

# Smart Helmet for Traffic Rules

[<sup>1</sup>]Aditya P chavan, [<sup>2</sup>]Saahil P Anande, [<sup>3</sup>]Mayur Ravekar, [<sup>4</sup>]Pooja Tatkare [<sup>5</sup>]Atul Shintre

<sup>1</sup> Student, Computer, PVPPCOE, Maharashtra, India

<sup>2</sup> Student, Computer, PVPPCOE, Maharashtra, India

<sup>3</sup> Student, Computer, PVPPCOE, Maharashtra, India

<sup>4</sup> Assistant Professor, Computer, PVPPCOE, Maharashtra, India

## ABSTRACT

*Abstract—An accident is unexpected event. The carelessness of drivers and lack of traffic sense are the major factors for occurrence of accidents. In Spite of many rules made compulsory by the government, still the rules are being violated. In order to avoid the accidents, a GSM Based Helmet can be introduced, which checks whether the person is drunk before driving and is wearing the helmet. If any of the conditions are not satisfied, the bike won't start and a message is sent to the phone no. saved . To make driving more safe GSM and GPS technology is used. Vibration sensor is placed at places where the probability of hitting is more. So when the rider crashes and the helmet hit the ground, these sensors sense. When the data exceeds the specified stress limit the GSM module sends message to the specified family members .Any vehicle crossing the road marking while red light is on, will be detected from rfid tag of that vehicle. Automatic ticket (fine) will issued to vehicle owner through message or e-mail. The data is fetched from the central database using the rfid tag attached to the helmet. Hence we can say this project will help in maintaining discipline on road and will definitely reduce the rate of accidents.*

**Keyword :** - Biker's safety, Accident detection and alert system, Smart helmet, Alcohol detection

## 1. INTRODUCTION

In the recent times helmets are made compulsory in Maharashtra. The rate of traffic accidents is rising every year. As per Motor Vehicles Act, 1988 it is compulsory for bike riders to wear helmet .In India drinking and driving dr case is a criminal offence.. The safest way to use your bike is using helmet. In Order to avoid brain injury it is important to wear helmet. Wearing helmet doesn't mean you can drive reckless, but wearing it reduce the damage in case you fall down. Wearing a motorcycle helmet can also reduce accident fatalities by almost one-third. Head injury is a leading cause of death in motorcycle crashes. We live in a country where the roads are unsafe. Even otherwise, an accident can happens for any reasons, whether it is your fault or not. Wearing a helmet is the most sensible thing to do. Unfortunately, we lack it.

## 2. LITERATURE SURVEY

### 2.1 Smart Helmet & Intelligent Bike System: -

**Prof. Chitte P.P. 1, Mr. Salunke Akshay S.**

The paper have showed that the bike ignition will start if the helmet is worn. Hence it can protect the bike from being stolen and reducing the rates of accidents on road.

## 2.2 SMART-HELMET SYSTEM

**Anshu Singh Gautam, Gulshan Kumar Dubey, Mayank Mishra, Mohita Prabhat**

This paper develops an electronic smart helmet system that efficiently checks the wearing of helmet and also drunken driving. The system efficiently sends the location to the police authorities in case alcohol is detected which helps in creating a disciplined and a safer environment.

## 2.3 SMART-HELMET:-

**Ayush Garg Chitkara Institute of Engineering and Technology HIMUDA Education Hub**

This paper sends the victim's location to family members and police station. Also, accident rates can be drastically reduced by making this helmet as a compulsion while riding.

