ALCOHOL, ACCIDENT DETECTION AND REPORTING SYSTEM USING NODE MCU

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering degree in Computer Science and Engineering

By

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SCHOOL OF COMPUTING

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **Arnikaa A (Reg. No - 39110082) and Anshi Bhardwaj (Reg. No - 39110070)** who carried out the Project entitled **"ALCOHOL AND ACCIDENT DETECTION WITH ENGINE LOCKING FOR CARS"** under my supervision from January 2023 to April 2023.

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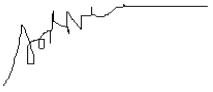
DECLARATION

I, **Arnikaa A (Reg. No - 39110082),** hereby declare that the Project Report entitled **"ALCOHOL AND ACCIDENT DETECTION WITH ENGINE LOCKING FOR CARS"** done by me under the guidance of **Dr. S. Prince Mary, M.E., Ph.D** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in **Computer Science and Engineering**.

DATE: 24.04.23



PLACE: Chennai **SIGNATURE OF THE CANDIDATE**

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ABSTRACT

The technology that has advanced the fastest has improved our way of life. However, because of insufficient emergency facilities, technology has also increased the risks associated with driving and the frequent road accidents that result in significant life losses. This paper will help with this displacement. The abstract of an automatic alcohol and accident detection system in IoT typically describes a system designed to prevent accidents caused by alcohol consumption while driving. The system uses various sensors such as an alcohol sensor, an accelerometer, and a GPS module to detect alcohol consumption and vehicle movement. Once alcohol consumption is detected, the system prevents the vehicle from starting, and if an accident occurs, the system sends an alert to emergency services with the location of the accident. To alert the rescue team, the notification is transmitted via the IFTTT (If This, Then That) application, and the position of the accident is acquired with the aid of the GPS (Global Positioning System) module. After receiving the information, the rescue crew can track down the area quickly using the location coordinates. The necessary action will then be done after the location has been confirmed. In this instance, a buzzer has been placed to warn onlookers. The abstract may also discuss the benefits of the system, such as reducing the number of accidents caused by drunk driving and the associated costs, as well as the potential for the system to be integrated into existing smart city infrastructure.

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LIST OF ABBREVIATIONS

MQ-3	-	Grove-Gas Sensor
IoT	-	Internet of Things
DC Motor	-	Direct Current Motor
IFTTT	-	If This, Then That
GPS	-	Global Positioning System
GSM	-	Global System for Mobile Communication
SMS	-	Short Message Service
ADC	-	Analog-to-Digital Converter
IDE	-	Integrated Development Environment

CHAPTER 1

INTRODUCTION

In present days the rate of accidents is increasing rapidly. Due to employment the usage of vehicles like cars, and bikes are increased, and because of this reason, accidents can happen due to Overspeed and drinking and driving. People are going at risk because of their overspeed, and due to the unavailability of advanced techniques, the rate of accidents can't be decreased. To reduce the accident rate in the country this paper introduces an optimum solution. Alcohol and accident detection system using IoT is introduced.

1.1 Internet of Things (IoT)

Fig 1.1 depicts the IoT in healthcare. It is a representation of how the Internet of Things (IoT) is transforming the healthcare industry. It shows various medical devices and sensors connected to a network, enabling healthcare providers to collect and analyze real-time data about patients' health and wellness. The image highlights the potential of IoT in healthcare, such as remote monitoring of patients, smart medical devices, and personalized care.

Fig 1.1 IoT in Healthcare

The Internet of things (IoT) describes the network of physical objects "things" that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet.

Things have evolved due to the convergence of multiple technologies, real-

time analytics, machine learning, commodity sensors, and embedded systems. Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of things. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", including devices and appliances (such as lighting fixtures, thermostats, home security systems and cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers. IoT can also be used in healthcare systems.

The IoT is the strategy for gadgets that encase hardware, and network, which enables these devices to fix, act together and switch information. IoT incorporates broadening Internet beneficial than standard gadgets, for example, work areas to any decision of generally non web get to material gadgets and on a day by day source objects. Inserted through innovation, these gadgets can banter and coordinate over the Internet, and they can be a little checked and restricted.

1.2 Alcohol Detection

The current scenario shows that the most of the road accidents are occurring due to drunk-driving. The drivers who drink alcohol are not in a stable condition and so, rash driving occurs on highway which can be risky to the lives of the people on road, the driver inclusive. The enormity of the dangerous driving transcends boundary. The laws in India are currently prohibiting drivers to drink and drive so that the fine can stop them to drink and drive. Whatsoever, effective observation of inebriated drivers could be a challenge to the policemen and road safety officers. There is therefore the need for an alcohol detection system that can function without the restriction of space and time.

The concept described in this project report is aimed to restrict the drunken driver by not allowing to drive the vehicle. When this system is installed in a vehicle over the dashboard and detects the drunken driver through the alcohol sensor, the simulated vehicle presented here with a DC motor will be stopped automatically, treated as engine shutdown.

The sensor used here is named MQ-3. This sensor is used here to detect alcoholic vapors. Presently, this kind of sensor can be used for goods transport vehicles, because these vehicles will not carry passengers. At the point when this sensor is utilized in vehicles, it is hard to recognize the tanked individual in light of the tipsy travelers. Henceforth it is prescribed to involve this innovation in trucks just because the truck contains a separate lodge for the driver and his associate. If a proper sensor is used, it can be installed in cars also.

1.3 Accident Detection

The arrival of modern technology has made our lives much easier and comfortable in comparison with the previous decades. Nowadays, people are becoming more reluctant to vehicles for travelling purpose due to its ease and reduction of time. This leads to increased usage of vehicles, which also increase traffic hazards in a proportionate rate, causing many people to die due to road accidents.

According to survey of Government of India, most of the people lost their lives in road accidents, where 8 % of lives could have been saved if they would have got medical treatment before-hand. This can be achieved by identifying the accident. Now-a-days, it became very difficult to know that an accident has occurred and to locate the position where it has happened. There is no system for identification and finding the location of an accident. When an accident occurs the information only is sent through GSM but there is no possibility to locate the spot. This Project presents an automotive localization system using GPS and GSM- SMS services that provide the exact location. And through the accident detection system one can identify the vehicle is in accident or not.

In this work, a system that is focused on GPS and GSM is offered as a solution to this challenge. This device will continuously monitor the moving vehicle's speed. The potentiometer will enable us to gauge the vehicle's speed, and when this value exceeds a predetermined threshold, an alert message will be delivered as a notification with the aid of the Arduino and GSM modules. This raises the likelihood that accidents will be decreased.

CHAPTER 2

LITERATURE SURVEY

These days, many accidents are happening because of the alcohol consumption of the driver or the person who is driving the vehicle. Alcohol Detectors installed inside the vehicle can provide safety to the people seating inside the car. An alcohol breath analyzer should be fitted/installed inside the vehicle. Another age of innovation is coming to fruition around frameworks that keep vehicles from working assuming the driver is tanked. Scientists say the innovation is promising to the point that they contrast it with the coming of the safety belt concerning its true capacity. This is the best option to prevent drunken driving.

[9] The entire system is GSM and GPS based, and the SMS is used to control the ignition of the vehicle. If the message sent is "*," the vehicle is considered to have been stolen, the vehicle is locked and its position is relayed to the registered mobile number. If the message sent is "#," the vehicle starts. The system's flaw is that it can only operate where there is a signal because it depends on an SMS for car ignition. This strategy is worthless if there is no signal. The system also included an ultrasonic sensor for accident detection. The measurements from an ultrasonic sensor are not always reliable, they have a short testing range, and they have trouble identifying small objects.

[14] Accident detection is done by the system using an accelerometer sensor. A message with the speed and location information is delivered to the registered mobile number once an accident is detected. The drawbacks of this device include its deteriorating effectiveness with time and the fact that it only monitors varying velocity, not constant velocity, which could lead to inconsistent readings.

[10] Real-time alcohol detection is provided by the suggested system, and if the level of alcohol detected is above the threshold value, the engine is locked and an SMS with the location information is sent to the registered cellphone number. Alcohol sensors have a lower lifespan and require constant re-calibration, which is a drawback.

[2] Proposed a driver drowsiness detection system. The driver drowsiness alert

system detects tiredness using an eye blink sensor. The main shortcomings of this system are that there is no alarm system for the driver and that the driver's eye blink sensor frame can be taken off, rendering the sensor inoperable.

[11] Proposed a motor-locking alcohol detection system. In order to avoid drunk driving, the system continuously checks the amount of alcohol on the driver's breath. If the detected level is higher than the threshold level, the engine is locked. The disadvantage is that the gadget is expensive, needs continuous re-calibration, and has a short lifespan.

[12] Proposed an alcohol detection system with an alert notification application. The application shows the driver's actual blood alcohol content as well as a warning message if they are intoxicated. A feature for calling a driver from a list of available driver contacts is also offered by the app. However, this system's primary flaw is that the IOT kit might be contaminated and that it is inappropriate for locations where CO and CO2 are produced. Additionally, it requires a constant power source (a +5V power supply) to function.

[3] Proposed a vehicle tracking system to monitor the stolen vehicle for recovery. Through a handy android application, it readily provides commuters with the precise location of the vehicle. The disadvantage of this technique is that GPS location can occasionally be wrong due to environmental factors, human interference, and edge-detected image noise, making it difficult to track the vehicle.

[1] Proposed a system to control the speed of the vehicle according to the respective zones. The vehicle will be equipped with a colour sensor that will identify the colour marked on the road and, in turn, maintain the vehicle's speed within that limit. Through an android application, the system also identifies accidents and reports them to the closest emergency response stations with the precise position of the accident. The lack of an autonomous speed limiter in the vehicle to prevent accidents is one of the drawbacks of the proposed system. Additionally, the application does not offer the ability to track speed and location in real time. It would also be more advantageous if it had a feature for image detection in front of the car.

[13] Proposed an alcohol detection system with engine locking using the Arduino

UNO. The engine will be turned off, if the alcohol content exceeds the cut-off point, which the system will continuously check. The system's flaw is that the values aren't always precise and that it costs more money to implement.

[4] Proposed an alcohol detection system with engine locking using an Arduino UNO as the control unit. The device will continuously check the alcohol concentration using an alcohol detection sensor, and if it rises above a certain level, it will shut off the vehicle's engine. Additionally, it uses the SIM900A to send a message with the vehicle's location to the registered mobile number. Due to the MQ3 sensor's ability to detect all gases, which makes it a universal gas sensor, the disadvantage is that the numbers might not be accurate.

[8] The device analyses a driver's breath to detect the presence of alcohol using an Arduino Uno3 microcontroller linked to an alcohol sensor. As soon as alcohol is discovered, the vehicle's engine is cut off, and the emergency buzzer is activated, reducing the likelihood of any potential accidents. The drawback is that alcohol sensors have a lower lifespan and require constant re-calibration.

[6] Proposed a GPS tracking and engine locking system along with an accident detection and alert system. It tracks the vehicle’s location anytime with the help of a message on the smartphone. It also works as an anti-theft vehicle tracking and accident-detecting device. The main disadvantage of utilizing a tilt sensor is the potential for falsely reporting an accident at a low speed, the inability to detect damage to the sensor, and the difficulty of communication in some locations without GSM networks.

[7] The paper provides a vehicle tracking system using GPS and GSM. The two-in-one device locks the engine of a car to prevent any unlawful usage of the vehicle. In case of theft, the system provides vehicle tracking. Also, after the theft, it provides the location coordinates through which the vehicle can be tracked easily. The system has the problem of not having an internet connection, which makes updates take longer.

[15] Proposed a system that will detect the alcohol level of the driver and lock the engine. It made use of the Node MCU microcontroller. The alcohol level detected

is displayed on an android application. And a message containing the location information is sent to the pre-registered mail ID. The drawback is that there is no alert system to prevent accidents.

[5] Proposed a system to identify accidents, warn the rescue crew in time, and detect alcohol. An SW420 sensor is used as a crash or rollover detector of the vehicle during and after a crash. The vibration sensor is utilized in order to check the vibration rates of the car. When an accident is discovered, the GSM Module transmits an alert message to the emergency services or a rescue team along with the latitude and longitude information provided by the GPS module. Its lack of internet connectivity means that updates may be slow, which could jeopardize people's chances of survival.

2.1 Inferences from Literature survey

- The entire system is GSM and GPS based, and the SMS is used to control the ignition of the vehicle. If the message sent is "*," the vehicle is considered to have been stolen, the vehicle is locked and its position is relayed to the registered mobile number. If the message sent is "#," the vehicle starts. The system's flaw is that it can only operate where there is a signal because it depends on an SMS for car ignition. This strategy is worthless if there is no signal. The system also included an ultrasonic sensor for accident detection. The measurements from an ultrasonic sensor are not always reliable, they have a short testing range, and they have trouble identifying small objects.[9]
- Proposed a driver drowsiness detection system. The driver drowsiness alert system detects tiredness using an eye blink sensor. The main shortcomings of this system are that there is no alarm system for the driver and that the driver's eye blink sensor frame can be taken off, rendering the sensor inoperable. [2]
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Overall, these papers suggest that IoT-based alcohol and accident detection systems have the potential to improve road safety and reduce the number of accidents caused by drunk driving. However, further research is necessary to address technical, ethical, and legal challenges associated with the system's development and deployment.

