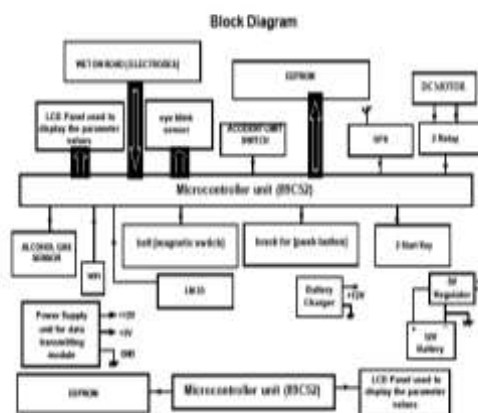


INTELLIGENT SYSTEM TO DETECT AUTOMOBILE ACCIDENTS

Abstract: Automotive electronics plays a significant role in the automobile industry and provides luxurious features and more importantly addresses the safety and security concerns. This project provides automatic accident notification system which helps in informing the nearest medical centers and the traffic authority by providing the location details in the form of coordinates (latitude & longitude) of the accident for immediate medical attention which can save numerous lives every day and also used to analyze the cause of vehicular accidents. The main aim of the project is to develop a vehicle diagnosis that can be installed in any vehicle. This can be designed with minimum number of circuits. This can contribute to provide the treatment for crash victims, helping police officers and insurance companies with their vehicle crash investigations.

Keywords: Microcontroller, EEPROM, GPS, Wi-Fi, Relays, water detector, DC Motor, limit switch, Temperature sensor, Magnetic switch, Eye blink sensor, LCD, Alcohol sensor, push buttons.



1. INTRODUCTION:

Every day many lives are lost due to the cause of the road accidents. The main causes of the accidents are due to many reasons such as carelessness of the driver, poor road infrastructure, and also due to the environmental conditions. These accidents are either intentional or actual accidents. So the vehicles running on the roads should adopt electronic systems which provide the details of before, during and after the crash accidents. The best solution to this situation is intelligent system which helps to find the way out to solve the problems.

Earlier whenever the accidents occurred the police officers investigated them by taking the information from the surrounding people. Since the exact proof is not found the real culprits escaped and many cases are closed which led injustice to the victims. Without proper information some of the innocent people got jailed and also got penalized. Many insurance companies didn't sanctioned loans because there is no exact proof of the accident. In order to overcome all these problems the intelligent system plays a major role which provides the exact information regarding the accidents. The main objective of the system is whenever the accident occurs it stores the parameter details which help to find the real culprit within a short period of time and provide justice to the victims. This information also helps to find whether the accident is intentional or real accident.

2. IMPLEMENTATION:

The intelligent system consists of two sections one is transmitter and other is receiver side. The major function of the intelligent system at the transmitter side is used to identify the accident and save the accident status in the EEPROM and send the saved information to the monitoring station by using Wi-Fi. Whenever the limit switch is pressed the microcontroller indicates that the accident has occurred. Now microcontroller immediately takes the GPS values from the GPS receiver which gives the details of exact location of the accident and stores the GPS values in the EEPROM at the same time it sends the GPS values to the monitoring station by using serial communication to the app installed by traffic authority and medical centers. Serial communication used in my project is Wi-Fi which creates the

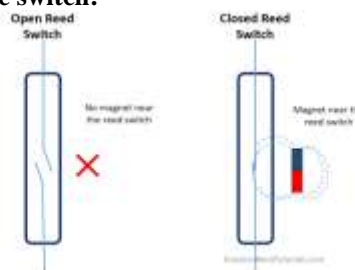
local area network at a range of 20-50ms indoors and several hundred meters outdoors. Here EEPROM acts as the storage device of accident information. The EEPROM saves the sensor values such as temperature sensor, eye blink sensor, alcohol sensor and the status of the belt condition, brake condition, speed condition and also sends these values to the monitoring station by using serial communication. The stored information in EEPROM is displayed in the LCD.

The receiver section of the intelligent system consists of the EEPROM slot, microcontroller and the LCD to display the stored values. The receiver section is used to display the stored information. The EEPROM chip at the transmitter side stores the accident information at the receiver side by inserting that chip displays the stored information in the LCD. By using this information the cars get the insurance, the culprits cannot be escaped from justice and also provides the behavior of the driver whether driving the car carelessly or with attention. A minute carelessness can cause the loss of the life which is very valuable.

