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IOT BASED SMART HELMET AND ACCIDENT IDENTIFICATION SYSTEM

[1]Indira Methuku, [2]M. Divya, [3]P. Vennela,[4]M. Anil kumar,M.Venkataramana

[1] Assistant professor in ECE Department, [2,3,4] Undergraduate Students of ECE Department

[1]Department of Electronics and Communication Engineering

[1]TKR College of Engineering & Technology, Hyderabad, INDIA

Abstract; There is now a smart helmet that can recognise dangerous situations when driving. When designing helmets, we had to take into account the two primary categories of hazards, namely alcohol detection and accident detection. The alcohol content is the first factor. When the driver was involved in an accident, the second accident detection method was favoured. As a result, only a small number of the current recommendations have been put into practice and tested in the real world, demonstrating that there is, at a level that is generally accepted in science, a gap between theory and real world application. The system is broken down into units in order to execute it as a whole.Accident notification is sent to the parents or emergency services via a mems sensor. MQ3 is nothing more than an alcohol sensor that is used to identify alcohol use. It is mostly utilized in order to produce a Challan whenever alcohol is found. A data processing unit, the ESP32 micro controller, is utilized to collect all the data from the aforementioned sensors and determine whether the user wearing it needs to activate any alert or notification units, as well as a 24 hour GPS tracker for security and notification. The data from the processing unit is sent via a wifi unit and sent as a notification to the authorities via the Blynk app. We may also remotely manage the ignition using this app. Overweight identification is also a feature of this system. The transmission through IOT, which proved successful at distances more than twice as great as those stated, is how this entire thing is accomplished. Additionally, the RF wireless communication module on this smart helmet connects it to the bike.

Keywords: Accident detection, IoT, Arduino, smart helmet, and databases

Index Terms – Piezoelectric sensors, Arduino, Atmega 328 Microcontroller, RFID Reader, RFID Tags

I.INTRODUCTION

A smart helmet that can recognize dangerous situations while driving has been developed. We took into account two key categories of hazards when developing the helmet, including alcohol detection and accident detection. The first factor is the alcohol content. If the driver was involved in an accident, the second accident detection was preferred. The system is split into two units so that each unit can be executed independently.Mem's sensors are used to detect accidents and notify the parents or emergency services. MQ3 is nothing more than an alcohol sensor that is used to identify alcohol use. It primarily serves to produce Challan whenever alcohol is found. The data processing unit, the ESP32 and Atmega328 micro controller, is utilized to collect all the data from the aforementioned sensors and determine whether the user wearing it needs to activate any alert or notification devices. A 24 hour GPS tracker is also included for security and notification. The data from the processing unit is sent via a wi-fi unit and sent as a notification to the authorities via the Blynk app. We may also remotely manage the ignition using this app. And an RF wireless connection module connects this smart helmet.

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II.EXISTING SYSTEM

The current project essentially involves wireless communications that are linked to smartphones. The communication hardware is utilized to automatically dial a predetermined emergency contact if this prototype's sensors detect a crash or accident. Controlling the biker's speed is the other system that is in place. The helmet is fixed with all the parts and sensors that measure the bike's speed and give the rider instructions on how to change their pace in response to impending impediments.

These have the following drawbacks:

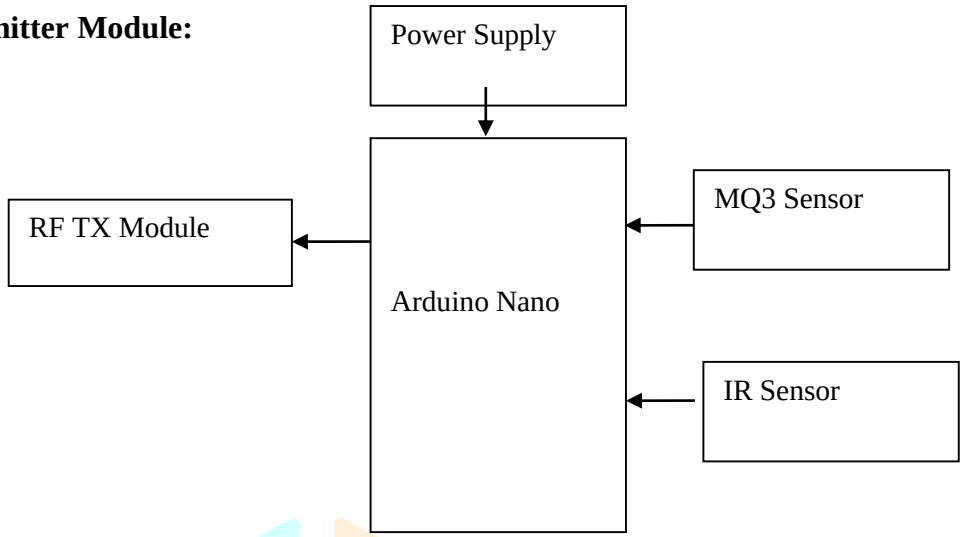
- In areas without traffic inspections, riders don't wear helmets.
- In large nations like India, it is hard to test the amount of alcohol in each rider's blood.
- Difficulty of traffic police enforcing traffic laws.

