



Accident Notification System by using Two Modems GSM and GPS

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ABSTRACT

Accidents are increasing automatically in the Sultanate of Oman where the people lose their lives because the unavailability of proper medical facilities in a timely manner. When an accident occurs the vibration sensor gives the signal to the microcontroller, which sends the information to the control room through GSM network. In this system we use Mikrobasic software, and use GSM technology to send a text message to the police in the place of the accident, which is determined by GPS. This system is applied in navigation systems to keep track of children and animals.

General Terms

GSM, GPS, Resistors, Capacitor

Keywords

PIC18F45k22 , LM35 Sensor, Limit Switches.

1. INTRODUCTION

Accident notification system by using GSM and GPS, the main purpose of this project is to find the site of the accident in any place and send message through GSM and GPS. Global System for Mobiles (GSM) technology is used to establish a cellular connection .GPS is used to trace the position of the vehicle. At present accidents are increasing significantly, this system facilitates to find accident place in remote areas and makes a hope in survival through the availability of ambulance or hospital as soon as possible. Circuit is designed using Proteus after completing the software implementation the hardware is to be implemented. There are many applications that can be used, such as in the detection of alcohol and in the car theft.

2. LITERATURE REVIEW

There were some literatures which referred before starting the work to take a good idea and to check the possibilities of getting the needed results. D.Jadhav., (2013) have shown in his study about the automotive localization system using GPS and GSM services. The system permits localization of the automobile and transmitting the position to the owner on his mobile phone as a short message (SMS) at his request. This system is also provided with emergency switch which can be turned off through an SMS.

This literature has some weakness as researcher in some places where there is no provision of GSM networks it is difficult for communication also did not mention more needed information of the advanced vehicle security system with theft control and accident notification and its strength theft control through GSM short message service and sends location in the form of latitude and longitude

Hurbert, et al. (2011) have shown in their study done about the position of the vehicle, the owner sends a request through a SMS. This is received by a GSM modem in the device and processed by the Spartan processor and the processor sends command to a GPS module in the device. The GPS module responds with coordinate's position of the vehicle. This position is sent to the user as a SMS to the user with date, time, latitude and longitude positions.

This literature has some weakness when consist air masses in the sky GPS will stop the work and do not send message and determine the location. Also some strengths, using an FPGA controlled system we can easily track any object or vehicle which ensures safety for vehicle owners and also lots of uses for public transport system.

Sneha (2011) have shown in her study about the Crash Notification for portable device presents an early crash notification system that can be implemented in handheld and aftermarket devices. This system features a crash detector, which can be connected over a wired or wireless link. Systems and services are at an increasingly developed to improve quality of service, safety and the environmental impact of the road traffic system.

This literature has some weakness as the delayed communication networks to send message recorded when the accident and has some strength can capture the streams of data provided by their accelerometers, compasses, and GPS sensors to provide a portable black box that detects traffic accidents.

The first literature study has done about the accident detection and send message using GPS and GSM modems. The second study is designing the alcohol sensor, which checks if the person has consumed alcohol or not .Third literature to design car alarm system in the event of theft. Fourthly, study designing vehicle tracking system using GPS. Fifthly, is design system a crash detector, which can be connected over a wired or wireless link Finally, all the literatures found are good and gave information about the application, working principle, how to design the System and choose best program to design the circuit This gives us the ability to write the paper and also to design accident notification system.

3. PROPOSED SYSTEM

3.1 Block Diagram of the System

The block diagram of the system is shown below. It shows the main working principle of the whole system of the Accident notification.

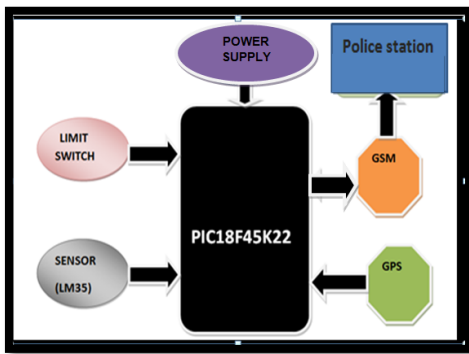


Figure3. 1: Block Diagram of the System

3.2 Working Principle of the whole System

The block diagram shows the working principle of the circuit upon the occurrence of accident or occurs fire. Limit switch or temperature sensor will be pressed automatically then sending a signal to microcontroller for activating GSM and GPS modems. initially GPS modem identify the location of an accident then sending messages through SMS by using GSM modems to mobile numbers such as, family members, friends, and police station.

Working Principle of Individual Parts

This part of the paper is showing the main idea of the working principle of each component connected in the circuit to achieve the needed aim and objectives.

Battery

Battery is device that convert stored chemical energy into useful electrical energy. Here, the needed battery is 12 volts battery.

