

# Collided Vehicle Position Detection using GPS & Reporting System through GSM

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## Abstract

*The purpose of this project work is to detect the location of collided vehicle, means where exactly the accident took place. The system designed here is very useful for certain departments, by which they can send their medical team to the exact spot where accident is took place, or police department persons can reach the spot immediately.*

*In this concept the vehicle is not tracked continuously, whenever the vehicle is crashed, location information will be transmitted to the concern mobile automatically. Since it is a prototype module and availability of exact hit sensor is difficult, here magnetic switch is used to simulate the hit sensor. Whenever a small permanent magnet is brought near to the switch, it will be activated. These magnetic switches contain two metal plates in the form of long levers & are arranged in a glass container. As because of the flexible action of metal plates, whenever the vehicle crashes and due to the bumping action, plates are contacted with each other. Based on this signal, the controller collects the longitude & latitude data from GPS receiver, & the same is transmitted to the concern mobile through GSM module. The location of the vehicle is indicated using GPS (Global Positioning System) technology. Communication link between the vehicle & mobile is made possible through a GSM modem. GPS will give the information of parameters like longitude & latitude, based on this information, the crashed vehicle position can be identified very easily. The advantage of using GSM (Global System for Mobile) technique is that it doesn't have any range restriction; the data can be acquired from anywhere from the world. The vehicle details & user mobile number are stored in microcontroller. Whenever the vehicle is crashed the Microcontroller gets the location of vehicle found by the GPS modem and sends the message to the same mobile using GSM modem. Smoke sensor is interfaced to microcontroller. When the pollution level is high, it sends the SMS to the authority. IR sensor is used to warn the probability of collision.*

**Keywords:** AT89C51 Microcontroller, Bump Sensor, GPS, GSM, Gas Sensor, Smoke Sensor

## I. INTRODUCTION

The concept described in this project report is aimed to detect exact position of collided vehicle

by which concern departments or concern persons can rush to the spot for rescue operations. If any accident took place at high ways it is very much essential to pass the information immediately to the concern departments like police department, hospital and ambulance service. If these services are available in time, life of the victims can be saved and hence it is recommended to install this kind of electronic device in each and every vehicle, especially in cars, busses and other public transport vehicles. The integration of GSM & GPS units working together can acquire the vehicle location and information will be passed to the concern mobile phones whose numbers are stored in to the main processing unit designed with Atmel 89C52 microcontroller.

To detect the collided vehicle GPS (Global Positioning System) is used, it is the function of GPS to acquire its global position through satellites. As this instrument is interfaced with microcontroller at its input side, information in the form longitude and latitude values are transmitted through GSM (Global System for Mobile communications) unit to the concern mobile phones. As the microcontroller is programmed to gather information from GPS and transmit the same to the mobile through GSM, it is called central processing unit. Based on the information gathered from GPS, the controller reads the data and it will be updated, means wherever the vehicle goes its present position data remains the ROM and previous data will be erased. If the processor gets collision signal immediately fresh data stored in the processor will be passed to the cell phone through GSM. The information contains the position of vehicle and this information gathered from GPS in the form of longitude and latitude values will be transmitted through GSM by which the vehicle position over the globe can be identified. The detailed description is explained below.

## II. SYSTEM DESIGN MODEL

### A. Software Design Module

For the operation purpose, the user application instructions are written programming code by using embedded c. The application program is compiled by using KEIL-C compiler and converts the source file into .hex file. For the dumping purpose, we use micro flash programmer. Here the program is dumped in the microcontroller ROM memory location. The  $\mu$ Vision3 screen provides us

with a menu bar for command entry, a tool bar where we can rapidly select command buttons, and windows for source files, dialog boxes, and information displays.  $\mu$ Vision3 lets us simultaneously open and view multiple source files.

A project contains enough information to take a set of source files and generate exactly the binary code required for the application. Because of the high degree of flexibility required from the tools, there are many options that can be set to configure the tools to operate in a specific manner. It would be tedious to have to set these options up every time the application is being built; therefore they are stored in a project file. Loading the project file into KEIL informs KEIL which source files are required, where they are, and how to configure the tools in the correct way. The user of KEIL centers on "projects". A project is a list of all the source files required to build a single application, all the tool options which specify exactly how to build the application, and – if required – how the application should be simulated. The project can then be saved to preserve the settings. The project is reloaded and the simulator or debugger started, all the desired windows are opened. KEIL project files have the extension.