II PROPOSED SYSTEM

The proposed approach places restrictions on helmet use and primarily focuses on preventing drunk and driving. The helmet determines if the rider is intoxicated or not; if so, the ignition of the bike is prevented, preventing the rider from operating the bike, preventing an accident and saving lives.The suggested solution comprises a mobile or laptop application for notifying parents or emergency services when an accident occurs. Additionally, the system uses GPS to deliver a message that includes the incident's latitude and longitude. The Mems sensor is used in this system to detect accidents, and it successfully transmits data through IOT at distances that are greater than twice the recommended range.

III.BLOCK DIAGRAM

Transmitter Module:



Receiver Module (Bike):

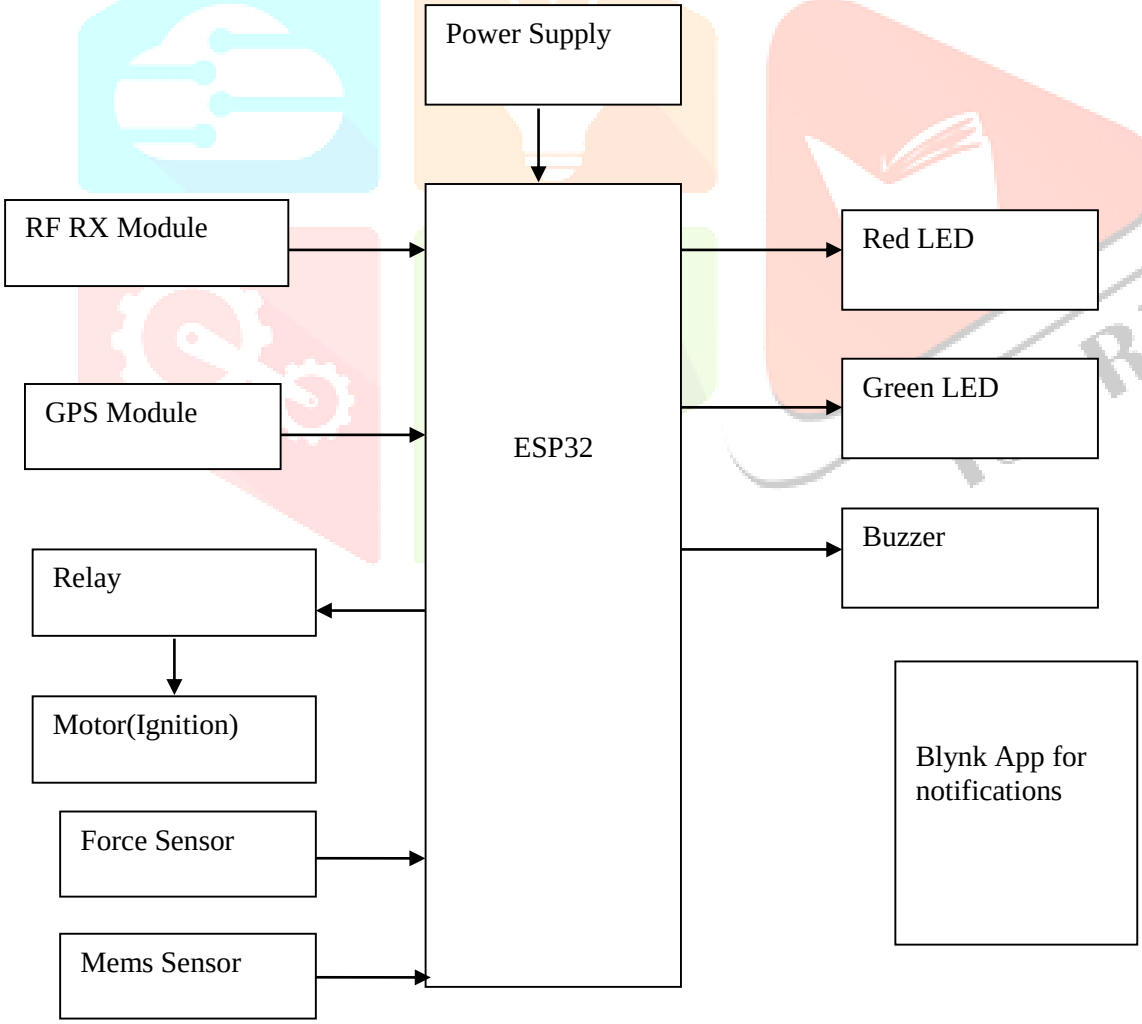


FIG 1 BLOCK DIAGRAM

Ir and mq3 sensors make up the transmitter component.You can tell if someone is wearing a helmet by looking at the Ir sensor.It is possible to tell if someone drinks alcohol or not by using a Mq3 sensor**.**

