Section A-Research paper
ISSN 2063-5346

DROWSY DRIVER ALERT SYSTEM

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ABSTRACT
The Internet of Things (IoT) refers to a network of computers, mechanical gadgets, and electronic sensors that can exchange data with one another and work together automatically to complete tasks. In an IoT system, a "Thing" can be any living being, machine, or inanimate thing that is being tracked by a sensor network. These sensors collect data, which is subsequently sent through a network to be processed and put to good use. The term "Internet of Things" refers to the interconnection of devices integrated in many different systems. Because they have a digital representation, these gadgets and things may be communicated with and controlled from a distance. This level of interconnectivity allows us to gather information in previously inaccessible settings, which boosts the reliability and safety of our day-to-day operations. This project details the planning and execution of an Ultrasonic Sensor and Arduino UNO-based BAC detection and engine-locking system for automobiles. If the level of alcohol detected by the sensor rises above a predetermined threshold, the system will cut power to the vehicle's engine. Additionally, the model will communicate the vehicle's location using SIM900A. The project offers a practical means of preventing drunk driving accidents
.

1. INTRODUCTION

Most car crashes today are the result of drunk driving. Drunk drivers risk themselves and everyone else on the road because they are unable to make rational decisions while impaired. This threat is so great that it affects people of all backgrounds equally. In Nigeria, lawmakers have passed legislation making it illegal for motorists to drink alcohol before or while behind the wheel, and law enforcement officials have been tasked with apprehending and prosecuting offenders. However, it might be difficult for police and other road safety officials to keep tabs on drunk drivers. The reason for this is that it is physically impossible for a single human being to be in two places at once and know everything about both. Every officer's best intentions to reduce drunk driving are undermined by their insufficient resources.

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Thus, a system for the automatic detection of alcohol that is not constrained by time or location is required.

Drunk driving poses a serious threat to other motorists and pedestrians because a drunk driver is more likely to lose consciousness or get dizzy, increasing the likelihood of a collision with another vehicle or an object in the driver's path. Drunk driving causes more accidents than any other traffic violation. The World Health Organization's first-ever Global Status Report on Road Safety found that India has the highest rate of road accidents worldwide. Drunk driving has been identified in the report as a major issue. About 40 young adults under the age of 25 lose their lives in traffic accidents every hour somewhere in the world. In 2009, there were an average of 13 people killed every hour in traffic accidents worldwide; in 2009, that figure rose to 14 per hour in India alone. According to the most recent statistics by the National Crime Records Bureau [5], there were approximately 1,34,513 fatalities resulting from traffic accidents in 2010. In 2015, 1,46,133 persons lost their lives as a result of traffic-related incidents. Drunk driving is cited in the NCRB study as a key contributor to traffic fatalities. It further claims that, because of the lack of enforcement measures, 99 percent of all accidents that occur outside of cities are the result of drunk driving. Since many cases are not reported, several road safety experts believe the true number of fatalities is likely far greater than what is listed in the report. Since many persons who are severely injured in traffic accidents do not succumb to their injuries until hours or days later, it is impossible to determine how many people were injured in these accidents. DUI will become a serious issue unless a system is put in place that monitors and prevents impaired driving.

The blood alcohol concentration (BAC) indicates the concentration of alcohol in a fixed volume of blood. In many European countries, this is reported as milligrams of alcohol per milliliter of blood (mg/ml). Between a BAC of 0.4 and 0.6, drivers may experience drowsiness, confusion, or disorientation, making it unsafe for them to operate a motor vehicle. The driver's cognitive, motor, and sensory abilities are all greatly diminished between a blood alcohol concentration (BAC) of 0.7 and 0.8. A driver who has reached this point is inactive and therefore unable to drive. A driver with a blood alcohol concentration (BAC) of 0.2% to 0.3% is nonetheless dangerously intoxicated. Therefore, a method that can cut down on drunk driving-related traffic accidents is necessary.

