Smart Helmet using IoT

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Abstract— *As we know that in India 50-60% of the population owns the two wheelers, In 2019 the domestic sells of the two wheelers were quite higher, since it is the most sold vehicle in India because of its low price, But now a days it is the most unsafe vehicle because of the reason of safety, As we know that accidents are increasing day by day, we can also notice that many laws and protocols are implemented by government in order to avoid this accidents. Accidents can be known as the unplanned event or the mistake that may occur causing in injury and sometimes it also leads to death. The accidents in case of two wheelers are more related to other vehicles. This may be avoided by wearing helmets and riding vehicles without consuming liquor. Since this survey is on smart helmet for accidence prevention and also we examining various related techniques. This research also helps us to understand IOT technology which is being developed now a days.*

Smart Helmet is the intelligent system that detects automatically whether the person is wearing the helmet and has nonalcoholic breath while driving. Here we have a transmitter on the helmet and the receiver on the bike. There is a switch used to assured the wearing of helmet on the head. The ON condition of the switch ensures the placing of the helmet in proper way. An alcohol sensor is placed near the mouth, the engine shouldn't ON if any condition is violated, when the rider met with an accident and the helmet hits the ground then sensor sense and give the information to main controller it will activate the GSM Module which automatically sends the message to the family member.

Keywords— *Smart Helmet, GSM, IoT.*

I. INTRODUCTION

The Internet of Things also known as IOT is a system of interrelated computing devices, machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring Human to human or human to computer interaction.

Now a days IOT is being used in many fields such as home automation, wearable's smart appliances, smart agriculture etc. Since it helps a mutual communication between the devices and the people over the network.

Basic concept working of All IOT device -:

I) At first the device is sense or generate the data and the data is sends over the server, since it can generate the huge amount of data by that data we can draw the conclusion and processing by analyzing it through the Big Data.

II) This gives the advantage in real time data reporting from environment.

Now a day's motorbike accidents are increasing day by day and we can notice numerous loss in lives. We can avoid this by using smart helmet. From the survey we can know that in India 4 people die every hour because they do not wear helmet. In 2017, more than 48,746 two wheeler user died in road accidents, Incidental 78.3% of them did not wear a helmet.

There are two important conditions that should be checked before the bike starts by the smart helmet. First condition is that we should check whether the rider is using the helmet and not just keeping it. Second to check whether the user has consumed alcohol or not by his breath, this can be verified by using sensors. Third if a person meets with an accident, the sensor check the condition of person and bike and send information of location to the family members. If the person has no major injurious then the button is pressed which is present in the bike this indicate that the person condition is good.
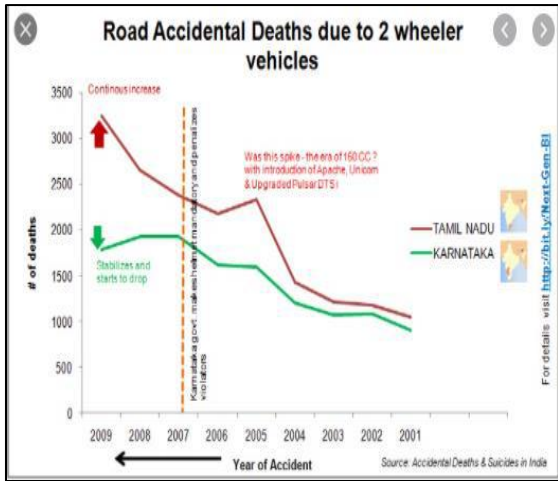
Fig.1: Accident Death through 2-Wheeler

II.   LITRATURE SURVEY

Through Statistics we suggested that the most of the road accidents that are take place is due to the 2-Wheeler,Helmets acts as a basic protection for two-wheeler rider. But it does not ensure that the rider strictly follows traffic rules. The major percentage of 2-wheeler accidents is due to violation of traffic rules by the riders.
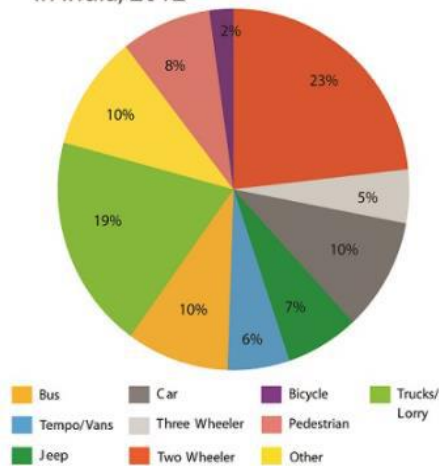

Fig.2: Accidents by various Modes

To ensure that the rider is not drunk breath analyzer is installed in some vehicles or the vehicles have to stop and the rider needs to give the test to the Traffic police. We the feature of sending SMS using GSM module in times of emergency.

