least amount of time spent using



# A Computer Aided Tool For Detection And 3D Visualization Of Brain Tumor In Human Brain

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**Abstract-** Brain tumors are a significant health concern, requiring accurate diagnosis through MRI reports and subsequent treatment guided by experienced neurologists. However, the lack of visualization tools for brain tumors poses a challenge in understanding their condition. To solve this issue, we propose the development of an augmented reality (AR) mobile application. This application utilizes MRI report analysis to detect brain tumors and provides a 3D model, enhancing comprehension for both patients and doctors. The AR-based visualization facilitates a better understanding of tumor characteristics, aiding in treatment planning and patient communication. This paper presents the design, development, and evaluation of the proposed AR application, highlighting its potential impact on improving brain tumor diagnosis and treatment outcomes.

**Keywords –** *U-net, Segmentation, Brain Tumor, Augmented reality, 3D visualization, MONAI.*

## I. INTRODUCTION

Brain tumors pose a significant health challenge worldwide, impacting a large number of individuals and necessitating accurate diagnosis for effective treatment. Magnetic Resonance Imaging (MRI) has emerged as a crucial tool in the detection and characterization of brain tumors, providing detailed anatomical information. However, interpreting MRI reports and comprehending the tumor's condition remain complex tasks, requiring the expertise of neurologists and the ability to mentally visualize the tumor's location and extent. In current practice, neurologists rely on their experience to analyse MRI reports and administer appropriate treatment procedures. However, this subjective process lacks a comprehensive visualization tool to aid both patients and doctors in understanding the tumor's condition. To address this critical gap, we propose the development of an augmented reality (AR) based mobile application that facilitates brain tumor visualization. For accurate extraction of brain tumors from MRI scans, we employed the UNET model, a popular deep learning architecture. To further enhance the model's accuracy, we introduced a modified version by incorporating a residual layer inspired by ResNet-50 before the output layer. This modification leverages the strengths of residual connections to enhance the model's ability to capture intricate tumor features.

This paper is our research on the design, development, and evaluation of an AR application aimed at enhancing brain tumor visualization. To achieve this, we leveraged the Unity game engine to develop the Android application and project a 3D brain model onto the MRI image. Real-time AR positioning and tracking were accomplished using the Vuforia Software Development Kit (SDK), enabling seamless integration of the virtual and real-world environments. Additionally, we utilized the MONAI framework, a deep learning library specifically designed for medical imaging tasks, to train the UNET model in the backend. This framework provides a range of tools and functionalities that facilitate efficient training and evaluation of deep learning models in the medical domain. By combining the Unity game engine, Vuforia SDK, and the modified UNET model trained using the MONAI framework, our AR application offers a novel and intuitive visualization approach for brain tumor analysis. This research contributes to bridging the gap between MRI reports and visual understanding, ultimately enhancing patient care, treatment planning, and patient engagement.

The rest of the paper is organized as follows. It delves into the technical details of our proposed AR application, outlining the methodologies employed, the integration of technologies, and the evaluation of its effectiveness in enhancing brain tumor visualization.



## **Channel Fusion Filter and Invariant Scattering Network-Based Leukocyte Image Discrimination Framework**

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**Abstract:** The escalating demand for accessible, effective, and precise healthcare solutions has driven extensive research into integrating artificial intelligence into the medical field. Recognizing intricate patterns within biomedical images remains a formidable challenge for human practitioners. In response to this, our study introduces a pioneering image enhancement paradigm, the stationary wavelet channel fusion filtered (SWCFF) algorithm. Additionally, we employ the invariant scattering network (ISN), a novel feature learning methodology to analyze leukocyte images. The novelty of our approach lies in the inventive combination of SWCFF and ISN for enhanced feature extraction and discrimination of leukocytes. Our investigation aims to assess the efficacy of automatically extracted features from this algorithm in differentiating leukocytes, leveraging a support vector machine (SVM) classifier for the diagnosis and detection of leukemia and other blood-related conditions. The proposed model is rigorously evaluated on four benchmark datasets: ALLIDB, C\_NMC, BCCD, and LISC. Notably, the ALLIDB binary class achieves a peak accuracy of 96.15% (95% CI: 0.9 to 1), while the class accuracy for neutrophils reaches an impressive 97.96% (95% CI: 0.89 to 1), accompanied by a precision of 100% and a false positive rate of 0%. Our innovative approach holds promise for the deployment of a cost-effective computer-aided diagnosis (CAD) tool in rural settings, aiding physicians in early disease prediction and the timely monitoring of treatment.

**Keywords:** Acute lymphoblastic leukemia, Image fusion, Leukocyte, Machine learning, Support vector machine, Wavelet scattering network.

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### **1. Introduction**

The analysis of blood cells serves as a crucial diagnostic tool, providing insights into human health conditions and has been a focus of research for several decades. The intricate process of blood cell development, marked by gradual transformations from early stem cells, underscores the complexity of physiological processes within the human body. Traditionally, the classification of these transformations into healthy and malign types, or their constituent components, requires the expertise of highly trained haematologists. Traditional methodologies, heavily reliant on manual labour and expertise, often struggle to provide timely and accurate diagnoses. The complexities of blood cell

development and the need for precise classification pose significant hurdles for haematologists. Additionally, the demand for enhanced diagnostic accuracy, streamlined laboratory processes, and the potential for expedited healthcare decision-making has prompted the exploration of advanced automated solutions.


The integration of artificial intelligence (AI) technology has brought about significant changes in the healthcare sector, particularly in improving diagnostic precision and optimizing workflow efficiency. AI has introduced automated assistance in diagnostics, expanded clinical operations, and implemented quantifiable imaging techniques.

In response to the need for early identification and precise diagnosis of illnesses, and to address the challenges related to the intricate analysis of

# A Hybrid Medical Image Denoising Based on Block Matching 3D Collaborative Filtering

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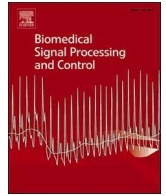
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## Abstract

To mitigate the noise effects without information loss at the edges of the radiological images, a well-designed preprocessing algorithm is required to assist the radiologists. This paper proposes a hybrid adaptive preprocessing algorithm that utilizes a Rudin\_Osher\_Fatemi (R\_O\_F) model for edge detection, Richardson\_Lucy (R\_L) algorithm for image enhancement, and block matching 3D Collaborative filtering for denoising images. The performance of the proposed method is assessed and estimated on two realistic datasets, one on chest X-ray images and the other on MRI and CT images. The proposed hybrid system verifies the data reliability of Gaussian noise-affected medical images. The simulation results show that the proposed adaptive method attains a high-value peak signal-to-noise ratio of 47.4433 dB for chest X-ray and 46.8674 dB for MRI and CT datasets, respectively, at a standard deviation value of 2. The performance analysis of the proposed scheme is further carried out using various statistical parameters, such as root-mean-square error, contrast-to-noise ratio, Bhattacharya coefficient, and edge preservation index. A comparative analysis of denoised image quality shows that the proposed system achieves better performance than several existing denoising methods.



# An adaptive watershed segmentation based medical image denoising using deep convolutional neural networks

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## ABSTRACT

Until today, researchers have introduced a range of methodologies to decrease the noise effect on medical images. In the proposed approach, an adapted deep convolutional neural network (CNN) is taken into consideration for denoising the images, along with adaptive watershed segmentation to recover the image details and a hybrid lifting scheme based modified bi-histogram equalized contrast enhancement as an image enhancement technique. Then this method is further improved by considering marker-based watershed segmentation. The performance of the suggested methodology is tested as well as evaluated on medical images like magnetic resonance imaging (MRI) and computed tomography (CT) images. The segmentation technique's Jaccard Index, Dice Coefficient, and F1 score, as well as the image denoising method's peak signal-to-noise ratio, contrast-to-noise ratio, Bhattacharya coefficient, edge preservation index, and root mean square error, are used to assess the performance of the suggested approach. The simulation results generated demonstrate that the proposed adaptive method attains a high Jaccard index value of 0.95 and a high peak signal-to-noise ratio value of 43.76 dB at a standard deviation value of 2, leading to better performance.

## 1. Introduction

The use of digital images is rapidly growing in the fields of medical imaging [1–4] and remote sensing applications. X-rays provide better quality images by focusing on minor irregularities; CT images give comprehensive information regarding the diagnosis of the patient; PET images supply information concerning the atypical metabolic activity before all other scans; ultrasound images provide better accessibility to soft tissues; and MRI images provide a non-invasive approach to diagnosing tissues, skeletal systems, and organs of the human body. The addition of noise to these images during picture acquisition or transmission results in a false diagnosis of the patient's condition. In medical imaging [5–8], fluctuations and variations of parameters like luminance and chroma in both spatial frequency and magnitude lead to the degradation of accurate and precise information about the patient's diagnosis.

Recently, to avoid the above problems, various image denoising approaches [9–12] have been introduced to mitigate the effects of noises like impulse noise, Gaussian noise, etc. The image denoising approaches are classified into four types: filtering-based approaches [13–16],

transform-domain based approaches [17–20], statistical-domain based approaches [21–26], and machine learning based approaches [27–35]. The first three types of denoising algorithms are mainly applicable to images affected by standard noises like impulse noise, Gaussian noise, etc. When it comes to real-world noisy images, i.e., blind noise these image denoising approaches result in poor performance. The image denoising approaches based on machine learning concepts avoid the loss of information due to over-smoothness at the image edges. This image denoising algorithm's performance is evaluated by using various parameters like contrast-to-noise ratio, peak signal-to-noise ratio, root mean square error, mean square error, Bhattacharya coefficient, etc. Even though conventional approaches to denoising can effectively limit the noise effect on the medical images, some significant details of local information may be lost because of the high frequency components of noise. Other limitations of these methods are that they require prior knowledge about the noise and can be applied only to a particular noise.

Recently, deep learning-based approaches have emerged as a capable substitute for medical image denoising. These approaches can extract useful information about the images without the help of manual feature extraction and strong assumptions. CNNs are considered [36–39] for

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# HOME AUTOMATION WITH MULTIPLE CONTROL OPTIONS BASED ON IOT

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**Abstract :** IoT Based Home Automation is a project that contains multiple ways to interact with our Home Appliances including controlling speed of fan as well, using a Mobile App, Voice Assistant along with traditional manual switches and manual fan regulator. The idea behind Google assistant-controlled home automation is to control home devices with Voice. On the market there are many devices available to do that, but making our own is awesome. In this Project, the Google assistant requires voice commands. Rain-Maker account which is a cloud based free IoT Based Application server used to create virtual switches, is linking to Rain-Maker Application Which is used to create if else conditional statements. The voice commands for Google assistant have been Added through Rain-Maker App.

## I. INTRODUCTION

Our main Motive in this project Implementation is to Control all the Electronic Appliances available in the Home Remotely and Manually. Where we'll be able to Control all the Home Appliances automatically Throughout the world wherever we are by using the Google-assistant and Alexa. And we'll be Controlling those Appliances using IR Remote and Manual Switches also in case of Internet Issues. By implementing this project, it would help humans by reducing their Efforts, Time, Cost and save Electric-Power. And mainly it would be useful for Physically Challenged Persons also by controlling their home appliances using Google-Assistant or Alexa or IR Remote. This Project would be useful in all Other Places such as Schools, Colleges, Offices etc.; "AND THIS PROJECT IS USER FRIENDLY DEVICES FOR AGED OR PHYSICALLY CHALLENGED PEOPLE ALSO".

## II. LITERATURE SURVEY

One of the topics which is gaining popularity of Home Automation System is because of its innumerable advantages. Home automation refers to the monitoring and controlling of home appliances remotely. with the never-ending growth of the Internet and its applications, there is much potential and scope for remote access and control and monitoring of such network enabled appliances. The effort targeted on the home automation concept of where the controlling and monitoring operations are expediting

## Development of renewable energy system for low power underwater devices

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### ABSTRACT

Underwater sensor networks (UWSNs) are an emerging field in the research area as they have potential applications starting from pollution monitoring to defense and ocean exploration. Ocean monitoring is of great importance in marine scientific research. However, battery-operated devices utilized in such systems have limited power and maintenance is difficult. So, devices used underwater suffer from many research challenges and energy issues. Apart from all the problems, harvesting energy underwater is the main limiting factor. Nonrenewable energies come from sources that may not be replenished in our lifetime. Hence, it is very much essential to use renewable energy sources. Ocean has an unlimited amount of energy like wind energy, solar power, and tidal energy. Obtaining sufficient energy is sort of difficult since devices are underwater. Researchers are continuously working on it. Water energy is quite environmentally friendly, and it is a sustainable solution for a secure energy system. This paper implements a renewable energy system using piezoelectric (PZT) sensor, which generates sufficient power for low-power underwater devices by employing two stage amplifier circuits. Experimental outcome shows the proposed energy harvesting system can generate a maximum voltage of 10.6 V and current of 10.1 mA which is sufficient to run low power underwater device.

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### 1. INTRODUCTION

With the growth of electronics, technologies have aided in reducing the power needed to run sensor devices and thereby increasing its autonomy [1]. The network lifetime of sensor device can be improved using simple renewable energy resource [2]. Energy harvesting is an evolving idea in maintaining sensor networks, whereby each sensor device is independent in terms of energy, reducing operation and battery expenditures. In dealing the UWSNs environment and other comparable applications, autonomous energy harvesters must be developed. To supply energy to the sensor, many forms of power generation were investigated, with its own set of operating concepts and components, each of which has set of benefits and drawbacks [3]. The renewable power generators are classified into two types [4]: semi-submerged devices, which generally operates on the surface of ocean; and fully submerged devices, which operates under the surface of ocean. An example of an underwater sensor network is shown in Figure 1.



## LITERATURE SURVEY ON SMART REAL-TIME DRAINAGE MONITORING SYSTEM

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**Abstract:** Life in a healthy environment is a right for all people. Bangladesh and many other developing nations frequently experience flooding as a result of blocked drains, which creates unsanitary conditions. As a result, when sewage gas poisons the air, numerous health problems arise. Standing water on the road for extended periods of time is one of the main reasons Aedes mosquito populations are rising. Manual tracking is challenging, as problems only surface once they are fully obstructed and the area is submerged under water. This study proposes a warning system that uses GSM techniques and IOT to create sensed data and deliver it to the controlling authorities, preventing such incidents even before they may affect the public. Water flow is monitored by a water level sensor, sewer gas is detected by an ultrasonic sensor, and sewer distance is determined by MQ135 sensor. The authority and the general public will be able to monitor real-time data via an online website implemented with NodeMCU. If the level reaches a certain threshold, it will send a text message using GSM to report the issues mentioning which areas should be fixed with a location using GPS. The threshold values can be changed to suit the user's preferences. People in the neighborhood can live healthier lives thanks to the system, which guarantees timely notifications to the appropriate authority and displays real-time data.

**Keywords:** GSM, Alert system, MQ135, Ultrasonic Sensor, Water Sensor, GPS Module

### I. INTRODUCTION

Millions of people live in large cities, where drainage systems are crucial. The foundation for soil dryness from excess, wasted, and rainwater is the drainage system. Monitoring drainage conditions is necessary to keep it functioning properly. Not every locality has a drainage monitoring crew, in actuality. It results in sporadic drainage condition monitoring. The neighborhood's flooding is caused by the inflow that results from blocked drainage, which is partly due to the sporadic monitoring. Incompetent manual monitoring also exists. The sensors used by the monitoring system. The microcontroller reads the data from the sensor and uses the GSM module to send the data to the server. The information gained is very helpful in identifying any obstructions or clogs in the drainage system. The authorities in question receive the data, which aids in their efforts to rid the system of obstructions. GPS is used to pinpoint the blockage's location for the police.

### II. LITERATURE SURVEY

In their work "Smart Real Time Drainage Monitoring System Using Iot" (April 2022), Hemamalini M. and Puvaneshwari S. suggest designing an intelligent drainage system with sensors to identify obstructions, floods, and gasses. It senses dangerous gases like methane (CH<sub>4</sub>), sulfur dioxide (SO<sub>2</sub>), and carbon monoxide (CO) and produces alarms when gas levels surpass threshold values. It also attempts to identify blockages and provide location data for action. The system ensures a healthy environment and prevents waterborne infections using Wireless Sensor Networking (WSN) technology to send sensor data to a cloud for real-time monitoring.

In his 2021 paper "Smart Drainage Monitoring and Controlling System Using IoT," Tushar Pathak suggests automating the maintenance of urban subsurface drainage systems through the use of IoT in a smart drainage monitoring and controlling system. Its objective is to continuously monitor air temperature, hazardous gas concentrations, water flow rates, obstructions, and water levels. The drainage system clogs can be automatically cleared by the system, which is designed to detect blockages and overflow. Cleaner cities, smarter drainage management, real-time environmental condition updates, and an affordable infrastructure management solution are among the goals.



# LITERATURE SURVEY ON WATER PURIFIER

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*Abstract: Every year, almost 3 million people—including 1.3 million children under the age of six—die from drinking water contamination. As per the World Health Organization and UNICEF Eight people on the planet do not have access to safe, clean drinking water, and many are forced to drink water that they know is tainted with bacteria that might be fatal. People in underdeveloped nations can access up to five gallons of clean, safe water per day. Boiling water in wood stoves was a popular and less expensive way to purify water during the early stages of human civilization. However, this practice still poses risks in kitchens with inadequate ventilation and contributes to deforestation. This essay aims to analyze and summarize the published research that has been done thus far on a variety of low-cost water treatment techniques that are appropriate for rural areas, such as slow sand filtration, solar sterilization, distillation, chlorine filters, bone marrow, and emergency homemade filters. These sustainable low-cost water treatment tool solutions are ideal for rural infrastructures.*

*Keywords: Water purification, sediment filter, carbon filter, IoT, IoS, IoP and IoE, QOI levels*

## I. INTRODUCTION

Human activity has contaminated the world's water supplies. These human endeavors entail the discharge of industrial chemical waste into rivers and lakes. Water contamination is caused by a multitude of sources, including industrial waste disposal, population growth, and oil leaks. The earth's water resources include rivers, ice caps, glaciers, seas, and oceans. Contamination of water bodies is referred to as water pollution. Ground water is contaminated by substances like fertilizer and pesticides that farmers employ to keep insects and pathogens away from their crops. The process of purifying water involves taking out unwanted chemicals, biological impurities, suspended solids, and gases. The waters and marine life are seriously threatened by unintentional oil leaks. Tainted water from taps or unclean sources can lead to cholera, dysentery, typhoid, diarrhea, and polio. Because arsenic and fluorides are components of contaminated water, diseases like arsenicosis are brought on by their presence. Water purification is the process of eliminating bacteria, unwanted chemicals, and suspended particles. Sand and suspended particles are eliminated from the water using a sediment filter, which is the main step in the purification process. Water colorants and unpleasant odors are eliminated from the water by using a carbon filter. The next step, known as UF filtering, removes germs, colloidal debris, and smaller pollutants. Large pores in the membrane are employed in a technique akin to reverse osmosis. UF filtration operates on regular water pressure; energy is not needed for it to function.