2.2 Open problems in Existing System

The current existing approach primarily prioritizes passenger safety rather than providing emergency assistance in the event of a collision. India has the dubious reputation of having the most fatalities from traffic accidents worldwide. Especially in India, road safety is becoming a significant social issue. The system's goal is to automatically identify accidents and notify the closest hospital or emergency services of their precise location.

2.3 Aim of the Project

The aim of an automatic accident detection system in IoT is to detect and alert emergency services about accidents or emergencies that occur on the road, in real-

time. This system is designed to use various sensors and technologies to detect when a car has been involved in an accident. By using the IoT technology, this system can communicate with other devices and services in real-time, such as emergency services. The automatic accident detection system can then send alerts and notifications to these services, providing critical information about the location and severity of the accident or emergency. The goal of this system is to improve emergency response times, reduce the risk of fatalities and injuries, and ultimately, save lives.

2.4 Objective of the Project

The objective of an automatic alcohol and accident detection system in IoT is to enhance safety by detecting and preventing drunk driving, as well as providing immediate assistance in the event of an accident. The system typically uses a combination of sensors, such as MQ3, accelerometers, and GPS, to detect alcohol consumption and driving patterns that indicate impaired driving. If the system detects that a driver is under the influence of alcohol, it can alert the driver to pull over and call for a ride, or even disable the vehicle to prevent them from driving.

In the event of an accident, the system can also detect the impact and automatically notify emergency services for immediate assistance. This can help reduce response times and potentially save lives. Overall, the objective of an automatic alcohol and accident detection system is to improve road safety and prevent accidents caused by drunk driving.

2.5 Scope of the Project

An automatic alcohol, accident detection system in IoT has a wide range of potential applications in the field of road safety. Such a system can be designed to monitor the behavior of drivers in real-time and detect any signs of alcohol consumption or reckless driving. The system can also provide immediate alerts to emergency services, family members or friends in case of an accident, allowing for timely and effective intervention.

The scope of such a system can vary depending on the specific features and functionalities that it offers. Some of the potential use cases of an automatic alcohol,

accident detection system in IoT include:

- *Vehicle safety*: An automatic alcohol, accident detection system can be integrated into vehicles to monitor the behavior of drivers and alert them in case they are driving under the influence of alcohol or drugs. The system can also take control of the vehicle in case of an emergency, such as sudden braking or swerving.
- *Fleet management:* The system can be used by fleet managers to monitor the behavior of drivers and ensure that they are driving safely and responsibly. This can help reduce the risk of accidents, improve fuel efficiency, and reduce maintenance costs.
- *Personal safety:* The system can be used by individuals to monitor their own behavior and ensure that they are driving safely and responsibly. This can be particularly useful for parents who want to keep track of their children's driving habits or for individuals who are concerned about their own safety on the road.
- *Emergency response:* The system can be integrated with emergency services to provide immediate alerts in case of an accident. This can help reduce response times and improve the chances of survival for accident victims.

Overall, the scope of an automatic alcohol, accident detection system in IoT is quite broad and has the potential to significantly improve road safety. However, the success of such a system will depend on the quality of the sensors and algorithms used, as well as the integration with other IoT devices and systems.

CHAPTER 3

REQUIREMENT ANALYSIS

Requirement analysis for an automatic alcohol and accident detection system in IoT involves identifying and defining the functional and non-functional requirements of the system.

Functional Requirements:

- *Detecting alcohol consumption:* The system must be able to accurately detect whether a driver has consumed alcohol or not. This can be achieved using sensors such as MQ3.
- *Detecting accidents:* The system must be able to detect accidents or emergencies that occur on the road. This can be achieved using sensors such as accelerometers, and GPS.
- *Alerting emergency services:* The system must be able to communicate with emergency services, providing them with information about the location and severity of accidents or emergencies.

Non-functional Requirements:

- *Reliability:* The system must be reliable and accurate in detecting alcohol consumption and accidents or emergencies.
- *Availability:* The system must be available 24/7, as accidents can happen at any time.
- *Security:* The system must be secure, with measures in place to prevent unauthorized access and protect personal data.
- *Usability:* The system must be user-friendly, with clear instructions for drivers and emergency services on how to use it.
- *Performance:* The system must perform well under varying weather and road conditions.
- *Scalability:* The system must be scalable to handle increasing numbers of users and data.

In addition to these functional and non-functional requirements, other factors

such as cost, legal and ethical considerations, and compatibility with existing transportation and emergency response systems would also need to be considered during requirement analysis.

3.1 Feasibility Studies/Risk Analysis of the Project

The feasibility study and risk analysis of an automatic alcohol and accident detection system in IoT would involve several considerations.

3.1.1 Feasibility Study

A feasibility study is an analysis of how successfully a project can be completed, accounting for factors that affect the project. The outcome of this study is used to determine the potential positive and negative outcomes before investing time, money, and human resources in the project.

The main factors affecting this are technical, economical, operational, and legal factors.

- *Technical feasibility:* Does the technology exist to develop such a system? Are the required sensors and communication technologies available?
- *Economic feasibility:* Can the system be developed and implemented at a reasonable cost? Will the costs be offset by benefits such as reduced accident rates and insurance premiums?
- *Operational feasibility:* Can the system be integrated with existing transportation and emergency response systems?
- *Legal feasibility:* Are there any legal barriers to implementing such a system, such as privacy laws?

3.1.2 Risk Analysis

- *Technical risks:* There is a risk that the sensors used in the system may not be accurate or reliable, which could lead to false positive or false negative results.

- *Security risks:* There is a risk that the system could be hacked, and data could be stolen or manipulated. This could potentially compromise the safety of drivers and passengers.
- *Privacy risks:* There is a risk that the system could infringe on the privacy of drivers and passengers, particularly if personal information is collected or shared without consent.
- *Legal risks:* There is a risk of legal liability if the system fails to detect an accident or emergency or provides inaccurate information that leads to harm.

Overall, the feasibility study and risk analysis would need to be carefully considered before implementing an automatic alcohol and accident detection system in IoT. It would be important to ensure that the system is reliable, secure, and respects the privacy of drivers and passengers, while also complying with applicable laws and regulations.

3.2 Software Requirements Specification document

Clear, concise, and executable requirements help development teams build high quality products that do what they are supposed to do. The best way to create, organize, and share requirements is a Software Requirements Specification (SRS) document.

3.2.1 Software Requirement Specification

- Windows 8 or above
- Embedded C
- Arduino IDE
- PHP MySQL

3.2.2 Hardware Requirement Specification

- Processor: INTEL(R) CORE(TM) i5-7200U
- Processor Speed: 2.50GHz
- Monitor: Color Monitor
- Hard Disk: 1000GB
- RAM: 8GB

3.2.3 IoT Hardware Kit

- Micro-controller (Node MCU)
- Bread Board
- Wi-Fi Model
- Accelerometer Sensor
- MQ-3 Sensor
- IFTTT
- Potentiometer
- GPS Module
- Buzzer
- Motor driver
- DC Motor
- Power Supply Unit
- Connecting Wires
- Soldering Kit

3.3 System Use case

The System Use case of an automatic alcohol and accident detection system in IoT can be described as follows:

Actor:

- Driver
- Emergency services

Preconditions:

The system is installed in the vehicle and connected to the Internet.

Basic Flow:

- The driver enters the vehicle and starts the engine.
- The system performs an initial self-test to ensure that all sensors and

communication systems are working properly.

- The driver is prompted to provide a breath sample for alcohol detection.
- If the driver's breath sample indicates that they have consumed alcohol above the legal limit, the system alerts the driver and disables the vehicle.
- If the driver's breath sample indicates that they are not under the influence of alcohol, the system continues to monitor the driver's behavior while driving.
- If the system detects an accident or emergency, it immediately alerts emergency services, providing them with the location and severity of the incident.
- Emergency services can then dispatch appropriate personnel and equipment to the scene of the accident.

Alternative Flow:

If the system detects a fault or malfunction, it alerts the driver and recommends that they seek maintenance or repairs.

Postconditions:

- If an accident or emergency occurs, emergency services are notified and can respond quickly, potentially reducing the risk of fatalities or injuries.
- If the driver is found to be under the influence of alcohol, they are prevented from driving, potentially reducing the risk of accidents caused by drunk driving.

Overall, the system Use case of an automatic alcohol and accident detection system in IoT is focused on detecting and responding to potential safety risks in real-time, improving overall safety on the road.

CHAPTER 4

DESCRIPTION OF PROPOSED SYSTEM

The proposed system detects accidents and transmits the essential information to the cloud in a matter of seconds after an accident has happened. By instantly notifying rescue agencies about an accident and giving them a message, this device can help save lives. The location of the accident, the time it happened, and its angle are all displayed in the web application. When an accident occurs, it is detected with help of a sensor that activates the device and it feeds the microcontroller its output. Alerts are sent by microcontrollers.

4.1 Selected Methodology

The system receives a power source each time the car is started. The system's power source is then turned on, and the Arduino Uno, GPS, MQ3 sensor, and MEMS sensor are all launched. The system turns on, and the software shows "NO ALCOHOL DETECTED" and the car's engine starts. The app indicates "ALCOHOL DETECTED" when the alcohol sensor finds alcohol. The buzzer also activates at this point, and the engine (motor) is shut off. A notification with the warning message "OVERSPEED" is delivered to the driver if the engine (motor) is started without alcohol detection and the vehicle is being driven at a high rate of speed (potentiometer to control speed). If the vehicle still continues to move at a high speed, then the buzzer is turned 'ON'. As soon as the MEMS sensor detects a change in the course of the vehicle (Position and angle of the car), a notification containing an alert message "ACCIDENT HAPPENED" is sent to the driver, and the buzzer is turned 'ON' and the app displays "ACCIDENT DETECTED". All these actions take place with the help of Wi-fi. The notification is sent to the user via the IFTTT application. The user receives the notification through IFTTT application. To inform the rescue team of the accident's location, a GPS module is employed. This enables the police or rescue team to immediately track the location using the GPS module after getting the information. The essential steps are conducted once the location has been verified.

4.2 Architecture of Proposed system

Fig 4.1 represents the system architecture of the proposed system. It shows various sensors and devices, such as alcohol sensors, GPS, and accelerometers, that are interconnected to a cloud-based platform. This platform collects data from these devices in real-time, analyzes it, and triggers alerts if any abnormal behavior is detected. The image also depicts how the system can send notifications to relevant authorities, such as emergency services, in case of an accident.

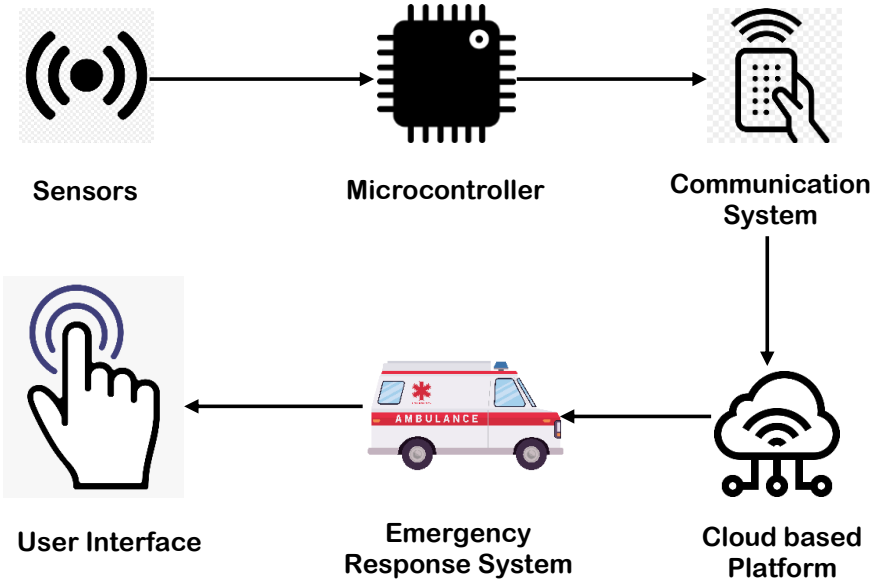


Fig 4.1 System Architecture of an Alcohol and Accident detection System

The system architecture of an automatic alcohol and accident detection system in IoT typically involves the following components:

- *Sensors:* The system would require multiple sensors to detect alcohol consumption and detect accidents or emergencies. The sensors capture data related to alcohol consumption and accidents or emergencies, which is then transmitted to the microcontroller. The microcontroller processes this data and sends it to the cloud-based platform through the communication system.
- *Microcontroller:* A microcontroller is a small computer on a single integrated circuit that would control the various sensors, process the data received, and make decisions based on pre-defined algorithms. It would also communicate with other components of the system. Here, Node MCU has been used as

the main controlling unit.

