

A Novel Method for Safety of Two Wheeler using Microcontroller

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ABSTRACT

The main cause of death in two-wheeler drivers is over-speeding, drunken driving and careless driving. Numerous lives could have been saved if emergency medical service could get accident information and reach in time to the scene. To resolve these current issues we are proposing a solution to develop a smart helmet. These main issues motivates us for proposing this idea. The primitive aim of proposed system is to secure the vechile driver and overcome road accidents by preaccessing vital factors like detection of alcohol,over speeding as well as helmet detection.This is implemented by using advance features like alcohol detection, GPS module,earlobe sensor and PIC microcontroller.

Keyword : - PIC Microcontroller,alcohol sensor,RF module,Relay

1. INTRODUCTION

A traffic accident is defined as any vehicle accident include collisions between vehicles and animals, vehicles and pedestrians, or vehicles and fixed obstacles occurring on a public transport highway. In less developed countries, road traffic accidents were the most significant cause of injuries, ranking eleventh among the most important causes of lost years of healthy life. In Indian road system, widening of the road is not an alternative solution to avoid traffic in such a cities. Application of electronics in the automobile field is very much popular now. Because of the low prices and various varieties available in the market people prefer motorbikes to buy over four wheelers. Hence Road Safety becomes a major issue of concern. Therefore it becomes necessary to implement such a technique which is not easy to bypass the basic rule of wearing helmet, to avoid drunken driving as well as ensuring speed limiting. Here we designed a system which checks the two conditions before turned ON the engine of the bike. Our system includes an alcohol sensor,a helmet sensing switch(earlobe sensor) and also Hall effect sensor. A switch is used to detect whether the biker is wearing helmet. Alcohol sensor is used to detect the biker is drunk, the output is fed to the PIC Microcontroller unit. While the Hall effect Sensor detects the tracks the speed of vehicle throughout its journey and the details are recorded in a mobile application. This can be used as a data record to find the violation of speed limit (as specified by Govt authority) throughout the journey of vehicle. Both the switch and the alcohol sensor are fitted in the helmet. If any of the two conditions are violated the engine will not turned ON.

Alcohol sensor is used here for detecting the alcohol concentration present in the driver's breath. Sensor provides an analog resistive output based on the alcohol concentration. PIC Microcontroller is the microcontroller unit, which controls all the functions of other blocks in this system. MCU takes or read data from the sensors and controls all the functions of the whole system by manipulating these data. Alcohol sensor is connected to the MCU through an interfacing circuit and the helmet sensing switch is directly connected to the MCU. MCU receives 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.

2. METHODOLOGY

This paper mainly focuses on avoidance of drunken driving as well as ensuring safety of driver by helmet sensing and speed detecting. Hence this system will not turn on the vehicle, when the user is in drunken condition or without helmet. The system will send short message service to the friends or relatives when an accident occurs. Our system consists of two major parts. They are 1) Main unit and 2) Alliance unit as shown in fig.1 & 2.

- MAIN UNIT

Components:

1. Alcohol sensor(MQ-3):-MQ-3 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. The sensitive material used for this sensor is SnO₂, whose conductivity is lower in clean air. It's conductivity increases as the concentration of alcohol gases increases. It has high sensitivity to alcohol and has a good resistance to disturbances due to smoke, vapor and gasoline. This module provides both digital and analog outputs. It is suitable for detecting alcohol content from the breath. So it can be placed just below the face defend and above the additional face protection. The surface of the sensor is sensitive to various alcoholic concentrations. It detects the alcohol from the rider's breath; Generally the illegal consumption of alcohol during driving is 0.08mg/L as per the government act. Threshold will be adjusted mistreatment exploitation.

2. Earlobe sensor:- An ear lobe detector sense that is fitted with the helmet unit senses the blood flow within the ear lobe region. So the wearing of helmet is confirmed by our system.

3. PIC Microcontroller:-The PIC Microcontroller is decision making unit. It receives the input from earlobe sensor as well as alcohol sensor. If both conditions are satisfied, an appropriate signal is sent to the further encoder.

