



VEHICLE ACCIDENT DETECTION SYSTEM BY USING IOT AND GPS

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Abstract

Major traffic accidents are caused by drivers who are sleepy. The amount of sleepiness brought on by drunk driving is rising these days. The eye blink sensor detects the rate of blinking if the driver's eyes are deemed to be drowsy for longer than three seconds. The car slows down if it is discovered that the eyes are closed. Alcohol MQ3 sensor is used in our suggested system to detect alcohol in addition to tiredness. The vehicle slows down if the driver's breath contains any alcohol. The Arduino UNO is interfaced with these sensors. When the automobile detects alcohol, the LED flashes, and when it detects tiredness, the buzzer rings. The speed of the vehicle changes accordingly.

Introduction

One big issue is driving while intoxicated. Nobody can pinpoint the precise moment when sleep takes over their body. As a result, the driver's ability to focus on the road is diminished. The driver's capacity to make wise decisions is impacted. As per the Unsensational Highway Traffic Safety Administration, sleepy driving is to blame for around one hundred thousand traffic crashes, which resulted in over 70,000 injuries and over 1,500 fatalities. Alcohol use is one of the main contributing factors to accidents. In 2018, there were 1,643 traffic accidents brought on by intoxicated driving. Consequently, the use of the alcohol and eye blink sensors, respectively, can help to lower the number of accidents caused by drunk driving and sleepiness. Thus, when they're noticed, the car's speed

Alan G. Smith's book "Introduction to Arduino: A Piece of Cake!" offers a basic overview of Arduino programming and interface, which is useful when integrating sensors with an Arduino UNO. Identify driver drowsiness to stop fatigue-related accidents. Use an Arduino to detect alcohol in the driver's breath by connecting these two sensors.[1]

"Drowsy Driving and Automobile Crashes," Committee on Sleep Medicine and Research, Board on Health Sciences Policy, Institute of Medicine.* This study looks at the connection between driving when drowsy and auto accidents, highlighting how important it is for road safety rules to address sleepy driving. When a driver nods off, they lose control of the vehicle and often cause an accident involving another vehicle or an immovable object. We now know how to lessen the problems.[2]

A.W. Jones' book "Alcohol Breath Testing: Basic Principles and Applications" This book provides in-depth discussion of alcohol detection technology, including the MQ3 sensor and the fundamentals of breath testing.[3]

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Reaz, M. B. I., Jalil, J., and Syedul Amin, M. (2012). System for reporting accidents that makes use of GPS, GPRS, and GSM technologies. The 2012 International Conference on Electronics, Vision, and Informatics (ICIEV). Reference: 10.1109/iciev.2012.6317382[5]

Singh, A. V., Wadhahi, N. T. S. A., Yosof, K. M., Hussain, S. M., and Hussain, S. A. (2018). This system uses infrared sensors to detect and prevent accidents and lessen traffic hazards. 7th International Conference on Information and Communication Technologies, Optimization, and Reliability, 2018 [6]

Basic Theory

A. Arduino Uno

The Arduino Uno features fourteen digital pins, six analog pins, a USB port, a power jack, and an ICSP header. Like the Arduino Mega, it is easier to use than other boards. The integrated development environment, or IDE, is used to program it, and it can run on

both online and offline systems. Almost every Arduino board now available on the market uses the IDE, which makes it a flexible and dependable tool for developers as well as fans.



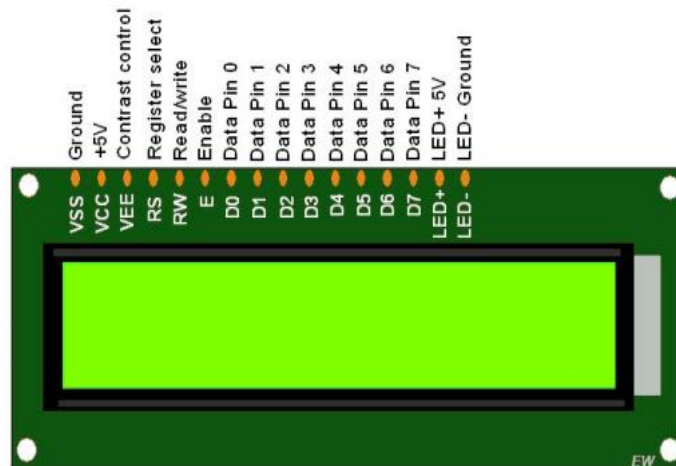
B. GSM SIM900 A

The SIM900A modem, which has an interface and a SIM900A GSM chip, may be easily connected to a PC or microcontroller with the use of USB to Serial to TTL converters. Once a serial connection is established, the modem can be readily programmed to do various tasks by transmitting AT commands. Because GSM is dependable and easy to use, it is the preferred choice for applications involving remote control and monitoring.



C. LCD (Liquid Crystal Display)

In electronic devices such as notebooks and tiny PCs, LCD technology is a common choice for picture display. A bright, high-quality image is produced on the screen by combining colored light with a grayscale image that is created as light interacts with the liquid crystal layer through a lens. To sum up, LCD technology provides a stylish and effective replacement for conventional display panels.