- *Communication System:* The system requires a communication system that connects the microcontroller to the Internet, allowing it to send data to the cloud and receive commands from remote servers. This communication system could be based on wireless protocols such as Wi-Fi, Bluetooth, or cellular networks. Here, the use of Wi-fi technology has been made for communication.
- *Cloud-based Platform:* The cloud-based platform receives the data and processes it to detect alcohol consumption and accidents or emergencies. If an emergency or accident is detected, the system communicates with the emergency response system, providing them with location and severity information. The platform would also store the data collected from the sensors for further analysis and reporting.
- *Emergency Response System*: The system communicates with the emergency response system, providing them with information about the location and severity of accidents or emergencies. This could involve integrating with existing emergency response systems or creating a new system specifically for this purpose.
- *User Interface:* The system would require a user interface that would allow drivers to interact with the system, providing breath samples for alcohol detection and receiving alerts if they are under the influence of alcohol. The user interface could be a mobile app or a dedicated device installed in the vehicle. Here, a dedicated web application has been made for this purpose.

The system architecture of an automatic alcohol and accident detection system in IoT involves a combination of hardware and software components, working together to detect and respond to potential safety risks in real-time.

4.2.1 Block Diagram

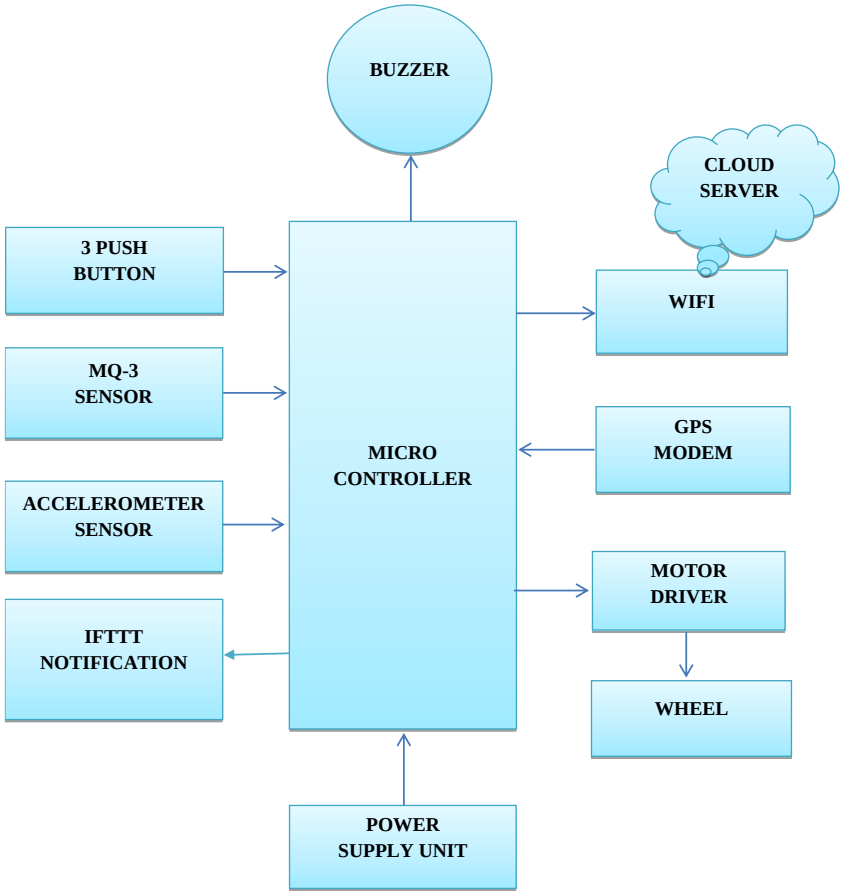


Fig 4.2 Block diagram of an alcohol and accident detection system

Fig 4.2 depicts the block diagram of an alcohol and accident detection system. It provides a detailed overview of the components and processes involved in the system. It shows how the system uses various sensors, such as alcohol sensors, GPS, and accelerometers, to detect potential hazards related to drunk driving. The image highlights how the data from these sensors is processed by a microcontroller. Additionally, the image illustrates how the system can communicate with a cloud-based platform to store and share the sensor data in real-time. Overall, the image provides a comprehensive understanding of the inner workings of the alcohol and accident detection system and how it can contribute to preventing accidents caused by drunk driving.

The system is divided into ten blocks:

- *MQ3 sensor block:* This block includes the MQ3 sensor that detects alcohol

consumption.

- *Buzzer block:* This block includes a buzzer that provides an alert to the driver in case of alcohol detection.
- *Accelerometer block:* This block includes an accelerometer sensor that detects accidents or emergency situations.
- *Potentiometer block:* This block includes a potentiometer that helps adjust the speed of the motor.
- *IFTTT notification block:* This block includes a app called IFTTT that helps sent notifications on an event of trigger.
- *Microcontroller block:* This block includes a microcontroller that receives data from the MQ3 sensor, accelerometer sensor, and potentiometer, processes it, and sends alerts to the driver via the buzzer and IFTTT notification.
- *GPS block:* This block includes a GPS that provides location data.
- *Wi-Fi module block:* This block includes a Wi-Fi module that transmits data to the cloud-based platform.
- *Motor driver block:* This block includes a motor driver that controls the motor.
- *Motor block:* This block includes a motor which is used to represent a car engine.
- *Power supply unit block*: This block includes a power supply unit that provides power to the system.

The block diagram provides a visual representation of the various components of the system and their interactions, helping to understand the overall architecture of the system.

4.2.2 HARDWARE MODULES

A hardware module is an assembly of parts designed to be added and removed from a larger system easily. The hardware modules added in the proposed system are:

4.2.2.1 Node MCU

Fig 4.3 depicts the Node MCU Microcontroller. It is a popular development board based on the ESP8266 Wi-Fi module. It is commonly used in IoT applications,

including alcohol and accident detection systems, due to its capabilities and low cost.

Fig 4.3 Node MCU

In an alcohol and accident detection system, the Node MCU is used as a microcontroller to process data from sensors such as the MQ3 alcohol sensor and the accelerometer sensor. The Node MCU can also connect to a Wi-Fi network and transmit data to a cloud-based platform for real-time monitoring and analysis. This can help to quickly identify any alcohol or accident events and alert the appropriate parties.

Additionally, the Node MCU can be used to control other components in the system, such as the buzzer or the motor. The Node MCU can receive instructions from the cloud-based platform and execute them to provide appropriate responses.

Overall, the use of the Node MCU in an alcohol and accident detection system can help to provide a low-cost, scalable, and flexible solution that can be easily integrated with other IoT devices and platforms.

4.2.2.2 Alcohol Sensor (MQ-3)

Fig 4.4 depicts the MQ3 gas sensor. It is a type of gas sensor that is commonly used to detect the presence of alcohol vapor in the air. In an alcohol and accident detection system in IoT, the MQ3 sensor is used to detect alcohol consumption by the driver.

Fig 4.4 Alcohol Sensor

The MQ3 sensor works by heating up a small metal oxide element, which increases its resistance to the flow of electricity. When alcohol vapor comes into contact with the heated element, it reacts with the metal oxide, causing a change in its resistance. The change in resistance is then measured and can be used to determine the concentration of alcohol in the air.

In an alcohol and accident detection system, the MQ3 sensor is connected to a microcontroller such as the Node MCU, which can process the data from the sensor and determine if the alcohol concentration is above a certain threshold. If the alcohol concentration is detected above the threshold, the system can trigger an alert, such as sounding a buzzer, to notify the driver that they are not fit to drive. This can help to prevent accidents and improve road safety.

Thus, the use of the MQ3 sensor in an alcohol and accident detection system in IoT is important for detecting alcohol consumption and preventing drivers from operating a vehicle while under the influence of alcohol.

4.2.2.3 Accelerometer Sensor

Fig 4.5 depicts the accelerometer sensor. It is a type of motion sensor that measures acceleration and changes in velocity in the X, Y, and Z directions. In an alcohol and accident detection system in IoT, the accelerometer sensor can be used to detect sudden changes in the movement or orientation of the vehicle, which may

indicate an accident.

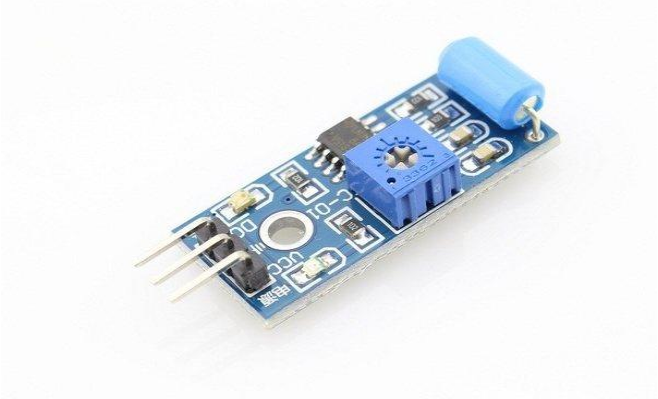


Fig 4.5 Accelerometer Sensor

In an alcohol and accident detection system, the accelerometer sensor is connected to a microcontroller such as the Node MCU, which can process the data from the sensor and determine if a sudden change in movement or orientation has occurred. If a sudden change is detected, the system can trigger an alert, such as sending a notification to emergency services.

Thus, the use of the accelerometer sensor in an alcohol and accident detection system in IoT is important for detecting and responding to accidents quickly, which can help to reduce the severity of injuries and fatalities resulting from car crashes.

4.2.2.4 Potentiometer Sensor

The potentiometer is a three-terminal device. It has a rotating contact that acts as an adjustable voltage divider. The potentiometer structure consists of a sliding contact (called wiper), a resistive element, electrical terminals, and a housing. The sliding contact moves along the resistive element, while the housing consists of the wiper and the element.

Fig 4.6 depicts the Potentiometer sensor. It is a variable resistor that can be used to measure changes in position or rotation. In an alcohol and accident detection system in IoT, a potentiometer sensor can be used to adjust the speed of the vehicle.

Fig 4.6 Potentiometer Sensor

4.2.2.4.1 Working

The fixed input voltage is applied across the two ends terminal of a potentiometer, which further produces the adjustable output voltage at the wiper or slider. As the slider moves from one end to another, the divider can vary the output voltage from maximum to Ground.

4.2.2.5 IFTTT

Users can automate web-based operations and boost productivity with the help of the free web service and mobile app IFTTT. IFTTT, which pays homage to the programming conditional statement, stands for "If This Then That." Users can specify task automation using formulas referred to as "recipes," so that when something occurs in one app, the event initiates an action in another app. For instance, you can program automation to immediately send a photo to Twitter, Instagram, Flickr, and other photo-sharing websites when you share it on Facebook.

4.2.2.6 Buzzer

Fig 4.7 depicts a buzzer which is a simple electromechanical device that can be used to generate a sound or alarm. In an alcohol and accident detection system in IoT, a buzzer can be used to provide an audible alert to the driver when the system detects that they are not fit to drive due to alcohol consumption.

Fig 4.7 Buzzer

When the MQ3 alcohol sensor detects a concentration of alcohol above a certain threshold, the microcontroller can activate the buzzer to sound an alarm. This alarm can alert the driver that they are not in a safe condition to drive and encourage them to find an alternative mode of transportation.

Additionally, a buzzer can also be used as an alarm in case of an accident. When the accelerometer sensor detects a sudden change in movement or orientation, the system can activate the buzzer to sound an alarm and alert passengers in the vehicle. This can help to reduce the severity of injuries and fatalities resulting from car crashes by providing a timely warning to occupants of the vehicle.

Thus, the buzzer can help to prevent accidents and improve road safety by providing timely warnings to drivers and passengers.

4.2.2.7 DC Motor

Fig 4.8 DC Motor

Fig 4.8 depicts an electric DC motor used to demonstrate the concept of

engine locking. Here in this work, the DC motor will be connected to the microcontroller. When alcohol is detected the DC motor stops in order to indicate that alcohol is detected and continue running when there is no alcohol detected.

The DC motor is typically controlled by a microcontroller, which receives input from various sensors, such as alcohol sensors, GPS, and accelerometers, to determine the appropriate action required to prevent an accident. The motor's speed and direction can be controlled by adjusting the voltage and current supplied to it, making it a versatile and reliable component of the alcohol and accident detection system. Overall, the DC motor plays a critical role in ensuring the safety and reliability of the system.

