International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 05 | May 2019 www.irjet.net p-ISSN: 2395-0072

Smart Helmet using Arduino and RF module

Dhruvesh Potekar[1], Onkar Thakur[1], Sumit Kumar[1], Krishna Trivedi[1], Prof. Farheen Bobere[2]

[1]Student, Department of Automobile Engineering, M.H.Saboo Siddik College of Engineering, Byculla, Maharashtra, India
[2]Assistant Professor, Department of Automobile Engineering, M.H.Saboo Siddik College Of Engineering, Byculla, Maharashtra, India

---

Abstract – *Smart Helmet using Arduino and RF module is a project undertaken to increase road safety among motorcyclist. Most of the accidents occurring today are due to the lack of safety as well as driver being drunk. So, in order to overcome this our project ensures that the driver has worn the helmet and at the same time s/he is not drunk. For this we are using Arduino and RF module for programming and for wireless transmission.*

Key Words: **Rider safety, Alcohol detection, Sensors, Rider safety, wireless transmission**

1. INTRODUCTION

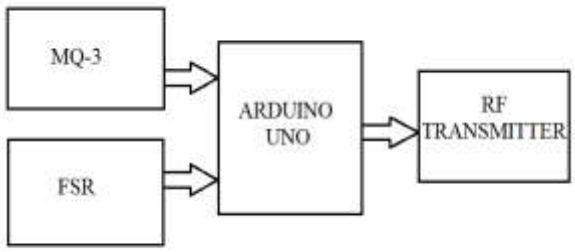
India ranks second in terms of population in the whole world, and as the population is increasing day-by-day so is the need of transportation. In India the middle-class families prefer to buy two-wheelers instead of four-wheelers and there are cities like Pune, Bangalore, Mumbai which are among the highest number of two-wheeler usage cities in Asia. Most Indians prefer two wheelers for their daily commute to work. Almost 33% of Indians use two-wheelers to reach work. Although the two wheelers used today are good with new and increasing features, there is an imminent need of some additional features to be incorporated for the two-wheeler riders which incorporate safety. The aim of this project is to provide safety to the bike rider hence in order to implement this we come up with the idea of Smart Helmet. The smart helmet will consist of two features both of which must be satisfied in order to start the bike. The first of which is that the rider must be wearing the helmet and the second is that the rider must not be drunk. If these two conditions are satisfied only then the bike will start. Also, if only a single condition is satisfied the engine won't start. In order to achieve this, sensors like FSR (Force Sensitive Resistor) and MQ3 (alcohol sensor) are used. The whole program is compiled on Arduino Uno using Arduino IDE software. When both the conditions will satisfy, the rider will able to able to start the engine otherwise not.

1.1 Methodology

FSR sensor are mainly used for "touch sensitive" application. It is also used for detecting physical pressure, squeezing and weight. Here we use FSR because of simple of use and low cost. It has 2 pins in it. It changes its resistive value on pressing hence more the one presses its resistance go down. It is placed inside the helmet above the position of head. An alcohol sensor is suitable to check whether the driver is drunk or not, hence it is placed in the helmet which covers the jaw region of the rider so that it placed right in front of rider's mouth. As per the section 185 of the Motor Vehicle Act, the blood alcohol content (BAC) legal limit is 30mg alcohol in 100ml blood. Here for demonstration purpose we program the limit as 350mg/L. Since it is highly sensitive to alcohol vapor and less sensitive to benzene it is used to check the alcohol consumed by the driver and its sensitivity can be adjusted by using the potentiometer. It consists of 5 pins. Hence wearing the helmet is confirmed using FSR and it detects the alcohol within the breath and sends the signal to the Arduino. The RF module (Radio Frequency) of 433MHz is used to transmit the signal wirelessly between the two devices. It consists of transmitter and receiving part and ranges differ from device to device. Both transmitter and receiver have an operating voltage of 5V. RF transmitter receives the data through the antenna which is connected to the 4th pin of the transmitter. Whenever there is RF module used in a circuit it comes mainly with an encoder and decoder. Here we have used HT12-E encoder and HT12-D decoder. It is mainly used in interfacing RF circuits. HT12-E encoder converts the parallel inputs into serial output. It consists of 12 pins out of which 8 are address bits and 4 are data bits. Similarly, HT12-D decoder converts serial input to parallel output. It also consists of 12 pins out of which 8 are address bits and 4 are data bits.