The latter two points ensure safety only in high end four wheelers, but this can be extended at a nominal cost to ensure safety and proper help in 2-wheelers also. As we know the above stated reasons are major cause of road accidents. So we have decided to include all these

features in the 2-wheelers to ensure the proper following of traffic rule and in case of any accident message will be sent to rider's family with the help of GSM module.

III.   PROPOSED SYSTEM

MQ-3 gas detector (alcohol sensor) is reasonable for recognizing alcohol substance from the breath. So it can be put fair below the face protect and over the extra face security. The surface of the sensor is sensitive to different alcoholic concentrations. It recognizes the alcohol from the rider's breath; the resistance value drops leads to alter in voltage (Temperature variety occurs).Generally the illicit utilization of alcohol during driving is 0.08mg/L as per the government act. Threshold will be adjusted mistreatment. So the wearing of protective cap is affirmed by alcohol
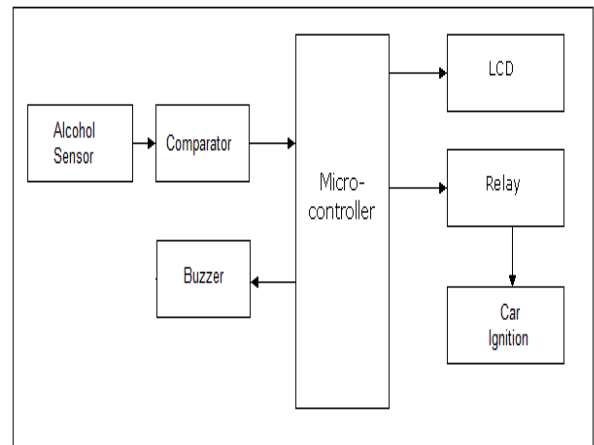

Fig.3

A smart helmet is an idea which makes motorcycle driving safer than before. The working of this smart helmet is very simple, if helmet hits the ground, these sensors sense and gives to the RIO. When the data exceeds stress limit then GSM module automatically sends message to family members.

IV.   METHODOLOGY

A.   Load Sensor -:

Strain-Gauge type load sensors are commonly used to measure loads. Strain-Gauge is a transducer that converts force into an electrical signal. When force applies to strain gauge, it produces a voltage difference. The voltage difference will be positive or negative which defined by compressing or stretching a strain gauge. Strain gauge makes it into a flexible surface. Therefore stretching a strain gauge

makes it longer and thinner, resulting to increase its internal resistance and compressing which makes it shorter and thicker, resulting to decrease its internal resistance. Changing internal resistance means the voltage difference. The S-type load cell used in this paper for detecting overload. There is a threshold load value for safety driving. When the sensor detects any overload, the rider cannot start the motorcycle. The threshold load value is about 180 kg which is the weight of two adult people. The S-type load cell is situated in the spring of the motorcycle.

B. MQ-3 Gas Sensor -:

MQ-3 module is the mostly use electrochemical gas sensor to detect alcohol. Tin Dioxide (SnO2) is used in the sensor which conductivity is lower than clean air. As the alcohol concentration is high, the conductivity of the sensor will be high. Therefore, the internal resistance of the sensor goes lower. The resistance of two points varies for detecting the presence of alcohol in the rider's breath.

C. GSM Module -:

Global System for Mobile communication (GSM) is the most frequently used in mobile phones, all over the world. Around 4.5 billion people from more than 214 countries use GSM for mobile phone operation. Both signaling and speech channels are digitalized.

It consist of (2G) Second Generation mobile phone system. Similarly GSM EDGE is the version 3rd protocol. Moreover GSM is designed using second generation cellular technology by using TDMA or FDMA system.

For booting the GSM module initial, insert the SIM card to GSM module and lock it. Then connect the adapter to GSM module and switch it ON. Currently sit up for it slow (say two minute) and see the blinking rate of 'status LED' (GSM module can take it slow to determine reference to mobile network). Once the association is established with success, the status/network light-emitting diode can blink unceasingly each three seconds. You'll strive creating a decision to the mobile range of the sim card within GSM module. If you hear a hoop back, the GSM module has with success established the network association.

