

INTELLIGENT HELMET

Prof. Rohit barve¹, Aditya Sarwankar², Nitesh Chalwadi³, Shubham Ambre⁴

¹Professor, Dept. of Information Technology, Vidyalkar Institute of Technology, Wadala, Mumbai, India,

^{2,3,4} Student, Dept. of Information Technology, Vidyalkar Institute of Technology, Wadala, Mumbai, India,

Abstract - A smart helmet is a special idea that makes two-wheeler driving safer than before. This helmet will avoid starting vehicles if the rider is not wearing a helmet or even if the driver is drunk. In addition, it has a great feature of detecting accidents and informs parents/people via SMS with location and speed of the bike when the accident occurs with the help of GPS and GSM based tracking system. We want to implement the sensors within the helmet, which will send the information to the module connected with the bike ignition wirelessly. This smart bike helmet will majorly consist of two modules, one on the helmet unit and another one on the bike unit. Alcohol sensor, speed sensor, and touch sensor are attached to the helmet module and GPS and GSM are connected on the bike unit. Communication between bike and helmet unit is done by the RF 433 Mhz Transmitter.

Keywords— Arduino Uno, ESP8266, MQ3 Alcohol sensor, RF 433MHZ transmitter, MPU6050, Sim 900A GSM module, Neo 6m GPS module, L293D motor Driver, Touch Sensor.

1. INTRODUCTION

This project aims to provide safety for bike riders. Even since helmets have been made compulsory, still people drive without helmets. Comparatively, in the last few years, there has been a rapid hike in the number of road accidents. According to vehicle safety, India meets only two out of the seven-vehicle safety standards by the World Health Organization (WHO). Two-wheelers account for 27% of total road crash deaths. Nearly 73% of motorcycle riders involved in accidents continued to wear helmets as shown in the records. Section 129 of the Motor Vehicles Act, 1988 makes it required for every single riding a two-wheeler to wear protective headgear following to standards of the BIS (Bureau of Indian Standards). In India, a drunk drive case is a criminal offense of The Motor Vehicle act 1939, which implies the bike rider will get punished. In existence bike riders easily get escaped from the law. These are the three main issues that motivate us for developing this project. The first step is to check whether the helmet is

worn or not. If the helmet is worn then ignition will start otherwise it will remain off till the helmet is not worn. For these, we use a touch sensor. The second step is alcohol detection. The alcohol sensor is used as a breath analyzer which checks the presence of ethanol in rider breath and if it crosses permissible range ignition cannot start. It will send the message to the registration number. MQ3 sensor is used for these. When these two conditions are satisfied then only the bike ignition will start. The third main issue is accident detection. If the rider met an accident with him he cannot receive medical help instantly, it's a big reason for deaths. There are a lot of deaths due to late medical help or the accident place is unmanned. In the rider falls for that detection, we place MPU6050 at the bike unit. Due to this mechanism, we detect the accident occurs or not. The aim of this project is to make a protection system in a helmet for the good safety of bike rider. In the helmet unit, the sensor module is built using sensors like alcohol sensors, accelerometer sensors, and touch sensors. All the above sensors are connected to Arduino Uno and RF transmitter. Once the person wears the helmet the signals get transmitted. The unit in the bike allows the rider to start the vehicle once it receives the signals from the helmet unit. The status of the helmet worn is uploaded to the database via the ESP8266 module. All events are uploaded to the database and from the database, it is retrieved in the android application.

2. Problem Statement

The problem in the existing system is that people use traditional helmets just for prevention from challan by traffic police, these helmets don't even ensure safety. A number of road accidents that occur in the country mostly involve two-wheelers. It was a necessity to introduce a helmet that would make motorists feel safer and also keep a track of events by the rider in case of emergency.

3. Objective

The primary goal of this proposal is to make a helmet that would have features that attract the rider to wear it while riding as well as not be drunk, and

thereby increasing the safety as well as the comfort of the rider.

