

Intelligent Vehicle Tracking System Using GPS on Android Smartphone and Pothole Detection

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ABSTRACT

GPS is one of the technologies that are widely accepted and used in a huge number of applications today. One of the applications is keeps regular monitoring and tracking your vehicle. Intelligent Vehicle Tracking System (IVTS) can inform you information can be observed from any remote location and the route and location travelled by vehicle. Intelligent Vehicle Tracking System (IVTS) includes the web application that provides exact and precise location of target vehicle. Intelligent Vehicle Tracking System (IVTS) helps user to track target vehicle in any weather conditions. In Intelligent Vehicle Tracking System (IVTS), GPS tracker device is attached to the vehicle. If the vehicle is stolen it automatically sends location of the vehicle to its owner as a SMS through GSM modem. Intelligent Vehicle Tracking System (IVTS) will be a much simpler and cost effective technique compared to others. Through Intelligent Vehicle Tracking System (IVTS) technique additional information about vehicles (e.g. exact location, speed) will be obtained. In Intelligent Vehicle Tracking System (IVTS), Pothole detection is the additional feature added.

Keywords: GPS (Geo-positioning system), VTS (Vehicle Tracking System), And IoT (Internet of Things), and IVTS (Intelligent Vehicle Tracking System).

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I. INTRODUCTION

The ability to track, trace and control anything by anyone from anywhere on the planet has been mankind's unfulfilled desire. The usefulness of GSM and GPS has made them popular in their own context; integrating these technologies can prove to be an accurate solution for many unsolved problems. The idea of IVTS is to integrate these two technologies into one system and provide an effective application for vehicle tracking as well as personal tracking. To implement a multi tracking system use of the following two technologies can be made, firstly GSM (Global System for Mobile) which is a set of standards to describe technologies for Second Generation (2G) and GPS (Global Positioning System) which is a satellite-based navigation system consisting several satellites revolving around the earth. IVTS will provide solution for tracking and tracing of multiple movable objects at a same time, so the name Intelligent Vehicle Tracking System (IVTS). IVTS shows current location of the object and other add-on features, for vehicles there will be live tracing, tracking and pothole detection GPS, controlling its subsystem parts via GSM

network using SMS or GPRS. IVTS will be implemented in java with android application.

What is IVTS?

Intelligent Vehicle Tracking system (IVTS) is tracking or tracing system for vehicles. IVTS will be useful because of its features such as Pothole detection and vibration sensing technology. Pothole detection is used to see the quality of the road by the sensor. The sensor here used is ultrasonic sensor. The sensor uses a threshold value in which if it triggers the threshold value then it will signal through the android application and plot the point on the map.

II. RELATED WORK

In Real time tracking system GM862 quad band of cellular module is used for implementation. [1] A graphical user interface and monitoring server on a website is also developed using ASP.net and Microsoft SQL Server 2003 to

