GPS and GSM Based Accident Spot Locator for Ambulance Service

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ABSTRACT

Recently technological development and increase in population, usage of vehicles is rapidly increasing and at same time accident is also increased. Every year lakhs of accidents are unnoticed and unreported. In today's world GPS and GSM have become a common method for navigation and mobile communication. Integration of these two technologies can be integrated and employed to locate the accident spot and find the nearest hospital can save thousands of lives.

Key Words: Global Positioning System(GPS), Global System for Mobile(GSM)

I. INTRODUCTION

The rise in vehicles have given rise to number of accidents also. These accidents often go unreported due to lack of communication or lack of accessibility to hospitals.

Today GSM and GPS are best sources of communication and Navigation, they can be integrated in a vehicle system to located a vehicle immediately and provide a timely help. Today GPS is being used in thousands of applications across the world right from tracking the public services to findings one way's is another feature which has proven its capability. As the advancement takes place the GSM can be upgraded to 4G system find so on.

II. BACKGROUND OVERVIEW

A. Literature Survey

- *The total number of road accidents in 2015 is 5,01,423.*

- *The total number of persons killed in road accidents in 2015 is 1,46,133 while road accident injuries were having also 5,00,279 in 2015.*

- *Out of total road accidents, **28.4 per cent and 24.0 per cent** accidents took place on National Highways and State Highways respectively in the country in 2015.*

- *National Highways (NHs) accounted for a share of 35.0 per cent in total number of persons killed and 29.1 per cent in total number of persons injured in road accidents during the calendar year 2015.*

- *Road accident on National Highways has gone up by 3.2 per cent from 1,37,903 in 2014 to 1,42,268 in 2015.*

- *Persons killed on National Highways has also gone up by 7.5 per cent from 47,649 in 2014 to 51,204 in 2015.*

B. Existing System

Currently no such system exists where hospitals or emergency services can be notified about any accident via phone call to nearest hospital or control room. The biggest drawback of this system is loss of time due to manual handling of all the cases.
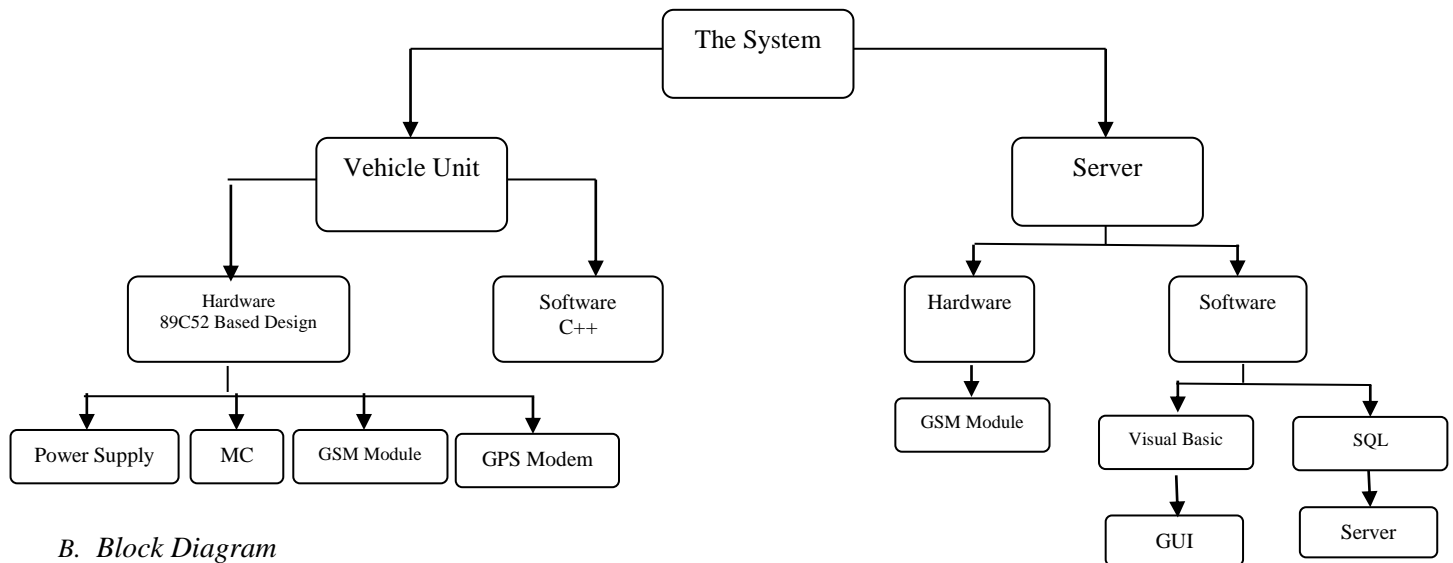
C. Proposed System

