Solar Powered Smart Helmet with Multifeatures

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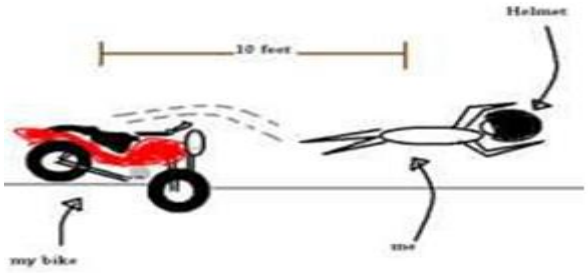
Abstract - *In today's era, the craze of motorbikes is really remarkable. As the bikers in our country are increasing, the road accidents are also increasing, due to which many deaths occur, most of them are caused by the not wearing helmet and due to alcohol consumption. It is difficult to check each and every rider on the road. In order to overcome the above mentioned problem we are designing an intelligent system that will be able to notify the accident to predefined number using GPS and GSM.*

Key Words: **GPS and GSM.**

1. INTRODUCTION

In today's world, due to increase in population there is a tremendous increase as well as demand for vehicles. There are almost 37 million vehicles across the globe which posses a great threat to the human life. This has consequently given rise to the problem of fatal accidents. Smart Helmet is thus, a very good option to deal with this problem. It will not only ensure the safety of the rider but also provide him the features of accident detection, speed detection, alcohol detection. In the Smart Helmet, the technology used is GPS and GSM, Microcontroller AT89S52 and RF technology.



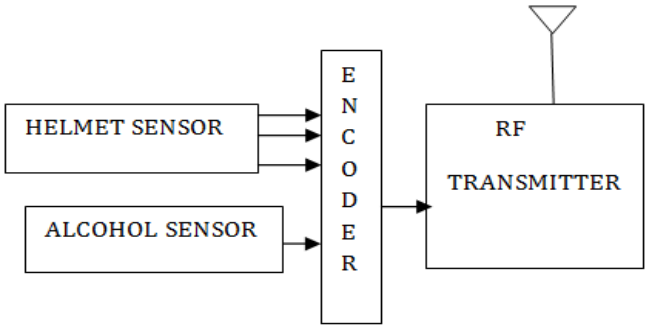
2. OBJECTIVE

The objectives of this project are:

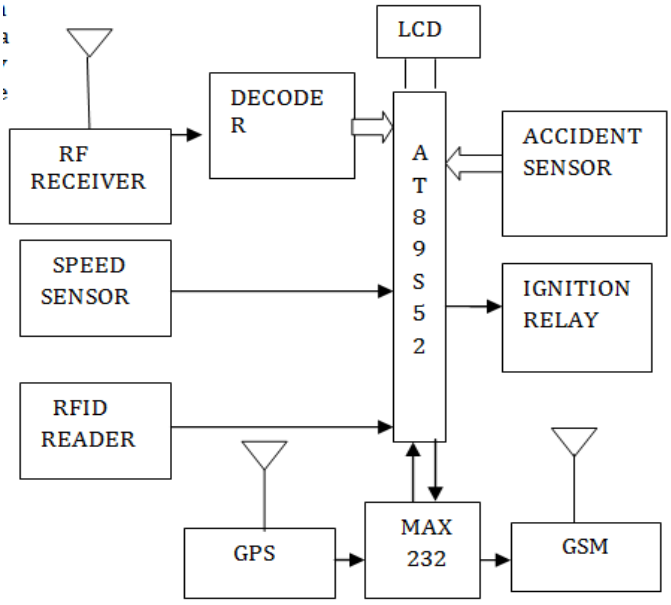
- To design the circuit that can improve the safety of motorcyclists.
- To develop a Smart safety helmet with multifeatures.
- To study and understand the concept of RF Transmitter and RF Receiver circuit in implementing the project.