V. SCHEMATIC DIAGRAM

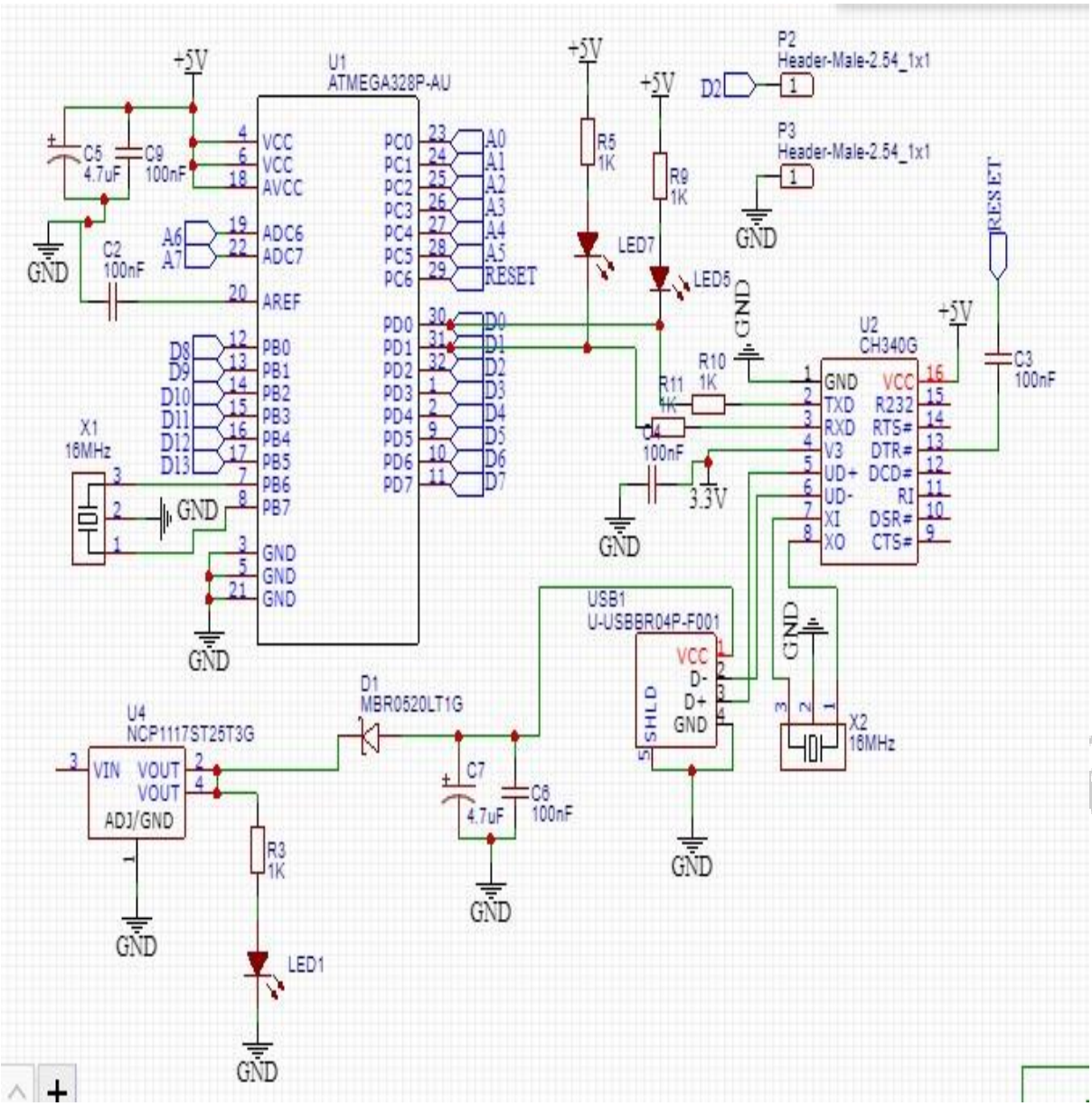


FIG 2 SCHEMATIC DIAGRAM

VI. METHODOLOGY

a-MQ-3 Gas Detector

- Most electrochemical gas sensors used to detect alcohol are MQ-3 modules. With a conductivity that is lower than that of pure air, tin dioxide (SnO2) is used in the sensor. Since there is a lot of alcohol present, the sensor will have a lot of conductivity. Because of this, the sensor's internal resistance decreases. To identify the presence of alcohol in the rider's breath, two locations have varying resistance.

b-IR SENSOR

- A fundamental electronic gadget used to identify the presence of things is an infrared sensor. This gadget emits infrared light. The presence or absence of a helmet is detected using an ir sensor.Ir sensor detection prevents the bike from starting.

c-FORCESENSOR

- A force sensor is a particular kind of transducer, or force transducer. It transforms a mechanical force that is being applied as an input, such as load, weight, tension, compression, or pressure, into another physical variable, in this example, an electrical output signal that can be measured, converted, and standardized.

d – PIEZO BUZZER

- A buzzer or beeper is a mechanical, electromechanical, or piezoelectric audio signalling device. Buzzers and beepers are frequently used for alerts, timers, and user input confirmation, such as mouse clicks and keystrokes. An electronic oscillating circuit or another audio signal source, driven by a piezoelectric audio amplifier, may drive a piezoelectric element. A click, a ring, or a beep are three common sounds used to signal that a button has been pressed.

