

# Intelligent Alcohol Detection and Engine Immobilization System with GPS Accurate Accident Tracker

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**Abstract-** This paper proposes a comprehensive vehicle safety system that includes alcohol detection, engine immobilization, and accident scene detection functions. The increasing number of accidents caused by drunk driving has raised serious concerns about driver safety. To address this issue, we have integrated an alcohol detection and engine lock system that prevents the vehicle from starting if the driver is intoxicated. Furthermore, to address the problem of identifying accident locations, we have introduced an accident scene detection function that uses sensors to detect signals indicating an accident. The Arduino microcontroller processes these signals and sends an alert message with location information to family members or the police through a GSM modem. Using GPS modem technology, family members and law enforcement officials can then immediately track the driver's location and provide assistance as necessary. This proposed system has the potential to significantly reduce the number of alcohol-related accidents and improve driver safety.

**Index Terms-** Arduino NANO, MQ-3 Sensor, Buzzer, LED, SIM900A, DC Motor

## I. INTRODUCTION

The current situation shows that the majority of road accidents are caused by drink-driving. Drivers who drink alcohol are in an unstable condition, so rushed driving occurs on roads, which is dangerous to the lives of people on the road, including the driver. The degree of dangerous driving exceeds the limit. Indian laws currently prohibit drivers from driving while intoxicated, so fines may deter them from driving while intoxicated. Yet effectively spotting drunk drivers can be a challenge for police and road safety officials because citizens are inherently incapable of existing as a state between the same domicile and the same time. This limited ability of law enforcement officers undermines all human efforts to target extreme drunk driving. Therefore, there is a need for an alcohol detection system which is not limited in space and time. The purpose of the accident detection system is to know where the vehicle is and to locate the vehicle by sending messages using the system, which is placed in the vehicle system. Most of the time, we cannot find where the accident happened because we don't know where the accident will happen. When the vehicle experiences an immediate crash, the sensor detects the signal and sends it to the Arduino microcontroller. The microcontroller sends a warning message (including location) to the police station or rescue team via a GSM modem. So the police or family members can track the location via GPS modem as soon as they receive the information

## II. LITERATURE SURVEY

- A. The proposed alcohol detection technology that uses GPS and GSM technology can be costly, but it can also be cost-effective in the long run by saving lives and preventing accidents caused by drunk driving. However, in this project, an alternative solution is proposed to address the issue of drunk driving. Instead of using expensive GPS and GSM technology, a siren is used as an economical option to alert nearby individuals of the situation. The siren is an effective means of alerting individuals to the presence of an intoxicated driver and can help prevent accidents caused by drunk driving. [1]
- B. The author recommends the use of a smart helmet to prevent accidents. However, there are certain limitations associated with this approach. Firstly, the use of a smart helmet is limited to two-wheelers only. Secondly, the implementation of smart helmets involves the use of microcontrollers, which are complex software systems that can be more expensive compared to cheaper and open-source hardware options like sirens. Therefore, while smart helmets can be effective in reducing the number of accidents, there are certain limitations and costs associated with their implementation. [2]
- C. The authors discuss the use of composite health monitoring and infrared sensors to detect alcohol. However, one of the limitations of this system is the risk of false positives. Even small changes in some cases can lead to false positives, which can be a concern for the reliability of the system. Nonetheless, by using this technique in our project, we can make it more realistic and effective in detecting alcohol. While the risk of false positives cannot be completely avoided, we can take steps to minimize them and improve the accuracy of the system. [3]
- D. To prevent drunk driving accidents, the author proposed using a PIC16F877A single-chip microcomputer. However, this system has some limitations. Firstly, it is an outdated and expensive option, which can make it less accessible to certain social classes. On the other hand, the Arduino Nano we use in our project is an advanced and economical option, which can make it more accessible to a wider range of individuals. By using the Arduino Nano, we can create a cost-effective solution to prevent drunk driving accidents. [4]

- E. The author proposed a system to alleviate the problem of drunk driving, which involves the use of the MQ2 alcohol sensor. However, one of the limitations of this sensor is that it is not very authentic and can increase the risk of false positives. In our project, we use the highly authentic MQ3 alcohol sensor, which helps us improve the accuracy of the system. By using a more reliable sensor, we can create a more effective solution to prevent drunk driving accidents. [5]
- F. The author proposed a complex system to deal with both headset neglect and alcohol detection, which involves the use of the P89V57RD2 microcontroller. However, this system is expensive and not suitable for vehicles with only two wheels. On the other hand, the Arduino Nano microcontroller is a more economical and versatile option that can be used with any class of vehicle. By using the Arduino Nano, we can create a more authentic and efficient solution to prevent accidents caused by both headset neglect and drunk driving. [6]

### III. METHODOLOGY

Alcohol detection with engine immobilizer helps reduce accidents caused by drink-driving. The MQ-3 sensor detects the presence of alcohol in the environment. The sensor provides an output based on the alcohol concentration, if the alcohol concentration is high, the conductivity of the MQ-3 sensor increases, providing the reading to the ARDUINO. If the reading is above the threshold level, the ARDUINO stops the DC motor and activates the buzzer. In the event of an accident, send a warning message to the family or to the police by GSM, so that the exact location of the vehicle can be found by GPS, and the necessary procedures can be carried out to rescue the people at risk.