3. RELATED WORK:

The brief introduction of different modules used in this project is discussed below:

Magnetic switch:

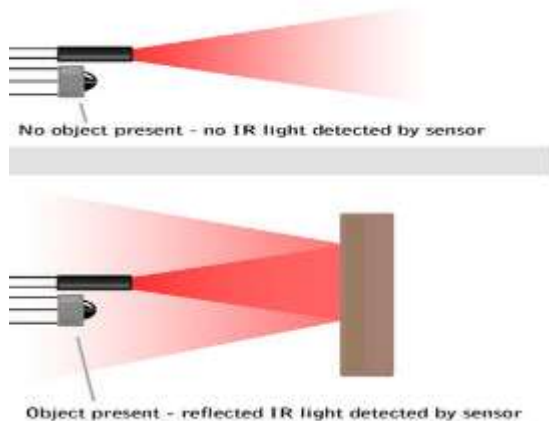


The magnetic switch is to identify the seat belt condition whether it is put on or not. The magnetic switch is assembled in a glass container, when the heavy magnet is brought near to this magnetic switch; the contact of the switch gets closed automatically by the magnetism process which indicates the driver is driving the car by having the seat belt.

Eye blink sensor:

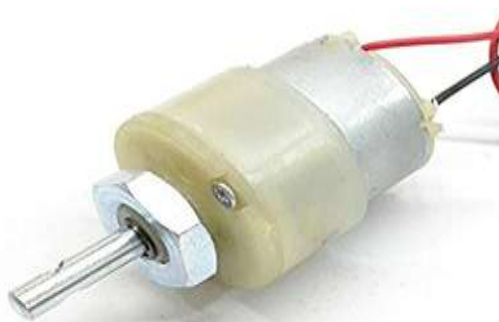
The eye blink sensor is designed by using IR sensors. It contains two IR sensors one for transmitting of IR signal to LED and one

for receiving of IR signal from LED. The eye blinking sensing block is designed with op-amp LM567 IC. For identifying the sleeping conditions or other condition of the driver the 567 IC is developed with two IR sensors. These sensors are organised close together and placed ahead of the eye

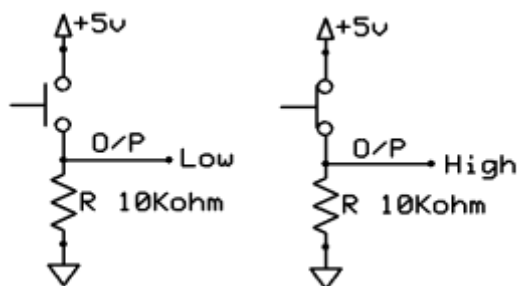


A relay is an electromagnetic switch, which can make or break the circuit. Here two relays are connected at the output of the controller to limit DC motor speed that indicates the vehicle speed which gives the information whether the vehicle is moving with over speed or normal speed. Through one relay 12V is supplied to the DC motor and 5V through the other relay. Microcontroller output is not sufficient to drive DC motor. So, high-voltage and high-current drivers are required. So the relay is used to drive the DC motor

DC Motor:



Brake operation:

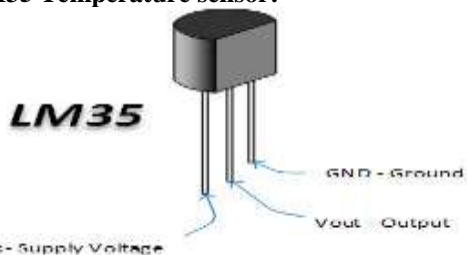


This brake operation helps to determine that the driver is applying brakes when needed or not with the help of push button and two other push buttons are used to indicate whether the driver is driving the car with normal speed or high speed.

Water detector:

To discover the wetness of a road an electronic circuit is designed, which takes care of the monitoring of water (wet road) continuously. For this purpose two electrodes are used. One electrode is fed with +5V DC and the other electrode for indicating the sensitivity of the roadway to the microcontroller.

LM35 Temperature sensor:



The LM35 is operated at a temperature range over a -55° to +150°C. The LM35 doesn't need any exterior calibration provide typical exactness of ±1.4°C at room temperature and ±3.4°C over a full -55 to +150°C temperature range. The output of the LM35 is given as an input to the Op-Amp LM324. The cut-off temperature value is set at the reference pin of the Op-Amp and the sensor input is given to the other pin of the Op-Amp. Now the Op-Amp will compare the input temperature value with the cut off value set as the reference value and will provide a high signal to the controller when the value exceed the cut off value indicating high temperature.

Relays:

An electric motor is a machine, which converts the heat energy into potential energy. It is based on the principle that when a current-carrying conductor is placed in a magnetic field, it experiences a mechanical force whose direction is given by Fleming's Left-hand rule.

Alcohol sensor:

MQ 2 is a general purpose Sensor that has good sensitivity characteristics to a high range of gases. This device is developed to function with a stabilized 5V heater supply and a circuit voltage is based on the design. MQ 2 sensor is connected to the Op-amp as one input and a reference voltage is fed to the other input. When the alcohol fumes are more than the value set by the op-amp, the output of the op-amp will become high, which is connected to the controller. Here the op-amp is connected as a comparator that compares with the reference value and provides a logic signal to the controller.

GPS(Global Positioning System):



The GPS receiver used is NEO-6M GPS module. It consists of an antenna where the sending and receiving of the radio frequency signals takes place from the satellite. The GPS receiver computes the distance between itself and the satellite and can assume its own location by a mathematical process called trilateration.

