Vehicle Tracking System using GPS

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Abstract—*The motivation for every location based information system is to assist with the exact information, at right place in real time with personalized setup and location sensitiveness. In this era we are dealing with palmtops and iPhones, which are going to replace the bulky desktops even for computational purposes. We have vast number of application and usage where a person sitting in a roadside cafe needs to get relevant data and information. Such needs can be catered with the help of LBS. These applications include security related jobs, general survey regarding traffic patterns, decision based on vehicle information for valid registration and license numbers etc. This electronic document is a live template. The various components [title, text, heads, etc] are already defined on the style sheet, as illustrated by the portions given in this document. A very appealing a application includes surveillance where instant information is needed to decide if the people being monitored are any target. We have been able to create a number of different applications where we provide the user with information regarding a place he or she wants to visit. But these applications are limited to desktops only. To import them on mobile devices ensure that a person when visiting places need not to carry travel guides with him. All the information must be available in his mobile device and also in user customized format.*

1. INTRODUCTION

Mobile phones and the Internet have revolutionized the communication and with it the lifestyle of people. An increasing number of mobile phones and Personal Digital Assistants (PDA) allow people to access the Internet where ever they are and whenever they want. From the Internet they can obtain on one hand information events (cinema, concerts, parties) and on the other hand information on places (city maps, restaurants, museums, hospitals). Suppose somebody wants to take a dinner in a restaurant and is therefore searching a restaurant in the Internet. A useful approach to prevent that one gets as search result every restaurant web-page on the world one could restrict the search by adding further search criteria. A good choice is the city where the mobile user is (position), the actual time (evening) or a special type of restaurant (Chinese or Greek). Such kind of restaurant search with respect to position and time can be done by use of a Location Based Service (LBS).The appearance of different technologies such as wireless networks, Internet, Geographical Information Systems (GIS) and Global Positioning Systems (GPS), have introduced a new type of information technology called Location Based Service (LBS). Location Based Services is defined as the ability to locate a mobile user geographically and deliver services to the user based on user's location. The aim of this paper is to understand Location Based Services (LBS) and identify its key components behind service providing then shed some light on the limitation preventing the technology advancement. LBSs are information services accessible with mobile devices through the mobile network and utilizing the ability to make use of the location of the mobile device. A LBS services can be used in a variety of contexts, such as health, work, personal life, etc. LBS include services to identify the location of a person or object, such as discovering the nearest banking cash machine or the where about of a friend or employee. LBS services include parcel tracking and vehicle tracking services. LBS give the possibility of a two way communication and interaction. Therefore the user tells the service provider his actual context like the kind of information he needs, his preferences and his position. This helps the provider of such location services to deliver information tailored to the user needs.LBS have two major actions, that is:

1. Obtaining the location of user.

2. Utilizing this information to provide a service. LBS services can be categorized as triggered LBS services (push services) and user-requested LBS services (pull services). In a triggered (push) LBS service, the location of user's mobile device is retrieved when a condition set in advance is fulfilled. For example, a call to emergency center can automatically trigger a location request. Advertisement messages can be delivered to users who enter a specific area in a shopping mall, and warning messages can be delivered to users who are in the area where weather conditions will change (e.g. hurricane, rain). In a user-requested (pull) LBS service, the user decides whether and when to retrieve the location of his/her mobile device and use it in the service. User-requested LBS service can involve personal location (i.e. finding the current location of the user) or services location (i.e. finding the location of the nearest restaurant or bank). Navigation and direction system is an example of pull LBS services**.**

2. LITERATURE SURVEY

LBS (Location Based Services) is not what they are inside of but rather what they are not an active part of and the answer is

very little. They are a part of virtually all control and policy systems which work in computers today. They have evolved from simple synchronization based service models to authenticated and complex tools for implementing virtually any location based service model or facility.

2.1. Foundation of Location Based Services

Stefan Steiniger, Moritz Neun & Alistair Edwardes [1] , Location Based Services (LBS) are developing rapidly in the mobile and information technologies (IT) fields. Increase demand to modern technologies and interest in utilizing geospatial information servers to provide useful information and services to mobile users though wireless networks plays a very important factor to LBS advancement. Location based service (LBS) is emerging as a killer application in mobile data services thanks to the rapid development in wireless communication and location positioning technologies. Users with location-aware wireless devices can query about their surroundings (e.g., finding the nearest restaurant or all shopping malls within 5 miles) at any place, anytime. While this ubiquitous computing paradigm brings great convenience for information access, the constraints of mobile environments, the spatial property of location-dependent data, and the mobility of mobile users pose a great challenge for the provision of location-based services to mobile users.

