WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

IoT Based Drunken Driver Detection in Vehicles

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Doi: https://doi.org/10.55248/gengpi.5.0524.1206

ABSTRACT-

After starting the automobile in which the our device is fit . IoT based drunken driver detector with engine controlling using ESP32 & Telegram application IoT based drunken driven detector will detect minimum 20% alcohol consumed by driver or not in vehicles and will send data to RTO and will warn the driver to stop the vehicle by an alarm and LED's .Also gives message to driver's family along with the live location of the vehicle .

Keywords— IoT (Internet of Things), Drunken driver detection, Alcohol-impaired driving, Sensor technologies Data processing algorithms**,** Machine learning**,** Real-time monitoring, Driver behavior analysis, Vehicle safety systems**,** Traffic accidents prevention

Introduction

Alcohol-impaired driving remains a critical issue worldwide, contributing significantly to road accidents and fatalities. In response to this challenge, there is a growing interest in leveraging Internet of Things (IoT) technology to develop innovative solutions for detecting drunken drivers in real-time. These IoT-based systems integrate sensors, data processing algorithms, and communication networks to identify alcohol intoxication and prevent potential accidents. This research paper provides a comprehensive review and analysis of IoT-based drunken driver detection systems, exploring their technological foundations, implementation challenges, and potential impact on road safety. Through this investigation, we aim to contribute to the advancement of effective strategies for mitigating the risks associated with alcohol-impaired driving.

LITERATURE SURVEY

Previous studies have explored various aspects of IoT-based drunken driver detection systems, highlighting the significance of integrating sensor technologies with data processing algorithms for accurate and timely detection. Sensor technologies such as breathalyzers, touch-based sensors, and wearable devices have been investigated for their efficacy in detecting alcohol intoxication. Additionally, research has focused on developing machine learning and statistical models to analyze sensor data and identify patterns indicative of drunkenness. While existing literature demonstrates the potential of IoT-based systems in enhancing road safety, challenges such as sensor accuracy, real-time data processing, and system scalability remain areas of ongoing research. This literature survey provides insights into the current state-of-the-art and lays the foundation for further exploration in the development and deployment of IoT-based drunken driver detection systems.

Abbreviations and Acronyms

IoT – Internet of things, LED- Light emitting diode, RTO- Reginal Transport Office, ESP- Espressif Systems, GPS- Global Positioning System , GSM- Global System Mobile Communication.

BACKGROUND STUDY

Internet of things

The global positioning system (GPS) module, which is crucial to an IoT system because it measures and logs location, speed, direction, and time, is one of the internet of things (IoT) used in this project. Another is the global system for mobile (GSM), which is based on enhanced data rates for GSM evolution (e-GPRS) and functions as a low-power, high-capacity, long-range, and simple cellular system for wireless communications.

The Blink app and Telegram may be sent by embedded devices thanks to the ESP32's dual-core module and Wi-Fi antenna, which enable network connections. Among IoT platforms, blink is the most popular choice for cloud device connectivity. Creating apps to manage Internet of Things devices, examine telemetry data, and more is what makes it so popular, and oversee large-scale product deployments [13]–[17]. This project makes use of two apps: Telegram and the blink app. Apart from that, the GSM will use the supplied subscriber identity module (SIM) card to make calls and send messages.

Automatic toll collection, identification of alcohol use, load and vehicle data via the internet of things, and mail system

Using infrared sensors, the technology finds the specifics of the car. When RFID tags are attached to objects, electromagnetic fields are used to automatically identify and track the tags. [18][20]. The methods currently in use rely on non-commercial, impractical technologies such as vision and ultrasonic sensors, which are not equivalent to RFID technology. We remove the constraints in terms of practical application and use by putting in place an RFID-based localization system that pinpoints the positions of different items without a doubt and right away. RFID represents the sole means of object identification because the existing approach is immutable. Time and effort can be saved by using RFID tags that hold data about a particular car to withdraw money from a user's prepaid account.

METHODOLOGY

Figure 1 shows the schematic of the IoT-based intelligent alcohol detection system for automobiles. NodeMCU ESP32 Microcontroller: Included with a complete TCP/IP stack for internet connectivity, Bluetooth 4.2, and built-in Wi-Fi, the ESP32 is a potent 32-bit microcontroller. The low cost, high power, and numerous interface options of the ESP32 microcontroller make it an excellent choice for Internet of Things (IOT) applications.

