Vehicle Tracking System using GPS and GSM using Mobile Applications

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Abstract:- Global Positioning System (GPS) is used in numerous applications in today's world. A real time vehicle tracking system using the GPS technology is proposed in this paper. The project Android App based Vehicle Tracking Using GSM AND GPRS mainly focuses in tracking the location of the vehicle on which the device has been installed. It will then send the data in the form of latitude and longitude coordinates through SMS on the user's mobile where the coordinates will be plotted in the Android app automatically. Initially, the GPS installed in the device takes input from the satellite and stores it in the microcontroller's buffer. In order to track the vehicle, the mobile user has to call on the SIM number that is registered in the GSM module of the device. Once the call is received, the device authenticates the calling number. If authenticated, the location of the vehicle is sent to the registered mobile number in the form of SMS. After sending the message, the GSM is deactivated and the GPS is activated again. The coordinates of the location received in the SMS can be viewed on the android app. The hardware part described in the paper comprises of GPRS, GSM module.

Keywords:- GPS, GSM, Google maps, Arudino Board, Android Arudino, Sensors, Vehicle Tracking, Microcontroller.

I. INTRODUCTION

The Vehicle Tracking System is used to track the vehicle position and location. It is located on every vehicle like trucks, buses and cars to get exactly the vehicle location by GPS in terms of latitudes and longitudes from remote areas..When we use these latitude and longitude values in Google Earth we get exact area of vehicle. [1].We can calculate the distance travelled between two stations and also can track the vehicle in any weather conditions. Tracking system is important in modern world because of its use in solider monitoring, theft of vehicle[2].The system is microcontroller based which consists of Global Positioning System which is used to find position of vehicle and Global System for mobile communication. The system uses GPS and two way communication is achieved using GSM modem. The GSM modem has sim card from which message is sent to owner's mobile number predefined in microcontroller[3]Vehicle tracking system main aim is to give Security to all vehicles. Accident alert system main aim is to rescuing people in accidents. This is improved security systems for vehicles. The latest like GPS are highly useful now days, this system enables the owner to observe and track his vehicle and find out vehicle movement and its past activities of vehicle. When the vehicle is stolen, the location data from tracking system can be used to find the location and can be informed to police for further action. [2]This system is based on new technology, its main purpose is to detect an accident and alert to the control room, so the victim can find some help. It can detect accidents the intensity of the accident without any visual contact from control room. If this system is inserted in every vehicle then it is easy to understand how many vehicles are involved in a particular accident and how intense is it. So that the help from control room will be according to the control room. The present board designed has both vehicle tracking and accident alert systems, which make it more valueable and useful. This board alerts us from theft and on accident detection also. This device detects fire accidents also by placing fire detector in one of the interrupt pins.[4]
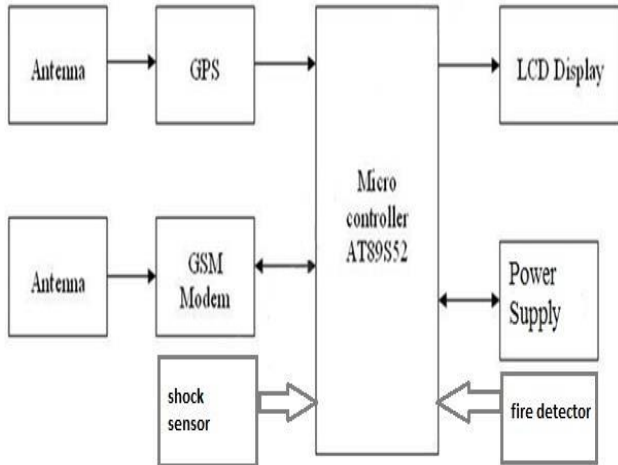
II. BLOCK DIAGRAM

Fig 1:- Block diagram of the project

A. Concept and Overview

This vehicle tracking system[5] takes input from GPS and sends it through the GSM module to desired mobile/laptop using mobile communication. Vehicle Tracking System shown in fig 2, is one of the biggest technological advancements to track the activities of the vehicle. The security system uses Global Positioning System GPS, to find the location of the monitored or tracked vehicle and then uses satellite or radio systems to send to send the coordinates and the location data to the monitoring center. At monitoring center various software's are used to plot the Vehicle on a map. In this way the Vehicle owners are able to track their vehicle on a real-time basis. Due to real-time tracking facility, vehicle tracking systems are becoming increasingly popular among owners of expensive vehicles.
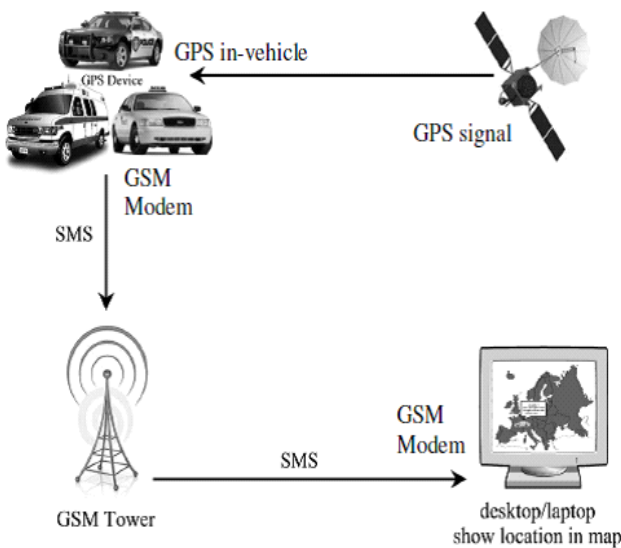

