



EMERGENCY PRECAUTION SUPPLY BASED ON WIRELESS ALERT SYSTEM

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Abstract — Security in travelling is a primary concern for everyone. Rising demand for automobile has increased the traffic, thereby causing more accidents on the road. People often lose their lives because of poor emergency facilities. Pre-emption of the accidents taking place on the roads is not possible but at least the after effects can be minimized. The proposed system ensures making emergency facilities available to accident victims as early as possible by letting relatives, hospital or a rescue team know the accident spot with the help of this module embedded in the vehicle. Sensors are attached to the microcontroller. In case there is an accident, the sensor gets activated and the GSM system will send notifications to the nearest hospital, police station or kind of the victim with the picture of accident scene where the accident has occurred. GPS Modem will send location. This scene will capture via camera and send via E-mail address. It will also send accident occurring time.

Keywords — Accident Alert, Emergency, Embedded System, PIC Micro-controller, GSM Module, GPS Modem, Impact Sensor, Web Camera, External Camera, E-mail, Snapshot.

I. INTRODUCTION

Now a day the vehicle accident rate has been increasing day by day. Since demands are increasing, there will be more possibility of vehicle accidents. Vehicle accidents are one of the leading causes of the fatalities. It will be a serious consequence if people can't get help on right time.

Main aim of this work is to provide security to the vehicle in very reasonable cost so in this system the PIC microcontroller is used for cost effective and also for easy understanding. In this GSM Module is used to access the internet and send the exact location of the vehicle and send short alert message to the nearest hospital, police station or kind of the victim. GPS Modem is used for tracking purpose. This message will read by them and then emergency medical service can be given to the accident victims as soon as possible.

This design focuses on providing basic information on the accident site to the hospital or police station. As a result of this sudden help, precious life may get saved.

II. SYSTEM DESIGN

The circuit is first gets the power from 230 power supply and then Initialized and the 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 sensor gives a positive output. To detect the accident, sensor is used. So, when accident happens, this sensor will be active. And the information sends to PIC microcontroller. At the same time, GSM module will also active which are interfaced to the PIC microcontroller. And through GSM module the same data send to the contacts which are stored in the database. Laptop also connected with this system. By using webcam scene of accident will capture and send accident images to the hospital, police station, friends etc. Hence decrease the total action time and save the lives in emergencies.