2. LITERATURE SURVEY

The author proposes an expensive method that uses GPS and GSM to detect alcohol; however, these costs can be reduced significantly. A siren is being employed in this project because it is both cost-effective and effective in keeping people in the immediate area on guard. [1] The author suggests using smart helmets to avoid accidents, although these devices have drawbacks. First, limiting helmet requirements to two-wheeled vehicles alone. Second, unlike the alluringly cheap open source hardware, microcontrollers are a software-based mega system. The writer mentions that [2] composite health monitoring and sensors based on infrared are used to ascertain alcohol, but that there is always a chance of false alarm in this system due to the fact that even a small change in some situations can result in a false alarm. However, the use of the necessary technology in our project makes it more authentic. When it comes to preventing drunk driving accidents, the author's use of the PIC16F877A microcontroller is both antiquated and prohibitively expensive, while our usage of the Arduino and Uno microcontrollers is both cutting-edge and wallet-friendly. Concerned about drunk driving, the author proposes a solution, but the use of the mQ2 alcohol sensor has resulted in explosions.In contrast to the very reliable MQ3, we avoided using the less reliable MQ2 alcohol sensor. [5]

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3. MATERIALS AND METHODS

Units such as the power supply, alcohol detection, engine locking, ignition system, display, alarm, and indication are all part of our suggested work. To serve as a warning system for the driver and passengers, an LCD screen will be installed inside the car. In this demonstration of engine locking, a DC motor serves as the vehicle's "engine." The Arduino Uno, a microcontroller based on the ATmega328 chip, will be used to poll the alcohol sensor repeatedly for a reading. To write code, compile it, build a hex file, and load it onto the microcontroller, the Arduino Uno sketch is utilized.

Block Diagram

The suggested system's functional architecture is depicted in figure 1, which may be found here. It is made up of a portion for the power supply, an alcohol sensor model MQ-3, a DC motor, an LCD display, a microcontroller, an alarm, and LED lights. Each of the different units underwent development and testing in isolation.

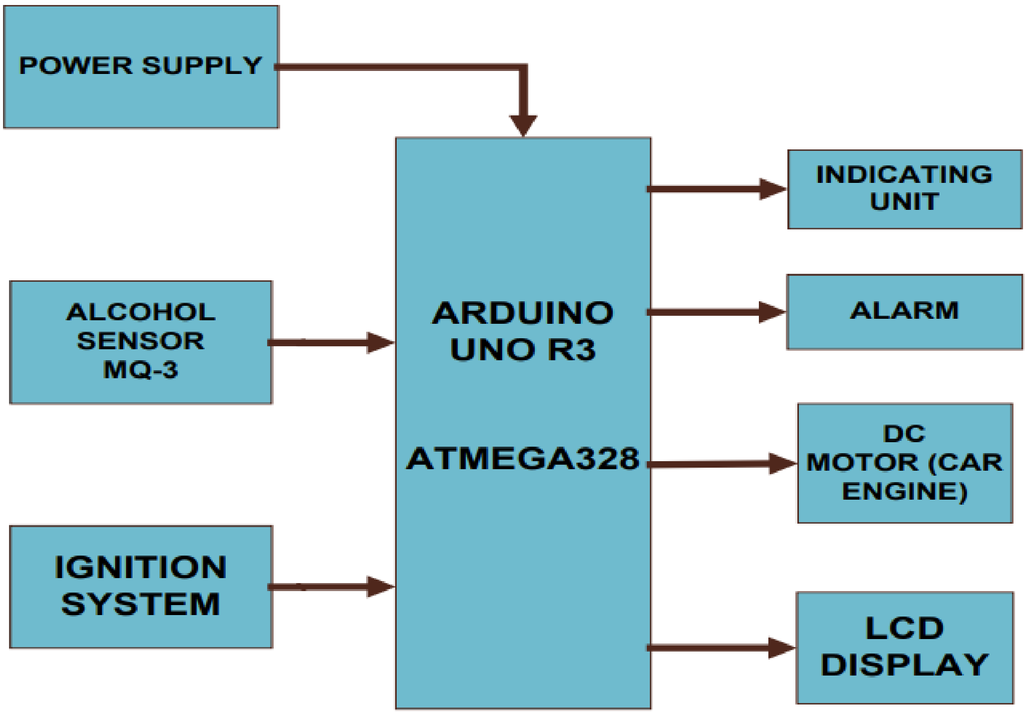

Fig. 1: Block diagram of Alcohol detection of drunk drivers with automatic car engine locking system

Power Supply Unit

A 9-volt battery provides the electricity for our system. A source of 5V DC, as the microcontroller, sensor, and display unit all necessitate its use. LEDs require a voltage of 2V, while other components such as DC motors require a voltage of 1.5V. The Arduino Uno board has previously been built to function without the need for a transformer. The system can be powered either through the USB connection from the computer or with an external power supply ranging from 7 to 12 Volts. The power for the External (non-USB) device can be supplied by either a battery or an AC-to-DC adaptor (also known as a wall-wart). Any voltage that is higher than 12V may cause the control device to catch fire, which will result in the board being destroyed. It is

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recommended that the voltage be between 7 and 12 volts.