4.2.2.8 Motor Driver

Fig 4.9 Motor Driver

Fig 4.9 depicts a motor driver which essentially “drives” a motor i.e., it allows the motor to be controlled using the microcontroller. It acts as an interface between the motor and the microcontroller mainly because they work on different levels of currents.

A motor requires a high amount of current whereas a microcontroller needs less amount of current. A motor driver takes the low-current signal from the controller circuit and amps it up into a high-current signal, to correctly drive the motor. It basically controls a high-current signal using a low-current signal. There are different

types of motor drivers available in the market, in the form of ICs. They have different characteristics and serve the purpose of driving different types of motors.

4.2.2.9 GPS Module

Fig 4.10 depicts a GPS (Global Positioning System) module which is a device that can receive signals from GPS satellites to determine the location and speed of a vehicle. In an alcohol and accident detection system in IoT, a GPS module can be used to track the location of the vehicle and send alerts to a cloud-based platform in case of an accident or alcohol consumption.

Fig 4.10 GPS Module

For example, if the accelerometer sensor detects a sudden change in movement or orientation of the vehicle, the microcontroller can activate the GPS module to determine the location of the vehicle and send an alert to a cloud-based platform. This alert can be used to notify emergency services or other relevant parties about the accident and provide the location of the vehicle for a more rapid response.

Thus, the use of a GPS module in an alcohol and accident detection system in IoT can help to improve road safety by providing real-time location tracking and alerts in case of an accident or unsafe driving due to alcohol consumption.

4.2.3 SOFTWARE MODULES

The software modules refer to the software that has been used to develop the proposed system. The software modules added in the proposed system are:

4.2.3.1 Arduino IDE

Arduino IDE (Integrated Development Environment) is a software platform that can be used to program and control microcontrollers such as Arduino boards. In an alcohol and accident detection system in IoT, Arduino IDE can be used to develop and upload the code to the microcontroller that controls the sensors and other components of the system. The code written in Arduino IDE can be used to read data from the sensors such as the MQ3 alcohol sensor and accelerometer sensor, process the data and make decisions based on the data received. The code can also be used to control the DC motor and activate the buzzer to provide alerts to the driver.

Moreover, Arduino IDE can also be used to communicate with other components of the system such as the GPS module and Wi-Fi module. The code can be written to integrate the data received from the GPS module into the system and send alerts to a cloud-based platform using the Wi-Fi module.

Overall, Arduino IDE provides a user-friendly interface for programming and controlling the microcontroller in an alcohol and accident detection system in IoT. The use of Arduino IDE allows for easy development and testing of the code, which is critical for building a reliable and effective system.

4.2.3.2 Embedded C

Embedded C programming plays a crucial role to make the microcontroller run & perform the fancied actions. At present, we usually utilize several electronic devices like mobile phones, digital cameras, etc. The managing of these embedded devices can be done with the help of an embedded C program. Embedded systems control many devices in common use today. Ninety-eight percent of all microprocessors are manufactured as components of embedded systems.

Embedded C programming strengthens with functions where every function is a set of statements utilized to complete specific tasks. The embedded C and C languages are equivalent and implemented through significant components like a variable, character set, keywords, etc.

4.2.3.3 PHP

PHP (Hypertext Pre-processor) is a server-side scripting language that is commonly used for web development. In an alcohol and accident detection system in IoT, PHP is used to develop the backend of a web application or cloud-based platform that receives alerts from the system and stores data about the accidents and alcohol consumption incidents.

For example, the PHP code can be written to receive data from the sensors and microcontroller through Wi-Fi or other wireless communication protocols. The data received can be processed and stored in a database for future analysis and reporting.

Moreover, the PHP code can be used to generate reports and analytics about the incidents, which can be used for future analysis and decision-making. The reports can be used to identify trends in accidents or alcohol consumption incidents, which can help to inform policy and regulatory decisions.

The use of PHP in an alcohol and accident detection system in IoT can help to develop a robust backend system for receiving, processing and storing data about accidents and alcohol consumption incidents. This can help to improve road safety by providing timely alerts and generating reports that can inform policy and regulatory decisions.

Features of PHP:

- PHP just like MySQL is open source and free.
- PHP also has in built support for working hand in hand with MySQL.
- PHP is cross platform which means one can deploy the application on a number of different operating systems such as windows, Linux, Mac OS etc.
- Just like MySQL has built in functions for data manipulations, PHP also has built in functions for connecting to MySQL server and manipulating the data in the database.

4.2.3.4 mySQL

IoT systems rely on databases to store and process the accumulated information that drives them. MySQL is one of the most popular database platforms

in the world and is used in a wide variety of business and scientific solutions. MySQL is a valid choice in database platforms when you are designing a system that interacts with the IoT.

It has several advantages that make it a viable solution for IoT implementations:

- Data security is critical for many types of applications including IoT systems. MySQL is well known as an exceptionally secure database platform that is used by many popular websites.
- Scalability is another factor that is important when designing an IoT system. As the system evolves it may need to expand in unexpected directions. MySQL has a proven track record of handling the large amounts of data generated by the IoT.
- High performance and availability are hallmarks of MySQL that make it a perfect fit as the backend of an IoT system.
- It is Opensource.

4.3 Description of Software for Implementation and Testing plan of the Proposed Model

The steps required for the implementation of software and the testing plan of the proposed model are given below:

4.3.1 Description of Software for implementation

To reduce the accident rate in the country this paper introduces an optimum solution. Alcohol and accident detection system using IoT is introduced; the main objective is to control the accidents by sending a message to the registered mobile using wireless communications techniques. When an accident occurs at a city, the message is sent to the registered mobile through IFTTT in less time. Micro controller is the heart of the system which helps in transferring the message to different devices in the system. Accelerometer sensor will be activated when the accident occurs and the information is transferred to the registered number through IFTTT. GPS system will help in finding the location of the accident spot. The proposed

system will check whether an accident has occurred and notifies to nearest medical centers and registered mobile numbers about the place of accident using IFTTT and GPS modules. The location can be sent through tracking system to cover the geographical coordinates over the area. The accident can be detected by an accelerometer sensor which is used as major module in the system.

4.3.1.1 System Flowchart for alcohol detection

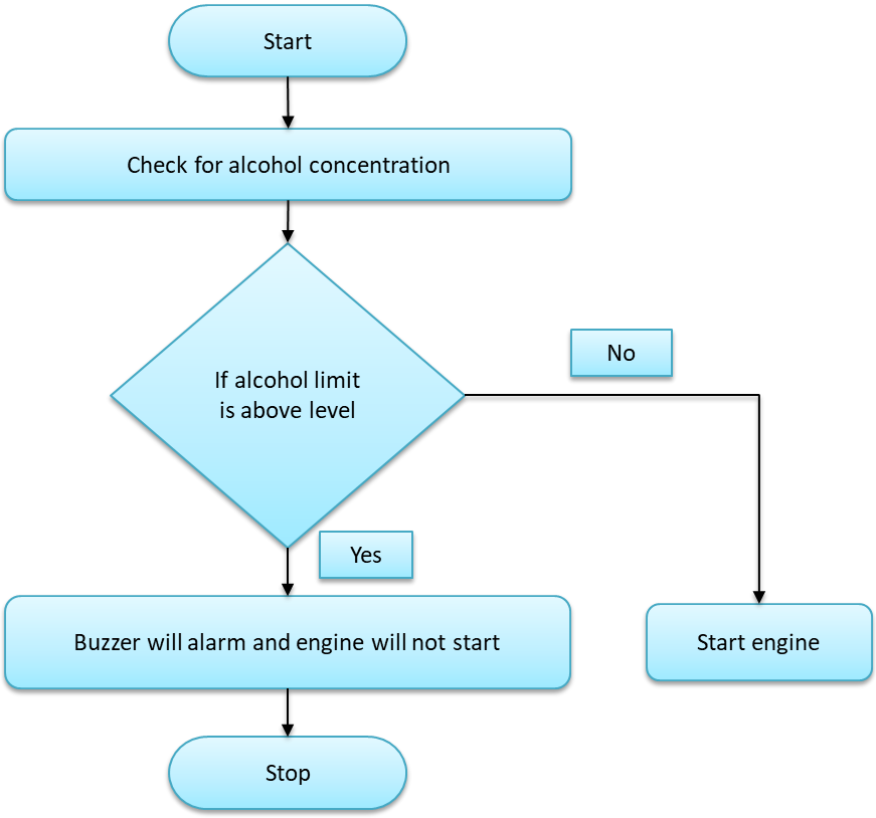


Fig 4.11 System flowchart for alcohol detection

Fig 4.11 depicts the system flowchart for alcohol detection. It represents the step-by-step process to detect the presence of alcohol in a person's breath. The flowchart begins by initializing the system and initializing the alcohol sensor. If the alcohol concentration is above a predefined threshold, the system triggers an alarm. Overall, the image provides a clear understanding of the alcohol detection process.

The system algorithm comprises of three main steps. First is to boot up the system, next is the measuring state, this stage measures the amount of alcohol level from the drivers. A prescribed set limit will be given as input to the

microcontroller, once the alcohol level exceeds the limit the car will not start.

4.3.1.2 System Flowchart for accident detection

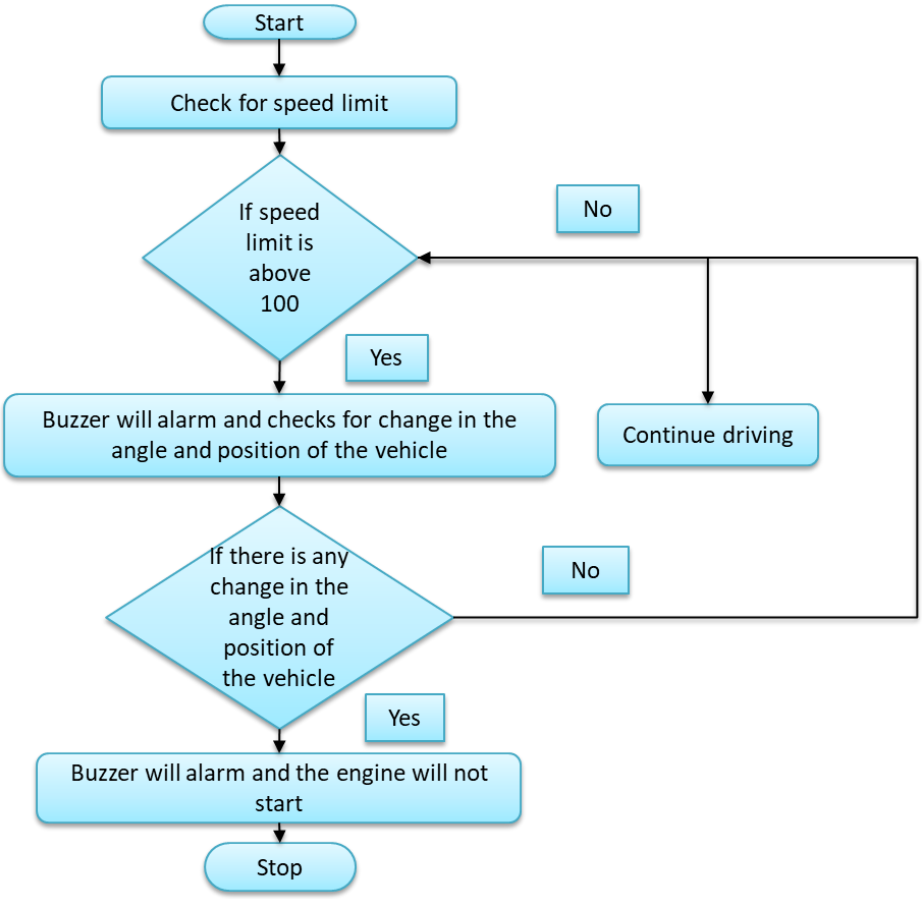


Fig 4.12 System Flowchart for accident detection

Fig 4.12 depicts the system flowchart for accident detection. It represents the step-by-step process to detect a potential accident. The flowchart begins by initializing the system and initializing the accelerometer sensor. The image shows how the system continuously monitors the sensor data and detects any abnormal behavior. If an accident is detected, the system triggers an alarm. The image provides a clear understanding of the accident detection process.

The system algorithm comprises of three main steps. First is to boot up the system, next is the measuring state, this stage measures the speed level of the vehicle. A prescribed set limit will be given as input to the microcontroller, once the speed level exceeds the limit, the buzzer will alarm. Third stage is the measuring

of angle and position of the vehicle. If there is any change in the angle and position of the vehicle, then the it is taken as accident detected and the buzzer will alarm, the engine will not start.

