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IOT-POWERED VEHICLE ACCIDENT PREVENTION AND VEHICLE SAFETY

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Abstract
Vehicle monitoring and tracking systems are implemented, using Blynk app platform acting as a medium for data transfer. However to the best of our knowledge most of the systems don't have advanced Eye Blink Sensor to monitor the drowsiness of the drivers so to overcome the above limitations, in this work, we are using advanced sensors and platforms which includes eye blink sensor and ThingSpeak. The system is developed to monitor various driver's help parameters such as eye blinking, Alcohol consumption and vehicle parameters like Engine Temperature, and tracking of the live location of the vehicle. We have successfully demonstrated the application of eye blink sensor with the help of ThingSpeak platform, which serves as a medium for data transfer and display, by applying the above functioning concept. Eventually, we can say that using eye blink sensor and ThingSpeak platform has improved decision-making and accident prevention.

Keyword / Key Index / Key Terms:
Eyeblink sensor, Alcohol sensor, Temperature sensor, Accelerometer sensor, Thing speak.

I. Introduction

The Internet of Things (IoT) is nothing more than a network of connected gadgets that can communicate with one another. The Internet of Things (IoT) is a cutting-edge breakthrough in which all sensor data is saved in the cloud and readily accessible there. This also includes sensors and actuators for obtaining data and transmitting it online. We use the cloud for data analysis, collection, and visualisation in addition to data storage.

On-demand service delivery, resource pooling, and flexibility are some of the cloud's fundamental features. The term "Internet of Things" (IoT) refers to the internet-based communication between gadgets. Smart cities health monitoring systems and smart energy are two examples of IoT applications.

IoT solutions like Blynk, Thingspeak.io, and Thingspeak can store and analyse data that is transmitted via sensors. Currently, every family has at least one vehicle. People's attitudes toward time are changing as a result of the need to finish tasks as quickly as possible in a time-constrained environment. As a result of this tendency, people drive their vehicles very quickly and put their lives in danger in an effort to finish tasks that ultimately cost them their lives. Without our intervention, accidents may happen sometimes because of someone else's negligence. Most people believe that driving quickly is the best form of transportation in this day and age.

However they were unable to see that it was the biggest danger to their lives. Despite certain checks, a few people continue to consume alcohol while driving, which is dangerous for both the general public and the occupants of the car. Overworking or getting little sleep can also lead to laziness, which makes people fall asleep behind the wheel or close their eyes for a long period of time, which can cause fatal accidents.

There are some instances where the motor's temperature rises due to increased environmental warmth or coolant loss; these are the most accidents happen as a result of drivers failing to maintain a safe

distance between them, which is another serious issue to take into account. To address these problems, we designed a vehicle observation and control system that makes use of various sensors to collect data from each sensor and analyse it using the Thingspeak application. We also used a GPS module to track the data.

II. Literature Survey

According to **Manali et al**: Proposeda system for tracking accidents and whereabouts in vehicles. They observed that driver's eye blinks, this technology offers a way to lessen tragedies. This demonstrates driving while intoxicated, roadside obstructions, and tiredness. Accident and vehicle locations are discovered. As accident information is made available through this system, which was created and has features such as database keeping, primary care is provided. There are GPS and GSM modules on the job. The framework can also measure engine temperature and alcohol intake, and the results are all shown on the website. Therefore, the passengers in the car are kept safe.[1]

According to **Imteajet al:** Created an Android application that recognises an unintentional circumstance and alerts the nearby police station and healthcare facility. An external pressure sensor is used in this application to measure the vehicle body's radial force. As a result, the application is crucial for post-accident services and may decrease the effects of an accident.[2]

Acording to **A.Anusha et al:** Created an Android application that recognises an unintentional circumstance and alerts the nearby police station and a healthcare facility. An external pressure sensor is used in this application to measure the vehicle body's radial force. As a result, the application is crucial to post-accident services and could reduce the effects of an accident. It has been described as a system that leverages an open source platform.