## 3. OBJECTIVES

- The bike requires helmet to start.
- Detection of accident can be easily done and medical services provided in short time.
- Detects whether the driver is drunk, if drunk the bike won't start
- Operates on both solar energy as well as battery supply.
- The motive of this project is to used RFID reader which is liable to power and interacts with the RFID

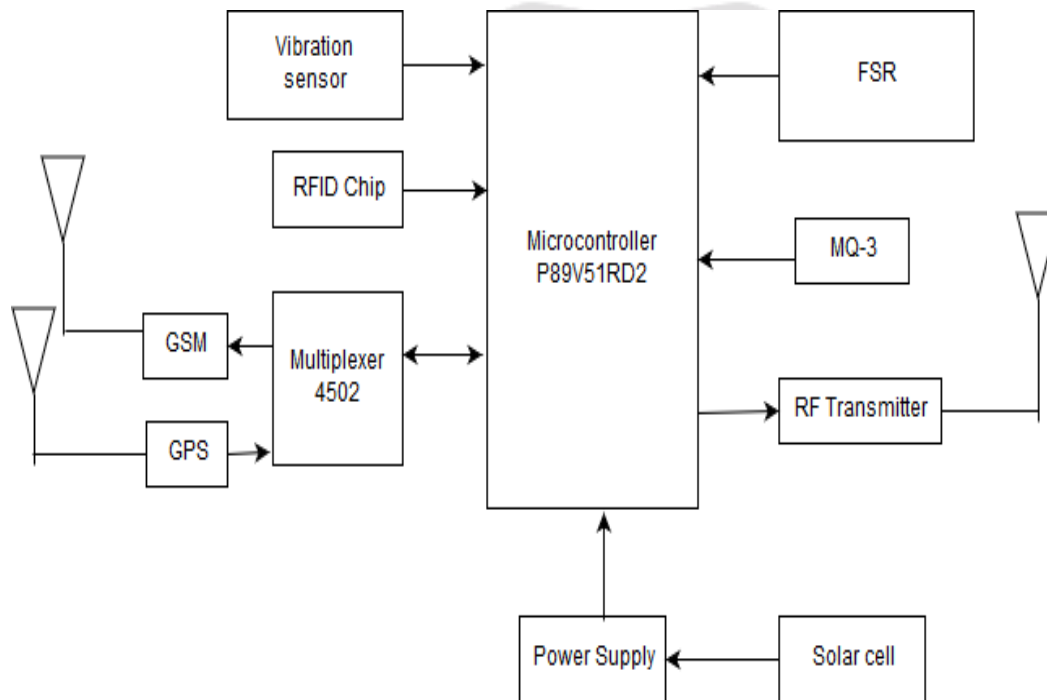
## 4. PRINCIPLE OF OPERATION

This Smart helmet consists of two operating modules which are receiver section and transmitter section. The transmitter part of the smart helmet is installed in the helmet whereas receiver section is placed in the bike. This enables wireless communication between the two sections. In this transmitter section pressure gesture is observed by (FSR) Force Sensing Resistor which is placed inside the helmet. The analog signal to digital signal conversion is done by the comparator and the output is given as logic level 1 to the input of transmitter, the output is produced by transducer. When the bike rider takes the helmet off, the output of transducer is zero and the input of the transmitter will be logical level. A 1 (high level) digital output is observed in the receiver section by the pin which detects the output until the rider is wearing the helmet when this signals strengthens the digital signal, the ignition module of the bike gets completed. When the rider takes off the helmet, relay unlatches and the connections of the circuit will get concluded. Also, the MQ-3 gas detector is used to identify the presence of alcohol content from the breath of the rider. It is positioned just below the face defend of the helmet so that the presence of alcohol is detected without any difficulty. If the rider consumes alcohol, then the resistance value falls, this value is send to the microcontroller and the microcontroller prevents the bike from starting. The vibration sensor is fixed in the helmet such that it detects vibrations of the helmet when in accident. When the rider happens to be in a accident, the helmet hits the floor of the ground and the vibration sensor identify the vibrations that are created when the helmet hits the ground and then the microcontroller identify the accident occurrence and it will send an SMS containing information about the accident and location of accident using GSM and GPS modules. This system makes the use of RFID ,which is done by the browser, which obtains a query signal and high frequency electromagnetic energy. The energy which is generated is seized by tag antenna and transmits the tag's unique ID to the browser. The idea behind the project is to develop the automatic challan system which can be use to determine the signal break by any bike rider. The RFID Reader reads the information like number of vehicles and automatically shows a report on the site itself through LCD. Power supply is sent to microcontroller for further operation. The GSM, RFID and MC are ready to do their operation and

traffic signal lights gets ON. As soon as the motorcyclist with RFID card skip the red signal along with riding over the RFID reader module. Reader extracts all information from card and send the information to the microcontroller.