2.2. Perceived effectiveness of Push vs. Pull mobile location based advertising

Ramaprasad Unni, Robert Harmon [2] , *Push services imply that the user receives information as a result of his or her where about without having to actively request it. The information may be sent to the user with prior consent (e.g., a subscription based terror attack alert system) or without prior consent (e.g., an advertising welcome message sent to the user upon entering a new town) Pull services, in contrast, mean that a user actively uses an application and, in this context, "pulls" information from the network. This information may be location-enhanced (e.g., where to find the nearest cinema).*

2.3. Location Based Services

Thamer Abulleif & Abdulwahab Al-Dossary [3] , GPS is the worldwide satellite-based radio navigation system, consisting of 24 satellites, equally spaced in six orbital planes 20,200 kilometres above the Earth, that transmit two specially coded carrier signals, one for civilian use and one for military and government use. The system's satellites transmit navigation messages, which a GPS receiver uses to determine its position. GPS receivers process the signals to compute position in 3D – latitude, longitude, and altitude – with an accuracy of 10 meters or less. The main advantage of this technique is that the GPS system is already in use for many years. GPS uses these satellites to calculate positions accurately to a matter of meters. The positions are measured using the receivers themselves or processed on the network then the actual position is sent to the user.

## 2.4. Implementing Location Based Service in Android using GPS & web services

Manav Singhal, Anupam Shukla[4] , Location based Services offer many advantages to the mobile users to retrieve the information about their current location and process that data to get more useful information near to their location. With the help of GPS in phones using GPRS, Location based Services can be implemented on Android based smart phones to provide these value-added services: advising clients of current traffic conditions, providing routing information, helping them find nearby hotels.

3. SYSTEM DESIGN AND ANALYSIS

The system design involves different stages.

3.1. General architecture

LBSs contain a number of components including maps and Geographic Information System (GIS) information, location collection services, and LBS application-specific subcomponents. The architecture of LBS can be generalized as shown in Fig. 1
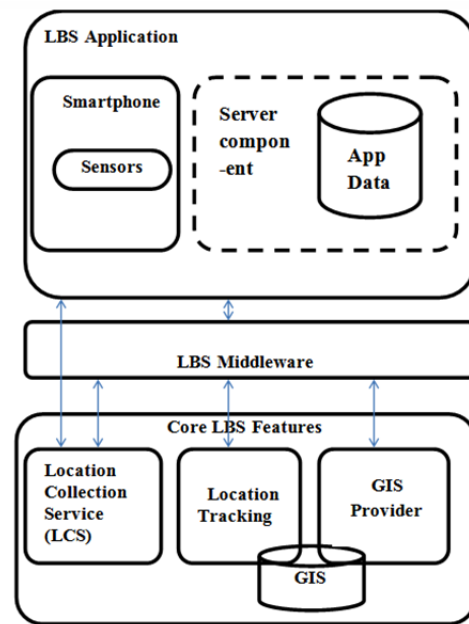
Fig. 1: Architecture of LBS

3.1.1 LBS application

This represents a specific application such as a "find my friends" application. This consists of a Smartphone component, which has a number of sensors, and potentially a server component that includes application-specific data (such as location-tagged information).

3.1.2 LBS Middleware

This wraps access to Core LBS Features (Location Tracking, GIS Provider and Location Collection Services) to provide a consistent interface to LBS applications.

3.13 Location Tracking

This component stores the location trace of individual users. This represents a fundamental component in next-generation LBS as it contains the data that allows a user's route to be determined and potentially predicted. In particular, this component would typically support the following functionality:

- Keep records on user's current and past locations.

- Notify other components when a specific user has moved, or when they move in or out of an area. This supports location-based notifications being sent to users.

- Determine which users are within a defined location this supports geocasting features.

- Queries of location trace to generate user movement models.

3.1.4 GIS Provider

This component provides geospatial functionality for many LBSs including map information, map visualization and directory services. Google Maps with its API can be considered a GIS provider.

3.1.5 Location Collection Service

This component performs location collection to get a latitude and longitude for a specific user. Depending on the technology, this component may be accessed via the LBS Middleware (e.g., mobile network triangulation via a service provider) or directly (e.g., via GPS receiver in the Smartphone).

3.1.6 LBS Service Classes in Android

Android provides access to the above components to facilitate the implementation of LBS services through the help of following classes:

- Location Manager
- Location Provider
- Geocoding
- Google-Map

Location Manager: Location Manager Class of android is present to manage all other components needed to establish a LBS system.

Location provider: Location provider represents the technology to determine the physical location i.e. to handle GIS. Location Provider component of Android application is a present to facilitate the determination of available provider and selection of suitable one. To get a list of names for all the providers available on the device, call get Providers method.