The framework, designed to track a vehicle's location, also monitors its fuel use and engine Temperature and vehicle speed are communicated with using GPS/GPRS/GSM modules. The web server's database contains all of the values. The web page displays all of the statistics. The framework also detects alcohol consumption and engine temperature. Therefore, protection is offered to the passengers in the car.[3]

According to **Das et al:** Detailed a system that makes use of an open source platform and is designed to track and monitor a car's position. The framework also monitors fuel usage, engine temperature, and vehicle speed, and GPS, GPRS, and GSM modules are utilised for communication. The database on the web server contains all the values, also presented a system that includes an Android phone built with GPS and GSM modules and a CPU installed inside the car. Throughout the motion of the vehicle, the GPRS-enabled web server continuously monitors the vehicle's location.[4]

III. Methodology

In this study, a system for tracking, preventing and monitoring vehicles has been built. The front of the car has an accelerometer sensor that will inform the driver if there are any vibrations. sent to the registered mobile number with a message. A temperature sensor is used and installed in the vehicle's engine compartment to prevent sparks. If the temperature inside the car rises, the engine will shut off automatically. If alcohol consumption is high, a warning will be given, and the engine will also shut off. The IR sensor detects tiredness and activates the alarm, sending a message to the recipient that the driver is in a drowsy state .Node MCU gathers the sensor values because it has an integrated Wi-Fi module, which then transmits the data to the cloud for analysis using Thingspeak. Alerts are delivered based on the circumstances.

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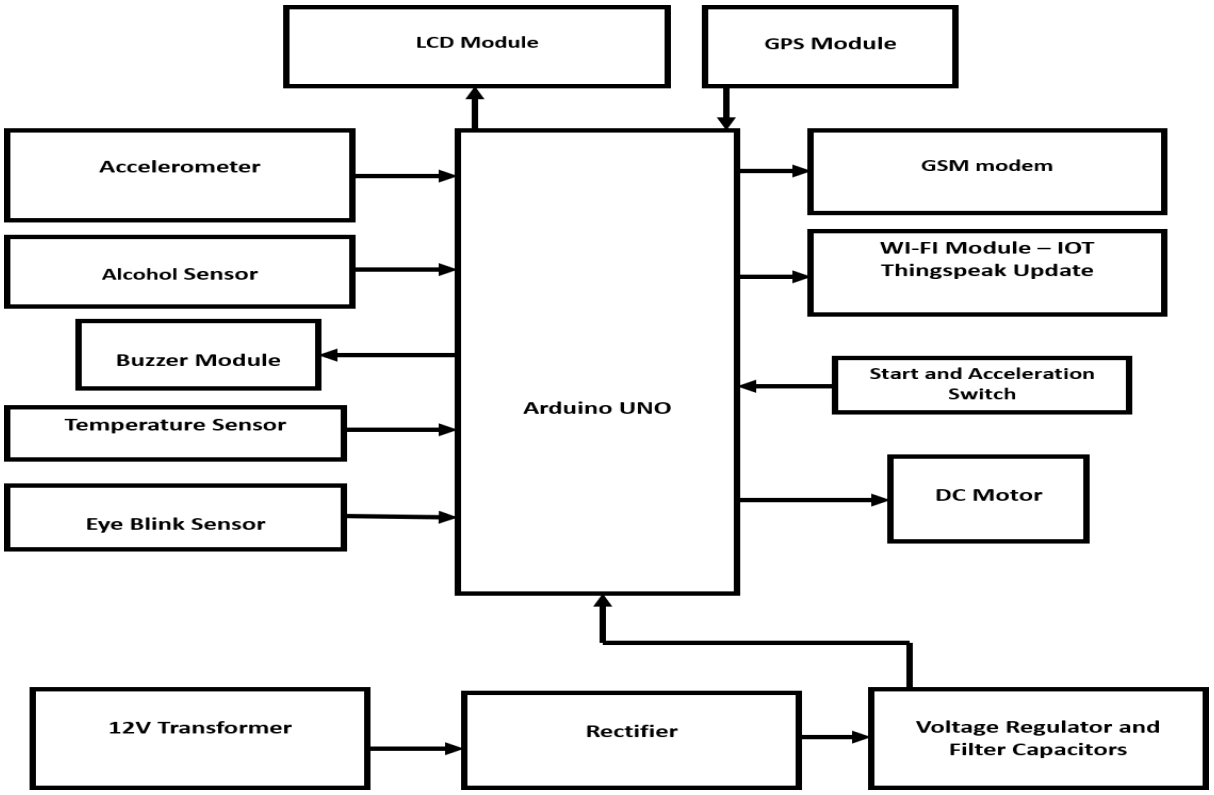

BLOCK DIAGRAM

Here, we're employing a variety of sensors and microcontrollers, including the Arduino UNO and NodeMCU, a temperature sensor, an alcohol sensor, an eye blink sensor, an accelerometer sensor, and GSM, GPS, Buzzer, LCD modules and also a Dc motor. All of the sensors are wired to the Arduino Uno's digital and analogue pins. We use the NodeMCU provided wi-fi to deliver messages and track the location of the vehicles. The eye blink sensor is used to determine whether a person is drowsy. It functions similarly to an IR sensor in that it sends out IR rays and determines whether the driver is conscious or asleep based on the reflected IR rays. A buzzer sound is used to signal when a driver is dozing off.

