Intelligent Accident Identification and Prevention System Using GPS and GSM Modem

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Abstract – *Accident is an unexpected occurrence event, which leads to loss of many lives. Accident may occurs due to fast driving of the driver, drunk and drive or no proper driving knowledge, poor road conditions and so on. In many situations we may not be able to find accident location because we don't know where the accident will taken place. So we use GPS to track to the location and GSM to convey message to coded number. The purpose of this work is to prevent the lives of human being and detect the accident. If driver does not wear seatbelt and alcoholic consumed buzzer will on and message display on LCD. When accident occurs, immediately accident sensor will detect signal and then PIC will send signal to GPS. The GPS will track the location and signal send through GSM to coded number.*

Key Words: **GSM, GPS, PIC, Alcohol Sensor, Limit Switches.**

1. INTRODUCTION

Due to rapidly increase in population of world, number of vehicles are increasing leading to increase in no of accidents. The aim of the work is to minimize vehicle accident which leads to loss valuable human lives by providing some safety. Because of road traffic, accidents are leading problem of death from survey report we comes t o know that nearly 1.3 million people die every year on the world's road. There are many reasons for accident   like drunk driving, reckless driving, speeding, unsafe lane changes, street racing, etc. To avoid accident it is necessary to take preventive measures like checking whether the driver is wearing seat belt or not or whether he is under influence of alcohol or not. Also after the occurrence of accident if the injured is treated immediately then it would save many lives so it is important to track the position of accident i.e. tracking the location of accident because accident is unexpected. Seat belt[2] test will ensure that driver is wearing seat belt and alcohol sensor[4] placed on steering will check if driver is drunk. The accident will be detected via limit switches[3] at the back and front of the car. When accident is detected buzzer will ring and simultaneously the accident location details are tracked through GPS[1] and message would be forwarded through GSM to coded number.

2. LITERATURE SURVEY

1] Intelligent automobile system for accident prevention and detection (S.SARANYA, M.SHANKAR, N.MUTHULINGAM)

- From this paper we got idea of seat belt sensor and alcohol sensor. i.e. if seat belt is not weared and driver is alcoholic consumed ignition system remains off .

2] Intelligent accident identification system using

GPS, GSM modem (S.SONIKA1, Dr.K.SATHIYASEKAR2, and S.JAISHREE3)

- This paper tells about tracking of location of accident by GPS and convey the msg to coded number via GSM

3] Real Time Vehicle Accident Detection and Tracking Using

GPS and GSM (NAMRATA H. SANE, DAMINI S. PATIL, SNEHAL D. THAKARE)