## II. LITERATURE SURVEY

According to Raj. Kishore.S.(2021)[1], Naturally occurring materials, such as plane sand that has been passed through an IS sieve measuring 425 to 600 microns, and wood charcoal that has been gathered and ground into particles no larger than 10 mm, are used to remove iron. Additionally, anthracite with a size of 625 microns and below as well as manganese-modified sand of 850 microns were employed. In order to produce drinking water, the zinc, copper, and iron solution was prepared and passed through various adsorption processes. The result was that the heavy metal solution, which had a concentration of 6.00 to 5.00 ppm, was filtered out of the water to leave up to 0.3 to 0.1 ppm and maintain a pH of 6.5-8.5. Therefore, utilizing materials that are readily available locally, the oxidation-reduction method is utilized as a tool for evaluating and determining the concentration of residual iron and dissolved oxygen in the infiltrate. The primary disadvantage of this procedure was its increased power consumption.

Feedback Control for Drinking Water Purification Alvaro E. Gil and Kevin M. Passino [2]. The writers of this research study examine a few methods for treating raw water as well as the control measures that have been put out thus far to attempt and provide drinking water in a dependable manner. The variable raw water quality, seasonal variations in pH and temperature that affect disinfection efficacy, transport delays related to water transportation times, and the multiple-input, multiple-output nature of the issue (i.e., multiple chlorine





# Literature Survey on Authenticated Access Control for Vehicle Ignition System by Driver's License and Fingerprint Technology

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*Abstract: One of the most widely used and trustworthy forms of personal biometric identification is fingerprint identification. We are able to stop those without licenses from operating a vehicle and causing collisions by utilizing this biometric authentication. The suggested method comprises of a smart card that can store a specific individual's fingerprint. The license holder's fingerprint must be recorded on the card at the time of issuance. Cars and other vehicles ought to be equipped with a card reader that can scan a license. The fingerprint reader device should be installed in the same car. If a person wants to operate the car, they must first swipe their finger after inserting their smartcard. The system moves on to alcohol detection and helmet verifying if the fingerprint matches the fingerprint that is saved on the smart card. The car will start once all authentications have been completed. If any of the authentications are unsuccessful, the car won't start and won't move on to the next phase. This makes cars more secure and guarantees safe driving by averting collisions. The Master controller uses the ignition system prototype. (Cortex M3 based Micro controller) is created and executed in conjunction with the vehicle prototype, with the accompanying outcomes.*

*Keywords: Smart card reader, Fingerprint module, Alcohol sensor, Helmet detector*

## I. INTRODUCTION

In many nations, driving without a license is a serious problem. According to the survey, drunk drivers, unlicensed drivers, and drivers who don't wear helmets are the main causes of accidents. India has a high accident rate because to dangerous driving conditions. 84,674 road accident deaths were reported from India alone in 2002, out of around 11.8 lakh road accident deaths worldwide, according to WHO figures. To 92,618 fatalities in 2004 was the higher figure. Comparing India to the UK, Sweden, the Netherlands, and Japan, the mortality rate is 8.7 per 100,000 people, while it is 5.6 in the UK, 5.4 in Sweden, and 6.7 in Japan. Compared to affluent countries where the incidence is less than two, India has a fatality rate of up to 14 per 10,000 automobiles. In India, 1,10,300, 1,05,725 and 1,54,600 deaths are projected for the years 2005, 2006, and 2014. In the previous way, the car was started with keys. Vehicles that are taken using this manner are not able to stop accidents.

Many smart systems are made to warn the owner as soon as the car is lit in order to avoid vehicle theft. Numerous writers have put forth various systems, which are summarized in the literature review.



## LOW-COST WATER PURIFIER

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### ABSTRACT

*A water purifier is a device that removes impurities from your drinking water. These impurities can include things like bacteria, viruses, chlorine, and lead. There are a few different types of water purifiers available, each with its own advantages and disadvantages. The most common type is a reverse osmosis (RO) system, which uses a semi-permeable membrane to remove contaminants. Other types of purifiers include ultraviolet (UV) filters, which use ultraviolet light to kill bacteria and viruses, and carbon filters, which remove chlorine and other taste and odor-causing contaminants. Choosing the right water purifier for your home will depend on your specific needs and budget. Human activity has contaminated the world's water supplies. These human endeavors entail the discharge of industrial chemical waste into rivers and lakes. Water contamination is caused by a multitude of sources, including industrial waste disposal, population growth, and oil leaks. The earth's water resources include rivers, ice caps, glaciers, seas, and oceans.*

*Tainted water from taps or unclean sources can lead to cholera, dysentery, typhoid, diarrhea, and polio. Large pores in the membrane are employed in a technique akin to reverse osmosis.*

**Keywords:** Reverse osmosis, ultraviolet (UV) filters, carbon filters, contaminants.

### INTRODUCTION

The process of purifying water involves taking out unwanted chemicals, biological impurities, suspended solids, and gases. The waters and marine

life are seriously threatened by unintentional oil leaks. Tainted water from taps or unclean sources can lead to cholera, dysentery, typhoid, diarrhea, and polio. Because arsenic and fluorides are components of contaminated water, diseases like arsenicosis are brought on by their presence. Water purification is the process of eliminating bacteria, unwanted chemicals, and suspended particles. Sand and suspended particles are eliminated from the water using a sediment filter, which is the main step in the purification process. Water colorants and unpleasant odors are eliminated from the water by using a carbon filter. The next step, known as UF filtering, removes germs, colloidal debris, and smaller pollutants. Large pores in the membrane are employed in a technique akin to reverse osmosis. UF filtration operates on regular water pressure; energy is not needed for it to function.

### LITERATURE SURVEY

According to Raj. Kishore.S.(2021)[1], Naturally occurring materials, such as plane sand that has been passed through an IS sieve measuring 425 to 600 microns, and wood charcoal that has been gathered and ground into particles no larger than 10 mm, are used to remove iron. Additionally, anthracite with a size of 625 microns and below as well as manganese-modified sand of 850 microns were employed. In order to produce drinking water, the zinc, copper, and iron solution was prepared and passed through various adsorption processes. The result was that the heavy metal solution, which had



## SMART REAL-TIME DRAINAGE MONITORING SYSTEM

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### ABSTRACT

Every individual has the right to live in a healthy environment. Blocked drains often cause flooding in many other developing countries, leading to unhygienic conditions. Consequently, sewage gas poisoning of the air leads to a host of health issues. One of the main causes of the increase in Aedes mosquito populations is standing water on the road for extended periods of time. It is difficult to track manually because issues don't always become apparent until they are completely blocked and the area is underwater. This study suggests a warning system that creates sensed data using IOT and GSM techniques and sends it to the controlling authorities to stop such incidents before they have a chance to affect the public. An ultrasonic sensor detects sewer gas, a water level sensor tracks water flow, and a MQ135 sensor measures sewer distance. Real-time data monitoring will be possible for both the public and the authorities through an online website that uses NodeMCU. When the level hits a predetermined level, it will use GPS to pinpoint the location of the problematic areas and send a text message via GSM to report the issues. The user can modify the threshold values to fit their preferences. Because the system shows real-time data and ensures timely notifications to the appropriate authority, people in the neighbourhood can live healthier lives.

**Keywords:** GSM, Alert system, MQ135, Ultrasonic Sensor, Water Sensor, GPS Module

### INTRODUCTION

Millions of people live in large cities, where drainage systems are crucial. The foundation for land dryness from excess, wasted, and rainwater is the drainage system. Monitoring drainage conditions is necessary to keep it functioning properly. Not every area has a drainage monitoring team, in actuality. It results in sporadic drainage condition monitoring. The neighbourhood's flooding is caused by the salutation that results from blocked drainage, which is partly due to the

irregular monitoring. Additionally, manual monitoring is inept. The sensors are used by the monitoring system. The microcontroller reads the data from the sensor and uses the GSM module to send the data to the server. The information received is very helpful in identifying any obstructions or clogs in the drainage system. The authorities in question receive the data, which aids in their efforts to clear the system of obstructions. GPS is used to pinpoint the blockage's location for the authorities.




### LITERATURE SURVEY


According to Hemamalini M. and Puvaneshwari S.'s work "Smart Real Time Drainage Monitoring System Using Iot" (April 2022), an intelligent drainage system with sensors to detect obstructions, floods, and gasses should be designed. The system senses harmful gases like methane (CH<sub>4</sub>), sulphur dioxide (SO<sub>2</sub>), and carbon monoxide (CO) and generates alarms when gas levels exceed threshold values. It also looks for blockages and provides location data for action. Using Wireless Sensor Networking (WSN) technology, sensor data is sent to a cloud for real-time monitoring, ensuring a healthy environment and preventing waterborne infections.




In his paper "Smart Drainage Monitoring and Controlling System Using IoT," published in 2021, Tushar Pathak proposes the use of IoT in a smart drainage monitoring and controlling system to automate the maintenance of urban subsurface drainage systems. Its goal is to continuously monitor water levels, obstacles, air temperature,





# An adaptive watershed segmentation based medical image denoising using deep convolutional neural networks

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## Abstract

Until today, researchers have introduced a range of methodologies to decrease the noise effect on medical images. In the proposed approach, an adapted deep convolutional neural network (CNN) is taken into consideration for denoising the images, along with adaptive watershed segmentation to recover the image details and a hybrid lifting scheme based modified bi-histogram equalized contrast enhancement as an image enhancement technique. Then this method is further improved by considering marker-based watershed segmentation. The performance of the suggested methodology is tested as well as evaluated on medical images like magnetic resonance imaging (MRI) and computed tomography (CT) images. The segmentation technique's Jaccard Index, Dice Coefficient, and F1 score, as well as the image denoising method's peak signal-to-noise ratio, contrast-to-noise ratio, Bhattacharya coefficient, edge preservation index, and root mean square error, are used to assess the performance of the suggested approach. The simulation results generated demonstrate that the proposed adaptive method attains a high Jaccard index value of 0.95 and a high peak signal-to-noise ratio value of 43.76dB at a standard deviation value of 2, leading to better performance.



Previous

Next



## Keywords



# SMART GLASS FOR INDIVIDUALS WITH HEARING IMPAIRMENT

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## I. ABSTRACT

*Smart glasses is a wearable device, specifically smartglasses, designed to facilitate real-time speech translation and transcription. The device includes a head-mounted display that displays the translated text, a microphone for recording audio, and a translator for translating. When it is connected to the Internet, it uses a translation engine and can be configured via a mobile phone. smartglasses aim to enable seamless communication between people speaking different languages, so separate translation devices are not required. Its compact and portable design offers a practical solution for real-time language translation that can be useful for the deaf or hard of hearing. The device uses machine learning, automatic speech recognition (ASR), natural language processing and the Internet of Things to deliver a low-latency solution that demonstrates its potential to improve accessibility for the hearing impaired.*

**Keywords:** ASR, DHH, AR, Smartglasses.

## II. INTRODUCTION

The study explores the advances and challenges of automatic speech recognition (ASR) technology, particularly its usability in the Deaf and Hard of Hearing (DHH) community. Despite significant improvements in ASR accuracy, DHH speech, which varies widely between individuals, presents a unique challenge. The study provides an in-depth analysis that goes beyond previous studies and evaluates improvements in Word Error Rate (WER) when using ASR with adapted language models. The results show that despite technical advances, the usability of ASR for the DHH population remains a challenge due to the specific nature of DHH speech. Recognizing the need for access services for the DHH community, the paper addresses the limitations and challenges of using such services. Often, inadequate infrastructure and processes hinder the accessibility of housing, making it expensive or unaffordable. The study highlights the case of a DHH student in the classroom and highlights the difficulties in accessing translation or subtitling services, especially when the

# Survey on Bluetooth Controlled Pick and Place Robots for Industrial Applications

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**ABSTRACT:** Pick and place robots are revolutionizing industrial operations by automating repetitive tasks with precision and speed. These robots, equipped with advanced sensors and control systems, adeptly handle diverse objects, optimizing manufacturing processes in industries such as automotive, electronics, and logistics. Their ability to swiftly and accurately position components enhances productivity while ensuring consistent quality. Beyond efficiency gains, these robots contribute to workplace safety by mitigating human exposure to hazardous tasks. Integrating seamlessly into Industry 4.0 frameworks, they leverage connectivity and data-driven insights for adaptive production and predictive maintenance. Pick and place robots stand as pivotal tools in reshaping manufacturing landscapes, offering unparalleled efficiency, precision, and safety in industrial applications.

**Keywords:** Bluetooth controlled, Pick and place robots, Precision, Workplace safety, Adaptability.

## INTRODUCTION

In the dynamic landscape of industrial automation, pick and place robots have emerged as game-changers, redefining traditional manufacturing methodologies. These robots, characterized by their precision, agility, and adaptability, have revolutionized production processes across diverse industries. By seamlessly manoeuvring through assembly lines, they efficiently handle tasks involving object recognition, grasping, and placement with unparalleled accuracy. From automotive to electronics, pharmaceuticals to logistics, the integration of pick and place robots has unleashed a wave of operational enhancements. Their seamless integration into existing workflows has not only elevated productivity but also upheld stringent quality standards. By minimizing errors and optimizing processes, these robots have become indispensable contributors to resource conservation and cost-effective manufacturing.

## LITERATURE SURVEY

[1]. This paper introduces an inventive approach to industrial automation through a Bluetooth-controlled pick and place robot employing a colour sensor for object identification and sorting. The system's distinctive elements lie in its utilization of Bluetooth connectivity for remote control, enabling flexibility in operation, and the innovative use of a colour sensor to categorize objects based on their colours, streamlining sorting processes. Additionally, the system's focus on efficiency enhancement, error reduction, and improved accuracy stands out, illustrating its potential to minimize human error in comparison to manual pick and place tasks. The robot's ability to handle hazardous tasks in factories, ensuring workplace safety, and its utilization of a soft gripper for safe object handling showcase its commitment to safety and innovative component selection. Moreover, emphasizing the system's potential for industrial automation in handling repetitive tasks across industries underscores its scalability and practicality. This integration of technology, safety considerations, and real-world applicability positions your project as a comprehensive solution in the realm of automated systems for manufacturing and logistics.

[2] The paper discusses the design and implementation of a pick and place robotic arm using gesture and voice recognition. The proposed robotic arm consists of accelerometer sensors to capture the operator's hand gestures and movements. The robotic arm and gripper movements are controlled wirelessly based on the accelerometer readings. The robotic arm can perform tasks like picking up objects, dropping objects, and rotating the gripper. Voice commands are also used to control the robotic arm. The text mentions various gesture recognition techniques like vision-based, accelerometer-based, and finger gesture recognition. It also discusses different existing robotic arm designs and control methods. Overall, the key points are the design of a robotic

## Reinforcing optimization enabled interactive approach for liver tumor extraction in computed tomography images

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### ABSTRACT

Detecting liver abnormalities is a difficult task in radiation planning and treatment. The modern development integrates medical imaging into computer techniques. This advancement has monumental effect on how medical images are interpreted and analyzed. In many circumstances, manual segmentation of liver from computerized tomography (CT) imaging is imperative, and cannot provide satisfactory results. However, there are some difficulties in segmenting the liver due to its uneven shape, fuzzy boundary and complicated structure. This leads to necessity of enabling optimization in interactive segmentation approach. The main objective of reinforcing optimization is to search the optimal threshold and reduce the chance of falling into local optimum with survival of the fittest (SOF) technique. The proposed methodology makes use of pre-processing stage and reinforcing meta heuristics optimization based fuzzy c-means (FCM) for obtaining detailed information about the image. This information gives the optimal threshold value that is used for segmenting the region of interest with minimum user input. Suspicious areas are recognized from the segmented output. Both public and simulated dataset have been taken for experimental purposes. To validate the effectiveness of the proposed strategy, performance criteria such as dice coefficient, mode and user interaction level are taken and compared with state-of-the-art algorithms.

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## 1. INTRODUCTION

The liver [1] is the second-largest internal organ in human body. It helps to keep the human body free of toxins and toxic substances, helps to maintain body's metabolic balance. It is found in the abdomen upper right quadrant and weighs one and a half kilograms. The liver has many activities, including blood filtration, synthesis of protein, processing nutrients and fats, storing carbohydrates and transforming harmful substances into water solvable compounds. It is additionally inclined to a few kinds of liver ailments. The World Health Organization (WHO) [2] conducted statistical research on liver illnesses and concluded that it is one of India's most common ailments. Liver diseases can be identified with different colors for example brown for fibrosis yellow for fatty liver and blue for cyst.

Medical imaging [3] is a well-known technology used to view and examine the internal parts of the human body. This imaging provides a detailed informative mapping of a subject's anatomy. Because this imaging is primarily utilized for diagnosis, it is also known as diagnostic imaging. To diagnosis a specific problem in the human body, medical experts have used therapeutic hardware tools for image analysis. But



# A Survey on Automatic Accident Insurance claim

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## ABSTRACT

These days, data plays a central role and serves as a significant asset in the insurance industry. In the current landscape, the insurance sector plays a vital role in our journey. The innovative approach to revolutionize insurance claims processing in response to the escalating number of accidents linked to the growing vehicle population. The system comprises three key elements: reidentifying vehicle make and model, identifying damaged components with type and severity, and generating accurate repair estimates through damage component identification. Additionally, the system streamlines documentation by automatically extracting relevant fields from user-provided voice input, ensuring mutual benefits for all involved parties. The solutions are crafted using Artificial Intelligence techniques, specifically leveraging CNN models and Natural Language Processing methods.

**Keywords-component :** Automated claims processing ,Geolocation Tracking, Sensor Data, Image recognition, Real Time analytics, CNN model.

## I. INTRODUCTION

In the dynamic landscape of the insurance industry, there is a growing need for innovative solutions that enhance efficiency and provide a seamless experience for policyholders. One area where technological advancements can make a significant impact in processing insurance claims, particularly in the context of accidents. The traditional process of filing and assessing claims can be time-consuming, often involving manual documentation and complex procedures. The current process of filing a claim typically requires extensive paperwork, physical inspection of damages, and can result in prolonged waiting periods for claim approval. This not only inconveniences the policyholders but also poses challenges for insurance companies in managing and processing claims efficiently.

## II. LITERATURE SURVEY

The estimation of car damage costs by using image data has been a research challenge in the insurance industry. The efforts prove that there is a lot of potential for using images to estimate the damage severity of a vehicle which could revolutionise the insurance user experience. The method could help by shortening



# WIFI BASED INDUSTRY PROTECTION SYSTEM

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**Abstract**—Security is a fundamental component that every individual seeks in their house, business, or industry in today's fast-paced world. Security is essential in the life of an individual to protect his property from being stolen or physically damaged. It is a duty of the owner, particularly in industries where workers deal with dangerous as well as sophisticated machines, to restrict and prohibit unnecessary access of people into restricted areas. Considering the global increase in crime, it is our responsibility to keep employees safe. To overcome the drawbacks of the previous methods, the proposed research work aims to provide a way of protecting people from entering areas that are restricted and avoiding industrial accidents. Alarms are used in traditional security systems to send the signal. Here Internet of Things is used to communicate with the device for sending and receiving required information and data through internet. Therefore, using a computer, smartphone, or other smart gadget, it may be managed and seen at any time and from any location.