3.1. Component description

3.1.1. Eye Blink sensor:

Fig:1 Eye Blink sensor

3.1.2. Temperature sensor:

The second crucial sensor is the temperature sensor, which measures the engine's temperature. If the engine of the car becomes too hot, it will shut off automatically. It will also display a message in the LCD module stating that the engine is too hot and has been turned off.

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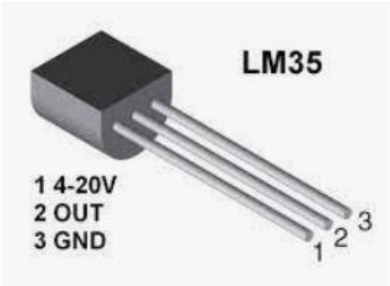

Fig:2 Temperature sensor

3.1.3. Alcohol Sensor:

Nowadays, the primary cause of traffic accidents is because drivers alcohol intake has been increasing. In order to measure the concentration of alcohol present in the air, we are using an alcohol sensor. When alcohol is present in the air, it will combine with oxygen molecules and cause the depletion layer to disappear. As a result, the depletion layer will disappear. When the alcohol concentration value exceeds the minimum concentration value, a message indicating the presence of alcohol and an automatically shut-off engine, message will be displayed on the LCD.

Fig:3 Alcohol Sensor

.3.1.4. Accelerometer sensor:

The accelerometer sensor, which is used to measure angles, is the next crucial sensor. When a vehicle is involved in a collision, it will vibrate or may tilt slightly. The GSM module will help to share the location of the accident area and will send a message to the registered mobile number and share the location using the built-in wi-fi that was provided by NodeMCU in order to report the accident to the relatives in this situation, which indicates that the vehicle has been in an accident.

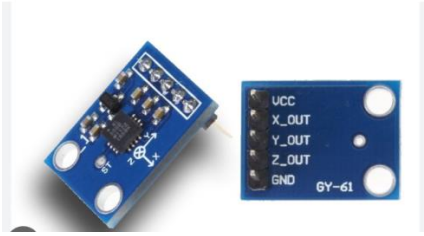

Fig:4 Accelerometer sensor

3.1.5. Node MCU:

NodeMCU is an open source development board and firmware based in the widely used ESP8266 - 12E WiFi module. It allows you to program the ESP8266 WiFi module with the simple and powerful LUA programming language or Arduino IDE.

Fig:5 Node MCU

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3.1.6. GSM module:

The GPRS Pro Serial A6 GPRS GSM Module Core DIY Development Board is a professional-grade development board that allows you to create your own IoT projects using the GPRS A6 module. The board supports dual-band GSM/GPRS networks and can be used to send and receive SMS messages, make and receive phone calls, and connect to the internet using GPRS.

