

MANDATORY HELMET PROTECTION SYSTEM WITH INBUILT SOBRIETY TEST AND EYE BLINKING SENSORS FOR ACCIDENT PREVENTION FOR TWO WHEELERS

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ABSTRACT

This paper aims at implementing mandatory helmet protection system for two wheeler vehicles and an inbuilt sobriety test system in the helmet which allows us to test the alcohol content of the driver. So if a driver is drunk and tries to drive the system, if it detects alcohol presence in his/her breathe then it locks the engine so that the vehicle fails to start. This paper also aims to take care of ours, while driving by less conscious using eye blinking sensor. This sensor moves to active mode if the person is in unconscious state. If we equip all the vehicles with automated security system that provides high security to driver, also gives an alarm in case of any threat, then we can prevent accidents to great extent.

Keywords: *IR sensor, Sobriety test*

I. INTRODUCTION

At present road accidents are the major problem in all over the world. The Global status report on road safety which was conducted in 2015, reflecting the information from 180 countries, indicates that in worldwide the total number of road traffic deaths has plateaued at 1.25 million per year. In the last three years, 17 countries have aligned at least one of their laws with best practice on seat-belts, drink-driving, speed, motorcycle helmets or child restraints. Half of all road traffic deaths are among pedestrians, cyclists and motorcyclists and adults aged between 15 and 44 years account for 59% of deaths. 99% of accidents are happening in the low economic countries, with South-East Asia and Africa having the highest rates.

MUARC report says that 13.5% of accidents are due to intoxication and 11.8% of accidents are due to fell asleep while driving. Another latest report of National Crime Records Bureau or NCRB says that 40 people under the age of 25 die in road accidents all around the world. It states that the drunken driving is a major factor for the rising of death on roads. It shows that the problem of drunk driving is far from over. In 2012 DUI national statistics released by the NHTSA (National Highway Traffic Safety Administration) 11,773 people died in alcohol-related crashes. Most of the accidents occur outside of the cities because, no testing methodology is adopted to avoid these cases in highways. From the records of police reported crashes, it was revealed that 12% of crashes are due to fatigue and 5% of injuries due to lack of wearing helmet. About half of the head injuries result from motor vehicle crashes, falls and mishaps. Accidental injury is one of the leading causes of mortality

in India. India has overall 1% of vehicles in the world but accounts for 6% of total road accidents. There are approximately 4,00,000 road accidents per year in India resulting in 80,000 deaths and 1.2 million serious injuries.

Head is the most important part of human body. Any injury to head sometimes can lead to death. So the government has made the helmet compulsory while driving two wheelers. But most of the people not obeying this rule. So implementation of mandatory helmet protection rule is carried out in this project. Drinking and driving is also major cause of accidents. In this paper we also check the alcohol content in the driver in his presence and not allowing him/her to ride by blocking the engine if he/she is alcoholic. In this paper we also propose a method to make the driver alert when he/she is less conscious by giving an alarm.

II. METHODOLOGY

The three applications in this paper are implemented as follows.

HELMET CHECKING APPLICATION:

IR transmitter is placed on the helmet and it will emit pulses of IR. An IR receiver is placed on the bike which is in line of sight with the transmitter. IR Rx is connected to the microcontroller. Now when the bike key is turned on, the microcontroller switches on taking the supply from the bike's battery. If the helmet is in the proper position, IR receiver must have voltage output. The microcontroller checks for the IR Rx output and if it is high it indicates the presence of helmet and tests for alcohol content. Microcontroller will not move to the next state until it senses high output on the IR Rx. The message "wear the Helmet" will be displayed on the LCD until he wear Helmet.

SOBRIETY TEST APPLICATION:

Our proposed system would be constantly monitoring the driver breath by placing an alcoholic sensor inside the helmet so if a driver is drunk and tries to drive, the system detects alcohol presence in his/her breathe and locks the engine so that the vehicle fails to start. In this system we use an AVR family microcontroller interfaced with an alcohol sensor along with an LCD screen and a dc motor to demonstrate the concept. So here the alcohol sensor is used to monitor users breath and constantly sends signals to the microcontroller.

The microcontroller on encountering high alcohol signal from the alcohol sensor, it displays alcohol detection note on LCD screen and also stops the dc motor to demonstrate as engine locking. The system needs a push button to start the engine. If alcohol is detected at the time of starting the engine the engine does not start at all. If alcohol is detected after engine starting, the system locks the engine at that time.

EYE BLINKING SENSOR APPLICATION:

This project involves measure and controls the eye blink using IR sensor. The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of eye. If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low. This is used to know the state of the eye whether our eye lashes are opened or closed while driving. This output is given to logic circuit to indicate the alarm. This involves controlling accident due to unconscious through Eye blink. Here one eye blink sensor is fixed in helmet where if rider loses conscious it alerts him through alarm.