**Keywords**— Internet of Things (IOT), Node MCU, MQ gas sensor, Flame sensor, DTH Sensor, ESP32, Relay.

## 1. INTRODUCTION

The Internet of Things is a network of physical objects that can communicate data using sensors, electronics, software, and networking[1]. These systems do not require any human intervention. The Node MCU-based system transfers signals from several sensors, such as the temperature and humidity sensor and gas sensors, to the

microcontroller[2]. The result is then transmitted to the IOT platform by the microcontroller. The NodeMCU will receive information from the smoke and temperature sensors in the event of a fire, indicating the presence of smoke and variations in temperature. The microcontroller is linked to the Wi-Fi, buzzer, and exhaust fan. If there are any changes to the illumination, NodeMCU receives the information and activates the backup light[4][5]. When the temperature sensor detects a temperature higher than a specific threshold, the NodeMCU is configured to activate the buzzer. This value can be set to a particular value. The sensor values will be transmitted to the website (ThingSpeak) simultaneously. Because the data is monitored LIVE by the customer on an IOT platform, immediate action can be carried out[6]. An comprehensive sensor implementation across equipment and instruments, utilizing the Internet of Things (IoT) concept to regulate and monitor conditions, is one suggested solution to this problem. The planned gateway, which is responsible for data collection, processing, uploading, and user control information management, is a key element of the proposed system. Interestingly, in situations when network connections are lost, the system makes sure that the data is saved for later upload when the network is restored. Beyond standard limits, the Internet of Things anticipates a wide range of tangible components, including personal devices like tablets, smartphones, and digital cameras[7][8]. This method represents a major advancement in the integration of technology for increased efficiency as it foresees a spike in linked devices offering data, information, and services.



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## Automatic Accident Insurance Claim

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**ABSTRACT:** In today's fast-paced world, the process of filing insurance claims after an accident can be time-consuming and cumbersome, often involving significant paperwork and manual documentation. To streamline this process and provide more efficient and timely assistance to policyholders, this project proposes an Automated Accident Insurance Claim System utilizing GSM (Global System for Mobile Communications) technology. The system aims to revolutionize the traditional insurance claim process by incorporating advanced technologies to automatically detect and report accidents, thereby reducing response times and improving customer satisfaction. The key components of the proposed system include sensors, micro controllers, GSM modules, and a centralized database. Upon detecting an accident, the system's sensors installed in vehicles will immediately trigger the transmission of relevant data to a central server via GSM modules. This data may include information such as the location of the accident, impact severity, and vehicle identification details. The central server will then process this information and automatically initiate the insurance claim process. The proposed Automated Accident Insurance Claim System offers numerous benefits, including reduced claim processing times, enhanced accuracy in claim assessment, and improved overall customer experience. By leveraging GSM technology and automation, this system has the potential to revolutionize the insurance industry's approach to handling accident claims, ultimately leading to greater efficiency and customer satisfaction.

### I. INTRODUCTION

The process of filing insurance claims following an accident is often fraught with challenges, ranging from delays in reporting to paperwork and documentation. In today's dynamic world, where efficiency and timely assistance are paramount, traditional methods of handling insurance claims can be inadequate. To address these shortcomings, this project introduces an Automated Accident Insurance Claim System leveraging GSM (Global System for Mobile Communications) technology. The aim of this system is to revolutionize the way insurance claims are handled by automating the detection and reporting of accidents. By integrating advanced sensors, microcontrollers, GSM modules, and a centralized database, the system enables swift and seamless processing of insurance claims. This introduction provides an overview of the proposed system's key components and functionalities, highlighting



# Mobile Jammer Circuit

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**Abstract:** Mobile jammer circuits are electronic devices designed to disrupt or block cellular communication signals within a specified range. This abstract presents a concise overview of a mobile jammer circuit, outlining its purpose, components, and functionality. Mobile jammer circuits utilize the principles of radio frequency (RF) interference to interfere with the transmission and reception of mobile phone signals. The primary objective of these circuits is to create a localized electromagnetic disturbance, rendering nearby mobile devices unable to establish or maintain connections with cellular networks. The circuit consists of various components, including power sources, oscillators, amplifiers, and antennas. The power source provides the necessary energy to operate the jammer circuit. Oscillators generate high frequency signals that are amplified by the amplifier circuitry.

**Keywords:** Radio frequency

## I. INTRODUCTION

A mobile jammer circuit, also known as a cell phone jammer, is an electronic device designed to block or interfere with the signals between cell phones and their respective base stations. The purpose of a mobile jammer is to create a "dead zone" or an area where cell phones cannot establish or maintain a connection to a cellular network. The circuit of a mobile jammer typically consists of various electronic components that work together to disrupt the communication signals. The basic principle behind the operation of a mobile jammer is to transmit a high-power signal on the same frequency bands used by cell phones, effectively overpowering and interfering with the weaker signals from the mobile devices. It's important to note that building and using mobile jammers may be illegal in many countries. They can disrupt emergency services, legitimate phone communications, and violate privacy rights.

## II. LITERATURE SURVEY

A literature survey typically involves reviewing academic papers, conference proceedings, and other reliable sources to understand the state of the art and advances in a particular field. Please note that the information below may not be up-to-date with the latest developments, and the use of mobile jammers may be illegal in many jurisdictions due to their potential to interfere with communication networks. Always comply with local laws and regulations when dealing with such devices. "Design and Analysis of a Low-Cost Cell Phone Jammer" by Egea-Lopez et al.

(IEEE Transactions on Consumer Electronics, 2013). This paper presents the design and analysis of a low-cost cell phone jammer, providing a technical overview of the components and principles used in constructing a basic mobile jammer. "A Novel High-Power Wideband Jammer Architecture for Countering Cellular and Wireless Networks" by Naik et al. (IEEE Journal of Selected Topics in Signal Processing, 2014). This paper discusses a novel jammer architecture for wideband jamming of cellular and wireless networks, exploring techniques to disrupt multiple frequencies efficiently. "Low-Cost and Portable GPS Jammer" by S. Thilak and K. Varatha Rajan (International Journal of Engineering Research and Applications, 2015). The paper outlines the design and development of a low-cost, portable GPS jammer to prevent GPS tracking and navigation signals.

"A Study of Jamming Attacks and Countermeasures in Wireless Sensor Networks" by I.F. Akyildiz and W. Wang (Ad Hoc Networks, 2005). While this paper is not directly focused on mobile jammers, it provides valuable insights into the use of jamming attacks in wireless networks and discusses potential countermeasures. "On the Feasibility of Spoofing GPS Time in Automotive Applications" by C. Hegarty et al. (IEEE International Conference on Intelligent Transportation Systems, 2015). This paper investigates the feasibility of spoofing GPS time, which is a technique related to jamming that involves providing incorrect timing information to devices reliant on GPS signals.



# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

## RFID 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.

**Index Terms** - manual entry, Radio Frequency Identification (RFID), reliable, efficient, simple design, low cost.

### I. INTRODUCTION

The RFID 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 RFID 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 SURVEY

Roberto Casula et al. [1] proposed the focus is on the vulnerability of modern fingerprint recognition systems to adversarial fingerprint presentation attacks. While these systems are generally accurate, artificial fingerprint replicas pose a significant threat, prompting the use of presentation attack detection (PAD) methods as a defense mechanism. Adversarial attacks, designed to manipulate fingerprint images and deceive PADs, were previously deemed theoretically unrealistic due to the need for internal system access. However, Casula proposes a novel method to generate robust adversarial perturbations that can withstand the physical crafting process of creating artificial fingerprint replicas. The introduction of a "focus attention" mechanism allows the concentration of perturbations on specific fingerprint regions. Experimental validation, including both white-box and black-box scenarios, illustrates the efficacy of the proposed method in generating realistic adversarial presentation attacks. The study emphasizes the potential threat posed by such attacks on fingerprint recognition systems, emphasizing the urgency of implementing protective measures.



# Sensor-Based Smart Wireless Emergency Pendant

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## ABSTRACT:

Smart wireless emergency pendants represent a technological advancement in personal safety devices, offering an innovative solution for rapid access to emergency assistance. This paper explores the evolution, functionalities, applications, benefits, and challenges associated with these wearable devices. Through an extensive review of existing literature and technological developments, this research elucidates the pivotal role played by smart and wireless emergency pendants in revolutionizing emergency response systems, particularly in healthcare settings. The analysis encompasses the technological components, such as sensors and connectivity, highlighting their capabilities in detecting emergencies, triggering alerts, and facilitating prompt communication with emergency services or designated contacts. Moreover, this paper discusses the broader implications of these devices, including their impact on emergency response times, user safety, and the challenges related to adoption and implementation. Future trends and potential societal implications are also deliberated upon, laying the groundwork for further advancements and applications of these devices in diverse contexts. This research underscores the significance of smart and wireless emergency pendants in augmenting personal safety and enhancing emergency preparedness in an increasingly interconnected and technology-driven world.

**Keywords:** Arduino, Sensors, Fall detection, Emergency Button, Wireless emergency pendant, GPS-enabled and wearable pendant, GSM Module.

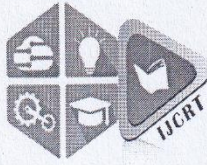
## I. INTRODUCTION

In recent years, technological advancements have revolutionized the way we approach personal safety and emergency response systems. Among these innovations, smart and wireless emergency pendants have emerged as crucial tools designed to provide immediate assistance and peace of mind, particularly for seniors, individuals with medical conditions, or those living alone. These devices, often compact and wearable, offer a seamless connection to emergency services or designated contacts, leveraging cutting-edge technology such as GPS tracking, fall detection, and real-time communication capabilities. This introduction explores the significance, functionalities, and benefits of these modern emergency pendants in ensuring swift and effective responses during critical situations. These are innovative devices designed to enhance personal safety and provide immediate assistance in emergency situations. These devices are often worn as accessories allowing individuals to call for help or notify their emergency contacts with a simple activation button. These devices are equipped with various sensors such as the fall detection sensor, GPS-tracking, sweat sensor, temperature sensor, heart rate and oxygen sensor. The primary objective of the intelligent, smart and wireless emergency pendant is to enhance personal safety and security, ensuring immediate help in emergency situations, allowing individuals to lead an independent life with the assurance that support is so easily accessible whenever needed.

## II. LITERATURE SURVEY

M. Arabboev, Sh. Begmatov (2022). The paper titled "Development of a wearable device for monitoring and predicting human health in emergencies" discusses about the wearable device for health monitoring and emergency alarm is developed using all the sensors and modules mentioned above interconnected. This device could perform real-time heart rate, blood oxygen saturation and body temperature monitoring. The data obtained on these three vital signs are displayed on the display of the device. The device could generate a strong alarm when a patient's health status was deteriorating. In addition, when a person needs help in an emergency, they can produce an alarm signal by pressing a button on the device. This makes it easier for rescuers to find survivors in search and rescue operations in emergencies [1].

Lee, S., Lee, S., & Park, S. (2020). The paper titled "Development of Smart Emergency Pendant with Voice Recognition and Fall Detection", presents a comprehensive exploration of the design and development of a smart emergency pendant equipped with voice recognition and fall detection capabilities. The main focus of the paper revolves around the creation and integration of technological features within the emergency pendant. These features include voice recognition, which likely enables users to trigger alerts or communicate with the pendant through voice commands. Additionally, the paper discusses fall detection technology, a critical aspect for identifying potential emergencies, particularly in scenarios where the user may not be able to manually activate the pendant [2].



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<sup>1</sup> Associate Professor, Department of Electronics and Communication Engineering, K.S. Institute of Technology [VTU], Bangalore, India.

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### ABSTRACT:

Smart wireless emergency pendants represent a technological advancement in personal safety devices, offering an innovative solution for rapid access to emergency assistance. This paper explores the evolution, functionalities, applications, benefits, and challenges associated with these wearable devices. Through an extensive review of existing literature and technological developments, this research elucidates the pivotal role played by smart and wireless emergency pendants in revolutionizing emergency response systems, particularly in healthcare settings. The analysis encompasses the technological components, such as sensors and connectivity, highlighting their capabilities in detecting emergencies, triggering alerts, and facilitating prompt communication with emergency services or designated contacts. Moreover, this paper discusses the broader implications of these devices, including their impact on emergency response times, user safety, and the challenges related to adoption and implementation. Future trends and potential societal implications are also deliberated upon, laying the groundwork for further advancements and applications of these devices in diverse contexts. This research underscores the significance of smart and wireless emergency pendants in augmenting personal safety and enhancing emergency preparedness in an increasingly interconnected and technology-driven world.

**Keywords:** ESP32, Sensors, Fall detection, Emergency Button, Wireless emergency pendant, GPS-enabled wearable pendant, GSM Module.

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leveraging cutting-edge technology such as GPS tracking, fall detection, and real-time communication capabilities. This introduction explores the significance, functionalities, and benefits of these modern emergency pendants in ensuring swift and effective responses during critical situations. These are innovative devices designed to enhance personal safety and provide immediate assistance in emergency situations. These devices are often worn as accessories allowing individuals to call for help or notify their emergency contacts with a simple activation button. These devices are equipped with various sensors such as the fall detection sensor, GPS-tracking, sweat sensor, temperature sensor, heart rate and oxygen sensor. The primary objective of the intelligent, smart and wireless emergency pendant is to enhance personal safety and security, ensuring immediate help in emergency situations, allowing individuals to lead an independent life with the assurance that support so easily accessible whenever needed.

### II. LITERATURE SURVEY

Kommey, B., Kotey, S. D., & Opoku, D. (2018). The paper titled "Patient Medical Emergency Alert System" focuses on the development of a system that provides timely alerts for medical emergencies in hospitals. The system uses a structured early warning score (EWS) tool to detect patient deterioration and trigger appropriate responses, which is facilitated by the afferent arm of the rapid response system (RRS). The RRS consists of three interrelated components: an afferent arm, an efferent arm, and a governance and audit process. The afferent arm is responsible for crisis detection and response triggering, while the efferent arm provides competent and skilled personnel and resources at the bedside to initiate an appropriate response. The governance and audit process coordinates human and financial resources, evaluates and prevents future adverse events, and ensures the sustainability of the RRS.[1].

Xueyi Wang, Joshua Ellui and George Azzopardi. (2020). The paper titled "Elderly fall detection systems", provides a comprehensive literature survey on the topic of elderly fall detection using sensor networks and IoT. The paper delves into various aspects related to



# RFID 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.

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Daniel Benalcazar et al. [2] focused on the adoption of remote biometric authentication for online services during the global pandemic of COVID-19. This allowed people to carry on with their normal business activities from home without the risk of spreading the virus. Some services include remotely opening a bank account, something that required physical attendance only a few years back. The downside of remote services is twofold. Firstly, in regions like South America, the accelerated technological Leap was too quick for some countries, resulting in difficulties for the national identification systems to catch up with the advancements, to properly increase the number of captured ID card image samples in our datasets for fraud detection using synthetic images, examples of the four classes must be generated: bonafide, composite, print and screen. This work presented four different methodologies capable of generating synthetic ID cards and evaluated the performance of each as a possible supplement for captured Images. For this purpose, we trained two MobileNetV2 networks using different combinations of captured and synthetic images. Further, obtaining real ID cards from new people and manually simulating composite, print, and screen attacks is very time-consuming and costly. Also, privacy regulations such as the GDPR assure individuals the right to withdraw their consent to use or store their private data, practically complicating the use and distribution of large datasets. Therefore, achieving similar performance with synthetic data and fewer resources is valuable for future applications and extension to other countries and improving the fake-ID detection techniques.

Nnamdi Henry Umelo et al. [3] proposed a groundbreaking solution to tackle the tag collision problem in dense Radio Frequency Identification (RFID) environments, such as those encountered on the Internet of Things (IoT). The proposed algorithm, named K-mean: grouped dynamic frame slotted Aloha (kg-DFSA), operates in two distinct stages. Firstly, in the initialization stage, tags are grouped using an





# ACCIDENT PREVENTION SYSTEM IN RAILWAYS

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## ABSTRACT

Transport is a key necessity for specialization that allows the production and consumption of products to occur at different locations. Economic prosperity depends on efficient and sustainable transportation that also prioritizes safety and environmental impact. The accident prevention system designed by us is one of the sub-systems for the railway lines of India and is essential equipment to ensure the transportation safety of the high-speed railway. This paper proposes a framework structure and accident prevention methods, particularly against cracks, obstacles, and fire catching which cost them their life.

**Keywords:** Railway Accident, crack, obstacle, Fire, Arduino.

## I. INTRODUCTION

Presently in the real world, commuters are using different transport facilities such as flights, trains, buses, cars, etc. But the majority of the public in our country prefers to travel by train. The reason may be the comforts available for long journeys and relatively lesser traveling charges. Though the railways have implemented many safety standards for safe journeys, still one can witness some rail accidents leading to the loss of many precious lives and loss of property. Due to its huge size, poor maintenance will create accidents in the rails. Many lives are affected due to the lack of carelessness. To avoid this, we introduced a system that can avoid many accidents on rails. Some of the major reasons for rail accidents are faults on the rail, Obstacles, and fire attacks. At present our railways are using manual methods of detection through human inspectors. To avoid this, we are



## An E-Commerce Platform for Farmers.

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**Abstract:** The proposed website will serve as an online marketplace where farmers can showcase and sell their produce to consumers. To enhance efficiency, various electronic systems will be employed throughout the supply chain. RFID (Radio-Frequency Identification) tags will be utilized to track and trace products, ensuring transparency and authenticity from farm to table. This technology will enable consumers to access detailed information about the origin and journey of the products they purchase, fostering trust and accountability.

Additionally, sensors will be embedded in farms to monitor temperature, humidity, and other environmental factors. These sensors will provide real-time data to farmers and distributors, ensuring optimal storage conditions and minimizing product spoilage. Furthermore, incorporating automated inventory management systems will facilitate better stock control and reduce wastage.

**Index Terms**—Sensors, Farmer to Consumer F2C, Precision Farming, IOT, Data Analytics.

### I. INTRODUCTION

This project focuses on the development of an innovative Farmer-to-Consumer (F2C) website platform fortified with cutting-edge electronic systems. The primary goal is to create a seamless digital interface that connects farmers directly with consumers while employing advanced electronic solutions to optimize the agricultural supply chain.

The proposed platform will serve as an online marketplace where farmers can exhibit and vend their produce directly to consumers. A core aspect involves the utilization of RFID (Radio-Frequency Identification) technology to establish a robust product tracking mechanism. This system will enable consumers to access comprehensive product information, including origin, cultivation practices, and transit details, ensuring transparency and authenticity.

To bolster efficiency and reduce spoilage, sensors will be implemented within storage facilities. These sensors will continuously monitor environmental variables like temperature and humidity, transmitting real-time data to stakeholders to maintain optimal storage conditions and prevent product degradation.

Additionally, the project aims to incorporate automated inventory management systems utilizing electronic components. These systems will enable real-time inventory updates, minimizing discrepancies and enhancing supply chain visibility for both farmers and consumers.

The platform will feature secure electronic payment gateways to facilitate seamless and secure transactions, prioritizing user convenience while ensuring fair compensation for farmers.

Furthermore, the project will emphasize the educational aspect by integrating electronic interfaces to disseminate agricultural knowledge and best practices. Online forums and resources will promote sustainable farming methods and technological advancements, empowering farmers with crucial insights for improved productivity.

In summary, this final-year electronics project endeavors to create an integrated F2C website platform fortified with sophisticated electronic components. The project's objectives revolve around enhancing transparency, efficiency, and trust within the agricultural supply chain, contributing to a more resilient and technologically advanced agricultural ecosystem.

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# A Survey on Farmer-to-Consumer Website with Embedded Sensors.

