IMPLEMENTATION OF SMART SAFETY MODEL FOR TWO WHEELER DRIVERS USING EMBEDDED SYSTEM

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ABSTRACT

A Smart Helmet is a good idea which makes motorcycle driving safer than past. In today's era, many cases of bike accidents can be seen around us. People get injured and one of the reason is not wearing helmet by bikers. Many people can save their life in accident cases if they will wear helmet. Carelessness of the driver is the major factor of such accidents. The traffic authorities give a lot of instructions to the operators. But many of them do not obey that rules. This is implemented using radio frequency 433MHz module. The working of this smart helmet is simple, RF transmitter is placed in helmet and RF receiver is placed in bike, which is connected to microcontroller8051.

KEYWORDS: RF433MHz Module, Accident, Helmet, Bike, Safety Encoder HT12E/DecoderHT12D.

The two wheeler accidents are increasing day by day[2], which increases loss of many lives. According to the survey of India, 698 accidents occur per year, nearly half the injured people die due to not wearing helmet. The major factor is that the bikers ride without helmet. A helmet is a type of protective shield used by motorcyclist. The main purpose is to make a safe society. This project plays a vital role to save millions of life. The circuit is so designed that the bike won't be start as long as the biker won't be wear helmet. It provides a security system on the rider with the perfect helmet usage before riding. In this project, RF433 MHz and 8051 Microcontroller based circuitry is used. By the control of RF transmitter and RF receiver, the bike can be moved, if it received signal which is transmitted by the RF transmitter. The pie-chart of accident is as shown below[8].
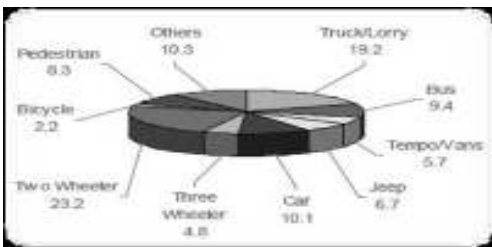

Figure 1: Accident of different vehicle

Accidents Statistics

According to the statistics about 90% of the head injuries cases are due to road accidents , about 72% are youngsters in the age group of 18 to 40. Atleast three young men using two wheelers die every 10 minutes in India due to head injury. This scenario grabbed our interest to ensure safe bike riding.
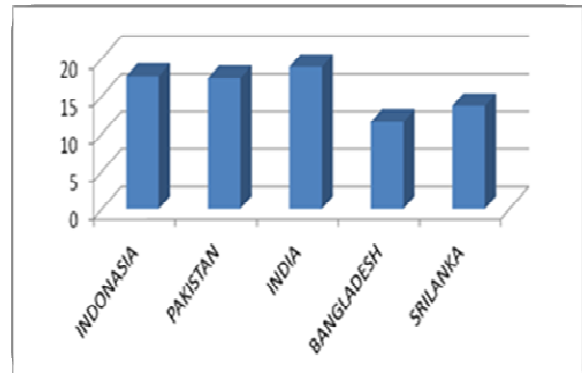

Figure 2: Accident Statistics

Objective of Project

The main objectives of this project are:

- To make safe society.

- To study the working of RF433MHz module.

LITERATURE REVIEW

After reading various research papers that were based on smart helmet, we establish this topic as the most useful technology in the present growing technology. After reading many papers relative to this concept we found one paper that was very much helpful to us in leading the project. This paper describes us about the operation of RF module and how we create a safe society and also explains about the serial communication. The survey of different research papers are as below-

1. Smart Helmet Using GSM & GPS Technology for Accident Detection and Reporting System [2]: A smart helmet is an innovative concept which makes motorcycle driving safer than before. It uses the GPS and GSM as its core technologies. The mechanism of this smart helmet is very simple, vibration sensors are placed in different sections of helmet where the chances of hitting is more which are connected to

microcontroller board. So when the rider crashes and the helmet hit the ground, these sensors sense and provide it to the microcontroller board, then controller extract GPS data using the GPS module that is integrated to it. When the data goes below the minimum stress limit then GSM module automatically sends alerting message to ambulance or family members. The hardware used in this system is alcohol sensor, GSM, GPS, microcontroller, pressure sensor and vibration sensor.