## 5. BLOCK DIAGRAM

In our smart helmet system P89V51RD2 microcontroller is used. When it is turned on, the LED is ON indicating that the power has been supplied to circuit. The RF module checks whether the rider is wearing the helmet or not, if not then it won't allow the bike to start.



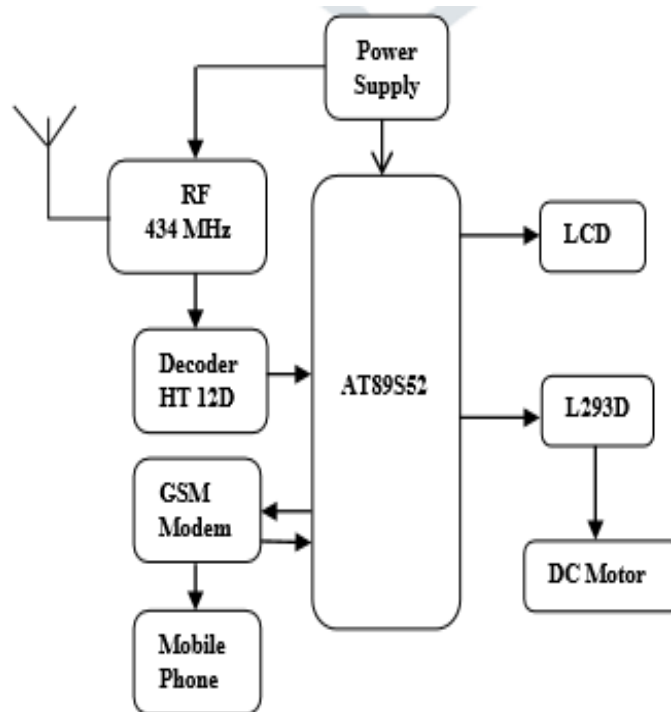
**Fig1-Helmet unit**

A Small voltage of the bike ignition is grounded. When the user wears the helmet the pressure sensor senses the pressure applied due to the biker and the RF transmitter will transmit the FM modulated signal. The Radio Frequency receiver connected to the bike, which receives the transmitter signal and hence activates the relay. The relay on receiving the signal, removes the ignition wire from the ground and connects it with starter. After this the bike will start. When driver meets with accident, the vibration sensor will send message to microprocessor. The GPS receives the location of the accident spot and it gives the information back. This data will be sent to the stored mobile number. This message will be received using the GSM modem. The longitude and the latitude of the accident spot will be provided by this modem.

To operate the two modules GPS and GSM, a microcontroller is used which is easy to program and can interfaced with any sensors and modules and is very small in size.

The thoughts that would arise are, How the message will be sent using GSM module such that the message includes the location of the accident and done with the help of GPS module., How will the microprocessor know that the accident has taken place? The answer to this, is that it can be done using a sensor placed in our helmet called as vibration sensor.