- From this paper we get idea of accident sensors i.e limit switches are use in this paper for accident detection.
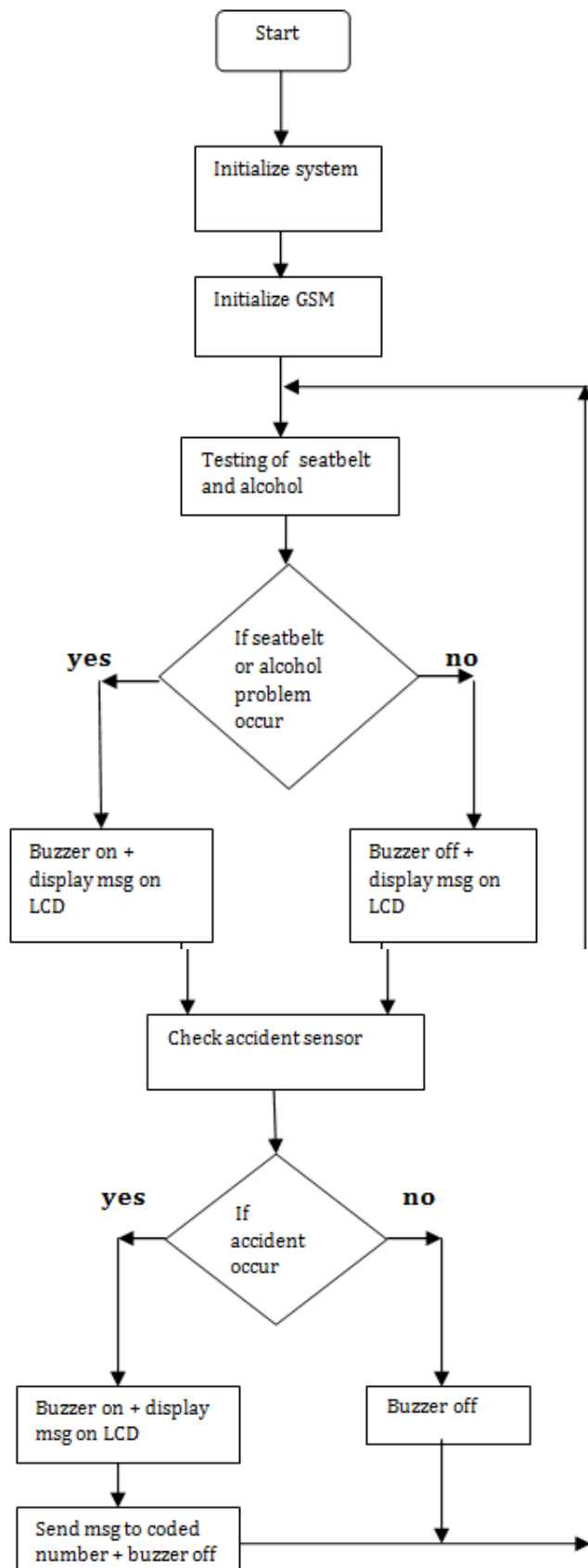
3. FLOW CHART

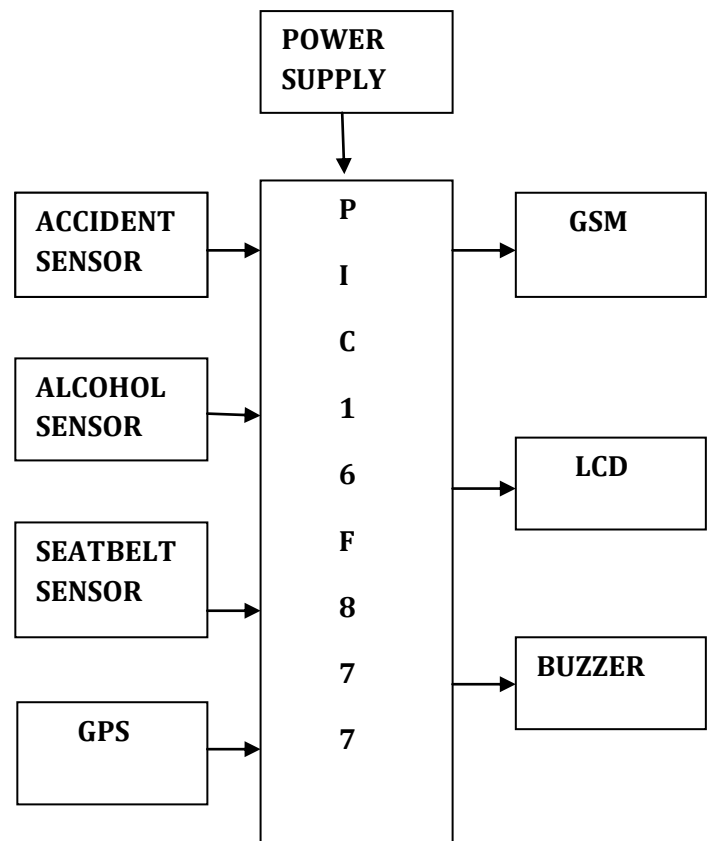**Fig: Flow Chart**

4. BLOCK DIAGRAM

Fig: Block Diagram

4.1 BLOCK DIAGRAM DESCRIPTION

Block diagram consist of two parts: prevention and detection as shown in above figure. Hence prevention and detection of accident goes on simultaneously. In prevention, if driver not weared seat belt PIC will give signal to LCD that time buzzer will on and message displayed on LCD is "seat belt/MQ3 problem". If driver had drunk alcohol, buzzer will on and message display on LCD "seat belt/MQ3 problem". If both conditions are ok and accident is not detected the message on LCD is "normal situation". Accident sensors are placed inside the car bonnet. Initially accident sensors are normally open. When accident occurs the sensor get closed and it will give signal to PIC microcontroller, On that time buzzer will on and message display on LCD is "accident detect". Buzzer will remains on up till GPS tracks exact location. When GPS will track the location buzzer will get off and message send via GSM to coded number.