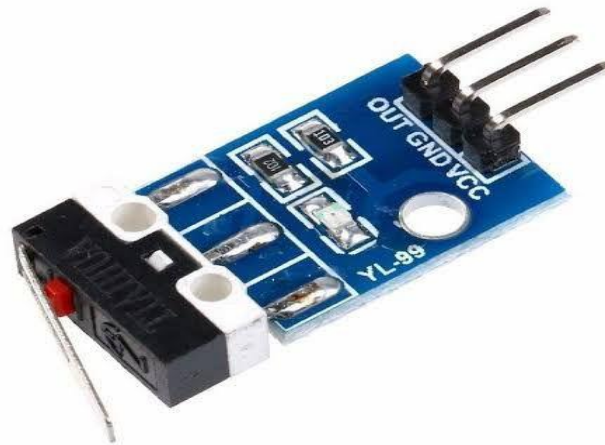


D. GPS NEO 6M

Modern technology is used by our NEO 6M GPS module, which comes with a battery for quicker GPS lock and precise positional data. Furthermore, it can be used with Arduino Mega V2, providing your multirotor control platform with optimal functionality. We promise to bring you the finest GPS option available.

**E. Accident Sensor**

The suggested solution does not specify the threshold distances at which an infrared sensor will react. The airbag method is not intended for use on motorcycles or cycles. In the event that a mobile application is utilized for accident detection, the application may not operate effectively on all smartphone models due to variations in processor speed across different phone models. Consequently, a unique strategy based on an ultrasonic sensor is presented in this work. Ultrasonic sensor-based accident detection offers the capability to identify an accident in a variety of street scenarios and may also function well in a variety of environmental circumstances, such as rain.

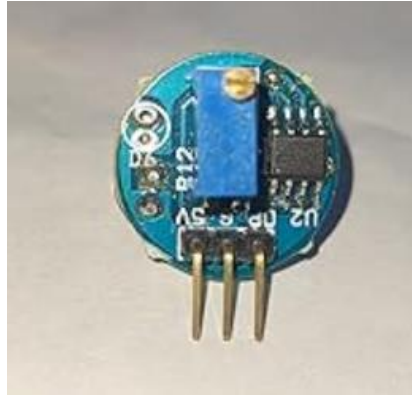
**F. Alcohol sensor**

An infrared cell that concentrates infrared light through the sample detects any extra energy at the other end. Alcohol also absorbs infrared light, in a manner similar to how a sunglass lens does. Infrared absorption increases with increasing ethanol content.



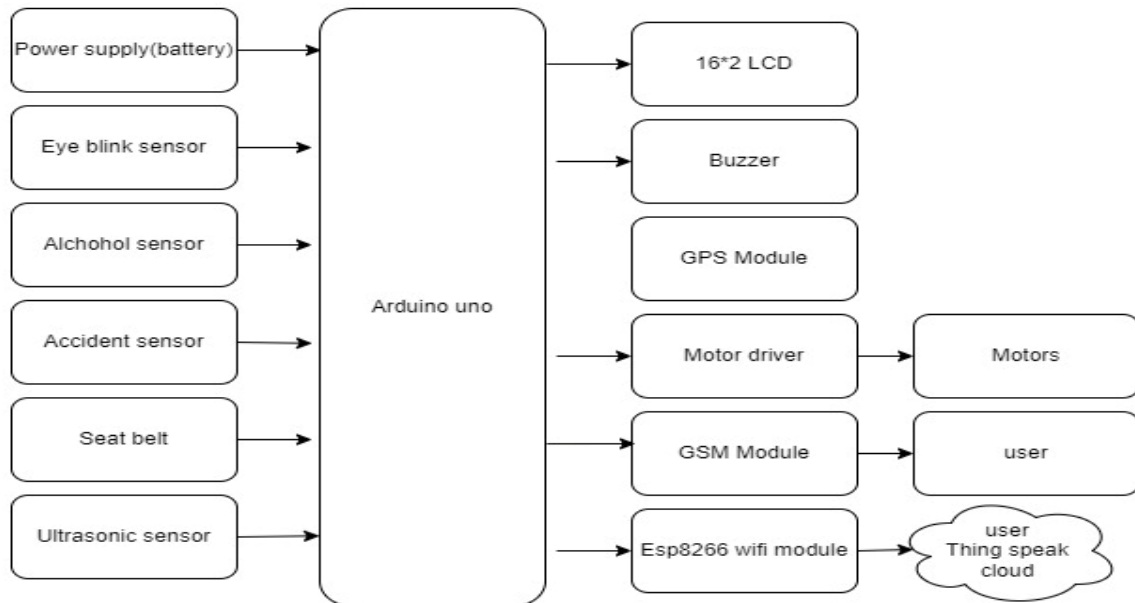
G. Eye sensor

An extremely simple sensor for tracking eye blinks is the eye blink sensor. To detect if someone's eye is closed, it uses a simple infrared sensor. The data that comes with it is then processed using whatever logic is required for the intended use.