<sup>1</sup>Aditi Dubey,<sup>2</sup>Gandhamani C M,<sup>3</sup>Harshitha J, <sup>4</sup>Meghashree M

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# ACCIDENT PREVENTION SYSTEM FOR RAILWAYS

Neha cr, Pavani ts, Priyanka m, Pushpa dt, Santosh Kumar BR  
Student, Student, Student, Student, Guide

KSIT

## ABSTRACT

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**Keywords:** Railway Accident, crack, obstacle, Fire, Arduino, Zigbee, dc motor.

## 1.INTRODUCTION

Presently in the real time world, commuters are using different types of transport facilities such as flights, trains, buses, etc. But majority of the people in our country prefers travelling in trains. The reason may be the comforts available for long journeys and relatively lesser travelling charges. Though the railways has implemented many safety standards for the safe journey, still one can witness some rail accidents and leading to the loss of many precious lives and loss of property. Some of the major reasons for rail accidents are due to the crack, obstacle on the rail and fire catch. At present our railways are using manual methods of detection through human inspectors. Many lives are affected due to the lack of carelessness. To avoid this, we are introducing a system that can avoid all this accidents that occur on rails. In the same way, accidents also occur in the station. In order to prevent this too, we are introducing a fence system to prevent loss of lives. The proposed system uses sensors to detect the obstacles on the railway tracks and notifies the loco pilot and the train stops. This system uses a



# A SURVEY ON : SMART CAR PARKING SYSTEM

PRADHYUMNA S KASHYAP <sup>1</sup>, RAJATH K ACHAR <sup>2</sup>, VINEETH MS <sup>3</sup>, YASHWANTH Y <sup>4</sup>, Dr .DEVIKA B<sup>5</sup>

Student, ECE, KSIT, Bengaluru, India<sup>1-4</sup>

Associate Professor, ECE, KSIT, Bengaluru, India<sup>5</sup>

## ABSTRACT

Efficient and smart way to automate the management of the parking system that allocates an efficient parking space using Internet of Things technology. The user can monitor the parking area's availability and access the system wirelessly thanks to the Internet of Things. The number of automobiles in metropolitan areas is growing, and one of the main issues being confronted is traffic congestion. Typically, the user squanders time and energy trying to find a spot in a designated parking lot. The user sees the parking information through an LCD. Creating a smart parking system using RFID that tracks the availability of open spots and directs a car to the closest one by texting a cell number that is linked to the car's RFID. To give users advance notice of parking space availability, the proposed system makes use of pairs of infrared transmitters and receivers to remotely communicate the status of parking occupancy to the Arduino UNO microcontroller. The display of available slots is located at the entrance of the parking area. The user saves a significant amount of time when parking their vehicle thanks to the implementation, which requires little human input and offers a smooth parking experience.

**Keywords:** Arduino, RFID, GSM Module, LCD

## 1 INTRODUCTION

These days, parking is a major issue in many public venues, including malls, multiplex systems, hospitals, workplaces, and market areas. The vehicle parking [1-3] area has multiple lanes/slots for car parking. As a way to park an automobile one has to search for all of the lanes. Furthermore, a lot of investment and manual labour are required for this. Therefore, it is necessary to create an automated parking system that, at the entrance, clearly displays the availability of open parking spaces in any lane. It involves a system with a display outside the vehicle parking gate and an infrared transmitter-receiver pair in each lane. so that the person who wants to park their car is aware of the current state of parking space availability. Traditional parking systems rely on security guards to keep an eye on the parking lots; they lack an intelligent monitoring system. Finding a spot to park takes up a lot



# A SURVEY ON TECH-FEED: INTELLIGENT FEEDING FOR FURRY FRIENDS

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<sup>1</sup>UG Student, <sup>2</sup>UG Student, <sup>3</sup>UG Student, <sup>4</sup>UG Student, <sup>5</sup>Associate Professor

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<sup>1,2,3,4,5</sup>K S Institute of Technology, Bengaluru, India

**Abstract :** Keeping pets means taking responsibility. This includes keeping their company, showing your concerns, and of course, feeding them on time and in a correct way. One of the top health concerns of pets is overeating and obesity. Especially at younger ages, they are usually satisfied with however much is given to them and also many adult pets are fed unscientifically which later may cause a short longevity. Automatic pet feeders have witnessed transformative growth, integrating smart features to build up pet care. The work is about a pet feeding system automatically for a daily minimum period of eight hours when all the nuclear family members are busy at work to survive in the metro cities and other cities. This paper concludes by identifying emerging trends and future directions in automatic pet feeder development and asserts the need for continued research to address advancing challenges and opportunities in this progressive domain.

**Index Terms -** Arduino, ESP8266, pet feeder, automatic, microcontroller

## I. INTRODUCTION

Nowadays, automation is being integrated into the lives of many people to make their lives easier and more suitable. Today many people are interested in having pets in our homes. But these pets must be properly cared for. Feeding them on time is an important task as they are part of the family. But in their busy lives, people fail to pay attention to their pets and thus fail to get proper nutrition on time. Owning pets can enhance people's lives, but it also has responsibilities that can cause hassle. Pet owners know all too well that feeding their pets provides joy and well-being, but sometimes they are too busy to give their pets the food they need, or they are not at home to check if they are eating or not. This is where a pet feeder comes in. This device replaces the manual feeding of pets with a modern system. It helps the owner to feed their pets while they are not at the house. This pet feeder will be controlled via mobile application through the webserver. Pet owners now have a convenient way to feed their pets. Also, portion sizes are easier to control with this system, as users can set the right portion size for their pet. Access to a healthy amount of food the whole day, regardless of the owner's schedule. This could help pets maintain their weight and eliminate the problem of pet owners giving too much or too little food. The owner can leave pets at home in the event of any emergency as well. The cost of caring for a pet has been reduced due to the introduction of such equipment on the market and also these products are gaining popularity throughout the world today.

## II. LITERATURE SURVEY

Harsha Bongale et al [1] proposed Automatic Pet Feeder. The project emphasizes the need for a system that can automatically feed pets, specifically targeting dogs, cats, monkeys, and rabbits. The system is designed to function during the absence of the pet owner, ensuring that pets are fed regularly and adequately. The introduction highlights the importance of pet care and the challenges pet owners face, especially when they are busy or not present at home. It emphasizes the significance of an automated feeding system to ensure pets are nourished properly. The implementation details the use of various hardware components such as servo motors, IR sensors, ultrasonic sensors, and Arduino Uno. The system's design revolves around these components to automatically dispense food when the pet is detected in proximity. The project concludes by highlighting the successful integration of components and ideas to create an automated pet-feeding system using Arduino Uno. It emphasizes the benefits of freeing the pet owner from constant feeding duties and ensuring the pets receive food on schedule.



# TECH-FEED: INTELLIGENT FEEDING FOR FURRY FRIENDS

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**Abstract:** Keeping pets means taking responsibility. This includes keeping their company, showing your concerns, and of course, feeding them on time and in a correct way. One of the top health concerns of pets is overeating and obesity. Especially at younger ages, they are usually satisfied with however much is given to them and also many adult pets are fed unscientifically which later may cause a short longevity. Automatic pet feeders have witnessed transformative growth, integrating smart features to build up pet care. The work is about a pet feeding system automatically for a daily minimum period of eight hours when all the nuclear family members are busy at work to survive in the metro cities and other cities. This paper concludes by identifying emerging trends and future directions in automatic pet feeder development and asserts the need for continued research to address advancing challenges and opportunities in this progressive domain.

**Index Terms** – Node MCU, H-Bridge, ESP32-CAM, pet feeder, automatic

## I. INTRODUCTION

Nowadays, automation is being integrated into the lives of many people to make their lives easier and more suitable. Today many people are interested in having pets in our homes. But these pets must be properly cared for. Feeding them on time is an important task as they are part of the family. But in their busy lives, people fail to pay attention to their pets and thus fail to get proper nutrition on time. Owning pets can enhance people's lives, but it also has responsibilities that can cause hassle. Pet owners know all too well that feeding their pets provides joy and well-being, but sometimes they are too busy to give their pets the food they need, or they are not at home to check if they are eating or not. This is where a pet feeder comes in. This device replaces the manual feeding of pets with a modern system. It helps the owner to feed their pets while they are not at the house. This pet feeder will be controlled via mobile application through the webserver. Pet owners now have a convenient way to feed their pets. Also, portion sizes are easier to control with this system, as users can set the right portion size for their pet. Access to a healthy amount of food the whole day, regardless of the owner's schedule. This could help pets maintain their weight and eliminate the problem of pet owners giving too much or too little food. The owner can leave pets at home in the event of any emergency as well. The cost of caring for a pet has been reduced due to the introduction of such equipment on the market and also these products are gaining popularity throughout the world today.

## II. LITERATURE SURVEY

Harsha Bongale, Nandakumar Mugali and Divya T L proposed Automatic Pet Feeder. The project emphasizes the need for a system that can automatically feed pets, specifically targeting dogs, cats, monkeys, and rabbits. The system is designed to function during the absence of the pet owner, ensuring that pets are fed regularly and adequately. The introduction highlights the importance of pet care and the challenges pet owners face, especially when they are busy or not present at home. It emphasizes the significance of an automated feeding system to ensure pets are nourished properly. The implementation details the use of various hardware components such as servo motors, IR sensors, ultrasonic sensors, and Arduino Uno. The system's design revolves around these components to automatically dispense food when the pet is detected in proximity. The project concludes by highlighting the successful integration of components and ideas to create an automated pet-feeding system using Arduino Uno. It emphasizes the benefits of freeing the pet owner from constant feeding duties and ensuring the pets receive food on schedule. [1]



# SMART CAR PARKING SYSTEM

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## ABSTRACT

The demand for personal transportation has grown significantly over time due to population growth and rising purchasing power, as a result, parking spaces at public locations like shopping centers, supermarkets, and large housing developments have expanded to accommodate the growing number of people. Large parking spots come with the obligation to manage them effectively and conveniently in order to give users quick and simple parking options. Parking facilities are currently employing assistance staff to aid drivers in finding parking spaces within the facility. The proposed system, called the SCPS (Smart Car Parking System), uses infrared (IR) sensors to detect the presence of a vehicle in a parking area in order to map the available parking spaces into a dynamic, real-time virtual map. This approach automates the process and reduces the need for human intervention while users park their cars. The display is then updated after the SCPS system marks that specific slot as occupied. We have created a smart car parking system in this article with the help of an Arduino, GSM, RFID reader, and Internet of Things module. Consequently, we reduce the need for needless human intervention needed for the parking facility. This makes parking easier and reduces the need for repeated assistance, freeing up human talents for other projects.

## KEYWORDS:

## I. INTRODUCTION

These days, parking is a major issue in many public spaces, including malls, movie theaters, hospitals, and marketplaces. There are numerous lanes and parking spaces in the parking area. To park an automobile, you have to search every available slot from beginning to end.

Moreover, a Conventional parking system do not have any monitoring system and the parking lots are monitored by security guards. this involves a lot of manual labour and investment, and a lot of time is wasted in searching vacant slot for parking. So, there is a need to develop an automated parking system that indicates directly the availability of vacant parking slots.

An effective automobile parking management system utilizing Arduino and RFID technology is provided by the RFID-based automobile Parking System project. We have installed a system that will automatically detect when a car enters or exits the parking lot through the gate and then display the total number of automobiles there. In today's automated world, everything is done automatically. IR sensors at the parking lot's exit and an RFID reader at the lot's entrance will manage the vehicle's check-in and check-out procedures.

Because there is less land available in cities, parking has gotten more multi-story in order to fit



## Machine Learning and Deep Learning Analysis of Vehicle Carbon Footprint

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### ABSTRACT

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**Keywords:**  
*greenhouse gas emissions, machine learning, fuel efficiency, climate change*

Clearly climate change is one of the most significant hazards to mankind nowadays. And daily the situation has become worse. No other way characterises climate change except through changes in the patterns of temperature and weather. Human activity generates the primary greenhouse gas emissions. Among these activities are burning coal, oil, natural gas, as well as other fuels; agricultural techniques, industrial operations, deforestation, burning coal, oil. Mostly resulting from human activities, the average temperature of the planet has significantly increased by almost 1.1 degrees Celsius since the late 1800s. One theory holds that internal combustion engines affect roughly thirteen percent. The objective of this work is to do an analysis of a complicated dataset involving fuel consumption in urban and highway environments as well as mixed combinations since the relevance of these variables in modelling attempts dictates. Reduced CO<sub>2</sub> emissions and environmental impact follow from reduced fuel use. The project used numerous machine learning and deep learning approaches to comprehend data analysis. Moreover, this work investigates the dataset to acquire knowledge and concurrently solves problems such as overfitting and outliers. Control of complexity is achieved using several methods like VIF, PCA, and Cross-Validation. Models combining CNN and RNN performed really well with an accuracy of 0.99. The R-squared metrics are utilized in order to do the evaluation of the model. Apart from linear regression, support vector machines, Elastic Net with a rewardable accuracy, random forest was applied. It has rather good 0.98 accuracy. We can therefore state that our model analyzed the data properly and generated accurate output since the results we obtained during the assessment phase exactly the same ones we obtained during the training stage. Mass data cleansing is required as well as further study to increase machine learning model accuracy and performance.

### 1. INTRODUCTION

CO<sub>2</sub> is a naturally occurring greenhouse gas that has a significant impact on the Earth's atmosphere. It aids in the regulation of the planet's temperature by capturing and inhibiting the dissipation of heat into outer space. Due to use of fuels like petrol and diesel in automotive industry increasing the CO<sub>2</sub> emission, defined as carbon footprint which in turn impacts the climate change. Increased concentration of CO<sub>2</sub> enhances the greenhouse effect which results in global warming, change in weather pattern which disturbing in environment [1]. These disturbances include melting of ice or glaciers and the occurrence of dreadful weather conditions. Since 1800s due to human activities in industries like forestry, agriculture, transportation, energy generation etc., has increased the climate change. Global temperature currently is 1.1 degree Celsius greater than the temperature during the industrial era. Projections suggested that the temperature may increase up to 3 degrees Celsius by end of this period if the proper action is not taken.

As if to address the much-discussed issue of climate change

it is imperative that different parties, people, governments and the automotive companies especially must come together to join efforts. A particular should be placed on discussing sustainable best practices to address the consequences of this problematic occurrence on the international level emphasis [2]. The problem requires further development of the renewable energy, rational and effective use of lands as well as conservation of the environment, reduction of emissions from vehicles and industries, and international collaboration since the problem is global in nature. Placing myself in a sustainable context, I can confirm that we have the power to save the environment for future generations and prevent the world from the more drastic consequences of climate change.

Emphasizing the Significance of Transportation and its Impact on the Environment: Transport related emissions have a decisive influence on climate change as transport sector is ranked to be contributing to over 13 to 15% of the environmental impact. Figures 1 and 2 emphasize the significant impact of transport-related emissions on climate change. In the present world with growing competition, it becomes necessary for the centre to address this particular



# A Survey on Fruits and Vegetables Quality Monitoring Systems

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**Abstract:** The advent of Internet of Things (IoT) technology has revolutionized the agricultural industry, particularly in the realm of fruits and vegetables quality monitoring. This literature survey delves into the innovative integration of IoT and billing systems to ensure the quality and freshness of agricultural produce. The paper focuses on an automated system designed to streamline the monitoring process, employing a methane gas sensor as a pivotal component. The sensor detects gases emitted by fruits and vegetables, specifically targeting methane levels as indicators of ripeness or decay. Upon surpassing a predetermined threshold, the system initiates the segregation of deteriorated produce, ensuring only high-quality items proceed further along the conveyor belt. The paper elucidates the system's workflow, encompassing gas sensing, sorting, weighing, and real-time inventory updates through cloud-based technology. Additionally, the study emphasizes the practical implications of this technology in empowering stakeholders with accurate information for informed decision-making. This survey not only underscores the current state of IoT-driven quality monitoring in agriculture but also explores its potential for future advancements and widespread application in optimizing produce quality, reducing wastage, and enhancing supply chain efficiency.

## I. Introduction

The agricultural sector is undergoing a transformative evolution propelled by technological advancements, particularly the integration of Internet of Things (IoT) applications. Within this domain, one of the critical aspects demanding attention is the quality monitoring of fruits and vegetables along the production and supply chain. Ensuring the freshness and quality of agricultural produce is not only pivotal for consumer satisfaction but also for minimizing waste and optimizing inventory management. This literature survey delves into the innovative convergence of IoT technology and billing systems to address the imperative need for efficient and accurate monitoring of fruits and vegetables' quality. The paper focuses on an automated system meticulously designed to assess produce quality in real-time, employing IoT-enabled sensors and advanced algorithms.

At the heart of this system lies the utilization of methane gas sensors, strategically placed along a conveyor belt to continuously monitor gases emitted by the fruits and vegetables. Methane, being a prevalent byproduct of organic decay, serves as a crucial indicator of produce ripeness or decay. The system utilizes predetermined thresholds for methane gas concentration to differentiate between fresh and deteriorated produce. Upon detection of gas levels surpassing the set threshold, the system initiates a process to segregate and divert the affected items, ensuring only high-quality produce continues along the production line. Furthermore, the system extends beyond mere quality assessment by incorporating elements of billing and inventory management. This integration facilitates real-time updating of inventory databases via cloud-based technology, enabling stakeholders to access accurate stock levels and sales data remotely.

This paper aims to provide a comprehensive overview of the state-of-the-art in IoT-driven quality monitoring systems for agricultural produce. It examines the operational workflow of the system, discusses its potential applications, and explores the implications of this technology on enhancing efficiency, reducing waste, and empowering stakeholders with actionable insights for informed decision-making in the agriculture industry. Through this exploration, the survey not only highlights the current capabilities and advancements but also aims



## Fruits and Vegetables Quality Monitoring Using IoT

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### I. INTRODUCTION

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At the heart of this system lies the utilization of methane gas sensors, strategically placed along a conveyor belt to continuously monitor gases emitted by the fruits and vegetables. Methane, being a prevalent byproduct of



# A SURVEY PAPER ON VOICE CONTROLLED ELEVATOR

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## Abstract

This paper presents the design and construction of a voice operated elevator control system. As we normally see an elevator which might not deal with many safety issues, this system acts as a human-machine communication system. Speech recognition is the process of recognizing the spoken words to take the necessary actions accordingly. This system is extremely beneficial to those who are paralyzed, limited of stature, or severely impaired. If two or more voice signals are received at the same time then the microcontroller will operator on the priority basis. Manual override buttons are also physically connected to the microcontroller. These buttons provide alternate option for voice who finds to use traditional elevator inconvenient. With this system, residence and Commercial facilities are provided with minimize elevator costs. Educate the users on use of voice as well as manual elevator. Thus, this elevator provides experience for people with disabilities and short stature people.

**Index Terms:** Voice control, voice input, microphone, automated elevator, disabled friendly

## I. INTRODUCTION

Elevator system is common but voice-based elevator system is one of the rarest approaches to serve the humanity. Voice based elevator control system acts as a communication system between humans and machines. Speech recognition is the process of recognizing spoken words. We will take necessary measures accordingly. Users can also control electrical equipment such as fans and doors using their voice. Voice recognition system is extreme beneficial for people with paralysis or limited height or people with severe disabilities. Elevators are very common in most places. Elevator usage is increasing in many areas uses such as square measure for carrying around vertical transportation of products and people in high-rise buildings, etc. Offices, search center and alternative skyscrapers and as technology advances, the need for it increases the number of devices is increasing every day. So, this project Emphasis is placed on the design and modernization of existing elevators infrastructure that remembers voice commands. Automatic speech recognition is a method of converting speech. A computer is used to convert audio signals into words. These words are in turn used by microcontroller to provide acceptable results instructions to all connected devices. With support for people with disabilities will also be enhanced. Ensuring contactless transportation of people and goods in elevators by accepting input via voice commands, i.e. It is also beneficial in times of COVID-19.

