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Automatic Vehicle Accident Detection and Rescue System

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Abstract - Now a day, technology rapidly growth, but also people do not survive his/her life after road accident because there is no emergency facilities available in our country. so we design a technology which facilitate the emergency facilities. this project inform about an accident that is occurred to vehicle to rescue team and the family members of the travelling persons. This uses a piezo-electric and MEMS which can detect the abrupt vibration and 3D position when an accident is occurred and also used ultrasonic sensor for distance calculation. ARM 7 microcontroller controls all function. More advantages of this system is we interface panic switch and NOP switch, press the switch if required in any other condition. the information send to the rescue team by using GSM modems and locate the position by GPS receiver modems in the form of latitude and longitude.
Keywords - ARM7 Microcontroller, MEMS Sensor, Vibration Sensor, Ultrasonic Sensor, GPS and GSM Modem.

I. INTRODUCTION

The high demand of automobiles has also increased the traffic hazards and the road accident. Life of the people under the high risk. This is because of the lack of best emergency facilities available in our country. It is shocking to realize that in most cases causalities occure due to improper or no communication to the rescue team. We are looking forward to solve these issues by proposing an efficient idea and reduces the loss of human life as much as possible. This design is a system which can detect accidents in significantly less time and sends the basic information to first aid centre within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. A Switch is also provided in order to terminate the sending of a message in rare case where there is no casualty, this can save the precious time of the medical rescue team. When the accident occurs the alert message is sent automatically to the rescue team and to the police station. The message is sent through the GSM module and the location of the The basic idea is to localize the vehicle system by receiving the real time position of the vehicle through GPS and send the information through GSM module via SMS service with an added feature of GPRS transmission to the monitoring center through usage of internet [M.AL-Rousan, A. R. AI-Ali and K. Darwish et al, 2004]. Using AT89S52, this project has been designed. It used EEPROM to store the phone numbers. accident is detected with the help of the GPS module. The accident can be detected precisely with the help of both Micro electro mechanical system (MEMS) sensor and vibration sensor. The Angle of the rolls over of the car can also be known by the message through the MEMS sensor. This application provides the optimum solution to poor emergency facilities provided to the roads accidents in the most feasible way.

II. LITERATURE SURVEY

At present criteria, we cannot detect where the accident has occurred and hence no information related to it, leading to the death of an individual. The research work is going on for tracking of the vehicle even in dark clumsy areas where there is no network for receiving the signals. In literature, a number of approaches to provide security and safety through moni- toring the vehicle's real time precise positioning and information using different tech- nologies have been proposed. A good survey of using GPS, GSM and GIS has been provided in [Ioan Lita, Ion Bogdan Cioc, Daniel Alexandru Visan et al, 2006] and [Mrs. Ramya Kulandaivel, P.Ponmalar, B.Geetha, G.Saranya et al, 2012]. The general mechanism is to provide the real time geograph- ical position of a vehicle using GPS receiver and send this information to GSM center through configurable software, this is all done by the monitoring center which is working as a control unit that is connected not only by an optical cable but also connected wirelessly through TCP/IP protocols. The monitoring center distributes the data to the client in an understandable format and it also stores the travelling records and displays the real time information about vehicle on electronic map through GIS system [Ioan Lita, Ion Bogdan Cioc, Daniel Alexandru Visan et al, 2006]. Another approach is that vehicle terminal includes a GPS receiver which extracts information about position through GPS satellites and sends it through GSM network and to the control center which reads

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the information, process it through GIS management system and saves it in the data base system and on user demand displays it on electronic map via MapX tool [Mrs. Ramya Kulandaivel, P.Ponmalar, B.Geetha, G.Saranya et al, 2012].A different approach is proposed by integrating GPS and GSM/GPRS transmission technologies .

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III. METHODOLOGY

A. Complete layout of the whole set up will be drawn in form of a block diagram.
B. A vibration sensor and MEMS sensor will first sense the occurrence of an accident and give its output to the microcontroller.
C. Microcontroller received message from sensor and control all operation.
D. The GPS detects the latitude and longitudinal position of a vehicle.
E. The latitudes and longitude position of the vehicle is sent as message through the GSM.
F. GSM send the accident alert message to rescue team and family member.
G. PANIC and NOP switch control the required operation.