Wi-Fi:

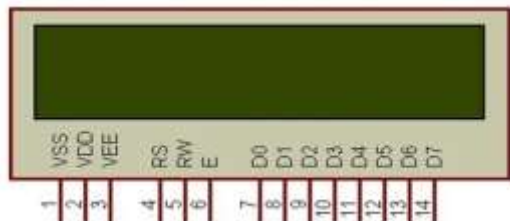
The Wi-Fi modem is the RN-171 module to promote connection to the wireless networks. There are only 4 of the pins required to wire the Wi-Fi module, they are VCC (5v), GND, RX and TX. The RX and TX pins are short to the Transmitter and Receiver pins of the microcontroller respectively for serial communication.

Ignore the rest of the pins on the module. The VCC and GND power connections are easy, just wire directly to the power supply (+Vcc and Gnd). The controller communicates with the Wi-Fi module through the AT commands.

EEPROM:

The main advantage of using this 93C56 IC is that the data stored in EEPROM don't delete even if the power fails. Data stored in EEPROM will not be corrupted up to 100 years. Each device can be used up to 1000 cycles (erase and read). The other advantage of using this device is, since it is having 2K memory, lot of data can be stored in a single device. This IC is interfaced with both the microcontrollers parallel, such that 89C52 writes the data into it when the vehicle is met with an accident, whereas 89C52 controller at the reading section acquires the data from this chip and displays the parameter conditions before the accident.

Liquid Crystal Diode (LCD):-



The LCD panel is interfaced with micro-controller through the output port. This is a 16 character x 2 Line LCD module, capable of displaying the numbers, characters, and graphics. The display consists of the two internal byte registers where one for the commands (RS=0) and the second for the characters to be displayed (RS=1). It provides a user Programmed RAM area that is the character RAM which can be programmed to provide any desired character that can be formed using a dot matrix. R/W is a read or writes Pin, which allows the user to write information to the LCD or read information from it. R/W=1 when reading, R/W=0 when writing. The enable (E) pin is used by the LCD to latch information presented to its data pins. When data is supplied to data pins, a high level to low level signal is applied to this pin then the data pins is selected.

Microcontroller:

In this project work two micro-controllers AT89C52 are used which belongs to 8051 family with 40 pins where out of these pins 32 pins are used as general purpose input and out pins. These two micro-controllers are placed one at transmitter section and other at the receiver section. It contains 8-bit In-system programmable flash memory which allows programming or reprogramming the flash memory soldered in target PCB board and also contains the 256 bytes of RAM which stores the data temporarily.



4. CONCLUSION:

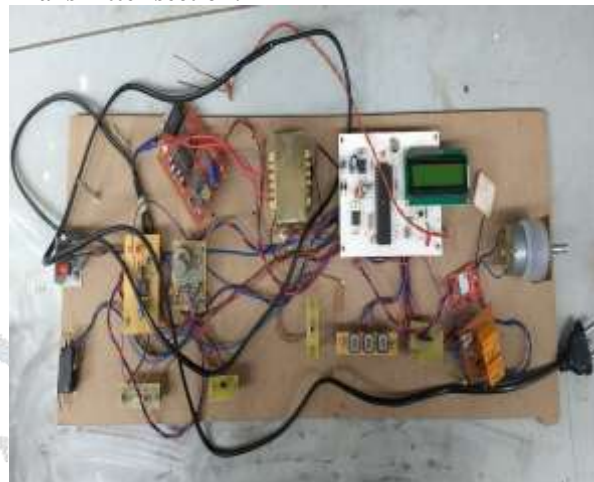
The intelligent system to detect automobile accidents is designed by using the AT89C52 microcontroller. The system is designed to detect the accident and send the information to the medical centers which helps to provide the treatment for crash victims, helping traffic authority and insurance companies with their vehicle crash investigations

5. ACKNOWLEDGEMENT:

We would like to thank all the authors of different research papers referred during writing this paper. It was very knowledge gaining and helpful for the further research to be done in future.

6. RESULTS:

Transmitter section:

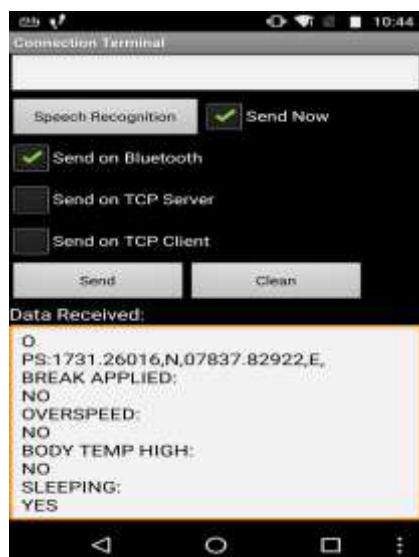


Receiver section:



OUTPUTS:





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