Figure 4 GSM Module
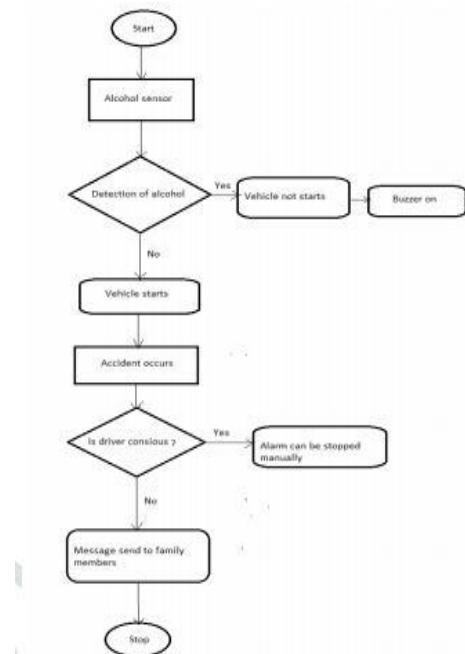
D. Flowchart

Figure 5

V.WORKING PRINCIPLE

Each year, motorcycle-related accidents lead to catastrophic passing's, taken a toll enormous cash in a few countries. A savvy head protector makes a difference to diminish those mischances casualty and saves lives. In this model plan, the savvy helmet has two sets of circuits. One is the head protector circuit, other is the onboard circuit conjointly contains a portable application. .
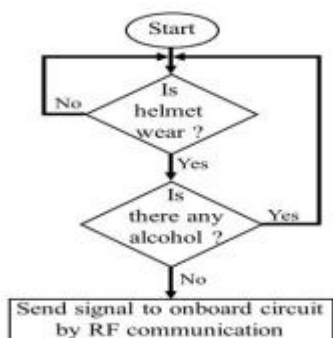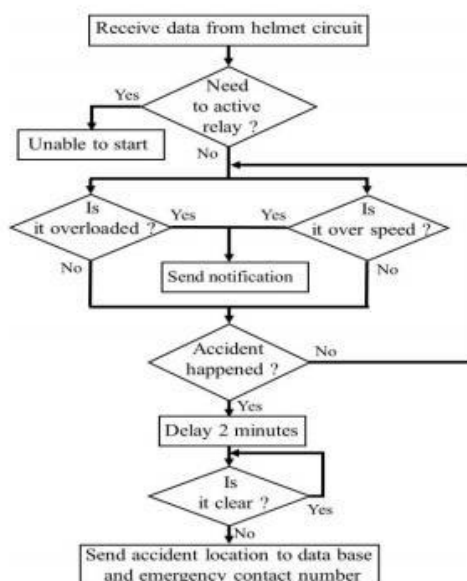
Fig.6

Fig.7: Working Principle of the onboard Circuit

The keen helmet circuit comprises of two sensors, an alcohol sensor, and an IR sensor. Alcohol sensor measures alcohol show within the rider's breath and the IR sensor recognizes the nearness of the rider's head. In case there any alcohol presents or doesn't wear the head protector, an anomaly flag sent to the onboard circuit by RF flag at the recurrence of 433 MHz Any anomaly found within the helmet circuit which gives a signal to the microcontroller for tall beat yield to the encoder IC HT12E. The encoder IC sent the flag at RF frequency to the decoder radio wire. When the receiving wire gets any flag, decoder IC HT12D translates the flag and sends it to ArduinoNano for the further prepare. In case there's any abnormality within the protective cap circuit, the hand-off will actuate to disconnect the battery circuit. Therefore, the bike can't begin. Sometime recently beginning the cruiser, the rider.

V.   RESULT & DISCUSSION

The smart helmet guarantees motorcycle rider security and also takes the vital steps to decrease mischance causality. in case any security highlights are abused, the framework can't allow the rider for beginning the motorcycle. The alcohol sensor's accuracy depends on the separate bet ween the mouth and sensor. When the separate over 15 cm, the sensor examined < 150 mg/L implies rider has moo blood liquor substance (BAC). The alcohol level reaches >350 mg/L implies rider has higher BAC, as the remove reduce s to less than 6 cm. On the other hand, the accident detect on sensor, the 3 pivot accelerometer sensor encompasses a tall exactness rate. After calibration, the accelerometer's esteem changes about 1.280 g from the initial esteem. It has 100Hz transmission capacity for detection.

VI.   CONCLUSION

The proposed system aims to prevent motorcycle accidents and also reduce the fatality of accidents. Family members, law enforcement agencies, and the nearest hospital are informed about accidents and also accidents location. Accidents detection algorithm has high accuracy and automatically record, detect, and report the accidents immediately. The driving data helps the rider to improve driving. This system makes a habit to wear a helmet among motorcycle riders. The smart helmet would make a motorcycle journey more protected and safer.

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