view the proper location of a vehicle on a specific map like google, bing. Real time tracking system provides information about the vehicle status such as mileage, speed. Automobile anti-theft system using GSM and GPS module system [2] allows anti-theft system which makes easy for the user to protect their vehicle on the basis of RFID tracking system. Automobile anti-theft system using GPS module and GSM module system uses geo-fencing. Automobile anti-theft system using GPS module and GSM module system alerts the user by message on the user's android smart phone. Main advantage of Automobile anti-theft system using GPS module and GSM module is tracking of vehicle is easy because of RFID tag. Development and deployment of GPS and GSM module based Vehicle Tracking and Alert System. [4] Development and deployment of GPS and GSM module based Vehicle Tracking and Alert system allows inter-city, intra-city transport companies to track their vehicles in real-time and provides security from accident occurrences and armed robbery. Development and deployment of GPS module and GSM based Vehicle Tracking and Alert System useful for large size organization. Tracking and Routing System for Mobile Vehicles in Large Area system allows vehicle tracking system using GPS tracker and sensor attached to the vehicle. [5] As transport companies travel a long distance in a circuit Routing and Tracking System for Mobile Vehicles in Large Area system helps the companies to track their particular vehicles. Development and deployment of GPS module and GSM based Vehicle Tracking and Alert system and Routing and Tracking System for Mobile Vehicles in Large Area system are developed for same purpose. Cloud Computing for Agent Based Urban Transportation System [7] allows storing the information of the particular vehicle. The coordinates (latitude and longitude) are stored as the vehicle moves through a path. Coordinate information helps the user to track the vehicle. The server stores the information in a key format and used later for tracking operation. Real time pot-hole detection system using Android smart phones with ultrasonic sensors system allows [8] the user to get the reliability of the road. The ultrasonic sensor is a sensor which gives the intensity of the obstacles in the road. Real time pot-hole detection system using Android smart phones with ultrasonic sensor system will also indicate the driver with an audio and also plot the points on the map. Android Interface Definition Language (AIDL) [9] system allows the user to navigate through the application. Android is used to make an application for the ease of the user. An efficient GUI is designed to get the tracking details about the vehicle and to show the details of the sensor and the points on the map where the potholes are plotted. Advantage of Android Interface Definition Language (AIDL) system is user friendly GUI. Safe Driving Using Mobile Phones system allows [10] the user to track the motion of the vehicle. The android application provides a graphical view of the moving of the vehicle with the help of Google maps. As pothole detection is used the user is aware of the quality of the road which eventually will help user to save some time by using a different route. Intelligent Transportation Systems Society of Canada [6] is knowledgeable source for advice and information on intelligent transportation systems in Canada, and positions itself to be fair and unbiased by not lobbying for or promoting government policy or any specific commercial interest.

III. PROPOSED SYSTEM

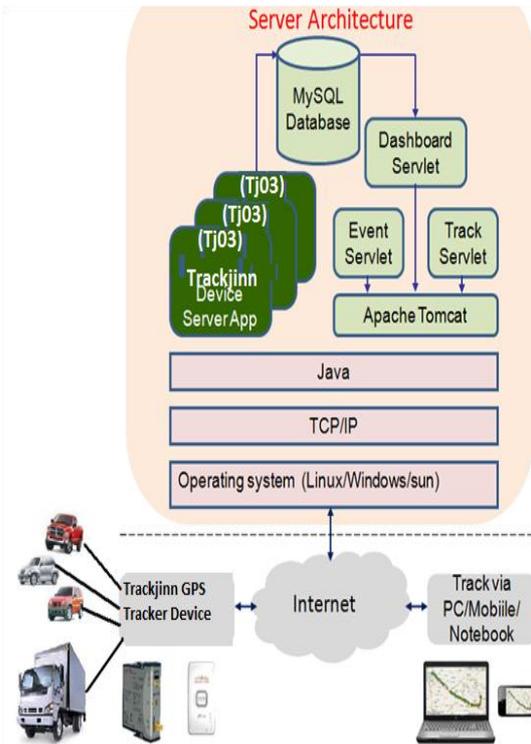


Fig-1: Proposed system of Vehicle Tracking System

There are some challenges in developing a smart Transport System –

1. Sustainable tracking is not possible just by increasing the infrastructure available. Considering infrastructure which uses less space and is efficient is a major task to perform.
2. Implementing Vehicle tracking system becomes a big deal when additional features are added to its infrastructure like safety, privacy, large fence area, etc. Changing the traditional methods to completely intelligent tracking system is a total change of the system. The main problems that are hampering this change to materialize are not just technological limits, but conceptual, social, cultural, emotional, political and economic hurdles.

IV. FUTURE-WORK

The GPS-based model was applied to a running vehicle tracking service as well as used to simulate a hypothetical public security service. The development and deployment of a GPS-based model is a contribution to the literature survey. Future improvements to the model should include the addition of reports of obstacles, vehicle details, intrusion detection and better algorithms.