### **B. Hardware Design Module**

In general sophisticated technology must be used to detect the collided vehicle, for which suitable sensor is essential. As described in the abstract availability of suitable sensor is critical and keeping in view of sensor cost, here magnetic switch is used as a collision sensor. This switch will be activated when any magnet is brought near to the switch, means the collision is simulated by activating the magnetic switch through a small piece of permanent magnet. Whenever the switch is activated, controller understands that it is a collision signal and based on this signal immediately present position of the vehicle will be transmitted in the form of SMS.

The information gathered from the GPS will be displayed through an LCD, the information contains vehicle details and position data, by which the user can identify where exactly the vehicle has been collided. As the system utilizes GSM technology for the communication, there won't be any range restriction, the information can be passed to anywhere in the world, because mobile network covers all corners of the world. Similarly the information can be passed to the multiple mobile phones, here required phone numbers data must be stored in to the main processing unit. Application point of view, the system designed here can be installed in all vehicles and collided vehicles information can be transmitted to the concern departments mentioned in the beginning of this chapter, in addition information also can be passed to the traffic police for clearing traffic jams.

The main processor that is supposed to be installed in the vehicle is aimed to acquire global position data through GPS. This data in the form of longitude and latitude values are decoded by the microcontroller and same values are displayed through an LCD interfaced with the microcontroller. As the vehicle is running, these values will be changed frequently at every distance of 15-20 meters. Now whenever the collision sensor is activated, the controller will acquire present position data of vehicle, and it will be transmitted to the concern mobile through GSM module. In addition the system can be used as vehicle tracking system. As long as the communication link is established, running vehicle position will be displayed through mobile screen. The GPS receiver used in this project work acquires its global position data through satellites, this information in the form of longitude & latitude values are displayed through LCD interfaced with GPS data decoding circuit designed with microcontroller unit.

As the GSM and GPS processors are playing major roll in this project work, more information must be provided, in this regard separate chapter is created to introduce the GSM technology in following chapter.

Global Positioning System satellites transmit signals to equipment on the ground. GPS receivers passively receive satellite signals; they do not transmit. GPS receivers require an unobstructed view of the sky, so they are used only outdoors and they often do not perform well within forested areas or near tall buildings. GPS operations depend on a very accurate time reference, which is provided by atomic clocks at the U.S. Naval Observatory. Each GPS satellite has atomic clocks on board.

Each GPS satellite transmits data that indicates its location and the current time. All GPS satellites synchronize operations so that these repeating signals are transmitted at the same instant. The signals, moving at the speed of light, arrive at a GPS receiver at slightly different times because some satellites are farther away than others. The distance to the GPS satellites can be determined by estimating the amount of time it takes for their signals to reach the receiver. When the receiver estimates the distance to at least four GPS satellites, it can calculate its position in three dimensions.

There are at least 24 operational GPS satellites at all times. The satellites, operated by the U.S. Air Force, orbit with a period of 12 hours. Ground stations are used to precisely track each satellite's orbit.

### **C. Determining Position**

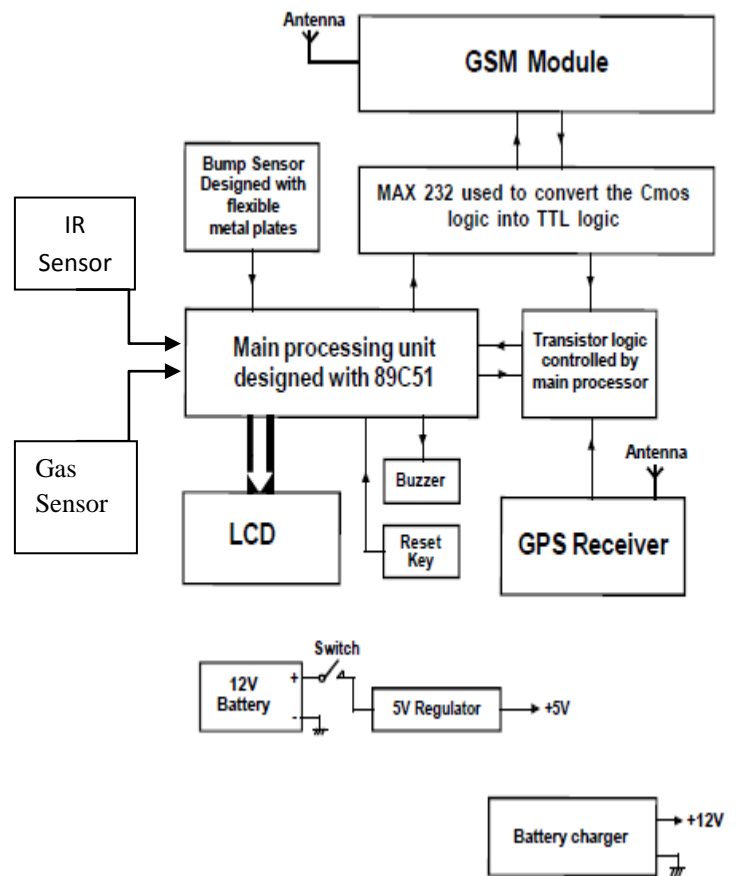
A GPS receiver "knows" the location of the satellites, because that information is included in satellite transmissions. By estimating how far away a satellite is, the receiver also "knows" it is located

