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Smart Helmet Using GSM &GPS Technology for Accident Detection and Reporting System

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Abstract: **A smart helmet is a special idea which makes motorcycle driving safer than before. This is implemented using GSM and GPS technology. The working of this smart helmet is very simple, vibration sensors are placed in different places of helmet where the probability 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 gives to the microcontroller board, 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 or family members.**

Keyword: **Alcohol Sensor, Gsm, Gps, Microcontroller, Pressure Sensor, Smarthelmet, Vibration Sensor.**

I. INTRODUCTION

The thought of developing this project comes to do some good things towards the society. Day by day the two wheeler accidents are increasing and leads to loss of many lives. Accord to a survey of India there are around 698 accidents occurring due to bike crashes per year. The reasons may be many such as no proper driving knowledge, no fitness of the bike, fast riding of bike, drunken and drive etc. Some time the person injured, the accident may not be directly responsible for the accident, it may be fault of rider, but end of the day it's both the drivers involved in the accidents who is going to suffer. If accidents are one issue, lack of treatment in proper time is another reason for deaths. According to the survey India 698 accidents occur per year, nearly half the injured people die due to lack of treatment in proper time. The many reasons for this such as late arrival of ambulance, no persons at place where the accident occur to give information to the ambulance or parents.

This is a situation we observe our day to day life, a thought of finding some solution to resolve this problem come up with this idea of giving the information about accident as soon as possible and in TIME….!!!!Because after all time matters a lot, if everything is done in time, at least we can save half the lives that are lost due to bike accidents.

Considering three major factors for avoiding the accident causes such as I. Make wearing the helmet compulsory. II. Avoid drunk and drive. III. If person met with an accident, no one is there to help him. Simply leaving or ignoring the person he may die. In such situation, informing to ambulance or family members through mobile to rescue him for an extent.

The idea of this work is to give information about the rider wearing the helmet or not, whether the rider drunken or not and also, he met with an accident it gives an information about location where he is met with an accident through GSM module to mobile numbers family members, so I have chosen GSM technology to give the information by sending SMS, using GSM module which has SIM card slot to place the SIM and send SMS. Sending SMS alone can't help the driver, if we send and an SMS saying that accident had occurred where the ambulance will come without knowing the location of the accident. So to trace out the location where exactly accident occur using GPS module, and gives to microcontroller, then it sends the SMS which contains the latitude and longitude of a area to family members mobile numbers For this we use GPS module to extract the location of the accident, the GPS data will contain the latitude and longitude values using which we can find the accurate position of the accident place.