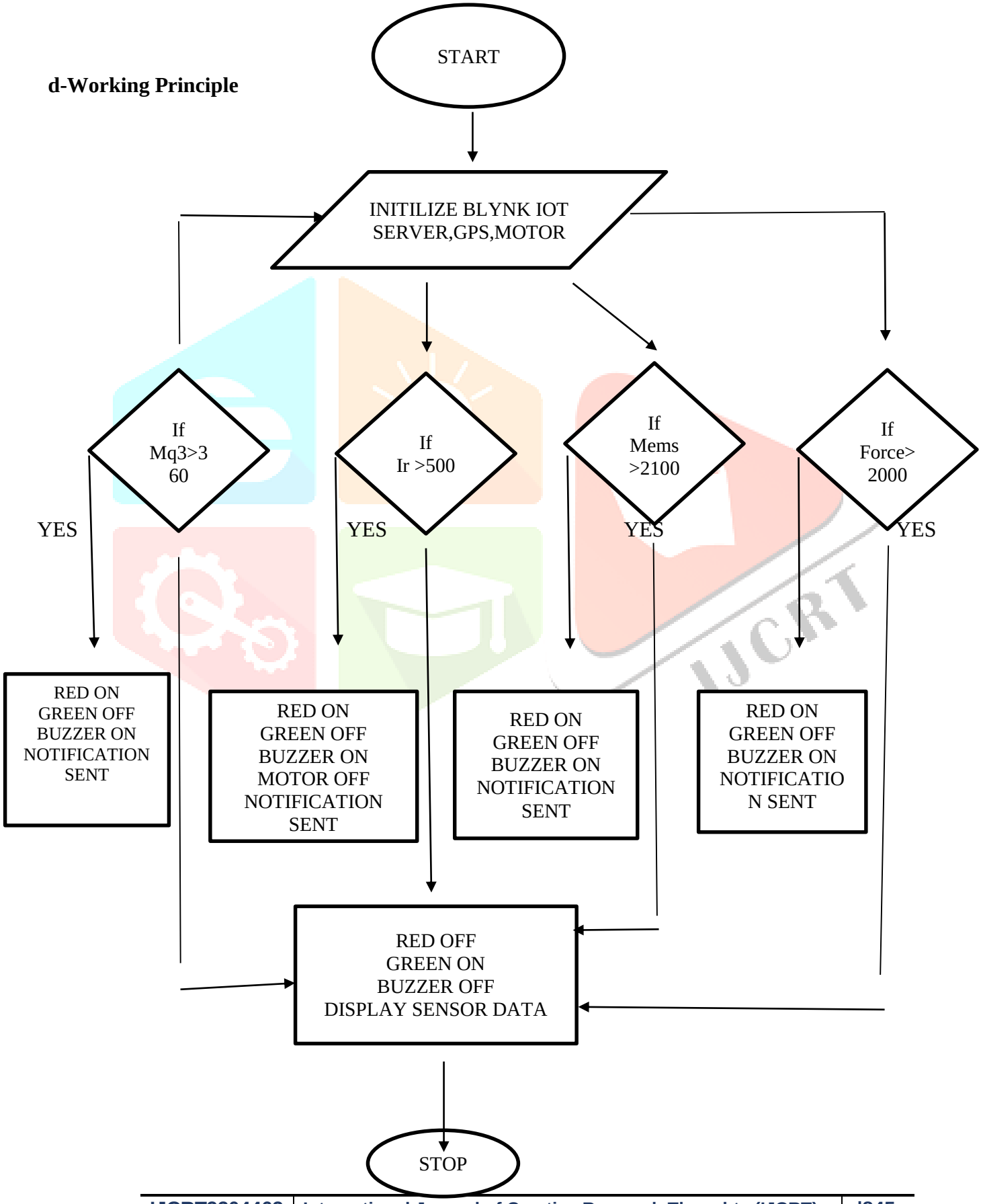
e-DATA BASE

- The mobile application may access a sizable amount of user data from the database. Google's Firebase is an open-source, cost-free database that processes real-time data that may be stored or made money from. When a motorbike rider registers for a mobile application, all of their data is saved in a database that can be remotely and instantly monetized and categorized based on the operator's preferences. The location of the accident site and the motorcycle rider's information are sent to the closest hospital and emergency contact numbers when an accident occurs. The operator may also be categorized along with all accident information, including its time and place

F- **GPS(GLOBAL POSITION SYSTEM)**

- A U.S. worldwide navigation satellite system called the worldwide Positioning System (GPS) is based in space. It continuously offers trustworthy positioning, navigation, and timing services to users all around the world in all conditions, day or night, and wherever on or near the Earth..

d-Working Principle



Two sensors, an IR sensor and an alcohol sensor, make up the smart helmet circuit. The IR sensor locates the rider's head, and the alcohol sensor monitors the amount of alcohol in the rider's breath. A 433 MHz RF signal is used