somewhere on the surface of an imaginary sphere centered at the satellite. It then determines the sizes of several spheres, one for each satellite. The receiver is located where these spheres intersect. The accuracy of a position determined with GPS depends on the type of receiver. Most hand-held GPS units have about 10-20 meter accuracy. Other types of receivers use a method called Differential GPS (DGPS) to obtain much higher accuracy. DGPS requires an additional receiver fixed at a known location nearby. Observations made by the stationary receiver are used to correct positions recorded by the roving units, producing an accuracy greater than 1 meter. As the availability of professional grade GPS systems is critical and moreover they are used for military applications, here commercial type of module is used and the accuracy of it may not be perfect hence it is defined as 20meters.

When the system was created, timing errors were inserted into GPS transmissions to limit the accuracy of non-military GPS receivers to about 100 meters. This part of GPS operations, called Selective Availability, was eliminated in May 2000

The system described here utilizes AT89S51/52 microcontroller, and this device is also playing dominant role in this project work. Microcontrollers are increasingly being used to implement communication systems. It is therefore important to understand Microcontroller based systems well. Today, microcontrollers have become an integral part of all digital communication systems. Dedicated system that use microcontrollers, have certainly improved the functional, operational and performance based specifications. The architectural changes in instrumentation and control systems where and are due to the computing and communication capability of the Micro controller devices. Micro controller must be treated as a tool for computing and communication; Knowledge of microcontrollers is meaning full and very rewarding if it is applied to design a product that is useful in the industry or for the society in general. This is a subject, which has direct relevance to industrial product development and automation. In this project work, microcontrollers are programmed to perform the function of encoding and decoding techniques, which is essential for any digital communication system. Any Micro-controller, that functions according to the program written in it. Here the program is prepared in such a way, so that the system performs the function of establishing a digital communication between two distant units.

### III. BLOCK DIAGRAM



### IV. PROJECT KIT



### V. CONCLUSION

Without proper equipment identifying the spot of crashed vehicle is very difficult, it is very important activity for any type of public transport vehicle. Information technologies help in supporting these functionalities from remote locations and

transmit the information to the concern authorities. Tracking the mobile assets locations data and analyzing the information is necessary for optimal utilization of the assets.

Vehicle Tracking System is one of the important feature added to the list of advanced automobile devices, it is a software & hardware system enabling the authorized persons to track the position of their vehicle. Presently this system is designed to monitor the position of collided vehicle through GSM mobile, but if required this data can be recorded in the computer for further analysis, when these type of tracking devices are installed in all types of vehicles it is very useful activity, because every day lot of vehicles are crashing due to various reasons. In addition field activities like how the driver is running the vehicle, vehicle speed, mileage traveled, etc. can be monitored through same communication network using GSM technology. To achieve all these activities, the system technology must be enhanced & it has to be modified considerably. Driver activity can be recorded by modules attached to the vehicle. And then the data is transmitted to a central, internet-connected computer where it is stored. Once the data is transmitted to the computer, it can be analyzed and up to date reports can be stored and necessary actions can be taken. Also We are adding two more features like a warning before collision using Ir Sensor and pollution level detection using Gas Sensor. The major advantage of this technology is the vehicle which has undergone to an accident can be identified by using tracking technology without any delay and immediate medication will be provided to the accident victims.

### **REFERENCES**

The following are the references made during design, development and fabrication of the project work.

Books:

- [1] Mobile & Personal Communication Systems and Services-  
By: RAJPANDYA
- [2] Programming and Customizing the 8051 Micro-controller-  
By: Myke Predko
- [3] The concepts and Features of Micro-controllers- By: Raj  
Kamal
- [4] The 8051 Micro-controller Architecture, programming &  
Applications  
By: Kenneth J. Ayala
- [5] GSM made simple - By: George Lamb. Yani Batteau
- [6] Principles & Applications of GSM - By: Vijay K. Gargand  
Joseph E. Wilkes
- [7] GPS and Geo-caching in education - By: Burt Lo
- [8] GPS for Land surveyors - By: Jan Van Sickle