ijpam.eu

AN EFFICIENT LOCATION DETECTION MECHANISM FOR VANETS USING SMART PHONE DEVICE

Dr. Siva Nageswara Rao S[1] ,G.Parimala [2] , Dr.K.LakshmiNadh [3]
[1]Associate Professor , Narasaraopeta Engg. College,Hyderabad
[2]Assistant Professor ,Vfstr, Hyderabad,India
[3]Associate Professor, Narasaraopeta Engg College, India

Abstract— Now a days, communication is being performed using mobile phones. During communication tracking the devices becomes difficult because of the mobility of the device. A smart phone app with a micro controller is designed to find the location of the device. This device is connected to the vehicle to track the vehicle at real time. A microcontroller is used to control the GPS and GSM/GPRS modules. The exact location of the vehicle and the distance from user to the vehicle can also be identified by using   the proposed system. The system contains single android mobile that is equipped with GPS and GSM/GPRS in order to get geographic coordinates and for transmitting and updating the vehicle location in database respectively.

 Keywords: Vehicle tracking, Micro controller, GSM, GPRS, GPS

1.   Introduction

Vehicle Tracking Systems (VTS) was developed for the purpose of cargos and carriers because customers are looking to identify where the vehicle located was at any period of time. Now a days, with the rapid development in technologies, automatic vehicle tracking mechanisms are used in a various ways to identify and locate the vehicles in a real time. This paper is going to addresses and uses GPS/GSM/GPRS enabled technology for VTS and Smartphone APP to deliver efficient service and low cost solution for customers. GPS and GSM built vehicle location and tracking system will provide effective, actual vehicle position information, mapping and reportage of this information back to controlling or management system and enlightening the level of service delivered [1]. A GPS enables VTS notifies that where the vehicle is, where it was located and how long it was located. The VTS utilizes the geographic location information and time from the GPS Satellites. The system usages the geographic location information and time information from the Global Positioning Satellites.

The prevailing mechanisms do not provides full coverage of the course, making difficult to determine if a truck or another delivery vehicle is travelling in a planned path [2].

 In our paper, we implemented a Smartphone APP along with device which is having vehicle tracking functionality. This functionality efficiently identify and track the location of vehicles in a handy way.

A vehicle tracking mechanism is a prerequisite of the supreme function in all fleet organizations. GSM/GPS are most commonly used technology in vehicle tracking systems [5]. Vehicle location is one of the fundamental issue in vehicle tracking systems. GPS technology delivers the information about vehicles location and time wherever on the earth [6].

2.   Architecture

Vehicle tracking systems can be used in various sectors such as fields such as vehicle location detection systems, anti-theft identification systems, intelligent transportation management systems and fleet systems.

A. Bus Tracking:

 S Lau [9] implemented simple bus tracking system. This simple bus tracking system offers students with the tracking location of a bus within a permanent track.

B. Vehicle Tracking and Anti-Theft Tracking Mechanism:

 An anti-theft tracking mechanism is one approach to avoid or identify the unauthorized accessibility. Ramadan, at el [10] developed GPS/GSM technology enabled tracking systems, which is used to protect the vehicles from intruders and also used as vehicle anti-theft and tracking system. This mechanism also used filter [11] to eliminate location errors, thus enhancing the location accuracy of the location determination.

Fig 1: Block diagram of Vehicle Tracking and Anti-theft mechanism [7]

C. VTS using Social Network Service:

 VTS based on social network services like Twitter and Facebook has paying attention to more number of users [12]. Every VTS has social network account and which is used to identify the vehicle location in social network in a periodical manner. An interface can be used to manage the vehicles location sited on Google maps, and know the status of a vehicle such as door open, close and ignitions on/off.

3.   Proposed Mechanism

In the proposed mechanism, microcontrollers, hardware and software design techniques are required to develop the VTS.

It contains of the following elements:

1) Transmitting Unit: Transmitting Side contains GPS, GSM and GPRS functionality which is preloaded in a smart phone device. Therefore the device will be used as transmitting unit.

 a) GPS: The USA Department of Defense has developing the N-GPS, which is a weather and space based navigation system to meet the needs of the United States military. GPS has made a considerable impression on position, monitor, navigation, timing and other applications.

b) GSM: In GSM wireless networks, GSM modems are used. These modes are worked as a Dial-up modem. The working principle of GSM modem are rely on commands; The Commands always starts with (A_Tention) and ends with a CR_acter. The AT Commands are given to the GSM Modem with the help of desktop or Controller.

2) Monitoring Unit (MU): MU can be an Android APP or a Web Application through which user will get to know the actual location of vehicle. This MU will display the longitude and latitude values. Based on these receiver can track the device and plot on Google Maps.

A. Arduino Microcontroller

The Atmega328 based Arduino UNO R3 microcontroller is used to control the vehicle tracking system. Arduino Shields are used for the GPS and GSM/GPRS modules. A software program to control them is implement in the C programming, compiled and then stored into the Arduino UNO R3 memory.

B. GPS module

 The GPS is most popularly used technology in VTS, which provides the information to users such as location coordinates, speed, time etc. In this work, one GPS module and one GPS receiver are embedded in vehicle. The antenna is also embedded in the GPS module has the GPS receiver modules. These are having one push button switch and two slide switches.

C. GSM/GPRS module

 The GSM/GPRS module is used to establish connections between vehicle and a remote server for conveying the location information of vehicle, using TCP/IP connection with the help of the GSM/GPRS module

D. HTTP communication

A HTTP communication can be done through TCP/IP connection. Port 80 is the standard port for HTTP servers. Socket connection is required to send data over the Internet. The socket is useful for functioning with server and it allows the users to establish a TCP socket connection for transmission of data. The socket is categorized by three main elements, those are protocol, an IP address / a host name, and a port number. The commands   "AT+S_DATA_CONF"   and "AT+S_DATA_START" are used to align remote host and port and open socket for TCP connection respectively.

