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Arduino-based Vehicle Alert and Control System for Drunken Drivers

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Abstract: This system is designed to reduce traffic accidents caused by drunk driving. The alcohol sensor is used to determine the condition of the driver. If the driver drinks alcohol while driving, the indicating system will alert them and the vehicle speed limit will be activated. Using the l293-d motor driver shield, the vehicle's speed will be reduced, and the ignition system will be turned off. This method should make road traffic safer than it was before.

Keywords: l293d driver module; MQ3 sensor; DC motor; GSM; GPS; Arduino Uno

I. INTRODUCTION

According to the present predicament, a significant proportion of road people will be affected by drunk driving. Drivers who abuse alcohol are not in a stable state, and as a result, rash driving occurs on the highway, destroying the lives of everyone on the road, including the driver. The intensity of dangerous driving crosses all constraints. In India, the laws currently prohibit drivers from drinking alcohol so the fine can deter them from doing so. However, effective observation of inebriated drivers could prove problematic to police officers and road safety officers. The explanation for this stems from citizens' natural inability to be present as well as the state between identical houses and time. This clearly shows that almost all drivers, particularly business and heavy-duty truck drivers, collaborate in drink and driving, which can lead to an accident. Bharat establishes a legal limit of 30mg/100mL blood alcohol concentration (BAC), regardless of level. Higher than that, they are ineligible. The BAC represents the amount of alcohol in a very precise volume of blood its weight of alcohol per metric capacity unit of blood or milliliters of blood (mg/ml, as used in many of Europe). Drivers feel impaired at BAC levels ranging from 0.4 to 0.6.dazed/confused/otherwise disoriented, and it's not certain. It is safe for a driver to operate a vehicle in such conditions. Future scope a BAC level of 0.7 to 0.8 impairs a driver's mental, to be physical and sensory functions.

II. LITERATURE SURVEY

1. Alcohol Detection and Motor Locking System- International Journal of Advanced Research in Electrical, Electronics, and Instrumentation Engineering,

The paper proposed an alcohol recognition system. Regrettably, it engages GPS and a GSM module, which tends to raise the overall cost and could be avoided. In this project, the usage of a siren is more premium the use of a siren will alert the citizens. Nearby, and thus any necessary action can be taken.

2. Automatic Drunken Driving Prevention System -International Journal of Students Research in Technology and Management.

To avoid accidents, the paper discusses the use of a smart helmet. Their design has numerous flaws. Each significant limitation is that it is limited to only vehicles that use helmets, i.e. 2 wheelers which is not a feasible option while driving, especially over short distances. Another limitation of the system is that it makes the helmet too heavy, which is not ideal for driving. They also used an expensive microcontroller, whereas the use of open-source hardware, which is very cost- effective.

3. Alcohol Detection and Vehicle Controlling - International Journal of Engineering Trends and Applications.

The paper discusses complex health monitoring systems and infrared sensors for detecting alcohol presence. One significant disadvantage of this system is the possibility of a false alarm. This system is designed in such a way that even minor changes in a specific condition can cause false alarms to sound even when everything is normal. In this project, only the necessary technology, makes the system more reliable and cost-effective when implemented.

4. Automatic Vehicle Engine Locking Control System Using Virtual Instrumentation to Prevent Drunk Driving - International Journal of Engineering and Technical Research, 2016.

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Here is proposed a system to prevent accidents caused by drunk driving. The main disadvantage of this system is that they used a PIC16F877A microcontroller, which is not as useful as the Arduino Uno microcontroller that we use. Furthermore, they have used an old design system that is no longer useful and raises the overall cost of the system, making it expensive and somewhat unaffordable to certain segments of society, limiting its scope of use. As a result, this system is less expensive and more accessible.

5. Smart Drunken Driver Detection and Speed Monitoring System for Vehicles - International Journal of Advanced Technology in Engineering and Science

This paper discusses the issue of drunk driving and proposes a solution in the form of a system. The main disadvantage of their system is that they use an MQ2 alcohol sensor, which is inaccurate and not specific to alcohol. This project used an MQ3 sensor, which is designed to be accurate indetecting alcohol, resulting in more accurate results and fewer false alarms. Furthermore, they used a PIC microcontroller, which is more expensive than the open-source Arduino Uno.