to send an abnormality signal to the onboard circuit if alcohol is present or if the helmet is not worn. Any anomaly in the helmet circuit that signals the microcontroller to output a high-intensity pulse to the encoder IC HT12E. The decoder antenna received the signal at RF frequency from the encoder IC. Any signal that is received by the antenna is decoded by the decoder IC HT12D and sent to the Arduino Uno for further processing. Arduino recognizes it as an accident if there is an acceleration variation over a brief period of time. Arduino watches for a response from a mems sensor after an incident.

As soon as an accident is detected by a sensor, its current location and emergency contact information are automatically sent to a database. The GPS (Global Positioning System) module embedded into the mobile device is used by the mobile application to determine the user's current location. GSM (Global System for Mobile communication) also notifies the emergency contact number of the location. The database receives the accident location over the internet.

VII.RESULTS:

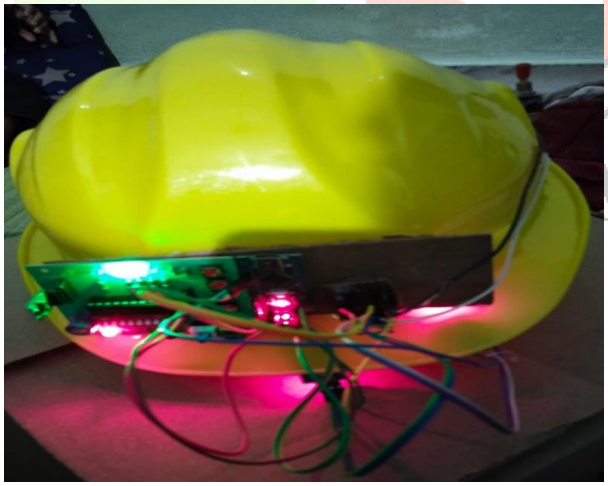


FIG 3 UPPER PART OF HELMET

The top of the helmet is depicted in Figure 3. Ir and mq3 sensors are part of it. So that it can determine if someone is wearing a helmet or not