It is a well-known fact that the young generation prefers bikes and motorcycles over four-wheelers. A survey indicates that more than 70% of the riders avoid wearing helmets without any specific reason. Moreover, riding fast and drunk driving have become common issues this day. The main objectives of this smart helmet are :-

1. Ignition starts on valid reasons only.
2. Over-Speeding/ Buzzer Initiating on Over-speeding.
3. Alcohol Detection and sending SMS.
4. Accident detection and sending SMS as google link to Parent Number.
5. Android Application displaying events of Rider.

4. Literature Surveyed

The main purpose of this literature overview is to investigate the topic of "Smart Helmet". The following section explores different references that discuss various topics related to our project.

[1]. In this paper, an IOT product called "Smart Helmet" is proposed, which comprises two units, motor unit, and helmet unit. It consists of different sensors and transmitter circuitry. The transmitter side microcontroller contains three sensors which are an alcohol sensor, a vibrating sensor, and an IR sensor. The receiver side mainly consist of an LCD screen, GSM module, RF recipient, Receive antenna, DC motor, drive L293D, and GPS module.

[2]. A system for an intelligent helmet has been proposed. This system detects the occurrence of an accident and makes provisions to sound an alert through the use of a GPS and GSM system. This system aims in providing a low-cost intelligent system mainly focusing on the importance of human life.

[3]. The objective of this project is to develop a smart helmet is to provide a means and apparatus for detecting and reporting accidents. For the accident detection system, communicates the accelerometer values to the processor and thereby continuously monitors for erratic variations. When an accident occurs, the related details are sent to the advisory contacts by GSM module through SMS. The vehicle location is obtained by the concept of the global positioning system.

[4]. Shrewd System for Helmet Detection utilizing Raspberry Pi guarantees cap ownership by a bike rider constantly by catching a depiction of the rider's head protector by the Pi Camera and affirming object location by cascading technique. The primary thought behind the venture is to diminish street fatalities among motorcyclists. An intelligent LED will caution the rider if the protective cap is not recognized after which the rider needs to guarantee the ownership of a cap or else the System will show a notice message which will win the rider a strike in the event that it is overlooked. An automated e-mail alert generation system is also developed in a reporting module of the proposed system.

[5]. The smart helmet includes an integrated electronic system that uses some of the basic components in the world of electronics. The microcontroller coordinates with the GPS, GSM, WIFI, and sensors. Once the sensors are triggered above a certain value, the GPS coordinates along with time will send a message to the family members and the server via WIFI component and GSM.

5. SCOPE

Vision and the target of this project are towards making Safe two-wheeler rides. And also focusing on minimizing the hardware used so that the device is purchasable by everyone as in making it cost-effective. It can integrate on any type of helmet. We can develop bioelectric sensors on the helmet to measure various activities. We can use a small camera for recording the driver's activity. It can be used for passing messages from one vehicle to another vehicle by using a wireless transmitter. In future scope, we can use used solar panel for helmet power supply by using same power supply we can charge our mobile.

6. PROPOSED SYSTEM

In this project we make bike rides safe by integrating internet, sensors, buzzer, and helmet. The proposed project would provide a safe facility for the rider-emergency contact. The proposed system comprises majorly of two units, helmet, and vehicle. The vehicle is controlled via signals from the helmet unit. The helmet unit has a sensor module to monitor whether the helmet is worn or not, alcohol detection, all connected to Radio Frequency (RF) transmitter. The vehicle unit has an RF receiver. Based on the RF signal received the vehicle starts and stops automatically. And every status is uploaded to the database The helmet

checks if the rider is drunk and driving. If the rider is drunk then the ignition of the bike is kept off and thereby not letting the rider start the bike. Another main function is the detection of Accidents and sending an SMS to the family members with a current location so that the motorist can be tracked easily, and the Over-Speeding feature that makes a normal helmet safer and more advanced. All the activity performed by the Rider can be traced through an Android Application through the database.