The paper attempted to create a system that would address both the issue of helmet negligence and alcohol detection at the same time. The system is excessively complicated. In addition, usage of the P89V51RD2 microcontroller is more expensive than an Arduino Uno. Furthermore, this system has a limited scope of application because it can only be used with two-wheelers and not with any other vehicle segment. This system, on the other hand, can be integrated into any type of vehicle, preventing more accidents and saving more lives.

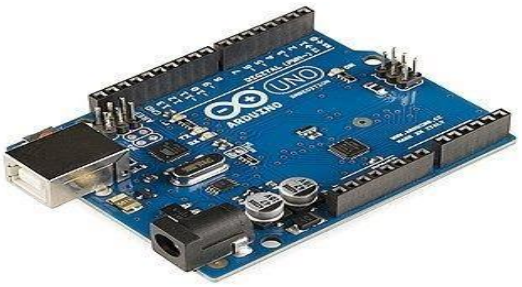
III. PROPOSED SYSTEM

Here is proposed a system using an Arduino Uno microcontroller to design a system consisting of an alcohol sensor, MQ3, to detect the presence of alcohol by analyzing a person's breath and shutting down the vehicle's engine when a specific amount of alcohol is detected to prevent any kind of mishap or accident that may occur due to the driver taking control of the vehicle. As a result, drunken driving is under control, reducing the loss of life and property.

IV. HARDWARE MODULE

The system is built around an Arduino microcontroller, which serves as a controller for all of the components. The microcontroller is powered by a 5-volt DC power supply and is connected to an LCD, an alcohol sensor, a buzzer, a DC motor, and an LED. When the system is turned on, the LCDs "No Alcohol Detected," and the vehicle engine starts. When the alcohol sensor detects alcohol, the LED begins to blink, the buzzer sounds, the engine is turned off, and the LCD "Alcohol Detected."

ARDUINO:



The ATmega328P-based Arduino UNO is a microcontroller board. It has 14 digital I/O pins, 6 analog inputs, a ceramic resonator operating at 16 MHz, a USB connection, a power jack, an ICSP header, and a reset button. It comes with everything you need to support the microcontroller; simply connect it to a computer via USB or power it via an AC-to-DC adapter or battery to get started. which can tinker with your UNO without fear of doing something incorrectly; worst-case scenario, that can replace the chip for a few dollars and start over.

MQ3 SENSOR:

MQ3-Alcohol Gas Sensor

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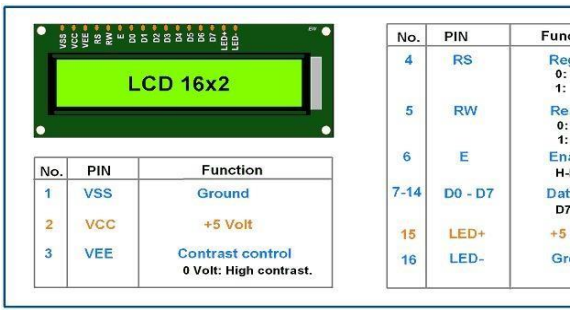
The MQ3 alcohol sensor is connected to pin A0. It is one of the most precise and widely used alcohol sensors. This sensor can detect the presence of alcohol up to a distance of 2 meters, making the detection process much more accurate. Furthermore, the sensitivity can be adjusted to meet specific requirements, making the sensor more versatile.

16X2 LCD DISPLAY:

A 16X2 LCD has two registers, one for commands and one for data. The LCD command instructions are stored in command registers. A command is an instruction given to an LCD to perform a predefined task such as initializing it, clearing its screen, setting the cursor position, controlling the display, and so on. Data registers hold the information that will be displayed on the LCD. The ASCII value of the character to be displayed on the LCD is represented by the data. In a project, the LCDs information about the system's current status.