## II. LITERATURE SURVEY

This paper 1 focuses on voice recognition project. The speech recognition model is elevator control, and from this model, you can control the elevator by receiving feedback. When we are thinking about the first concept to appear: voice control what I'm thinking of is voice recognition. Machines must be able to recognize and interpret human's speech as input to a speech recognition model. Voice recognition is done by machines I can understand the words, but I can't understand the context of the words. Anyone can speak using the speech recognition module.[1]

The arduino microcontroller works checking all input ports ensures proper connectivity. The same applies to the power connections for the outputs of the pins. This can be used to connect with external devices. Arduino you can run the program using the software. Programs and software work with C and C++ programming language. These programs can be used to upload to the Arduino microcontroller. What I noticed here is that this is a very efficient method of deployment. Speed control is implemented using PWM. Pulse width modulation is a type of modulation in the digital domain you can modify the signal using pulse width modulation effectively change the operating cycle and elevator speed engine. The method used in this article is reliable and Variable speed is easy to implement which was noticed in this paper.[2]



# A REVIEW ON SOLAR POWERED LAKE CLEANING ROBOT

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*Abstract: Natural lakes and all kinds of artificial lakes make the living environment beautiful. However, with the increase of the activities of human beings, the pollution of the floating garbage on the surface of the lake is serious. Governing the pollution of the floating garbage on the surface of the lake is urgent. Water pollution with floating garbage is a serious issue in many countries. The process of cleaning the water surface is a routine task. Collecting large amounts of dry waste floating such as plastic bottles confront the tension on the water surface and small drag force causes the waste materials to float away. The aim of this project is to design a robot that will assist humans with collecting waste materials by scooping the waste off the water surface and promote the use of clean energy technologies for environmental conservation.*

*Keywords: Water pollution, floating debris, purification, solar powered.*

## I. INTRODUCTION

In developing countries, growing amounts of dry waste in canals, ponds, and lakes affect water drainage and life quality of residents living close to those areas. Often found floating waste is such as plastic scraps, foams, tree leaves, and aluminum bottles. Accumulation of the dry waste floating on the water surface can obstruct water drainage in city canals and cause floods. Water surface cleaning must therefore be done regularly. Due to less specific weight than water, the dry waste such as foams or plastic bottles can be easily observable on water surface. As the waste has a small drag force and water surface tension causes surface waves, the waste usually flows away when reaching by ship or boat. The typical waste collected by humans is often done by using a scoop net with a long handle. However, the operation requires much effort from the cleaning team when the amount of waste is enormous. In this work, we focus on collecting the waste floating on the water surface automatically and segregate the waste into bio degradable and non-bio degradable and dump them in separate bins.

## II. LITERATURE SURVEY

The introduction of a water body cleaning robot controlled through a website using IoT technology is done that aims to prevent direct human contact with water bodies to avoid infections from microbes. Solar energy is employed to minimize power consumption. The robot's coverage and waste collection depend on user input. The design incorporates solar charge control, an IR sensor for object detection, and a user-accessible website via QR code scanning. Users install an application through the QR code, granting them control over the robot's functions. Waste is stored at the water body's bank, and users can operate the robot from there.[1]

A semi-automatic drain for sewage water treatment of floating materials is used as an innovative solution to replace manual labor in drainage cleaning. This highlights the crucial role of mechanical drainage systems in industrial applications for proper sewage disposal. Despite the significance of these systems, the manual cleaning of blockages poses challenges and even risks human lives. In response to this issue, the authors propose a design for a mechanical semi-automatic drainage water cleaner. The goal is to efficiently manage waste disposal, prevent blockages, and ensure regular filtration of wastages, ultimately enhancing safety and reducing reliance on manual labor in drainage maintenance.[2]



# Solar Powered Lake Cleaning Robot

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**ABSTRACT:** The creation of a robot for clearing trash from the water's surface is described in this chapter. Durability, cost-effectiveness, and robustness are three significant challenges we encounter when constructing aquatic robots. Due to the nature of the cleaning work, we designed the vehicle structure that can provide high stability, good ability in maneuver and can easily collect all the waste.

The design and analysis of the floating garbage collecting machine is the focus of this work. The work focuses on the problematic state of our nation's rivers and other bodies of water, which are clogged with sewage waste and loaded with debris, pollutants, toxic materials, etc. Taking this into account, a machine was created to assist in cleaning the water bodies and maintaining water quality. The device floats to different areas of the water body to clean the light and floating wastes present in the water. We use solar energy as our alternative source of energy. This device aids in the removal of floating wastes from water bodies, which helps to prevent water pollution, provide clean water, and maintain a healthy marine ecology.

## INTRODUCTION

Waste is an environmental issue that keeps coming up year after year and still hasn't been fully solved. We frequently discovered trash dumped into rivers, streams, or reservoirs from various locations. The trash can obstruct the flow of water, making it unclean and odorous to the point that it frequently overflows and creates calamities including flooding. It takes a lot of resources to remove waste from water regions, like cleaning personnel and excavators.

On the earth's surface, there is a tremendous amount of water, yet much of it is unfit for human use. The situation of cleanliness and hygiene, particularly with regard to waste management, has deteriorated significantly over time and is still in danger as a result of the fast growth in population. Major rivers' water quality has gotten worse to a large level. Household wastes, kitchen wastes, bathroom wastes, toilet waste water, as well as wastes from factories,



# VOICE CONTROLLED ELEVATOR

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**Abstract**--This paper presents the design and construction of a voice operated elevator control system. As we normally see an elevator which might not deal with many safety issues, this system acts as a human-machine communication system. Speech recognition is the process of recognizing the spoken words to take the necessary actions accordingly. This system is extremely beneficial to those who are paralyzed, limited of stature, or severely impaired. If two or more voice signals are received at the same time then the microcontroller will operator on the priority basis. Manual override buttons are also physically connected to the microcontroller. These buttons provide alternate option for voice who finds to use traditional elevator inconvenient. With this system, residence and Commercial facilities are provided with minimize elevator costs. Educate the users on use of voice as well as manual elevator. Thus, this elevator provides experience for people with disabilities and short stature people.

**Keywords:** Voice control, voice input, microphone, automated elevator, disabled friendly

## I. INTRODUCTION

Elevator system is common but voice-based elevator system is one of the rarest approaches to serve the humanity. Voice based elevator control system acts as a communication system between humans and machines. Speech recognition is the process of recognizing spoken words. We will take necessary measures accordingly. Users can also control electrical equipment such as fans and doors using their voice. Voice recognition system is extreme beneficial for people with paralysis or limited height or people with severe disabilities. Elevators are very common in most places. Elevator usage is increasing in many areas uses such as square measure for carrying around vertical transportation of products and people in high-rise buildings, etc. Offices, search center and alternative skyscrapers and as technology advances, the need for it increases the number of devices is increasing every day. So, this project Emphasis is placed on the design and modernization of existing elevators infrastructure that remembers voice commands. Automatic speech recognition is a method of converting speech. A computer is used to convert audio signals into words. These words are in turn used by microcontroller to provide acceptable results instructions to all connected devices. With support for people with disabilities will also be enhanced. Ensuring contactless transportation of people and goods in elevators by accepting input via voice commands, i.e. It is also beneficial in times of COVID-19.



## SURVEY OF ROBOTIC VACUUM CLEANERS

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### ABSTRACT

This study looks at the many cleaner bot types that are utilized in classrooms, including robotic litter collectors, AI-powered waste segregators, and self-contained vacuum cleaners. It examines the underlying technologies that enable these bots to navigate a variety of environments and perform cleaning tasks, including computer vision, machine learning, and sensor integration.

This poll also discusses the impact of cleaner bots on campus environments and how they can reduce operating costs, raise standards of hygiene, and promote environmentally conscious behavior. It also looks at the challenges these bots face, such as adaptability to changing surroundings, user acceptability, and energy efficiency.

The report also makes recommendations for future research directions, emphasizing the need for advancements in AI algorithms, energy optimization, and human-robot interaction to maximize Campus Cleaner Bot's potential and acceptability.

The main objective of this paper is to bridge the gap of knowledge between real world application and theory, readily available components. Adaptive manufacturing method was selected in order to reduce the cost for constructing a robot.

The LIDAR sensor and webcam on the robot made it possible to create increasingly advanced methods. A low-level proportional-integral-derivative (PID) speed controller was coupled with a high-level controller that uses fake potential functions to generate repulsive components in order to prevent collisions with obstacles.

**KEYWORDS:** Arduino, Autonomous Navigation sensors, floor cleaning, Smart robot.

### INTRODUCTION

Cleaning has always been a laborious task, dating back to the dawn of human civilization. There were numerous techniques for keeping the area tidy. However, those techniques required a lot of work and were tiresome. It's getting harder for people who work to find time to tidy their rooms. Due to the challenges, the current system was not regarded as an Automation.

The cleaning process was considerably more effective. Using an automatic floor cleaner that can take mobile commands from the user can significantly lessen the cleaning strain. The primary goal of this project is to design and build a robot that can be controlled by an





# SMART BLIND SHOPPING CARRIER

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## I. ABSTRACTIONS

Supermarkets becoming more popular in today's consumer environment, drawing a varied range of people owing to their vast product offerings. Supermarkets provide a large variety of things, including fresh vegetables, meats, dairy, and packaged goods, as well as home essentials, making them an excellent one stop destination for completing all shopping at once. This convenience, however, is not without its drawbacks. Long lineups can make shopping experiences unpleasant, leading supermarkets to utilize techniques such as technological improvements to enhance the shopping experience—especially during peak periods when many offers are available. The billing method is typically time-consuming and hectic, requiring the inclusion of more human resources in the billing area. Furthermore, customers often have trouble operating overloaded excessive carts. Manual computations of purchases and budget comparisons until the scanning process in the invoicing area adds another degree of aggravation. To address these concerns, an extraordinarily idea encompassed with IoT and RFID scanners are implemented into shopping trolley. As clients load items into the trolley, the RFID reader automatically reads products data such as item names, prices, and weights. A speaker will declare the goods that buyers have chosen, as well as their price and weight. This information is then shown on a screen,

move, eliminating the need for customer to push it back and forth. Customers may pay with card in front of the RFID, and payment is completed in seconds. An SMS will be delivered to the customer's phone number to confirm the payment, and the payment procedure will also trigger a announcement over the speaker if the card does not have adequate a balance. When a customer is done shopping, they can easily take their cart to the payment area. This cuts down on the time-consuming physical counting process and makes shopping less tiring, especially for older customers.

## II. INTRODUCTION

For the visually impaired individuals, shopping for groceries and household items can be considered a challenging and frustrating experience. They frequently need to rely on help from the store employees or other customers, which might take some time and reduce independence. Researchers, they have suggested using RFID technology to create some smart shopping systems that can help shoppers, who are blind or visually impaired, while they are out shopping to solve this problem, RFID is like a wireless communication technology that automatically identifies and tracks items using radio waves or whatever, kind of cool! It can be used for creating an environment for smart shopping where



## CAMPUS CLEANER BOT

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### ABSTRACT

*This study examines the many cleaner bot types used in schools, such as self-contained vacuums, robotic litter collectors, and waste segregators driven by artificial intelligence.*

*cleaners. It looks at the underlying technologies, such as computer vision, machine learning, and sensor integration, that allow these bots to operate in a range of contexts and carry out cleaning duties.*

*This survey also covers the effects of cleaner bots on university campuses and how they can lower operational expenses, improve hygienic standards, and encourage eco-friendly behavior. It also examines the difficulties these bots encounter, including user acceptability, energy efficiency, and environmental adaptation.*

*The report also offers suggestions for future lines of inquiry, highlighting the necessity of developments in artificial intelligence algorithms, robot interaction to The*

*acceptability and potential of Campus Cleaner Bot.*

*This paper's primary goal is to close the knowledge gap between theory and widely available components and real-world application. The robot construction cost was chosen to be lower by using the adaptive manufacturing method.*

### I. INTRODUCTION

Cleaning has been a tedious chore from the beginning of human society. There were multiple approaches for maintaining order in the space.

But these approaches were laborious and time-consuming. People who work are finding it more and more difficult to find time to clean their rooms. The difficulties meant that the existing system was not considered an automation.

The cleaning procedure was far more

# Implementation of Smart Shopping Trolley

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## ABSTRACT

Recently researches and many developments were going in the field of automation and embedded systems to develop and reduce the work of the manpower in industry as well as in public domain areas like Railway station for automatic ticket collection, Metro bus, Flight etc. This system can be used to develop more automation in and to help the blind people, old age and handicapped person we proposed a technique named as automatic trolley carrier navigation and the billing system. This method can be implemented in all shopping malls, big clothing shop, house hold appliances shops etc. It avoids the people to stand in a big queue and automatic billing can be done. Moreover, it helps blind people, old age people, Handicapped Persons in the shopping malls make them to purchase in shopping malls by informing about the product, quantity, price and automatic billing etc. The use of RFID reader is to scan the RFID tag of all products to Identify the name, price, quantity of the products. Depending on the RF signal from the RFID - reader, it passes the information to the micro - controller and from that it identifies the product and, quantity, price of each product. The ultrasonic sensor is used to detect the any obstacles as well as the object.



# Bionic Arm

Mr. Praveen A<sup>1</sup>, Chaithra K<sup>2</sup>, Hima Swetha S<sup>3</sup>, B S Hemashree<sup>4</sup>, Bhuvaneshwari K<sup>5</sup>

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**Abstract:** The Bionic Arm Project is an innovative attempt aimed at developing advanced prosthetic limbs that replicate the functionality and competence of a human arm. Through cutting-edge technology and engineering, this project seeks to enhance the quality of life for individuals with limb loss, providing them with improved mobility and a greater degree of independence. Prosthetic devices enhance the independence and well-being of countless people around the world. The main characteristic of bionic limbs is that they establish an interface between the biological residuum and an electronic device, providing not only motor control of prosthesis but also sensitive feedback. This paper explores the advancements in bionic arm technology, focusing on the integration of robotics and neural interfaces to enhance limb functionality.

**Keywords:** Bionic, prosthetic, residuum, interface, innovative, integration.

## I. INTRODUCTION

Bionic arm is an electromechanical device that attaches to human body and replicates the functionality and appearance of natural human arm. The bionic arms are advanced prosthetic devices designed to replace or enhance the functionality of a missing or impaired arm. They use cutting-edge technology like sensors, motors, and microprocessors to mimic the movements of a natural arm.

It is designed to help people who have lost their arm or have a disability in their arm to regain some of their mobility and independence. It's like a high-tech robotic arm that can be controlled by the user's muscles or through other methods like sensors or even brain signals.

The primary objective of this project is to design and create a bionic arm that closely mimics the functionality and appearance of a natural human arm. While similar devices are indeed on the market, our goal is to create a more cost-effective alternative with relatively simpler components.

## II. PROBLEM IDENTIFICATION

Individuals coping with upper limb amputations encounter diverse challenges spanning functional, emotional, and societal dimensions. The absence of hands significantly impedes functional independence, rendering basic activities like eating and dressing arduous and necessitating assistance. The main problem with traditional prosthetic arms is their limited functionality and lack of natural movement.

The problems with the already available bionic arm are:

- Cost of Development: Developing advanced bionic arms can be expensive, limiting accessibility for those who need them but cannot afford them.
- Natural Movement: Achieving natural and fluid movement in a bionic arm is a complex engineering challenge.
- Customization: Mass-produced bionic arms may not fit individual users' needs and preferences, necessitating better customization options.
- Durability and comfort are also the areas that can be improved upon.

Overall, there is still room for advancements in terms of functionality and user experience.

## III. EXISTING SYSTEM

The existing systems for bionic arms vary depending on the specific technology used. Some bionic arms use surface electromyography (EMG) sensors that detect muscle activity in the residual limb, allowing the user to control the arm's movements. Others may utilize pattern recognition algorithms to interpret muscle signals and translate them into specific actions. There are also bionic arms that can be controlled through nerve interfaces or even brain-computer interfaces. Well, while bionic arms have come a long way, there are still some drawbacks to consider. One common challenge is the cost, as bionic arms can be quite expensive, making them less accessible to everyone who could benefit from them.



# PREPAID ELECTRICITY ENERGY METER AND TAMPERING DETECTION

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## ABSTRACT:

The aim of the paper is to minimize the queue at the energy meter billing counters and to restrict the usage of energy meter automatically, if the bill is not paid. The project also aims at proposing a system that will reduce the loss of power and revenue due to power thefts and other illegal activities. This technology holds good for all electricity distribution companies, private communities, IT parks and self-containing housing projects. The implementation of this paper will help in better energy management, conservation of energy and in doing away with the unnecessary hassles over incorrect billing. The prepaid card communicates with the power utility using GSM communication network. Once the prepaid card is out of balance, the consumer load is disconnected from the utility supply by the latching Relay (contactor). This paper demonstrates the use of prepaid energy meter system. If we use this system, it will be beneficial for the consumer to manage power. It is easy to operate and cost effective. Another advantage of the prepaid system is that the human errors in taking meter readings and processing bills can be largely reduced.

**KEYWORDS:** Prepaid, Energy meter, GSM module.

## I.INTRODUCTION

In recent years many attempts have been made to design the energy meter with instant billing technique but till now the designed energy meters are not efficient and do not provide replacement. Now a

day the number of electricity consumers is largely increasing. It is hard to handle and maintain the power due to growing requirements. Maintenance of the power is an important task as the human operator goes to consumer's house and takes the meter reading and based on this reading produced the bill amount for this month in which electricity consumed by the

customer. The billing process takes a lot of time if the consumers are not in the house while reading of energy consumption and generating the bill. If the consumer did not pay the bill, the Electricity Board people need to go their house to disconnect the power supply. This consumes time and is difficult to handle. The manual operator cannot find the Un-authorized connections or malpractices carried out by the consumers to reduce or stop the meter reading/power supply. Some of the energy meters which had been implemented are prepaid but it needs a Smart card to recharge it. The major disadvantage of that method is that it needs internet and the computer interface. In this paper we propose a method which uses GSM Network which eliminates the need for the internet. "GSM Based Prepaid Energy Meter" system consists of Energy Meter and the GSM Network. The system provides efficient power meter reading, usage notification and consumers maximum demand using GSM network. GSM modem utilizes the GSM network to send equivalent unit for the recharge amount to the Microcontroller and send message to the customers also. The message consists of details of energy required to the customers in the terms of the unit.



# BIONIC ARM

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**Keywords:** Bionic, prosthetic, residuum, interface, innovative, integration.

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They use cutting-edge technology like sensors, motors, and microprocessors to mimic the movements of a natural arm. It is designed to help people who have lost their arm or have a disability in their arm to regain some of their mobility and independence. It is like a high-tech robotic arm that can be controlled by the user's muscles or through other methods like sensors or even brain signals.