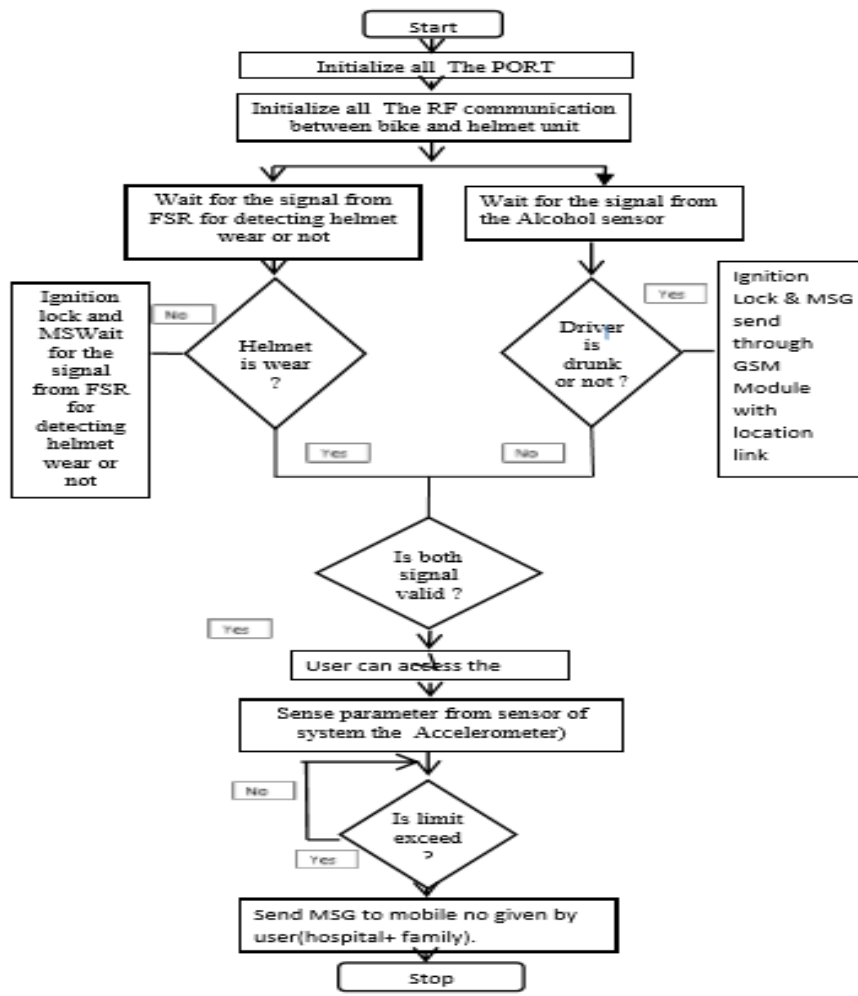
The vibration of the helmet can be detected by the vibration sensor which is placed in the helmet. When the bike rider undergoes a crash, the helmet hits the ground and the vibration caused by the crash is sensed by the vibration sensor and the microcontroller detects the accident occurrence and sends a sms containing location of the accident using GPS and GSM modules. Alcohol sensor senses whether the rider is drunk or not, if he is drunk, bike will not start, showing as “alcohol detected” on LCD display. Use of pressure sensor, gives the information whether the rider is wearing the helmet or not, if not the bike doesn't start and displays the rider to wear the helmet.



