



Helmet Operated Smart E-Bike

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ABSTRACT

This system is specially designed for the safety & security of the two-wheeler riders. According to the world health organization, India is inclinable for road accident and most of the cases are of two-wheeler accidents. Hence for the safety of the rider, we came up with an idea of the smart helmet. So the main aim of the system is to reduce the possibility of a two-wheeler accident and drunk drive case. This system is implemented using microcontroller kit which consists of RF transmitter and RF receiver system. The bike will not get started without wearing the helmet by the rider this condition is sensed by the helmet press button which is used as a sensor. Similarly alcohol sensor is also implanted for the drunk drive case. This alcohol sensor is placed near the mouth of the rider in the helmet. If the breath of the order is alcoholic then the bike will not get started.

We have also implemented in the system so that when the rider gets crashes and whenever helmet hits the ground, the sensor gets the sense the signal from the magnetic sensor and giving to the microcontroller by using GSM module and these then GSM module automatically send the message to the registered mobile number.

Keywords : Helmet Press Button, Alcohol Sensor, Magnetic Sensor, Microcontroller, GSM Module.

I. INTRODUCTION

The thought of developing the project comes to do some good things toward society. Day by day the two-wheeler accidents are increasing and leads to the loss of many lives. The reason may be such as no fitness of bike, the fast riding of the bike, drunken and drive, etc. This is a situation we observe our day to day life, a thought of finding some resolve this problem come up with this idea that is Helmet Operated Smart E-Bike. So this system gives information about the rider wearing the helmet or not, whether the rider drunken or not and also rider met with accident it gives the information about the accident. Basically there are two major units in the

system that is helmet unit and bike unit. Smart helmet focusing on three major applications that are helpful in our day to day life. At first and most one is the ignition of the bike will not on if rider is not wearing the helmet. Secondly alcoholic driving is not possible by using this smart helmet. If the rider is alcoholic, the bike will not start. The third application is accident detection. If person met with an accident, in such situation informing to ambulance or family members through mobile to rescue him for an extent. The helmet press button and alcohol sensor is placed inside the helmet. RF transmitter a circuit and battery are placed backside of the helmet. Bike unit consists of RF receiver circuit relay circuit ignition circuit and buzzer and LED module circuit

the bike unit is placed on actual E-bike. LCD is used for showing the various types of output after wearing the helmet. The 12v battery is used for giving the supply to the circuit.

II. METHODS AND MATERIAL

Power and LED Display Circuit

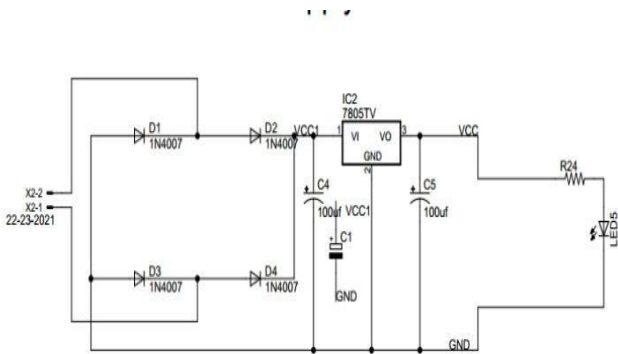


Fig.: 2.1 power and LED Display Circuit

A bridge rectifier makes use of four diodes in a bridge arrangement to achieve full-wave rectification. The rectifier efficiency of a bridge rectifier is almost equal to the center-tapped full-wave rectifier. The only advantage of bridge rectifier over center tapped full wave rectifier is the reduction in cost. In a bridge rectifier, instead of using the center-tapped transformer, four diodes are used. The 12v Ac supply is converted into the 12DC by this rectifier. It mainly consists of four diodes. The simple capacitor filter is the most basic type of power supply filter. The application of the simple capacitor filter is very limited. The capacitor filter is also used where the power- supply ripple frequency is not critical; this frequency can be relatively high. The capacitor is a simple filter connected across the output of the rectifier in parallel with the load. The capacitor acts as a filter for each circuit. Due to the use of this capacitor the ac components blocked and dc

components are bypassed. 7805 provides +5V regulated power supply. IC 7805 is a voltage regulator integrated circuit. Microcontroller ATMEGA328 is used for the operation of the circuit. 16*2 LCD display is used for monitoring the output. All the outputs are displayed on the LCD screen.