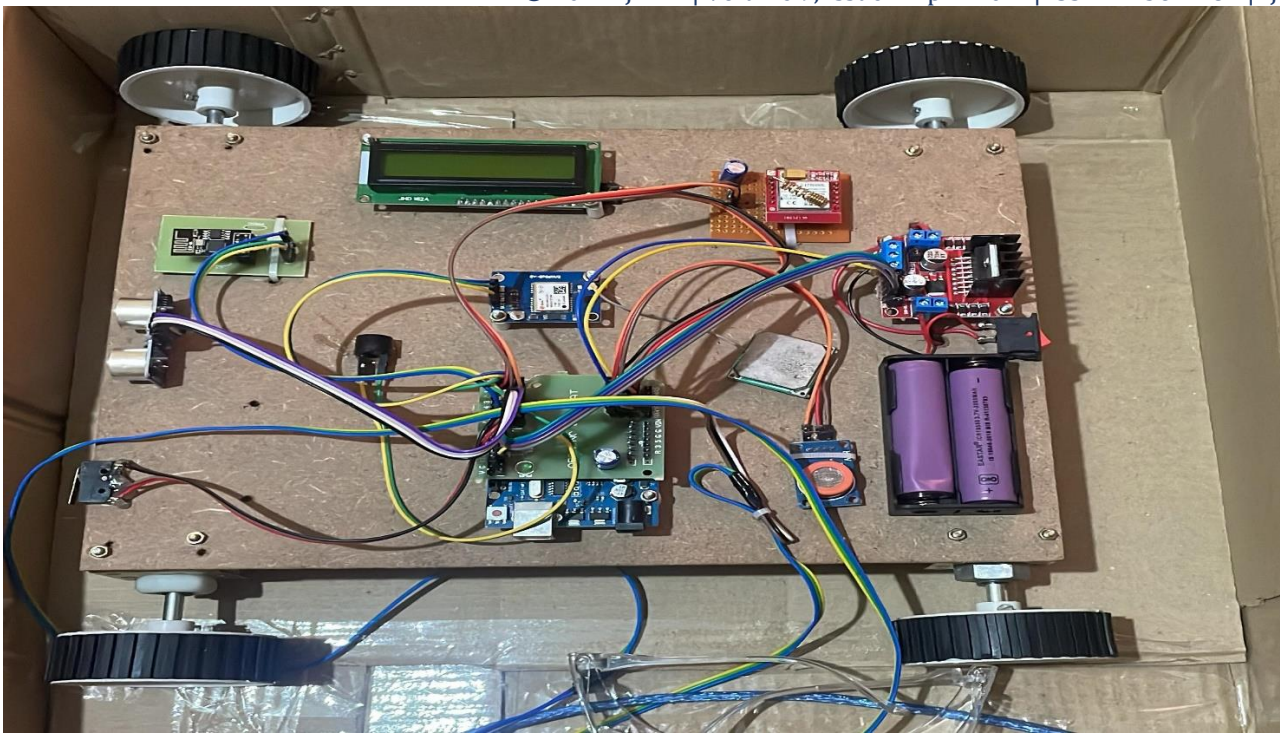


Design

Our suggested method uses an eye blink sensor to identify the driver's tiredness. Arduino is used to continuously monitor the eye blink rate. The motorist is considered sleepy if their eye is closed for longer than five seconds. As a result, the buzzer begins to beep and the car's speed decreases (a dc motor indicates this). Alcohol is also identified by the Mq3 sensor. Arduino is interfaced with the sensor. When alcohol is detected, an LED illuminates, and the DC motor's speed changes based on how much alcohol is in the driver's breath.




 Research Through Innovation



Results

When an accident happens, a message including the latitude and longitude in the form of Google maps is transmitted by GSM and GPS to the registered cell number mentioned in the code. The eye blink sensor records the driver's eye blink rate and reports it to the microcontroller, while the alcohol sensor detects the presence of alcohol. The registered cell phone number receives the message and the exact location.

Vehicle stopped due to Driver Sleeping, at
https://www.google.com/maps/search/?api=1&query=0.000000,0.000000

+ SMS

Vehicle stopped due to accident, at
https://www.google.com/maps/search/?api=1&query=16.3510,81.0426

Vehicle stopped due to Driver Sleeping, at
https://www.google.com/maps/search/?api=1&query=16.3510,81.0426

Conclusion

The driver drowsiness and alcohol detection system is intended to identify when a motorist is drowsy as well as when they have consumed alcohol. The car's engine slows down and a buzzer sounds until the person's eyes awaken if they are sleepy or consuming. The serial monitor of the Arduino IDE will show the alcohol levels and the blink rate. This suggested system uses Arduino to detect alcohol and determine tiredness. This aids in preventing several mishaps. We expand on this concept by employing a webcam to identify the driver's level of sleepiness.

References:

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- [5] Sungchul Choi, Sungjun Han, Hanil Bae, Youngil Youm, Chulhue Park, and Yongchul Kim "HUMAN-LIKE ARM BIOMECHANICAL MODEL FOR CRASH TEST"
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