ALCOHOL SENSING ALERT SYSTEM WITH ENGINE LOCKING MECHANISM FOR SAFER ROADS

INDUSTRY ORIENTED MINI PROJECT REPORT

BACHELOR OF TECHNOLOGY
IN
INFORMATION TECHNOLOGY
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CERTIFICATE

Date:

This is to certify that the minor project work entitled "**ALCOHOL SENSING ALERT SYSTEM WITH ENGINE LOCKING MECHANISM FOR SAFER ROADS**" is a bonafide work carried out **by J.NITHIN - 20JJ1A1218, R.SAGAR - 21JJ5A1210, CH.AKASH - 20JJ1A1210, U.AKHIL KUMAR - 20JJ1A1252**, respectively in partial fulfillment of the requirements for the degree of **BACHELOR OF TECHNOLOGY** in **INFORMATION TECHNOLOGY** at **Jawaharlal Nehru Technology University Hyderabad University College Of Engineering Jagtial** during the academic year 2023-24.

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DECLARATION

We hereby declare that the major project titled **"ALCOHOL SENSING ALERT SYSTEM WITH ENGINE LOCKING MECHANISM FOR SAFER ROADS**" has been undertaken by our team and this work has been submitted to **JNTUH University College of Engineering Jagtial**, Nachupally, Kondagattu, Jagtial(Dist).,in partial fulfillment of the requirement for the award of degree **Bachelor of Technology in Information Technology.**

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ABSTRACT

This project endeavors to create an innovative Alcohol Sensing Alert System with an integrated Engine Locking Mechanism (ALSELM) to significantly reduce the incidence of drunk driving and enhance road safety. Drunk driving remains a severe public safety concern, necessitating the development of proactive and technologically advanced solutions.

The Alcohol Sensing Alert System with Engine Locking Mechanism utilizes state-of-the-art alcohol sensors and biometric technology to accurately detect alcohol levels in the driver's system. Upon detecting alcohol above the legal limit, the system triggers an immediate alert, notifying the driver and relevant authorities. Simultaneously, the engine locking mechanism is activated, preventing the vehicle from starting or continuing to operate until the driver's sobriety is confirmed.

This project represents a critical step towards mitigating the risks posed by impaired driving, safeguarding lives, and promoting responsible behavior on the roads. The integration of cutting-edge technology with stringent safety measures promises to make our roadways safer for all.

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INTRODUCTION

The Alcohol Sensing Alert System with Engine Locking Mechanism is an IoT project designed to enhance road safety by preventing individuals under the influence of alcohol from driving. Using sensors to detect alcohol levels, the system triggers an alert and, if necessary, automatically locks the vehicle's engine. This technology aims to reduce the risk of accidents caused by impaired driving, promoting safer roads and responsible behavior.

This project introduces a multi-faceted approach to tackling impaired driving, combining hardware components like precise alcohol sensors with software logic to interpret and respond to alcohol levels effectively. The user interface is designed to be intuitive, offering seamless interaction for drivers, while the engine locking mechanism adds a crucial layer of safety.

Additionally, the system's integration with IOT enables remote monitoring, allowing authorities or designated contacts to receive alerts and respond promptly. The emphasis on compliance with legal standards, thorough testing, and ongoing data analytics ensures the reliability and continuous improvement of the system. Overall, this Alcohol Sensing Alert System with Engine Locking Mechanism stands as a technological solution poised to significantly enhance road safety and contribute to a safer driving culture.

The system incorporates advanced alcohol sensors, typically based on breath or touch detection, ensuring accurate readings. When elevated alcohol levels are detected, a real-time alert is sent to both the driver and a designated contact, providing immediate notification of the situation.

The engine locking mechanism adds an extra layer of safety. If the alcohol levels surpass a predetermined threshold, the system disables the vehicle's engine, preventing the impaired individual from driving. This proactive approach helps mitigate potential accidents and promotes a safer driving environment.

Moreover, the project can be integrated with IOT platforms, allowing for remote monitoring and data analytics. This enables authorities or concerned parties to track alcohol-related incidents, analyze patterns, and take preventive measures. Overall, the Alcohol Sensing Alert System contributes to a more responsible and secure road ecosystem.