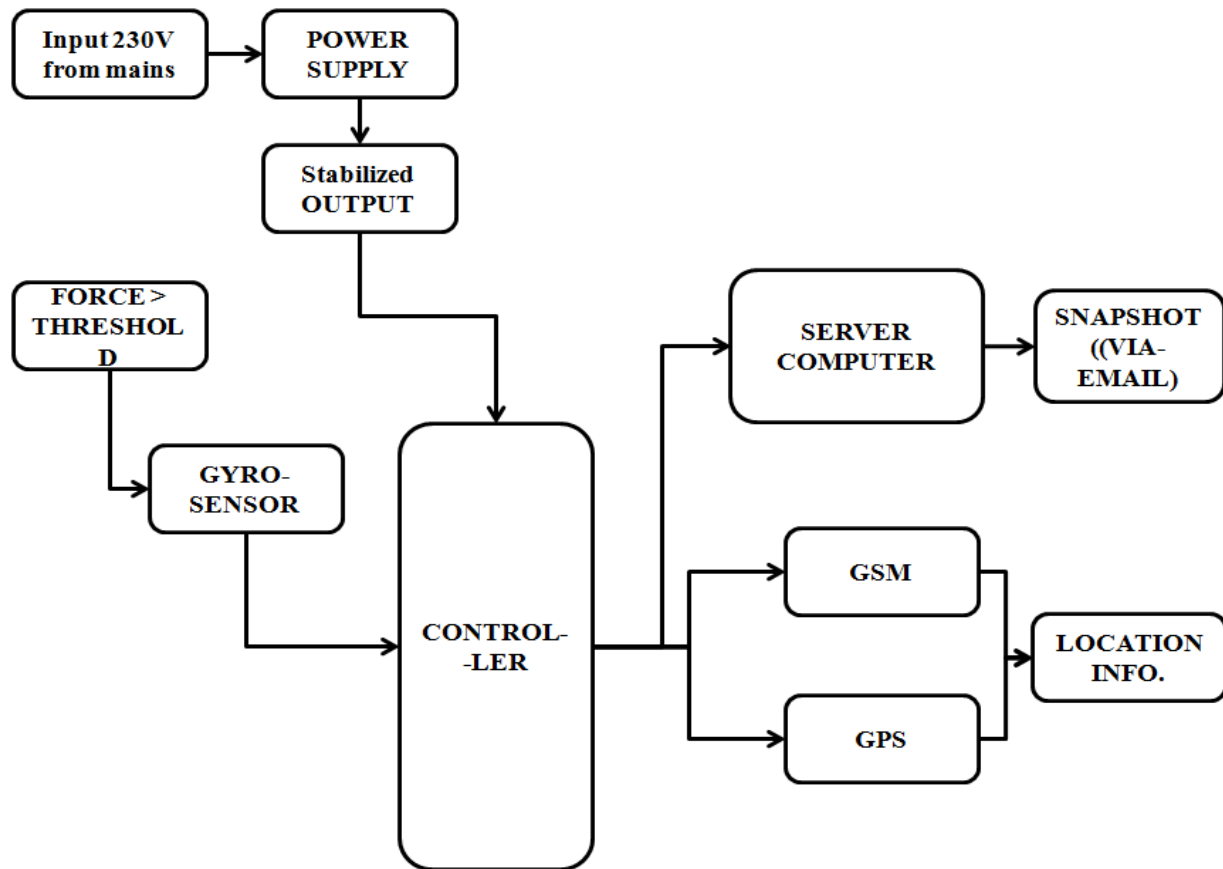


Figure 1: Block Diagram of the System

The major components used in this device are:

1) PIC Microcontroller, 2) GSM Module with SIM Card 900, 3) Sensor, 4) GPS Modem.

III. SYSTEM IMPLIMENTATION

3.1. PIC microcontroller PIC16f877a

The PIC microcontroller PIC16f877a is one of the most renowned microcontrollers in the industry. This controller is very convenient to use, the coding or programming of this controller is also easier. One of the main advantages is that it can be write-erase as many times as possible because it use FLASH memory technology. It has a total number of 40 pins and there are 33 pins for input and output. PIC16F877A is used in many PICmicrocontroller projects. PIC16F877A also have many applications in digital electronics circuits.

PIC16f877a finds its applications in a huge number of devices. It is used in remote sensors, security and safety devices, home automation and in many industrial instruments. An EEPROM is also featured in it which makes it possible to store some of the information permanently like transmitter codes and receiver frequencies and some other related data. The cost of this controller is low and its handling is also easy. It is flexible and can be used in areas where microcontrollers have never been used before as in coprocessor applications and timer functions etc.



Figure 2: PIC16F877A Microcontroller

3.2. GSM- SIM Card 900

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 anti-theft 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 is 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.



Figure 2: GSM Module

3.3. GPS Engine Board

The EB-3531 is a compact, high performance, low power consumption GPS engine board. It features a SiRF Star III chipset, which can track up to 20 satellites at a time and perform fast TTFF (time to first fix) in weak signal environments. The EB-3531 is ideal for automotive or marine navigation, personal positioning, fleet management, and mobile-phone navigation.

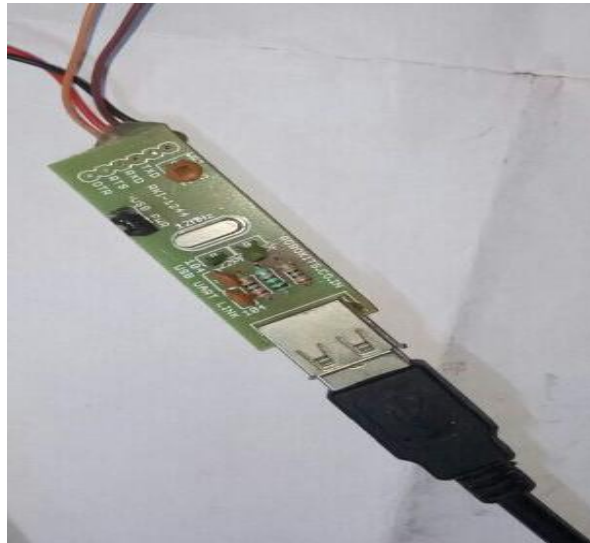


Figure 3: EB-3531

3.4 GPS(Global Positioning System)

The **Global Positioning System (GPS)** is a space-based radionavigation system owned by the United States government and operated by the United States Air Force. It is a global navigation satellite system that provides geolocation and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The GPS system operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information. The GPS system provides critical positioning capabilities to military, civil, and commercial users around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver. However, the US government can selectively deny access to the system, as happened to the Indian military in 1999 during the Kargil War.