III. EXPERIMENTAL SETUP

This project involves several modules. The different modules are shown in below figures. They consists of alcoholic detection, eye blinking detection and helmet detection.

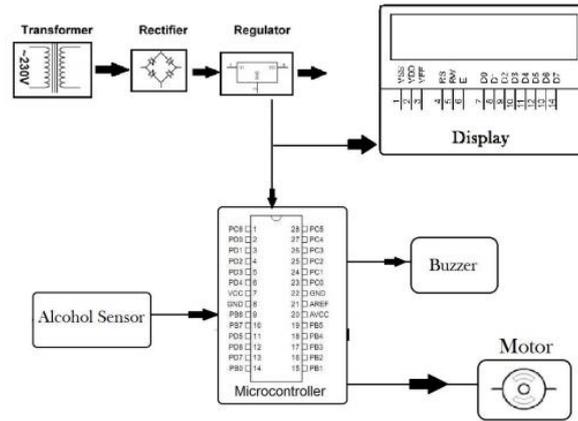


Fig1: block diagram of alcoholic detection process

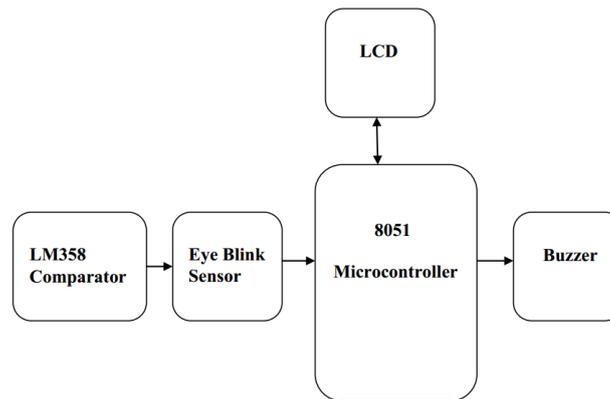


Fig2: block diagram for eyeblinking detection process

The alcoholic detecting sensor is in interface with the microcontroller and provides a buzzer and blocks the engine to start.

Infrared transmitter is one type of LED which emits infrared rays generally called as IR Transmitter. Similarly IR Receiver is used to receive the IR rays transmitted by the IR transmitter. One important point is both IR transmitter and receiver should be placed straight line to each other. The transmitted signal is given to IR transmitter whenever the signal is high, the IR transmitter LED is conducting it passes the IR rays to the receiver. The IR receiver is connected with comparator. The comparator is constructed with LM 358 operational amplifier. In the comparator circuit the reference voltage is given to inverting input terminal. The non-inverting input terminal is connected IR receiver. When interrupt the IR rays between the IR transmitter and receiver, the IR receiver is not conducting. So the comparator non inverting input terminal voltage is higher than inverting input. Now the comparator output is in the range of +5V. This voltage is given to microcontroller or PC and led so led will glow. When IR transmitter passes the rays to receiver, the IR receiver is conducting due to that non inverting input voltage is lower than inverting input. Now the comparator output is GND so the output is given to microcontroller or PC.

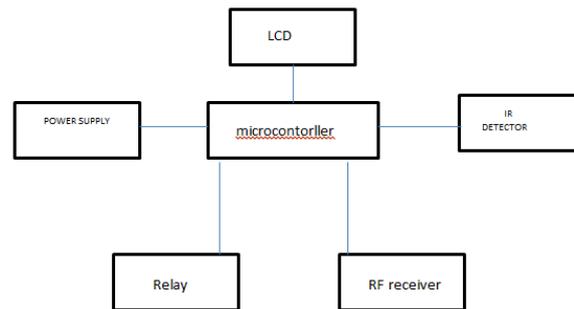


Fig3: block diagram of module in the bike

HARDWARE AND SOFTWARE TOOLS USED:

- Pulsed IR sensors
- Alcohol Sensor
- Eye blinking sensor
- LCD
- RF transmitter
- Microcontroller
- Buzzer
- Helmet for implementation
- Relay
- RF transceiver
- Arduino Uno
- MC programming language: embedded C

IV. RESULTS

Once bike key is turned on, whole system starts and initially helmet checking is carried out. If the helmet is present at proper position, test to find if the driver is sober is done. If both conditions satisfy, then the rider can start the bike. In case of unconscious of driver the circuit gives alarm so that the driver can be alerted.

V. FUTURE SCOPE

In future if there is a large demand of this type of helmets, we can make simple and small circuits, so that they can be easily fitted into helmets. We can also use solar energy so that it uses green energy and does no harm to environment. Also as a future scope it can be combined with many existing technologies to provide guidance and further extend & implement the circuit for various safety measures.

VI. CONCLUSION

This project is completely advantageous because, accidents due to drowsiness is prevented and controlled when the vehicle is out of control. And the drunken drive also prevented by installing alcohol detector in the

vehicle and with the help of this project we save a precious life of the person and valuable time of traffic controller.

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