1.1 Motivation

The motivation behind the Alcohol Sensing Alert System with Engine Locking Mechanism for Safer Roads IoT project stems from the critical need to address the persistent issue of impaired driving and its detrimental impact on road safety. Here are key motivations:

1**. Reduce Impaired Driving Incidents**:

- Impaired driving, often due to alcohol consumption, remains a leading cause of accidents globally. The project is driven by the motivation to significantly reduce incidents related to driving under the influence.

2. **Prevent Accidents and Save Lives**:

- Impaired driving poses a severe risk to the lives of both the driver and others on the road.

3. **Promote Responsible Behavior**:
- By integrating an alcohol sensing system with an engine locking mechanism, the project seeks to encourage responsible behavior among drivers, discouraging them from getting behind the wheel while under the influence.

4. **Utilize IOT Technology for Safety**:
- Leveraging IOT technology allows for real-time monitoring and immediate response to potential dangers. The motivation is to harness these technological advancements to enhance road safety and minimize the impact of impaired driving.

5. **Support Legal and Regulatory Efforts**:
- The project aligns with legal and regulatory efforts to curb impaired driving. It provides a proactive approach to enforcing alcohol-related driving restrictions and contributes to the overall improvement of road safety standards.

6. **Community and Stakeholder Welfare**:
- Enhancing road safety benefits the entire community and stakeholders, including law enforcement, emergency services, and healthcare providers. The project is motivated by a commitment to the well-being of these groups.

1.2 PROJECT OVERVIEW AND OBJECTIVES:

The objectives of the Alcohol Sensing Alert System with Engine Locking Mechanism for Safer Roads IOT project include:

1. **Impaired Driving Prevention**:
- Develop a reliable alcohol sensing mechanism to accurately detect alcohol levels in individuals.

2. **Real-time Alerts**:
- Implement a system for immediate notification to both the driver and a designated contact when elevated alcohol levels are detected.

3. **Engine Locking Mechanism**:
- Integrate a secure engine locking mechanism to prevent the vehicle from being driven if alcohol levels surpass a predefined threshold.

4. **User-Friendly Interface**:
- Design an intuitive and user-friendly interface for drivers to interact with the system, ensuring ease of use and understanding.

5. **IOT Connectivity**:
- Incorporate IoT connectivity for remote monitoring, enabling real-time data transmission and alert notifications to relevant authorities.

6. **Data Analytics and Reporting**:
- Implement features for data analytics, allowing for the analysis of alcohol-related incidents, patterns, and

.

7. **Compliance with Regulations**:
   - Ensure that the system complies with relevant legal and safety regulations, taking into account different jurisdictions and standards.

8. **Scalability and Compatibility**:
   - Design the system to be scalable and compatible with a variety of vehicles and IoT platforms to facilitate widespread adoption.

By addressing these objectives, the Alcohol Sensing Alert System aims to significantly contribute to the reduction of alcohol-related accidents and enhance road safety.

1.3 FLOW OF WORK

The Alcohol Sensing Alert System with Engine Locking Mechanism for Safer Roads begins with a clear definition of project scope and objectives, outlining targeted alcohol detection levels and engine-locking mechanisms. Hardware integration involves selecting appropriate sensors, like breath or touch-based options, and linking them to a microcontroller for data processing. The system design incorporates a user-friendly interface and integrates an engine locking mechanism with the vehicle's control system. Software development encompasses programming logic for alcohol level interpretation, real-time alert systems, and IoT connectivity. Testing and calibration ensure sensor accuracy and system reliability.

User education involves creating manuals and conducting training sessions. Legal compliance is addressed, followed by deployment in vehicles and ongoing monitoring with remote capabilities. Data analytics tools are implemented for incident analysis and reporting, contributing to continuous improvement. Public awareness campaigns aim to inform the public about the system's benefits and encourage responsible driving practices. Through this systematic workflow, the project endeavors to create a robust solution for curbing impaired driving and enhancing road safety.

