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Smart Helmet

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Abstract: ***Todays road condition is worse because of heavy traffic, and increase of traffic accidents. In certain countries like India the people don't get any medical services at the right time. This project mainly focuses on detecting the accidents and informs the detection of accidents to preprogrammed numbers like family/ friends/ police etc. The GSM and the GPS are the two technologies used for this project. In this project an electronic device is installed to track the driver in vehicle and helmet to enable the hospital (ambulance- 108), police station and relatives. If the driver met with an accident, it will be detected by the system in helmet. The fetching of the location of the driver and sending of messages are done by GPS and GSM technology. This system also monitors status of driver like whether he is wearing the helmat or not. Here a microcontroller called ADRUINO is interfaced serially to a GSM Modem and GPS Receiver. The latitude and longitude of the rider will be detected by the GPS. A GSM Modem will send the position of the driver to police/family/hospital.***
Index Terms: GPS module , GSM module, ADRUINO

I. INTRODUCTION

The number of increase in the vehicles in these days is the most important cause of accidents. According to the World Health Organization, an estimated 1.2 million people lose their lives every year due to car accidents. The increase in the number of vehicles is due to un efficient road facilities. In most of the accident cases, the people lose their lives due to the unavailability of medical facilities at the right time. If the driver met with an accident then the electronic device is installed in a vehicle and helmet get activated, and enable the hospital (ambulance- 108), police station by sending the messages and locations through GPS and GSM.
It is an embedded system which is used for tracking and positioning of any vehicle. The driver wears the helmat the system will activated automatically. if the helmat is weared then the engine starts .the modules in the both helmet and bike will continuously monitor a moving vehicle and report the status of the driver. If the accident occurs the pressure sensors will detect it and modules in bike system get activated.This tracking system can inform you the location and route travelled by vehicle, when the driver met with an accident. This system can be used in any weather conditions.

II. EXISTING TECHNOLOGY

This project is mainly used to track the position of the Vehicle by the owner or can also be used in the public transportation system by the people to know the location of the buses or trains. In case of any accident, the system sends automated messages to the pre-programmed numbers. We can send messages to any number of mobiles. The owner of the vehicle, Police to clear the traffic, Ambulance to save the people can be informed by this device. This uses a GPS(Global Positioning System) to know the exact position of the vehicle with an accuracy of a few feet. GSM is used to receive SMS from the user and reply the position of the vehicle through a SMS. A Renesas microcontroller is used to control and co-ordinate all the parts used in this system. When there is any accident, an Impact Pressure sensor is triggered and it sends signal to the Renesas microcontroller. The Renesas microcontroller circuit processes the input and sends the appropriate output according to the programming done.



Fig 1 Block diagram of accident location tracing.

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III. PROPOSED SYSTEM

A. System Overview

Helmet section

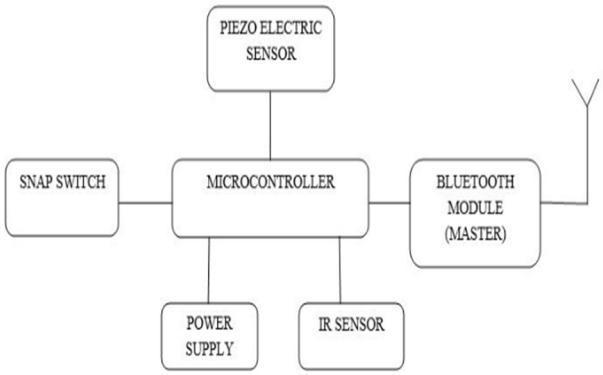


Fig 2.Block diagram of helmet section

The Figure 2 shows a simplified block diagram of transmitter. According to given block diagram, we have to implement transmitter section block and finally interconnect all of them together to form a complete transmitter section which will be implemented in the helmet. Helmet is a form of protective gear worn to protect head from injuries. And nowadays it's essential to wear a helmet as high risks of accidents are possible on roads. So using helmet as our chief component we can implement a design to helmet which can help the user to get a fast access to medicinal help in emergency.