II. BLOCK DIAGRAM

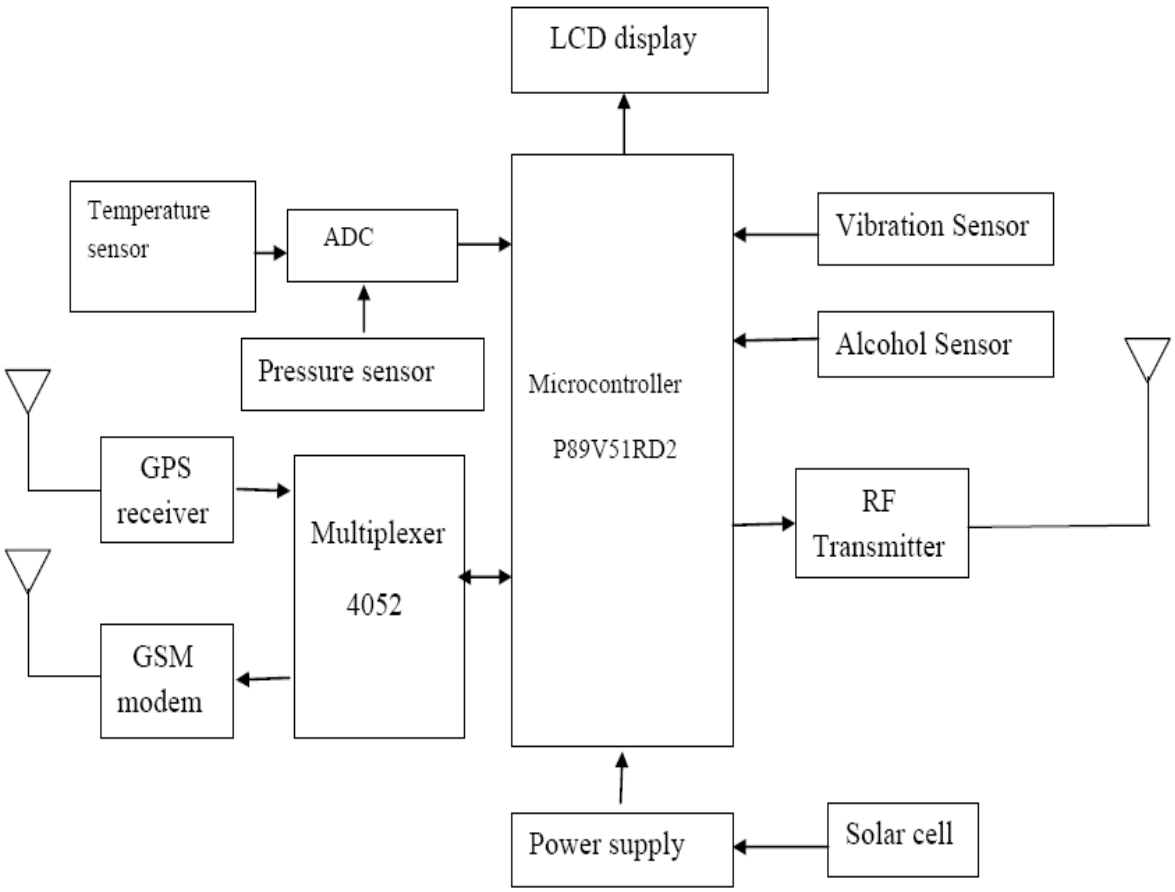


Fig: 1.1 Block Diagram of Smart Helmet

In this system P89V51RD2 microcontroller is used. When the system is switched on, LED will be ON indicating that power is supplied to the circuit. The RF is used for start the two wheeler firstly it check whether the driver is drunken or not if drunken it will not allow to start two wheeler .The small voltage of ignition of the two wheeler is grounded. In normal condition when the helmet is wearied the pressure sensor is senses pressure and the RF transmitter radiates the FM modulated signal. The RF receiver is connected with the two wheeler which is receive the radiated signal and activate the relay .The relay is remove the ignition wire from the ground and connected with the starter switch now the two wheeler will start. When driver met with accident vibration sensor sends message to microcontroller. The GPS receives the location of the vehicle that met with an accident and gives the information back. This information will be sent to a mobile number through a message. This message will be received using GSM modem present in the circuit. The message will give the information of longitude and latitude values. Using these values the position of the vehicle can be estimated.

To run the GPS and GSM module, microcontroller is a very user friendly device which can be easily interfaced with any sensors or modules and is very compact in size.

Now some of the thoughts in our mind, how will send the SMS using the GSM module by keeping the GPS location in the SMS which is obtained from the GPS module. But when should all this is done? When accident occurs, how will the microcontroller detect the accident? This can be done by using a vibration sensor which is placed in the helmet.

The vibration sensor is placed in the helmet such that it detects vibrations of the helmet. When the rider crashes, the helmet hits the ground and the vibration sensor detects the vibrations that are created when the helmet hits the ground and then the microcontroller detect the accident occurrence and it will send an SMS containing information about the accident and location of accident using GSM and GPS modules. Alcohol sensor sense the alcoholic content whether the rider drunken or not, if he drunken bike will not start showing as alcohol detected on LCD display. Use of pressure sensor, gives the whether the rider wear the helmet or not. If he not wears the helmet again bike will not start and intimate to rider to wear the helmet.

Hardware Software Description

The P89V51RD2 are 80C51 microcontrollers with 64kB flash and 1024 bytes of data RAM. A key feature of the P89V51RD2 is its X2 mode option. The design engineer can choose to run the application with the conventional 80C51 clock rate (12 clocks per machine cycle) or select the X2 mode (six clocks per machine cycle) to achieve twice the throughput at the same clock frequency. The flash program memory supports both parallel programming and in serial ISP. Parallel programming mode offers gang-programming at high speed, reducing programming costs and time to market. ISP allows a device to be reprogrammed in the end product under software control. The capability to field/update the application firmware makes a wide range of applications possible.

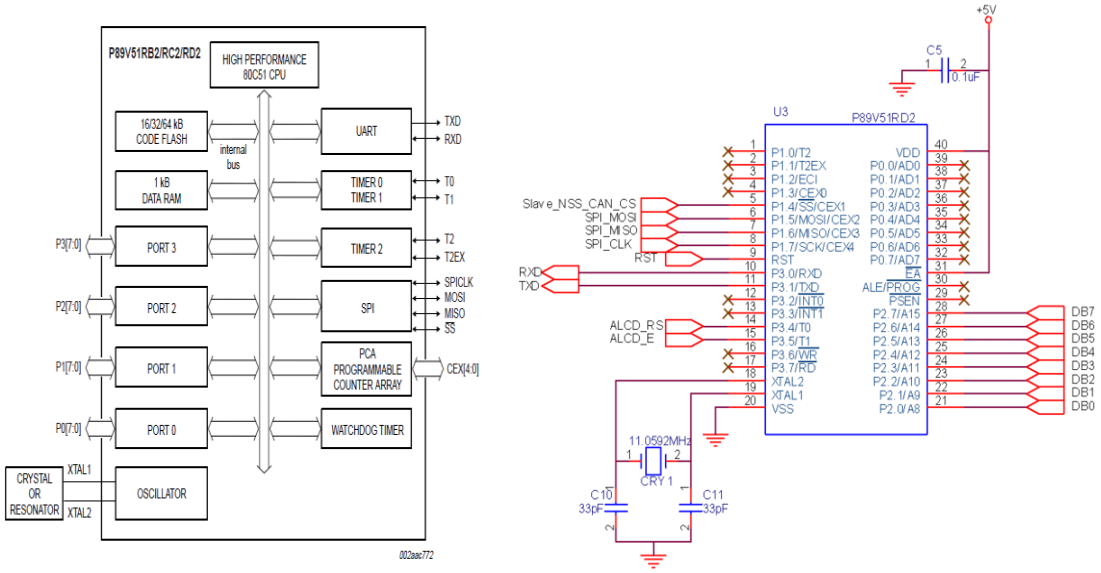


Fig: 1.2 Block diagram and schematic Diagram of P89V51RD2

LCD display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs.The reasons being LCDs are economical easily programmable have no limitation of displaying special & alphanumeric characters A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines.

