



# M.I.E.T. ENGINEERING COLLEGE

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## 1.3.3: Number of Students undertaking project work/field work/internship during last year

Dept: B.E. Electronics and Communication Engineering

Academic Year-2023-2024

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# **AUTOMATIC STREET LIGHT CONTROL SYSTEM AND FAULT DETECTION USING IOT**

**A PROJECT REPORT**

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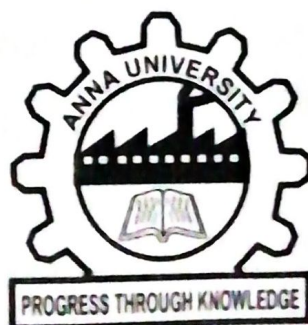
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**INTERNAL EXAMINER**



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## ABSTRACT

The IoT (Internet of Things) is a blooming technology that mainly concentrates on the interconnection of devices to one another and the people. The world is getting smarter these days, and people are drawn to the word "Smart". Given that India is one of the world's fastest-growing tech markets, we are incorporating a smart framework into the switch. The project's goal is to provide automatic control and fault detection for street light. The lights are switched ON/OFF automatically based on the intensity of sunlight using the LDR sensor. Automation helps to solve a variety of challenges in both the global economy and everyday life. The power supply which is supplied to the system is converted via Relay before supplying to the street lights. Here the system check's fault in the street light and also sends the alert message to the authorized mobile number through the GSM module. An object's motion is detected using an infrared sensor. According to the program, if there is any object comes near the IR sensor, the light will glow as bright. Otherwise, the light will glow as dim.

## CHAPTER 9

### CONCLUSION AND FUTURE ENHANCEMENT

#### 9.1 CONCLUSION

In conclusion, the implementation of automatic street light control systems with fault detection using IoT represents a significant advancement in urban infrastructure management. By leveraging IoT technologies, these systems offer a comprehensive solution for enhancing the efficiency, reliability, and safety of street lighting in urban environments.

Through the integration of sensors, micro-controllers, communication modules, and actuators, automatic street light control systems can dynamically adjust lighting levels based on environmental conditions, traffic patterns, and time of day. This capability not only optimizes energy usage and reduces light pollution but also improves visibility and safety for pedestrians and motorists.

Moreover, the incorporation of fault detection mechanisms allows for proactive monitoring of the street light infrastructure, enabling early detection and resolution of issues such as lamp failures, wiring faults, or power supply disruptions. By promptly identifying and addressing these issues, automatic street light control systems minimize downtime, reduce maintenance costs, and ensure the continued reliability of the lighting infrastructure. Furthermore, the remote monitoring and control capabilities enabled by IoT technologies provide administrators with real-time insights into the status and performance of the street light system. This remote access allows for proactive management,

troubleshooting, and optimization of the system, even from off-site locations, enhancing operational efficiency and responsiveness. Overall, automatic street light control systems with fault detection using IoT offer a smart and sustainable solution for urban lighting management. By combining advanced control algorithms, IoT connectivity, and fault detection mechanisms, these systems contribute to creating safer, more energy-efficient, and resilient urban environments for residents and communities alike. As cities continue to embrace smart technologies, the adoption of automatic street light control systems with fault detection using IoT is poised to play a crucial role in shaping the cities of the future.

## **9.2 FUTURE ENHANCEMENT**

Advanced Sensor Technologies:

- ◆ Integration of AI-enabled cameras for enhanced traffic monitoring and security surveillance.
- ◆ Use of environmental sensors for measuring air quality and noise levels

Robotic Maintenance and Autonomous Systems:

- ◆ Deployment of robotic maintenance units with AI and computer vision capabilities.
- ◆ Integration of autonomous vehicles for street light maintenance tasks

5G and Low-Latency Connectivity:

- ◆ Leveraging 5G for high-speed, low-latency communication between IoT devices and the control system.
- ◆ Vehicle-to-infrastructure communication for enhanced traffic management and safety.