The GPS project was launched in the United States in 1973 to overcome the limitations of previous navigation systems, integrating ideas from several predecessors, including a number of classified engineering design studies from the 1960s. The U.S. Department of Defense developed the system, which originally used 24 satellites. It became fully operational in 1995. Roger L. Easton of the Naval Research Laboratory, Ivan A. Getting of The Aerospace Corporation, and Bradford Parkinson of the Applied Physics Laboratory are credited with inventing it.



Figure 4: GPS Modem with external antenna

IV. SOFTWARE IMPLEMENTATION

4.1 Flowchart

The system flow chart shows the sequenced processes and steps taken to carry out specific action with the application. This employs a number of symbols for representing entities, decisions, conditions, processes and so on.

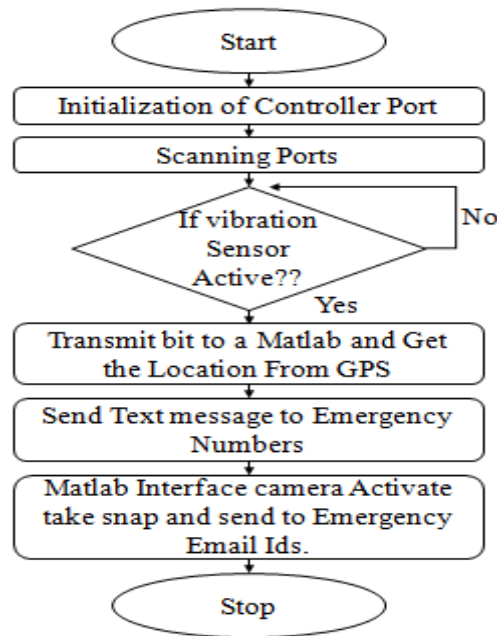


Figure 5: Flowchart

4.2 Simulation results

In this system, we use Proteus software for circuit design, MicroC Pro software for coding and generating hex files, and Matlab software for system coding purpose and here we also use G-mail app for sending snapshot of accident.

Figure 6 shows the result before accident occurred and figure 7 shows the result after accident occurred.

