

## SMART HELMET KIT

Mohammad Sumamah<sup>1</sup>, Mohd Faiz<sup>2</sup>, Anshuman Tyagi<sup>3</sup>

<sup>1,2</sup>Student, Dept. of Electrical and Electronics, Pranveer Singh Institute of Technology, Kanpur, UP, India

<sup>3</sup>Head Of Department, Dept. of Electrical and Electronics, Pranveer Singh Institute of Technology, Kanpur, UP, India

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**Abstract** - Everyday many people die in road accident in India. According to transport ministry data around 33 percent who died in the road accident were driving two wheeler. And it is found that 98 percent people did not wore the helmet at the time of accident. So from this statistics it is very clear that wearing helmet is a choice between life and death. And research by UN Motorcycle study says that wearing an appropriate helmet would increase the chances of survival by 42 percent and reduces the chances of injury by 68 percent.

So in order to encourage people to wear the helmet a protection kit is designed called Smart Helmet which is installed in the helmet and in the bike. The main feature of this kit is that when a person wears a helmet then only the bike will start otherwise the bike will not start. The second feature is that it will send the location of rider if he met with an accident to a pre stored number. The third feature is added to avoid accident at the turns. LEDs are used at the back side of the helmet which are synced with turn indicators and tail light of the bike.

**Key Words:** GPS, GSM, BLUETOOTH, ACCELEROMETER, PIC MICROCONTROLLER, LIMIT SWITCH

### 1. INTRODUCTION

India is a developing country and larger part of its population comprises of middle class people, so many people prefer two wheelers because of its simplicity and low cost. But problem occurs when people avoid wearing helmet while riding and when accident takes place then it would bring serious injuries or death to the rider. The risk of death is 2.5 times more among riders not wearing a helmet compared with those wearing a helmet.

The second problem is that sometimes person die because help does not reaches to him on time. The third problem is addressed regarding to avoid accident at turns. Many times it is evident that a person is not able to see turn indicator given by other rider and eventually they met with an accident.

So to overcome all these problems and to provide more security to the rider while driving this smart helmet is designed.

### 2. RELATED WORK

Many authors presented their work regarding smart helmet and safety against road accident. This proposed system is a modified version of all the previous works. Some of them are described below:

Smart Helmet using GSM and GPS[1]. In this work Smart helmet band is designed. The working of this smart helmet band is very simple, Limit switch is placed inside the helmet, which will detect whether the rider has worn the helmet or not, if not then the bike will not start. Smart helmet band provides help in case of accident by using GSM and GPS technology.

Real Time Vehicle Detection and Tracking Using GPS and GSM [2]. This paper presents review on the accident detection techniques and some future possibilities in this field. The purpose of the project is to find the vehicle and locate the vehicle by means of sending a message using a system which is placed inside a vehicle. The project is designed for vehicle accident detection and tracking system by using GSM and GPS.

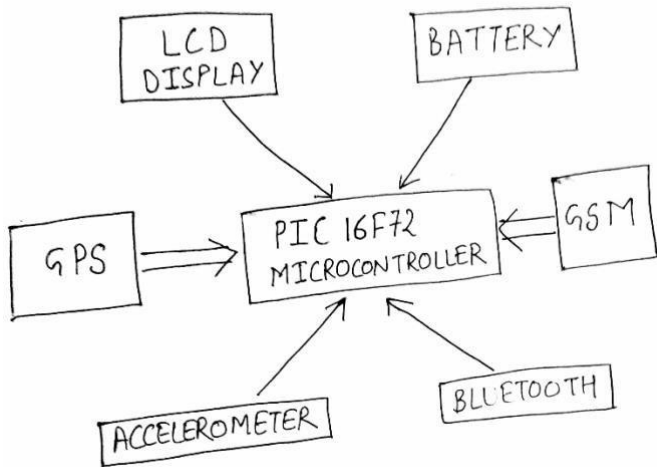
Accident prevention and Reporting System Using GSM(sim900D) and GPS(NMEA 0183),has been described in [3]. It enables intelligent detection of an accident at any place and reports about the accident on predefined number. When the distance is too short between the vehicle and obstacle then alarm will be "ON" as an indicator to move vehicle in other direction which is safer but when a vehicle faces accident despite of alarm, immediate vibration sensor will detect the signal and Microcontroller sends the alert message through the GSM model including the location to the predefined number. This provides an automatic accident prevention and reporting system.