V. CONCLUSION

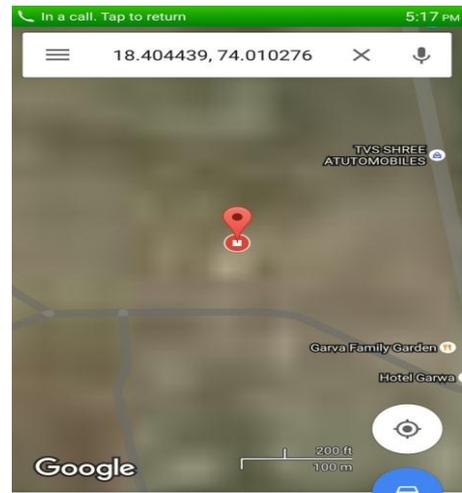
Intelligent Vehicle Tracking System Using GPS on Android Smartphone paper deals with the efficient way of tracking the vehicles and easy communications between two ends. The pothole detection feature then gives us the reliability of the road and on collaborating with the government it will be an easy task to prioritize the repairs. The sensors may perform to the fullest and store data in the information repository. The methods used for storage of data makes it easy to store as well as retrieve the data whenever needed. Nowadays as people are using smart-phone devices

which are easy to carry same goes to the system proposed as a simple android application helps the user to register the vehicles and track them whenever needed. It also provides a security to the rental data which is stored neat, clear, and not lost or spilled.

VI. RESULT



Fig 2. GPS Tracker Device



18°24'16.0"N 74°00'37.0"E
Labeled as Location:null 30 min

Fig 5. Pin point values(Lat, long values)