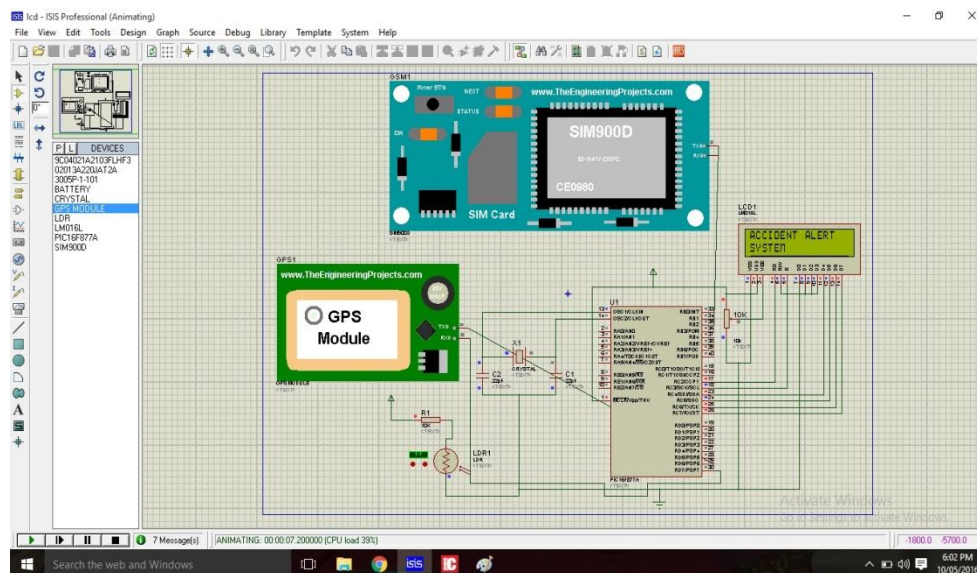


Figure 6: Simulation of PIC16F877A with GSM

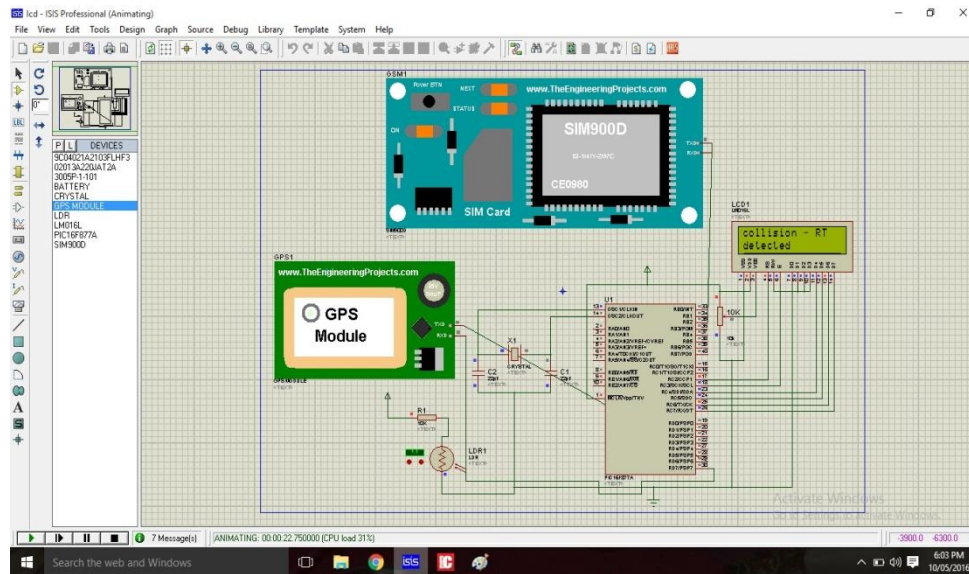


Figure 7: Simulation of PIC16F877A with GSM

V. SYSTEM HARDWARE

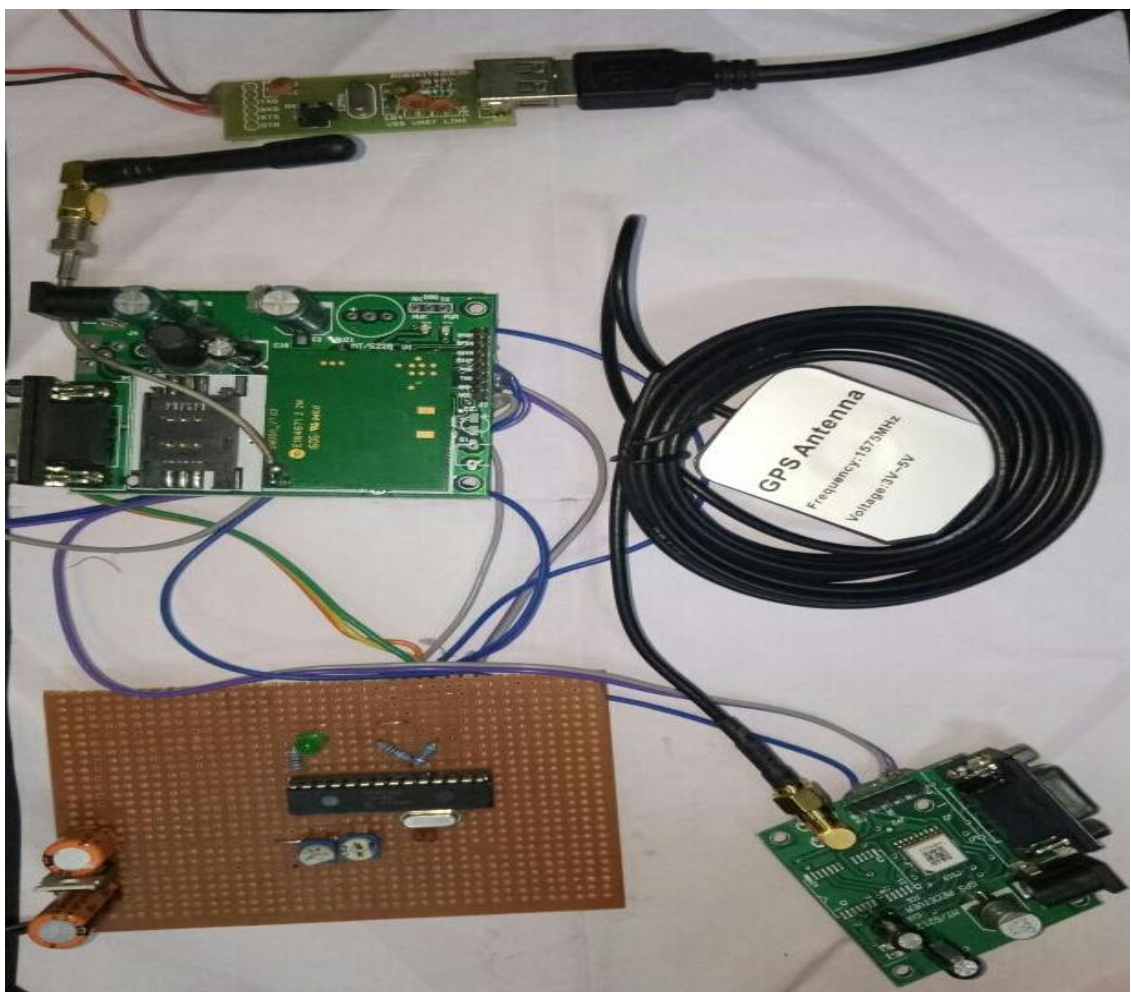


Figure 8: System Hardware

VI. ADVANTAGE & APPLICATION OF THE SYSTEM

6.1. Advantages

- Low cost to design the circuit
- Easy to implement the circuit
- Low power consumption
- Instant service
- High reliability
- Good performance

The applications of this project are follows,

- Emergency Precaution Supply Based on Wireless Alert System” used in any kind of vehicle to safe the human life.
- This system can be used for different types of motor companies.
- It also indicates accident occurring time, due to this if ambulance gets let to reach, victim can case on him.
- Our system can be used in any vehicle. When the accident takes place, the alert signal or message is automatically sent to the nearby police stations and hospitals for the immediate help and safe the user life.
- Accident scene also will send to pre-defined numbers.

VII. BENEFITS OF THE SYSTEM

7.1 Benefits

Here severity of the accidents could be known and help could be provided accordingly.

- Could save a life in rural areas also where people are not there for manual help and contacting emergency contact numbers.
- Cost effective solution.
- This is very useful and fast system.
- Save money.