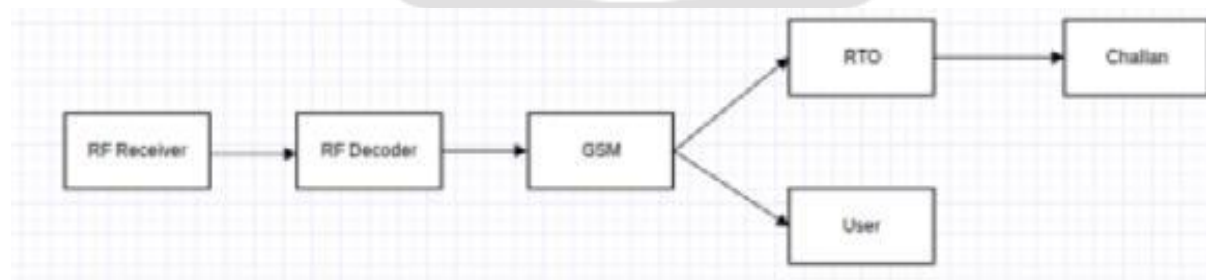
**Fig2-Bike unit**

This section consist of two parts signal reception and control. The first part is placed on the bike which consists several components which are MCU, GSM module , RF decoder , RF receiver, DC motor and LCD for indication purpose. The coded binary data transmitted by the RF transmitter is received by the receiver and send the data to RF decoder. The data is decoded by the decoder and produce a four bit digital data to the MCU if and only if the address bit of decoder and encoder is the same. MCU controllers the DC motor through IC L239D motor driver after it receives the data from the transmitter section. When the sensors detect that the driver is drunk, the GSM module activates itself and a message is sent to the relatives of the rider or the nearest police station so that proper action can be taken by the authorities. The block diagram of the system at the bike is shown in fig2.

6. FLOW CHART



RFID



## 7. HARDWARE & SOFTWARE REQUIREMENTS:-

### 7.1. Force Sensing Resistor (FSR):

Force Sensing Resistor is placed at a place inside the helmet where the actual human pressure is sensed.

It determines whether the user has worn the helmet or not.

### 7.2. MQ-3 Alcohol Sensor

MQ-3 gas sensor is used for identifying whether driver is drunk or not. It is positioned just in the front of Rider's face.

### 7.3. RF Communication circuit

Wireless link of RF is used to connect the helmet and the bike unit. RF communication circuit includes a decoder and an encoder.

### 7.4. RFID

The motive of this project is to use RFID reader which is liable to power and interact with the RFID tag.

### 7.5. ARDUINO

### 7.6. VIBRATION SENSOR

### 7.7. LCD DISPLAY

### 7.8. GPS MODULE

#### Software Used:-

**Programming IDE:** Arduino IDE

**Programming Language:** Embedded C Compiler: AVR GCC

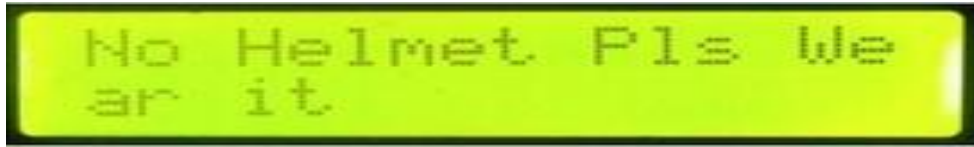
**Programmer:** ATMEL AVR ISP MKII

## 8. RESULT

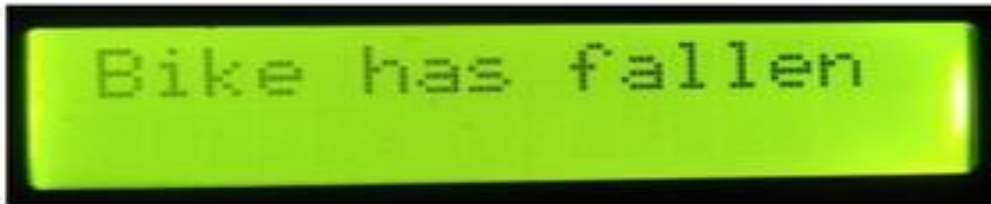
IF RF is not in range or if helmet RF module is not switched on:-



IF the rider doesn't wear his helmet the following message is displayed:

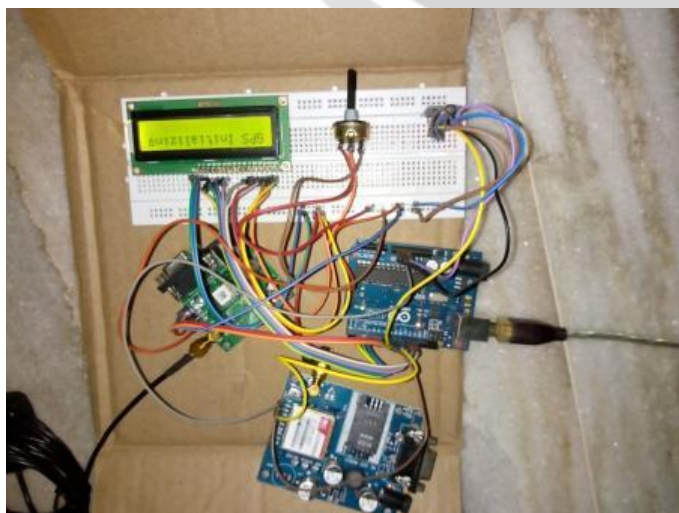


If accident occurs and the bike falls, the following message will be displayed on the LCD and a SMS will be sent to the registered phone no.

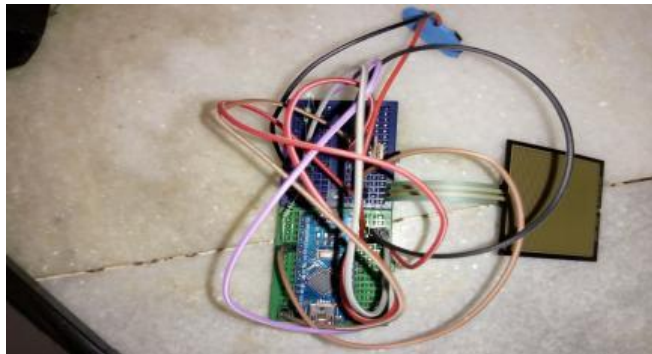


IJARIE

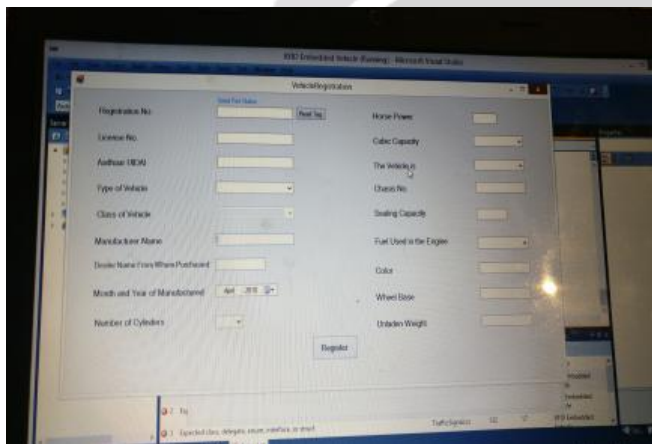
The GSM module looks as follows:-



Vibration module looks as follows:-



The RFID registration interface looks as follows:-



RFID module looks as follows:-



## 9. CONCLUSION

As the concluding part of this project, we would like to say that -"With proper action at proper time, a life can be saved. We need to understand how precious lives of people are.



If this project imparts this idea in even one person, we would think that the project will be successful. In future the complete circuitry can be made in a single board and mass production of those can reduce the cost and size of complete system with longer life with high efficiency. Use of this technology will become ubiquitous in coming day. And will be one of the greatest contributions to development of 21st century.”

## 10. REFERENCES

### [1]. Smart Helmet with Sensors for Accident Prevention

Mohd Khairul Afiq Mohd Rasli, Nina Korlina Madzhi, Juliana Johari Faculty of Electrical Engineering  
University Tecnology MARA40450 Shah Alam

### [2] Smart Helmet & Intelligent Bike System:

Prof. Chitte P.P. 1, Mr. Salunke Akshay S.

### [3]A Solar Powered Smart Helmet With Multifeatures

Mr.P.Dileep Kumar<sup>1</sup>, Dr.G.N.Kodanda Ramaiah<sup>2</sup>,Mr.A.Subramanyam<sup>3</sup>, Mrs.M.Dharani<sup>4</sup> International  
Journal of Engineering Inventions e-ISSN: 2278-7461, p-ISSN: 2319-6491 Volume 4, Issue 10 [June 2015] PP:  
06-11)