5. HARDWARE DESCRIPTION

5.1 PIC

PIC is a Peripheral Interface Microcontroller from microchip family. PIC16F877A this is probably the most popular IC. It

is very fast and easy to execute program compare with the other microcontroller. PIC is based on Harvard architecture. In this project we use PIC because it has inbuilt ADC and reduced instruction set.

5.2 SEAT BELT SENSOR

Seat belt is used to detect whether the driver is wearing seat belt for not .Initially the seat belt test is taken which ensures whether the driver is wearing seat belt or not via limit switches.
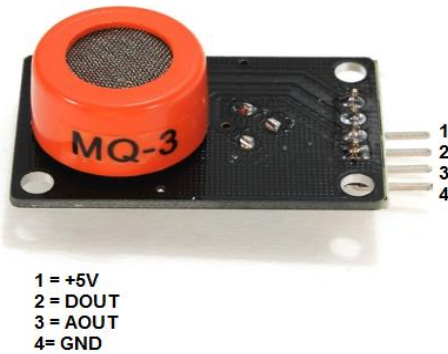
5.3 ALCOHOL SENSOR

Fig: Alcohol Sensor

Alcohol sensor MQ-3 is suitable for detecting alcohol in air. MQ-3 is a tin dioxide semiconductor gas sensor. This has high sensitivity to alcohol with quick response speed. The alcohol sensor would be placed on steering wheel of the car, because range of sensor is low so sensor has to be placed near to the driver of vehicle .When driver is under the influence of alcohol, the sensor's conductivity increases. Sensor is analog sensor and PIC microcontroller cannot read analog voltage so to convert signal in digital we use signal conditioning.

5.4 ACCIDENT SENSOR

Fig: accident sensor

Limit switches in the project are used for detecting accident. It is a electromechanical device that consisting of actuators. It would be placed on the front and back of car so as to detect accident then hit by any external object.

5.5 GSM

Fig : GSM

GSM (Global system for mobile communication) is a digital mobile telephony system used in all world.GSM uses TDMA system. In this project we use SIM800 GSM module. It is capable of receiving information from GPS satellites and then calculates the device geographical position. When an accident occurs GPS tracks that location of vehicle containing longitude and latitude details further send to controller and message to be send through GSM module to particular coded number.
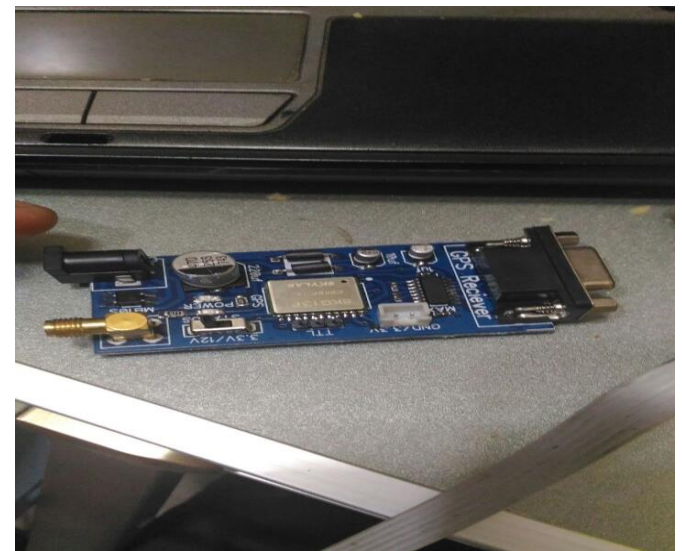
5.6 GPS