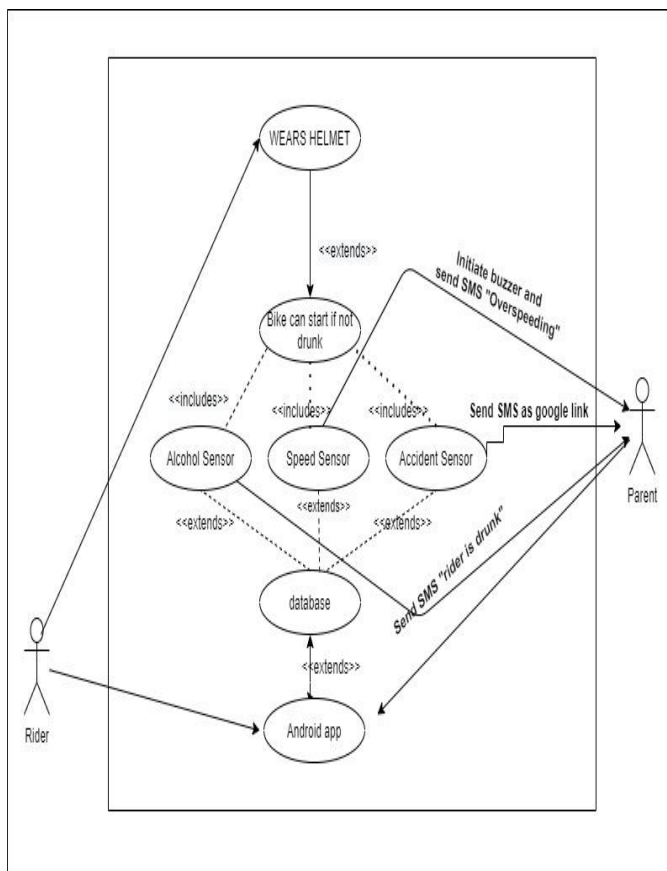


Fig -1: UML Diagram

6.1 FLOWCHART

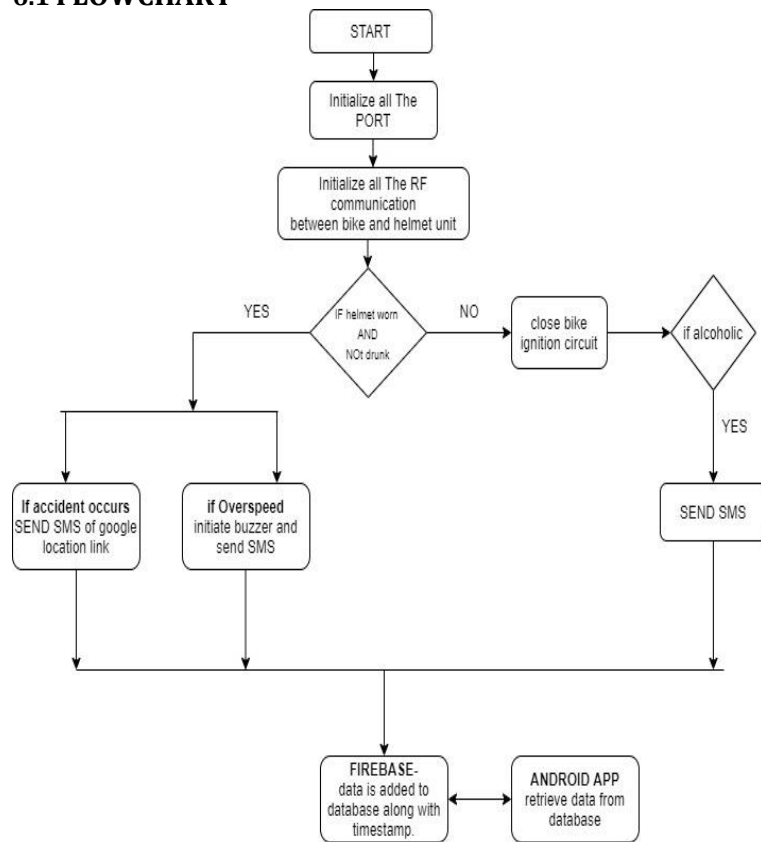


Fig -2: Flow-Chart

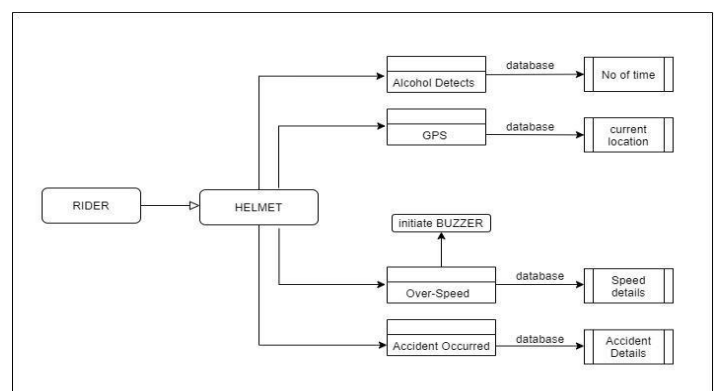


Fig -3: Work-Flow

7. METHODOLOGY

The smart helmet system mainly consists of 2 modules; the helmet module and the bike module. The helmet contains Sensors that are connected with a microcontroller unit. Sensors like alcohol sensor, Touch Sensor, GSM, speed sensor tag are placed on the helmet.

The bike module consists of an RF decoder, Motor Driver, ESP8266, and a Buzzer.

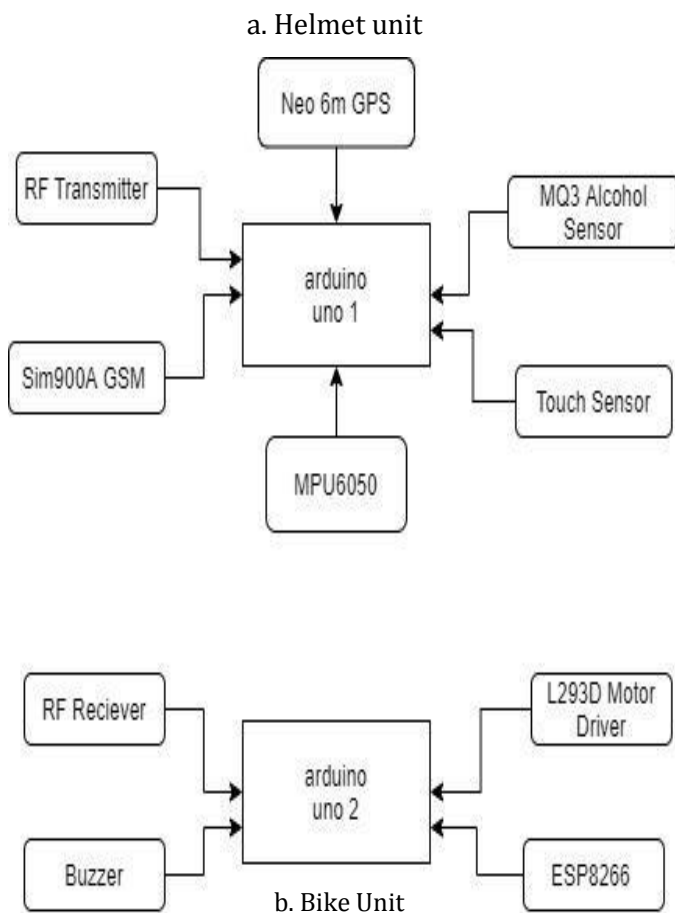


Fig -3: Block Diagram

7.1 HELMET UNIT:

Touch Sensor is placed Inside the helmet, to check if the rider is wearing the helmet or not and send the helmet status to the microcontroller and then to the RF transmitter. The Touch Sensor gets turned ON only when the rider wearing the helmet on his head properly. The alcohol sensor used in this section senses the alcohol content of ethanol in the rider's breath. The speed sensor of the bike is recorded by using an MPU6050 Sensor. If the rider has an alcoholic breath or if the rider is not wearing the helmet then, then the bike ignition does not starts. Communication is done by RF 433MHz Transmitter.