# WIRELESS CHARGING FR ELECTRIC VEHICLES POWERED BY SOLAR PANEL

A PROJECT REPORT

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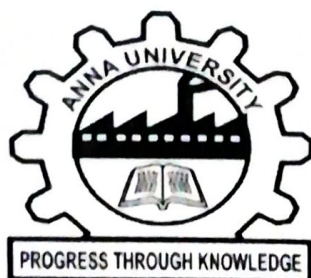
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## ABSTRACT

Electric vehicles are today's zero emission vehicular technology which is considered as the future of automotive industry. The batteries of the vehicles get charged in order to drive the vehicle. The methodology of charging the electric vehicle currently is through plug-in method where the charging station charges the battery of an electric vehicle. However, an alternative method for charging the battery of an electric vehicle is through Wireless Power Transfer where it can be as a Static or Dynamic charging systems. Static Charging System can be implemented to charge the batteries of the electric vehicles when the vehicle is parked in static mode. Dynamic Charging System can be implemented to charge when the vehicle is in motion. This method of wireless charging of electric vehicle is done through inductive power transfer where wireless transmission of power is achieved by mutual induction of magnetic field between transmitter and receiver coil. The state of the battery is monitored using Battery Management system (BMS). This technology attempts to review about the difference between plug-in and wireless charging of vehicle, operational principle of wireless charging, types of charging systems, static and dynamic wireless charging, application of dynamic charging system in future and drawbacks of wireless electric vehicle charging.

## CHAPTER - 8

### CONCLUSION AND FUTURE ENHANCEMENT

#### 8.1 CONCLUSION

Electric cars (EVs) are essential in the present when the environment has worsened so significantly. The government of plans to completely phase out diesel cars by the year 2030. Because waiting for an electric vehicle to charge is the biggest drawback to EV adoption, dynamic charging technology and charging stations are essential to the widespread acceptance of EVs. A renewable energy system is at the heart of the "solar-based wireless EV charging" initiative. This saved power is used to refuel EVs.

#### 8.2 FUTURE ENHANCEMENT

This can be improved to be intuitive to the customers, for example to reduce the time in charging station and good parking alignment. Future wireless charging systems may support higher power levels, enabling faster charging times and reducing the overall time required to replenish an EV's battery and increased overall charging efficiency.

  
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# AN ACCIDENT PREVENTION ZEBRA CROSSING

## A PROJECT REPORT

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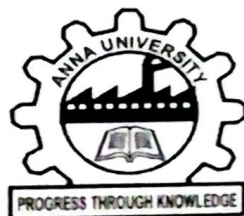
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## ABSTRACT

This report addresses the safety concerns associated with pedestrian crossings in urban areas, where heavy road traffic poses a threat to pedestrians. The primary objective is to reduce accidents occurring at these crossings, specifically caused by drivers disregarding traffic signals. The prevalent issue leading to pedestrian collisions is the unethical behavior of drivers who ignore signals, contributing to unsafe road crossings. To mitigate these risks, the proposed solution involves implementing automatic barriers for zebra crossings. These barriers would automatically elevate to facilitate pedestrian crossing and lower during vehicle traffic, creating a physical barrier to enhance safety. One effective approach to improving safety at pedestrian crossings is the incorporation of traffic signalization. By implementing signalized crossings, pedestrians are provided designated time intervals during signal phases, minimizing conflicts with vehicular traffic. This not only enhances pedestrian safety but also streamlines the flow of both pedestrians and vehicles. Furthermore, the research aims to explore additional measures and technologies that can complement the proposed automatic barriers and signalization. By combining these elements, the study seeks to create a holistic framework for pedestrian safety at crossings in urban environments, addressing both behavioral aspects of drivers and implementing technological innovations to ensure a secure and efficient system for pedestrians to traverse roadways safely. To overcome the difficulties of physically challenged people while zebra crossing by using conveyor for faster movement and safety concerns.

# CHAPTER 8

## CONCLUSION AND FUTURE ENHANCEMENT

### 8.1 CONCLUSION

The pedestrian safety ensured by implementing our concept. To avoid unethical behaviour of the driver who ignores the signal will be avoided by implementing the barriers. To overcome the difficulties of physically challenged people while zebra crossing by using conveyor for faster movement and safety concerns.

