

Smart Helmet for Accidental Prevention

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ABSTRACT—

For the past 20 years it has been clearly noticed that the 2-wheeler road accidents ultimately result to death or severe injuries mainly due to the absence of HELMET. It is very dangerous to the motorcyclists when driving without a helmet. Wearing a helmet can reduce the impact of an accident and may also save a life. There are many countries where helmet wearing is a must while driving and are thus enforced to wear while driving. Considering all the adversities and cause of accidents, this project has been made specially made to avoid it. Adding four new features, we have a helmet buckle in sensor FSR (Force Sensing Resistor) for sensing the rider's head. Unless and until the helmet is buckled, the vehicle would not start. We have an alcohol detector with MQ-3 sensor, which when detected would not let the vehicle start. There is an eye blink sensor which checks upon the eye blinks, if the eye does not blink for 20 seconds then the alarm gets activated. A BLDC fan is used for detecting the motorcycle's speed. For the communication between the transmitter and receiver sections a 315 MHz Radio Frequency Module is used. AT89C51 is a microcontroller to control the entire component in the system. An alarm is activated if the speed of motor exceeds 60 km/hour.

Key Words—Accident, Road traffic, Alcohol sensors, Eye blink sensor, FSR (Force sensing Resistor), Motorcycle speed

INTRODUCTION

A traffic accident is defined as any vehicle accident occurring on a public highway. These accidents therefore include clash of vehicles with animals, pedestrians, or with fixed obstacles. In higher-income countries, road accidents are amongst the peak causes of disease burden since 1998 as surveyed in DALYs (disability-adjusted life years). In less developed countries, road traffic accidents are the prior reason for deaths. In Indian road system, widening of the road is not an alternative solution to avoid traffic. The problem with drink and drive control systems can be resolved through many other ways. The most effective will be assigning authority and responsibility amongst the citizens and organisations, because drink and drive control requires action at all levels. The use of media in such cases can be very effective. Making the impact public to all can create awareness amongst people. It may not give instant reactions but would definitely add to the long term improvement. And they will establish mechanisms for identifying and solving problems rather than attempting to apply one-size-fits-all methods.

The main reason of the use of motorbikes instead of four wheelers is its low price. Therefore the need for road safety becomes a major concern. Therefore using a technique like this can be seen as a major breakthrough to avoid drunken driving as it does not implement on the manpower but the use of technology where one cannot avoid it if it needs to drive the motorbike. Therefore our system here checks the condition before turning the vehicle ON. Our system includes an alcohol sensor and a helmet buckle sensing switch. A switch is used to detect whether the biker is wearing and buckled the helmet. Alcohol sensor is used to detect the biker is drunk, the output is fed to the MCU. 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 MQ3 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. MCU 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.

Another feature is added i.e. speed control sensor or motor sensor. In motor sensor whenever the speed of the vehicle crosses 60 km/h a buzzer is activated to acknowledge the driver to maintain the speed. It works on the number of revolutions per second. For 60 km/h the revolutions is 20. This sensor is the connected to MCU. Lastly, eye blink option is also added to ensure driver with sleepy eyes.

BLOCK DIAGRAM

This paper mainly focuses on avoidance of drunken driving and over speeding. Hence this system will not turn on the vehicle, when the user is in drunken condition and activates the buzzer when speed limit is crossed over 60 km/hour and if eye does not blink for 20 seconds. Our system consists of two major parts. They are 1) Helmet unit and 2) Vehicle unit as shown in fig.1 & 2.

TRANSMITTER SECTION

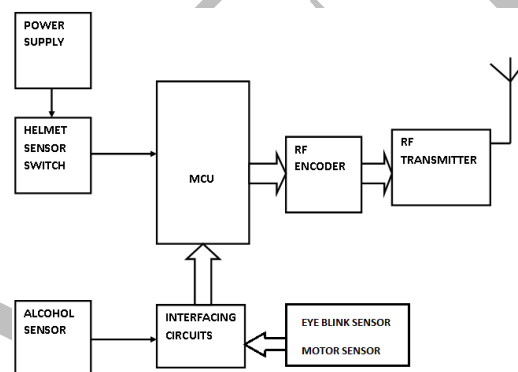


Figure 1 Helmet Unit.

This project describes the design of an effective security system for a bike, in order to avoid accidents and other malpractices. Vehicle accidents due to the use of alcohol are increased nowadays and the wearing of the helmet reduces the severity of the accidents. In our project we combine these two aims in a single embedded system.

This section consists of an alcohol sensor, helmet buckle sensing switch, eye blink sensor, motor sensor, MCU, encoder and an RF transmitter. Both the switch 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. It encodes one of the active inputs to a coded binary output. RF transmitter transmits this coded binary output from the encoder. Here we use the popular ASK modulation technique. In this RF system, the digital data is represented as variations in the amplitude of carrier wave. This kind of modulation is known as Amplitude Shift Keying (ASK).