The proposed system will use GSM and GPS modules for locating the accident spot and sending the location to the nearest hospital in vicinity. The GPS module works on the location coordinates of the accident spot location while GSM module works on sending those coordinates to the server. The server consists of a GUI (Graphical User Interface) and the Data Base of the hospitals. The server maps the radius and finds the smallest possible radius i.e. distance between spot and hospital and selects the hospital and send the coordinates to the same. The entire process is expected to be carries out in space of 10-15 seconds depending on the network provider. The system will be divided into two units viz. Vehicle Unit and Server. The vehicle unit is fitted in the vehicle while server is present in control room of emergency service office.
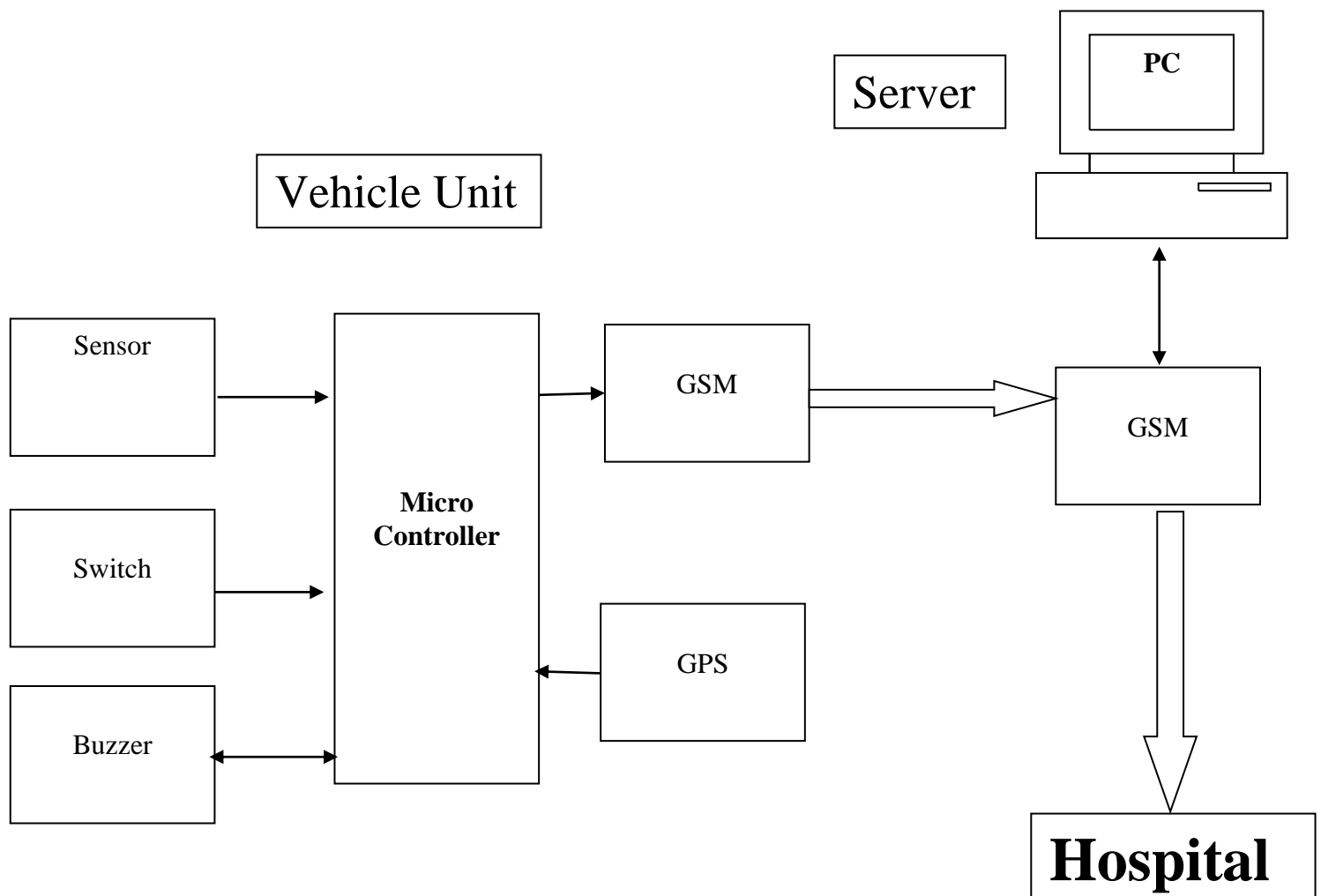
III. **PROPOSED SYSTEM**