7.2 BIKE UNIT:

The main task of this section is to receive the helmet position data by the bike unit through an RF receiver and send data to the microcontroller on the

bike unit. When the transmitted signal from the helmet unit is received by the bike unit, then the vehicle ignition system will be turned ON. If an accident occurs, then the tilt angle of the Helmet measured by using an accelerometer. The GPS module placed in the bike detects the vehicle's location. The accident status is sent to predefined persons using GSM. All these sensors and parameters are controlled by using a microcontroller and thus login into the server. A WIFI module is presented in the bike which is used for the internet connection and for sensing all these data into the database.

7.3 HARDWARE REQUIREMENTS

- 1) MQ3 - Alcohol sensor
- 2) RF 433MHZ transmitter
- 3) Accident/Overspeed – MPU6050
- 4) Sim 900A GSM module.
- 5) Neo 6m GPS module
- 6) L293D motor Driver
- 7) Touch Sensor
- 8) ESP8266 WiFi Module
- 9) Arduino Uno (x2)
- 10) Jumper wires.

7.4 SOFTWARE REQUIREMENTS

- 1) Arduino IDE
- 2) Firebase Database
- 3) Android Studio

8. CONCLUSION

By presenting this project, we ensure that a safe journey is possible which would decrease fatal injuries during accidents and also reduce the accident rate due to driving a bike after consuming alcohol.

A system for helmets has thus been developed, wherein there is communication between two unit which is the helmet and one on the vehicle. This smart helmet gives a guarantee of the safety of the rider, by making it compulsory to wear a helmet, and ensures that the rider is not drunk and if met to an accident then inform the parent/advisory number. If any of these major safety rules are avoided, the system will prevent the rider from starting the vehicle unit. This project focuses mainly on providing a low-cost safety system mainly focusing on the importance of human life and making two-wheeler riders safe.

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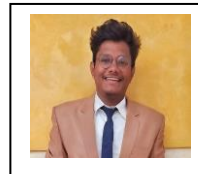
9. REFERENCES

- [1] "Implementation Of Smart Helmet" Deekshitha K J and Pushpalatha S, 2017.
- [2] "Accidental Identification and Navigation System In Helmet" A.Ajay, G.Vishnu, V.Kishoreswaminathan, V.Vishwanth, K.Srinivasan and S. Jeevanantham, 2017.
- [3] "An IoT based Smart Helmet for Accident Detection and Notification" Prem Kumar M, Rajesh Bagrecha, 2017.
- [4] "Faaz Smart Helmet" Faizan Manzoor, Shah Asif Bashir, Aaqib Manzoor, Zain Ashraf Wani, Shahid Mohi Ud Din, 2017.
- [5] "IoT BASED SMART HELMET SYSTEM USING RASPBERRY Pi-3" Vinith. G and Dr.K.thangarajan, 2017.

10. BIOGRAPHIES



Rohit Barve, Professor of Department of Information Technology from Vidyalkar Institute of Technology, Wadala, Mumbai.



Aditya Sarwankar, A student of the Department of Information Technology at Vidyalkar Institute of Technology, Wadala, Mumbai, India.



Nitesh Chalwadi, A student of the Department of Information Technology at Vidyalkar Institute of Technology, Wadala, Mumbai.



Shubham Ambre, A student of the Department of Information Technology at Vidyalkar Institute of Technology, Wadala, Mumbai.