ATmega328 Microcontroller Unit

The ATmega328 Arduino Uno microcontroller board serves as the primary component of the proposed system. The device has a total of 14 pins, 6 of which can be used to output Pulse Width Modulation signals, an electronic oscillator operating at 16 megahertz, a Universal Serial Bus port, a power connector, an on-board voltage regulator, an ICSP header, and a reset button. Additionally, the device has a continuous signal with a time-varying quantity of 6 continuous signals, and it has 6 pins that can be used to output PWM signals. The memory capacities of the Atmega328 are as follows: 32 KB for flash, 2 KB for SRAM, and 1 KB for EEPROM.

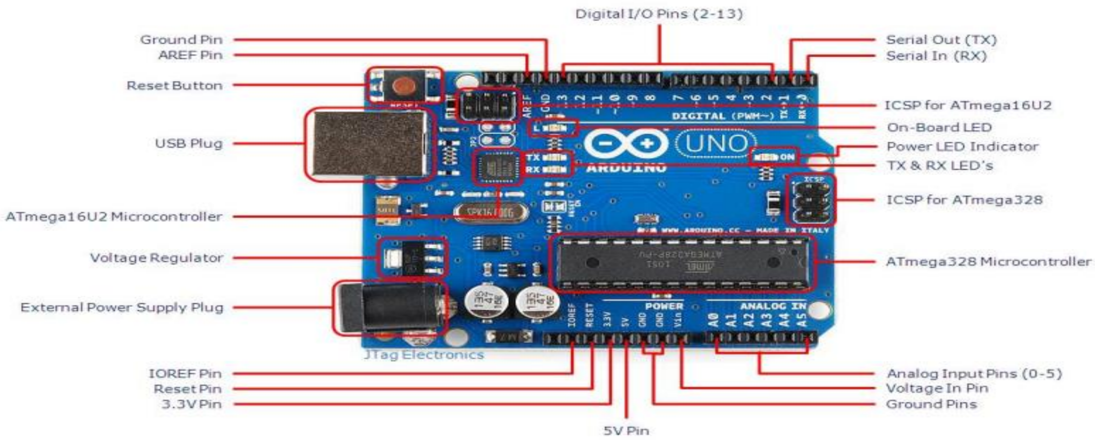

Fig. 2: Arduino Uno ATmega328 microcontroller unit.

4. RESULTS

To begin, the user needs to register for the Safe Drive system by using either the online application or the android app. During the registration process, the user will be required to furnish the Safe Drive system with his or her personal information. The page for registering for the android app is depicted in figure 3.

Figure 3: Sign up Page of Safe Drive App

The engine can be unlocked if the user successfully completes the sobriety test, in which the app presents the user with a series of questions, all of which must be answered properly by the user. The user will be able to access the engine once they have successfully answered at least half of the questions correctly. A screenshot of one of the questions that can be asked by the app can be shown in Figure 4.

Figure 4: sobriety test

If the user is unable to pass the sobriety test, a message will be issued to the user's relative, whose contact information will be kept when the user registers for the service. By using the Android app, the user's relative will be able to track the user's whereabouts. The notification that was sent out by the server to the user's relative may be seen in Figure 5.

Figure 5: Notification from android app.