PIC18f45k22 Microcontroller

This system will use microcontroller (PIC18f45k22) which consist two UARTs. This pic has many futures for examples, 28/40/44-Pin,Low-Power,andHigh-Performance.Also some futures such as, Flash Program Memory (32 Kbytes), EEPROM Data Memory (256 bytes), SRAM Data Memory (1536 bytes), I/O Pins (36).

LM35 Sensor

LM35 is a precision IC temperature sensor with its output proportional to the temperature (in 0C). The operating temperature range is from -55°C to 150°C. The output voltage varies by 10mV in response to every 0C rise/fall in ambient temperature, i.e., its scale factor is 0.01V/ 0C.

Limit Switch

Simple limit switches relay on direct, physical contact when an object comes into contact with the actuator, the device operates the contacts to make or break an electrical connection. It can determine the presence or absence of an object.

GPS Modem

GPS (Global Positioning System) is used to trace the position. GPS receiver gets the location information from satellites.

GSM Modem

A GSM modem (Global system for mobile communication) is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator .GSM modem used for sending and receiving SMS and MMS.

3.3 Design

This part shows the design steps to achieve the main aim which is a system design to detect an accident. This part of the paper describes which software can be used and the important steps to be followed to achieve the final design. The steps followed to implement the design are as described below:

Proteus software

Proteus software is used for microcontroller simulation, schematic capture, and printed circuit board (PCB). Steps following shows the designing of the circuit using Proteus software

1. Install the MikroBasic PRO for PIC then press on Microbasic software.
2. After that click on the project and choose from the list, New project

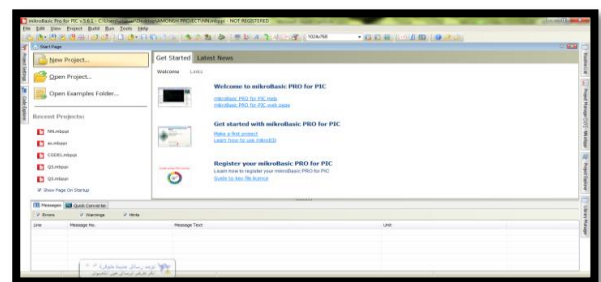


Figure 3.2 Mikro Basic PRO Software

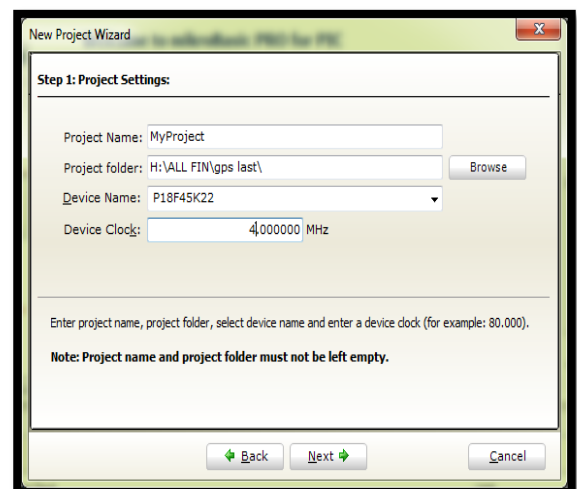


Figure 3.3 Selecting microcontroller PIC18F45k22with 4MHzthen pressing next

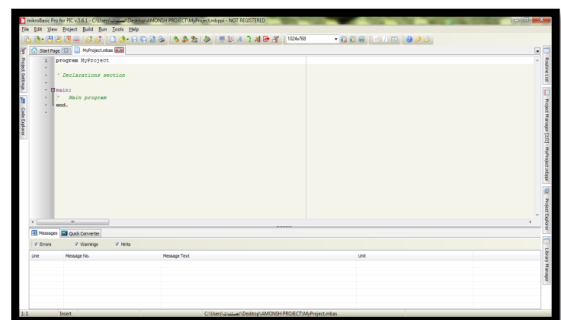


Figure 3.4 Writing the program in the command window

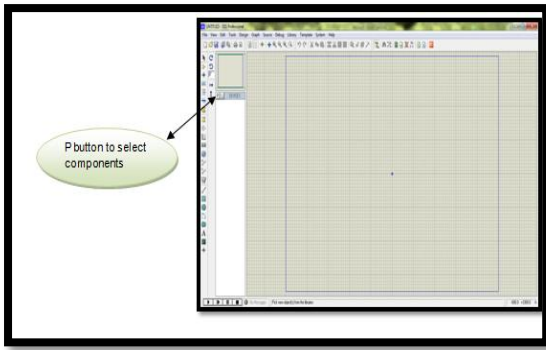


Figure 3.5 When P button is clicked a list of components will appears, then double click to select component