Fig 2:- Overview of the System

III. ESSENTIALS COMPONENTS TO CARRYOUT SMOOTH WORK

A. Microcontroller

Here in this system micro controller used is AT89S52. Mainly micro controller consists of cpu, memory and various I/O pins, and the speed of this micro controller is enough to execute the program in real time. This particular micro controller is chosen because the experiment requires minimum of 8-bit micro controller. This microcontroller contains 4Kb flash memory inbuilt in it, this memory is enough to dump our code in to the microcontroller. This micro controller contains 40 pins and circuit is designed according to fig 2.3. The 40 pins of microcontroller has different properties and usage they are shown in the following image
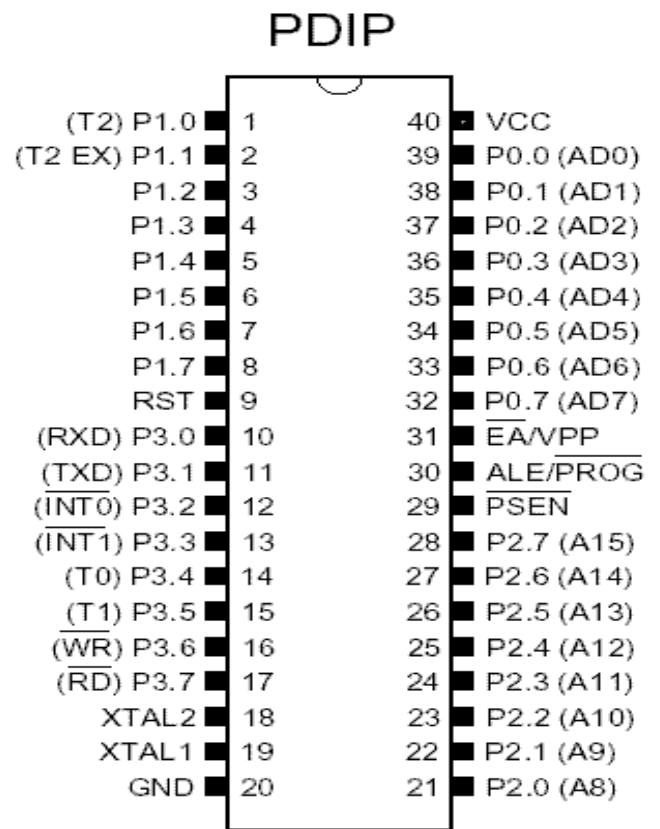

Fig 3:- Pin Diagram of Microcontroller

B. GPS

GPS abbreviates global positioning system and this is used to detect the latitude and longitude of the particular position and it also shows the exact time. It detects these values anywhere on the earth. In our project it plays main role and it is the main source of the latitude and longitude of the vehicle to know the accident occurred location, or even for theft tracking of the vehicle. This gadget gets the coordinates from the satellite for each and every second. This device is the main component of vehicle tracking project

Fig 4:- Global Positioning System

C. GSM

GSM abbreviates global system for mobile communication, 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 can be inserted which has a unique number, this unique number is used for contact. This GSM device consists 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.

Fig 5:- Global System for Mobile Communication

D. Shock sensor

The sensor used to detect accident is shock sensor. This is single stage shock sensor,it detects any hard impact acted on it . The output from sensor after impact will be +5v and connected to INT (pin 12) of processor. These sensors are fixed on all sides of the car to detect impact occurred on it. These outputs from sensors is send into OR gate to detect at least one impact

Fig 6:- Shock Sensor

E. Liquid Crystal Display

LCD is the display device which is of 16x2 size and it has yellow background light. This LCD is connected to microcontroller. The following is the interfacing diagram of LCD with microcontrollerAT89S52.
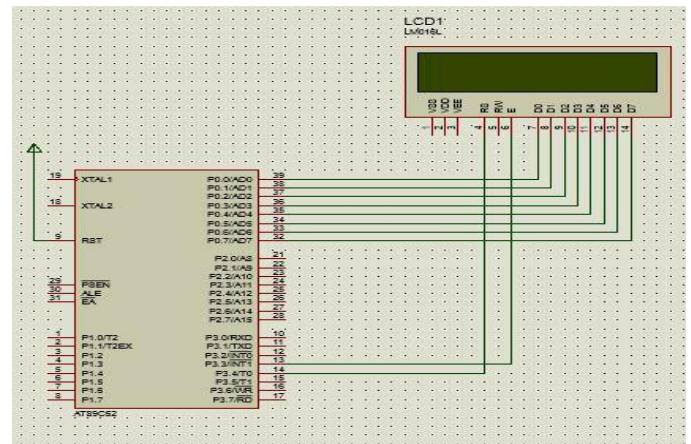

Fig 7:- LCD Display

IV. RESULTS

Whenever accident or theft of the vehicle is occurred then the device sends message to given mobile device.
Message for theft: "Vehicle alert
Latitude: 2400.0090, N
Longitude: 12100.0000, E
Time: 12:00"
Message for accident : "Accident alert
Latitude: 2400.0090, N
Longitude: 12100.0000, E
Time: 12:00"

Fig 8:- showing latitudes and longitude values displayed on LCD

V. CONCLUSIONS

Vehicle tracking system makes better fleet management and which in turn brings large profits. Better scheduling or route planning can enable you handle larger jobs loads within a particular time. Vehicle tracking both in case of personal as well as business purpose improves safety and security, communication medium, performance monitoring and increases productivity. So in the coming year, it is going to play a major role in our day-to-day living. Main motto of the accident alert system project is to decrease the chances of losing life in such accident which we can't stop from occurring. Whenever accident is alerted the paramedics are reached to the particular location to increase the chances of life. This device invention is much more useful for the accidents occurred in deserted places and midnights. This vehicle tracking and accident alert feature plays much more important role in day to day life in future.

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