4.3.2 Testing Plan

The testing plan of an automatic alcohol and accident system in IoT should include several steps to ensure that the system operates effectively and reliably. Here is an example of a testing plan that could be followed:

- *Unit Testing:* This involves testing each component of the system individually to ensure that it functions as expected. The sensors, microcontrollers, and communication modules should be tested to ensure that they are working properly.
- *Integration Testing:* This involves testing how the components of the system interact with each other. For example, the sensors should be tested to ensure that they communicate with the microcontroller correctly.
- *System Testing:* This involves testing the overall functionality of the system. For example, the system should be tested to ensure that it accurately detects alcohol levels and triggers an alert if necessary.
- *Performance Testing:* This involves testing the performance of the system under different conditions, such as high or low temperatures or in noisy environments.
- *User Acceptance Testing:* This involves testing the system with end-users to ensure that it is user-friendly and meets their needs.
- *Security Testing:* This involves testing the system for vulnerabilities and ensuring that it is secure against potential attacks.
- *Regression Testing:* This involves re-testing the system after any changes or updates to ensure that it continues to function as expected.

The testing plan for an automatic alcohol and accident system in IoT should be comprehensive and ensure that the system is reliable, accurate, and user-friendly.

4.3 Project Management Plan

There is a lot to consider when beginning an IoT project. Here are the

project plans for the development of the whole project:

4.3.1 Phase-1

- The required assets for the model have been acquired.
- Currently the project has been started following the base idea of alcohol and accident detection using Arduino.
- Completed the simulation of the alcohol and accident detection separately.
- The alcohol detection part has been planned to be completed for phase-1 and the accident detection part for phase-2.

4.3.2 Phase-2

- To work on completing the accident detection part.
- To combine both alcohol and accident detection as a single working model.
- To create the complete simulation of the model.
- To create a complete working model following the simulation.

4.4 Financial Report on Estimated Costing

The required hardware has been acquired. The Node MCU, MQ-3 sensor, and Accelerometer sensor are bought at an economical cost.

4.5 Transitions/Software to Operations Plan

A Transitions/Software to Operations plan for an alcohol and accident detection system in IoT would include the following steps:

- *Define the scope of the system:* Clearly define the purpose, objectives, and goals of the alcohol and accident detection system in IoT, and identify the key stakeholders.
- *Develop a software development plan:* Identify the software development team and establish a plan for the development of the software. This plan should include timelines, milestones, and deliverables.
- *Identify the hardware requirements*: Determine the necessary hardware components for the system, including sensors, microcontrollers, and

communication modules.

- *Develop a testing plan:* Create a testing plan for the software and hardware components of the system, including unit testing, integration testing, and system testing.
- *Implement the system:* Once the software and hardware components have been developed and tested, deploy the system in the field. This may involve installing sensors in vehicles, setting up communication channels, and integrating the system with existing infrastructure.
- *Establish monitoring and maintenance procedures:* Develop a plan for monitoring the system and performing maintenance tasks as needed. This should include regular system checks, updates, and repairs.
- *Develop a data management plan:* Determine how the system will collect, store, and analyze data, and ensure that appropriate data privacy and security measures are in place.
- *Establish a transition plan:* Create a plan for transitioning the system from development to operations, including the handover of responsibilities from the development team to the operations team.

It should cover all aspects of system development, testing, implementation, and maintenance to ensure that the system operates effectively and reliably in the field.

CHAPTER 5

IMPLEMENTATION DETAILS

5.1 Development and Deployment setup

Development in IoT means combining hardware parts and software programs in such a way that the final product could monitor specific values, collect and transfer data, analyze given data and cause the physical device to act correspondingly.

5.1.1 Development

The following technologies to construct an optimized communication model are utilized:

- Arduino IDE, to program the ESP32.
- Domain name and hosting server.
- PHP script for inserting data into the MySQL database and displaying it on a web page.
- MySQL database for storing readings.
- PHP script for displaying data on the web page.

5.1.2 Deployment setup

The application is deployed in the IoT cloud using HTTP, PHP and mySQL. PHP is used as a backend service to manage the web requests and mySQL is used to manage the database. The PHP and mySQL is connected to the IoT cloud application. So, as soon as the data from the sensors are received, it is uploaded to the cloud application and the application is displaying the same.

5.2 Algorithm

The communication between the web client and the web server, the hosting server and the domain name is established by the Hypertext Transfer Protocol (HTTP). Web clients can connect to the web server through a router and the internet. The required activities are carried out using a standard client–server architecture and building a client that requests a PHP script to publish sensor readings in a MySQL database. The webpage displays sensor readings that can be accessed

anywhere. With the assistance of this method, sensor data can be transmitted from websites to web clients. These data may then be utilized to evaluate, investigate, and take necessary actions.

The program's design includes a Hyper Text Markup Language (HTML) structure that specifies how the webpage should be displayed. The ESP32 must connect to the appropriate sensors to monitor the environment to complement successfully uploading the programming code. This idea aims to have a domain name and a hosting account that allows us to store sensor readings from the ESP32. It can visualize the readings from anywhere by accessing its own server domain. The web client may access the data through a web browser thanks to the design of an Internet of Things network for alcohol and accident monitoring and its implementation using a web server.

5.3 Testing

Testing in IoT is a process of performing several tests on the IoT solution to ensure that it is ready for real-life applications. The various tests performed on the proposed IoT solution to make sure that it is working without any errors are given below.

Table. 4.1. Test Cases

Test ID	Test Case Description	Input	Expected Output	Actual Output	Pass/Fail
1	MQ-3 sensor working	Sense the alcohol level	Glow the appropriate LED	Glow's the appropriate LED successfully	Pass
2	Node MCU	Output of Sensor, buzzer, LED	Read correct input of sensor, control of LED &	Successfully read's and controls	Pass

			buzzer		
3	Sensor: If alcohol level<threshold	Alcohol	Red LED should glow	Red LED ON Successfully glows	Pass
4	Sensor: If alcohol level>=threshold	Alcohol	Green LED should glow	Green LED ON Successfully glows	Pass
5	Buzzer: Should beep when alcohol detected	Instruction given by Arduino Uno	Should beep	Beeps successfully	Pass
6	Notification	IFTTT sends the sensor values to the registered mobile number	A pop up notification should appear	Notification successfully received	Pass
7	Buzzer: Should beep when accelerometer sensor is on	Output of Accelerometer sensor	Should Beep	Beeps Successfully	Pass
8	Accelerometer sensor working	Detect any vibrations/inclination of the device	Buzzer should beep	Buzzer beeps successfully	Pass

CHAPTER 6

RESULTS AND DISCUSSIONS

An alcohol and accident detection system in IoT is designed to detect when a driver is under the influence of alcohol and alert authorities or emergency services in the event of an accident. The system uses sensors to detect alcohol levels and accelerometers to detect accidents, and the data is processed to detect alcohol consumption and accidents or generate emergency alerts.

The results of an alcohol and accident detection system in IoT are highly dependent on the accuracy of the sensors, the reliability of the microcontroller, and the performance of the cloud-based software. When properly designed and implemented, the system can detect alcohol levels with high accuracy and provide timely alerts in the event of an accident.

6.1 Experimental setup

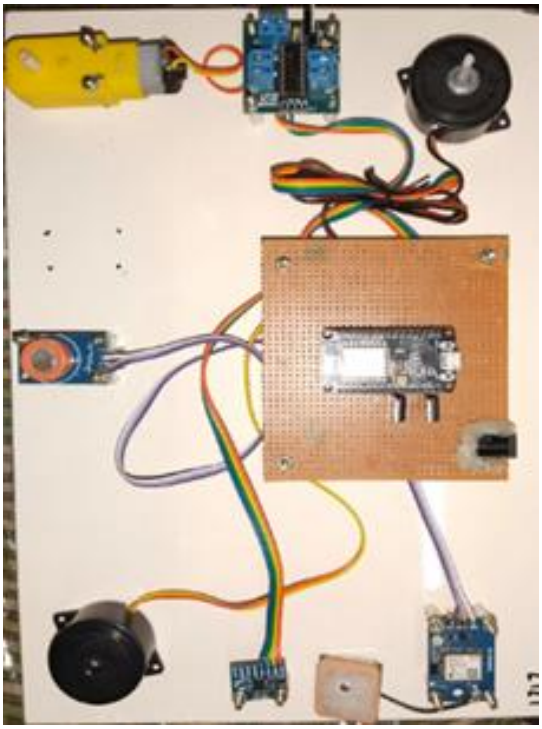
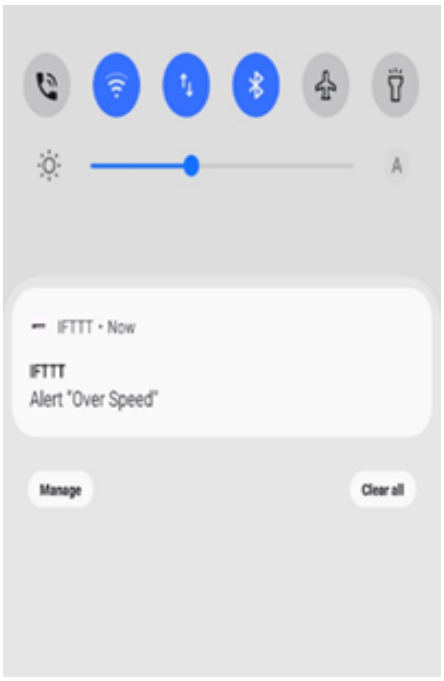


Fig 6.1 Overall connection of the system

Fig 6.1 shows the experimental setup of the system in order to run the project.

All the components have been connected and tested for the overall working of the system. The working of the system has been tested and run successfully.

6.2 IFTTT notification



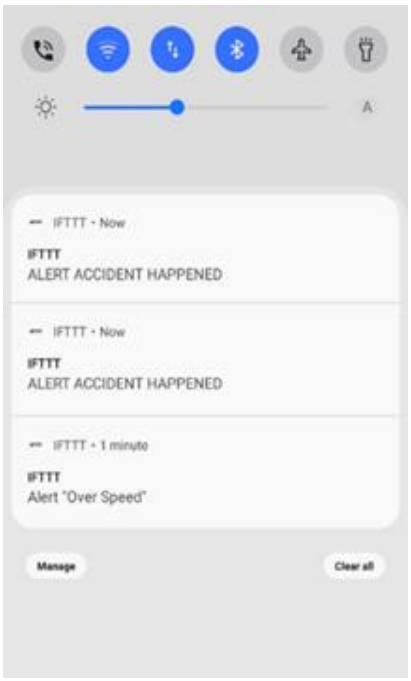


Fig 6.2 Alert notification message for Overspeed

Fig 6.3 Alert notification message for Accident detection

Fig 6.2 and 6.3 shows that an alert notification is sent to the registered mobile number when the vehicle is driven at a high speed, and if the accident is detected. A notification with the warning message "OVERSPEED" is delivered to the driver if the vehicle is being driven at a high rate of speed (potentiometer to control speed). If the vehicle still continues to move at a high speed, then the buzzer is turned ‘ON’. As soon as the accelerometer sensor detects a change in the course of the vehicle (Position and angle of the car), a notification containing an alert message “ACCIDENT HAPPENED” is sent to the driver, and the buzzer is turned ‘ON’.

The notification is sent to the user via IFTTT application. The user receives the notification through IFTTT application. Thus, the notification has been sent and received successfully to the registered mobile number with the help of IFTTT.

6.3 Web Application

i. Web application displaying the IoT data

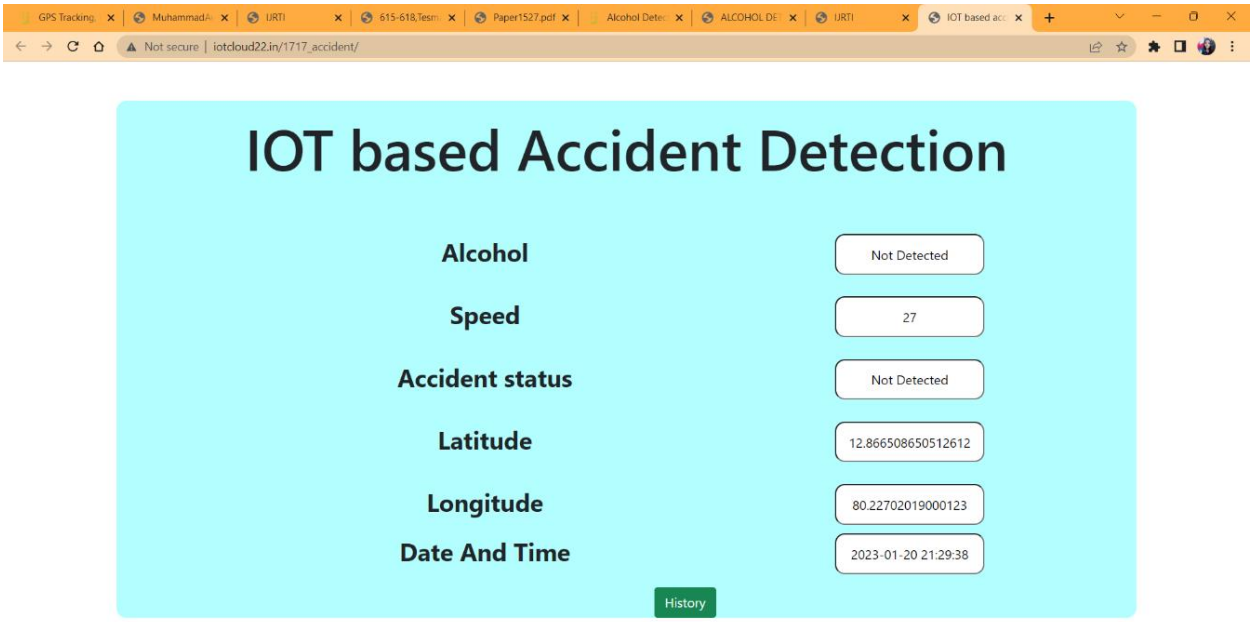


Fig 6.4 Web application displaying the speed, latitude, and longitude values, the current date, and time.