IV. BLOCK DIAGRAM

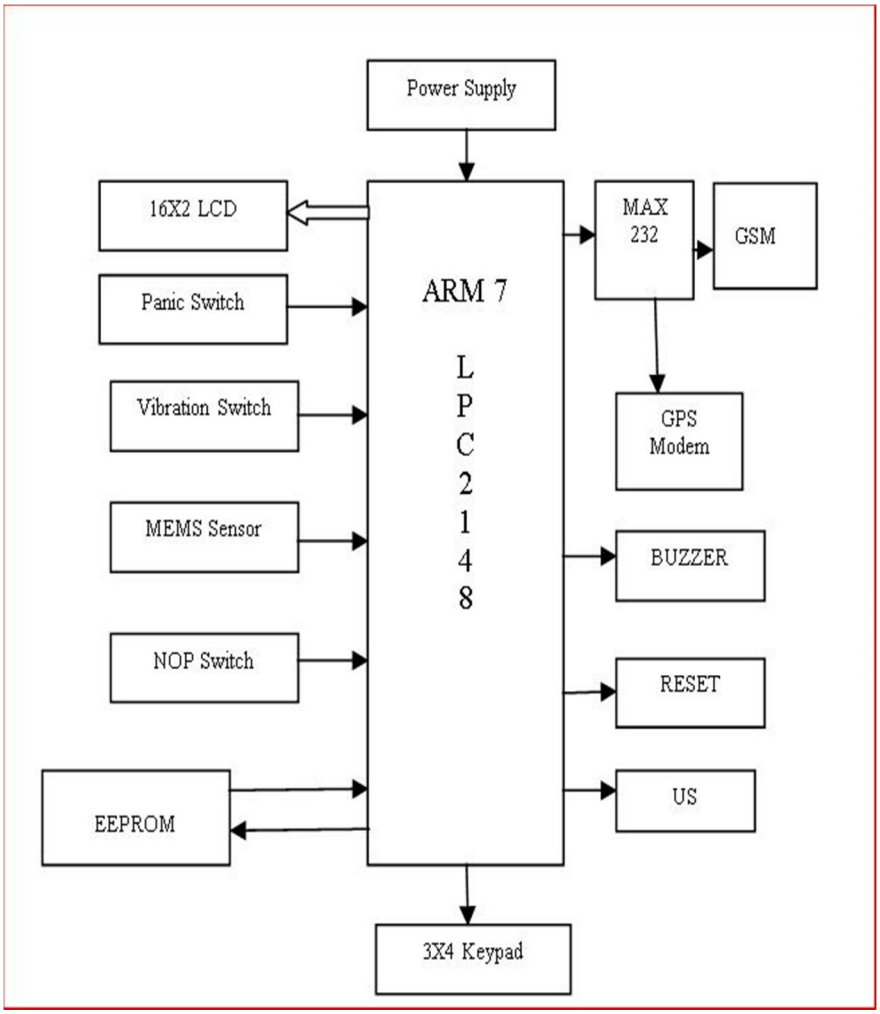


Fig .1.Block diagram of automatic vehicle accident detection.

