

SMART HELMET

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Abstract - SMART HELMET for motorcyclists is a project undertaken to decrease the rate of accidents among motorcyclists. Through the study indented, it is analysed that the helmets used were lagging smart features like helmet detection, alcohol detection etc. Therefore, this project is designed to introduce safety systems for the motorcyclist to wear the helmet compulsorily. The main safety feature we are introducing is the alcohol detection, helmet detection, accident detection and the reporting the location of the accident to the emergency contact number for the immediate assistance of the rider. When the rider meets with an accident the sensor detects the crash and reports the occurrence of the accident along with the location to the specified emergency contact number.

1. INTRODUCTION

A helmet is a type of defensive stuff worn to shield the head from wounds. The word helmet is little from steerage, a middle age word for defensive battle headgear. Current protective helmets have a lot more extensive scope of utilizations, including helmets adjusted to the requirements of numerous athletic pursuits and workplaces, and these frequently consolidate plastics and other manufactured materials for their light weight and shock assimilation capacity. A few sorts of manufactured filaments used to cause helmets in the 21st century to incorporate Aramid, Kevlar and Twaron.

1.1 MOTIVATION

A total of 1231 two-wheeler accidents were recorded during 2017-2018. Majority (77%) of the victims were in the group of 18-44 years. Accidents among males(83%) were higher than that among females(17%). Five percent of the victims (75) were injured, of whom 45 died on the spot. Highest number of accidents was seen during 6-10pm.

Since, there is considerable injuries and loss of life due to two-wheeler road accidents. Among the fatality's majority died at the spot. It is recommended to have a good support system and Para medical training for the people managing the ambulance. And if no one is present for support then it's difficult to treat or give medical support and is dangerous to life. So, we are designing a product which informs about accident to the emergency contacts along with the location of the place.

1.2 PROBLEM STATEMENT

When a two-wheeler rider meets with an accident, the family members of the rider or the emergency contact number should get an alert message along with the location of the accident so that the rider gets an immediate medical assistance at the location of the accident.

2. METHODOLOGY

In this project the goal of the team is to make sure that rider wears the helmet compulsorily. As bike accidents are increasing daily out of which most of these accidents occur due to the absence of helmet. So other than the owner, people who don't have password cannot use the bike. The team has stated that the bike will not start till the rider doesn't wear the helmet. To check this, Arduino and ultrasonic sensor is used, based on this signal will be sent to the next module voice recognition system for authentication purpose. The drawback in this project is that they have not focused on issues that will occur regarding alcohol consumption, alert on accident, etc.

In this project, team had developed this project to help with the safety of riders. Helmet utilizing GSM and GPS innovation for mishap identification and detailing framework goal of this project was to study and implement the concepts of RF transmitter and receiver circuits. The project was implemented by using ARM7TDMI processor, GPS and GSM modules. When an accident occurs then accident spot will be noted and information will be sent to specified contacts. The disadvantage of this project is that they are not using any display device for showing the status.

Microcontroller based smart wear for driver safety. In this project the team had discussed on the speed limit of the vehicles. In this application, the project will be analyzing the routes in which the vehicle will be moving. When entering any crowded/caution areas like public places and schools etc. LCD display is used for showing the various types of messages after wearing the smart helmet. The vehicles speed will be controlled to a predefined limit. The team worked only accident which happens due to drunk and drive scenario. They also stated that the accidents do not always happen due to alcohol consumption but also happen because of over speeding. The Smart Helmet in this project the team has implemented the smart helmet because of increasing bike accidents. People are injured or dead because of not wearing a helmet. As no one follows road rules this helmet is designed. The team has used encoder IC that receives data in the form of address bits and control bits. The drawback in

this project is that they have not focused on issues that will occur regarding alcohol consumption, alert on accident etc.

2.1 HARDWARE

GSM SIM 800C Module

A GSM module is a gadget which can be either a cell phone or a modem gadget which can be utilized to cause a PC or some other processor to impart over an organization. A GSM modem requires a SIM card to be worked and works over an organization range bought in by the organization administrator. It very well may be associated with a PC through sequential, USB or Bluetooth association. It is utilized for remote correspondence in the middle of the driver and his crisis contacts. It has a SIM card which empowers telephone network for the correspondence. AT orders are utilized to set the GSM module to SMS mode which then, at that point, communicates the information. The module is amazingly quick and solid in its information transmission rates as it utilizes portable organization.