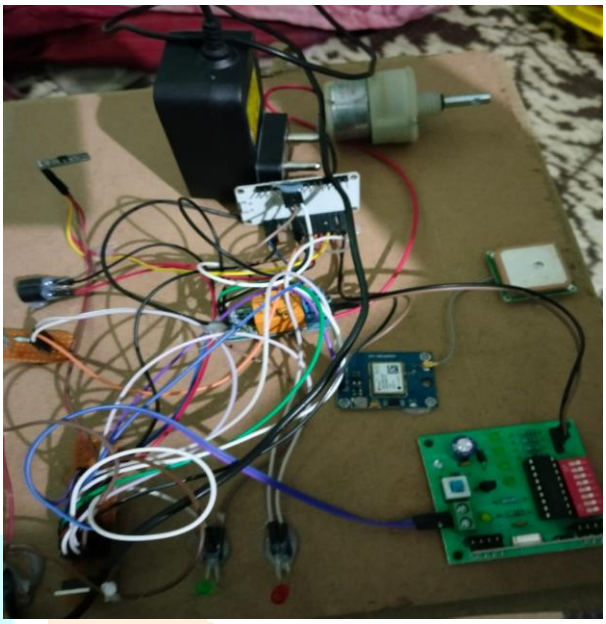


Fig 4 power supply of bike module

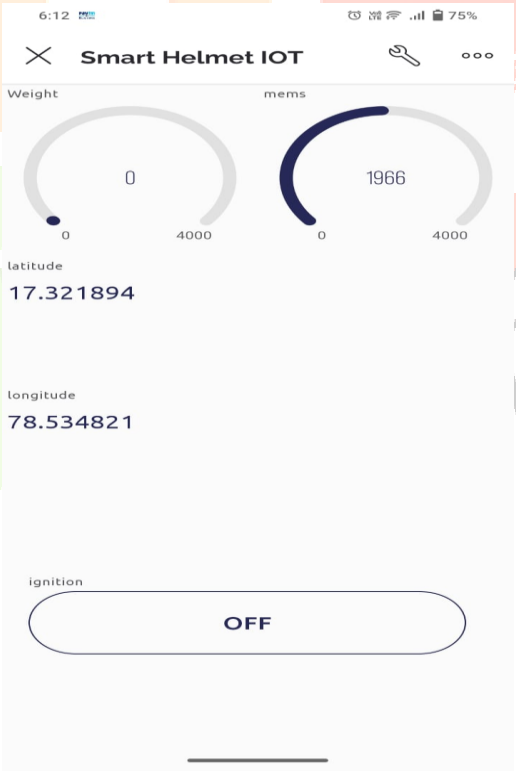


Fig 5 blynk app

VIII.RESULTS AND DISCUSSION

The motorcycle rider's safety is guaranteed by the smart helmet, which also takes the required actions to lessen accident causality. The system won't let the rider start the motorcycle if any safety elements are disregarded. The accuracy of the alcohol sensor is influenced by the separation between the mouth and sensor. When the sensor reads 150 mg/L at a distance greater than 15 cm, the cyclist has a low blood alcohol concentration. (BAC). When the rider's blood alcohol content exceeds 350 mg/L and the distance is less than 6 cm, the rider has a higher BAC. In this approach, a smartphone with an integrated GPS is used. Low mobile signal, rapid movement, and GPS modules of an older generation are the main causes of decreased GPS accuracy. The GPS module's accuracy in this system is roughly 1 to 5 meters.

IX.CONCLUSION

The suggested technique seeks to lessen accident fatalities while also preventing motorbike accidents. Accidents are reported along with their location to family members, police enforcement, and the closest hospital. High accuracy accident detection algorithms automatically record, identify, and immediately report accidents. The cyclist can drive more safely thanks to the driving data. This strategy encourages motorcycle riders to wear helmets as a habit. A motorbike trip would be safer and more protected with the smart helmet.

X.FUTURE PERSPECTIVE.

1. By including more sensors, such as an accident intensity detecting system

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