E. Web Server and Database

A free web service is used to develop the web server. A web page were consists of simple PHP that can rightly connect to and manipulate a database. "mysql_iconnect"

command is used to establish an association with a MySQL database

F. Google Maps API

A Google maps interface for iOS is used to monitor the vehicle location on a Mobile APP in real-time using the request from HTTP protocol. The Google maps interface spontaneously handles access to the Maps servers, displays location and reacts to vehicle gestures like clicks and drags. The legs array comprises of information about two locations within the given path. "distance" and "time duration" fields from the legs array are used in the Google directions Interface. These fields gives the information to users with the calculated distance and time duration between the current position of a vehicle and the customer location within the given path. "Start address" and "End address" values are used to specify an address of a vehicle and customer, respectively.

4. Result Analysis

A. Testing In-vehicle device

From figure 2, GPS module get the geographic points from satellite. Microcontroller read the vehicle location and Vehicle ID, and this information is transmitted to the server through GSM/GPRS.
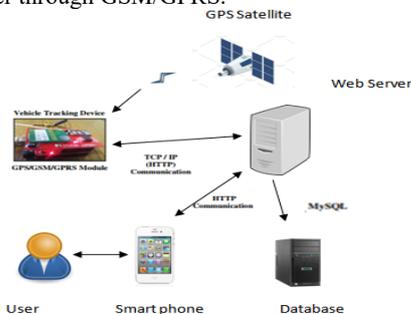

Figure 2: proposed architecture

B. Testing Web Server and Database

A database is maintained at server for keeping the vehicle information like vehicle location and vehicle ID. Some experimental values regarding the vehicle location and ID is shown in the below table

Table 1: Vehicles Location Information

ID	Vehicle ID	Time	Latitude	Longitude
22	2017	2017-11-10 10:30	41.01492	-83.71353
23	2017	2017-11-10 10:30	41.01459	-83.71347
24	2017	2017-11-10 10:30	41.01492	-83.71321
25	2017	2017-11-10 10:30	41.01476	-83.71355
26	2017	2017-11-10 10:30	41.01451	-83.71336
27	2017	2017-11-10 10:30	41.01491	-83.71354

C. Testing Smartphone application:

The developed smart phone app is installed in an iphone. The vehicle location and distance between user and the vehicle is updated from in-vehicle tracking device. Whenever a vehicle location changes, the vehicle's address will be updated regularly.

5. Conclusion

This paper gives the architecture implementation and results of a vehicle tracking technique. Test cases are also conducted at real time. This device (micro controller with smart phone) was inserted into the vehicle which was equipped with GPS/GSM technology by connecting to the database to get the vehicle location and to find the distance between the users at real time.

References

[1]　Abid Khan & Ravi Mishra, ―GPS – GSM Based Tracking System‖, International Journal of Trends and Technology, ISSN: 2231 – 5381, Volume 3, Issue 2, 2012

[2]　Rodrigo R. Oliveira, Felipe C. Noguez, Cristiano A. Costa, Jorge L. Barbosa & Mario P. Pardo,

―SWTRACK: An Intelligent Model for Cargo Tracking based on off-the-shelf Mobile Devices‖, ELSEVIER – Expert Systems with Applications 40 (2013) 2023 – 2031.

[3] Jithin V mohan, Minu Balan, Sharoon Thomas, and Lynn Mariette Mendonza, "Fleet Mangement System", B.Tech Degree Thesis, College of Engineering, Munnar, Idukki, Kerala, India, 2009

[4] Mohammad A. Al-Khedher, "Hybrid GPS-GSM Localization of Automobile Tracking System", International Journal of Computer Science & Information Technology (IJCSIT) Vol 3, No 6, Dec 2011

[5] Saed Tarapiah, Shadi Atalla, and Rajaa AbuHania, "Smart On-Board Transportation Management System Using GPS/GSM/GPRS Technologies to Reduce Traffic Violation in Developing Countries", International Journal of Digital Information and Wireless Communications (IJDIWC) 3(4): 96-105, The Society of Digital Information and Wireless Communications, 2013 (ISSN: 2225-658X)

[6] Muruganandham, "Real Time Web based Vehicle Tracking using GPS", World Academy of Science, Engineering and Techonogy, 37, 2010.

[7] Montaser N. Ramadan, Mohammad A. Al-Khedher, and Sharaf A. AlKheder, "Intelligent Anti-Theft and Tracking Sytem for Automobiles", International Journal of Machine Learning and Computing Vol.2 No. 1, February 2012

[8] Engineering and Applications, Vol 1, No.3, 2011 [9] Eddie Chi-Wah Lau, "Simple Bus Tracking System", Journal of Advanced Computer Science and Technology Research, Vol3, No.1, 2013

[9] Montaser N. Ramadan, Mohammad A. Al-Khedher, and Sharaf A. AlKheder, "Intelligent Anti-Theft and Tracking Sytem for Automobiles", International Journal of Machine Learning and Computing Vol.2 No. 1, February 2012.

[10] Swapna Raghunath, P.Visalakshmi, and Karam Sridhar, "GPS Datum Conversion and Kalman Filtering for Reducing Positional Errors", Asian Journal Of Computer Science And Information Technology1: 5 (2011) 141– 145.

[11] Ahmed ElShafee, Mahmoud EIMenshawi, and Mena Saeed, "Integrating Social Network Services with Vehicle Tracking Technologies", International Journal of Advanced Computer Science and Applications, Vol. 4, No. 6, 2013