### 8.2 FUTURE ENHANCEMENT

- Including real-time data analytics and predictive maintenance.
- Investigate integration with smart city infrastructure for real-time communication with traffic management systems.
- Strengthen security measures with additional layers.
- Explore integration with energy management systems to optimize energy consumption.
- Design the system to be scalable for easy integration into fleet management solutions.

**SEED SOWING AND SPRAYING AGRICULTURE  
ROBOT USING APP CONTROL**

**A PROJECT REPORT**

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## ABSTRACT

To design the implementation of a prototype robot model, which can be utilized to sow seeds in agricultural fields are presented. In this design to cover the seeds sowed by the robot with sand, a metal plate is fixed at the rear side of the robot. As the robot moves forward, the rear side plate keeps covering the seeds. To control the valve on the seed tank feed line at a desired rate, DC motor is employed. With the help of the control algorithm developed for the seed sowing robot, seed sowing depth and number of seeds per position can be altered as per the need of the user. This robot can manage to plant the seeds up to 2–5 cm depth. Bluetooth module attached to the microcontroller unit establishes communication of control signals between the robot and a smart mobile phone. Different tasks of the robot are controlled by an Android application installed on a smart phone. A mechanical device that helps in sowing operation and controlled using Bluetooth has been developed. This project is focused on an agriculture seed sowing and fertilizer spraying process using a android application. The integral construction of the robot is made simple to use. Recently in agriculture, the required manpower is not available as well as the aging farmer and increasing world population are causing a threat to the future. This project focuses on developing the m robot to minimize the working cost and increase the accuracy of seed planting. Agriculture has been the backbone of the Indian economy and it'll still remain so for an extended time. Today the environmental influence of agricultural production is extremely much focused and therefore the demands to the industry are increasing. In the present scenario, most of the cities in India do not have sufficient skilled man power in agricultural sector and that affects the progress of developing country. Therefore, farmers have to use upgraded technology for cultivation activity.

## CHAPTER VII

### CONCLUSION & FUTURE SCOPES

The project "seed sowing and spraying agriculture robot using app control" is a testament to the power of pre-planning and strategic design. By meticulously laying out our objectives and methodologies in advance, we've crafted a solution that not only addresses the needs of modern agriculture but also offers unprecedented flexibility in its operation.

Through innovative design and thoughtful engineering, we've developed a solution that is not only highly desirable but also incredibly economical. By leveraging the latest advancements in robotics and app control technology, we've created a system that streamlines the process of seed sowing and spraying in agricultural settings, as well as in homes and other environments..

In conclusion, the "seed sowing and spraying agriculture robot using app control" project represents a triumph of innovation, collaboration, and perseverance. By harnessing the power of technology and strategic planning, we've created a solution that promises to make a meaningful impact in the world of agriculture and beyond.

The future implementation of the "seed sowing and spraying agriculture robot using app control" project could involve several advancements and enhancements to further improve its effectiveness and efficiency. Here are some potential future implementations:

#### FUTURE SCOPES

- We can develop the robot by adding sensors to check the temperature of the soil, moisture of the soil, etc.
- We can also develop the control gesture of the robot via Artificial intelligence.
- The energy used by the robot can be renewable by charging the battery via solar panels.
- The robot can be developed to operate automatically without human control, just by feeding commands only one.
- Expand the capabilities of the robot to perform multi - tasks like soil cultivation, harvesting and crop monitoring, etc.

# SMART GLOVE FOR DEAF AND MUTE PEOPLE

## A PROJECT REPORT

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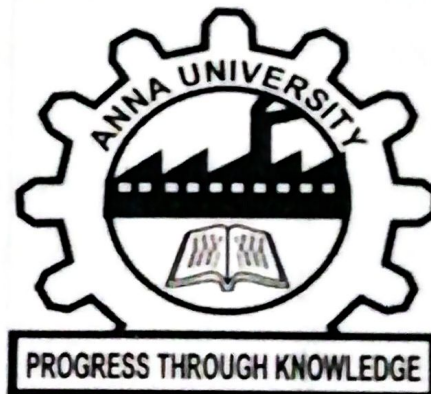
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13/5/24

