

Tracking Location & Speed of Vehicles: Using GPS on Android Platform

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Abstract- As urban living environment is becoming more and more complex, the road condition is becoming worse because of heavy traffic, increase of traffic accidents and high ratio of empty vehicles. It increases the cost of transportation and wastes time of vehicle movement. To solve such problems, a land vehicle tracking system has been developed. A land vehicle tracking system determines the position of land rover with a terminal with embedded GPS receiver or PCS phone and displays the position on a digital map. Recently, vehicle tracking technologies have brought some breakthrough in these areas: commercial vehicle operations, fleet management, dispatching, emergency rescue, hazard material monitoring, and security.

This system is useful for fleet operators in monitoring driving behavior of employees or parents monitoring their teen drivers. Moreover, this system can be used in theft prevention as a retrieval device in addition of working as a security system combined with car alarms. The main contribution of this paper is providing two types of end user applications, a web application and a mobile application. This system provides a ubiquitous vehicle tracking system with maximum accessibility for the user. The system's tracking services includes the location and ground speed of a given vehicle in the current moment or on any previous date.

Keywords: Android, AGPS, Eclipse, GPS, Internet, Java, Land, Mobile App, Vehicle Tracking

A vehicle tracking system combines the installation of an electronic device in a vehicle, or fleet of vehicles, with purpose-designed computer software at least at one operational base to enable the owner or a third party to track the vehicle's location, collecting data in the process from the field and deliver it to the base of operation. Modern vehicle tracking systems commonly use GPS or GLONASS technology for locating the vehicle, but other types of automatic vehicle location technology can also be used. Vehicle information can be viewed on electronic maps via the Internet or specialized software. In case of our software the device that we are going to use is an android phone and the vehicles will be watched by an administrator using a web application. This paper proposes a system that aims to make vehicle tracking easier and more available for any individual user in addition to fleet companies. A major concern is the parents who wish to monitor their teen drivers. The proposed system does not only provide the traditional web-based tracking software, but it also provides a mobile software that enables anytime and anywhere tracking services for a wider range of users. The system allows people to track down their vehicles position, speed, stops, and movements. The system is employed in monitoring a given vehicle when another person is driving it. *in italic type, within parentheses, following the example.*

I. EASE OF USE

Due to the increasing need of vehicle tracking, many systems have been proposed, designed and implemented. This section discusses some of the basic features that previous systems provided. Previous systems contain set of components and services that

are provided to the user either via a website or pre downloaded software. They usually use GPRS to retrieve. Besides tracking such as allowing the user to search for addresses and directions, and historical playback for vehicle's movement. Another way to provide these services is by an application that can be downloaded on an administrator PC for fleet management and these applications provide distance calculations in addition to the basic tracking system.

The main contribution of this paper is to present a system that provides tracking services anytime, anywhere. This ubiquitous tracking system provides all the basic tracking functionalities using a mobile application developed using Java2 Platform, Micro Edition (J2ME). The mobile application is connected to the Internet via GPRS in addition to the web-based application that will provide the same functionalities but with more services.

Related Work Done:

Paper Name	Author	Content
"Land Vehicle Tracking System using Java on Android Platform"	Ramesh Chandra Gadri, Bhagyashree Alhat	A land vehicle tracking system determining the position of land rover with embeded GPS receiver or PCS phone and displays the position on digital map.
"Implementation of Internet-Based Land Vehicle Tracking System using Java"	Mi hyun Eom, Eun Young Han, Hee Soon Changes	In this paper, the location of the moving vehicle is tracked by using internet.
"A Novel Map Matching Algorithm to Improve Vehicle Tracking System Accuracy"	Agung Dewandaru, Abas M. Said, Abdul Naste Matori	In this paper, using a "Novel-Map-Matching Algorithm" the vehicle tracking is done and system accuracy is achieved.

II. SYSTEM OVERVIEW

The proposed GPS vehicle tracking system is mainly implemented using JAVA 2 Enterprise Edition platform (J2EE5) , JAVA 2 Standard Edition Platform (J2SE 6). The maps used in both the web-based and the mobile applications are Google maps, and the hardware used is "Orion Easytrac" device which is a GPS/GSM/GPRS module. The main services provided by our system fall mainly into the following categories:

3.1 Maps

Google maps are provided to show the last updated position of all the user`s vehicles, and a static Google map is sent to them mobile application as an image that represents the current location of a selected vehicle. The reports are also provided with a map to show the location history of each vehicle. In addition to that, maps are used to draw geo-fences as circles that cover the area chosen by the administrator user and the coordination of these circles are saved in the database.

3.2 Alerts

SMS notifications are sent to the user`s cell phone when one of these four events occur.

