

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 9, Issue 3, March 2020

## Embedded Based Smart Helmet to Ensure Traffic Regulation

S.Mohanram<sup>1</sup> M.Soundarya<sup>2</sup>, S.Vijayasalini<sup>3</sup>, P.Yuvarani<sup>4</sup>

Assistant Professor, Department of Electronics and Communication Engineering, Pollachi Institute of Engineering and  
Technology, Pollachi, Tamilnadu, India<sup>1</sup>

UG Scholar, Department of Electronics and Communication Engineering, Pollachi Institute of Engineering and  
Technology, Pollachi, Tamilnadu, India<sup>2,3,4</sup>

**ABSTRACT:** India is a developing country, with advancement in the transportation technology and rise in the total number of vehicles, road accidents increase rapidly. This development in technology also increased the traffic hazards. Two wheeler accounts for 35% of total road crash death. Our task as an engineer was to design a helmet that could safeguard a driver from the hazards he could face on the road because of his careless activities and unexpected hurdles he might pass through his journey. Such issues are supposed to be outraged; “Accident Detection and Drive protection using Intelligent Wireless Safety Helmet” is developed. A smart helmet is a type of protective headgear which ensures the safety of the driver to a greater extent never than ever. It is embedded with a intelligent system merging the helmet and the vehicle.. Vehicle is fitted with an individual unit which checks and intimates accident through geometric coordinates via Short Message Service. This paper also proposes a Smart Helmet system using GPS and GSM modules which will help in avoiding such situations to a significant extent and report accidents. The micro-controller keeps on recording all the parameters of automobile for prevention and detection of accidents and controls the function of relay and thus the ignition, thereby enables detection of an accident at any place and reports about the accident to predefined numbers accident.. An RF Module can be used as a wireless link for communication between the transmitter and the receiver, By using geometric coordinates, location of the injured rider can be traced and transported to the nearby medication facility without any delay on searching the casualty.

**KEYWORDS:** Alcohol, Accident, Helmet, Vehicle, Message, GSM Modem, GPS receiver technology

### I. INTRODUCTION

In developing countries like India, road traffic accidents were the most significant cause of injuries, ranking eleventh among the most important causes of lost years of healthy life. In a road system like India, widening of the road is not an alternative solution to avoid traffic in such a cities. However, motorcycle riding has its own risks involved, especially when the rider does not follow the rules and do not take the necessary precautions to avoid unfortunate situations, which can lead to accidents, which are sometimes fatal. Although there are laws related to safe operation of motorcycles most of the times the rules are not followed. The traffic police responsible for enforcing the laws on the riders find it very difficult due to rapid increase in the number of motorcycle riders and not having adequate manpower and monitoring systems to monitor the situation. Apart from skipping traffic junctions or similar violations of the traffic laws one major issue with riders is not wearing the helmet while operating a motorcycle and another major problem is of drunk driving especially during night. The problems with drunk and driving control systems can be solved in many ways. The most effective has to comply with several principles: They will invest authority and responsibility in people and organizations at all levels, local to national, because drunken driving control requires action at all levels.

The aim of the project is to provide reliability and soundness on the helmet to the bikers against road accidents. A Smart Helmet for next generation is an innovative recommendation which make motor cycle driving safer than before; this is performed using GSM Modem and GPS receiver technology. The one more supremacy of this project is

