Accident Recognization And Messaging System

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Abstract: The advent technology has also increased the traffic hazards and the road accidents take place frequently which causes huge loss of life and property because of the poor emergency facilities. An accelerometer sensor can be used in a car alarm application. It can be used as a crash or rollover detector of the vehicle during and after a crash. The signals from an accelerometer, a severe accident can be recognized. When a vehicle meets with an accident immediately Accelerometer sensor will detect the signal or if a car rolls over, and Micro electro mechanical system (MEMS) sensor will detects the signal and sends it to PIC controller. Microcontroller sends the immediate message through the GSM MODEM including the location details to police control room and a rescue team. Then after conforming the location necessary action will be taken. If the person meets with a small accident or if there is no serious threat then the immediate message can be terminated by the driver by a switch or key provided in order to avoid wasting the valuable time of the rescue team. This paper is useful in detecting the accident by means of both accelerometer sensor and MEMS sensor. As there is a scope for improvement and as a future implementation we can add a wireless webcam for capturing the images which will help in providing driver`s assistance.

Keywords: GPS, GSM, MEMS sensor, PIC microcontroller.

I. INTRODUCTION

This project is because of the lack of best emergency facilities available in our country. This design is a system which can detect accidents in less time and sends the information to rescue team within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred. This message is sent to the rescue team in a short time, which will help in saving the 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 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 accident is detected with the help of the GPS module. The accident can be detected with the help of both Micro electro mechanical system (MEMS) sensor and accelerometer sensor. The rolls over of the car angle 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. METHODOLOGY

The prototype model of an accident recognization and messaging system working will be made in the following steps:
✓ Complete layout of the whole set up will be drawn in form of a block diagram.

- ✓ A MEMS sensor will first sense the occurrence of an accident and give its output to the microcontroller.
- ✓ The GPS detects the position of a vehicle.
- ✓ The position of the vehicle is sent as message through the GSM.
- ✓ The phone number is pre-saved in the EEPROM.
- ✓ Whenever an accident has occurred the position is detected and a message has been sent to the pre-saved number.

III. BLOCK DIAGRAM

A 9V portable power supply will power the microcontroller. The GPS + GSM shield and the impact sensor will derive power from the board itself. The circuit is first initialized and the GPS + GSM module is turned on. The system waits till the GSM module acquires a signal and is registered with the network. The system then goes on standby until the impact sensor gives a positive output. Once the accident is detected, it acquires the current location with area name of the vehicle using the GPS module and the co-ordinates are then sent via SMS to emergency services and/or contacts the user have stored.
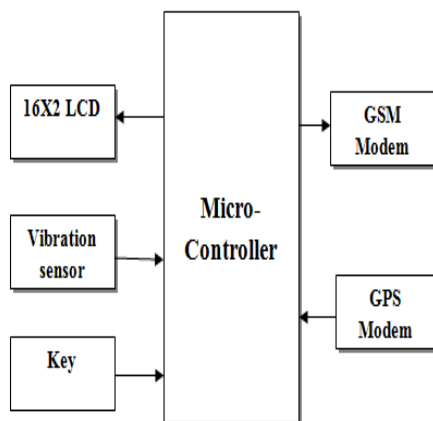

Figure1: Functional Block Diagram

DESCRIPTION

In this project the GPS is used to provide the exact position of the vehicle. The information that is collected by the GPS modem is passed to the microcontroller on its request. The information provided by the GPS system contains longitudinal and latitude positions and area name.

Here we use PIC16F877A microcontroller. It mainly controls the all function of the project. It gets the information from the GPS modem and passed it to the GSM modem.

GSM modem is used to send messages to the predefined numbers stored in the microcontroller. This GSM modem uses AT commands in order to send messages to the predefined number.

MICROCONTROLLER

The microcontroller being used here is AT89S52 .It belongs to the 8051 mc family. It is a 40 pin device. All 8051 microcontrollers have 4 I/O ports each comprising 8 bits which can be configured as inputs or outputs. Accordingly, in total of 32 input/output pins enabling the microcontroller to be connected to peripheral devices are available for use. Pin configuration, i.e. whether it is to be configured as an input (1) or an output (0), depends on its logic state, in order to configure a microcontroller pin as an input, it is necessary to apply a logic one (1) to appropriate port. In this case, voltage level son appropriate pin will be 5V (as is the case with any TTL input. Program memory (FLASH) is used for storing a written program. Since memory made in FLASH technology can be programmed and cleared more than once, it makes this microcontroller suitable for device development.
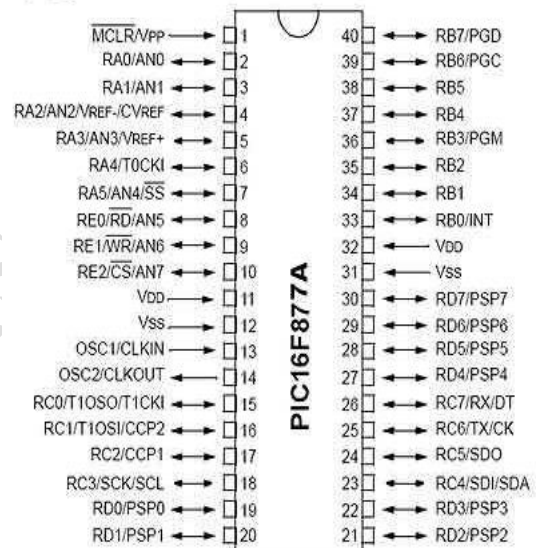