Fig 2.1.1 GSM SIM 800C Module

GPS neo-6M Module

GPS module is utilized to follow the record live area of the vehicle. Initially, the sign of time is sent from a GPS satellite at a given point. Hence, the time distinction between GPS time and the place of time clock which GPS beneficiary gets the time sign will be determined to produce the separation from the collector to the satellite. It is feasible to work out the situation of the GPS beneficiary from distance from the GPS collector to three satellites. Notwithstanding, the position produced through this strategy isn't precise, for there is a mistake in determined distance among satellites and a GPS recipient, which emerges from a period blunder on the clock consolidated into a GPS beneficiary. For a satellite, a nuclear clock is fused to produce on-the spot time data, however the time created by tickers fused into GPS recipients isn't quite so exact as the time produced by nuclear timekeepers on satellites. Here, the fourth satellite comes to assume its part: the separation from the fourth satellite to the beneficiary can be utilized to register the situation in relations to the position information produced by distance between three satellites and the collector, consequently decreasing the room for give and take in position exactness.



Fig 2.1.2 GPS neo-6M Modul

MQ3 Alcohol Sensor

The module is fuelled utilizing the accessible 5v pin in the Atmega328p. The ground and the 5v pin are utilized to drive up the Arduino while the A5 pin is utilized to get the information from the liquor sensor.



Fig 2.1.3 MQ3 alcohol sensor

Vibration Sensor

Vibration sensors will be sensors for estimating, show, and breaking down straight speed, relocation and nearness or speed increase.

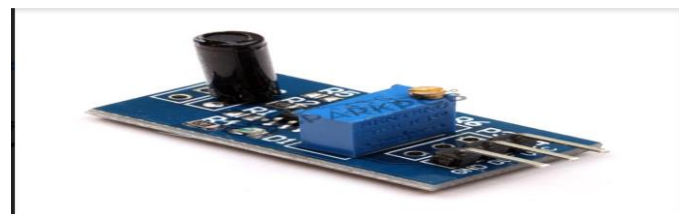


Fig 2.1.4 vibration sensor

Limit Switch

In electrical designing a cut-off switch is a switch worked by the movement of a machine part or presence of an item. They are utilized for controlling hardware as a feature of a control framework.



Fig 2.1.5 Limit Switch

Single Layer PCB

Single layer PCB is broadly utilized in the printed circuit board plan in a wide range of electronic areas where low

expenses are required. one layer of directing material on one side of the board and opposite side is utilized for fusing diverse electronic parts on the board.

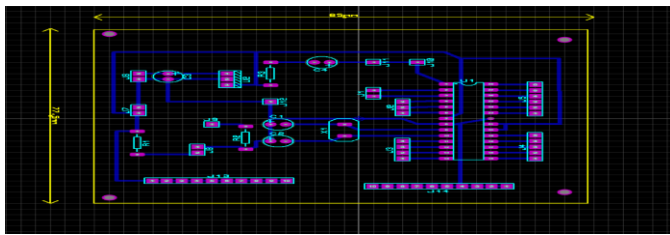


Fig 2.1.6 Single layer PCB

Atmega 328p Micro-controller

All the signals are processed in microcontroller and sent it to various other devices. It is also known as the brain of the circuit.



Fig 2.1.7 Atmega 328p Micro-controller

Servo Motor

A servo motor is an electric device which can rotate with great precision. It is made up of simple motor which runs through the servo mechanism. Servo motor is rated at 3kg/cm. The position of a servo motor is decided by electric pulse.



Fig 2.1.8 Servo Motor

9V Battery

All components are 5V compatible, so standard 9v battery is used to energise Arduino from there all the other components are powered.



Fig 2.1.9 9V Battery

RF Transmitter and Receiver

A RF transmitter gets successive data and sends it remote through RF through its radio wire related at pin4. The transmission occurs at the speed of 1Kbps 10Kbps. The sent data is gotten by a RF authority working at the very repeat as that of the transmitter.



Fig 2.1.10 RF Transmitter and Receiver

2.2 IMPLEMENTATION

STATUS OF RIDER WEARING HELMET: If the rider wears the helmet and press the switch, only then the motor will start. Without wearing the helmet, the motor will fail to start.

ALCOHOL CONTENT TEST: Illicit utilization of liquor at the hour of driving is 0.08mg/L according to govt act. Be that as it may, for showing reason it is customized to as far as possible 0.04 mg/L. If the affectability of MQ-3 is more than 0.04mg/L in inhale then the driver can't drive the bicycle.

ACCIDENT DETECTION: A range of frequency generated depending upon vibration produced due to accident or obstacle. If frequency is greater than the threshold value then the vehicle unit shows accident detected.

ACCIDENT LOCATION: Once, vehicle unit shows "Accident Detected" then GSM sends the location of accident with the help of GPS.