**INTERNAL EXAMINER**



13/5/24

**EXTERNAL EXAMINER**

## ABSTRACT

Communication is an important tool to share and express our inner feeling via speech and it is easy for normal people but it is difficult for deaf and mute community. In recent years, technological advancements have provided promising solution to bridge this gap. One such innovation is the development of smart glove tailored specifically for the deaf and mute population. The smart glove incorporates an array of sensor and actuators coupled with sophisticated machine learning algorithms to translate sign language gesture into spoken language or text in real-time. Smart glove includes its ergonomic design for comfort and ease of use, wireless connectivity for versatile application, and adaptive learning capabilities to enhance accuracy and efficiency over time. Through a combination of hardware innovation and software intelligence, the Smart Glove represents a significant advancement in assistive technology, empowering deaf and mute individuals to communicate more effectively and participate fully in social interactions, education, and professional environments society. By providing a portable, intuitive, and efficient means of communication, this project aims to empower deaf and mute individuals to engage more fully in social interactions, education and professional settings, ultimately promoting in accessibility for all.

## CHAPTER-9

### CONCLUSION AND FUTURE WORK

#### 9.1 CONCLUSION

In conclusion, the development of a smart glove designed specifically for deaf and mute individual holds immense promise in revolutionizing communication accessibility and inclusivity. By harnessing advanced technology such as sensors, machine learning algorithms, and this innovative device has the potential to break down barriers faced by the deaf and mute community in everyday interactions. The ability to translate sign language gestures into text or speech in real-time not only facilitates communication with non-signers but also fosters greater independence and confidence among users. Furthermore, the integration of connectivity options enables seamless integration with other devices, expanding its utility and impact. Ultimately, the smart glove represents a significant step towards creating a more inclusive society where individuals of all abilities can fully participate and engage in various aspects of life without limitation.

Sign language is one of the useful tools to ease the communication between the deaf and mute communities and normal society. Though sign language can be implemented to communicate, the target person must have an idea of the sign language which is not possible always. Hence our project lowers such barriers. The glove is capable of translating their sign language gestures into speech through android phone. Smart glove focuses the translation of gestures of the alphabets. Comparing with other approaches, smart glove uses Principle Component Analysis to classify the real time input data for feature extraction. Disabled use these gloves to convert sign performed by them into speech and text. This paper is a useful tool for speech impaired and partially paralyzed patients which fill the communication gap between patients, doctors and relatives.

# **AUTOMATED WASTE DISPOSAL SYSTEM WITH METAL DETECTION AND OVERFLOW ALERTS**

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**INTERNAL EXAMINER**



**EXTERNAL EXAMINER**

ii



## ABSTRACT

The non-metal smart dustbin operates through a sophisticated network of sensors and a servo motor, all controlled by an Arduino Nano. Initially, an inductive proximity sensor is employed to detect the presence of metal objects near the bin. If a metal object is sensed, the servo motor remains closed, indicating that the bin is not yet available for trash disposal. Conversely, when the proximity sensor fails to detect any metal, the servo motor opens, signaling that the bin is accessible. To enhance its functionality, the system incorporates an ultrasonic sensor, which specializes in identifying non-metallic objects nearby. Upon detecting a non-metal object in proximity to the bin, the ultrasonic sensor communicates with the Arduino Nano. Subsequently, the Nano commands the servo motor to open, enabling convenient disposal of non-metal waste. Through the seamless integration of these sensors and motor control mechanisms, the non-metal smart dustbin offers an efficient solution for waste disposal. The Arduino Nano serves as the brain of the system, orchestrating actions based on sensor inputs. This intelligent system not only simplifies the process of trash disposal but also promotes effective segregation of different waste types, thus contributing to environmental sustainability.