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The main problem with traditional prosthetic arms is their limited functionality and lack of natural movement. The problems with the already available bionic arm are:

- **Cost of Development:** Developing advanced bionic arms can be expensive, limiting accessibility for those who need them but cannot afford them.
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Well, while bionic arms have come a long way, there are still some drawbacks to consider. One common challenge is the cost, as bionic arms can be quite expensive, making them less accessible to everyone who could benefit from them. Additionally, the weight



## Brain-Computer Interface to achieve Aided Communication

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### ABSTRACT

The aim of this project is to enhance communication by integrating brain-computer interfaces (BCIs) into our daily interactions. By gathering and analyzing complex brainwave data through electroencephalography (EEG) sensors, the system forms a foundational understanding of neural patterns. These insights are then leveraged to train a machine learning model built on PyTorch, emphasizing both accuracy and efficiency for real-time processing.

At the heart of the project lies the trained model, which adeptly translates incoming EEG signals into coherent text outputs. This breakthrough enables those equipped with EEG sensors to communicate effectively, forging a new avenue for interaction. The user interface is intentionally designed to be intuitive and accessible, catering to a diverse spectrum of

user needs.

The ethical dimensions of the project, particularly data privacy and security, receive utmost attention. Strict safeguards are employed to preserve the confidentiality of brainwave data. Additionally, user feedback is integral to the continuous iteration of the system, ensuring its evolution aligns with practical utility.

Expanding beyond the technical complexities, the project delves into wider considerations such as user training, accessibility, and the social implications of embracing cutting-edge communicative tools. By fluidly integrating BCI technology with machine learning, this project aspires to revolutionize traditional communication methods and offer ar



# LASER ENGRAVING

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**Abstract:** The complex equipment known as the laser engraver uses laser technology to precisely etch intricate designs onto a variety of materials. It provides flexibility for customized creations on materials including wood, metal, plastic, and glass and is operated by computer software. Because of its accuracy, it's a popular option for creating customized products, signs, and creative projects that combine technology with creativity in a seamless way.

**Keywords:** Laser module ,Slider x3,Power supply ,CNC shield v3,Arduino uno,A4988 Driver x2 **Introduction:**

A laser engraver is a precision tool that etch or engraves designs onto a variety of materials, including glass, metal, plastic, and wood, using a laser beam. This technology is popular for artistic crafts, signage, and personalized objects because it can achieve great precision and fine detailing. Computer software governs the laser engraving process, providing freedom and personalization in the creation of intricate patterns, text, or images on a variety of surfaces.

## Literature survey:

**Mr. Sachin Patel (2020)** has been discovered the influence of process parameters like laser power ,scanning depth, laser frequency on material removal rate, surface roughness & Engraving depth by experimentally. In these paper author describes many types of laser like carbon dioxide (CO2) laser and neodymium – dopes yttrium Aluminum garnet laser, semiconductor laser, fiber laser which are used for lase engraving process. The author recently

performs laser engraving of stainless steel 316. Material is removed by lase process called as laser engraving machining process.

**Georgi M. Martinov** published paper on an approach to building specialized CNC system for Laser Engraving machining. This paper describes the main problem for material processing with impulse laser emission is necessary to maintain impulse frequency in fixed interval .The traditional control method with impulse confirmation waiting





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Georgi M. Martinov published paper on an approach to building specialized CNC system for Laser Engraving machining. This paper describes the main problem for material processing with impulse laser emission is necessary to maintain impulse frequency in fixed interval .The traditional control method with impulse confirmation waiting could be realized in any NC system .The experiment shows that the developed approach allows to greatly increase the processing speed compared to the method with impulse confirmation waiting .Hence the increases the 30-50% is achieved.

Alexander Stepanov gives an idea of engraving of paper by using laser. The laser is useful in processing of paper materials



# Brain-Computer Interface to achieve Aided Communication

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## ABSTRACT

The project aims to improve communication by integrating brain-computer interfaces (BCI) into our daily interactions. The system collects and analyzes complex brain data from electroencephalogram (EEG) sensors, providing a better understanding of neural patterns for accuracy and real-time performance. The system converts input EEG signals into output signals. This invention opens new ways of interaction by allowing people with EEG sensors to communicate effectively. The user interface has been carefully designed to be intuitive and accessible to meet the needs of many users. Strict security is used to protect the privacy of information in the brain. Moreover, user feedback is an important part of the continuous operation of the system to ensure that its development is consistent with the actual

results. Use the best communication tools for social impact. The project aims to transform traditional communication by integrating BCI technology and provide an important channel for individuals with special communication needs.

## I. INTRODUCTION

This project focuses on exploiting the potential of brain-computer interfaces (BCIs) to improve human communication. It is based on the use of electroencephalography (EEG), in which special sensors are sent to capture and record neural data. To prepare this data for analysis, it must be carefully cleaned and structured including steps such as noise reduction and signal enhancement. Improved structure for maximum and uninterrupted operation. This involves creating a complex set of rules and a good training process to ensure the model



## Arnold Transform-Lifting Wavelet Transform and Singular Value Decomposition Based Alpha Blending Image Steganography for Secure Communication

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**Abstract:** Image steganography is an artistic approach used to conceal secret data within a cover image (CI) while maintaining its visual quality. This paper presents a strategy for image steganography by applying Arnold Transformation (AT) to Secret Image (SI), Singular Value Decomposition (SVD), and Lift Wavelet Transformation (LWT) to CI and SI. AT is enforced on the RGB plane of SI, and the LWT is engaged to decompose the image into approximations and detail coefficients, allowing for the identification of areas suitable for embedding without noticeable changes. The SVD is operating on the approximation coefficients, resulting in the U, singular value S, and V matrices. By modifying the singular values, secret data is embedded. The proposed method offers improved robustness and security as modifications are distributed across various frequency components, making it challenging for unauthorized parties to detect the confidential information. Experimental results demonstrate that the combination of LWT and SVD yields effective results, i.e., Mean Squared Error (MSE) and Peak Signal to Noise Ratio (PSNR) with minimal visual distortion. However, the embedded information may still be susceptible to specific steganalysis attacks, necessitating additional security measures for sensitive data.

**Keywords:** Cover image, Payload image, Stego image, PSNR, Steganography.

### 1. Introduction:

Image steganography is a technique that involves hiding secret data within an image without perceptibly altering its visual appearance [1]. This provides a covert way of transmitting sensitive information by embedding it into the pixels of CI [2]. Transmission of Electronic Medical Record (EMR) using the Internet of Things (IOT) [3] Arnold Transformation (AT), LWT and SVD techniques are used in this paper [4] [5] [6]. AT is a two-dimensional chaotic map that is enforced on a reference image to rearrange its pixel value positions; AT operates by dividing the image into cells or blocks of equal size [7]. The LWT method is based on the wavelet transform, which is a mathematical tool that measures and is used for analyzing and processing images [8]. An image is divided into several frequency bands using LWT, representing different levels of detail. By manipulating the coefficients in these frequency bands, it is possible to embed secret information [9] [10]. The common approach is to modify the Least Significant Bits (LSBs) of the wavelet coefficients to encode the hidden information [11]. The small variations in LSBs are less noticeable to the human visual system; the modifications are usually imperceptible [12]. The SVD technique utilizes the

algorithm to decompose an image matrix into three matrices: U, S, and V. The S matrix contains the singular values, which represent the image's energy. By modifying these singular values, secret data is concealed within the image [13] [14]. Similar to LWT, the modifications are performed in a way that ensures minimal visual impact on the image. AT- LWT and SVD techniques provide a robust means of hiding information in images [15]. They offer different approaches for embedding data and have their advantages and limitations. The choice between the techniques depends on factors such as the application requirements, the optimum degree of security, and the susceptibility to steganalysis [16][17][18]. All the researchers in this field often explore and combine several techniques to enhance the efficiency and security of image hiding [19] [20].

**Contribution:** Arnold Transform (AT) – LWT, SVD, and Alpha Blending Image Steganography is proposed in this paper.

**Organization:** Section II is related works; Section III is the proposed steganography technique. Section IV and Section V are result analysis and conclusion.

### 2. Related Works:

Saidi et al. [21] discussed the steganography system rooted on DCT. Chaotic mapping is used to select the embedding position. Rabie et al. [22] proposed a DCT domain-embedding process rooted on a global adaptive region.

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# IOT BASED PREPAID ELECTRIC VEHICAL CHARGING STATION

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*Abstract: We are seeing the increasing use of Electric Vehicles (EVs) now a days which is connected to the power grid generates challenges in the EV charging coordination and operation cost management. Prepaid electric vehicle (EV) charging involves users paying in advance for the electricity they plan to use to charge their EVs. This model allows for better cost management and control over charging expenses. Users typically load a prepaid amount onto their charging account, and the charging stations deduct the cost as the vehicle charges. It can be convenient for budgeting and may offer discounts or incentives for prepayment. The mobile application manages the user authentication mechanism to initiate the electric vehicle charging process, where a sensor is used to measure the current and voltage based on the microcontroller, the device makes a communication with data with the mobile application. A user interface has been developed to visualize this process happening, which show the various sensor data to the user and also send alerts messages. And after charging user see the charging status on their phone. Their data will remain safe and secure as data will be stored on cloud.*

## I. INTRODUCTION

Whether you as of now drive an electric vehicle (EV) or are considering getting one, charging assumes a basic part in driving an EV. With the mass reception of electric vehicles not too far off, the significance of brilliant electric vehicle charging will become fundamental for both the charging point network administrators, and the public power matrix. One of the significant difficulties while entering the electric vehicle (EV) market is the charging system, where the primary issues are connected with the absence of appropriate framework in private (high rises) because of their ineptness for this new reality. The loft has a common power issue, which doesn't meet the prerequisites of EV proprietors. In light of new advances in the Web of Things (IoT) and related sensors and correspondence stages, frameworks can possibly make new answers for these issues. One more part of this challenge is connected with rental lodging and the chance of requiring electric vehicle charging help with these conditions. In condos, sadly, there is an overall hesitance to introduce EV charging stations, which might be utilized by a couple of proprietors. Furthermore, there is likewise an issue connected with the security of the electrical frameworks, as they are not effectively worked to help EV charging stations, and the change of the electrical foundation of the loft won't just requires agreement among a greater part of proprietors, which can be troublesome, yet can likewise be hard to get, from government building wellbeing specialists. Taking into account the way that most private structures have normal spaces with shared electrical establishments and are not ready for the establishment of new EV charging frameworks, this is a boundary to reception. A review recognized four key trouble spots with regards to sharing electric vehicle charging arrangement structures, charging framework inaccessible, building limits, administrative issues, and accessibility of the parking garage.

## II. LITERATURE SURVEY

As the number of EVs on the roads increases, charging stations in both parking structures and private garages will become more prevalent. These stations will be responsible for meeting the requirements of the distribution grid, EV owners, and parking structure operators. For security and financial reasons, among the many functions these charging stations will perform are user authorization, authentication, and billing. Basic, networked, charging stations such as Leviton[1] and ClipperCreek[2] require a point of sale (POS) device to authorize and enable charging. Other commercial charging stations, such as Coulomb [3] and Blink [4] require a short range RFID card for the same purpose. In both cases, extra steps on the part of the user must be taken to authorize charging. The authors in [5] propose using conventional RFID tags inside EVs and RFID readers on parking garage access gates together with middleware and an aggregate charging controller to authorize, assign, and enable charging. However, this system still requires action from the user and is not as flexible as may be desired. The UCLA SmartGrid Energy Research Center (SMERC) has developed a software-based EV monitoring, control, and management system that employs multiplexed charging stations capable of providing varying power to several EVs from one circuit, called WINSmartEVTM[6][7][8]. This system centers on a server-based aggregated charging controller and utilizes a user database together with a smart-phone interface for charging authorization. In order to simplify the charging authorization process and make it

# Smart Bus Management System

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**Abstract**—In today's fast-paced world, time management is of utmost importance. Public transport is the most widely used service and a major source of revenue for the government. In order to have a proper ticket collection system and to save time from the traditional bus ticket collection system, a smart ticket collection system is proposed. RFID tags are used to speed up the ticket fair process and also to determine the availability of seats. The schedule of the upcoming bus and the availability of seats are updated to the passengers. Therefore, the passengers can choose their alternative mode of transportation and save time. Our system aims to have an effective fair collecting system with continuous updates to the passengers at the bus stop.

**Keywords**— RFID Reader, Ticket collection, Smart Payment, RFID tags.

## I. INTRODUCTION

Bus services for public transportation typically consist of a published public transportation schedule that guides the regular running of transit buses along a route, stopping at prearranged bus stops. People waste time waiting for the bus at the bus stop because they are not aware of the bus's timetables. Another is that passengers may experience cash flow issues and a conductor is needed to handle fare collection. The existing system is beset with several issues. Using an RFID card, the Smart Bus Fare Collection System is built. This device is easy to use; it will recognize the passenger automatically and subtract the charge based on the distance traveled. Passenger and transaction identification is made extremely accurate with the use of Radio Frequency Identification (RFID) cards. RFID tickets are more convenient and reusable than those obtained using paper-based ticketing systems. The whole public is given RFID cards. By gathering the personnel information, an account will be made and each individual will receive a unique ID card using RFID technology. As a result, it is feasible to verify his account and deduct the fare by accessing this database. The proposed system integrates all of these subsystems into a single, physically deployable solution for public bus systems, thereby simplifying the process for all parties involved. We'll examine these fields' literature and how it connects to one another in the sections that follow.[13][15]

## II. LITERATURE SURVEY

Swapnil Bhosale, Abhishek Aru, Tushar Jashav, Vikas Kalokhe, Santosh Sambare focuses on " RFID Based Bus

Tracking System." The proposed bus monitoring and management system utilizes RFID technology and GSM communication for real-time tracking and data exchange. A black box in each bus contains an RFID reader, GSM modem, and emergency button, interfaced with a microcontroller. As the bus approaches a tagged bus stop, RFID devices interact, and data is sent to the Superstation via GSM, updating the central database. Bus modules transmit location information, and in emergencies, the driver can use an emergency button to inform the Superstation. The Superstation processes data, sends location information to Bus-Stop modules, and monitors emergencies. Bus-Stop modules display bus locations and expected arrival times, improving passenger convenience. The system aims to reduce bus un-utilization and waiting times, benefiting both administrators and passengers.[1]

In the recent work by Ms. Supriya K. Adak, Ms. Akshata M. Annadate, Ms. Swarupa A, Deshmukh Mrs. Snehal Bhosale the focus is on the development of a Smart Bus Tracking System Using RFID The system involves three terminals: the device on the bus, device on the bus stop, and the master device on the bus stand. The device on the bus sends wireless data, including its ID, to the device on the bus stop. The bus stop device transmits the received data through RS 485 to a PC with a map displaying bus locations. The master device at the bus stand receives SMS updates on bus status, conveyed by the device on the bus. An Android app allows users to inquire about bus status remotely. The RFID tag used is the EM18 with Wiegand protocol, connected to a microcontroller. The RFID reader continuously transmits an electromagnetic field, and when an RFID card enters its 10cm range, it powers up and provides a 26-bit ID to the reader. The Wiegand protocol is interrupt-based, requiring the microcontroller to interpret data from interrupts on data lines connected to its external interrupt pins.[2]

Sudhir Divekar, Sagar R. Patil, Satish Shelke have introduced an innovative Smart Bus System. The project involves two sections: a transmitter placed in a bus and a receiver system at a bus stand. The transmitter comprises a PIC microcontroller, GPS module, GSM modem, voice recording/playback unit, RF transmitter, door switch, relay unit, and an LCD display. The GPS module receives signals from satellites to determine bus locations based on latitude, longitude, and altitude. The microcontroller stores and



# IOT BASED PREPAID ELECTRIC VEHICAL CHARGING STATION

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**Abstract:** *The increasing ubiquity of grid-connected electric vehicles (EVs) poses challenges for controlling operational expenses and scheduling EV charging. Prepaid electric vehicle (EV) charging requires customers to prepay for the electricity they wish to use. This technique allows for better control over invoicing charges and cost control. The charging stations subtract the amount that a user deposits into their account ahead of time from the vehicle's charge. It can help with budgeting, and there may be incentives or discounts for early payments. When charging an electric vehicle, a sensor measures the voltage and current; this process is controlled by a mobile application.*

## INTRODUCTION

Charging is an essential part of using an electric vehicle (EV), whether you presently own one or are considering buying one. When electric vehicles gain widespread acceptance in the near future, brilliant electric car charging will become crucial for network administrators of charging stations as well as the public power matrix. When first entering the electric vehicle (EV) market, the charging system presents one of the major obstacles. The primary issues here stem from private buildings' inadequate infrastructure (high rises), as these structures are ill-prepared to deal with this new reality. The standard power issue on the left does not meet the needs of EV owners. Taking into account recent advancements in the mechanisms, sensors, and communication phases related to the Internet of Things (IoT) might be able to offer fresh answers to these issues. Renting lodging and the potential requirement for assistance with electric vehicle charging in these situations are further aspects of this challenge. Though some condo owners may use them, there is still a widespread reluctance to install EV charging stations. Since the electrical networks aren't built to accommodate EV charging stations, there is also an issue with their security. Not only would changing the electrical basis of the loft require approval from the majority of owners, which may provide challenges, but obtaining permission from government building health specialists may also prove to be challenging. An analysis of the way in which Buildings, sensors, and communication stages may all be able to provide innovative solutions to these problems. Additional components of this problem include renting accommodation and possibly needing help with electric vehicle charging under these circumstances. Despite the fact that some condo owners might utilize them, installing EV charging stations is still largely opposed. Additionally, there is a security risk with EV charging stations because the electrical networks aren't designed to support them. Not only would it be difficult to get consent from the majority of owners to change the electrical basis of the loft, but it might also be difficult to get approval from government building health specialists.

## LITERATURE SURVEY

As the number of EVs on the roads increases, charging stations in both parking structures and private garages will become more prevalent. These stations will be responsible for meeting the requirements of the distribution grid, EV owners, and parking structure operators. For security and financial reasons, among the many functions these charging stations will perform are user authorization, authentication, and billing. Basic, networked, charging stations such as Leviton [1] and Clipper creek [2] require a point of sale (POS) device to authorize and enable charging. Other commercial charging stations, such as Coulomb [3] and Blink [4] require a shortrange RFID card for the same purpose. In both cases, extra steps on the part of the user must be taken to authorize charging. The authors in [5] propose using conventional RFID tags inside EVs and RFID readers on parking garage access gates together with middleware and an aggregate charging controller to authorize, assign, and enable charging. However, this system still requires action from the user and is not as flexible as may be desired. The UCLA SmartGrid Energy Research Center (SMERC) has developed a software-based EV monitoring, control, and management system that employs multiplexed charging stations capable of providing varying power to several EVs from one circuit, called WINSmartEVTM[6]. This system centers on a server-based aggregated charging controller and utilizes a user database together with a smart-phone interface for charging authorization. In order to simplify the charging authorization process and make it more convenient for users, an authentication system based on an RFID mesh network is proposed as an additional capability for the existing WINSmartEVTM framework. The proposed improvements allow charging authorization to take place seamlessly at multiple charging stations in a single geographic location without any action on the part of the user. Vehicle Monitoring/Identification Modules (VMMs), located in EVs, act as RFID tags for vehicle identification and charging authorization. Unlike the layered architecture for managing a



# OPTIMIZING TRANSPORTATION FOR SMART BUS MANAGEMENT SYSTEM

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**Abstract**—In today's fast-paced world, efficient time management is paramount, particularly in the realm of public transportation. Recognizing this need, a smart ticket collection system is proposed as a solution to streamline the traditional bus ticketing process. By leveraging RFID technology, this system aims to enhance both the efficiency of fare collection and the overall passenger experience. RFID cards serve as the linchpin of this innovative approach, enabling swift ticket validation and eliminating the need for manual ticketing processes. Beyond facilitating fare collection, RFID technology also allows for the real-time monitoring of seat availability on buses. This information is seamlessly integrated into passenger-facing interfaces, providing commuters with up-to-date schedules and seat availability status. The system's real-time updates empower passengers to make informed decisions about their travel plans, allowing them to opt for alternative modes of transportation if necessary. By offering continuous updates at bus stops, the system enhances transparency and convenience for passengers, ultimately saving their valuable time and improving overall transit experience. Overall, the smart ticket collection system represents a significant step towards optimizing public transport operations and meeting the evolving needs of modern commuters.