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

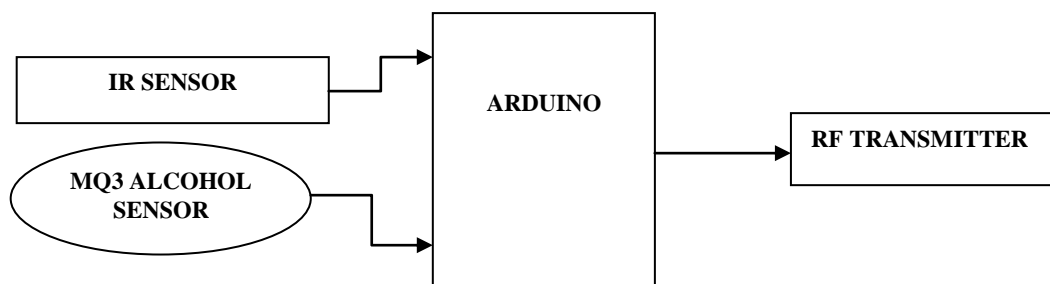
Vol. 9, Issue 3, March 2020

to know the alcohol level of drunken motorcyclist who is sitting on the bike. Alcohol sensors are used to detect whether the rider is drunk, the output is fed to the MCU. Both the reliable gears switch and the alcohol sensor are fitted in the helmet. Among the given criteria If any of the two conditions are violated the engine will not turned ON. Here MQ3 is used as an Alcohol sensor for detecting the alcohol concentration present in the driver's breath. As like always, Sensor provides an analog and resistive output based on the alcohol concentration. The microcontroller, which controls all the functions of other blocks in this system. MCU is fed with data from the sensors and controls all the functions of the whole system by manipulating these data. Alcohol sensor is paralleled to the MCU through an interfacing circuit and the helmet sensing switch is directly connected to the MCU. MCU receiving data from these sensors and it forwards them as a digital data corresponding to the output of sensors to the encoder only if the two conditions are satisfied, and other some sensors to check whether the biker has worn the helmet or not. The alcohol level is determined and displayed on a LCD display. Whenever the alcohol is detected by the alcohol sensor in the helmet, the vehicle won't start and buzzer is blown and the respective authorized people will get the notification. There are different microcontrollers used in this project. Each unit is backed up with a separate microcontroller, for bike unit ATMEL microcontroller is used. Signal way transmission between the helmet unit and bike unit is achieved by using a RF concept.

## II. OPERATIONAL PRINCIPLE

The principle of operation is quite plain. If the biker had consumed the alcohol, the alcohol sensor placed near the front ends of the helmet senses the alcohol and the output is fed to the MCU which provides an analog resistive output based on the alcohol concentration which doesn't allow the biker to start the bike. Secondly when the biker meet with an accident the vibrator sensor in the bike receives the signal send a message and the location of accident to the family members. Thirdly the bike won't activate until the helmet is worn when RF decoder sends information to the microcontroller which allows the biker to start the bike. Alcohol sensor is emerged to the MCU through an Interfacing circuit and helmet sensing switch is directly paralleled to the MCU. MCU is fed by the data from these sensors and it gives a digital data corresponding to the output of sensors to the encoder only if the two conditions are satisfied. If the rider is drunk or the helmet is not worn the engine will not turned ON. The GPS system will capture the present location of the vehicle. Also the GSM unit will automatically send distress message to police or family members.

## FUNCTIONAL BLOCK DIAGRAM HELMET UNIT



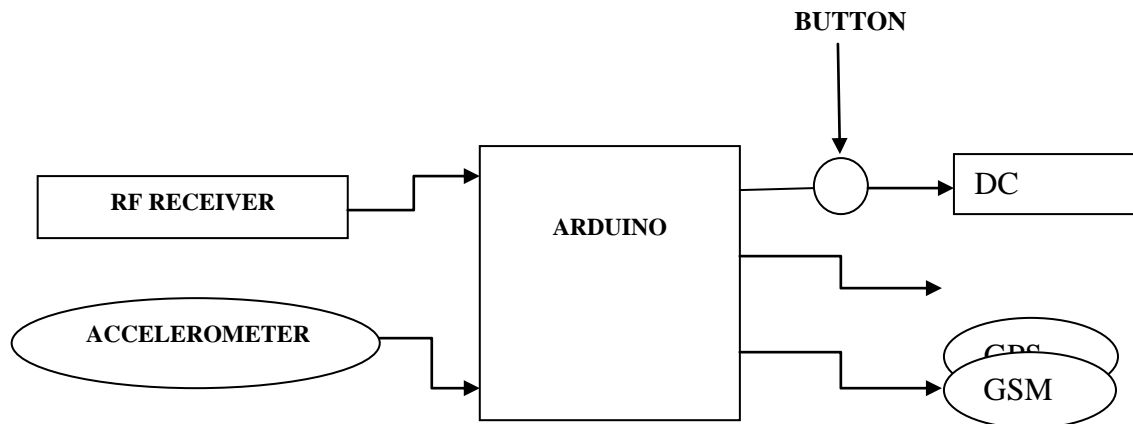
# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 9, Issue 3, March 2020