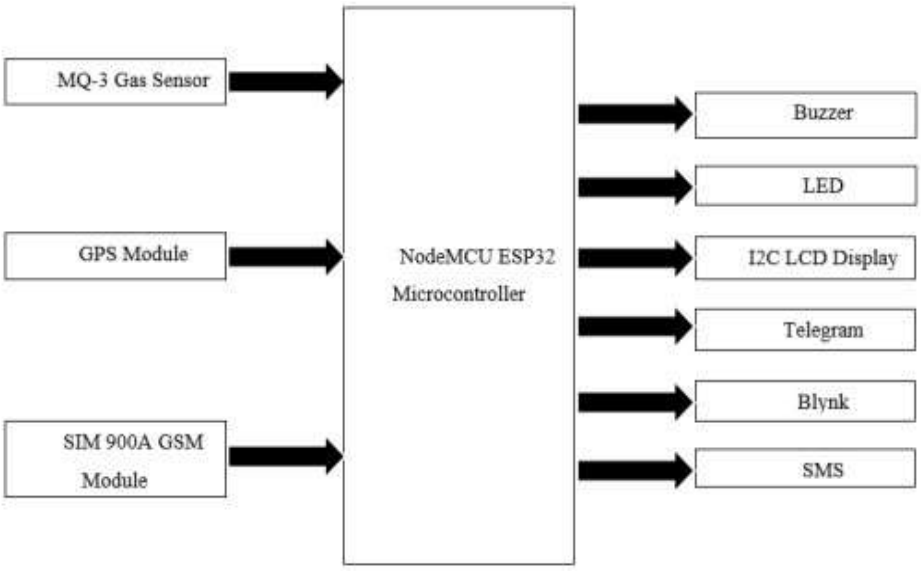

Figure 1. Block diagram of the system

MQ3 gas sensor: This straightforward gas sensor works well for identifying alcohol and can be incorporated into a breathalyzer. It is extremely sensitive to alcohol and hardly sensitive to benzene. It is possible to balance affectability with the potentiometer. A mineral is tin oxide (SnO2). As the

In clean air, the sensitive material of the MQ-3 gas sensor has a reduced conductivity.

GPS module: the Neo-6M GPS Module is a stand-alone GPS receiver that uses the Elite U-Box 6's positioning engine. They provide choices for power and memory in addition to a small design. Anywhere on or near Earth with an unobstructed visible path to at least four GPS satellites can receive area and time data from the GPS, a space-based satellite route system.

The most popular wireless standard for mobile phones in human history is the Global System for Mobile Communications (GSM), which is represented by the SIM 900A module. Both the TEXT and PDU modes are supported for short messaging service (SMS) transmissions. The setup requires a SIM (Subscriber) in order to communicate.

Blynk app: The IoT was considered when developing Blynk. In addition to performing a number of other functions, it can save and visualize data, show sensor data, and remotely control devices. The three main parts of the platform are Blynk libraries, Blynk servers, and Blynk apps. With the help of Blynk App, we may combine multiple widgets to build visually appealing user interfaces for our projects. All data transfers between the hardware and the smartphone are managed by the Blynk Server.

A buzzer, sometimes referred to as a beeper, is a sort of auditory signaling device that functions as an audio indication where it makes sound at a frequency range of 1 to 7 kHz, as shown in the block diagram in Figure 1. Despite being electronic screens, I2C LCD displays screens

It is multipurpose in its application. A basic module used in many different circuits and devices is the 16x2 LCD screen, which is widely used. The I2C LCD display comes with a PCF8574 chip (for I2C connection) and a potentiometer for controlling the LED lights. Consequently, an LED is a semiconductor device that produces visible or infrared light by being charged with an electric current.

Simulation part

Figure 2 shows the system's operation in theory. One innovative technology that has several uses in smart cities and smart transportation is the internet of things drunk driving monitoring system. When the micro cable is connected to the Arduino via the laptop, the system is activated. The gadget will start working.