In addition to this GPS provider and Network provider can be accessed directly by using the static variables defined in the Location Manager class:

Furthermore for finding the provider on the basis of some criteria we can use the criteria class and then can find the best provider for defined criteria using the Best Provider method. If more than one provider is available fulfilling the given criteria then the one with best performance is returned. On the other hand if no provider is found for the defined criteria then criteria are loosened in order Power use, Accuracy, Ability to return bearing, speed, and altitude.

Geocoding

Reverse geocoding: provides a way to convert geographical coordinates (longitude, latitude) into street address. **Forward geocoding** provides a mean to get geographical coordinated from street address. For forward geocoding we use get Latitude() and get Longitude() method. For reverse geocoding we use get From Location method with geocoder.

Google Map in Android: Android provides a number of objects to handle maps in LBS system like MapView which displays the map. To handle this a Map Activity class is there. To annotate map it provides the overlays class. Even it provides canvas by which one can easily create and display multiple layers over the map. Moreover, sufficient provisions are there to zoom the map, localize the map by means of Map Controller.
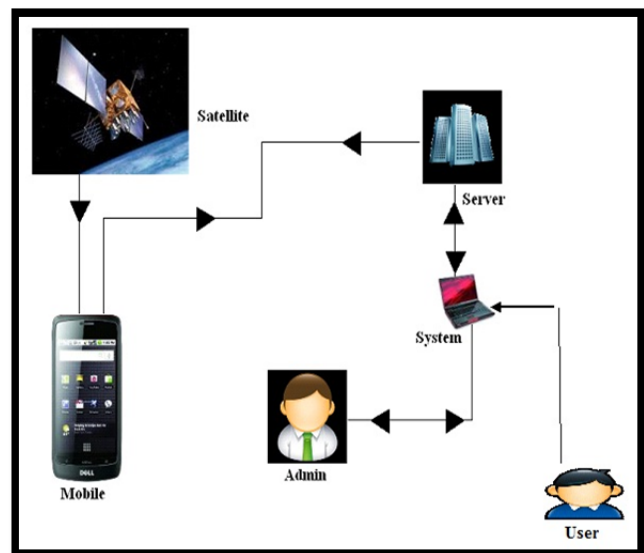

Fig. 2: Architecture of location based service

4. IMPLEMENTATION

4.1 Proposed algorithm

The purpose of this is to give a brief description about various implementation tools, like the languages, the modules created and the details of the module implementation.

4.2 Digital Diary

Digital diary get location details of latitude and longitude values. The values are stored in digital diary database.

4.3 Implementation Phases

The objective of this application "**Vehicle Tracking System Using GPS and Vehicle Number"** is to serve the services to you and your family based on your location. This also ensures that we follow the mobile etiquettes which are the common courtesies for using the mobile phone in a responsible manner. This apps allows you to Knowing where your loved ones are even when they are not paying attention to their mobile by entering the vehicle number we can get the location of the vehicle, and also as a re-collector (Digital Diary).This apps mainly consists of Five main modules.

5. OBJECTIVES

5.1 Locate Them

Allows you to know where your relatives, friends are by entering the vehicle number. A tracking system, with GPS, for your family safety when we not paying attention to their mobile

5.2 Digital Diary

This application would track the Location for particular intervals and save the location details on server. That way you can later go back to a specific day and find out where you were or locations and keep a log of your life.

5.3 Service Process

1) First, user sends a service request using the application running on mobile device.

2) The service request, with user's current location information obtained from the positioning component (in this example, GPS data), is sent to service server via the mobile communication network.

3) The service server requests geographic database and other related database to get required information.

4) The request information is send back to the service server from the geographic database and other related database.

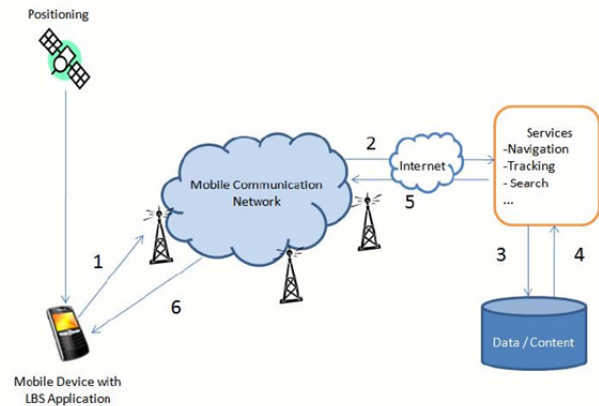5) At last, the requested information is sent back to user's mobile phone via mobile communication network.

Fig. 3: Service process

6. ADVANTAGE & DISADVANTAGES

Advantages of an Android are listed as:

Android is Open Source.

