RESEARCH ARTICLE

VEHICLE TRACKING SYSTEM USING GPS AND GSM MODEM- A REVIEW

Ajay Hemant Jethwa

Lecturer, Computer Engineering Department, BGIT, Mumbai

ABSTRACT

Vehicle tracking system uses GPS and GSM technology to track and provide complete location and sped information to user over mobile phone. This project gives Minute-by-minute updates about vehicle location by sending sms through GSM modem. This SMS contains longitude and latitude of the location of vehicle. Microcontroller is the central processing unit CPU of our project. Microcontroller gets the coordinates from GPS modem and then it sends this information to the user in Text SMS. GSM modem is used to send this information via SMS. SMS will be sent to the owner of the vehicle.

INTRODUCTION

GPS based Vehicle tracking system is required in many situations, like in case of car theft detection. This project will be useful when our car is stolen. Also if somebody wants to track school bus of their children, at that time it will be helpful to find out the location of kids. One more situation is when some company wants to track the location of the cab or transport bus of employee then in this case this vehicle tracking system will be very useful.

In GPS tracking system the location of vehicle is sent to remote place and it is done by GSM modem. Global Positioning System (GPS) modem requires minimum 3 satellites to calculate the exact location. This modem communicates only in single way with microcontroller. This means that it can only transmit data to microcontroller. GPS Modem does not receive any data from microcontroller. At the same time GPS modem does not send data to Satellite, it only receives signal from satellites.

This system has Global Positioning System (GPS) which will receive the coordinates from the satellites among other critical information. Tracking system is very important in modern world. This can be useful in soldier monitoring, tracking of the theft vehicle and various other applications. The system is microcontroller based that consists of a global positioning system(GPS) and global system for mobile communication (GSM). The concept uses only one GPS device and a two way

communication process is achieved using a GSM modem. GSM modem, provided with a SIM card uses the same communication process as we are using in regular phone. The system is not limited to find the location of the target but also calculates the distance travelled b/w two stations. This system is user friendly, easily installable, easily accessible and can be used for various other purposes. After installation system will locate target by the use of a Web application (HTML based application) in Google map. The system allows to track the target anytime and anywhere in any weather conditions.
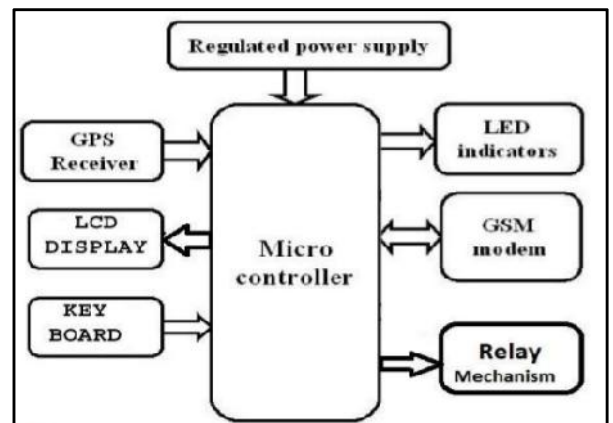
Block Diagram

Figure 1 Block Diagram

Corresponding author: **Ajay Hemant Jethwa**
Lecturer, Computer Engineering Department, BGIT, Mumbai

Description In Detail

This project consists of following blocks

1. ***GPS Modem:*** GPS modules are popularly used for navigation, positioning, time and other purposes. GP Santenna receives the location values from the satellites. GPS gives information about:
   A. Message transmission time
   B. Position at that time
2. ***GSM Modem:*** GSM modem is used for transmitting and receiving the data. SIM 300 is a tri- band GSM/GPR Sengine. It works on various frequencies i.e. EGSM 900MHz, DCS 1800MHz and PCS 1900MHz.
3. Microcontroller
4. ***LCD Display:*** The monitoring unit consists of a GSM mobile and a Web Application. The GSM mobile will acquire the position of the vehicle (longitude and longitude) and then by typing those co-ordinatesin web application owner of vehicle can get the exact location of the vehicle.
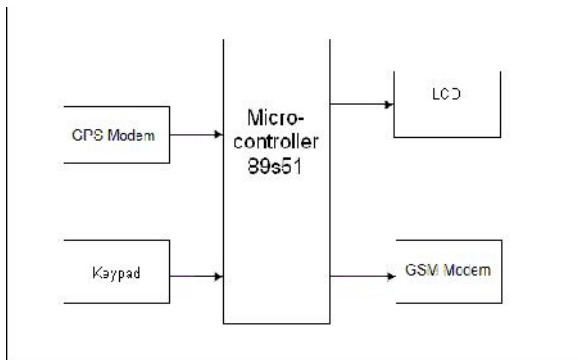

Figure 2 GSM Overview

Gsm Overview

Global System for Mobile Communications or GSM (originally from *Groupe Spécial Mobile*), is the world's mostpopular standard for mobile telephone systems. The GSM Association estimates that 80% of the global mobile market uses the standard. [1] GSM is used by over 1.5 billion people[2] across more than 212countries and territories. [3] This ubiquity means that subscribers can use their phones throughout the world, enabled by international roaming arrangements between mobile network operators. GSM differs from its predecessor technologies in that both signaling and speech channels are digital, and thus GSM is considered a second generation (2G) mobile phone system. The GSM standard has been an advantage to both consumers, who may benefit from the ability to roam and switch carriers without replacing phones, and also to network operators, who can choose equipment from many GSM equipment vendors.