**Keywords**—RFID Reader, RFID tags, ticket collecting system, sensors, motors.

## I. INTRODUCTION

Public transportation serves as the backbone of urban, providing vital connections for millions of people and playing a pivotal role in facilitating economic development and societal progress. However, conventional bus systems often struggle with various shortcomings, including overcrowding, frequent delays, inconsistent scheduling, limited seating capacity, and vulnerabilities to fraudulent activities in ticket collection. Recognizing the imperative for a more efficient and passenger-centric transit solution, we have developed an optimized bus management system. Our innovative approach leverages advanced technology, particularly Radio Frequency Identification (RFID), to overcome the challenges inherent in traditional bus systems. RFID technology enables seamless tracking and identification of buses and passengers, revolutionizing the way we conceptualize and manage urban transit. By implementing RFID tags on buses and RFID cards for passengers, our system enables precise tracking of bus locations, efficient fare collection, and real-time monitoring of passenger flow. RFID-enabled fare collection systems enhance revenue security and streamline passenger boarding processes, reducing boarding times and improving overall efficiency. Moreover, by providing passengers with greater transparency and convenience in accessing transit services, our system enhances passenger satisfaction and fosters a more positive perception of public transportation.

## II. LITERATURE SURVEY

Parveez Shariff<sup>1</sup> et al. have all proposed a system for the smart bus ticketing system. A smart card that is connected to each traveler's service provider account is given to them. Travelers may check bus locations and occupancy estimates with an Android mobile app. Passengers use the Radio Frequency Identification (RFID), reader to board, and it deducts the tariff according to the start and finish points of the voyage from their account. Seat availability predictions are made possible by the Global Positioning System (GPS) module, which provides the server with real-time bus whereabouts. Passengers can select a bus based on projected occupancy by using the smart phone app, which shows a map view of the buses in operation. To maintain security, only travelers with a minimum balance and verified identity may board. After every journey, the system refreshes the database, improving oversight, openness, and anti-corruption efforts. [1]

U. L. Kokate et al. have focused on IoT based smart public transport bus. Every bus has an Arduino Nano-based system that uses the Global Positioning System (GPS) to determine latitude and longitude, the Global Mobile Communication System (GSM) to provide wireless internet access, and infrared sensors at the entry and departure doors to count passengers. Arduino



# Vehicle Fuel Theft Detection and Monitoring System

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*Abstract: The improvement of the car alarm security system is the main goal of this article. Since the public's safety when it comes to car fuel is of utmost importance, we became aware of this initiative when we noticed the startling rate at which vehicle fuel is being stolen in our nation. The modern world requires digital methods for measuring any quantity, and since standard fuel meters are analog, we are working to digitize them so that they can display fuel values digitally. Our project displays the fuel quantity, digitally represented as 1 liter, 1.5 liter, 2 liter, etc. in the gasoline tank. Fuel theft is a major issue worldwide as well. In our concept, the bike owner will receive a text message if fuel is stolen, and the owner will also hear a buzzer to alert them. Certain types of systems, such as computerized fuel availability displays and gasoline Bicycle theft can be prevented. The project focuses on the fuel management system, which manages sensors, logs, and theft alerts to ascertain the current state of the gasoline tank.*

**Keywords** –Digital techniques, buzzer, sensors

## 1.INTRODUCTION

The world has gone digital these days, allowing us to deal with real-time systems with ease. The actual fuel that is in the bike's fuel tank is a downside of the digital fuel meter that is currently being used in automotive systems. is displayed as a bar or deflecting needle rather than in terms of numbers. As a result, we were unaware of the actual amount of fuel in the bike's fuel tank, as the display simply indicated the fuel level. Customers will occasionally fill up their cars using a digital gasoline pump, however our car has a bar or deflection needle mechanism instead of a digital interface. The gasoline meters seen in cars and motorcycles are depicted in the illustration. However, because of the current fuel metering technology, it is unable to provide an actual value for the fuel filled, which means that the owner of the gas station has deceived the customer. The customer is unaware of this deception. The proprietor of the gas station receives all profits, which leads to frequent customer fraud. In order to address this issue, we created a digital gasoline meter system that displays fuel values in digits like 1 lit, 1.5 lit, 2 lit, etc. The digital gasoline meter can be used with any kind of vehicle, including cars and motorcycles. Car One of the biggest worries for many automobile and bike owners is fuel theft.. We have frequently heard, or some of us have personally experienced, the theft of gasoline from automobiles or bikes. The owner of the car or bike is not aware that fuel has been stolen. The next time he rides his bike, he will have several difficulties due to fuel theft. The primary component, the microcontroller, uses the GSM module to send a message to the owner when fuel theft occurs. A buzzer will then sound to alert the owner of the theft; the entire process is done in real time, making it more precise and safe GSM-based automobile fuel theft detection system with SMS alert is applicable to cars, motorcycles, and all other types of vehicles. We employed communication to implement the concept; specifically, SMS is integrated into or modified from the current car security system. This system creates a new entity called machine to human telecommunication in place of human to human telecommunication. The goal of this project is to monitor fuel security using GSM technology.



# Vehicle Fuel Theft Detection and Monitoring System

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## ABSTRACT

*The improvement of the car alarm security system is the main goal of this article. Since the public's safety when it comes to car fuel is of utmost importance, we became aware of this initiative when we noticed the startling rate at which vehicle fuel is being stolen in our nation. The modern world requires digital methods for measuring any quantity, and since standard fuel meters are analog, we are working to digitize them so that they can display fuel values digitally. Our project displays the fuel quantity, digitally represented as 1 liter, 1.5 liter, 2 liter, etc. in the gasoline tank. Fuel theft is a major issue worldwide as well. In our concept, the bike owner will receive a text message if fuel is stolen, and the owner will also hear a buzzer to alert them.*

**Keywords:** Digital techniques, buzzer, sensors

## INTRODUCTION

The world has gone digital these days, allowing us to deal with real-time systems with ease. The actual fuel that is in the bike's fuel tank is a downside of the digital fuel meter that is currently being used in automotive systems. It is displayed as a bar or deflecting needle rather than in terms of numbers. As a result, we were unaware of the actual amount of fuel in the bike's fuel tank, as the display simply indicated the fuel level. Customers will occasionally fill up their cars using a digital gasoline pump, however our car has a bar or deflection needle mechanism

instead of a digital interface. The gasoline meters seen in cars and motorcycles are depicted in the illustration. However, because of the current fuel metering technology, it is unable to provide an actual value for the fuel filled, which means that the owner of the gas station has deceived the customer. The customer is unaware of this deception. The proprietor of the gas station receives all profits, which leads to frequent customer fraud. In order to address this issue, we created a digital gasoline meter system that displays fuel values in digits like 1 lit, 1.5 lit, 2lit.

## LITERATURE SURVEY

Srinivas. M et.al [1] developed to use a flow sensor with an ultrasonic sensor to indicate the fuel level. When the key was entered, the operation began. The sensor then began to function and check the fuel level in the tank. All of the circuit's components that take 230 volts from the main supply and convert it to 9 volts are powered by a 2 amp switched mode power supply, or SMPS. The voltage regulator integrated inside the Arduino will change 9 volts to 5 volts. The fuel level is measured by the microcontroller and shown on the LCD when the power is turned on. It additionally displayed the ignition's ON and OFF states. The owner will not receive the notification if the fuel level was above the range. If not, the owner will receive a notification, and the buzzer will turn on right away. An LCD was utilized to display the fuel level. An SMS alerting the user of fuel theft was sent using a GSM module.

HedaVenkata et.al [2] suggested a project



## Visitors Robotic Guide

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**Abstract:** This guide introduces an avant-garde campus navigation system, seamlessly integrating cutting-edge internal mapping technology to transform the traditional campus exploration experience. Aptly titled "Visitors Robotic Guide" this guide is designed to cater to the diverse needs of students, faculty, and visitors, offering an intelligent and interactive solution for efficient navigation within the campus confines. The internal mapping system embedded in the guide provides detailed, user-friendly maps of campus buildings, ensuring users can effortlessly locate classrooms, offices, amenities, and points of interest. Beyond mere wayfinding, the guide offers a personalized experience, adapting to individual preferences and schedules to provide the most efficient and enjoyable routes. One of the standout features of "Visitors Robotic Guide" is its interactive information platform, delivering real-time updates on campus events, ongoing activities, and essential services. This ensures that users are not only well-directed but also engaged with the dynamic life of the campus. Voice assistance adds an extra layer of convenience, allowing users to navigate hands-free while receiving clear and concise directions. The guide is designed with inclusivity in mind, providing accessibility support to ensure that every user, regardless of ability, can benefit from this innovative navigation solution. As we usher in a new era of campus exploration, "Visitors Robotic Guide" redefines how we interact with our academic surroundings. Whether you're a new student finding your way, a faculty member optimizing your schedule, or a visitor eager to explore, this guide promises to enhance your experience, making each journey on campus a seamless and informative adventure.

Welcome to the future of campus navigation—welcome to "Visitor Robotic Guide."

**Keyword:** Navigation, Guide, voice assistant, detailed indoor maps, Personalized Routes, Raspberry pi 3b+.

### I. INTRODUCTION

Navigating a large college campus can be daunting, especially for freshmen or visitors unfamiliar with the layout. Internal mapping comes to the rescue, providing a visual representation of the campus interior to help people find their way around efficiently. This project aims to create a comprehensive and user-friendly system for directing individuals within the campus grounds.

**Detailed Indoor Maps:** Get step-by-step directions inside buildings, helping you locate classrooms, offices, libraries, and more.

**Personalized Routes:** Tailor your journey based on your preferences and schedule, ensuring the most efficient and convenient path to your destination. **Interactive Information:** Access real-time information about events, campus services, and ongoing activities at the touch of a button. **Voice Assistance:** Enjoy a hands-free experience with voice-guided navigation, allowing you to keep your eyes on the surroundings while receiving directions. **Accessibility Support:** Our internal mapping system is designed to accommodate all individuals, including those with specific accessibility needs, ensuring an inclusive and user-friendly experience.

Whether you're a new student trying to find your way around, a faculty member with a busy schedule, or a visitor eager to explore our campus, our internal mapping system is here to make your journey effortless and informative. Welcome to a new era of campus exploration with the Guide!

### II. LITERATURE SURVEY

[1] "K. Manohar, L. Sai Kishore, G. MEERAGANDHI", in this paper the "Raspberry Pi Based Voice-Operated Personal Assistant" is a voice-controlled processor with a camera that interacts with picture to text conversion utilizing Open CV and OCR algorithms for visually impaired people. Infrared sensors aid in the recognition of the voice direction of those conversing with the visually impaired. The Open CV and OCR algorithms recognize the letters contained in the taken photographs from the camera and convert them to audio, which is then communicated to the consumer equivalent using the built-in voice. By



# LITERATURE SURVEY ON LIBRARY MANAGEMENT ROBOT

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## Abstract:

The library management and books picking robot would describe a system designed to automate library operation enhancing efficiency and user experience. This innovative solution integrates robotics and software to organize, locate, and retrieve books. The robot utilizes advanced algorithms to navigate through open cv using cam, identify book locations, and pick requested items. The library management aspect involves a comprehensive software platform for cataloging, tracking, and user management. This integrated approach aims to streamline library tasks, reduce manual efforts, and provide patron with swift access to desired books

**Keyword:** Rasp berry pi ,robotic arm ,cam module, barcode scanner, ultra sonic sensormo ,  
motor driver

## I. INTRODUCTION

The Library Management Robot marks a significant leap in library automation, revolutionizing traditional book retrieval systems. This cutting-edge technology combines robotics and software to create a seamless and efficient process for managing and delivering library resources. In a world where information is at our fingertips, libraries are adapting to meet evolving user expectations. The Library Management Robot is designed to enhance the overall library experience by addressing common challenges such as time-consuming book searches and manual shelving processes. Due to the increase in the number of shelves in the library, it is difficult for a single person to remember such a large record. In a computerized system, if the books are a large number, picking books from the counter or reading table to their respective shelves. The robot is used to pick the desired book from the shelf. If any object appears, the robot will stop or it will change its direction and the robot will scan the desired shelf where the instruction is given by the user. From advanced navigation algorithms for precise book location to a user-friendly interface facilitating seamless requests, the Library Books Picking Robot is poised to transform how libraries function in the digital age. This can be used as package tracing and picking system.

## II. LITERATURE SURVEY

- Automated Library System using Robotic Arm (2019). K. V. Jyothi Prakash The main objective was to overcome the problem of searching the books in the library and provide automation in a user-friendly manner. The robot with an arm is designed which can search the required book, pick the book from the rack and deliver the book to the issue counter. It can also place the book in its designated slot once the book is returned by the borrower. The hardware and software required for an automated library system using a robotic arm has been designed



## LIBRARY MANAGEMENT ROBOT

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**Abstract--** *The library management and books picking robot would describe a system designed to automate library operations, enhancing efficiency and user experience. This innovative solution integrates robotics and software to organize, locate, and retrieve books. The robot utilizes advanced algorithms to navigate through open cv using cam, identify book locations, and pick requested items. The library management aspect involves a comprehensive software platform for cataloging, tracking, and user management. This integrated approach aims to streamline library tasks, reduce manual efforts, and provide patrons with swift access to desired books*

**Keyword:** *Rasp berry pi, robotic arm, cam module, ir sensor, ultra sonic sensor, motor driver*

### I. INTRODUCTION

The Library Management Robot marks a significant leap in library automation, revolutionizing traditional book retrieval systems. This cutting-edge technology combines robotics and software to create a seamless and efficient process for managing and delivering library resources. In a world where information is at our fingertips, libraries are adapting to meet evolving user expectations. The Library Management Robot is designed to enhance the overall library experience by addressing common challenges such as time-consuming book searches and manual shelving processes, due to increase in number of shelves in the library it is difficult for a single person to remember such a large record. difficult to search records when there is no computerized system, if the books are large number. Picking books from the counter or reading table to respective shelf. This robot is used to pick the desired book in the shelf. If any object will appears means the robot will be stop or it will change the direction and the robot will scan the desired shelf where the instruction given by user. From advanced navigation algorithms for precise book location to a user-friendly interface facilitating seamless requests, the Library Books Picking Robot is poised to transform how libraries function in the digital age. This can be used as package tracing and picking system.

### II. LITERATURE SURVEY

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## Visitors Robotic Guide Using Raspberry PI

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**ABSTRACT:** The creation of a robot for clearing trash from the water's surface is described in this chapter. : In recent years, the integration of robotics and artificial intelligence (AI) has paved the way for innovative solutions in various domains. One such application is the development of a Visitor Guide Robot (VGR), which serves as an interactive and intelligent guide for visitors in museums, exhibitions, or large facilities. This project aims to design and implement a VGR using Raspberry Pi, a versatile and cost-effective single-board computer. The proposed VGR incorporates several key components, including Raspberry Pi for processing and control, sensors for environment perception, motors for mobility, and a user interface for interaction. The robot utilizes computer vision techniques for object recognition and navigation, allowing it to autonomously navigate through the environment while avoiding obstacles. Additionally, natural language processing (NLP) algorithms enable the VGR to understand and respond to visitor inquiries effectively. The development process involves hardware integration, software programming, and testing to ensure the functionality and reliability of the VGR. The Raspberry Pi serves as the central hub for processing sensor data, executing control algorithms, and facilitating communication with the user interface. Various sensors, such as cameras, ultrasonic sensors, and infrared sensors, provide the necessary input for environment perception and obstacle avoidance.

*Keywords* - Robotics , artificial intelligence, Visitor Guide Robot, Raspberry Pi, object recognition, navigation, , natural language processing



# Survey On Railway Management System

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**Abstract:** The literature surveys examined various aspects of railway management, encompassing topics such as Radio Resource Management (RRM) for High-Speed Railway (HSR) communications, digital management's role in transforming railway operations, dynamic models for railway traffic management, rescheduling challenges in railway networks, and the recognition of structured handwritten forms in the Indian Railway Reservation System. Additionally, the evaluations of Indian Railways' performance, the integration of artificial intelligence (AI) in railway transport, energy-efficient practices in urban rail transit, Big Data adoption for railway asset management, wireless communications applications in the railway industry, and Low-Power Wide-Area Networks (LPWAN) in smart railways were explored. The studies also investigated the resilience of railway communication networks against electromagnetic attacks, the integration of 5G technology in urban rail transit, and the use of Natural Language Processing (NLP) in a railway reservation bot. These surveys collectively contribute valuable insights, methodologies, and recommendations for advancing railway systems, encompassing safety, efficiency, technology integration, and customer experience.

## I. INTRODUCTION

A comprehensive exploration of diverse facets within the realm of railway management and operations. Covering a spectrum of topics ranging from Radio Resource Management (RRM) in High-Speed Railway (HSR) communications to the integration of artificial intelligence (AI) and low-power wide-area networks in intelligent transportation, these surveys delve into critical areas of technology, safety, energy efficiency, and resilience. Authored by experts from various institutions, these works contribute valuable insights into the challenges and advancements shaping the railway industry. From rescheduling methodologies and recognition of handwritten forms to the evaluation of Indian Railways' performance and the application of 5G technology in urban rail transit, these literature surveys collectively form a rich repository of knowledge, guiding researchers, policymakers, and practitioners in navigating the complex landscape of modern railway systems.

## II. LITERATURE SURVEY

The literature review conducted by Xu, Zhu, Ai, and Zhong sheds light on the pivotal role played by Radio Resource Management (RRM) in addressing the complex challenges associated with High-Speed Railway (HSR) communications. Through a comprehensive analysis of existing research, the survey emphasizes the critical importance of comprehending HSR channel models and characteristics to facilitate the development of effective cross-layer RRM designs. The examination of state-of-the-art RRM schemes offers valuable insights into key aspects such as admission control, mobility management, power control, and resource allocation. Despite the valuable contributions of existing approaches, the survey also underscores the existence of current challenges, notably the diverse Quality of Service requirements inherent in HSR communications, underscoring the necessity for innovative solutions. In conclusion, this review establishes itself as a foundational resource, providing guidance for future endeavors aimed at advancing RRM strategies to ensure optimal performance in the realm of HSR wireless communications.. [1].

The work authored by Tsvetkov V.Ya. and S.V. Shaytura provides insights into the pivotal role played by digital management in the transformation of railway operations. Through a thorough examination, the authors highlight the crucial significance of contemporary technologies in augmenting efficiency, safety, and overall performance within the realm of railway transport. The paper underscores the imperative for a resilient digital infrastructure, coupled with advanced automation and communication systems, to address the evolving demands of the railway industry. By exploring the integration of information and automation, the authors make a meaningful contribution to the expanding body of knowledge dedicated to propelling railway systems into the digital era. This advancement is anticipated to bring about improvements in sustainability, reliability, and passenger service. The research findings presented in the paper offer valuable guidance for policymakers, researchers, and industry practitioners as they navigate the dynamic landscape of digital management within the railway sector. [2].

