An Automatic Protective Headgear for Safer Ride

J.Jayasri[#1], S.Swetha[#2],AL.Solai[#3], Chitra Valavan, M.Tech (Ph.D*)*

B.E., ECE, A.V.C College of Engineering,
Mannampandal, Mayiladuthurai, Nagapattinam (dist).
professor, Department.of ECE, A.V.C College of Engineering, Mannampandal, Mayiladuthurai,
*Nagapattinam (dist).*

Abstract-
Providing safety to a person while riding the bike is of prime concern. The government is forcing the drivers to wear helmet during driving. Negligence of the driver is the major factor of such accidents. The idea of developing this project comes from social responsibility towards the society. In order to overcome this, we introduce an automatic protective headgear for safe riding which includes a headgear controlled safety system to ensure that the bike rider is wearing a helmet or not using RF module. An MQ-3 alcohol gas sensor is placed in the head gear near the mouth of the person to detect whether the person is drunk or not. When accident occurs, it is sensed by Vibration sensor and automatically Short message is sent via GSM network and received with current location with the help of GPS module. In case of theft, the owner can know the current location of the bike with the aid of GSM and GPS module. By using GPS module the location of an object can be easily identified With all this features, accidents can highly be reduced in future.

Keywords: *PIC16F877A, RF module, MQ-3 Alcohol sensor, Vibration sensor, GSM, GPS*

I. INTRODUCTION

In India more than 37 million people are using two wheelers. Hence accident percentage is high in two wheelers when compared to four wheelers. To overcome this, we introduce an automatic protective headgear for safe riding. A headgear controlled safety system to ensure that the bike rider is wearing a helmet or not using RF transmitter. This transmitter is placed in the helmet. An MQ-3 alcohol gas sensor is placed in the head gear near the mouth of the person to detect whether the person is drunk. This headgear also incorporates various applications to prevent the rider from accidents and theft through GSM and GPS module.

II. SYSTEM DESIGN
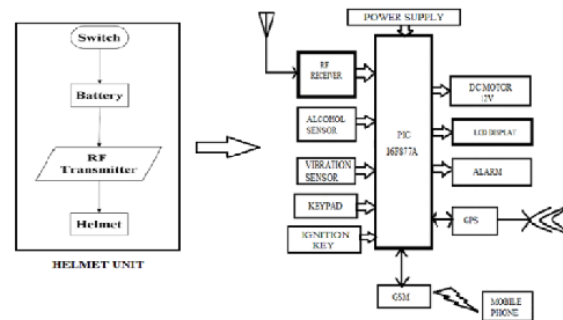
The four major parts are used in the transmitter side consists of switch, battery, RF transmitter and Helmet.

While in receiver side consists of RF receiver, Alcohol sensor, vibration sensor, Keypad, Ignition key, 12v dc motor, LCD, GPS and GSM.

A. PIC16F877A Microcontroller:

PIC microcontroller PIC16f877a is one of the major microcontrollers. It is very much essential to use, the coding or programming of this controller is very simple and also have many application in digital electronics circuits. PIC16F877a has 40 pins and In this 40 pins 33 pins are used for input and output purpose. An EEPROM is provided which makes it possible to store some of the information permanently like transmitter and receiver codes, frequencies and some other related data. The cost of this controller is low and it is very simple to handling.

B. RF Transmitter/Receiver:

The RF module operates at Radio Frequency. The corresponding frequency range varies in-between 30 kHz & 300 GHz. Provides long distance transmission and reception of about 300m to 500m .The providing Supply voltage required is 3-12V

C. Alcohol sensor:

This Entire module is made by using Alcohol Gas Sensor MQ3. It is a low cost semiconductor sensor which can detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L.

D. *Vibration Sensor*

Vibration sensor is used originally as vibration switch because of its high sensitivity; it is sensitive to environment vibration, and generally used to detect the ambient vibration strength. When module did not reach the threshold in shock or vibration strength, DO port output gets high level and when external vibration strength exceeds the threshold, D0 port output gets low level. Small digital output D0 can be directly connected to the microcontroller, for the microcontroller to detect low level, thereby to detect the ambient vibration. Small digital output DO can directly drive the relay module, which can be composed of a vibration switch. If any accident occur it will be sensed by this sensor the main advantage is it will be only sensed at particular range of frequency from the motor bike .other than that it will not be sensed.

E. *GPS*

The GPS signal is applied to the antenna input of module, and a complete serial data message with position, velocity and time information is accessible at the serial interface with routine protocol. The small form factor and low power consumption make the module easy to integrate into portable device like mobile phones, cameras and vehicle such as bike, car, aero plane and any other navigation systems.

F. *GSM*

GSM (Global System for Mobile communications) is a digital cellular technology used for transmitting Message such as mobile voice transmission, receiving services and data services. GSM supports voice calls and data transfer speeds of up to 9.6 kbps, together with the transmission of SMS (Short Message Service). While the vibration sensor has to be sensed then it will be automatically transfer the message to the particular person at very instant.