The development process for the Alcohol Sensing Alert System with Engine Locking Mechanism for Safer Roads follows a systematic and well-organized flow of work. It begins with project initiation, where the scope and objectives are clearly defined, and a multidisciplinary team is assembled. Research and requirements gathering phase involves selecting appropriate alcohol sensors and collecting specifications for both the engine locking mechanism and user interface. Subsequently, the hardware integration phase integrates the chosen sensors with a microcontroller, while the system design phase focuses on creating an intuitive user interface and architecting the integration of the engine locking mechanism. Software development encompasses writing code for data interpretation and real-time alert systems.

The project also involves establishing IOT connectivity for remote monitoring and data transmission. Thorough testing and calibration ensure the reliability of the system, while user education and training sessions facilitate proper interaction. Legal compliance measures are implemented, and the system is deployed in vehicles, followed by continuous monitoring and maintenance.

CHAPTER-2

SYSTEM REQUIREMENTS

2.1 Hardware Requirements:

1.**Arduino Board**: The Arduino board serves as the central hub of the LiFi system, coordinating the modulation and demodulation processes crucial for data transmission.

2.**Relay Module**: The Relay module plays major role in this project ,this module consists of switching mechanism in order to switch the circuits that are connected to it according to code.

3.**Screen**: The screen serves as the visual interface, displaying the results and messages calculated by the Arduino, providing valuable feedback to the user.

4.**Breadboard and Connecting Wires**: The breadboard and connecting wires facilitate the prototyping and connection of the LiFi circuit, allowing for a systematic and organized layout of components.

5.**MQ3 Sensor**: This sensor sense the alcohol percentage and gives the analog and also digital output by taking vcc as input for power source.

6.**Buzzer**: The buzzer is used to give the sound according to given code .This buzzer should be connected to arduino board with ground and vcc ports.

7.**Motor:** This motor is used to rotate the wheel that we are assuming as car engine so motor also have two terminals.

2.2 Software Requirements:

The software requirements are as follows:

- Arduino IDE for programming the Arduino micro-control

CHAPTER-3

SYSTEM DESIGN

The Alcohol Detection with Engine Locking system helps to reduce accidents which are occurring due to drunk driving. MQ-3 sensor detects the presence of alcohol in the surroundings. The sensor provides output on the basis of the concentration of the alcohol, if the alcohol concentration is higher the conductivity of MQ-3 sensor increases which in turn gives the reading to ARDUINO.When the reading is above the alcohol limit the motor will stop working and buzzer will ON,if the reading is below the alcohol limit the motor will start and buzzer will OFF.

CHAPTER 4

SOURCE CODE

4.1 Implementation steps:

The implementation of this System involves translating the circuit design and theoretical concepts into a functional and executable system. Here's a step-by-step guide on how to implement the model.

Code:

```
#include<Servo.h>
const int relayPin = 3;   // Relay control pin
const int buzzerPin = 4;  // Buzzer control pin
const int sensorPin = A0; // MQ3 sensor analog pin
const int alcoholThreshold = 150;
void setup() {
  pinMode(relayPin, OUTPUT);
  pinMode(buzzerPin, OUTPUT);
  pinMode(sensorPin, INPUT);
}

void loop() {

  // Read alcohol level from MQ3 sensor

 int alcoholLevel = analogRead(sensorPin);

  // Check if alcohol level is above the threshold

 if (alcoholLevel > alcoholThreshold) {

    // Turn off relay (and motor) and activate the buzzer to alert

  digitalWrite(relayPin, LOW);
  digitalWrite(buzzerPin, HIGH);
  delay(1000); // Buzzer on for 1 second
  digitalWrite(buzzerPin, LOW);
  } else {

 digitalWrite(relayPin, HIGH);  // Activate relay (and motor) based on your specific conditions }
 // Add a delay to prevent rapid readings
  delay(10);
}
```