BUZZER:

A beeper or buzzer, for example, can be electromechanical, piezoelectric, or mechanical. The primary function of this is to convert the signal from audio to sound. It is typically powered by DC voltage and is found in timers, alarm devices, printers, alarms, computers, and other electronic devices. It can produce various sounds such as alarm, music, bell, and siren depending on the design. The buzzer's pin configuration is depicted below. It has two pins, positive and negative. The positive terminal of this is represented by the '+' symbol or a longer terminal. This terminal is powered by 6 volts, while the negative terminal is represented by the '-' symbol or short terminal and is connected to the GND terminal.

V. WORKING MODEL

The MQ series of gas sensors combine a small heater inside with an electrochemical sensor; these sensors are sensitive to a wide range of gases and are used at room temperature. The MQ135 alcohol sensor is a Sno2 with a lower conductivity of clean air. It converts the conductivity charge to the corresponding output signal of gas concentration using simple electronic circuits. The alcohol sensor is technically known as an MQ3 sensor, which detects ethanol in the air. When a drunken person breathes near the alcohol sensor, it detects the ethanol in his breath and provides an output based on the concentration of alcohol in his breath.

VI. RESULT

When a drunken person attempts to take control of a vehicle, the alcohol sensor detects the presence of alcohol and, if detected, shuts down the vehicle's engine and sounds an alarm, alerting anyone nearby. The LCD screen in the vehicle will display "Alcohol Detected," alerting people to the situation and allowing them to take appropriate action. As a result, by installing this system in a vehicle, any loss of life or property damage can be avoided. The system was simulated using the Proteus software. All of the components have been tested and connected as needed, yielding the desired result as shown. The system was simulated using the Proteus software. All of the components have been tested

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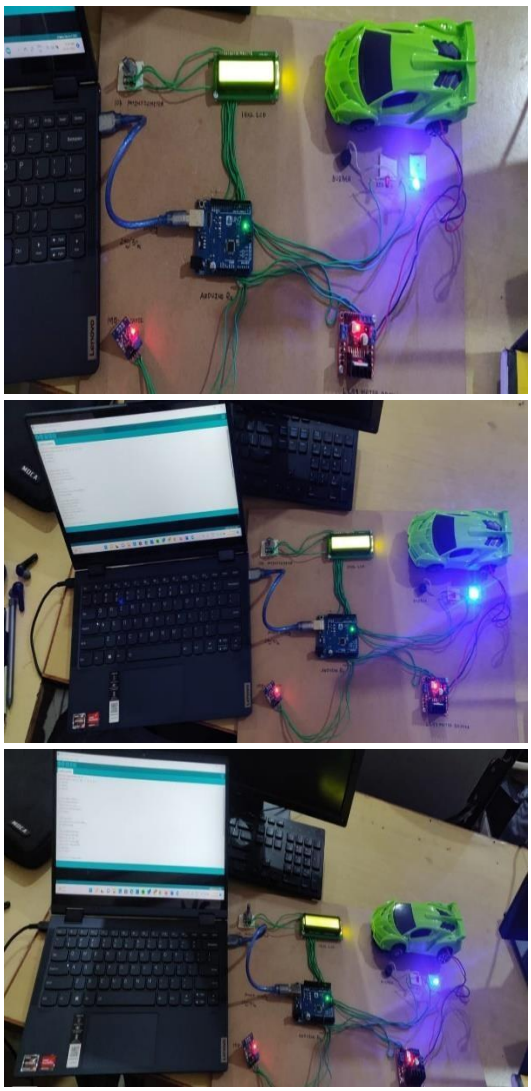
and connected as needed, yielding the desired result shown in the image above.

VII. CONCLUSION

This is an effective system to combat the dangers of drunk driving in this project. Our primary goal is to reduce the number of fatalities and property damage caused by drunk driving. Once implemented on a large scale, this system will be extremely useful in shutting down the vehicle's engine and alerting nearby people in the event of a mishap. The sensor used in the project is very accurate and can be configured according to the needs, increasing efficiency.



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