4. Encoder

5. Transmitter

Working:

This section consists of an alcohol sensor, helmet sensing switch, PIC MCU, encoder and an RF transmitter. Both the earlobe sensor and the alcohol sensor are fitted in the helmet. MCU reads data from the sensors, finds if the driver has non-alcoholic breath and helmet sensor switch is in closed position and gives corresponding digital output to an encoder only if the two conditions are satisfied i.e if both conditions are True(Logic 1).

- ALLIANCE UNIT

Components:

1. Receiver:-The signal received from RF transmitter is received by RF receiver which send further to decoder.
2. Decoder:-The information received from receiver is converted into digital signal using decoder which is the feed to PIC microcontroller unit.
3. Hall effect sensor:-The sensor primary purpose is to detect the speed by detecting the no of revolutions completed by the two wheeler. It works on the principle of magnetic field.
4. PIC Microcontroller:-The MCU receives the information from the decoder circuit and generates an appropriate signal which is then send to Relay section
5. Relay:-The relay acts as interlink between PIC Microcontroller unit and Car ignition circuit. If the relay is open, the circuit is disconnected and ignition circuit fails to start while if it is closed, the circuit is connected and ignition circuit starts. The Open and closed conditions of Relay is decided by the signal received from Microcontroller unit.
6. Mobile application:-The application act as source of records to obtain the data regarding the speed of vehicle along with its geographical location. This will also help the government authority to keep a track record of vehicle.

Working:

RF receiver receives the coded binary data transmitted by the RF transmitter and given to the RF decoder. RF decoder decodes the input and gives four bit digital data to the MCU only if the address bit of encoder and decoder matches. MCU operate the engine of the vehicle when it receives digital data from the transmitter section, it operates the engine through a relay circuit but it cannot operate the relay directly, so a relay interface is also used here.

Furthermore the hall effect sensor will detect the speed of the vehicle and send the data to the PIC MCU. The data received is consequently transferred to mobile application using a GSM Module. The GPS will enable to identify the geographical coordinates and relate the speed to its GPS location.