Piezoelectric sensors are embedded in the helmet system to detect the pressure or its change and convert it accurately and repeatedly into electrical signal. This electrical signal, which is a measure of magnitude of the applied pressure or change in pressure, is then relayed to a Buzzer.

The transmitting system core functionally consists of a piezoelectric sensor, IR sensor, microcontroller, Bluetooth module(master). When the driver wears the helmet, IR sensors placed at the helmet will detect the radiations and sends the signals to the microcontroller. Whenever the rider meets with an accident the piezoelectric sensor present in the helmet will detect vibrations due to pressure which generates electric signals and sends the required signals to the microcontroller. These signals will then transmit the necessary actions through the Bluetooth module. Thus the Bluetooth module will transmit the information to the receiver section installed in the vehicle.

Bike section

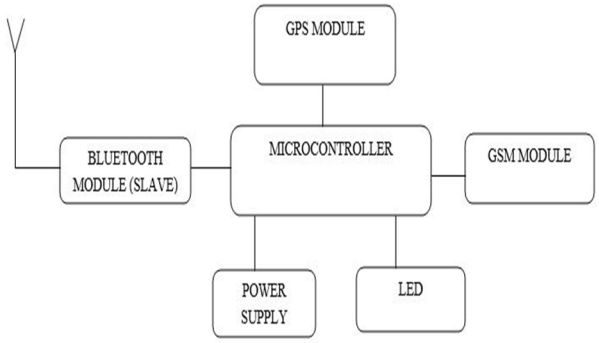


Fig 3 Block diagram of bike section

The Figure 3 shows the block diagram of the receiver, where it consists of a GSM Module, GPS Module, Microcontroller (ARDUINO UNO). The microcontroller coordinates the overall operation of the system. The system gets ON once the rider starts the engine. The tracking system installed in the vehicle gets activated from this the receiver section will get connected from the

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transmitter section installed in the helmet. The GPS in the system will continuously start tracking the rider position where ever he moves. The buzzer starts sounding once the helmet collides with the ground, as the sensor detects some vibrations. If the mishap is just a normal one then the rider can switch OFF the buzzer, or when the rider is seriously injured then after a short delay about 30sec the microcontroller will fetch the position of the accident zone through GPS. The Global Positioning System (GPS) is a space-based global navigation satellite system (GNSS) that provides reliable location and time information in all weather and at all times and anywhere on . The system provides the longitude and latitude of the vehicle and sends the information of the rider to the AMBULANCE-108, nearest police station and to the rider's relatives through GSM.