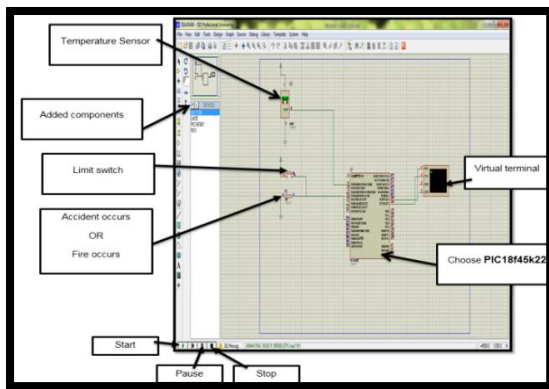


Figure3.6 Showing the place where to find the list of components

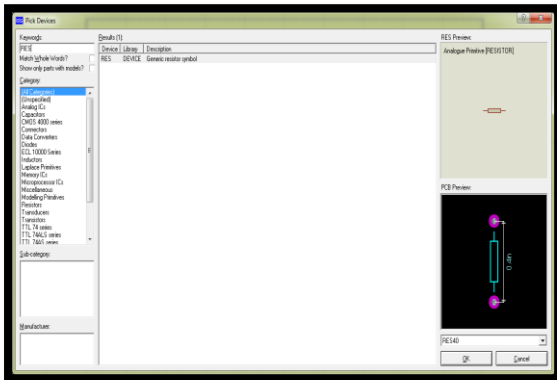


Figure 3.7 - Placing all required components on the Proteus after connecting between each component

4. RESULT AND DISCUSSIONS

This part illustrates the result we have obtained, simulation of system and hardware result.

4.1 Simulations Results

To get the beginning result, Proteus software is used to test the circuit and check if a system is working appropriately.

Most LEDs have a typical forward voltage drop of about 2v, with a typical operating current of around 10mA (it is always good not to operate a device at its high end current).

Table 4.1- Typical LEDs Characteristics of the simulation output

Color	Typical Voltage Drop	Typical current	Forward
Red	2.0V	20mA	
Orange	2.0V	20mA	
Yellow	2.1V	20mA	
Green	2.2V	20mA	
Blue	3.0V	20mA	
Infrared	1.2V	50mA	

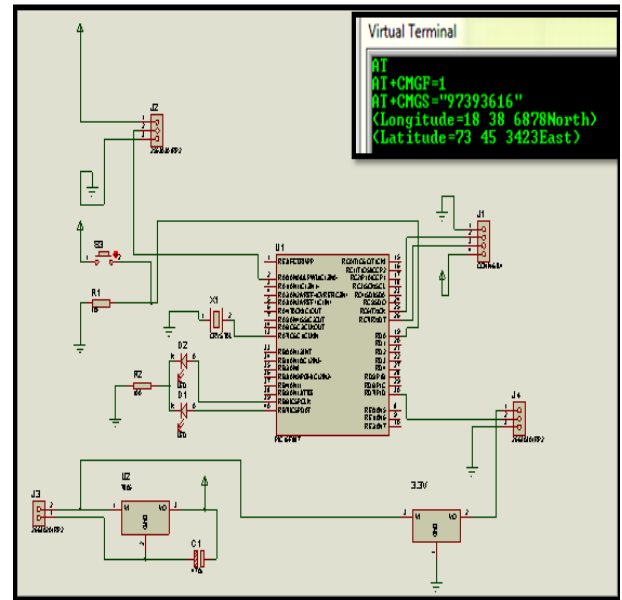


Figure 4.2 Run the project

4.2 Hardware Result

Initially to get the results, breadboard is used to assemble all the electronic components the assembled bread board is as shown in the picture below:

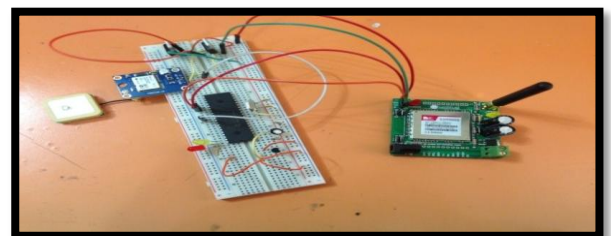


Figure 4.3 Installed all Electronic Components

In case of an accident, GPS recording the coordinates of the event and send SMS to the police through GSM modem.