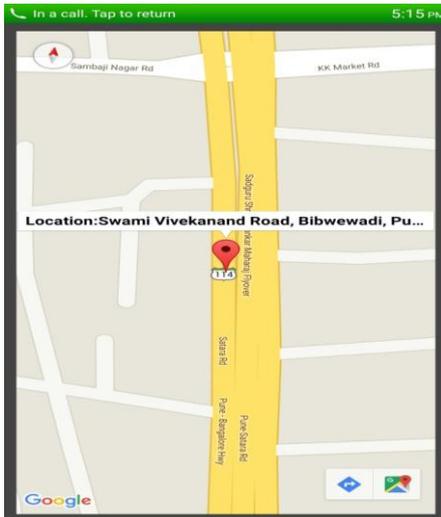


Fig 3. Pinpoint location of vehicle

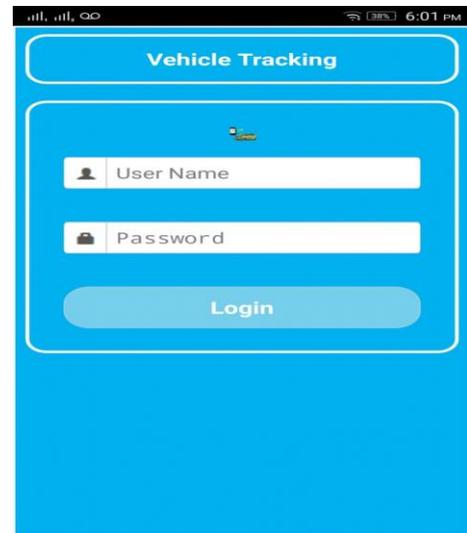


Fig 6. GUI of GPS Tracker application

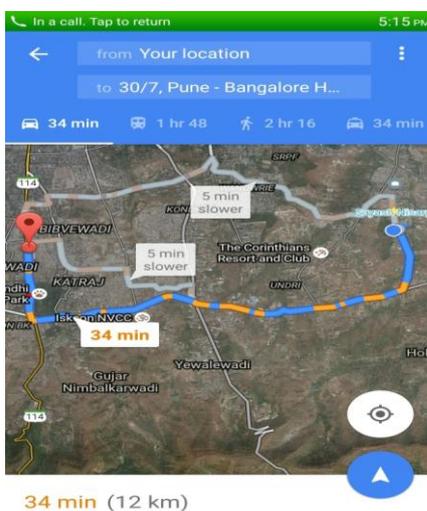


Fig 4. Route to the pinpoint location

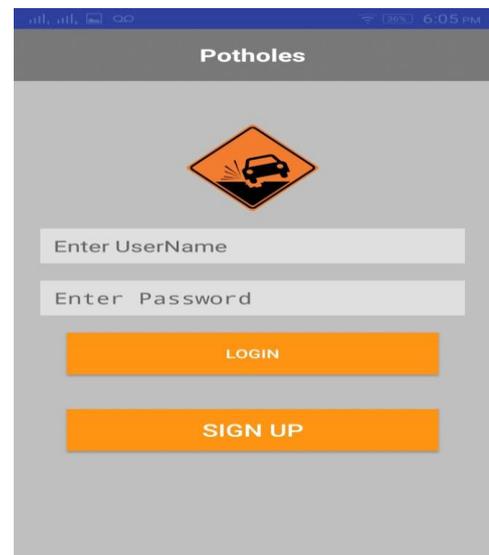


Fig 7. GUI of Pothole detection

REFERENCES

- [1] El-Medany, W.; Al-Omary, A.; Al-Hakim, R.; Al Irhayim, S.; Nusaif, M., "A Cost Effective Real-Time Tracking System Prototype Using Integrated GPS/GPRS Module," Wireless and Mobile Communications (ICWMC), 2010 6th International Conference on, vol.no., pp.521,525, 20-25 Sept.2010 International Journal of Computer Science, Engineering and Applications (IJCEA) Vol.3, No.3, June 2013
- [2] Hu Jian-ming; Li Jie; Li Guang-Hui, "Automobile Anti-theft System Based on GSM and GPS Module," Intelligent Networks and Intelligent Systems (ICINIS), 2012 Fifth International Conference on , vol., no., pp.199,201, 1-3 Nov. 2012
- [3] Nagaraja, B. G.; Rayappa, R.; Mahesh, M.; Patil, C.M.; Manjunath, T.C., "Design Development of a GSM Based Vehicle Theft Control System," Advanced Computer Control, 2009. ICACC '09. International Conference on, vol., no., pp.148, 152, 22-24 Jan. 2009
- [4] 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
- [5] Le-Tien, T.; Vu Phung-The, "Routing and Tracking System for Mobile Vehicles in Large Area," Electronic Design, Test and Application, 2010. DELTA '10. Fifth IEEE International Symposium on, vol., no., pp.297, 300, 13-15 Jan. 2010
- [6] Intelligent Transportation Systems Society of Canada: <http://www.itscanada.ca/english/index.htm>, last accessed on Dec. 20th, 2010.
- [7] Ramlalit, Pankaj Kumar Singh, Ashutosh Kumar, "Cloud Computing for Agent Based Urban Transportation Systems," International Journals for Computer Science and Information Technologies, vol. 3(6), 2012, 5508-551.
- [8] Mendis, A.; Digital Signal Process. Lab., Inst. of Electron. & Comput. Sci., Riga, Latvia, Strazdins, G., Zviedris, R., Kanonirs, C., "Real time pothole detection using Android smartphones with accelerometers" Distributed Computing in Sensor System and Workshops, IEEE CONFERENCE PUBLICATIONS , pp.1-6, June 2011.
- [9] Android Interface Definition Language (AIDL), URL: <http://developer.android.com/guide/components/aidl.html> [accessed: June 2014].
- [10] Mohamed Fazeen, Brandon Gozick, Ram Dantu, Moiz Bhukhiya, and Marta C. González, "Safe Driving Using Mobile Phones" IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 13, NO. 3, pp.1462-1468, SEPTEMBER 2012.