Figure2: Pin diagram of PIC 16F877A

GLOBAL POSITIONING SYSTEM (GPS)

The Global Positioning System (GPS) is a satellite based navigation system that sends and receives radio signals. A GPS receiver acquires these signals and provides the user with information. Using GPS technology, one can determine location, velocity and time, 24 hours a day, in any weather conditions anywhere in the world for free. The main application of this system is track the vehicle using the GPS receiver. This receiver gives the information about its position whenever required in the form of latitudes and longitudes. This is done with the help of the GPS satellite and the GPS module attached to the vehicle which needs to be tracked.

Figure3: GPS

GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM)

GSM is an open, digital cellular technology used for transmitting mobile voice and data services. We can track the vehicle continuously and also inform to the Local ambulance if the vehicle is met with any accident using GSM technology. This is an inexpensive device which reduces the problem associated with accident notification and antitheft control. If the user is somewhere far from the vehicle and he wants to know where his vehicle is right from the place he is standing, he has to send a predefined message to the modem. The controlling unit will be fixed to the vehicle. The controlling unit contains the microcontroller and the GSM modem interfaced to it. The microcontroller continuously checks whether it has received any message from the modem. Finally it receives the message and transmits the information to owner of the vehicle. This a second generation (2G) mobile network. This is widely used in all over the world for mobile communication. This GSM device consists of sim slot in which a sim card can be inserted which has a unique number, this unique number is used for contact. This GSM device consists of a unique number called IMEI number and this is different for each and every hardware kit. In our project the device is used for transmitting data. The data from GPS is transmitted to given mobile through this GSM itself [1].
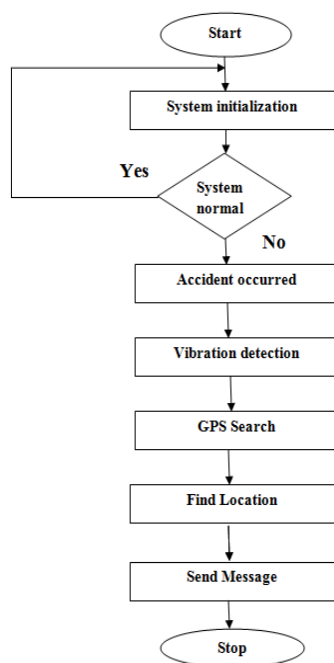

Figure 4: GSM

FLOW CHART

Figure 5: Flowchart for the System

The software used for the development of system is Proteus 7.8 with the C program language been used. The Flow Chart of the system is shown in the fig 5. It shows the system is initialized on power ON. When the system is detected to be abnormal, it can be concluded that the accident has occurred. The vibration/acceleration of the vehicle is detected to confirm the cause of the accident. As soon as the accident is detected, the message is sent automatically to the rescue team after the location is detected by the GPS. Fig.5 Flow chart of Accident recognization and messaging System.

IV. CONCLUSION

A working model of Accident recognization and messaging system using a GPS and GSM modems has been implemented successfully to detect the accident. The biggest advantage of our research is, whenever the sensor is activated we will be immediately getting the acknowledgement from GSM modem to our mobile numbers which are stored in EEPROM, without any delay. This system locates the accident spot accurately, realizing the automation of accident detection and messaging system. Consequently, the time for searching the location is reduced and the person can be treated as soon as possible which will save many lives.

Main motive of this system is to decrease the chances of casualties in such accident. Whenever accident occurs, paramedics are alerted and they reach the particular location to increase the chances of saving life. This device invention is much more useful for the accidents occurred in deserted places and those occurring at night time which usually goes unattended. This system will have broad application prospects and it will play an important role in day to day life in future.

FUTURE ENHANCEMENT

This system can be improved further by implementing a wireless webcam for capturing the images and Air bag system can also be provided which will help in providing drivers assistance and security in case of accident.

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