### 3. PROPOSED WORK

This system consists of two units:

- 1) Bike Unit
- 2) Helmet Unit

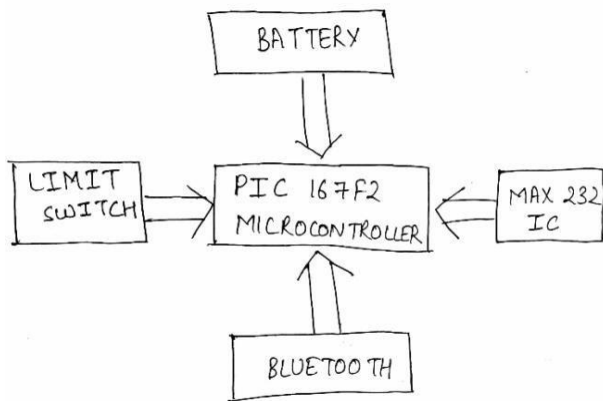
### 3.1 BIKE UNIT



**Fig.1 Bike Dashboard Unit**

In bike unit as shown in fig 1 we are using PIC 16F72 microcontroller, Analog Accelerometer(ADXL335), Battery, and Bluetooth. Firstly the Limit switch in transmitter checks whether the rider has worn the helmet or not. If yes, then it will send a signal to the receiver and it will provide ignition. The accelerometer will continuously monitor and if values of accelerometer will exceed the set threshold value then it will be considered as an accident.

### 3.2 HELMET UNIT

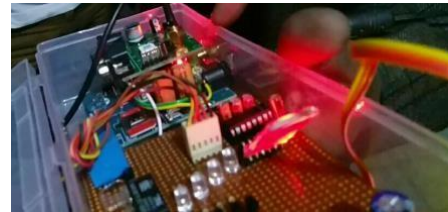


**Fig.2 Helmet Unit**

The helmet unit as shown in fig 2 consists of PIC 16F72 microcontroller Bluetooth, Sim808 (GPS GSM), Relay. After the detection of accident via accelerometer the Bluetooth sends signal to the receiver which enables the GPS and GSM(sim808). The sim sends a message to the pre-defined number along with the location of the vehicle. Bluetooth continuously read the turn indicators and tail light. And if any turn indicator is on then it would set signal to 1 and set other indicator and tail light to 0.

### 4. RESULT

So we have designed a security feature for the rider called smart helmet. The bike will start only when the rider will wear the helmet otherwise microcontroller send the signal to the bike unit with the help of relay not to start the ignition. Bluetooth is used for the continuous communication between the bike unit and helmet unit.



**Fig.3 Hardware of Bike unit**



**Fig.4 Hardware of Helmet Unit**

Helmet Unit is provided with extra feature. LEDs are used at the back side of the helmet which are synced with the turn indicators and tail light of the bike to avoid accident at the turns or if a person is coming from behind he would be able to clearly see indicators given by the rider.

### 5. CONCLUSION

The main aim of this work to ensure the safety of the rider and to encourage rider to wear the helmet. Accident detection is also provided by using GPS and GSM and LEDs are provided at the back side which are synced with the bike indicators and tail light. In previous work one or two features are provided but in this work an extra feature of placing LEDs at the back side is added which make this work unique from other works.

### 6. FUTURE WORK

In modification we can provide USB and micro USB port in order to avoid the battery problem. Rechargeable battery can be used which can be charged by using USB port and micro USB can be used to take out charging from the helmet to charge low power devices like mobile phone etc. Printed circuit boards can be used in order to reduce the size and complexity of the circuit and it would also reduce its cost and then it would be more affordable for the rider to purchase smart helmet.

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