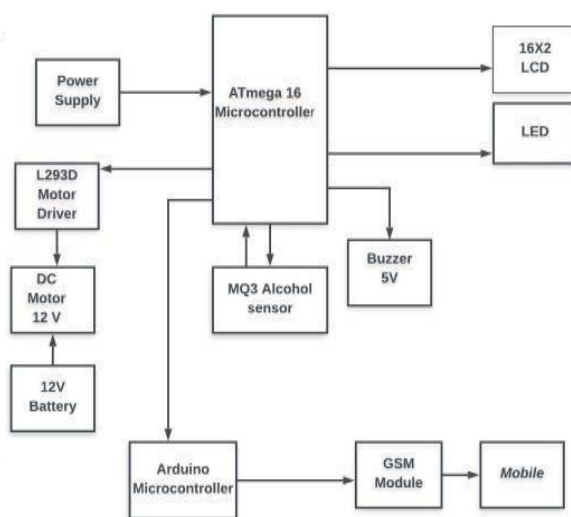


FIG 1. HARDWARE MODULE

#### Arduino Nano:

The Arduino Nano is a compact microcontroller board that is based on the ATmega328P or ATmega628 microcontroller. It has the same connectivity as the popular Arduino UNO board and is designed to be sustainable, small, consistent, and flexible. Compared to the UNO board, the Nano board is much smaller in size. The Arduino Nano is programmed using the Arduino Integrated Development Environment (IDE), which is compatible with a variety of platforms. To start a project using the Arduino Nano board, we need to have the Arduino IDE and a mini USB cable. The Arduino IDE software must be installed on a laptop or desktop computer, and the mini-USB cable is used to transfer the code from the computer to the Arduino Nano board.

#### GPS Module:

The GPS chip and module provide users with instant location and time data anywhere on the planet. The Global Positioning System (GPS) is a navigation system that provides accurate location and time information to any GPS receiver. The system can be used free of charge by anyone with a GPS receiver and a clear line of sight to at least four GPS satellites. A GPS receiver calculates its position by tracking signals sent by GPS satellites. GPS is used everywhere now.

#### MQ-3 SENSOR:

The MQ-3 sensor consists of a precision layer of tin dioxide (SnO<sub>2</sub>). It is classified with such a structure to give high physical character to liquor and low physical character to benzene. It features a transient driver circuit that provides anywhere in the world.

#### Buzzer:

The alarm device used by the is a buzzer which sounds when alcohol is detected. The buzzer is activated when an oscillating signal is sent through the buzzer coil, causing the disk in the buzzer to fluctuate at a specific frequency equal to the drive signal.

**DC Motor:**

The DC motor is connected to the L293D which in turn is connected to the Arduino and receives a 5V supply. DC motors operate according to Lorentz's law. When current passes through the motor, the coils carrying the current generate a magnetic field, which in turn causes the coils to spin with the force it experiences.

**SIM900A:**

This is a smaller and more robust remote module. SIM900A is a full set of dual frequency GSM/GPRS strategies in one SMT module, which can be installed in the client application. The SIM card is integrated in the SIM900A module and the vehicle on-security message will be displayed separately. Send to police or others.

**Google maps:**

Google Maps is a desktop and mobile web-based mapping service application that provides detailed information about geographic areas and sites around the world. In addition to traditional road maps, Google Maps also provides aerial and satellite images of many places. In some cities, Google Maps offers street views that include photos of vehicles. Google Earth Support says most of the images are no more than 10 years old.

**GSM module:**

GSM stands for Global System for Mobile Communications. The SIM900A is Simcom's GSM module that provides Global System for Mobile Communications functionality to any microcontroller, meaning it can connect to a mobile network to send and receive text messages, as well as an Internet connection via GPRS, TCP or IP. Another advantage is that the card uses existing mobile frequencies, which means it can be used anywhere in the world.

**IV. CONCLUSIONS**

We present a very effective approach to address and develop intelligent systems in vehicles to reduce the number of disasters caused by drink-driving. Vehicle safety is the key to the dynamic if understanding is built between people. The future degree of this structure is to control the frustration caused by alcohol consumption. The system increases personal safety and thus constitutes a convincing step forward for the automotive company by reducing possible driving frustration, whose valuable advice and encouragement served as a beacon and crowned with success.

**V. ACKNOWLEDGEMENT**

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