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V. FLOW CHART

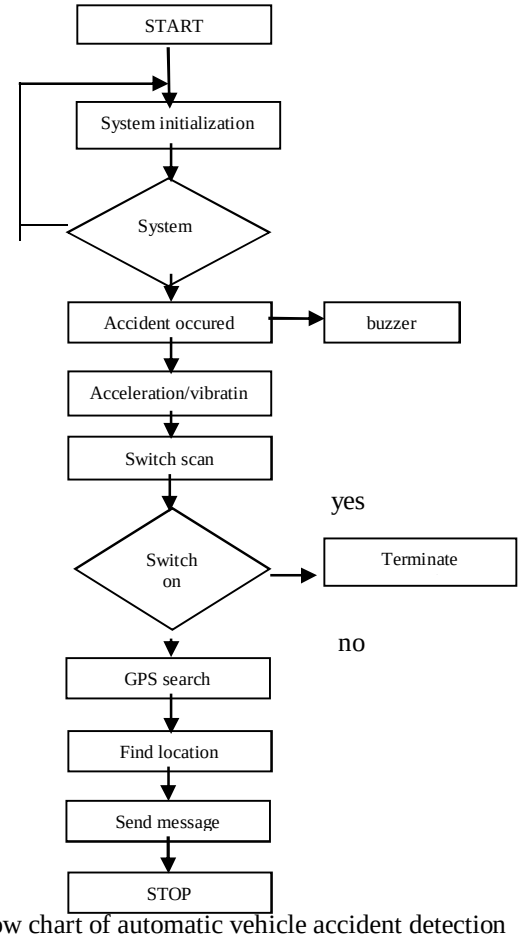


Fig.2. flow chart of automatic vehicle accident detection

VI. WORKING

Our project work on the principle of detection and tracking of accident. the system is on and initialization. If vehicle is normal, no information send to rescue team. whenever accident occurred ,the vehicle changes its direction randomly and vibrate with high frequency. The MEMS and Vibration sensor detect the happening with vehicle . the controller get the input from sensor and send the accident alert information to rescue team and family member and location of accident place through GSM and GPS corresponding. If they do not required rescue team or calling the rescue team for other person to press the NOP and PANIC switch corresponding.

A. ARM-7 Processor

ARM7 is one of the widely used micro-controller family in embedded system application. This section is humble effort for explaining basic features of ARM7 is a family of instruction set architectures for computer processor based on a reduced instruction set computer developed by British company ARM holdings. A RISC-based computer design approach means ARM processor require significantly fewer transistor than typical processor in average computer.

B. GPS-Global positioning system

GPS is used in vehicles for both tracking and navigation. Tracking system enable a base station to keep of vehicles without the intervention of the driver where, as navigation system helps the driver to reach the destination.

C. GSM

GSM is used as a media which is used to control and monitor and the transformer load from anywhere by sending message. It has its

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own deterministic character. Thereby, here GSM is used to monitor and control the DC motor, stepper motor, temperature sensor and solid state. Relay by sending message through GSM modem. Here no need to waste time by manual operation and transportation.

D. MEMS

Mems or Micro-Electro Mechanical system is a technique of combining Electrical and Mechanical components together on a chip, to produce a system of miniature dimensions. MEMS is the intergration of a number of microcomponents on a single chip which allows the microsystem to both sense and control the environment.

E. Ultrasonic Sensor

Ultrasonic sensor provides an easy method of distance measurement. This sensor is perfect for any number of application that requires you to perform measure
ments between moving or stationary object. Interfacing to a microcontroller is a snap. A single I/O pin is used to trigger an ultrasonic burst and then "Listen" for the echo returns pulse.

F. Vibration Sensor

The vibration sensor, which is useful for a variety of different field, has the ability to detect vibration in a given area. This can help to aletr someone to trouble with a system, and you will even find these types of sensors in use with security system today.

G. Panic And Nop Switch

There is we interface panic switch and NOP switch also if accident not occurred or any other condition it means critical condition persons need ambulance service then he/she press the panic switch. And one more things after accident persons need not any ambulance or police then he/she press NOP switch then after system work as per.

H. EEPROM

24C04 EEPROM is used in this project. This EEPROM stores the mobile number entered by the user for receiving accident alert SMS. The data stored in the EEPROM will retain even the power is off for long time.

I. MAX232

The MAX232 is a dual driver/receiver that includes a capacitive voltage generator to supply TIA/EIA-232-F voltage levels from a single 5V supply.

J. 16X2 LCD

16X2 LCD is used to display the operating instruction and status of the output. HD44780U is used in the project. It can be configured to drive a dot matrix liquid crystal display under the control of 4bit or 8bit micro-processor

VII. ADVANTAGE

A. Sophisticated security.
B. Monitors all hazards and threats.
C. Alert message to mobile phone for remote information.
D. Mobile number can be changed at any time.

VIII. FUTURE IMPROVEMENT

In the future, this system can be extended to more applications. We can facilitate connectivity to the nearest hospital and provide medical assistance through live streaming from the ambulance and also through video conferencing.