Fig 6.4 shows the web application that displays the real-time latitude and longitude values, the speed of the vehicle, and the current date and time. Thus, the application displays all the values correctly.

ii. Web application displaying the Accident status

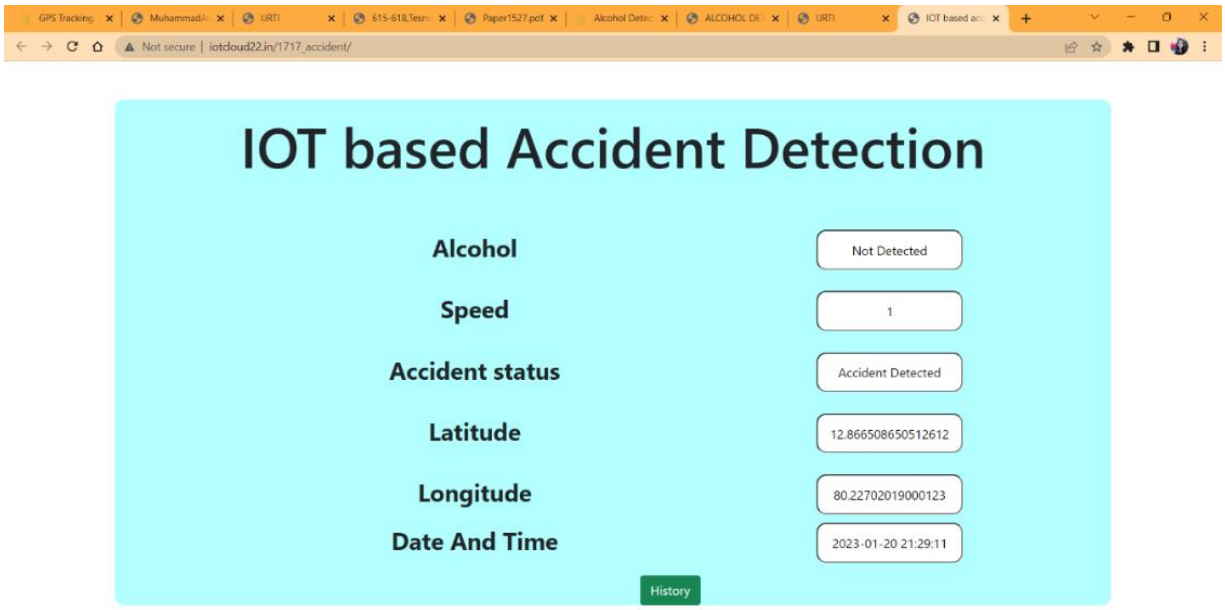


Fig 6.5 Web application displaying as Accident Detected

Fig 6.5 depicts the web application which displays as “Accident detected” as soon the accident is detected, along with the speed of the vehicle, latitude and longitude values, and the date and time.

Thus, the primary objective of the application on displaying the sensor values is successful. All these actions take place with the help of Wi-fi. To inform the rescue team of the accident's location, a GPS module is employed. This enables the police or rescue team to immediately track the location using the GPS module after getting the information. The essential steps are conducted once the location has been verified.

CHAPTER 7

CONCLUSION

7.1 Conclusion

An alcohol and accident detection system in IoT is an innovative solution that can greatly reduce the number of accidents caused by drunk driving. The system uses sensors and algorithms to detect the presence of alcohol in a driver's breath or blood and can alert the driver or even prevent the vehicle from starting if alcohol is detected. Additionally, the system can also detect if an accident has occurred and alert emergency services immediately, potentially saving lives and reducing the severity of injuries. This system has the potential to significantly improve road safety and prevent tragic accidents caused by drunk driving. The detection of drunk driving by drivers using an IOT-based system is covered in this study. This system is suggested and divided into two fundamental components, namely the hardware system and the software system. The software will be utilized by the owner, management, or driver of the truck or cab, and the hardware is situated inside the vehicle. The alcohol portion checks the driver's blood alcohol content after which the CPU and GPS antenna access the position. This GPS component with the help of a microcontroller, pinpoints the vehicle's location precisely, uploads the data to the cloud, and acts as a reporting mechanism to notify all drunk drivers. For the proposed work, an adaptable, precise, and alcohol-accident detection system have been developed.

7.2 Future Work

- In the future, the image detection feature can be implemented to detect a thing/person in front of the vehicle.
- A front camera can also be implemented to detect the driver’s facial expression and detect drowsiness in the driver to prevent accidents from happening.
- Deep learning models can also be integrated with IoT to improve the accuracy of the application.

7.3 Implementation Issues

Developing an automatic alcohol and accident detection system in IoT involves several implementation issues that need to be considered. Some of these issues include:

- *Sensor Selection:* Selecting the appropriate sensors for detecting alcohol levels and accidents is crucial. The sensors should be accurate, reliable, and capable of working in harsh environments.
- *Data Processing:* The system needs to collect and process data from the sensors to detect alcohol levels and accidents. The data processing algorithms must be efficient and accurate to ensure timely detection.
- *Connectivity:* The system needs to be connected to the internet to enable remote monitoring and reporting. The connectivity should be reliable and secure to prevent unauthorized access.
- *Power Consumption:* IoT devices are typically battery-powered, and power consumption is a critical consideration. The system must be designed to minimize power consumption while still maintaining optimal performance.
- *User Interface:* The user interface should be intuitive and easy to use to enable easy monitoring and reporting of alcohol levels and accidents.
- *Regulatory Compliance:* The system must comply with regulatory requirements for safety and privacy. This may involve obtaining necessary certifications and adhering to relevant standards and regulations.
- *Cost:* Developing an automatic alcohol and accident detection system can be expensive, and cost is an important consideration. The system must be designed to be cost-effective while still maintaining optimal performance and reliability.

Thus, developing an automatic alcohol and accident detection system in IoT requires careful consideration of several implementation issues to ensure optimal performance, reliability, and regulatory compliance.

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APPENDIX

A. SOURCE CODE

```
#include "Wire.h"
#include <ESP8266WiFi.h>
#include <ESP8266HTTPClient.h>
#include <WiFiClient.h>
#include <SoftwareSerial.h>

#define rx D7
#define tx D8
SoftwareSerial gpsSerial (rx, tx);

int updates;
int failedUpdates;
int pos;
int stringplace = 0;



String timeUp;
String nmea[15];
String labels[12] {"Time: ", "Status: ", "Latitude: ", "Hemisphere: ", "Longitude: ",
"Hemisphere: ", "Speed: ", "Track Angle: ", "Date: "};

String ch;
String lat = "0.0000";
String lon = "0.0000";

const char* ssid     = "iot";
const char* password = "12345678";

const char* serverName = "http://iotcloud22.in/1717_accident/post_value.php";
const char* speed_alert =
"http://maker.ifttt.com/trigger/speed/json/with/key/nW_5U10hkK5ybCNfcRSyWl-
```

```
HdUEccIAp-kleNtGo1oB";
const char* accident =
"http://maker.ifttt.com/trigger/accident/json/with/key/nW_5U10hkK5ybCNfcRSyWl-
HdUEccIAp-kleNtGo1oB";

WiFiClient client;
WiFiClient client1;
HTTPClient http;
HTTPClient http1;

const int MPU_addr = 0x68;

int16_t AcX, AcY, AcZ;

int gas, pot, sped, x, y, c, speed;

int flag = 0;
void setup() {
  Wire.begin(2, 0);
  Serial.begin(9600);
  gpsSerial.begin(9600);
  pinMode(D5, OUTPUT);
  pinMode(D7, OUTPUT);
  pinMode(D8, OUTPUT);
  pinMode(D6, INPUT);

  WiFi.begin(ssid, password);
  Serial.println("Connecting");
  while (WiFi.status() != WL_CONNECTED) {
    Serial.print(".");
    delay(500);
  }
  Serial.println("");
  Serial.print("Connected to WiFi network with IP Address: ");
```

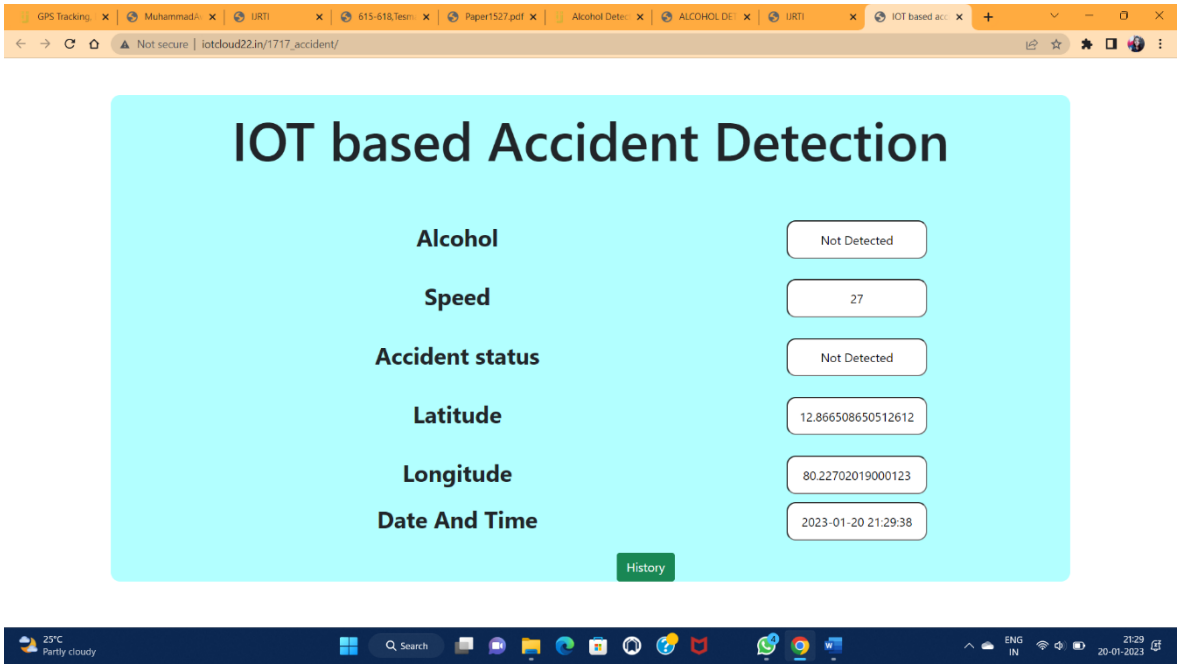
```
  Serial.println(WiFi.localIP());

  check_I2c(MPU_addr);
  Wire.beginTransmission(MPU_addr);
  Wire.write(0x6B);
  Wire.write(0);
  Wire.endTransmission(true);
}

void loop() {
  gas = digitalRead(D6);

  pot = analogRead(A0);
  //  Serial.print(" Speed : ");
  //  Serial.print(pot);

  speed = map(pot , 0, 1023, 0, 130);

  sped = map(pot , 0, 1023, 0, 255);
  //  Serial.print(" PWM : ");
  //  Serial.print(sped);

  //  sending_to_db();

  if (gas == 1 && flag < 15)
  {
    analogWrite(D7, sped);
    analogWrite(D8, 0);
  }
  else {
    analogWrite(D7, 0);
    analogWrite(D8, 0);
  }
```

```
if (speed > 100 )
{
  flag += 1;
}
else {
  flag = 0;
}
if (flag > 10 && flag < 15)
{
  digitalWrite(D5, HIGH);
  sending_to_db();
  trigger_to_speed_alert();
}
else if (flag >= 15)
{
  analogWrite(D7, 0);
  analogWrite(D8, 0);
}
else {
  digitalWrite(D5, LOW);
}
//  Serial.print(flag);

Wire.beginTransmission(MPU_addr);
Wire.write(0x3B);
Wire.endTransmission(false);
Wire.requestFrom(MPU_addr, 14, true);

AcX = Wire.read() << 8 | Wire.read();
AcY = Wire.read() << 8 | Wire.read();
AcZ = Wire.read() << 8 | Wire.read();

x = map(AcX, -17000, 17000 , 0 , 100);
y = map(AcY, -17000, 17000 , 0 , 100);
```