- Reliable system.
- Show traced location.
- Show accident time.
- Sophisticated security.
- Alert message to mobile phone for remote information.
- Mobile number can be changed at any time.

VIII. RESULTS

Whenever accident of the vehicle occurs, then the device sends a message with the information of accident and the picture to the predefined numbers so that help can be made available. The message sent with the help of the GSM module will appear like this - Message for accident: Accident occurred. Please send help.” This system shows the location of vehicle where the accident has occurred. This system also indicates accident time and which kind of accident occurred (normal or serious) and hence that information is added in the accident alerting message.

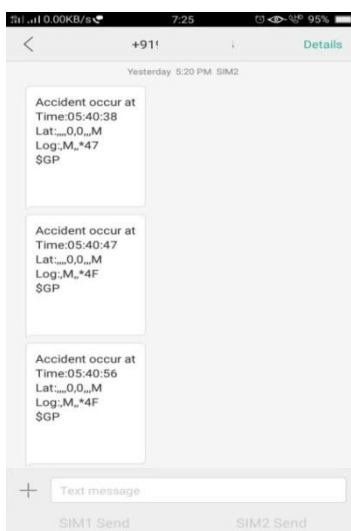


Figure 9: Received message

IX. CONCLUSION

In the previous existing system only SMS had been sent which includes the accident alert message and the vehicle registration number but it did not send the location information about the accident occurring place. Butto improve such system features we include the snapshot of the accident place. Here, we conclude that whenever an accident occurred the system will send the information through SMS which includes the time and location of the place as well as it also send a snapshot via email.

X. REFERRANCES

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