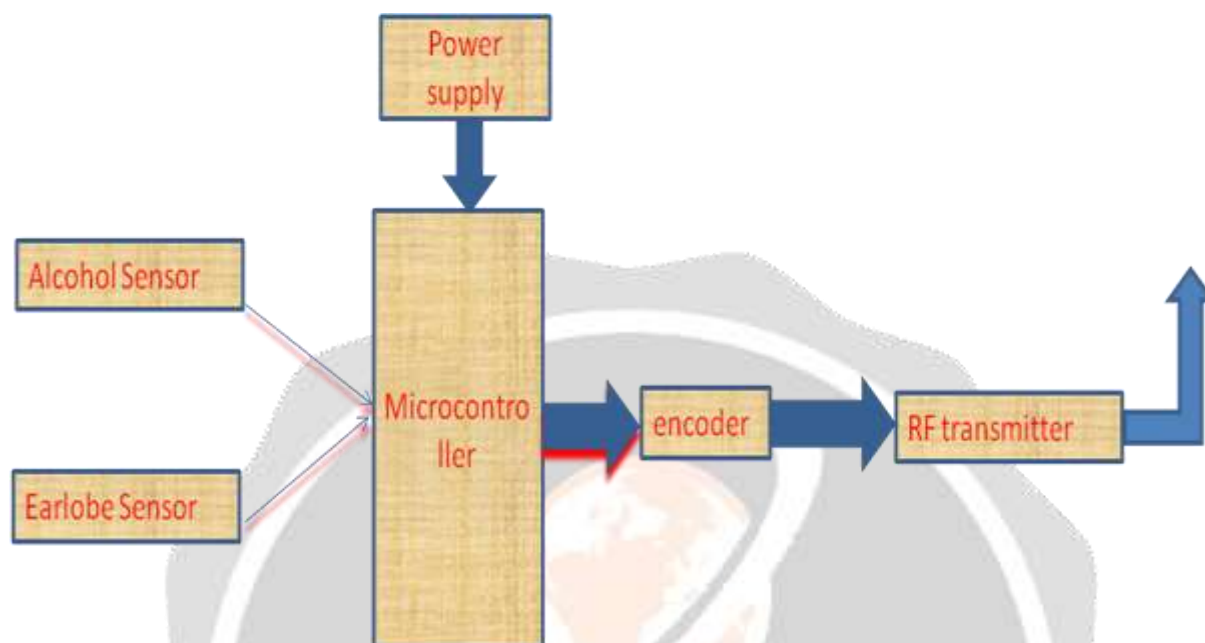


Fig 1.Flowchart of main circuit

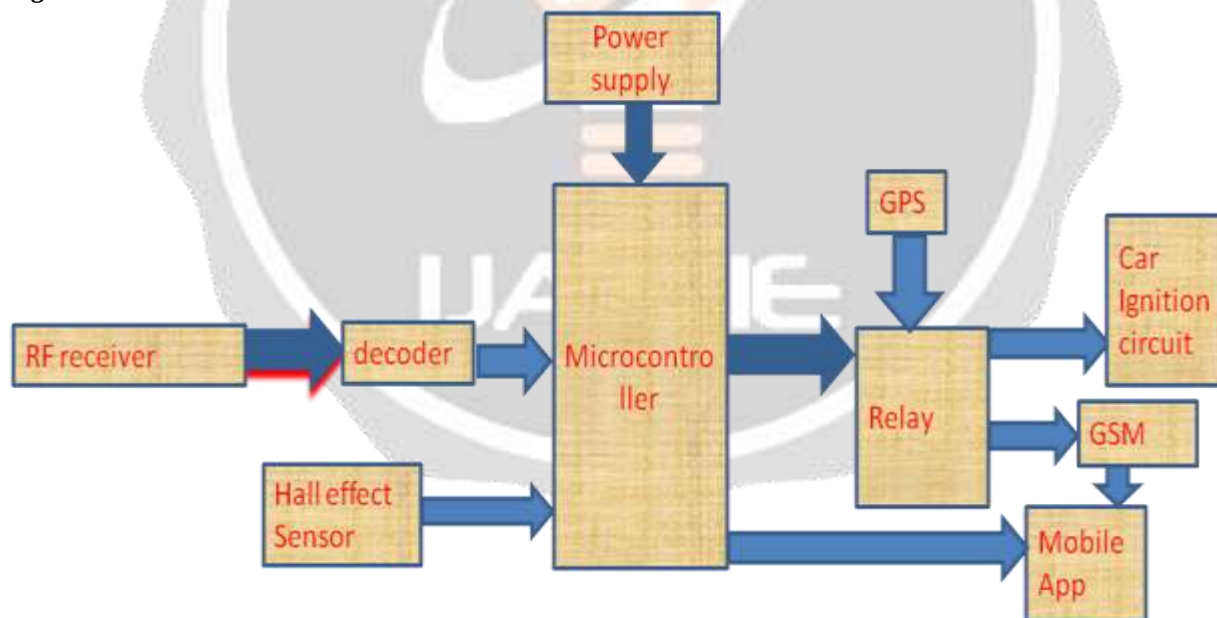


Fig 2: Flowchart of alliance circuit.

3.RESULT

Nowadays, most cases of accidents are a unit by motor bikes. The severities of those accidents are increased because of the absence of helmet, over speeding or by the usage of alcoholic drinks. In our proposed system we have a tendency to develop an electronic smart helmet system that efficiently checks the wearing of helmet, drunken driving as well as over speeding. By implementing this system a safe two wheeler journey is possible which would

decrease the head injuries throughout accidents caused from the absence of helmet or over speeding and additionally reduce the accident rate due to drunken driving. By developing a multipurpose mobile application it will enable us to keep a record of over speeding as well as detection of accident(if occurred).This makes the overall system more efficient and reliable.

4. CONCLUSION

The above proposed system provides a very effective solution to develop an intelligent system for vehicles for alcohol,over speeding as well as helmet detection. Since sensor has fine sensitivity range around two meters, it can suit to any vehicle and can easily be hidden from the suspects. The whole model is compact and highly reliable.

5.FUTURE SCOPE

The proposed system has vast scope of further improvement which includes detection of parking area as well as using advanced communication techniques in order to improve the speed as well as accuracy of whole unit.

6. REFERENCES

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