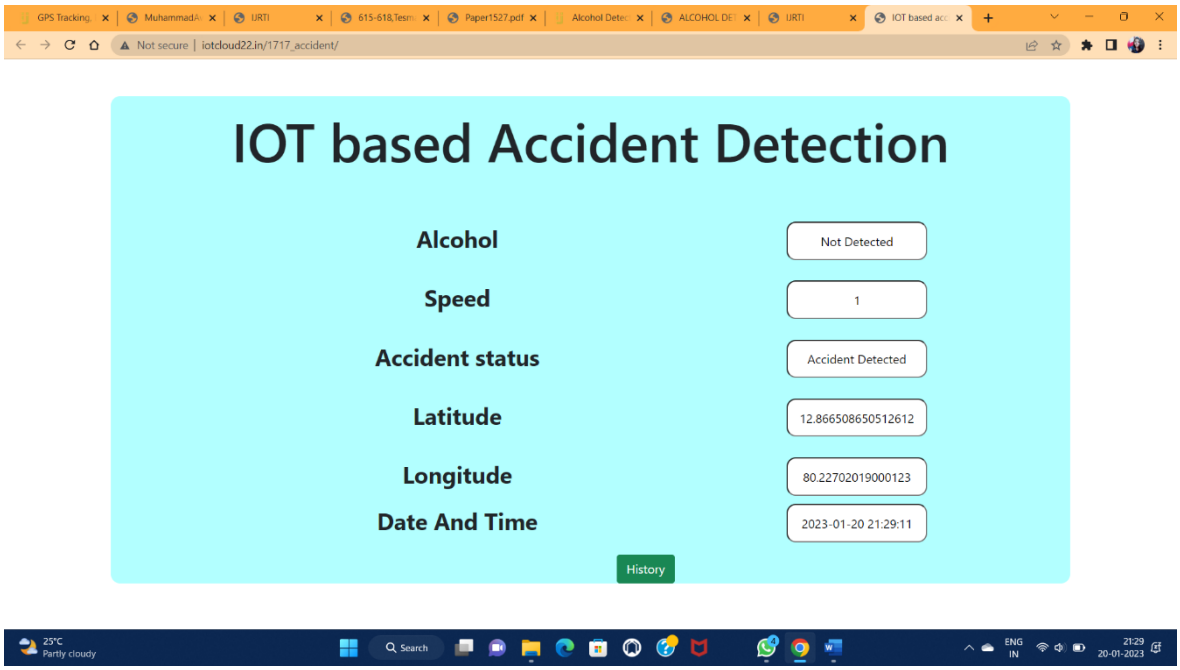
```
  //  z=map(AcZ, -17000, 17000 ,0 ,100);

  //  Serial.print("  AcX = "); Serial.print(x);
  //  Serial.print(" | AcY = "); Serial.println(y);
  //  Serial.print(" | AcZ = "); Serial.println(AcZ);

  if ((x > 30 && x < 70) && (y > 30 && y < 70)) {
    digitalWrite(D5, LOW);
    Serial.println("  NORMAL");
    c = 0;
  }
  else {
    Serial.println("ACCIDENT HAPPENED");
    digitalWrite(D5, HIGH);
    c = 1;
    sending_to_db();
    trigger_to_accident();
  }

  Serial.print(" Gas : ");
  Serial.print(gas);
  Serial.print(" speed : ");
  Serial.print(speed);
  Serial.print(" ACC : ");
  Serial.println(c);

  //  gps();
  sending_to_db();
  delay(500);
}
```

B. SCREENSHOTS

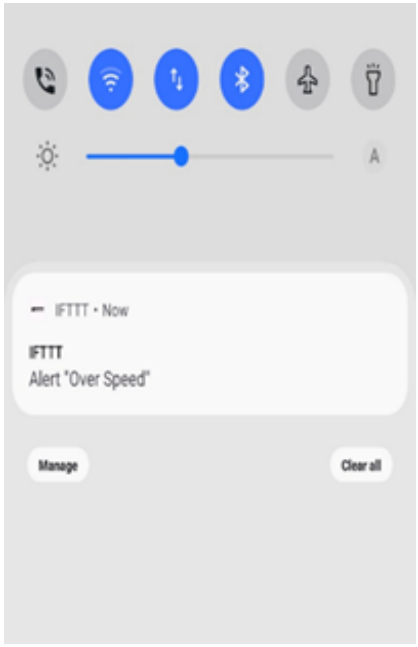
i. Screenshot of the Web application to display IoT data



ii. Screenshot of the Web application displaying the sensor values



iii. Screenshot of the Alert notification to the registered mobile number



C. RESEARCH PAPER

AUTOMATIC ACCIDENT DETECTION AND REPORTING SYSTEM USING NODE MCU

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***Abstract* — The technology that has advanced the fastest has improved our way of life. However, because of insufficient emergency facilities, technology has also increased the risks associated with driving and the frequent road accidents that result in significant life losses. This paper will help with this displacement. The process is completed when an accident occurs, the MEMS (Micro-Electromechanical Systems) sensor analyses the signal, and the microcontroller receives this signal. To alert the rescue team, the notification is transmitted via the GSM (Global System for Mobile communication) module, and the position of the accident is acquired with the aid of the GPS (Global Positioning System) module. After receiving the information, the rescue crew can track down the area quickly using the location coordinates. The necessary action will then be done after the location has been confirmed. In this instance, a buzzer has been placed to warn onlookers. The objective of this effort is to automatically identify an accident and notify the rescue crew or command centre.**

Keywords*— *MEMS (Micro-Electro-Mechanical Systems) sensor, GSM (Global System for Mobile communications) module, GPS (Global Positioning System) model, Buzzer, IoT (Internet of Things), Potentiometer, Node MCU, IFTTT notification.

I. INTRODUCTION

A. Alcohol Detection

According to the current fact, drunk driving is the main cause of car accidents. The lives of those on the road, including the driver, are at risk since drunk drivers are unstable and engage in aggressive driving on highways. The issue of reckless driving knows no borders. Driving while intoxicated is currently against the law in India, thus the fee will deter drivers from doing so. But it might be challenging for police officers and those responsible for traffic safety to monitor drunk drivers efficiently. In checkpoints, blood alcohol content (BAC) checks using breath analyzers are a typical approach to determine a person's alcohol consumption. In order to cause judgmental impairment while driving, a blood alcohol content of 0.05 percent is required. This system is untrustworthy because it lacks the necessary manpower, inspection authorities sometimes make compromises, and it costs money to keep checkpoints in place across a wide area. In order to detect alcohol, a system that is not limited by space or time is required.

By prohibiting inebriated drivers from operating a car, the idea outlined in this report aims to limit such behavior. The simulated vehicle shown here with a DC motor will automatically stop and be treated as the engine shutting down when this technology is put in a car above the dashboard and identifies the drunk driver using the alcohol sensor.

Here, the sensor is referred to as MQ-3. This sensor is being used to look for alcohol fumes. One advantage of using this sensor is that it is not case-sensitive, therefore it cannot differentiate very faint fumes. Since it shouldn't identify other intoxicated drivers who are the furthest from the steering wheel, it should be advantageous. This demonstrates that the sensor should be installed above the dashboard and that its direction should be quite near the steering wheel. As said, the sensor is not delicate; nonetheless, during a demonstration, the sensor must be exposed to alcohol fume.

B. Accident Detection

In contrast to earlier decades, the advent of contemporary technology has significantly eased and improved our quality of life. Due to their simplicity and reduction of time, people are becoming less and less inclined to use vehicles for transportation. As a result, there is a rise in the number of vehicles on the road, which raises traffic

dangers proportionally and results in a high number of fatal traffic accidents.

According to a survey by the government of India, the majority of fatalities occurred in traffic accidents, where 8% of those fatalities would have been prevented if the victims had received medical attention sooner. Finding the accident will help with this. Nowadays, finding the scene of an accident and learning that one has happened are exceedingly tough tasks. There is no procedure in place to identify and locate an accident. Information about accidents is only transmitted via GSM (Global System for Mobile communications), and the location cannot be determined. The Global Positioning Technology (GPS) and SMS-based GSM vehicle localization system pinpoint the exact location. We can also determine whether or not the car has been in an accident thanks to accident detection technology.

In this work, a system that is focused on GPS and GSM is offered as a solution to this challenge. This device will continuously monitor the moving vehicle's speed. The potentiometer will enable us to gauge the vehicle's speed, and when this value exceeds a predetermined threshold, an alert message will be delivered as a notification with the aid of the Arduino and GSM modules. This raises the likelihood that accidents will be decreased.

I. LITERATURE SURVEY

[1] The entire system is GSM and GPS based, and the SMS is used to control the ignition of the vehicle. If the message sent is "*," the vehicle is considered to have been stolen, the vehicle is locked and its position is relayed to the registered mobile number. If the message sent is "#," the vehicle starts. The system's flaw is that it can only operate where there is a signal because it depends on an SMS for car ignition. This strategy is worthless if there is no signal. The system also included an ultrasonic sensor for accident detection. The measurements from an ultrasonic sensor are not always reliable, they have a short testing range, and they have trouble identifying small objects.

[2] Accident detection is done by the system using an accelerometer sensor. A message with the speed and location information is delivered to the registered mobile number once an accident is detected. The drawbacks of this device include its deteriorating effectiveness with time and the fact that it only monitors varying velocity, not constant velocity, which could lead to inconsistent readings.

[3] Real-time alcohol detection is provided by the suggested system, and if the level of alcohol detected is above the threshold value, the engine is locked and an SMS with the location information is sent to the registered cellphone number. Alcohol sensors have a lower lifespan and require constant re-calibration, which is a drawback.

[4] Proposed a driver drowsiness detection system. The driver drowsiness alert system detects tiredness using an eye blink sensor. The main shortcomings of this system are that there is no alarm system for the driver and that the driver's eye blink sensor frame can be taken off, rendering the sensor inoperable.

[5] Proposed a motor-locking alcohol detection system. In order to avoid drunk driving, the system continuously checks the amount of alcohol on the driver's breath. If the detected level is higher than the threshold level, the engine is locked. The disadvantage is that the gadget is expensive, needs continuous re-calibration, and has a short lifespan.

[6] Proposed an alcohol detection system with an alert notification application. The application shows the driver's actual blood alcohol content as well as a warning message if they are intoxicated. A feature for calling a driver from a list of available driver contacts is also offered by the app. However, this system's primary flaw is that the IOT kit might be contaminated and that it is inappropriate for locations where CO and CO2 are produced. Additionally, it requires a constant power source (a +5V power supply) to function.

[7] Proposed a vehicle tracking system to monitor the stolen vehicle for recovery. Through a handy android application, it readily provides commuters with the precise location of the vehicle. The disadvantage of this technique is that GPS location can occasionally be wrong due to environmental factors, human interference, and edge-detected image noise, making it difficult to track the vehicle.

[8] Proposed a system to control the speed of the vehicle according to the respective zones. The vehicle will be equipped with a colour sensor that will identify the colour marked on the road and, in turn, maintain the vehicle's speed within that limit. Through an android application, the system also identifies accidents and reports them to the closest emergency response stations with the precise position of the accident. The lack of an autonomous speed limiter in the vehicle to prevent accidents is one of the drawbacks of the proposed system. Additionally, the application does not offer the ability to track speed and location in real time. It

would also be more advantageous if it had a feature for image detection in front of the car.

[9] Proposed an alcohol detection system with engine locking using the Arduino UNO. The engine will be turned off, if the alcohol content exceeds the cut-off point, which the system will continuously check. The system's flaw is that the values aren't always precise and that it costs more money to implement.

[10] Proposed an alcohol detection system with engine locking using an Arduino UNO as the control unit. The device will continuously check the alcohol concentration using an alcohol detection sensor, and if it rises above a certain level, it will shut off the vehicle's engine. Additionally, it uses the SIM900A to send a message with the vehicle's location to the registered mobile number. Due to the MQ3 sensor's ability to detect all gases, which makes it a universal gas sensor, the disadvantage is that the numbers might not be accurate.

[11] The device analyses a driver's breath to detect the presence of alcohol using an Arduino Uno3 microcontroller linked to an alcohol sensor. As soon as alcohol is discovered, the vehicle's engine is cut off, and the emergency buzzer is activated, reducing the likelihood of any potential accidents. The drawback is that alcohol sensors have a lower lifespan and require constant re-calibration.

[12] Proposed a GPS tracking and engine locking system along with an accident detection and alert system. It tracks the vehicle’s location anytime with the help of a message on the smartphone. It also works as an anti-theft vehicle tracking and accident-detecting device. The main disadvantage of utilizing a tilt sensor is the potential for falsely reporting an accident at a low speed, the inability to detect damage to the sensor, and the difficulty of communication in some locations without GSM networks.