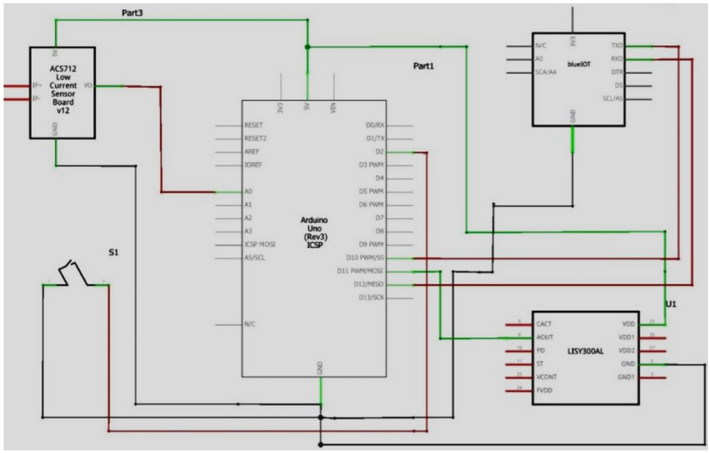


Fig 4 circuit diagram for helmet section

This project is mainly used to detect whether the rider wears a helmet or not and also to detect accidents and send messages to preprogrammed numbers. The Transmitter section consist of Bluetooth module, IR sensor, and piezo electric sensor and a switch. IR sensor detects whether the helmet is placed or not. If the helmat is placed, then the led placed at the receiver side will be ON and it indicates that the engine becomes ON. When the driver wears the helmet, IR sensors placed at the helmet will detect the radiations and sends the signals to the microcontroller. Whenever the rider meets with an accident the piezoelectric sensor present in the helmet will detect vibrations due to pressure which generates electric signals and sends the required signals to the microcontroller. These signals will then transmit the necessary actions through the Bluetooth module. Thus the Bluetooth module will transmit the information to the receiver section installed in the vehicle.

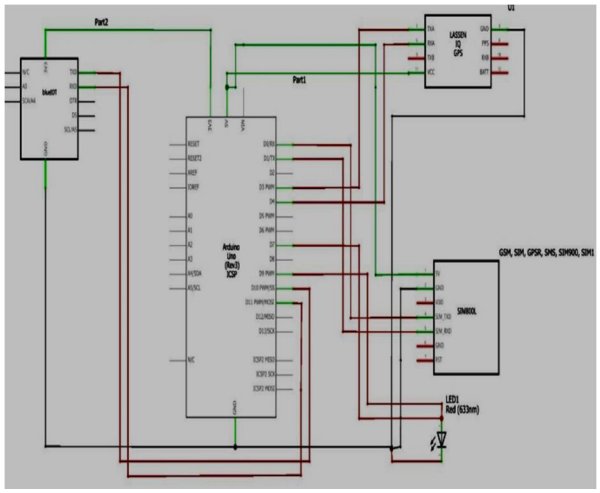


Fig 4 circuit diagram for bike section

The receiver section consists of Arduino, GPS module, GSM module, Bluetooth module. The Bluetooth module at the receiver side will receive the signals. If the mishap is normal then the rider can switch off the switch and no text message will be sent to the recipients or if it is amajor accident then the information will be sent to the recipients When the rider is seriously injured, then after a short delay about 30 sec.

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The microcontroller will fetch the position of the accident zone through GPS. The GPS system provides the longitude and latitude of the vehicle. The Global Positioning System (GPS) is a space-based global navigation satellite system (GNSS) that provides reliable location and time information in all weather and at all times and anywhere on . The Arduino will track the position through the GPS module and sends the information of the rider to the AMBULANCE-108, nearest police station and to the rider's relatives through GSM technology. GSM modem is a specialized modem which accepts a SIM card and operates over a subscription to a mobile operator.

IV. RESULTS

This system was simulates using adruino programming. Adruino is a microcont roller, it reduces the complexity. This system consist piezoelectric sensors, GPS module, GSM module, and Bluetooth .The piezoelectric sensors are used to detect the accident. The sensor will detect the vibration or pressure variation.

The GPS is used to identify the accident location and it will send to preprogrammed numbers . The system gets ON once the rider starts the engine. The tracking system installed in the vehicle gets activated from this the receiver section will get connected from the transmitter section installed in the helmet. IR sensor detects whether the helmet is placed or not. If the helmat is placed, then the led placed at the receiver side will be ON and it indicates that the engine becomes ON.

whenever a rider met with an accident the sensors will send signals to microcontroller. If the mishap is normal then the rider can switch off the switch. These signals will then transmit the necessary actions through the Bluetooth module. It will send signals to receiver section. At the receiver side ,the GPS get activated and track the location of accident . Sends the information of the rider to the AMBULANCE-108, nearest police station and to the rider's relatives through GSM technology.

V. CONCLUSION

Nowadays, there is a large increase in the number of accidents. This is due to the absence of helmet. This paper describes the design and implementation of a vehicle tracking module to give the location of the accident. This system automatically activated when the driver wears the helmet. Here the helmet is the transmitter section and it will detect the accident and sends signals to receiver section through bluetooth module. if the accident is normal, then the rider can switch off the buzzer .Otherwise, the GPS will track the location of accident and send information to police station, hospital, family etc by using GSM module. This is a efficient system can be used in any weather condition.