Ignition and Relay Circuit

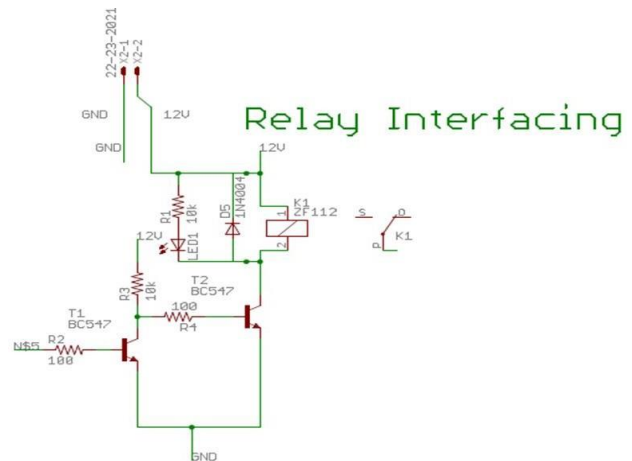


Fig :-2.2 Ignition and Relay Circuit

Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very useful devices and allow one circuit to switch another one while they are completely separate A relay can make a 5V DC battery circuit to switch a 230V AC mains circuit. In this project, the relay is used as an ignition relay. Transistor BC574 is mainly used for amplification and switching purposes. The transistor terminal requires a fixed DC voltage to operate in the desired region.

RF Transmitter and RF Receiver

An RF transceiver module will always work in a pair that is it needs a transmitter and receiver to send and receive the data. A transmitter can only send information and receiver can only receive it, so data

can always be sent from one end to another end and not the other way around. The transmitter module consists of three pins namely Vcc, Din, and ground. It consists of encoder IC and in RF receiver module consists of decoder IC. The battery required for this module is 5v DC to 9v DC

III. WORKING AND BLOCK

DIAGRAM

There are two features of this project it won't allow starting the bike if riders don't put the helmet on the head and if the rider is consumed alcohol then also it won't allow them to start the bike. There is the control circuit which is the backside of the helmet. The power is supply by the battery which is replaceable if it gets a discharge. In control circuit there is an RF transmitter which is 433MHz. Whenever the rider puts the helmet on the head this press button is automatically pressed. Secondly the alcohol sensor is also implemented inside the helmet which is sense the alcohol if rider has consumed the alcohol then it automatically sends the signal to the transmitter unit and then this transmitter unit sends the signal to the RF receiver. In bike control unit the engine of the bike is turned ON using the ignition relay. The ignition relay which is used in the circuit cannot be controlled directly so there is two-transistor used as an amplifier that will get the signal from the microcontroller and drives the relay. The microcontroller which is used in bike control circuit is ATMEGA328. 16*2 LCD display is used for monitoring the output. All the outputs are displayed on the LCD screen. RF receiver receives the signal from the RF transmitter this operation is identified by the LED which is also used for the communication purpose. There are the four diodes are also connected in the circuit which is acting as a bridge rectifier If the transformer is for the supply instant of the battery then these diode is converted 12v AC supply of the

transformer into 12v DC supply. As we know the output of the rectifier is not pure dc it has ripple as well as fluctuation so that there are two capacitors is used as a filter circuit which will filter out the ripple and fluctuation. IC 7805 voltage regulator which converts 12v dc into 5v dc. This 5v dc which will utilize by RF receiver, microcontroller, indicators. At the time of the accident, the glass tube inside the magnetic sensor will break and give the notification through the LCD screen and mobile which is connected through sim card by GSM module.