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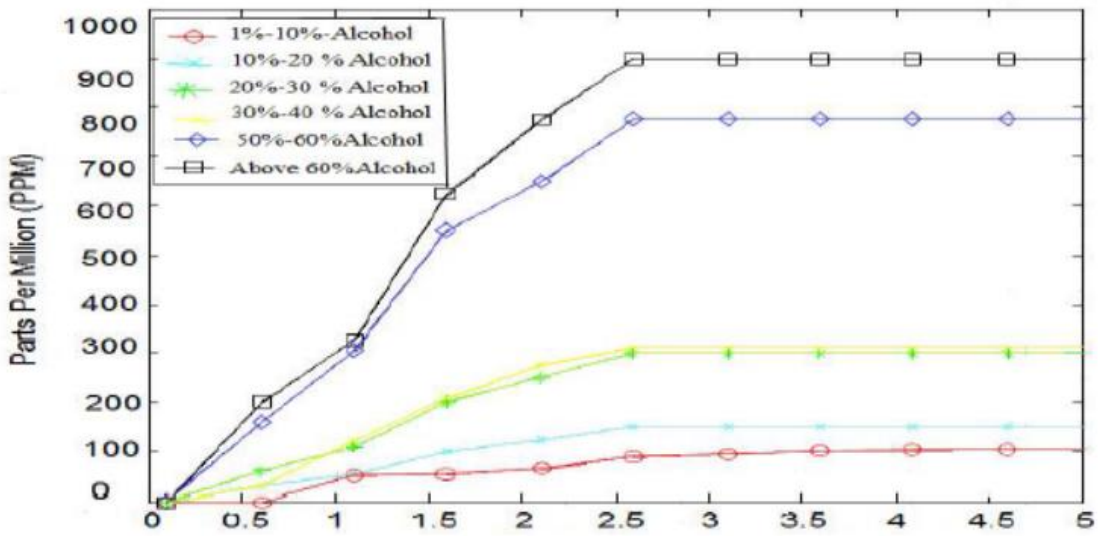

Fig. 6: Response of ppm (In Percentage) via alcohol sensor output voltages value.

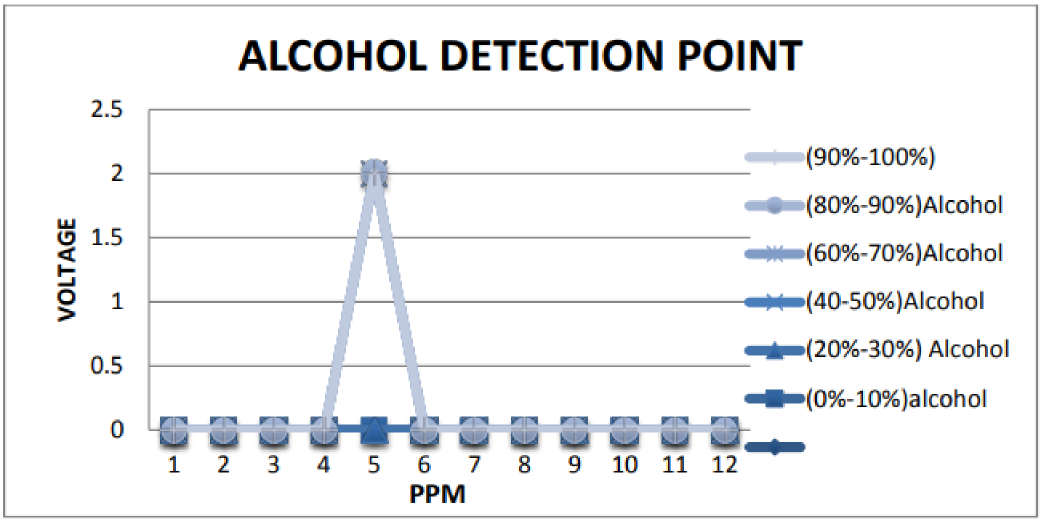

Fig. 7: Alcohol detection point.

CONCLUSION

The Safe Drive system gives automobiles the safety feature that the driver will not be able to operate the vehicle when he or she is under the influence of alcohol. This reduces the likelihood that the driver will be involved in a car accident. When the user is under the influence of alcohol, the real-time notifications that he provides can also assist the user's family members in assisting him to get home safely. Additionally, it gathers the data from which some essential insights can be derived for the benefit of the authorities in charge of traffic, such as the location and time of day during which the majority of DUI arrests take place. Even though the system works as intended, it will immediately shut off the engine if it detects alcohol, and this will occur even if the individual who is intoxicated is not the person operating the vehicle. This will likely be a nuisance for some drivers. It is possible to further improve the system by utilizing machine learning to circumvent the sobriety test, thereby lowering the percentage of false alarms and making it possible to identify in advance whether or not the driver is intoxicated even if the vehicle's engine is not disabled.

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