[13] The paper provides a vehicle tracking system using GPS and GSM. The two-in-one device locks the engine of a car to prevent any unlawful usage of the vehicle. In case of theft, the system provides vehicle tracking. Also, after the theft, it provides the location coordinates through which the vehicle can be tracked easily. The system has the problem of not having an internet connection, which makes updates take longer.

[14] Proposed a system that will detect the alcohol level of the driver and lock the engine. It made use of the Node MCU microcontroller. The alcohol level detected is displayed on an android application. And a message containing the location information is sent to the pre-registered mail ID. The drawback is that there is no alert system to prevent accidents.

[15] Proposed a system to identify accidents, warn the rescue crew in time, and detect alcohol. An SW420 sensor is used as a crash or rollover detector of the vehicle during and after a crash. The vibration sensor is utilized in order to check the vibration rates of the car. When an accident is discovered, the GSM Module transmits an alert message to the emergency services or a rescue team along with the latitude and longitude information provided by the GPS module. Its lack of internet connectivity means that updates may be slow, which could jeopardize people's chances of survival.

A. Existing System

The current approach primarily prioritizes passenger safety rather than providing emergency assistance in the event of a collision. India has the dubious reputation of having the most fatalities from traffic accidents worldwide. Especially in India, road safety is becoming a significant social issue. Our system's goal is to automatically identify accidents and notify the closest hospital or emergency services of their precise location.

B. Proposed System

The proposed system detects accidents and transmits the essential information to the cloud in a matter of seconds after an accident has happened. By instantly notifying rescue agencies about an accident and giving them a message, this device can help save lives. The location of the accident, the time it happened, and its angle are all displayed in the web application. When an accident occurs, it is detected with help of a sensor that activates the device and it feeds the microcontroller its output. Alerts are sent by microcontrollers.

I. PROPOSED METHODOLOGY

This is the block diagram consisting of all the main components. The main hardware module for the system was the Arduino Uno microcontroller board, as shown in the figure. Arduino Uno, Alcohol Sensor (MQ3), MEMS Sensor, Potentiometer, Buzzer, DC Motor, GPS Module, and Wi-Fi are the main function modules. As an additional feature, the Arduino UNO microcontroller is integrated with a smartphone application to track the location, speed, and position of the car in real-time.

A. Block Diagram

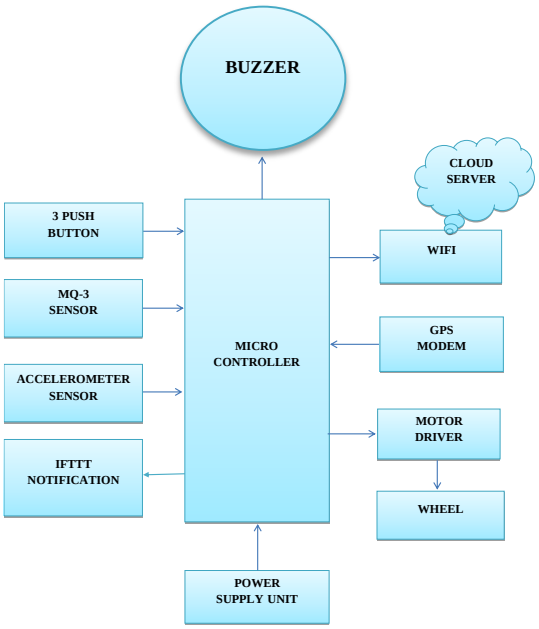

Fig. 1. Block diagram

A. *IoT Part*

Fig. 2. IoT part

The system receives a power source each time the car is started. The system's power source is then turned on, and the Arduino Uno, GPS, MQ3 sensor, and MEMS sensor are all launched. The system turns on, and the software shows "NO ALCOHOL DETECTED" and the car's engine starts. The app indicates "ALCOHOL DETECTED" when the alcohol sensor finds alcohol. The buzzer also activates at this point, and the engine (motor) is shut off. A notification with the warning message "OVERSPEED" is delivered to the driver if the engine (motor) is started without alcohol detection and the vehicle is being driven at a high rate of speed (potentiometer to control speed). If the vehicle still continues to move at a high speed, then the buzzer is turned 'ON'. As soon as the MEMS sensor detects a change in the course of the vehicle (Position and angle of the car), a notification containing an alert message "ACCIDENT HAPPENED" is sent to the driver, and the buzzer is turned 'ON' and the app displays "ACCIDENT DETECTED". All these actions take place with the help of Wi-fi. The notification is sent to the user via the GSM modem. The user receives the notification through a GSM modem. To inform the rescue team of the accident's location, a GPS module is employed. This enables the police or rescue team to immediately track the location using the GPS module after getting the information. The essential steps are conducted once the location has been verified.

II. HARDWARE MODULES

A. *Node MCU (ESP8266)*

The Esperessif ESP8266-12E Wi-Fi System-On-Chip serves as the foundation for NodeMCU. It is open-source and based on firmware written in Lua. As Arduino cannot operate wirelessly, Node MCU is ideal for Internet of Things applications, particularly for Wireless connectivity setup (Wi-fi). Since both of these chips are microcontroller-equipped prototyping boards that can be programmed using the Arduino IDE, they share a lot of similarities with the Arduino. However, because the ESP8266 is more recent and less established than the Arduino, it has more robust specs.

B. *Alcohol Sensor (MQ-3)*

Alcohol may be detected with the MQ-3 Analog Gas Sensor. High alcohol sensitivity and low benzene sensitivity characterize it. The conductivity of the sensor increases along with the concentration of the target alcohol gas when it is present. The MQ-3 gas sensor has a good resistance to disrupt gasoline, smoke, and mist and a high sensitivity to alcohol. A fine sensitivity range of about 2 meters is available. The sensor is inexpensive and suited for a variety of applications; it can be used to detect alcohol at various concentrations.

C. *MEMS Sensor*

Sensors constructed of a suspended mass between two capacitive plates are used in Micro-Electro-Mechanical Systems, or MEMS, chip-based technology. When the sensor is tilted, this suspended substance results in a change in electrical potential. The difference that was produced is then measured using a change in capacitance. Here, an alteration in the position and angle of the vehicle is exploited by the MEMS sensor to identify accidents. When the vehicle is tilted, the sensor transmits signals to the microcontroller, which then instructs the microcontroller to shut off the motor and activate the buzzer.

D. *Potentiometer*

A potentiometer sensor converts a linear or rotational object's displacement or distance into an electrical signal. In this instance, the potentiometer is used to control the speed of the vehicle.

E. *Buzzer*

In any system, beepers are the most typical application for Arduino buzzers. Most frequently, Arduino is utilized with a piezoelectric buzzer. Because it is compact, lightweight, and often

inexpensive, it can produce a variety of tones at various frequencies without the need for a separate oscillating circuit.

A. *DC Motor*

To illustrate the idea of engine locking, a DC motor that runs on electricity is used. The DC motor will be connected to the microcontroller in this location. The DC motor stops to indicate the presence of alcohol when it is detected. Otherwise, carry on demonstrating because no alcohol is found.

B. *GPS Module (Location Identification using GPS)*

Users may instantly find out their location and the time everywhere on Earth thanks to GPS chips and modules. Any GPS receiver can access the navigational system's Global Positioning System (GPS), which provides precise location and timing data. The method is free to use for anyone having a GPS receiver and a clear view of four or more GPS satellites. By carefully synchronizing the GPS satellite transmissions, a GPS receiver determines its location. All around the world, GPS is now widely used.

C. *IFTTT (Accident Alert notification using IFTTT)*

Users can automate web-based operations and boost productivity with the help of the free web service and mobile app IFTTT. IFTTT, which pays homage to the programming conditional statement, stands for "If This Then That." Users can specify task automation using formulas referred to as "recipes," so that when something occurs in one app, the event initiates an action in another app. For instance, you can program automation to immediately send a photo to Twitter, Instagram, Flickr, and other photo-sharing websites when you share it on Facebook.

II. SOFTWARE MODULES

A. *Arduino IDE*

Writing, creating, and uploading code to Arduino Modules are the main uses of the open-source program Arduino IDE, which was created by Arduino cc. A layperson with no prior expertise can easily understand the code compilation process because it is open-source software. To upload programs and communicate with them, it connects to the Arduino hardware. It is compatible with Linux, Windows, and MAC.

B. *Embedded C*

The C language's extension variation is called embedded C. Applications based on microcontrollers are typically developed using it. This programming language depends on the hardware.

C. *Internet of Things (IoT)*

The fusion of numerous technologies, real-time analytics, machine learning, commodity sensors, and embedded systems has caused changes in the world. The Internet of things is made possible by the traditional domains of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others. The Internet of Things (IoT) is a method for items that contain hardware and a network, allowing them to fix problems, work together, and switch information. IoT is extending Internet connectivity beyond conventional devices like workstations to a variety of typically non-web-accessible materials and everyday source objects. These technologically advanced devices can communicate and collaborate through the Internet while also being somewhat checked and limited.

III. RESULTS AND DISCUSSIONS

A. *Experimental setup*

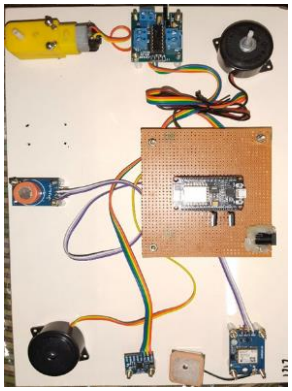

Fig. 3. Overall connection of an alcohol, accident detection, and reporting system

B. *IFTTT notification*

An alert notification is sent to the registered mobile number when the vehicle is driven at a high speed and if the accident is detected.

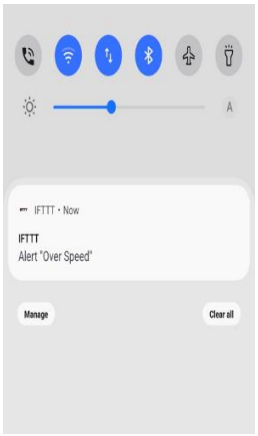

Fig. 4. Alert notification message for Overspeed

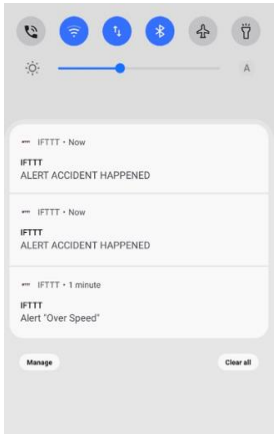

Fig. 5. Alert notification message for Accident detection

A. Web Application

The application displays the real-time latitude and longitude values, the speed of the vehicle, and the current date and time.

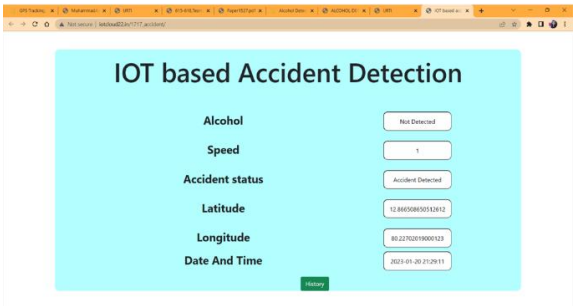

Fig. 6. Web application displaying as Accident Detected

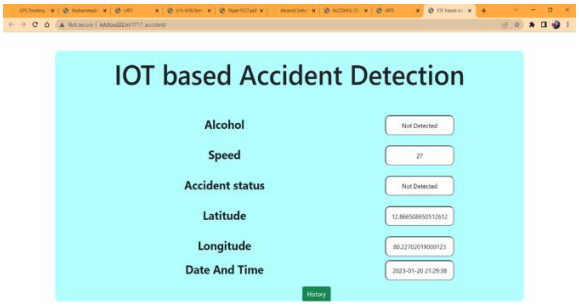

Fig. 7. Web application displaying the speed, latitude, and longitude values, the current date, and time.

II. CONCLUSION

The detection of drunk driving by drivers using an IOT-based system is covered in this study. This system is suggested and divided into two fundamental components, namely the hardware system and the software system. The software will be utilized by the owner, management, or driver of the truck or cab, and the hardware is situated inside the vehicle. The alcohol portion checks the driver's blood alcohol content after which the CPU and GPS antenna access the position. This GPS component with the help of a microcontroller, pinpoints the vehicle's location precisely, uploads the data to the cloud, and acts as a reporting mechanism to notify all drunk drivers. For the proposed work, we developed an adaptable, precise, and alcohol-accident detection system.

III. FUTURE SCOPE

In the future, the image detection feature can be implemented to detect a thing/person in front of the vehicle.

A front camera can also be implemented to detect the driver's facial expression and detect drowsiness in the driver to prevent accidents from happening.

Deep learning models can also be integrated with IoT to improve the accuracy of the application.

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