1.2 Block diagram

Transmitter part (Helmet Unit)



Receiver part (Bike Unit)

Transmitter module comprises of sensors like MQ3 & FSR when both the conditions satisfy it will send its signal through RF Transmitter via antenna.

Receiver module receives the signal from the transmitter, decode the data and will act accordingly

Sr no	Name of the Components	Units
1.	Arduino Uno	2
2.	MQ3(Alcohol Sensor)	1
3.	FSR	1
4.	RF Transmitter	1
5.	RF Receiver	1
6.	HT12 Encoder	1
7.	HT12 Decoder	1
8.	AND Gate (7408)	1

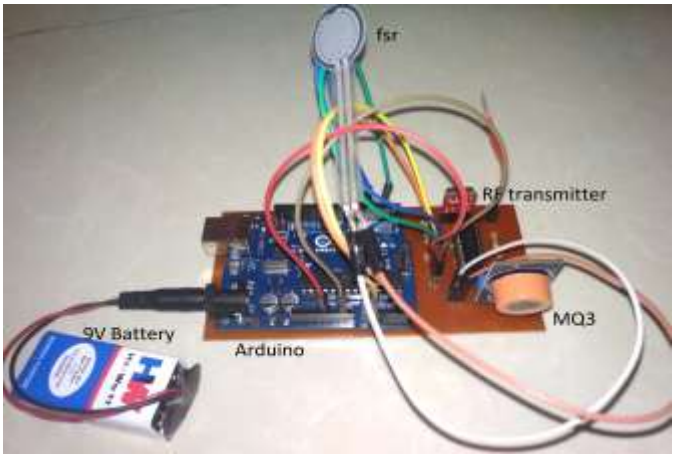
2. Software Used

The whole program is compiled on Arduino board using Arduino IDE software. The layout of the transmitter and receiver and its PCB layout was made on Proteus 8.1 software.

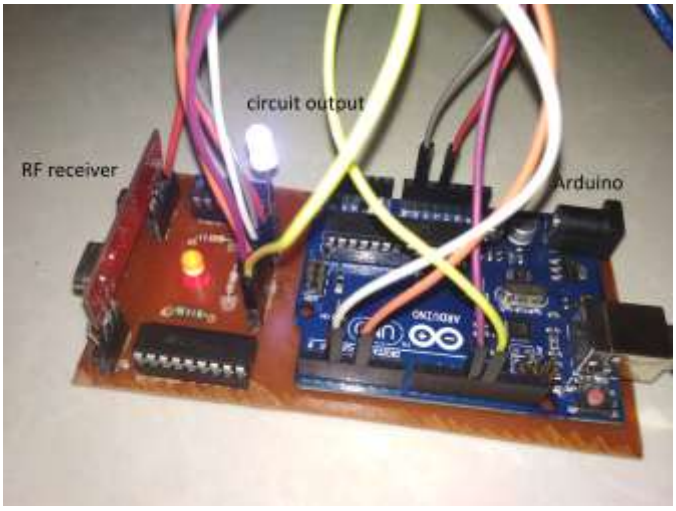
3. Result

The circuit was tested successfully and it was found out that if the bike is in off state then it won't start unless and until both the conditions are satisfied and if the bike is in on state and any of the two condition gets violated it will stop within 5 seconds thereby protecting the driver.

Transmitter part circuit



Receiver part circuit



4. Conclusions

The scope of this project was to increase the safety of the driver while riding a motorcycle. At a same time, government are implementing certain rules and regulations, but many people don't follow it. So, by the implementation of this technology it will become a compulsion for the driver to wear a helmet and the accidents that happen due to drink and drive will be significantly reduced.

5. References

1. https://www.engineersgarage.com/electronic-components/rf-module-transmitter-receiver
2. https://www.elprocus.com/rf-module-transmitter-receiver/
3. https://youtu.be/UjDV60q7ajU
4. Mr. Vivek A. Patel, Mr. Akash Mishra, Mr. Rana Hiten, Mr. Kautik Prajapati, Smart Helmet (IRJET)
5. Deekshitha K J, Pushpalatha S2, Implementation of Smart Helmet (IRJET)
6. Shabrin, Bhagyashree Jagadish Nikharge, Maithri M Poojary, T Pooja4, Sadhana B, Smart Helmet - Intelligent Safety for Motorcyclist using Raspberry Pi and Open CV.