## FUNCTIONAL BLOCK DIAGRAM VEHICLE UNIT



**WORKING:** The helmet consists of 3.6 V lithium batteries and a battery charger. It also consists of A HT12E encoder, 434MHz RF Transmitter, Alcohol sensor and a Helmet switch and a boost convertor. In HT12E encoder the 434MHz RF Transmitter is affixed to the encoder the alcohol sensor is bridged to data pin of the encoder and the helmet switch is attached to enable pin of the encoder. The input port of the helmet is 3.7 V but it regulated to 5 V by using a boost convertor.

**RF decoder:** The capability of this device is, it can receive information from a long distance and it can be from the space too. It has a DC driver which is used to drive the DC motor which acts as the bike in this project. The hardware system of the helmet mainly consists of ATmega32 Microcontroller running at 8MHz clock and operates at 5V power. It has a RF decoder which is connected to GPIO (general purpose input/output) pins. Microcontroller constructed of interrupt pins and these pins connects to the helmet switch and the vibration sensor. The 16x2 LCD is configured to work on 4bit mode and is connected to the port C of microcontroller.

The LED and the buzzers are used for indication when there any uncertainties occur. The GPS and GSM Modem is connected to DPDT delay switch which in turn is connected from GPIO pins. The input port of the system is 9V since hardware requires 5V supply the 9V is converted to 5V using LM7805 Regulator.

As soon as the microcontroller is powered, the peripherals such as GPIO, TIMER are initialized. The RF decoder and the vibration sensor is monitored by the microcontroller. The vehicle does not start because not wearing the helmet, once the helmet is worn the RF encoder sends the signal to the microcontroller and engine gets started.

Interfacing circuit and the helmet sensing switch is directly coupled to the MCU. MCU is fed by the data from these sensors and it gives a digital data corresponding to the output of sensors to the encoder only if the two conditions are satisfied. If the rider is drunk or the helmet is not worn the engine will not turned ON. The GPS unit will capture the present location of the vehicle. Also the GSM unit will automatically send distress message to police or family members.

## III. EXPERIMENTAL RESULTS

Controller at helmet side ensures that the status of alcohol consumption and helmet . If the rider wears helmet and free of alcohol then controller at the bike side will allow him to start the engine.