## CHAPTER-7

### CONCLUSION AND FUTURE ENHANCEMENT

#### 7.1 CONCLUSION

The system described is a non-metal smart dustbin prototype utilizing an Arduino Nano microcontroller, inductive proximity sensor, servo motor, and ultrasonic sensor. The inductive proximity sensor is designed to detect metal objects within its range, triggering the servo motor to keep the dustbin closed when metal objects are sensed. Conversely, when no metal object is detected, the servo motor opens the dustbin lid. However, to address the limitation of the inductive sensor in detecting non-metal objects, an ultrasonic sensor is incorporated. This sensor identifies objects in close proximity to the dustbin, regardless of their material composition. When a non-metal object is detected, the servo motor opens the dustbin lid accordingly. This integration of sensors and actuators enables the dustbin to automatically respond to the presence of objects, enhancing its functionality and user convenience. Through this setup, the prototype demonstrates a rudimentary yet effective mechanism for a smart dustbin capable of discerning between metal and non-metal objects, providing a glimpse into the potential of automated waste management systems.

#### 7.2 FUTURE ENHANCEMENT

The integration of an inductive proximity sensor, servo motor, and ultrasonic sensor into an Arduino Nano-based smart dustbin represents a significant advancement in waste management technology. While the current implementation effectively sorts and disposes of non-metal waste, there are several avenues for future work and enhancements to further improve the functionality and versatility of the system.

**WUSN BASED SOIL DATA COMMUNICATION FOR RESCUE AND HEALTH  
MONITORING OF TUNNEL AND MINING WORKING PEOPLE**

**A PROJECT REPORT**

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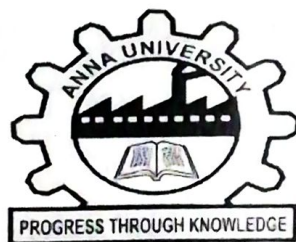
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**ANNA UNIVERSITY : CHENNAI 600 025**



MAY 2024

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**BONAFIDE CERTIFICATE**


This is to certify that the project report titled “WUSN BASED SOIL DATA COMMUNICATION FOR RESCUE AND HEALTH MONITORING OF TUNNEL AND MINING WORKING PEOPLE” is the Bonafide work of ABDUL FATTAH.S (812420106001), DHINESH BHARATHI.M.K(812420106006), GUHAN.S(812420106304), PRAVEEN KUMAR.K (812420106023)who carried out the project work under my supervision.

  
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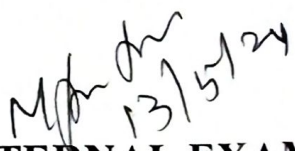
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## ABSTRACT

The abstract for a Wireless Underground Sensor Network (WUSN) based soil data communication system for rescue and health monitoring of tunnel and mining working people would encapsulate the key components and objectives of the study. It would highlight the innovation, significance, and potential impact of the proposed system. This study presents a novel approach utilizing Wireless Underground Sensor Network (WUSN) technology for real-time soil data communication aimed at enhancing rescue operations and health monitoring for individuals working in tunnel and mining environments. Traditional monitoring systems often face challenges in underground settings due to limited connectivity and accessibility. Leveraging WUSN, our proposed system establishes a robust communication network within the soil, enabling seamless transmission of critical data such as air quality, temperature, and structural integrity. By deploying miniature sensors strategically throughout the underground infrastructure, our system enables continuous monitoring of environmental conditions and physiological parameters of workers. Furthermore, the data collected is relayed to a central control unit on the surface, facilitating prompt response in case of emergencies and ensuring timely intervention for health-related issues. This research contributes to the advancement of underground safety protocols by harnessing cutting-edge WUSN technology, ultimately fostering a safer working environment and enhancing the overall well-being of tunnel and mining workers.

## CONCLUSION

In conclusion, the project presents a novel approach to data transmission in underground environments by leveraging transmitter sources. Additionally, the system incorporates GPS tracking functionality to safeguard mineworkers and prevent inadvertent crossing of maritime boundaries.

By enabling the transmission and reception of emergency messages through water in critical situations, the proposed system is poised to enhance the effectiveness and dependability of communication in underground settings.

Through these advancements, the project aims to bolster safety measures and streamline communication protocols for mineworkers, ultimately improving operational efficiency and ensuring their well-being at sea. In conclusion, the development of a WUSN (Wireless Underground Sensor Network) based soil data communication system represents a significant stride towards enhancing safety protocols and improving the well-being of tunneling and mining working people.