Android supports multitasking.

Easy access to the Android App Market.

Third party development is encouraged.

In contrast to advantages Android has following disadvantages:

Android does not support some applications like Firefox. Wasteful Battery.

Many applications contain virus.

7. CONCLUSION

Initially mobile phones were developed only for voice communication but now a days the scenario has changed, voice communication is just one aspect of a mobile phone. There are other aspects which are major focus of interest. Two such major factors are web browser and GPS services. Both of these functionalities are already implemented but are only in the hands of manufacturers not in the hands of users because of proprietary issues, the system does not allow the user to access the mobile hardware directly. But now, after the release of android based open source mobile phone a user can access the hardware directly and design customized native applications to develop Web and GPS enabled services and can program the other hardware components like camera etc. The LBS application can help user to find hospitals, school, gas filling station or any other facility of interest indicated by user within certain range. GPS device will update the location as soon as user changes his/her position.

8. FUTURE SCOPE

- Better traffic management by analyzing traffic patterns by individuals and (or as a whole).

- Learn individual's emissions and house hold information to lead to better/smart city concept.

- With the anticipation of big data and over 90% of total data in the world coming only in 2012, collaborating LBS with big data leads to better Customer Relationship Models (CRM) and understanding the consumer preference levels in details, which otherwise is not possible.

- Culprit tracking by exchange of information.

REFERENCES

[1] Stefan Steiniger, Moritz Neun and Alistair Edwardes2 , Foundations of Location Based Services.

[2] Ramaprasad Unni, Perceived Effectiveness of Push vs Pull Mobile Location Based Advertising

[3] Thamer Abulleif & Abdulwahab Al-Dossary, Location Based Services

[4] Manav Singhal1, Anupam Shukla[4], Implementing Location Based Service in Android using GPS & Web Services

[5] Brimicombe, A. J., 2002. GIS - Where are the frontiers now?. In: *Proceedings GIS 2002*., Bahrain, 33-45.

[6] Burrell, J. and Gay, G.K., 2002. E-graffiti: evaluating real-world use of a context-aware system. *Interacting with Computers*, 14(4), July, 2002 (Special Issue on Universal Usability), 301-312. (Download)

[7] Chalmers, M. and Galani, A., 2004. Seamful interweaving: heterogeneity in the theory and design of interactive systems. In: *Proceedings of the 2004 conference on Designing interactive systems: processes, practices, methods, and techniques.*, (ACM DIS), August 01-04, 2004, Cambridge, MA, USA. New York: ACM, 243-252. (Download)

[8] Chalmers, M., Bell, M., Hall, M., Sherwood, S., and Tennent, P., 2004. Seamful Games. In: *Adjunct Proceedings of 6th Int. Conf. on Ubiquitous Computing.*, UbiComp 2004 - Demonstrations Proceedings, Sept 7-10, 2004, Nottingham, England. . (Download)

[9] Chen, G., and Kotz, D., 2000. Technical Report: *A Survey of Context-Aware Mobile Computing Research.* Dept. of Computer Science, Dartmouth College, TR2000-381. (Download)

[10] Collins, P., Shukla, S., Redmiles, D., 2002. Activity Theory and System Design: A View from the Trenches. *Computer Supported Cooperative Work*, 11, 55-80. (Download)

[11] Dey, A., 2001. Understanding and Using Context. *Personal and Ubiquitous Computing.*, 5(1), 4-7. (Download)

[12] Dobson, J.E., Fisher, P. F., 2003. Geoslavery. *IEEE Technology and Society Magazine*, 22 (1), 47-52.

[13] Dru, M-A., Saada, S., 2001. *Location-based mobile services: The essentials.* Alcatel Telecommunications Review, first quarter, 71-76. (Download)

[14] Edwardes, A., Burghardt, D., Weibel, R., 2003. WEBPARK – Location based Services for Species Search in Recreational Areas. In: *Proceedings of the 21st International Cartographic Conference.* Durban, South Africa. (Download)

[15] Espinoza, F., Persson, P., Sandin, A., Nyström, H., Cacciatore. E. and Bylund, M., 2001. GeoNotes: Social and Navigational Aspects of Location-Based Information Systems. In: Abowd, Brumitt and Shafer, ed. Ubicomp 2001: *Ubiquitous Computing.*, International Conference, September 30 – October 2, Atlanta, Georgia. Berlin: Springer, 2-17. (Download)

[16] Heidmann,F., 1999. *Aufgaben- und nutzerorientierte Unterstützung kartographischer Kommunikationsprozesse durch Arbeitsgraphik: Konzeptionen, Modellbildung und experimentelle Untersuchungen.* Herdecke: GCA-Verlag.