CODE:

```

neo_gps_with_calling.ino
22
23
24 void loop() {
25   sensorValue = analogRead(0);
26   sensorValue2 = analogRead(1);
27   //Serial.println(sensorValue);
28   delay(100);
29   if(sensorValue>800) {
30     digitalWrite(12,HIGH);
31   }
32   while (gpsSerial.available() > 0)
33     if (gps.encode(gpsSerial.read()))
34       displayInfo();
35   if (sensorValue2 < 10) {
36     displayInfo();
37   }
38   delay(2000);
39 }
40
41
42
43 void displayInfo() {
44   if (gps.location.isValid())
45   {
46     Serial.println("Latitude: ");
47     Serial.println(gps.location.lat(),6);
48     Serial.println("Longitude: ");
49     Serial.println(gps.location.lng(),6);
50     Serial.println("sending sms");
51     if (tom) {
52       sms();
53       tom = false;
54     }
55   }
56   else
57   {
58     Serial.println("Location: Not Available");
59   }
60   delay(2000);
61 }
62
63

```

```

69 void sms(){
70
71
72 mySerial.println("AT+CMGF=1"); // Configuring TEXT mode
73 delay(500);
74
75 mySerial.println("AT+CMGS="+9702060727+"\r"); //change EE with country code and xxxxxxxxxxx with phone number to sms
76 delay(500);
77
78 mySerial.print("http://maps.google.com/maps?q=loc:"); //text content
79 delay(700);
80
81 mySerial.print(gps.location.lat(),0);
82 delay(500);
83
84 mySerial.print(",");
85 delay(500);
86
87 mySerial.print(gps.location.lng(),0);
88 delay(500);
89
90 mySerial.write(26);
91 delay(1000);
92
93 Serial.println("sms1 sent!!!");
94 delay(10000);
95
96 }
    
```

3. DESIGN

1. The accident victims will get their first aid in proper time. Hospitals and the emergency contacts are informed as soon as the accident takes place. If the helmet is not put up then the bike will not turn on. If rider is drunk then the sensors get activated and the key hub is shut

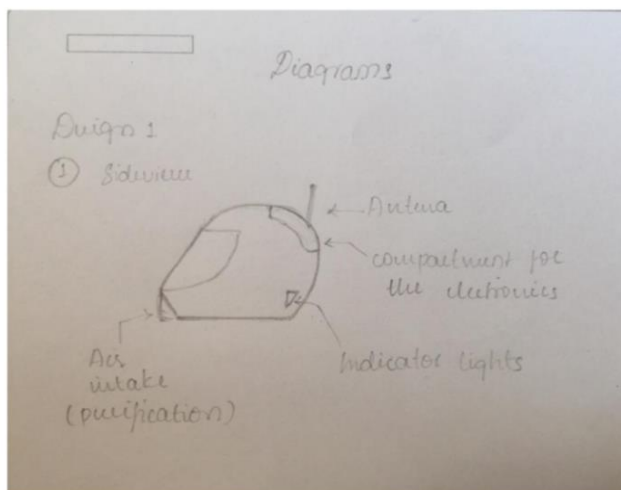


Fig 3.1 Design 1

2. Many accident victims will get their first aid in proper time. Hospitals is informed as soon as the accident takes place. It takes precautions such as if the rider is drunk then bike will not turn on. If the helmet is not put up then also the bike will not turn on.

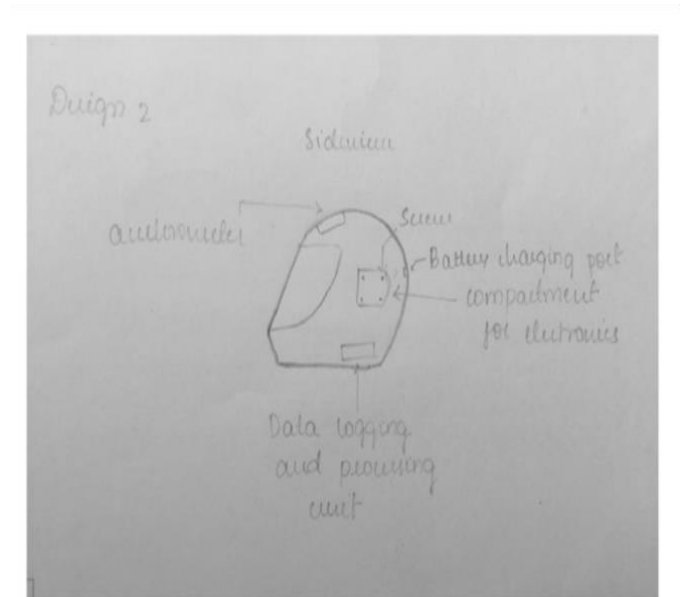


Fig 3.1 Design 2

3. Key slot opens only when the rider wears a helmet. It takes precautions such as if the rider is drunk then bike will not turn on. In case of accident the helmet sends the alert message and location to the emergency contacts. It has a well-developed design which doesn't the damage the standards of the helmet.