CHAPTER-5

WORKING MODEL

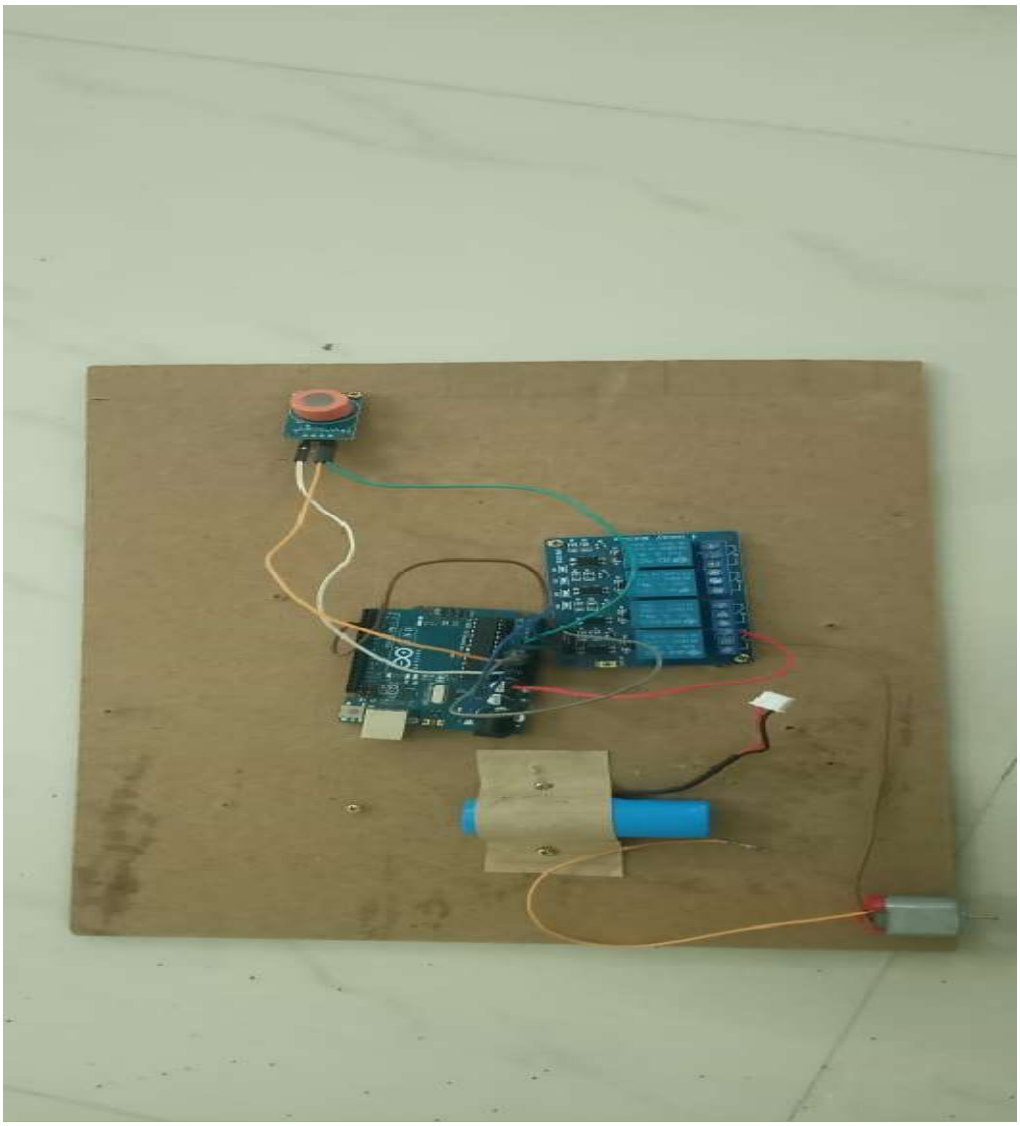

Figure 5.1 working model of Alcohol detection and engine locking system

CHAPTER-6

CONCLUSION

6.1 Conclusion

In conclusion, the Alcohol Sensing Alert System with Engine Locking Mechanism for Safer Roads represents a critical advancement in leveraging IoT technology to address the pervasive issue of impaired driving and enhance overall road safety. By integrating high-precision alcohol sensors, a user-friendly interface, and an engine locking mechanism, the system provides a proactive solution to prevent accidents caused by impaired driving. The real-time alert system and remote monitoring capabilities contribute to swift responses in emergency situations, further mitigating potential risks. The project's commitment to legal compliance, comprehensive testing, and continuous improvement through data analytics reflects a dedication to creating a reliable and effective solution. Moreover, user education initiatives and public awareness campaigns underscore the system's broader impact on fostering responsible driving behavior. As the project aligns with regulatory standards and societal goals, it stands as a testament to the potential of technology to significantly contribute to safer roads and the well-being of communities.

CHAPTER-7

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