A. System Overview

The above proposed system will be divided into the following sub modules or sections…

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                            The System

        Vehicle Unit                            Server

   Hardware          Software          Hardware          Software
89C52 Based Design     C++

Power Supply  MC  GSM Module  GPS Modem    GSM Module    Visual Basic   SQL

                                                          GUI        Server
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B. Block Diagram

The Block Diagram of the system is given below.

C. *Explanations of Blocks*

The following are the brief explanations of the working principle of the various major blocks or sections used in the system…

- Power Supply
  This unit will supply the various voltage requirements of each component in vehicle unit. It consists of filter and regulator. The rectifier used here will be Bridge Rectifier. It will convert 230VAC into desired 5V/12V DC. We can also give a direct 9V DC supply the system.

- Microcontroller
  This unit is the heart of the Vehicle Unit. It is responsible for all the process being executed. It will monitor & control all the peripheral devices or components connected in the system. In short, we can say that the complete intelligence of the project resides in the software code embedded in the Microcontroller.
  The controller here user will be of 8051 family. The code will be written in Embedded C and will be burned or programmed into the code memory using a programmer.
  This unit requires +5VDC for it proper operation.

- GSM Module
  This is the heart of communication of our system. The entire communication between vehicle and server and from server to hospital is carried out via this module. It works at frequency of 850MHz,900 MHz,1800Mhz and 1900MHz.
  This unit requires 3.8V to 4.2V DC for it proper operation.

- GPS Module

This blocks function is to pinpoint the location of the spot with maximum accuracy and send the location to microcontroller. GPS coordinates are fetched by microcontroller and sent to GSM module. A provision has been made to send the same to LCD display for viewing in case system fails due to lack of network.
This unit requires +5V DC for it proper operation.

D. *Features*

The Following are the prominent features of the above discussed system…

- Automatic System thereby saving time and efforts.
- Low cost.
- Easy Integration with Vehicle Sensors.
- Easy replacement available for failed components.
- Low maintenance.

E. *Technology & Programming Languages*

As microcontrollers are the core of these day's digital circuit design in industry, this system uses it for the centralized operation and digital processing. The technology used here is embedded technology which is the future of today's modern electronics.

The followings are the various Programming Languages & Technologies that are going to be used in the proposed system…

For Embedded System…
- Embedded Technology,
- 8051 Family Based Controller,
- Embedded C - Keil Compiler,
- Eagle Software for PCB Designing,

For PC System…
- VB.net 2008 Based Application Software,
- SQL for server Integration with GUI.

F. *Project Development Methodology or Steps*

The following will be development steps so as to achieve the working Prototype Model of the above proposed system…

- Defining the Problem,
- Understanding the Need & Usability in industry and society (Market Analysis),
- Developing Block Diagram,
- Designing Circuits of individual blocks,
- Testing circuits in LAB & Finalizing,
- Developing PCB on PC,
- Getting the PCB printed from market,
- Soldering the components,
- Performing various Basic Experiments to test the PCBs,
- Developing Flowchart for the entire process,
- Writing actual Software Program,
- Compilation & Burning,
- Testing and Debugging,
- Developing Flowchart for PC Side Software,
- Developing Data Flow Diagram,
- Writing actual code.
- Finally Running the system and,
- Documentation.

IV. SCOPE & APPLICATIONS

The project can also be implemented for the following

- 1. Fleet management of public transport.
- 2. Anti-theft system for vehicles.
- 3. Logistics services.
- 4. Cops department and fire services.

V. CONCLUSION

The project is all about reducing the number of accidental deaths caused due to lack of treatment in time for the patients. The aim of the project is to save the time taken for an accident victim to reach nearest possible hospital as fast as possible.

VI. ENHANCEMENTS

A. *Limitations and Drawbacks*

As generally all systems have some limitation, here are some listed for the proposed system…

- System depends on network.
- Delay in sending message

B. *Future Modifications*

There is always chance to improve the any system as research & development is an endless process. Our system is no exception to this phenomenon. The following improvements can be done…

- Entire System can be modified from GSM to 4G LTE system

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