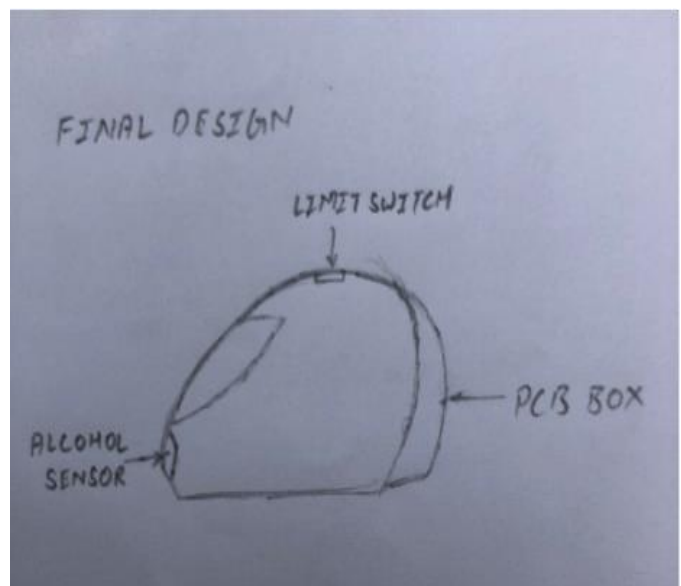


Fig 3.1 Design 2

3.1 RESULT AND PICTURES OF OUTCOME

1. Alcohol Detection



Fig 3.1.1 Result 1

2. Collision Detection

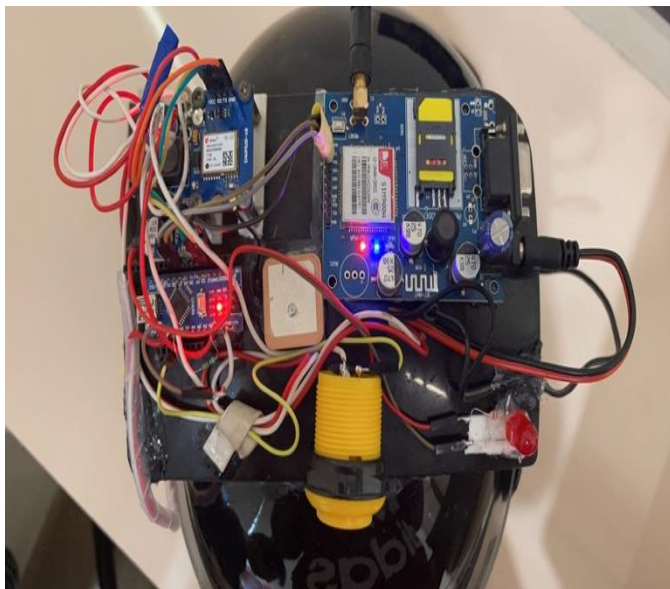


Fig 3.1.2 Result 2

3. MSG alert to emergency contact

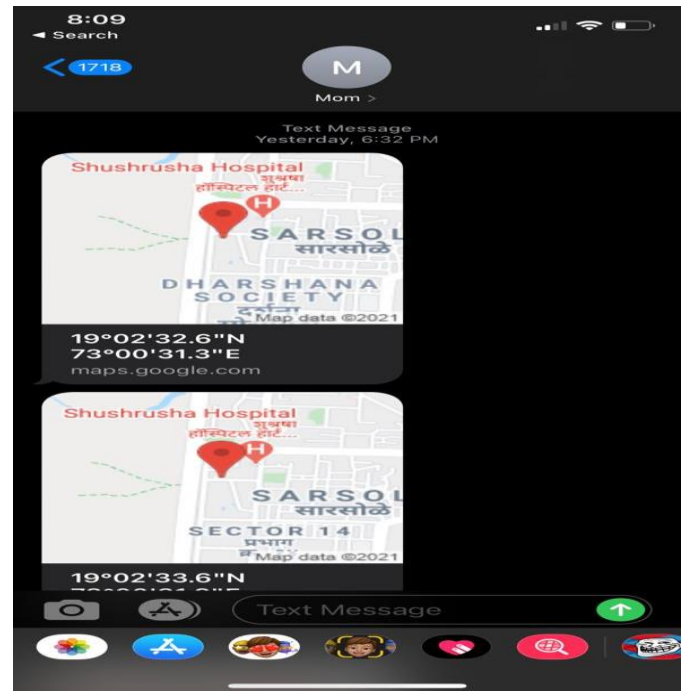


Fig 3.1.3 Result 3

4. CONCLUSION

The Project helps to reduce the Two-wheeler road accidents as the rider will be forced to wear the helmet otherwise the key slot will not open and it also makes sure that the rider has not consumed alcohol. During the journey if the rider meets with an accident the location co-ordinates of the accident is sent to given emergency contact. We hereby like to conclude that, the given Project is meeting the requirement of stated Need statement and Formulated Problem Statement.

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