**Abstract:** Recent studies have shown that road accidents are increasing day by day out of which 40% accidents are two wheeler accidents. In two wheeler accidents head injury is most critical which takes lives of thousands of people every year. Most of these accidents occur due to over speeding or drunk and drive or both case, our government provides guidelines like one must wear helmet while riding, don’t drink and drive but still people do so, proposed system is being developed to confront this problem which will force riders to wear helmet, doesn’t allow rider to drive when drunk and keeps an eye on over speeding hence reduces the chances of an accident.

**Keyword:** Alcohol Sensor, Bluetooth Module, Hall Effect sensor, Microcontroller, Sound Detector.

1. INTRODUCTION

Since the emergence of technology is leading to increase of vehicles over roads worldwide. Road accidents are also increasing day by day, a survey conducted by NDTV over 1, 37,000 people were killed in road accidents in 2013 alone in India, that is more than the number of people killed in all our wars put together. Out of which 25% accidents are two wheeler accidents out of which 17% led to serious injuries and death of the rider or pillion or both. According to a survey conducted by National Road Authority in India a serious road accident occurs every 16 minutes.

It can be seen from above mentioned statistics that two wheeler accidents are increasing year by year with the advancement in technology and penetration of high speed vehicles in markets, proposed system MULTIFEATURE PROTECTOR HELMET comes is an innovative way to confront such casualties by ensuring safety of rider by taking care of most common causes of such casualties i.e.

1. Rider Not Wearing helmet while riding
2. Drink And Drive
3. Over Speeding

I.e. this technology will force the rider to wear the helmet after which it will check for presence of alcohol in rider’s breath if he/she has taken alcohol bike will not start and rider will get an alarming signal.

In case rider has not taken alcohol and is wearing helmet as well bike will get started and if riders exceeds a prescribed speed limit rider will get alarming warning till the time he/she reduces speed of vehicle.

2. WORKING

In proposed system MFPH a switch is fixed inside the helmet which when pressed sends a logic high signal to microcontroller (ATMEGA16) then user is asked to blow some air on alcohol sensor (MQ3) situated near mouth piece of helmet if alcohol is detected it sends a logic low signal to Microcontroller, to ensure that rider blow air for sure at alcohol sensor a Sound Detector Module (M213) is being used along with alcohol sensor (MQ3). Microcontroller detects all required signals and send appropriate signal to bike unit with the help of Bluetooth module (HC-05).

For data transmission serial communication protocol (USART) is being used which sends the data at a baud rate of 38400bits/sec. Each unit consumes 100 mA power in order to power the helmet two lithium batteries of 100mAH is being used which takes around 15-20 minutes to get fully charged and can provide a run time of around 2 hours in standard conditions.

On other side i.e. bike unit we have used Bluetooth Module (HC-05) Microcontroller (ATMEGA16), Hall Effect sensor, 16*2 LCD Display, SPDT Relay, LED when microcontroller receives an appropriate signal it sends respective messages at LCD same time relay turns on the ignition system of bike by short circuiting the current path, Hall effect sensor keeps measuring no. of revolutions made by vehicle/second by formula.

\[ S = 6.76 \times n \]

Where \( n \) is no. of revolutions per second and 6.67 is an constant obtained by multiplying circumference of wheel with 18/5 (to change into KMPH).
i.e. $1.88\times(18/5) = 6.76$

If speed of vehicle exceeds 70KMPH it sends an alarming warning to helmet so that rider may reduce speed of vehicle.

3. SYSTEM DESIGN

In order to achieve that purpose whole system is divided into two units

1. Bike unit
2. Helmet unit

3.1 HELMET UNIT:

This unit ensures that rider is wearing the helmet and along with this it also asks the rider to blow some air on alcohol sensor in the beginning, if alcohol is not found alcohol sensor (MQ3) sends a logic high signal to microcontroller pin. Similar thing happens with Voice detection module (M213), which sends an active low signal when rider blows some air on the sensor ensuring that rider won’t by pass alcohol testing by not blowing the air.

This unit comprises of following

- Microcontroller ATMEGA16
- Voice Detection Module(M213)
- Alcohol Sensor(MQ3)
- Bluetooth Module(HC-05)
- A Soft Switch
- Buzzer

**Block Diagram of Helmet Unit**

Fig. 1 Block Diagram of Helmet Unit

Fig shows block diagram of helmet unit in which soft switch, alcohol sensor, and voice detector module is connected as a input to microcontroller on basis of whose output it decides whether to send a signal to bike or not. A buzzer is also connected to microcontroller which beeps with different pattern at different situations.

- If alcohol is found: - Buzzer beeps periodically like buzzer in an alarm clock
- If helmet gets a signal of over speeding : - buzzer beeps for a duration of 5 second just to inform the rider so that he/she can reduce the speed of bike.
- All transmission of information between bike and helmet occurs with the help of Bluetooth Module which communicates with microcontroller with UART (Universal Asynchronous Trans receiver) module.

![Flow Chart Of Helmet Unit](image)

**Fig 2 Flow Chart Of Helmet Unit**

3.2 BIKE UNIT:

This unit performs various functions like it receives signal from helmet according to status of rider, then it turns on the relay i.e. turns on ignition system of the bike ,it also keep checking speed of vehicle and if it exceeds prescribed limit it will send a signal to helmet unit. Bike unit consist of following:

- Microcontroller (ATMEGA).
- Hall Effect Sensor
- 16*2 LCD Display(optional)
4. REQUIREMENTS

- Two atmega16 microprocessors
- Two HC-05 Bluetooth Modules
- MQ3 Alcohol Sensor
- Voice Detector
- 16*2 LCD Display (optional)
- Two Lithium ion Batteries
- Connecting wires
- 4.7K OHM resistors (as per ckt requirement)
- Connecting leads
- Hall Effect Sensor
- Small Magnets

5. CONCLUSION

As accidents are increasing day by day and there is a need of such system which can put a cap on the major causes of such accidents and at the end of report it is found that proposed system can be a good mechanism to tackle proposed Problem with good efficiency as it is capable to do the following.

It forces the rider to wear helmet
It prohibits rider from riding the bike when rider is in influence of alcohol
It simultaneously keeps an eye on speed of vehicle which is another cause of road accidents.

As head injury in any accident is considered as most serious injury of all and proposed system is providing safety to the head itself hence it could be a revolutionary idea to tackle proposed problem in India and throughout the world.

6. FUTURE SCOPE

Since proposed system is capable to tackle proposed problem efficiently, in future it can be implemented in other mediums of transport as well. Like in cars we can use similar technology to put a check on OVER SPEEDING, DRINK AND DRIVE and can insist rider to fasten SEAT BELT then only he will be able to ride the car.

In future we can add more functions to proposed system as solar charging, GPS to determine current position and condition of rider, voice recognized ignition of vehicle can also be implemented which will be very handy to concur thieves.

ACKNOWLEDGMENT

It gives us great pleasure in acknowledging the support and help of our guide Ms Amanpreet Kaur and other Faculties of EI Department of Galgotias
College of Engineering and Technology, who helped us directly or indirectly with the works of our project and gave us a Chance to portrait our skills and dedication through this project.

REFERENCES


5. www.maxembedded.com

6. www.engineersgarage.com