By harnessing cutting-edge sensor technology embedded within the soil, this innovative system enables real-time monitoring of critical environmental parameters and worker health indicators.

The integration of sensors such as GPS for location tracking, respiratory sensors for monitoring breathing patterns, heart rate monitors for cardiovascular health assessment, and other relevant sensors creates a comprehensive monitoring network tailored to the unique challenges of underground environments.

This integrated approach not only enhances the ability to detect and respond to emergencies promptly but also enables proactive health management to prevent potential hazards before they escalate.

# ONLINE EXAMINATION SYSTEM FOR VISUALLY CHALLENGED PEOPLE

A PROJECT REPORT

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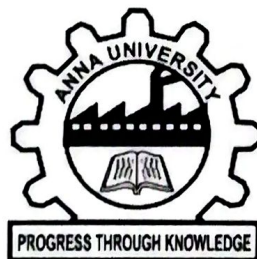
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## ABSTRACT

Voice-based systems allow users access to information on the internet over a voice interface. Prior studies on examination systems that make use of voice interface do not sufficiently exhibit intelligent form of assessment, which diminishes the rigor of examination. The objective of the system is to improve on the achievements of previous studies by providing a framework that will guide the development of a voice-based examination like government exams like TNPSC Group II, Group IV here we develop the project for blind students who all are interested to participate the examination, so that case expert system for the visually impaired students in that means the questions are ready by the language as they selected in the examination portal site. So, the question will be on read mode, the read mode will enhance the speech so that questions will be read and the options will also give in the read mode so they can easily understand the question and options they will answer it manner way. The study employs a combination of technologies such as system design, server-side scripting, voice-based system development, data management and rule-based reasoning in developing the system. The findings show that the voice-based examination system will not only be of immense benefit to the visually impaired students in respective of distance, but will also complement the existing web-based method for online examination.

## CHAPTER 8

# CONCLUSION AND FUTURE ENHANCEMENT

### 8.1 CONCLUSION

The proposed system is developed to conduct an Online Examination using voice which will be helpful for people who don't want to use keyboard for interaction with the system. The proposed method will help for voice recognition where we take voice as input through microphone and then register for online examination using the concept of Key generation. The system will analysis the voice based examinations like government exams TNPSC exam, UPSC exam, the online tests will be provided by the voice recognition along with perspective with add subjects and add and view the subjects details, with MP3 and ogg format . The questions and the answers will given like an options. So it will be develop the regular systems with online voice based examination.

### 8.2 FUTURE ENHANCEMENT

In this paper, an e-examination voice interface for the visually impaired learners in ODL has been provided. The developed system was realized using a framework, system design with pseudocode dialogue sequence and algorithm. A usability evaluation of the system was also conducted. The voice-based examination system would improve the accessibility of examination in distance learning for learners with visual impairment, as well as other able-bodied learners.

# ENHANCED HOSPITAL ELECTRIC APPLIANCES CONTROL VIA GESTURE

A PROJECT REPORT

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## ABSTRACT

To address critical hygiene challenges encountered in hospital environments, this project introduces an innovative contactless appliance control system operated via hand gestures. Recognizing the paramount importance of maintaining cleanliness in healthcare settings, the primary objective is to equip healthcare professionals with an efficient, hands-free method to manage various electric appliances. Leveraging cutting-edge technologies such as Node MCU ESP8266 and Gesture sensors, the system allows for the seamless control of multiple appliances through intuitive hand movements. By minimizing the need for physical contact, this innovative solution not only elevates hygiene standards within hospitals but also contributes to fostering a safer and more adaptable healthcare environment. Through the elimination of direct touch interactions, the system offers a novel approach to enhancing cleanliness protocols while simultaneously empowering healthcare workers with greater flexibility and convenience in their daily tasks.

## CHAPTER 7

### CONCLUSION

The gesture-based control system for hospital electric appliances represents a culmination of cutting-edge technology tailored specifically to the demands of healthcare settings. Its success lies not only in its ability to recognize hand gestures effectively but also in its seamless integration with NodeMCU and OLED display technology, resulting in a user-friendly, hygienic, and highly efficient solution.