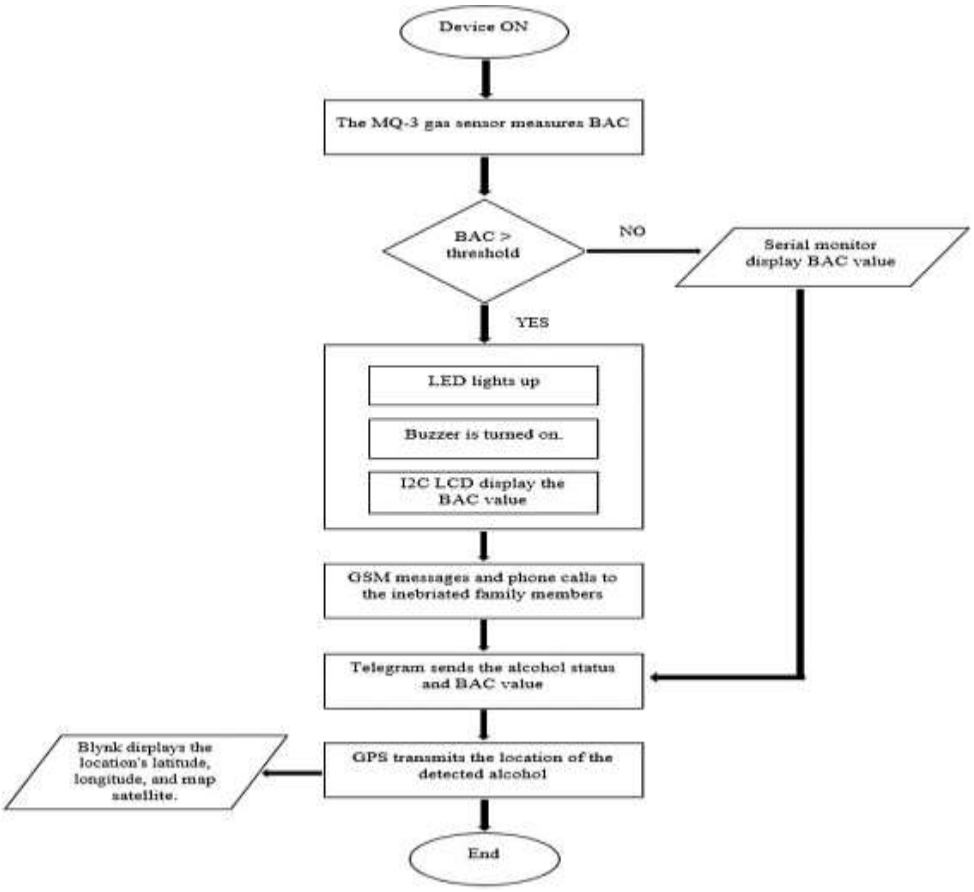

Figure 2. Working principle of the system

The MQ-3 gas sensor is the target of the alcohol. The blood alcohol content surpasses the 0.90 mg/L threshold limit if alcohol is found. 'Alcohol detected' and the BAC value will be shown on the I2C LCD, along with a buzzer and an illuminated LED. The BAC value is shown on the serial monitor, the LED is out, and the buzzer is silent if no alcohol is found, that is, if the blood alcohol content of the person's breath is less than 0.90 mg/L. The GSM is designed to text or call inebriated family members based on commands displayed on the serial monitor. Calling, messaging, receiving, redialling, and hanging are all possible with the GSM.

wake-up calls. The number entered in the Arduino code will be called by the GSM. Even in the absence of an internet connection, a sim card is necessary for the GSM to operate. Whether or not the drunk motorist has over the legal alcohol limit will be ascertained by the telegraph. Should the intoxicated motorist surpass the cutoff point, the Telegram bot will broadcast "alcohol detected" along with the breath analyser's BAC reading. The telegram bot will only send the breath analyser's BAC value if the drunk driver's BAC is below the cutoff.

Through GPS, the location of the alcohol that has been discovered will also be communicated. The Blynk will show the location's latitude, longitude, and satellite map. It will be simpler to locate the incidence as a consequence. Numerous benefits are provided by the designed system in terms of efficiency, convenience, and accident-free travel for passengers. The level of accuracy in detecting alcohol in the car is very high. By improving patient care, this arrangement actually grows the industry by decreasing alcohol-related accidents.