3. BLOCK DIAGRAM

3.1 Helmet section



3.2 Bike section



4. COMPONENTS REVIEW

4.1 AT89S52

AT89C52 is a low-power, high-performance 8-bit microcontroller with 8K bytes of Flash programmable and erasable read only memory. The device is manufactured by

Atmel and is compatible with the 80C51 and 80C52 controllers. LCD is connected to the port 2 while RF communication connections are done at port 3.

4.2 GSM Modem

A GSM modem is a wireless module network. A GSM modem doesn't have a keypad. It accepts certain commands and acknowledges for those. These commands are known as AT commands. GSM module requires a simcard to send the message on registered mobile number. It requires a 12V adapter for power supply.

4.3 GPS Receiver

Global Positioning System (GPS) satellite broadcast signal from space, which provides three-dimension of location (latitude, longitude, and altitude) plus precise time. It has an antenna to define the location.

4.4 Proximity Sensor

An inductive proximity sensor is used to calculate the speed that occurs due to oscillations of the bike's wheel. This is done for the speed detection.

4.5 RFID Module

RFID stands for Radio-frequency identification. It is based on RF communication. It includes RFID tag and RFID reader. This can be used for unique key for each vehicle and also to avoid bike theft problem.

4.6 MQ-3

M-Q3 gas sensor is highly sensitive to alcohol. It is a low cost sensor which can detect the alcohol gas at concentrations from 0.05 mg/L to 10 mg/L and used for the alcohol detection in helmet side circuitry.

4.7 Encoder & Decoder

The encoder and decoder are used before and after the RF transmission and RF reception respectively. Encoder and decoder are set with same address for their specific communication. Decoder does serial to parallel conversion and encoder does parallel to serial conversion.

4.8 RF Transmitter & RF Receiver

RF transmitter is capable of transmitting information from helmet to bike section circuitry while RF receiver is capable of receiving information from helmet to bike section circuitry and this is done through RF communication.

4.9 Push Buttons

Push buttons are required for both helmet checking and for accident detection. At helmet side push buttons are ANDed while in vehicle side push buttons are ORed.

5. WORKING

The working of this smart helmet is very simple; firstly RFID identification is done by using unique RFID tag to avoid vehicle theft. Then the condition for helmet is checked, that the rider has wore the helmet or not, if not warning is given to wear the helmet. Simultaneously alcohol detection is done. If all these conditions are satisfied then and then only the ignition of bike will be turned on. Continuous speed detection is done using the proximity sensor. Whenever accident occurs and the helmet hits the ground, the vibration sensors (push buttons) sense and gives data to the Controller, then controller extract GPS data using the GPS module that is interfaced to it. When the data exceeds minimum stress limit then GSM module automatically sends message to ambulance and family members.

6. RESULTS

6.1 For Accident Detection and Reporting

Push Buttons are placed in different places of Helmet where the probability of hitting is more which are connected to controller. Whenever the driver met with an accident the push buttons are going to be pressed and interrupt the controller and sends an alert message including the accident location to the family members or ambulance.

6.2 Alcohol detection

MQ-3 gas sensor can be placed just below the face shield and above the additional face protection. The surface of the sensor is sensitive to various alcoholic concentrations. It detects the alcohol; if rider is drunk it sends the command to controller to avoid driving in drunken condition.

6.3 Speed Detection

A proximity sensor is placed to detect the revolutions per minute of the wheel of the bike, thus counting its speed. If the speed is about a permissible value the driver will start getting warning for the same.

7. FUTURE SCOPE

- The system can also be modified as per the car on big vehicles.
- In future we planned to design our intelligent system in a compact size and as well as globally acceptable.

8. CONCLUSIONS

Nowadays, the severities of accidents are increased because of the absence of helmet or by the usage of alcoholic drinks. In our project we have developed an electronic intelligent helmet system that efficiently checks the wearing of helmet and drunken driving with speed. By implementing this system a safe two wheeler journey is possible.

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