International Journal of Research in Engineering, Science and Management
Volume-2, Issue-5, May-2019
www.ijresm.com | ISSN (Online): 2581-5792

Design and Implementation of Advanced Helmet

Anshul Soni[1], Dishank Singh[2], Santosh Kumar[3], Mayand Malik[4], Mayank Sharma[5], Shivam Sharma[6]
[1,2,3,4,5]*B.Tech. Student, Department of Mechanical Engineering, ABES Engineering College, Ghaziabad, India*
[6]*Assistant Professor, Department of Mechanical Engineering, ABES Engineering College, Ghaziabad, India*

***Abstract*: The main aim of this research is to make the wearing of helmet compulsory throughout the complete ride. Due to not wearing the helmet the number of accident are increasing day by day at a rapid rate, so this model can come out as a very effective method to reduce the head injuries which are very fatal and occur during most of the motorbike accident.**

The primary objective of this research is to reduce the road accidents by making it mandatory for the rider to wear the helmet.

The secondary objective of this paper is not to allow the alcohol consumption by the rider.

***Keywords*: Microcontroller: Arduino (UNO), RF Transmitter and Receiver: MX-05V, Head Switch, Alcohol sensor, Arduino IDE Software, MOSFET, LCD display.**

1. Introduction

In this modernizing era, the technology is also increasing at a very rapid rate. But this advancement has also proved fatal in many aspects. One of the aspect is that with the modification of power in motorbikes, the speed of motorbike has also increased. As the result, the number of motorbike accident has also increased at an exponential rate. In this fast moving world where this type of casualties happen day by day, we can only ensure the safety of the rider by upgrading the safety systems. Considering this serious situation, our main moto in this project is to make the wearing of helmet compulsory for two wheeler riders. It will also increase the safety of bikes being parked in the parking lots for long durations.

In this project the helmet will be continuously communicating with the motorbike during the ride and the ignition system will not be turned on if the rider is not wearing helmet. Another feature is that if the rider removes the helmet during the ride then also the ignition system will be turned off. One more feature is that if the rider has consumed alcohol above the certain limits then also the ignition system will not be turned on.

2. Literature review

The idea of developing this research paper comes in our minds as we see our self a future responsible members of society.

According to a report on road accidents in the year 2017, at least 98 motorbike riders died daily due to not wearing of helmets and these accidents claimed more than 1.4 lakh life's India only.

The main reasons of such fatal accident are:

- Rash driving
- Less driving knowledge
- Alcohol consumption
- Improper roads
- Not following traffic rules

As these accidents claimed lives at a very large scale so there is an urgent need of adopting some upgraded safety equipments.

Considering all such information the idea of developing our project "ADVANCED HELMET" becomes a necessary need for a safer society.

3. Proposed system

The main moto of our project "ADVANCED HELMET" is to confirm that the rider has worn the helmet continuously during the complete ride. Another objective of our project is to not allow the riding of motor bike if alcohol is consumed by the rider.

To achieve this purpose, we are using electronic technology. In this we are using a "HEAD SWITCH" to maintain a continuous communication between the bike module and helmet module. If at any instant the head switch remains unpressed, the communication between the motorbike module and helmet module will break and the ignition system will be turned off. When the Head switch is pressed the LCD will display the message "SAFE DRIVE" and the ignition system will be turned on.

For achieving the another goal of reducing the bike accident due to alcohol consumption we are using a "ALCOHOL SENSOR" which will ensure that the ignition system will be turned off if the rider has consumed the alcohol above the permissible limits and the LCD provided will also give the message of "ALCOHOL DETECTED"

A. Helmet Module

The basic and most important task of the helmet module is to check that the head switch is continuously pressed and a stable connection is setup between the helmet and motor bike with the help of radio frequency (RF) transmitter and receiver Another task which is completed in the helmet module is to regularly

check that the rider's alcohol consumption is below the permissible limit with the help of alcohol sensor (MQ3). All these tasks are performed with the help of micro controller Arduino (UNO) installed in the helmet. Helmet module is shown in Fig. 1.

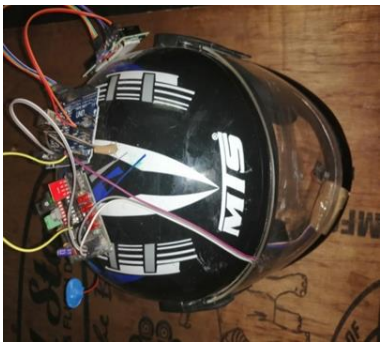

Fig. 1. Helmet module

B. Bike Module

The module which is installed on motor bike is kept in connection with the ignition system, so that the ignition system is turned on and off whenever the signals are sent from the helmet module (Fig. 2). If the motor bike is outside the permissible range of the helmet the no signal will be transferred and the ignition system will not be turned on and hence the bike will not start. Even when the alcohol consumption by the rider is above permissible limit then also the signals will not allow the bike to start. Bike module is shown in Fig. 2.