2. Alcohol Detection Using Smart Helmet System [3] :The system automatically checks whether the person is wearing the helmet and has non- alcoholic breath while driving. There is a transmitter at the helmet and a receiver at the bike. There is a switch used to sure the wearing of helmet on the head. The data to be transferred is coded with RF encoder and transmitted through radio frequency transmitter. The receiver at the bike collects the data and decodes it through RF decoder. MCU controls the function of relay and thus the ignition; it controls the engine through a relay and a relay interfacing circuit.

3. Smart Helmet for Indian Bike Rider [4] :This paper presents the smart helmet that makes sure that the rider cannot start the bike without wearing it. This helmet replaces the cable connections for wirelessly switching on a bike, so that the bike would not start without both the key and the helmet. A LED indicator is used to demonstrate the working of the model. The system is a simple telemetry system, which is activated with the help of a pressure that is applied to the inner side of the helmet when the rider wears it. The framework model uses DPDT electromechanical relay and hence there is some time lag in wearing the helmet and switching on of the circuit.

HARDWARE IMPLEMENTATION

RF Module

RF module consists of RF transmitter and RF receiver. The RF transmitter/receiver operates at 433MHz. The RF receiver, receives signal which is transmitted by RF transmitter. This signal is basically serial data. The transmission occurs at the rate of 1Kbps to 10Kbps. The transmitted data is received by an RF receiver operating at the same frequency. The encoder and decoder pair is used in this project, which is used to encode the serial data into parallel data and vice versa respectively. This radio frequency (RF) transmission system employs Amplitude Shift Keying (ASK) with transmitter/receiver (Tx/Rx) pair operating at 433MHz. The transmitter module takes serial input and transmits these signals through RF transmitter. The transmitted

signals are received by the receiver module placed away from the source of transmission.

Figure 3: RF Module
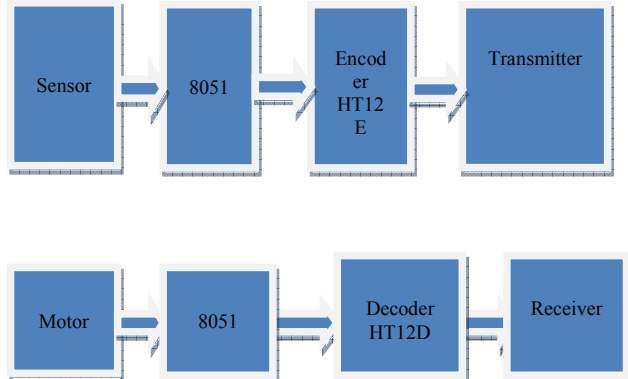
Block Diagram

Figure 4: Block Diagram of Project

Sensor

It will sense the data when biker will wear helmet and then transmitted to the microcontroller. Microcontroller will send four bit parallel data to the RF transmitter through encoder IC.

Encoder HT12E

It will encode the four bit parallel data which are sent by microcontroller into serial data and will pass to the RF transmitter.

Figure 5: Encoder HT12E

RF Transmitter

It is basically connected with 8051 Microcontroller which is further connected with sensor. It works as a switch to control the receiver section (Bike Ignition). The parallel data which is sent by controller is then converted into serial data by encoder HT12E and then transmitted through RF transmitter.

RF Receiver

In RF receiver section the output data i.e. ignition controlled data will be connected to the RF

receiver, and further connected to the microcontroller. And then received by the ignition board.

Decoder HT12D

It will decode serial data into four bit parallel data which will further send to the 8051 microcontroller.

Figure 6: Decoder HT12D

RESULTS AND DISCUSSION

In this project, we have designed a transmitter and a receiver section. Whenever the biker will wear helmet, sensors sense the data and sent for the further process, hence the bike will start.
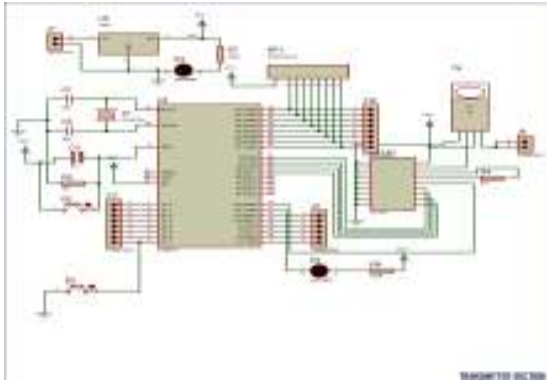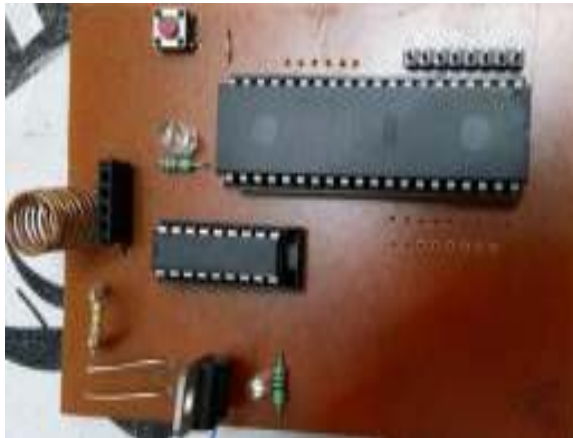