The Global Positioning System (GPS) is a space-based global navigation satellite system (GNSS) that provides reliable location and time information in all weather and at all times and anywhere on or near the Earth when and where there is an unobstructed line of sight to four or more GPS satellites. GSM network. provides recommendations, not requirements. The GSM specifications define the functions and interface requirements in detail but do not address the hardware. The reason for this is to limit the designers as little as possible but still to make it possible for the operators to buy equipment from different suppliers. The GSM network is divided into three major systems: the switching system (SS), the base station system (BSS), and the operation and support system (OSS).

GPS	GSM
GPS helps us to find the exact location of the vehicle.	GSM only give the location not the exact location.
GPS uses satellites to find the location of the vehicle.	GSM uses base station to find the location.
It is costly but effective.	It is cheaper but less costly.
GPS can be used in any geographical area on the earth.	GSM is only used where base station are implemented.
It uses longitude and latitude coordinates to find the location.	It is used distance of the base station from one other
More accurate	Less Accurate
Better Technology	Not better as compared to GPS

Table 1 GPS VS GSM

The operations and maintenance center (OMC)is connected to all equipment in the switching system and to the BSC. The implementation of OMC is called the operation and support system (OSS). The OSS is the functional entity from which the network operator monitors and controls the system. The purpose of OSS is to offer the customer cost-effective support for centralized, regional, and local operational and maintenance activities that are required for a GSM network. An important function of OSS is to provide anetwork overview and support the maintenance activities of different operation and maintenance.

Applications and Advantages

1. School transport Tracking: "Vehicle tracking system" can be used in the school bus for tracking.
2. This project can be used for detection of cab or car of companies.
3. Theft Protection: This project can be very useful when your vehicle or car is stolen.

How To Track The Location On Actual Map

It would be time consuming to track location on Printed maps. But now a day's various websites are available on internet which shows online map. Google maps is one of the main and useful website. We use any one of these websites to track or find the location of vehicle. We can track the location using Longitude and Latitude received in SMS. Using these maps you can get the exact location as well as directions to go to those places from your current/desired location.

Characteristics For Gsm

The specifications and characteristics for GSM

1. Frequency band—the frequency range specified forGSM is 1,850 to 1,990 MHz (mobile station to basestation).

2. Duplex distance—the duplex distance is 80 MHz.Duplex distance is the distance between the uplink anddownlink frequencies. A channel has two frequencies,80 MHz apart.
3. Channel separation—the separation between adjacentcarrier frequencies. In GSM, this is 200 kHz.
4. Modulation—Modulation is the process of sending asignal by changing the characteristics of a carrier frequency. This is done in GSM via Gaussian minimum shift keying (GMSK).
5. Transmission rate—GSM is a digital system with an over-the-air bit rate of 270 kbps.
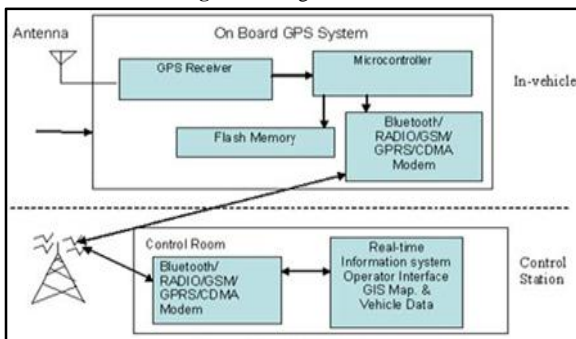