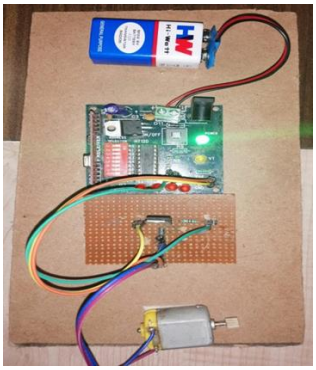

Fig. 2. Bike module

4. Components

A. Microcontroller

The microcontroller we have used in our module is Arduino (UNO) type, which is an open source microcontroller.

The Arduino UNO based on MICROCHIP ATmega328P. The board has 14 digital pins,6 analog pins and programmable with the Arduino IDE (Integrated development environment) via a USB cable.

The type of Arduino (UNO) is single board microcontroller. The memory used in the Arduino is SRAM.

Technical Specifications:

- Operating Voltage: 5 volts
- Input Voltage: 7 To 20 volts
- Length: 68.6mm
- Width: 53.4mm
- Weight: 25g

B. RF module/transmitter (MX05B)

RF module (radio frequency module) is a small electronic device that we have used for our main objective in the project. It transmits and receives radio frequency signals between two devices called transmitter and receiver. The whole module is based on the embedded technology that is often desirable to communicate with both devices each other wirelessly. The frequency used is 430MHz. This is a complex device because of the sensitivity of the radio circuits. The whole module based on the programs programmed in the microcontroller. These RF modules comes in the category of smart sensor application.

Transmitter module: RF transmitter module is a small PCB sub assembly capable of transmitting a radio wave and capable of modulating the wave carrying data the required action at the receiver end. and transmitting to the receiver module.

Receiver module: RF receiver module receives the modulated RF signal from the RF transmitter and demodulate it and perform

Technical Specifications

- Operating Voltage: 5 volts
- Input Voltage: 7 To 20 Volts

C. Alcohol sensor (MQ 3)

The alcohol sensor is based on embedded electronic technology is used to sense and detect a range of alcohol content in air volume at room temperature. The alcohol sensor uses a simple electronic circuit and it converts the charge of the conductivity to correspond the output signal the sensor can activate at the temperatures ranging from -10o C to 50oC.The sensing range is from 0.04 mg/L to 4mg/L which is suitable for breathalyzers. The power supply should be from 2.5 to 5 volt.

The MQ3 alcohol sensor has a chip converter PT1301. It has a lower conductivity to clean the air as a gas sensing material. It detects the alcohol, smoke, benzene, steam and other harmful gases. It has a long life with simple drive circuit and is of low cost.

D. MOSFET

MOSFET stands for metal oxide semiconductor field effect transistor. The material used in the manufacturing of MOSFET is silicon.

5. Result

All the component that are required in the project have been completely assembled together and required programming of project has been successfully tested on the software and it has been completely programmed in the Arduino (UNO) microcontroller.

Individual testing of every component in both the module has

been successfully carried out and collectively also been done successfully

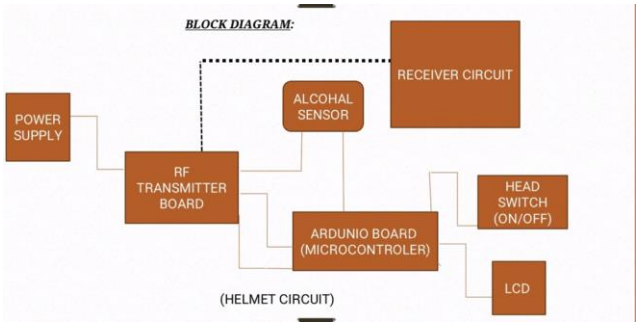

Fig. 3. Block diagram of the helmet circuit

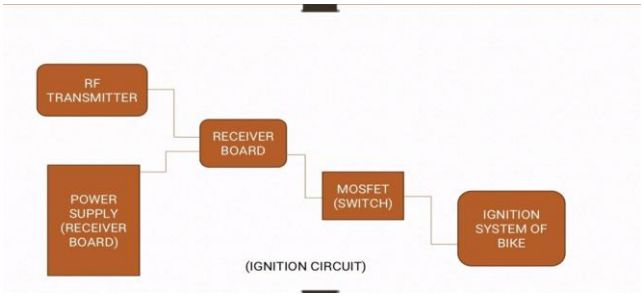

Fig. 4. Block diagram of the ignition circuit

6. Conclusion

This research paper will prove its importance towards a safer society in near future. It will not only increase the safety but also ensure that no careless behavior is done by the rider. It will act like a virtual traffic police continuously moving with the rider and checking that the rider has worn the helmet or not. This project not only increases the safety of the rider but also increases the bike being parked for long durations.

References

[1] Megha Manchanda and Shreya Jai (August 2018). Road accidents led to 3 deaths every 10 min in India in 2017- Business standard.
[2] Dipak K. Dash (oct,2018). 98 helmetless riders died per day in India last year- Times of India (TOI).
[3] Ardunio (UNO) for beginner's projects- marketspace.com
[4] RF module – F. Egan, William (2003). Practical RF System Design. Wiley-IEEE Press.