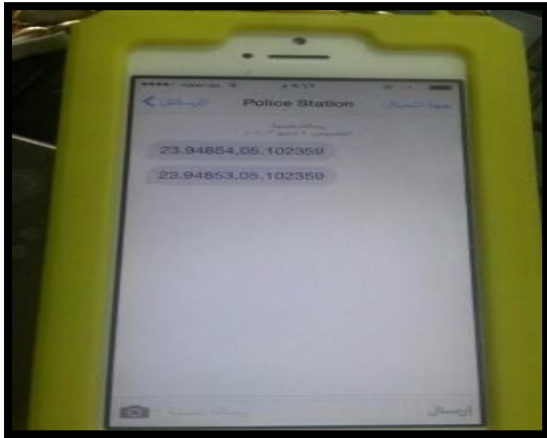


Figure 4. 4 Send SMS to the police



Figure 4. 5 Clarify the method of sending the message when the accident occur



Figure4. 6- Clarify the method of sending the message when the fire occur

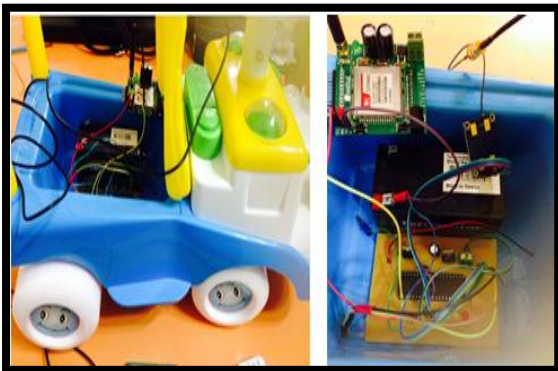


Figure4.7- This step install the project on the car

4.3. Discussion of the results

This part is a very important to get the result, it is clear that the idea of a successful project and can be applied in the detection of the accident or the fire and also this system can be applied in several applications and ease to use. Proteus SISI is best simulation software for various designs. So it is a handy tool to test programs and embedded designs for electronics. Proteus and PCB design combines the schematic capture and ARES PCB layout programs to provide a powerful, integrated and easy to use suite of tools for professional PCB Design. To get the hardware result breadboard is used to assemble all the electronic components and then it is installed in the car.

5. CONCLUSIONS

This paper is displaying one of the models of the accident notification system using two modems GSM and GPS. The paper showed the proposed system design, the block diagram, working principle and the simulation results. The main idea of the working principle of the system is when the occurrence of accident or fire, Limit switch or temperature sensor will be pressed automatically then sending a signal to microcontroller for activating GSM and GPS modems. initially GPS modem identify the location of an accident then sending Coordinates through SMS by using GSM modems to mobile numbers such as, family members, friends and police stations to take immediate action and help the victims of accidents.

In the future this project can be developed to make it best than preset, In order to use it in several application such as can be used for disclosure of liquor, which checks if the person has consumed alcohol or not. The eye sensor makes sure that the person in driver seat does not falls asleep. Thus this system ensures the life security. Also can be done with advanced vehicle security system with theft control and accident notification. It can be used for monitoring adolescent drivers by their parent's. In case of vehicle theft situations the owner can know the vehicles current location and based on that he can stop the vehicle by sending a predefined SMS message to this system. After receiving SMS message from owner this system automatically stops the ignition system hence the vehicle will not function any more.

6. ACKNOWLEDGMENTS

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7. REFERENCE

- [1] T. Hapsari, E.Y. Syamsudin, and I. Pramana, "Design of Vehicle Position Tracking System Using Short Message Services And Its Implementation on FPGA", in Proc.
- [2] Conference on Asia South Pacific Design Automation, Shanghai, China, 2005.



- [3] Sri Krishna, C., Poornesh, A., Tarun, V., Harsha,H.,2013. Automatic Vehicle Accident Detection And Messaging System Using GPS and GSM Modems, International Journal of Scientific & Engineering Research, 4(8), pp.10-20.
- [4] Sensor. Available at: http://www.engineersgarage.com/sites/default/files/LM35_1.jp
- [5] Mohamed, F., 2011. performance of semi-active control of railway vehicle suspension, International journal, 2(1), pp.120-140.
- [6] D. A. Whitney and J. J. Pisano TASC, Inc., Reading, Massachusetts, "Auto Alert: Automated Acoustic Detection of Incidents", IDEA project, [Online]. Accessed on 15 October 2014, Available: <http://pubsindex.trb.org/view.aspx?id=481489>.
- [7] Montaser N. Ramadan, Mohammad A. Al-Khedher, and Sharaf A. Al-Kheder," Intelligent Anti-Theft and Tracking System for Automobiles" International Journal of Machine Learning and Computing, Vol. 2, No. 1, February 2014.
- [8] Mohammad, F., 2009. vehicle tracking system using gps and gsm technology, Research Journal of Power Electronic & Drives, 3(2), pp. 220-240.
- [9] R. Rathinakumar and D. Manivannan," Wireless Accident Information System Using GSM and GPS" Research Journal of Applied Sciences, Engineering and Technology 4(18):3323-3326, 2012 ISSN: 2040-7467, September 15, 2014.
- [10] Wine, Y.,2010. Automatic accident detection and messaging system using GPS and GSM modems, international journal,[online] 3(2), pp.15-25. Available at :www.wineyardtechnologies.com [accessed on 12 Nov 2014].