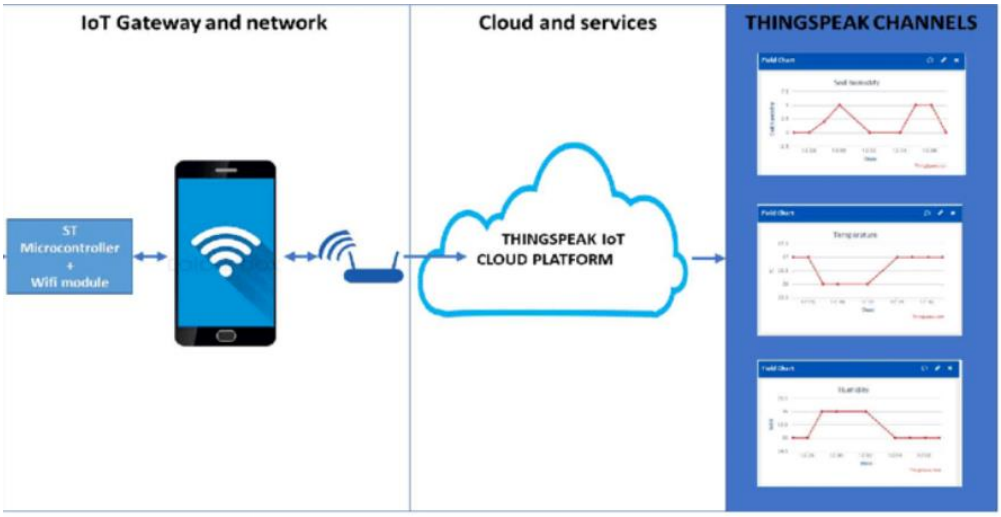
Fig:6 GSM module

3.1.7. Thing Speak Software:

The sensor data, including temperature, alcohol content, and accelerometer readings, will be continuously uploaded to Thing speak, an IOT platform, where it will be displayed as graphs to facilitate decision-making..

Thing Speak is free, open-source software that lets people talk with internet-connected gadgets. It was created in Ruby. By giving an API to both the devices and social network websites, it makes data access, retrieval, and logging easier.

With the help of Thing Speak, data can be sent from devices, websites, and sensors to the cloud and stored in either a private or public channel. By default, Thing Speak keeps data in private channels; however, data can also be shared in public channels. When data is present in a ThingSpeak channel, it can be visualised, used to generate new data, or combined with other devices, web services, and social media.



Transfer of data through Thingspeak

Here are a few examples of Thingspeak graphical data visualizations. The platform is the finest for IoT analytics and visualisation. It enables real-time (live) data analysis using a range of widely used IoT protocols. aids in measuring and reporting both simple and sophisticated facts. The integration of IoT projects with the cloud simplified the provision of analytics and data analysis.

3.2. Hardware Configuration

Eye-tracking technology is used to check a driver's alertness with the goal of exploiting their eye blink to prevent car accidents. This technology informs the driver when it detects indicators of distraction

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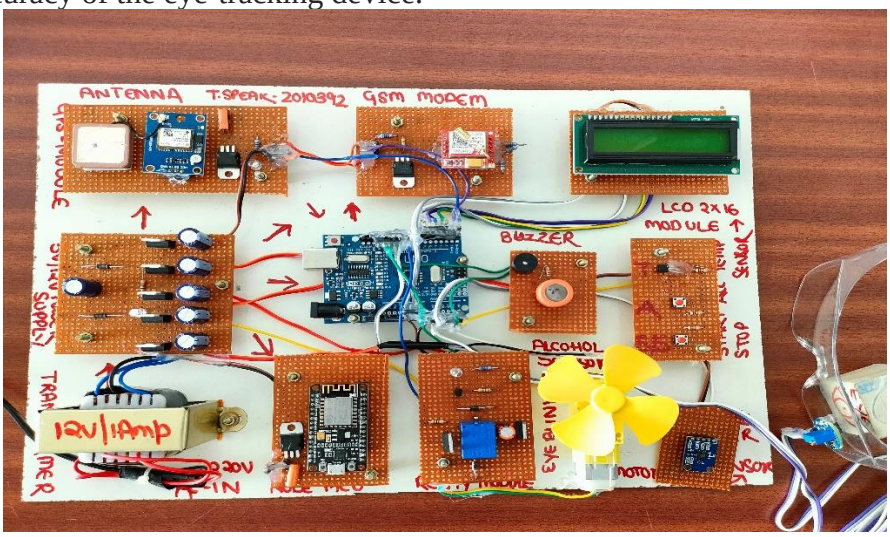
or fatigue, helping to avoid accidents. Although studies have indicated this strategy's promise, more analysis is required to ascertain its efficacy. Technical difficulties must also be resolved, such as ensuring the accuracy of the eye-tracking device.