III. HARDWARE DESCRIPTION

PIC16f877a finds its applications in a huge number of devices. It is used in remote sensors, security and safety devices, home automation and in many industrial instruments. An EEPROM is also emerged in this technique. The main motive of using this PIC16F877A is high speed and better storage capacity. The basic pin configuration is given as below.
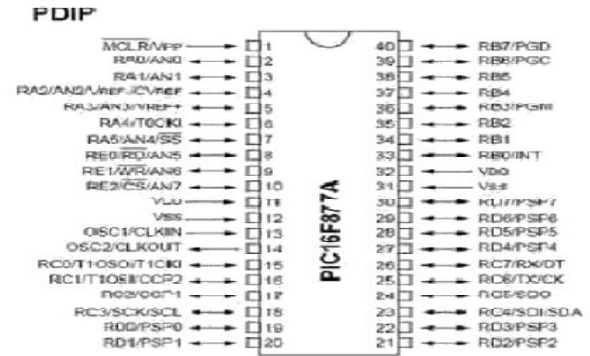
IV. CIRCUIT DIAGRAM
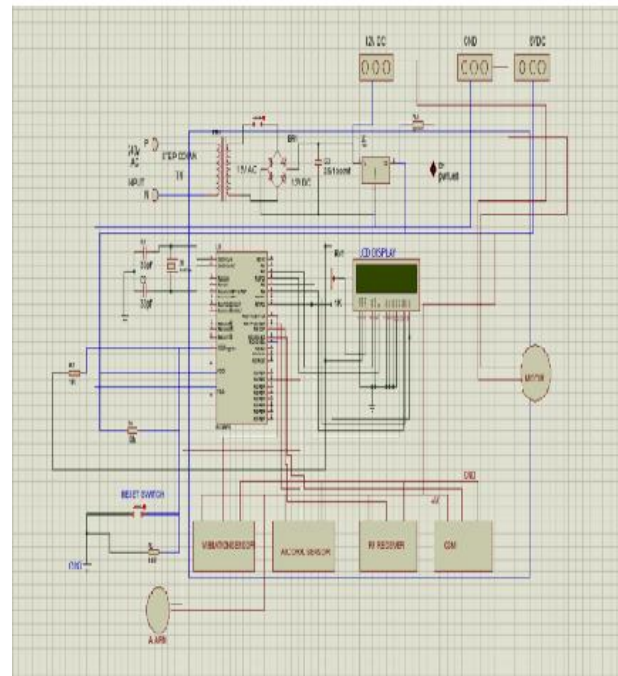
The basic circuit diagram is shown above. At first when the person wears a helmet, the switch gets pressed .as the switch is continuously pressed the RF transmitter transmit the signal to RF receiver. The RF module is connected to PORT C of microcontroller. An MQ-3 alcohol gas sensor is used which is highly sensitive, and checks whether the person is drunk. This Alcohol Sensor is connected to PORT C of controller. When accident occurs, it is sensed by Vibration sensor and Short message is sent via GSM network and received with current location by GPS module. Vibration sensor is connected to PORT C. And GSM is connected to PORT D of controller. In case of theft, the owner can know the current location of the bike with the help of GSM and GPS module. The output is shown in LCD and Buzzer is connected to PORT B of PIC Microcontroller.
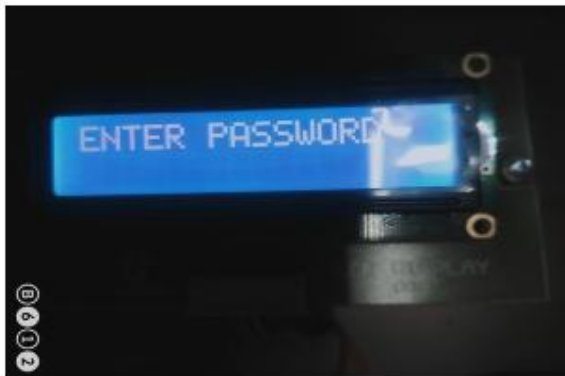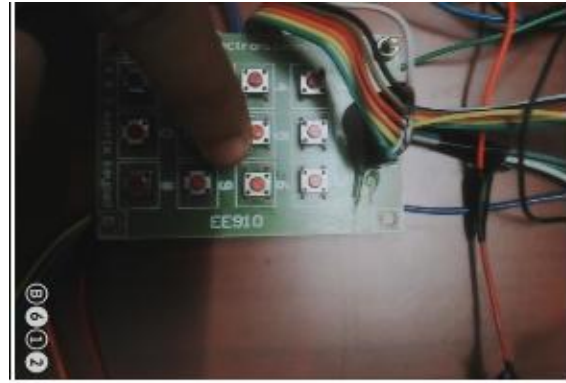
V. OUTPUT

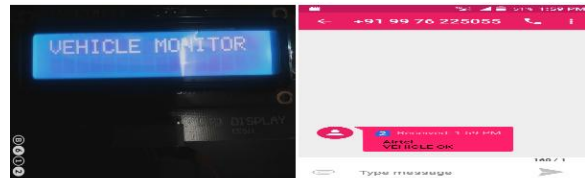Ignition key is off

Ignition key is on

After RF switch is pressed

Password entered

Dc motor is on

In case of Accident   Accident and Theft location

VI. CONCLUSION

In this fast growing country the technology plays an important role the people faces very busy schedules they need everything within a fraction of second for hat one of the important technology we all are used in our daily life is an transportation resource like car, bike etc. but the major accidents occur because of two wheelers.

This system is designed majorly to avoid motor bike accidents. The accidents are increased majorly due to absence of helmet or the usage of alcoholic drinks, so the major objective of this system is to develop an electronic headgear. The proposed system therefore, seals the safety and security of the rider as well as the motorcycle and can prove to reduce the fatality of the road accidents. Also it strives to decrease the theft of motorcycle by integrating additional security features such as helmet-put-on. In case the motorcycle has been stolen, remedial measures such as tracking and identification can be taken.

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