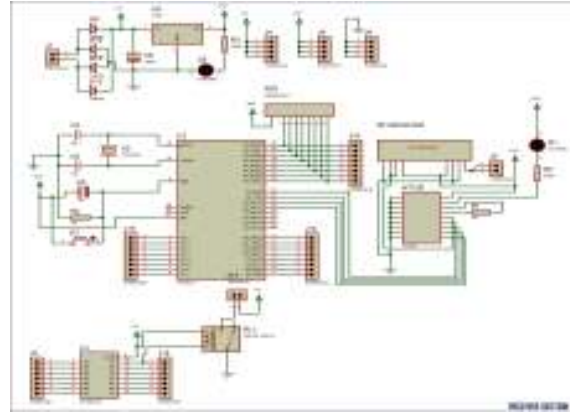**Figure 7: Layout of Transmitter Circuit**

Figure 8: Transmitter Section
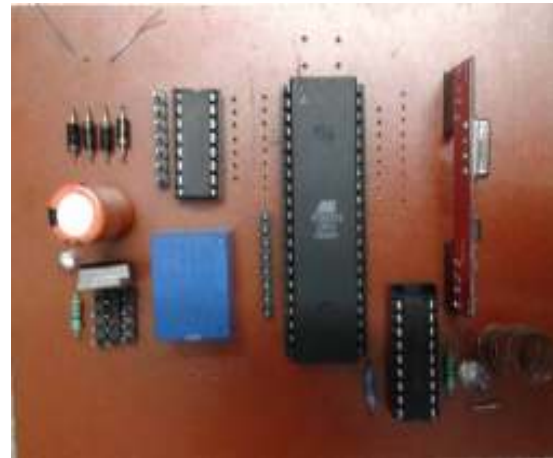

Figure 9: Layout of Receiver Circuit

Figure 10: Receiver Section

THE PROPOSED MODEL IN HELMET

The below figure shows the total setup of the helmet. In this helmet all the components are inbuilted like transmitter circuit which sends the data to the RF receiver.

Figure 11: Proposed System of Helmet

THE PROPOSED MODEL IN BIKE

These section will be inbuilted inside the bike only.

The total setup will be shown in below figure.

Figure 12: Proposed System of Bike

EXPECTED OUTCOME

Smart helmet for safe rider is designed with radio frequency connection, as user wear helmet an RF signal radiates from transmitter and these RF signal get received and synchronized with the help of address matching by the receiver section placed in the ignition switch of the bike and bike get started and bike stopped working as helmet keep out from head. This means that bike work properly till helmet keep on head.

APPLICATIONS

- It is useful for school students.
- Useful for bikes and scooters for safety purpose.
- It is very helpful to protect life in accident case.
- Many cases of violated traffic rules can be reduced.

CONCLUSION AND FUTURE SCOPE

This system is very effective and efficient for the safety purpose of the user. Users have to wear helmet to ride two wheeler vehicle and hence traffic rules will follow with this. It provides a better security to the biker.

- In future, we can use GPS and GSM system to detect the location of the person.
- We can design alcohol\detector by using sensor.
- We can use vibration sensor to control the speed.
- We can also use a camera in helmet.

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International Journal of Current Trends in Engineering & Research (IJCTER)e-ISSN 2455–1392 Volume 2 Issue 5, May 2016 pp. 291 – 296Scientific Journal Impact Factor : 3.468http://www.ijcter.com@IJCTER-2016, All rights Reserved 291Helmet Sensing Speed Controller DeviceProf G B Gour1, Poojashree M2, Chetan P Math3, Archit Jain4, Aditya A D5.

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