Fig: GPS

GPS (Global position system) is satellite navigation system, which is used to track the position of accident spot. GPS tracks location details via AT commands. After the occurrence of accident the details of the location are send via message to coded number.
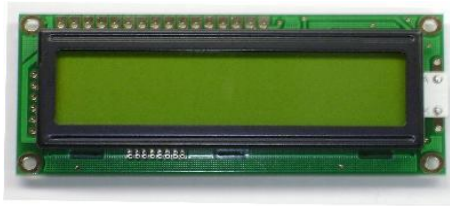
5.7 LCD

Fig: LCD

In this project 16*2 LCD is used to display message. It is basically used for displaying purpose . On the occurrence of accident it would display the accident detected message.

5.8 BUZZER

Buzzer is an electrical device which makes sound. In this project when accident is detected buzzer will turn on i.e. it will indicate that the accident has occurred.

6. SOFTWARE DESCRIPTION

6.1 EXPRESS PCB

It is used to design PCB layout .because it is easy to use and learn so in this project we have use this express PCB

6.2 MICRO C

Micro C is one of the program software IDE for PIC. Here library is inbuilt, so we have use this software. In this we have create a new project, written code ,compile it and test result.The micro C PRO for PIC compiler allows to manage several project at a time.

6.3 PIC KIT2

PIC KIT2 debug express allows in-circuit debugging on selected PICmicro microcontroller units (MCUs). In-circuit debugging allows the designer to learn,examine , and modified the program while the PICmicro MCU is embedded in the hardware. Debug expree interacts with MPLAB IDE software. Debud express require MPLAB IDE version 7.40. So by PIC KIT2 PIC16F877 may be debugged directly without any additional hardware.
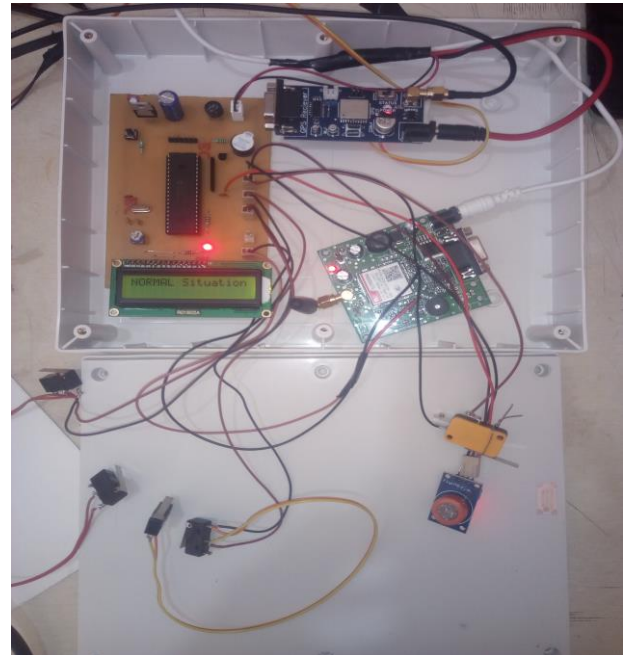
7. RESULT

Fig :Normal situation

At initial condition, seat belt is weared and no alcohol and accident detection takes place. So message on LCD is Normal Situation.
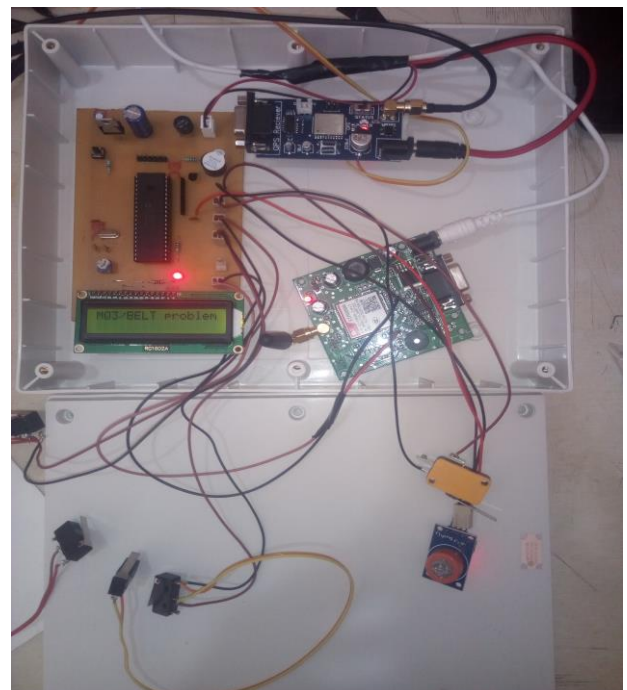