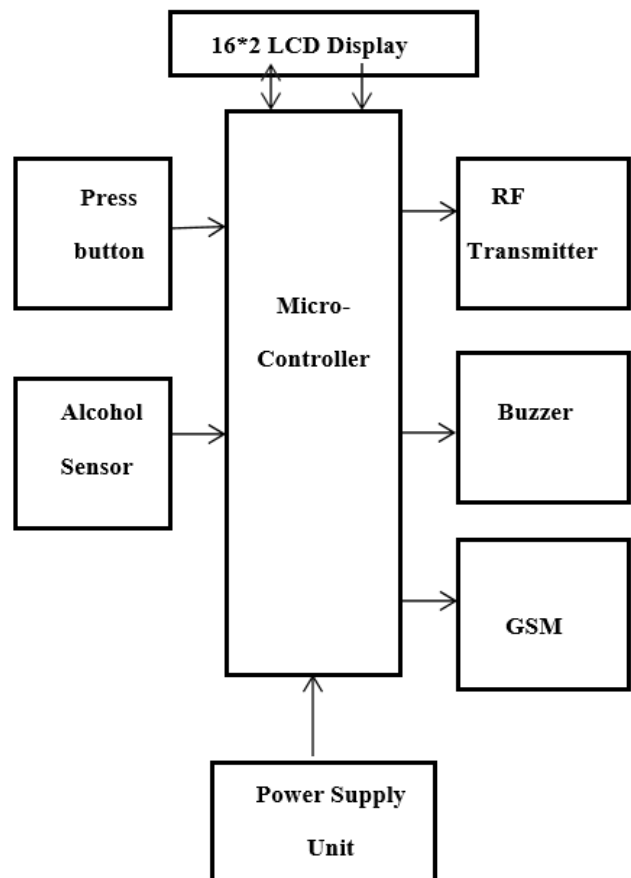


Fig :-3.1 Helmet Unit

If a rider does not wear a proper helmet then LCD display shows the "NO HELMET" shown in fig no 4.3

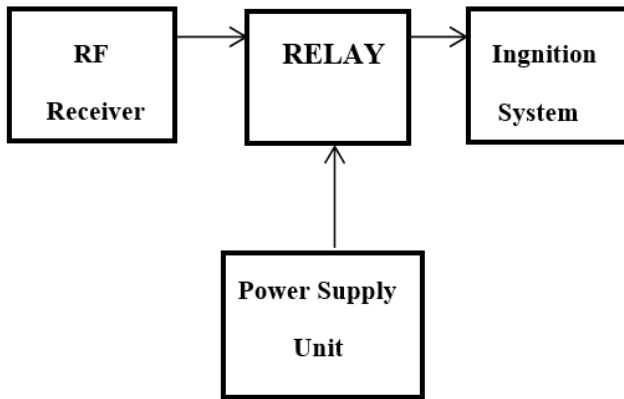


Fig :-3.2 Bike Unit

IV. EXPERIMENTAL RESULT

When the rider wears the helmet then press button which is placed inside the helmet is press by the rider head then transmitter transmits the signal to receiver and LCD display show the “IGNITION ON” as shown in fig no 4.1



Fig no:- 4.1 Ignition On

Illegal consumption of alcohol during driving as per the government act but for demonstration purpose, it is programmed as if alcohol in a breath then the helmet until will communicates with vehicle unit and show “ALCOHOL DETECTED” thereafter the ignition system gets switched off as shown if fig no 4.2



Fig :- 4.2 Alcohol Detected



Fig :-4.3 No Helmet

V. CONCLUSION

This paper has a good real-life scope if it is implemented by the government. It can help to reduce the road accident of two-wheeler. The designed smart helmet ensures the safety of the rider by making it necessary to wear a helmet and also ensures that the rider hasn't consumed alcohol. If any of these prime safety rules are violated, the proposed system will prevent the biker from starting the bike. Also, the helmet is being made user friendly with the help of GSM. In case of accident it sends message to the registration number. By implementing this system will reduce the accident rate due to drunken driving.

VI. ADVANTAGE

The bike will not get the start if the helmet is not worn by the rider. If rider consumed alcohol, it can be easily detected by the alcohol sensor. An accident can be easily detected by a magnetic sensor and thus medical service can be provided easily. Hence reduces the road accident. Easy to implemented. There are various sensors are used, which can be easily replaceable.

VII. REFERENCES

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