IX. CONCLUSION

This project presents vehicle accident detection and alert system with SMS to the user defined mobile numbers. The GPS tracking and GSM alert based algorithm is designed and implemented with LPC2148 MCU in embedded system domain. The proposed

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Vehicle accident detection system can track geographica information automatically and sends an alert SMS regarding accident. Experimental work has been carried out carefully. The result shows that higher sensitivity and accuracy is indeed achieved using this project. EEPROM is interfaced to store the mobile numbers permanently. This made the project more user friendly and reliable. The proposed method is verified to be highly beneficial for the automotive industry.

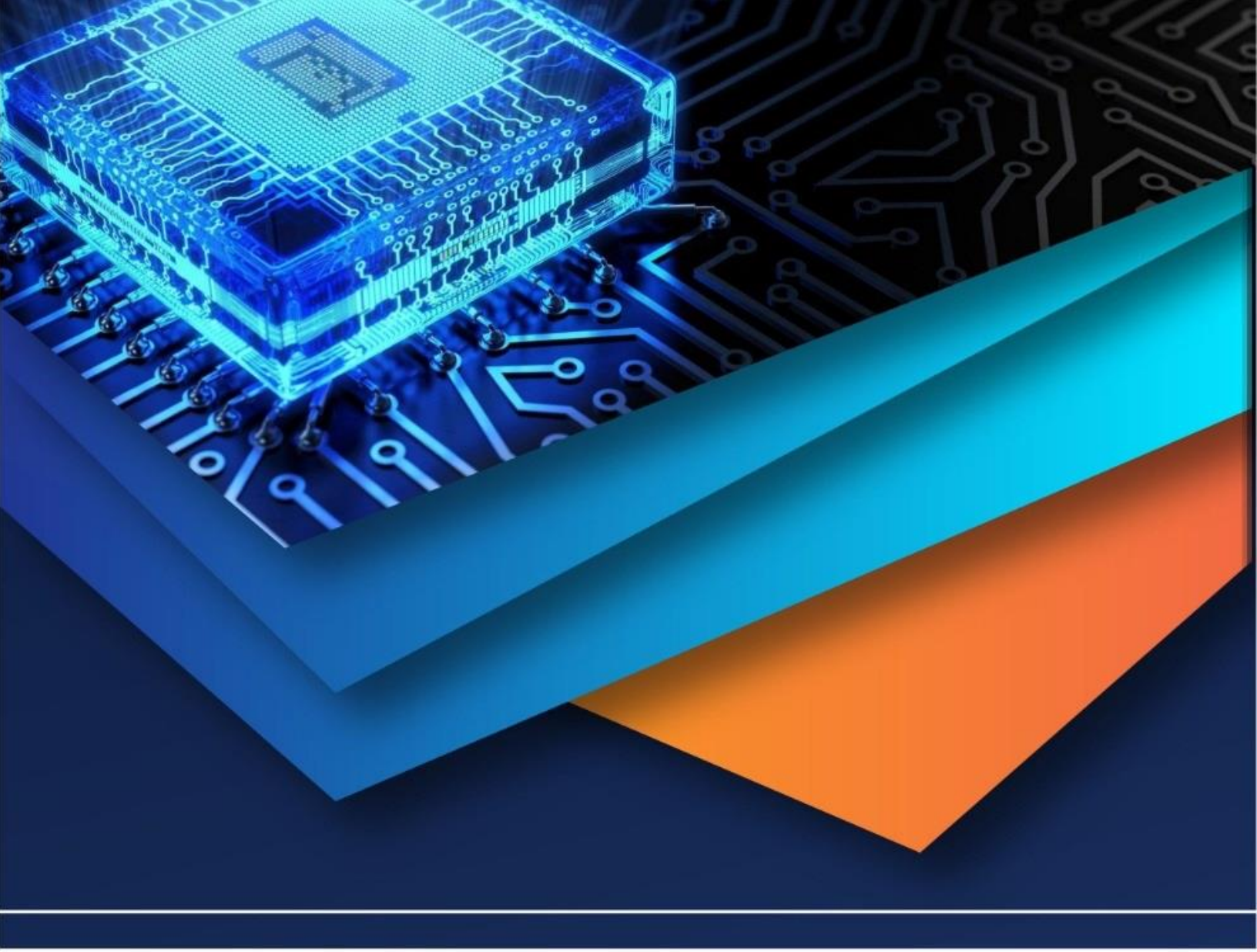
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