Offering a thorough exploration of online dynamic models and algorithms for the management of railway traffic, the research conducted by Corman and Meng delves deeply into the intricate domain of railway operations. Their work provides valuable insights into the myriad challenges associated with dynamic traffic scenarios and presents effective solutions. Navigating through a diverse array of models, the authors adeptly showcase their efficacy in optimizing railway systems. Through the synthesis of a wealth of information, Corman and Meng make a significant contribution to the field, offering substantial assistance to professionals seeking to implement more efficient and



# Railway Management System Using IOT

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**Abstract:** The comprehensive study explores diverse facets of railway management and operations, encompassing topics from Radio Resource Management (RRM) in High-Speed Railway (HSR) communications to the integration of artificial intelligence (AI) and low-power wide-area networks (LPWAN) in intelligent transportation. Through a synthesis of expert-authored literature, the survey examines critical areas including technology, safety, energy efficiency, and resilience. Key insights are provided on rescheduling methodologies, handwritten form recognition, and the application of 5G in urban rail transit. This body of work serves as a valuable resource for researchers, policymakers, and practitioners, offering guidance and foundational knowledge for advancing modern railway systems.

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# HAND GESTURE WHEEL CHAIR CONTROL WITH FALL DETECT SYSTEM AND LOCATION ALERT

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*Abstract:* A 'hand gesture' based easy to operate navigation mechanism using the wireless technology in the form of wheelchair control system is presented in this work. This work proposes an integrated approach for detection, tracking and recognition of hand gestures in real time. The approach uses acceleration technology to establish a reliable medium of human-machine interaction for the movement control of an intelligent wheelchair. The remote-control facility up to 60 meters and obstacle avoidance technology provided for additional comfort during navigation task for elderly or disabled people. The wheelchair motion is controlled by employing Arduino microcontroller interfaces with accelerometer sensor, motor driver unit, and edge detection sensors. The designed system was tested with five experiments by two subjects independently.

*Index Terms* -Tracking and recognition of hand gesture, Intelligent wheelchair and motor drive

## I Introduction

The wheelchair is one of the most commonly used assistive devices to promote mobility and enhance quality of life for people who have difficulties in walking (e.g. a person with spinal cord injuries resulting in quadriplegia or paraplegia, muscular dystrophy, etc). Wheelchair mobility opens up opportunities for wheelchair users to study, work, and engage in social activities and access services such as healthcare. In addition to providing mobility, an appropriate wheelchair benefits the physical health and quality of life of the users by helping in reducing common problems such as pressure sores, progression of deformities and improves respiration and digestion. To ensure effective mobility, wheelchair users need a wheelchair which fits them correctly and meets their specific needs. However, statistics show that about 10% of the global population, i.e. about 650 million people have disabilities and of these, some 10% require a wheelchair. It is thus estimated that about 1% of a total population, or 10% of a people with a disability, need a wheelchair, i.e. about 65 million people world wide. In addition, it was estimated that in 2003, 20 million of those requiring





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## II LITERATURE SURVEY

[1] AMUNDSON JS Over the years, several approaches, gesture and chain-based control mechanisms, have been proposed to help physically disabled people reduce their level of dependence on others for movement. An image-processing-based approach has been proposed to control a wheelchair. This approach relies on image processing to recognize a gesture.

[2] A MURAKA M.SRIDHARAN AND KUPIERS The proposed approach is easy to handle and operate by users. However, it requires wired controller to perform the operation, which makes it unreliable and difficult to use. A gesture-based wheelchair approach has been proposed in to control a wheelchair using hand movements for disabled people. The proposed approach uses the MEMS sensor connected to the hand and 3-axis accelerometer with digital output (12C), which detects and converts and gestures to

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/ Vol. 30 No. 5 (2024) (<https://kuey.net/index.php/kuey/issue/view/56>) / Articles

# Design And Validation Of A 32-Bit RISC-V Processor Incorporating Vedic Mathematics

PDF (<https://kuey.net/index.php/kuey/article/view/4465/3901>)

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**Dr. Girish H**

**Shylaja V**

**Dr. Vijayalakshmi D**

**Vanishree M L**

**Soumya N G**

**Dr. Anita P**

## Abstract

A Vedic multiplier architecture is employed in constructing a 32-bit RISC-V processor to enhance speed and reduce computational complexity. Its ALU and MAC units, based on Vedic Sutras, are implemented in Verilog HDL and simulated with the Xilinx design suite, achieving lower power consumption and latency compared to traditional designs. The processor includes conventional components like the Control Unit, Register Bank, Program Counter, and Memory. It can execute up to 16 instructions, making it a powerful option for various computing tasks due to its improved speed, reduced power consumption, and minimized area usage.

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# Evolution of SnO<sub>2</sub> nanoparticles for the electrochemical sensing of dopamine including photocatalytic toxic dyes degradation

S.R. Kiran Kumar<sup>a</sup>, Harisha S<sup>a,\*</sup>, Jalaja P<sup>b</sup>, B.K. Jayanna<sup>c</sup>, K. Yogesh Kumar<sup>d</sup>, M.S. Anantha<sup>e</sup>

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## ARTICLE INFO

### Keywords:

Dopamine

SnO<sub>2</sub> nanoparticles

Modified carbon paste electrode

## ABSTRACT

In the present study, SnO<sub>2</sub> nanoparticles were synthesized, and their structural features were evaluated by X-ray diffraction (XRD), scanning electron microscopy (SEM), energy dispersive X-ray analysis (EDX) and transmission electron microscopy (TEM) techniques. Modified electrodes (MCPE) were prepared and utilized to access the electrochemical behaviour of dopamine. This study was conducted in a phosphate buffer solution with a pH value of 7.2. The results indicate that the modified carbon paste electrode (MCPE), with a high active surface area, exhibited excellent electrochemical sensing properties and demonstrated good reproducibility and high sensitivity for the electrochemical determination of DA. Potentially interfering compounds were tested at the surface of the proposed sensor, confirming that, they did not interfere with the determination of DA under optimum condition. Additionally, the photocatalytic properties of SnO<sub>2</sub> were evaluated in degradation of cationic and anionic dyes. It was concluded that the higher photocatalytic activity in SnO<sub>2</sub> nanocomposites was attributed to their porosity and high surface area.

## 1. Introduction

Dopamine (3,4-dihydroxyphenethylamine), a biologically important organic compound belonging to catecholamine and phenethylamine families, plays a key role in brain and body metabolism of the human system. The functions of dopamine includes, cardiovascular, central nervous, renal and hormonal systems proving its importance in human metabolism [1,2]. Imbalances in the dopamine levels can lead to various disorder, such as Parkinson's disease, Tourette syndrome, Dementia, schizophrenia and attention deficit hyperactivity disorder (ADHD) [3, 4]. For neurophysiological analysis or diagnosis, controlling the concentration of DA is necessary. Various techniques have been developed over the past couple of decades for the selective and sensitive detection of DA, including chemiluminescence, fluorimetry, capillary electrophoresis, mass spectrographic and ion chromatography [5,6], etc. However, electrochemical process have gained widespread interest compared to the aforementioned techniques due to several advantages, such as rapid identification, ease, reproducibility, remarkable

cost-effectiveness, non-destructiveness [7,8].

The easier oxidation of dopamine (DA) at the surface of the electrode is due to its electro-active nature; therefore, electro-oxidation-based electro-analysis of DA has been commonly proposed. The coexisting components in the samples may cause serious external interference on the bare working electrode. In this regard, various types of chemically modified electrodes incorporating polymers, metal ions, and carbon based nanoparticles, have been developed in recent years and tested for advancement of accuracy and sensitivity [9–12]. Generally, the working electrodes are used in electrochemical sensor and biosensors as an electrode materials [13–15]. The key benefits of the carbon paste electrode include the simple preparation process, the creation of a fresh surface for detection and the production of low residual current in large potential windows. Furthermore, they exhibit strong electrical conductivity and mechanical strength due to their high accessible surface area. Moreover, these carbon paste electrodes can be doped with organic and inorganic molecules with large  $\pi$ -conjugation, thereby improving the activity and accuracy of drug sensing [16–19].

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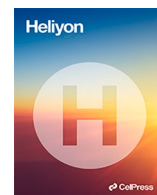
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## Research article

# *Acmella oleracea* induced nanostructured $\text{Ca}_2\text{Fe}_2\text{O}_5$ for evaluation of photo catalytic degradation of cardiovascular drugs and bio toxicity

Neelam Patil Radhika<sup>a</sup>, Malini S<sup>b</sup>, Kalyan Raj<sup>b</sup>, K.S. Anantharaju<sup>c</sup>, Shylaja K. R<sup>a</sup>, Abhishek Appaji<sup>d,e,\*</sup>

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## ARTICLE INFO

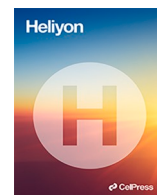
## Keywords:

Calcium ferrate  
Photocatalytic  
Cardiovascular drugs  
Antibiofilm  
Endodontics  
Cytotoxicity

## ABSTRACT

Biosynthesis of nanoparticles is increasingly becoming popular due to the demand for sustainable technologies worldwide. In the present investigation, *Acmella oleracea* plant extract fuelled combustion technique followed by calcination at 600 °C was adopted to prepare nanocrystalline  $\text{Ca}_2\text{Fe}_2\text{O}_5$ . The prepared nano compound was characterised using X-ray powder diffraction (XRD), scanning electron microscopy (SEM), Ultra Violet (UV) spectroscopy, Infrared (IR) spectroscopy and its role was assessed for photocatalytic pollutant degradation along with bactericidal action in the concentration range of 1 µg/mL to 320 µg/mL. The photocatalytic degradation efficiency of pollutant drugs Clopidogrel Bisulphate and Aspirin used for cardiovascular disorders is around 80% with 10 mg/L photocatalyst. The results showed that the photocatalytic activity increased with rising pH from 4, to 10, along with a significant antibacterial action against *Enterococcus faecalis* bacteria and a slight cytotoxic effect at high concentrations. The antibacterial property was reinforced by Minimum inhibitory concentrations (MIC) and Minimum bactericidal concentrations (MBC) studies with an average value of 0.103 at 600 nm which was further proved by significant anti-biofilm activeness. Adhesion tests in conjunction with cryogenic-scanning electron microscopy displayed a morphological change through agglomeration that caused an expansion in nano particles from 181 nm to 223.6 nm due to internalization followed by inactivation of bacteria. In addition, the non-toxicity of nano  $\text{Ca}_2\text{Fe}_2\text{O}_5$  was confirmed by subtle cytological changes in microscopic images of Allium Cepa root cells in the concentration range 0.01–100 µg/mL and a slight inhibition in HeLa cell proliferation indicated by  $\text{IC}_{50}$  value of 170.94 µg/mL. In total, the current investigation for the first time reveals the application of bio based synthesis of Nano  $\text{Ca}_2\text{Fe}_2\text{O}_5$  to new possibilities in bioremediation namely degrading cardiovascular pharmaceutical pollutants, endodontic antibacterial action and cytological activity.

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## Research article

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# Evolution of SnO<sub>2</sub> nanoparticles for the electrochemical sensing of dopamine including photocatalytic toxic dyes degradation

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## ABSTRACT

In the present study, SnO<sub>2</sub> nanoparticles were synthesized, and their structural features were evaluated by X-ray diffraction (XRD), scanning electron microscopy (SEM), energy dispersive X-ray analysis (EDX) and transmission electron microscopy (TEM) techniques. Modified electrodes (MCPE) were prepared and utilized to access the electrochemical behaviour of dopamine. This study was conducted in a phosphate buffer solution with a pH value of 7.2. The results indicate that the modified carbon paste electrode (MCPE), with a high active surface area, exhibited excellent electrochemical sensing properties and demonstrated good reproducibility and high sensitivity for the electrochemical determination of DA. Potentially interfering compounds were tested at the surface of the proposed sensor, confirming that, they did not interfere with the determination of DA under optimum condition. Additionally, the photocatalytic properties of SnO<sub>2</sub> were evaluated in degradation of cationic and anionic dyes. It was concluded that the higher photocatalytic activity in SnO<sub>2</sub> nanocomposites was attributed to their porosity and high surface area.

## 1. Introduction

Dopamine (3,4-dihydroxyphenethylamine), a biologically important organic compound belonging to catecholamine and phenethylamine families, plays a key role in brain and body metabolism of the human system. The functions of dopamine includes, cardiovascular, central nervous, renal and hormonal systems proving its importance in human metabolism [1,2]. Imbalances in the dopamine levels can lead to various disorder, such as Parkinson's disease, Tourette syndrome, Dementia, schizophrenia and attention deficit hyperactivity disorder (ADHD) [3, 4]. For neurophysiological analysis or diagnosis, controlling the concentration of DA is necessary. Various techniques have been developed over the past couple of decades for the selective and sensitive detection of DA, including chemiluminescence, fluorimetry, capillary electrophoresis, mass spectrographic and ion chromatography [5,6], etc. However, electrochemical process have gained widespread interest compared to the aforementioned techniques due to several advantages, such as rapid identification, ease, reproducibility, remarkable

cost-effectiveness, non-destructiveness [7,8].

The easier oxidation of dopamine (DA) at the surface of the electrode is due to its electro-active nature; therefore, electro-oxidation-based electro-analysis of DA has been commonly proposed. The coexisting components in the samples may cause serious external interference on the bare working electrode. In this regard, various types of chemically modified electrodes incorporating polymers, metal ions, and carbon based nanoparticles, have been developed in recent years and tested for advancement of accuracy and sensitivity [9–12]. Generally, the working electrodes are used in electrochemical sensor and biosensors as an electrode materials [13–15]. The key benefits of the carbon paste electrode include the simple preparation process, the creation of a fresh surface for detection and the production of low residual current in large potential windows. Furthermore, they exhibit strong electrical conductivity and mechanical strength due to their high accessible surface area. Moreover, these carbon paste electrodes can be doped with organic and inorganic molecules with large  $\pi$ -conjugation, thereby improving the activity and accuracy of drug sensing [16–19].

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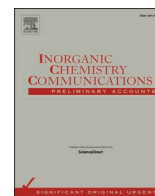
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## Short communication

Synthesis of heterojunction nanocomposites ZnFe<sub>2</sub>O<sub>4</sub>/ZnO/Nb<sub>2</sub>O<sub>5</sub> for photocatalytic, capacitor and antibacterial applicationsK. Gurushantha<sup>a,\*</sup>, K. Keshavamurthy<sup>b</sup>, S. Meena<sup>c,\*</sup>, Nagaraju Kottam<sup>a</sup>, M.N. Manjunatha<sup>a</sup>, S. Malini<sup>d</sup>, S. Shashidhar<sup>e,\*</sup>, G. Shobha<sup>f</sup>, T. Ramakrishnappa<sup>g</sup><sup>a</sup> Department of Chemistry, M. S. Ramaiah Institute of Technology (Affiliated to Visvesvaraya Technological University, Belgaum), Bengaluru 560054, Karnataka, India<sup>b</sup> Department of Physics, Dayananda Sagar College of Engineering, Bengaluru 560111, Karnataka, India<sup>c</sup> Department of Chemistry, Dayananda Sagar College of Engineering, Bengaluru 560111, Karnataka, India<sup>d</sup> Department of Chemistry, B.M.S. College of Engineering, Bengaluru, India<sup>e</sup> Department of Chemistry, New Horizon College of Engineering, Bengaluru 560103, Karnataka, India<sup>f</sup> Department of Applied Science and Humanities, K.S. Institute of Technology, Bengaluru 560109, India<sup>g</sup> Department of Chemistry, BMS Institute of Technology and Management, Yelahanka, Bengaluru, Karnataka, India

## ARTICLE INFO

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## ABSTRACT

Deriving the heterojunction nanocomposite for multifunction applications has attracted interest. Herein, we synthesized the ZnFe<sub>2</sub>O<sub>4</sub>/ZnO/Nb<sub>2</sub>O<sub>5</sub> heterojunction nanocomposite by varying the Nb<sub>2</sub>O<sub>5</sub> concentration from 0.03 to 0.07 mol% by the facile combustion method and analyzed its characteristics properties. Powdered X-ray diffraction (PXRD), spectrum from Fourier transform infrared (FT-IR), scanning electron microscopy (SEM), ultraviolet (UV) visible spectrophotometer, and Energy dispersive X-ray (EDX) analysis experimented to investigate the structure, optical properties, morphological nature and photodegradation performance of the heterojunction nanocomposites. PXRD was employed to investigate the composite's crystallinity formation. The morphology from the SEM image gives the flowed bud structure with confirmed crystallinity. The prepared ferrite as photocatalyst shows the degradation efficiency of 94 % for the crystal violet dye, as antimicrobial agent showed that the gram-negative bacterium pseudomonas had a better inhibitory zone around them and being as the electrode shows results as better capacitor and sensor.

## 1. Introduction

Presently the threats to the environment are the contaminants from dyes and their derivatives from industries like paper, dyeing, leather, and textiles. The main impacts on the ecosystem could be mainly due to disposals of either feebly metabolized or inadequate absorption of living creatures. These critical issues could be treated by various effective techniques like adsorption, photocatalysis, and biological treatment [1]. Photocatalytic degradation is an advancing method utilized for the production of effective radical species from the mineralization of organic materials [2].

In recent times, Semiconductor materials had extensive applications as photocatalysts for dye degradation and highly resolve the societal problems generated by these organic pollutants. The research analysis indicated that the semiconductors made of composites as photocatalysts become more popular because of their ability to reduce electron-hole

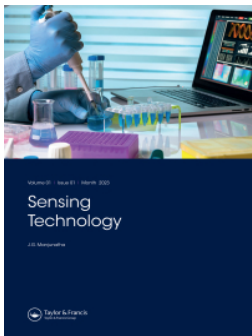
recombination and able to trigger the ratio of separation electrons generated by photolysis to improve the degradation efficiency. Hence the semiconductor composite photocatalyst can result in better activity than the ideal semiconductor photocatalyst [3,4].

Several metal oxide [5–10], and spinel materials [11] of modified structure have been developed to reach the goal of effective degradation. In this search, ZnFe<sub>2</sub>O<sub>4</sub> (ZFO) having a band gap of ~ ±2.2 eV can be a photocatalyst under visible light that can able to increase the charge carrier density while reducing the recombination of surface charge by absorbing photons which is in excess and catalytically progress the oxidation reaction superficially [12]. Metal oxides like ZnO and Nb<sub>2</sub>O<sub>5</sub> having band gaps ~ ±3.2 eV and ~ ±2.8 eV bandgap can be poor photocatalysts in visible and show results in UV light [13]. To make these metal oxides better photocatalysts in visible light they can be coupled as composite with ZnFe<sub>2</sub>O<sub>4</sub>. Crystal violet (CVt) or gentian violet is a protein cationic dye of deep purple color used mainly in textile,

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## Electrochemical-sensor, antimicrobial and Environmental Assessments of $\text{Bi}^{3+}:\text{Mg}_{(1-x)}\text{Zr}_x\text{O}_4$ NPs synthesized by bio-mediated combustion method

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