Figure 3 Google Location
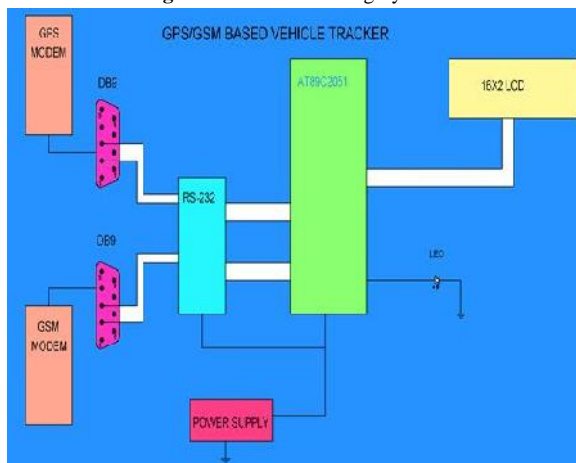

Figure 4 Vehicle Tracking System

Figure 5 The tracker overview

CONCLUSION AND FUTURE SCOPE

Vehicle tracking system is becoming increasingly important in large cities and it is more secured than other systems. Now a day's vehicle hefting is rapidly increasing, with this we can have a good control in it. The vehicle can be turned off by only with a simple SMS. Since, now a days the cost of the vehicles are increasing they will not step back to afford it. This setup can be made more interactive by adding a display to show some basic information about the vehicle and also add emergency numbers which can be used in case of emergency. Upgrading this setup is very easy which makes it open to future requirements without the need of rebuilding everything from scratch, which also makes it more efficient. We can monitor some parameters of vehicle like overheat or LPG gas leakage. We can dial an emergency call if the vehicle goes out of a certain / pre-decided track.

References

1. BaburaoKodavati, V.K.Raju, S.Srinivasa Rao, A.V.Prabu, T.Appa Rao, Dr.Y.V.Narayana/ International Journal of Engineering Research and Applications(IJERA) ISSN: 2248-9622 www.ijera.com Vol. 1, Issue 3, pp.616-625.
2. El-Medany,W.;Al-Omary,A.;Al-Hakim,R.;Al-Irhayim,S.; Nusaif,M.,"A Cost Effective Real-TimeTracking System Prototype Using Integrated GPS/GPRS Module," Wireless and Mobile Communications (ICWMC), 2010 6th International Conference on,vol.,no.,pp.521,525,20-25Sept.2010
3. Hu Jian-ming; Li Jie; Li Guang-Hui, "Automobile Anti-theft System Based on GSM and GPSModule," Intelligent Networks and Intelligent Systems (ICINIS), 2012 Fifth International Conferenceon , vol., no., pp.199,201, 1 -3 Nov. 2012
4. Nagaraja, B. G.; Rayappa, R.; Mahesh, M.; Patil, C.M.; Manjunath, T. C., "Design & Development ofa GSM Based Vehicle Theft Control System," Advanced Computer Control, 2009. ICACC '09.
5. International Conference on , vol., no., pp.148,152, 22-24 Jan. 2009
6. Fleischer, P.B.; Nelson, A.Y.; Sowah, R.A.; Bremang, A., "Design and development of GPS/GSM based vehicle tracking and alert system for commercial inter-city buses," Adaptive Science &Technology (ICAST), 2012 IEEE 4th International Conference on , vol., no., pp.1,6, 25-27 Oct. 2012
7. Le-Tien, T.; Vu Phung-The, "Routing and Tracking System for Mobile Vehicles in Large Area,"
8. Electronic Design, Test and Application, 2010. DELTA '10. Fifth IEEE International Symposium on ,vol., no., pp.297,300, 13-15 Jan. 2010
9. Iman M. Almomani, Nour Y. Alkhalil, Enas M. Ahmad, Rania M. Jodeh "Ubiquitous GPS Vehicle Tracking and Management System", IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT) 2011
10. Abed khan M.E.(Student), , Ravi Mishra, "GPS – GSM Based Tracking System" SSCET, CSVTU,

11. Bhilai, India International Journal of Engineering Trends and Technology- vol.3,no.,pp,161-164,2012
12. El-Medany, W.M.; Alomary, A.; Al-Hakim, R.; Al-Irhayim, S.; Nousif, M., "Implementation of GPRS Based Positioning System Using PIC Microcontroller," Computational Intelligence, Communication Systems and Networks (CICSyN), 2010 Second International Conference on , vol., no., pp.365,368,28-30 July 2010
13. Iman M. Almomani, Nour Y. Alkhalil, Enas M. Ahmad, Rania M. Jodeh "Ubiquitous GPS Vehicle Tracking and Management System", IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT) 2011
14. Lita, I.; Cioc, I.B.; Visan, D.A., "A New Approach of Automobile Localization System Using GPS and GSM/GPRS Transmission," Electronics Technology, 2006. ISSE '06. 29th International Spring Seminar on , vol., no., pp.115,119, 10-14 May 2006
15. Parvez, M.Z.; Ahmed, K.Z.; Mahfuz, Q.R.; Rahman, M.S., "A theoretical model of GSM network based vehicle tracking system," Electrical and Computer Engineering (ICECE), 2010 International Conference on, vol., no., pp.594,597, 18-20 Dec. 2010

How to cite this article:

Ajay Hemant Jethwa., Vehicle Tracking System Using Gps And Gsm Modem- A Review. *International Journal of Recent Scientific Research Vol. 6, Issue, 6, pp.4805-4808, June, 2015*

****