1. Over-Speeding.
2. Enter/Exit a Geo-fence area.
3. Car Stops/Moves.
4. Car Alarm going on.

3.3 Reports

Reports are provided to examine the history of a certain vehicle over a selected period of time. There are three types of reports that can be generated using the proposed system:

1. Standard report: a periodic report sent from the device in a user-defined time interval that provides standard GPS data including location (longitude and latitude), speed on ground and the exact time of when the readings were taken. All the user has to do to generate this report is to select a time interval to show this information that is recorded in the database at that interval.
2. Speeding report: filters out the standard report by setting a speeding value and only showing records of

speed higher than the defined threshold value. This way, it becomes much easier for the user to filter out the times and locations where her/his vehicle was over speeding. All the user has to do to generate this report is to select a time interval and enter a speed limit value to show all the times that a selected vehicle has exceeded this speed limit and what was the speed value at that moment.

3. Stops report: shows each time the vehicle has stopped for more than a time threshold specified by the system administrator (e.g. 5 minutes) and at which location the vehicle has stopped. The proposed GPS system is divided into three main parts: the Server, the Client applications, and the GPS tracking device.

A. Server Side:

The server side in our system consists of five components that interact with each other to provide the required services. These components are SMS server, GPRS server, Web server, Database, and the GSM modem.

B. Client side:

The clients in our system are the web application and the mobile application. These applications interact with the server side by sending and receiving HTTP requests as mentioned earlier.

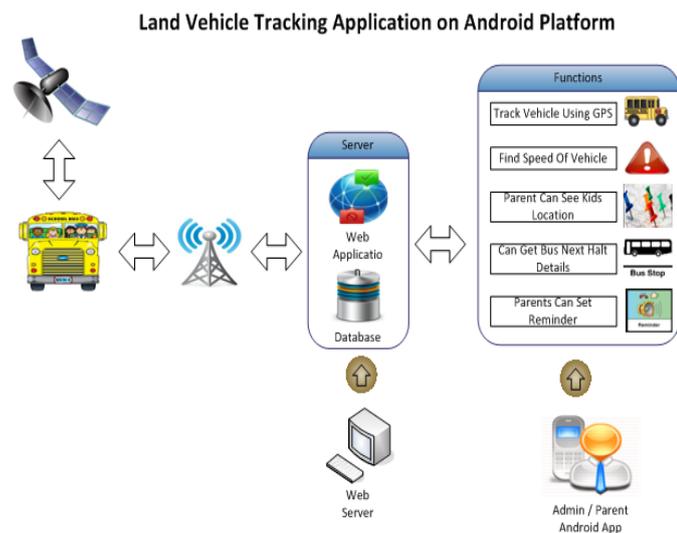


Fig. 1 The overall architecture of the system.

III. APPLICATIONS

1 Vehicle tracking systems are commonly used by fleet operators for fleet management functions such as fleet tracking, routing, dispatch, on-board information and security.

2 Vehicle tracking systems are also popular in consumer vehicles as a theft prevention and retrieval device. Police can simply follow the signal emitted by the tracking system and locate the stolen vehicle.

3 Asset tracking: Companies needing to track valuable assets for insurance.

4 Field service management: Companies with a field service workforce for services such as repair or maintenance, must be able to plan field workers' time, schedule subsequent customer visits and be able to operate these departments efficiently.

5 Field sales: Mobile sales professionals can access real-time locations.

6 Trailer tracking: Haulage and Logistics companies often operate Lorries with detachable load carrying units.

IV. RESULT AND ANALYSIS

Description	Input Data	Result
Search Route	Enter source and destination	Display Bus details
Add vehicle	Bus no., stops, route, time	Bus details are added to database
Set Route	Enter details of bus route	New route is added to database
Calculate Speed	Enter bus number	Location is tracked and speed is calculated
Display Map	Enter source and destination	Showing map from respected source to destination
Setting Alarms	Enter the name of stop	Giving intimation to user
Stop Intimation	Need to on the alarm	Signaling alarm to user

VI. CONCLUSION

Hence, we have implement the system which provides the various facilities to the client related to the bus application like to see the all bus details such as bus route, bus timings, bus stops and also facility to the admin for adding the new routes or other bus details.

The very important feature provide to the admin is finding the location and speed of the bus or client vehicle.

VII. FUTURE SCOPE

This system can also be used to prevent car theft by combining the device with the car alarm and also obtaining a map containing the car location if the car is thought to be stolen. Tracking vehicles in our system utilizes a wide range of new technologies and communication networks including GPRS, GSM, the Internet or the World Wide Web and GPS. All the services provided by this system had been tested in the real life. We implemented a system which is composed of a combination of a low-cost hardware unit and a user-friendly Android-based mobile application software utilized to create an on-board vehicle diagnostic system. For future work, more services could be added to the mobile application and also the graphical user interface could be improved.

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REFERENCES

[1] Mi Hyun Eom, Eun Young Han and Hee Soon Chang. (2001), "Implementation of Internet- based Land Vehicle Tracking System using Java"

[2] Chia-Chi Teng and Richard Helps. (2010), "Mobile Application Development: Essential New Directions for IT"

[3] Agung Dewandaru, Abas M. Said and Abdul Nasir Matori. (2007), "A Novel Map-matching Algorithm to Improve Vehicle Tracking System Accuracy"

[4] Feng Liu, Jan Sparbert and Christoph Stiller. (2008), "IMMPDA Vehicle Tracking System using Asynchronous Sensor Fusion of Radar and Vision"