RECEIVER SECTION

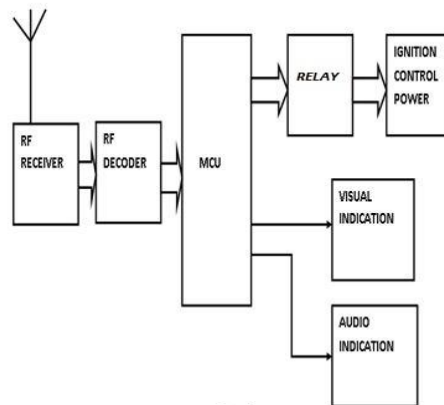
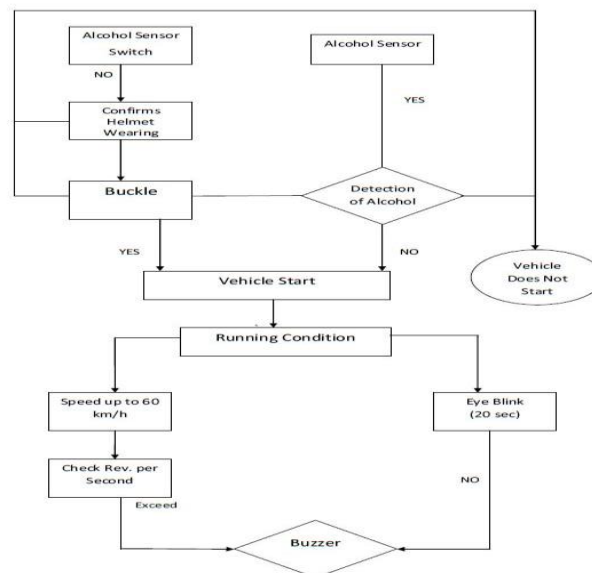


Fig 2 Vehicle Unit

This module is placed on the bike. It comprises of a microcontroller unit, RF receiver, RF decoder, visual section, alarm. The RF transmitter sends the binary coded data which is received by the RF receiver and then sends to the RF decoder. This unit after receiving the digital signal from transmitter operates the engine of the vehicle with the help of the relay circuit. The relay unit is to be interfaced with MCU because it cannot directly assist the MCU. This system is used by the motor vehicle department to avoid accidents.

FLOW CHART REPRESENTATION

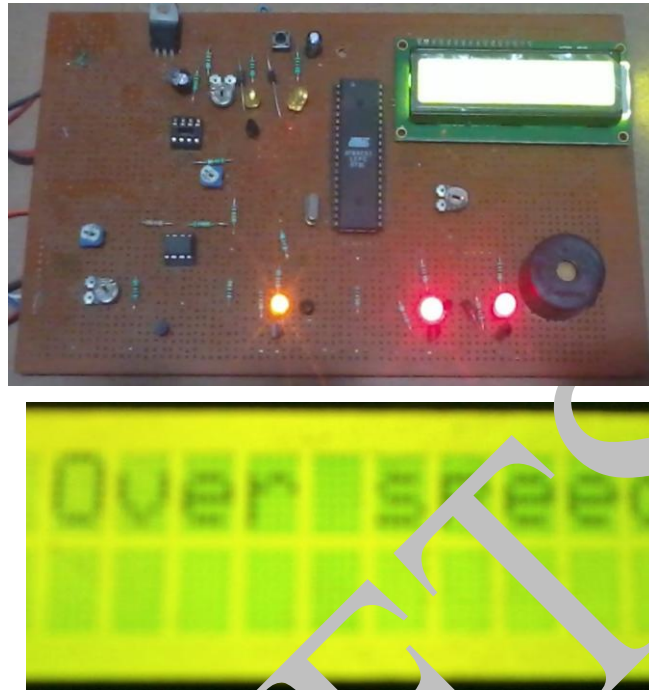


WORKING PRINCIPLE

MQ-3 gas detector (alcohol sensor) detects alcohol content from the breath. So can be placed just below the face defend and above the additional face protection. The surface of this sensor is sensitive to numerous alcoholic concentrations. It detects the alcohol from the rider's breath; the drop in the resistance value leads to change in voltage (Temperature variation occurs). Generally the felonious consumption of alcohol during driving is 0.08mg/L as per the government act. Except for demonstration purpose, it can be programmed upto 0.04 mg/L. Threshold will be adjusted mistreatment exploitation. A Force Sensing Resistor (FSR) detects the head of the rider. So the wearing of helmet is confirmed and similarly alcohol sensor attached to the mouth piece of the helmet detects the alcohol within the breath and thus acknowledges it to the microcontroller. If both of the norms are met appropriately then both the control signals are sent from the helmet unit to the vehicle control unit. The decoded RF signal is disseminated to the controller within the vehicle unit shown in fig 2 to start / stop the vehicle. If the signal from the FSR region and no control signal from alcohol sensor is

recognized then the vehicle can begin, otherwise the vehicle won't START. speed control sensor or motor sensor. In motor sensor whenever the speed of the vehicle crosses 60 km/h a buzzer is activated to acknowledge the driver to maintain the speed. It works on the number of revolutions per second. For 60 km/h the revolutions is 20. This sensor is the connected to MCU. Lastly, eye blink option is also added to ensure driver with sleepy eyes.

RESULT



FUTURE SCOPE

The Smart Helmet along with four of its unique features can add to a major breakthrough in serving life to people in various fields.

1. Due to the Eye blink sensors in the helmet they can be used by workers in industries.
2. A great help for drink and drive cases.
3. The buckle in factor may reduce the impact of the shock from accidents.
4. Made mandatory especially in metropolitan cities where rush driving is the main cause of accidents.

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