The obtained outcome is displayed in Table 1. The first condition showed that the buzzer did not raise an alarm and that the driver was not intoxicated. The driver is aware of the situation and competent to operate the car safely on the road even with the system on. The following stage is classified as slightly inebriated, with a 0.26 to 0.50 drunkenness level. This indicates that the driver needs help when driving on the road despite having had a minor amount of alcohol. The buzzer has been turned off. The range of intoxication levels for the third condition is 0.51 to 0.75. This indicates that the driver needs help when driving on the road despite having had a minor amount of alcohol. The buzzer is not working.

Since the threshold is set to activate the LED and sound the 60 buzzers if the blood alcohol content (BAC) hits or exceeds 0.90.

Table 1. Conditions of the system with level of drunkenness (in mg/L)

Output	Level of Drunkenness (in mg/L)			
	0-0.25	0.26-0.50	0.51-0.75	0.76-1.00
LCD display	BAC value	BAC value	BAC value	BAC value
Buzzer indication	OFF	OFF	OFF	ON
LED	OFF	OFF	OFF	ON
Alcohol status by Telegram	BAC value	BAC value	BAC value	Alcohol detected and BAC value
Message send by GSM	No alcohol detected	No alcohol detected	No alcohol detected	Alcohol detected
Conclusion	Intoxicated	Slightly drunk	Drunkenness	Over limit drunk

The motorist in the previous instance is not competent to drive since they are totally unconscious. The buzzer and LED light up when the blood alcohol content (BAC) is too high, and the LCD shows the breathalyzer's BAC reading. The alcohol status and BAC value will be transmitted via the telegram in the same manner as the LCD display. To inform the inebriated family members that the driver is intoxicated and operating a vehicle, the GSM will make phone calls or send texts. In the end, this technology will help to prevent traffic accidents by forbidding the driver from operating a vehicle in a hazardous manner.

The percentage of parts per million (PPM) in the alcohol is plotted against time in seconds in Figure 7. The volume of PPM increases as alcohol concentration rises. The driver is safe to drive again if their blood alcohol content (BAC) is less than 0.25 mg/L, which indicates that they were not under the influence of alcohol. When the blood alcohol content (BAC) falls between 0.26 and 0.50 mg/L, alcohol was found, but not in a risky situation. A person on the other side must help the driver who is intoxicated if their blood alcohol content (BAC) is between 0.51 and 0.75 mg/L. A BAC reading that falls between 0.76 and 0.90 mg/L indicates that the driver is over the permitted limit.

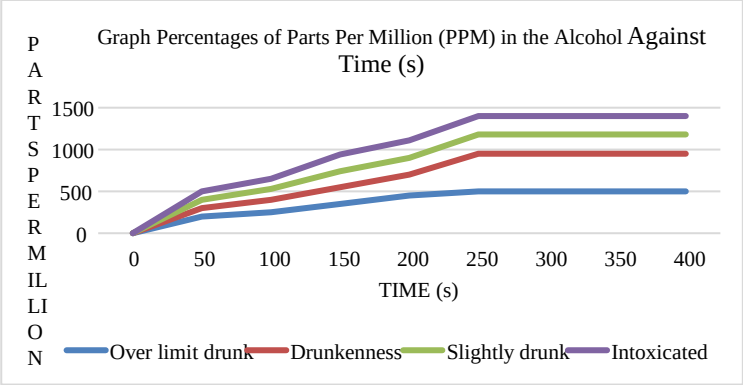

Figure 7. Graph percentage of parts per million (PPM) in the alcohol against

CONCLUSION

Tracking and locating occurrences involving drunk drivers on the recommended smart alcohol detecting technology has made driving a breeze. The effectiveness of the recommended approach was evaluated using the blood alcohol content (BAC). The driver's breath alcohol content is measured using the specified alcohol breath analyzer sensor. The alcohol status and BAC value will be displayed on an LCD, and when the level crosses the cutoff, a buzzer will sound immediately. The proposed design will be enhanced by using the Internet of Things (IoT) to make it easier for users to detect, monitor, and track their whereabouts and offer helpful results by SMS, phone calls, and telegram. The GPS will broadcast the location of the identified alcohol. For the system to advance further, it must incorporate a engine locking DC motor. Numerous collisions involving drunk drivers have resulted in damage to the vehicles of other drivers. It endangers life and property. When an intoxicated driver attempts to start a car, the device locks the engine, preventing the vehicle from going since it detects alcohol on the driver's breath.

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