3.2.1. Result and Discussion:

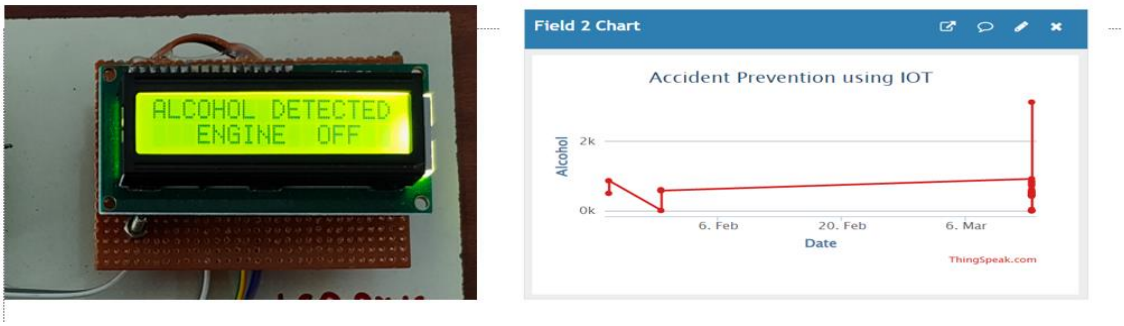


Fig: The LCD Module shows the alcohol detection

The alcohol concentration is detected by using alcohol sensor and the message is displayed in LCD and the values of alcohol concentration are showed in graph.

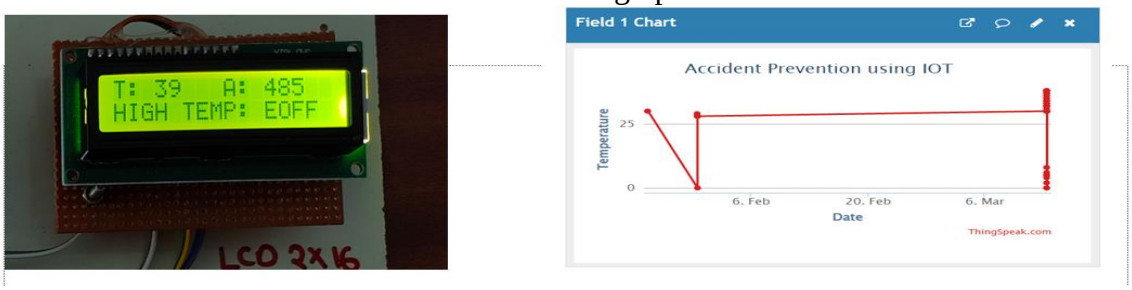


Fig: The temperature is detected and the message is displayed

Over heat of engine is detected by using temperature sensorand also message will be displayed in LCD module ,the values are showed in the graphical form.

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Fig: LCD module displays the message of accident detection

Accident is detected by using the accelerometer sensor and the location of the area is send in the form of message to the registered mobile number.

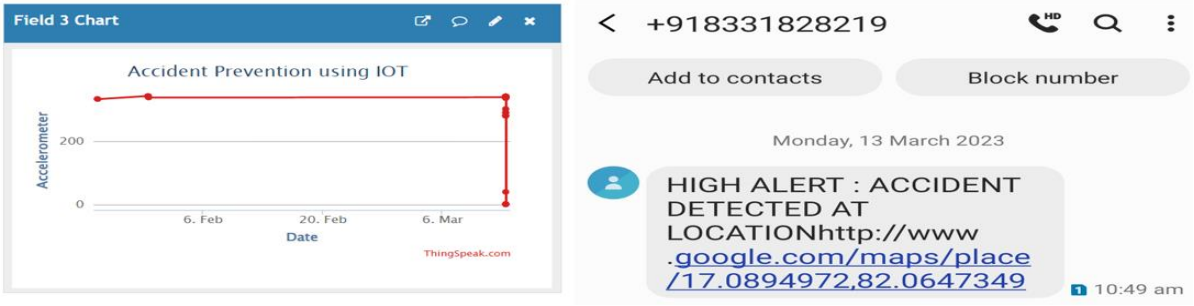

Fig: Indicates the values of accelerometer sensor, display of message.

The values of the accelerometer sensors are showed in graph and accident detected and location is shared

4. Conclusion

People are more likely to have accidents now. This is due to the fact that when a driver is sleeping, they are unable to manage their car, and by the time they wake up, an accident has already occurred. Due to the car's high speed on highways, handling is problematic, and it is challenging to bring the vehicle to a complete stop in such a situation. Because of this, numerous auto manufacturers are looking at ways to stop accidents brought on by driver weariness. In this project, we'll create a model that can help us avoid such a situation. The goal of such a model is to create a system for identifying driver fatigue symptoms and controlling vehicle speed to prevent accidents. The system's two major parts are an eye blink sensor for measuring the driver's blinks and an adaptive speed controller with a stepper motor for precisely placing the throttle valve to regulate the vehicle's speed. Because of advanced technology, there is some hope of avoiding this to some extent. This project uses an infrared sensor and an alcohol sensor to measure and control eye blinking.

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