Fig: Testing of alcohol and seat belt

Above figure shows,the detection of alcohol and no wearing of seat belt. So buzzer on and message on LCD is MQ3/belt problem.
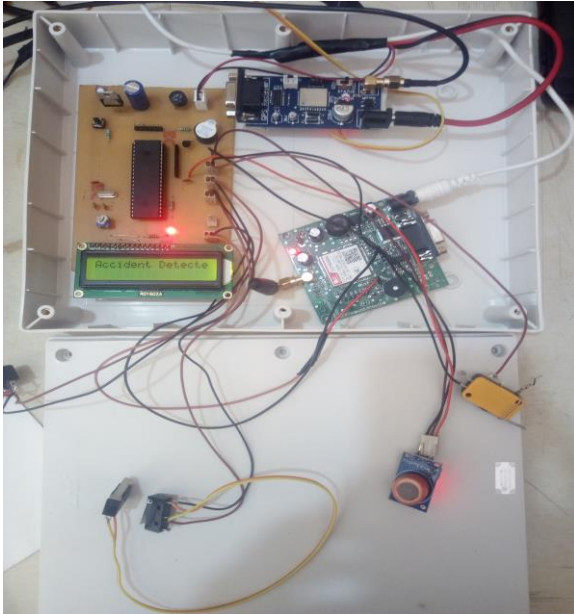
Fig: Accident detected

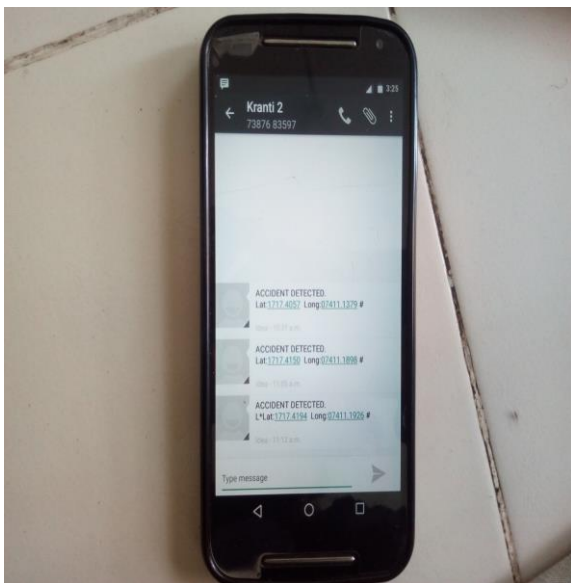Above figure shows, the detection of accident .and buzzer gets on and message display on LCD is Accident Detected

Fig: Message Received

Above figure shows, message on coded number when accident is detected.

8. CONCLUSIONS

Due to rapid increase in accident rate, prevention and accident detection is more necessary .so we have designed a system which would prevent the accident by seat belt and alcohol test as well as detect accident and trace location details via GPS and send message via GSM.

9. FUTURE SCOPE

If driver is in alcoholic consumed slowly the car speed will controlled and car will get stoped

10. ACKNOWLEDGEMENT

11. REFERENCES

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4]. Accident Detection and Message Conveyor System using GSM and GPS Module KHYATI SHAH, SWATI AIRAGI (IJCA ,Vol 176-no 2,oct 2017)

5] PIC 16F877 Datasheet