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 9, Issue 3, March 2020

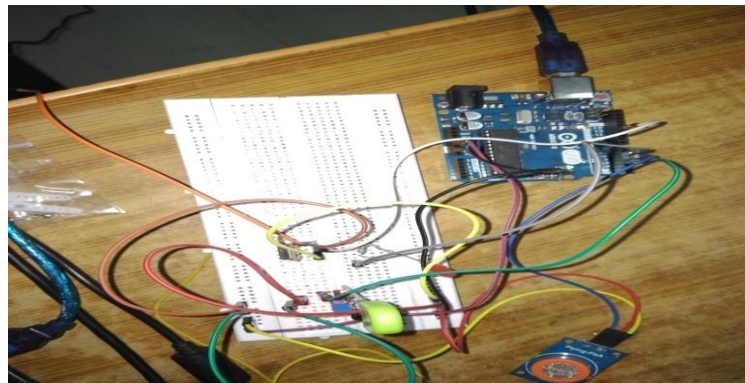


Fig: 1 HELMET SIDE RESULT

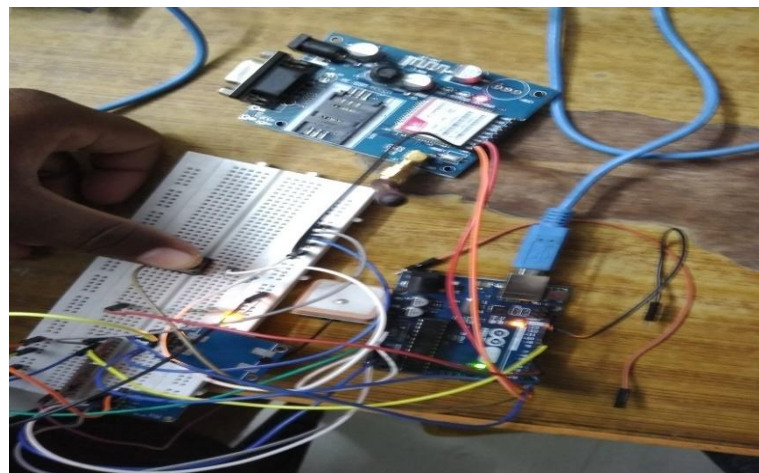


Fig:2 BIKE SIDE RESULT

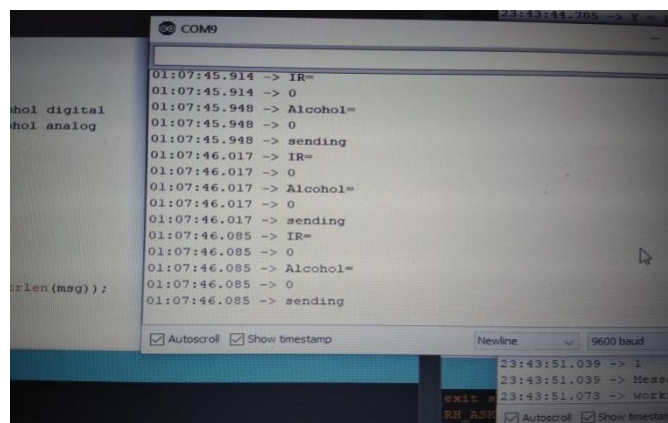


Fig:3 SOFTWARE SIDE RESULT

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 9, Issue 3, March 2020

## IV. ADVANTAGES

- A safe 2 wheeler journey is possible which would rather avoid the head injuries throughout accidents caused from the absence of helmet.
- Additionally reduce the accident rate due to drunken driving

## V. CONCLUSION

At present, rash driving of motor bikes is the major reason for most of accidents. Accident rate has hiked due to driving bike after consuming alcohol. The severities of those accidents are increased because of the absence of helmet or by the usage of alcoholic drinks accident rate due to driving bike after consuming alcohol. A helmet may not be 100% damage proof but it definitely the first line of defense for the rider in case of an accident to prevent fatal brain injuries. In this project we have a tendency to develop an electronic smart helmet system that efficiently checks the wearing of helmet and drunken driving. By executing this system a successful safe 2 wheeler journey is possible which would decrease the head injuries throughout accidents caused from the absence of helmet and additionally reduce the accident rate due to drunken driving. This system is also embedded with a GPS and GSM unit which will send a message and the location of the bike to the family members of the bike rider in the unfortunate event.

## REFERENCES

- [1] Amitava das and SoumitraGoswami [2015], "Design and Implementation of Intelligent Helmet to Prevent Bike Accident in India".
- [2] E.D.Dekiaris, A.Spadoni and S.I.Nikolaou, May 2009, "New safety and comfort in powered two wheelers".
- [3] Harish Chandra Mohandas, Raja Kumar Mahapatra and Jyotirmayee Module (2014)", "Anti-Theft Mechanism System with Accidental Avoidance and Cabin Safety System for Automobiles", International Refereed Journal of Engineering and Science (IRJES), Vol. 3, No. 4.
- [4] Mohd Khairul Afiq Mohd Rasli, Nina Korlina Madzhi, Juliana Johari, "Smart helmet with sensors for accident prevention." International Conference on Electrical, Electronics and System Engineering (ICEESE), pp 21 – 26, 2013
- [5] Manjesh N, Sudarshan Raj, "Smart Helmet Using GSM & GPS Technology for Accident Detection and Reporting System", International Journal of Electrical and Electronics Research, Vol 2, Issue 4, pp 122 – 127, 2014.
- [6] J. Vijay, B. Saritha, B. Priyadarshini, S. Deepeka, R. Laxmi, "Drunken drive protection system", International Journal of Scientific & Engineering Research, Vol 2, Issue 12, pp 1 – 4, 2011.