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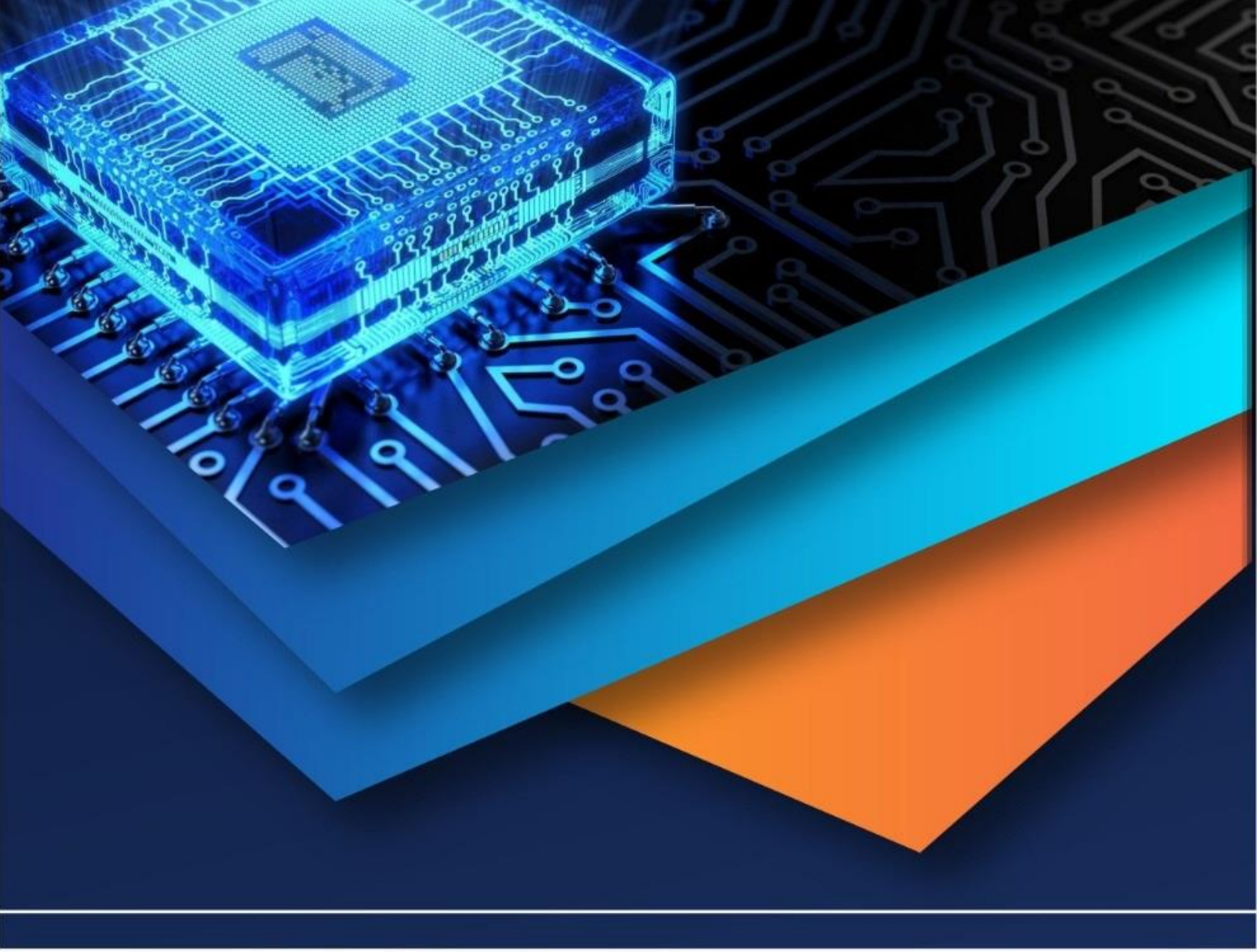


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