What truly sets this system apart is its capacity to provide real-time feedback and facilitate remote access, features that greatly enhance the convenience and safety of healthcare professionals. By eliminating the need for direct physical contact with appliances, the system reduces the risk of contamination, a critical consideration in healthcare environments where infection control is paramount.

Moreover, the system's potential for further refinement holds significant promise. As it continues to evolve, incorporating advancements in gesture recognition technology and interface design, its impact on hospital operations and patient care could be transformative. Imagine a future where healthcare professionals can seamlessly control appliances with intuitive hand gestures, freeing up valuable time and minimizing disruptions in their workflow.

Ultimately, this innovative system has the potential to become a standard feature in modern hospitals, reshaping the way appliance control is approached and setting a new standard for operational efficiency and patient safety. By leveraging the power of gesture-based interaction, it not only streamlines processes but also enhances the overall healthcare experience for both providers and patients, marking a significant step forward in the evolution of hospital technology.

**INTELLIGENT EMERGENCY RESPONSE  
INTEGRATION WITH AUTONOMOUS ASSISTANCE  
ROBOT FOR HOSPITAL**

**A PROJECT REPORT**

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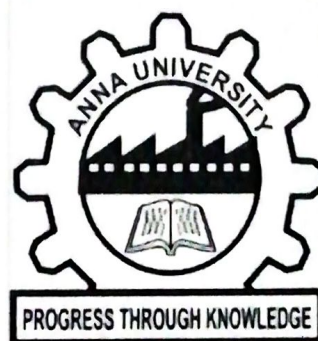
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## ABSTRACT

Nowadays, the robotics industry is rapidly advancing worldwide. The demand for robots in the medical sector is steadily increasing due to the rise in the number of patients being admitted to hospitals every day. Consequently, there is a shortage of manpower in hospital services compared to the influx of patients, prompting the need for robotic assistance. Various types of robots are now available for use in the medical field. It needs to enhance the efficiency of the autonomous navigation of the robot and Efficient intrahospital logistics play a crucial role in ensuring the timely delivery of medical equipment, tools, and medicine between wards. In this project, we introduce an autonomous medical assistive robot designed for the medical field, aiming to enhance contactless and autonomous navigation in an efficient manner by using ROS2 with nav2 algorithms. Additionally, we designed a smart emergency reaction system that is integrated into the robot. During the carrying process, if the robot causes any power failures or any unexpected events occur, then our emergency system will send an emergency message using GPS and GSM technology that message contains the current coordination of the robot to the hospital authority about the status of the robot. Further, we are adding fingerprint-based storage system, to ensure secure handling of sensitive medical supplies. The integration of these features aims to revolutionize the healthcare sector by improving efficiency, reducing human error, and ensuring timely response to emergencies.

### **Fig.6.2.1.3 SFLSS APPLICATION**

#### **CHAPTER 7**

#### **CONCLUSION**

The successful implementation of this project exemplifies the transformative potential of robotics technology within healthcare settings, ushering in a new era of efficiency and innovation. By seamlessly integrating advanced hardware components and intelligent software algorithms, our autonomous medical transport robot demonstrates unparalleled capabilities in navigating hospital environments, securing vital medical supplies, and responding promptly to emergencies. This groundbreaking achievement not only streamlines logistical operations but also revolutionizes the way healthcare institutions deliver care and manage resources.

A cornerstone of this project's success lies in the development of a sophisticated fingerprint-based smart storage system, which ensures secure and efficient management of medical supplies. This innovative solution enhances accessibility while maintaining stringent security protocols, contributing to seamless workflow management within hospitals. Moreover, real-time communication capabilities enable swift coordination and response to emergent situations, optimizing patient care and operational efficiency.

Beyond its core functionalities, the project underscores a commitment to maintaining hygiene standards and ensuring patient safety. Through meticulous attention to detail and adherence to best practices, our solution prioritizes infection control and promotes a safe healthcare environment for patients and staff alike.