Fig: 1.3 LCD display

Software required is keil's software for run the code and to dump the code into controller using flash magic. Using assembly language to write the code for the system.

ADC0809

ADC0809 is an 8-bit analog to digital converter. It is used to convert the analog voltage of temperature sensor and battery circuit. The reference voltage of ADC0809 is 5V. It is an 8 channel ADC. The temperature sensor is connected to channel 0 and battery circuit is connected to channel 1.The 8-bit A/D converter uses successive approximation as the conversion technique. The converter features a high impedance chopper stabilized comparator, a 256R voltage divider with analog switch tree and a successive approximation register. The 8-channel multiplexer can directly access any of 8-single-ended analog signals.

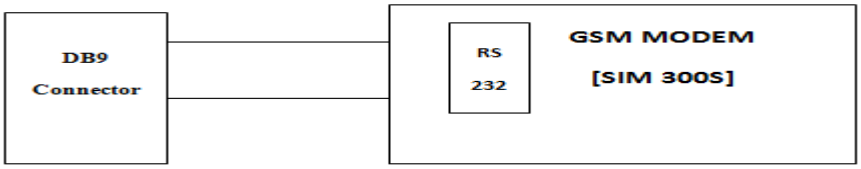
Vibration Sensor

This sensor buffers a piezoelectric transducer. As the transducer is displaced from the mechanical neutral axis, bending creates strain within the piezoelectric element and generates voltages. The Vibration Sensor Detector is designed for the

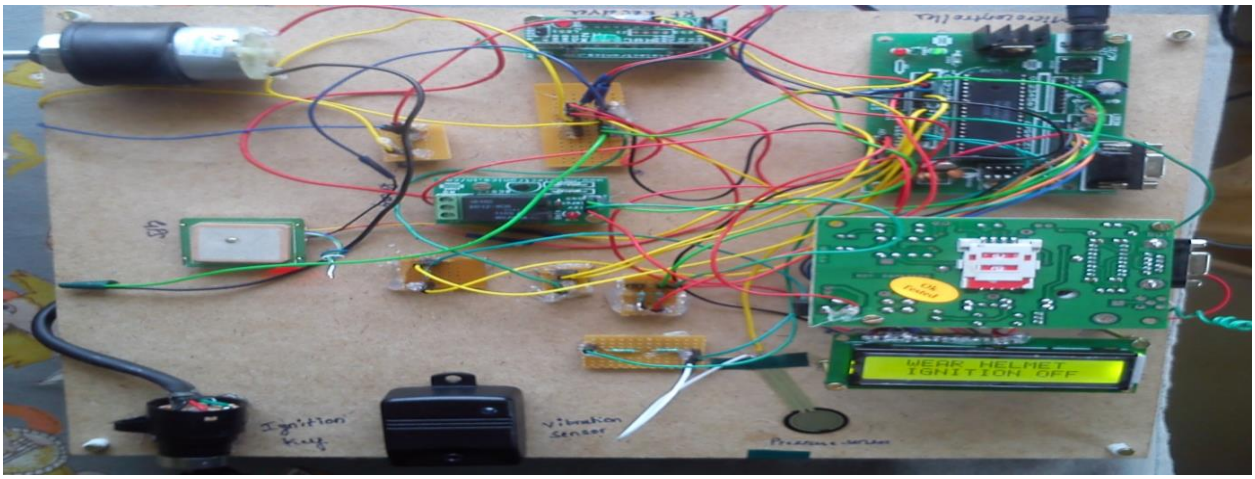
security practice When Vibration Sensor Alarm recognizes movement or vibration, it sends a signal to either control panel Developed a new type of Omni-directional high sensitivity Security Vibration Detector with Omni-directional detection

GSM Modem SIM 300

Designed for global market, SIM300 is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS1900 MHz SIM300 provides GPRS multi-slot class10 capability and support the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. With a tiny configuration of 40mm x 33mm x 2.85 mm, SIM300 can fit almost all the space requirement in your application, such as Smart phone, PDA phone and other mobile device



Results



III. CONCLUSION

As the concluding part of this project, I would like to say that-- "Without proper action at proper time, danger awaits us with a bigger face." We must act on time when a person is injured. We must take care of person the way it is meant. Otherwise, a valuable life might be lost .We need to understand how precious lives of people are and what importance first-aid carries in saving these precious lives.

If this project imparts this idea in even one person, I would think that the project will be successful.

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