

Location Based Services, Change in Profile and Notification

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Abstract:

In today's world time management is a big task. Now a day, we have a trend of using smart phones supporting different tools and applications which could make our life simple. The proposed study is based on android devices such as smart phones and tablets running on the Android operating system. A location-based service (LBS) is a mobile application that is dependent on the location of a mobile device. A positioning component is usually needed in a LBS application to determine the location of user's mobile device. Most of the current LBS services do not require users to input location manually, like giving zip code or street name. In the proposed system we will discuss about the application which provides the service of automatic profile changing, weather detection, sending message automatically by taking current location of user in case of emergency and remainder based on the user's location from one to other. It uses internet connection and GPS services to learn about the user's current location.

Key Words: LBS, Android Operating System, GPS, SQLite.

1. INTRODUCTION

The idea of using the mobile phones is to deliver the valuable services. Location-based services or LBS refer to a set of applications that exploit the knowledge of the geographical position of a mobile device in order to provide services based on that information. Location based services (LBS) provide the mobile clients personalized services according to their current location. They also open a new area for developers, cellular service network operators, and service providers to develop and provide value-added services: advising clients of current traffic conditions, providing routing information, helping the users to find nearby shopping malls. Location-based

services offer many merits to the mobile clients. For the mobile user, the examples of location based services are:

- Profile changer based on place or area
- Person Location tracking by Family Member
- Nearest Friends notification reminder

Location based Services can be classified in following categories

a. Public Safety / Emergency Services-

The location of the client can be determined by the mobile carrier hence it finds great use during Emergency since it can be used during the emergency/health hazard to locate the mobile clients.

b. Consumer Services-

Now days, smart phones like (Android, Blackberry and iPhone) provide a set of location based applications and services which helps the users to access the multiple services based on the user location.

- Maps Navigation - The users can use the Google Maps to get to the particular location or to trace the route between any two locations.
- Marketing /Advertising - Many corporate companies advertise their items based on the location of the clients. For Example - Sale in Shopping Mall near to your location.
- Location based Reminders - The phones can be used to set as the reminder based on the location.

This proposal is made on the basis of "Location based services on smart phone using Android application." and is been designed to be automatic using the GPS services provided by the smart phone manufacturers and using the internet services on the smart phone. This can be possible because of the rapid growth of the wireless communication systems and global location positioning systems. We know that the Android is an open source platform it allows anyone to try and develop application for it and use it for the specific function on the devices running Android. Since the mobile devices are built

having limited power and storage facility, it is ideal to build applications for one specific purpose or one specific work. In this proposed system we have designed an application that will provide the automatic profile change together with three different modules. There are other various location based services as well that could be implemented on the android devices.

2. LOCATION BASED SERVICES(LBS)

A location-based service (LBS) is a mobile application that depends on the location of mobile devices which is an information service accessible with mobile devices through the mobile network and utilize the ability to make use of the location of the mobile device.

A Location Based Service (LBS) is an information and entertainment service, accessible with mobile devices through the mobile network and utilizing this ability to make use of geographical position of the mobile device. LBS services can be used in a variety of way, such as work, health, personal life, etc. LBS include services to identify the location of a person or object, such as discovering the nearest ATM or the nearest filling station, tracking location of friend or employee. LBS services include order tracking and vehicle tracking services. There are two major parts-

- Obtaining the current location of the user.
- Utilize the obtained information to provide the user a specific service.

In order to make LBS services possible, some infrastructure elements are necessary, including mobile devices, applications, communication network, positioning component, and service servers. Mobile devices are tools used by users to access LBS services, to send requests and retrieve results. Such devices can be portable navigation devices (PNDs), Personal Data Assistants (PDAs), laptops, mobile phones, and so on. Application is the interface for users to access the LBS service. Due to the restrictions of mobile devices (small screen size, limited processor power and memory, battery capacity), LBS applications need to be lightweight and battery saving. Communication network refers to the mobile network which transfers service request from user to service provider, and requested information back to the user. A positioning component is usually needed in a LBS application to determine the location of user's mobile device. Service providers maintain service servers which offer different kinds of LBS services to users and are responsible for processing service requests and sending back request results. Servers calculate positions, search for a route, or search specific information based on user's position. Service providers usually do not store and maintain all the information requested by users. Instead, content providers are responsible for collecting and storing geographic data, location-based information, and other related data. These data will be requested and processed by service servers and then returned to users.

Fig-1 shows the interactions among these components, and the process of a LBS service. First, user

sends a service request using the application running on mobile device (Step 1). 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 (Step 2). The service server requests geographic database and other related database to get required information (Step 3, 4). At last, the requested information is sent back to user's mobile phone via mobile communication network paragraphs must be indented.

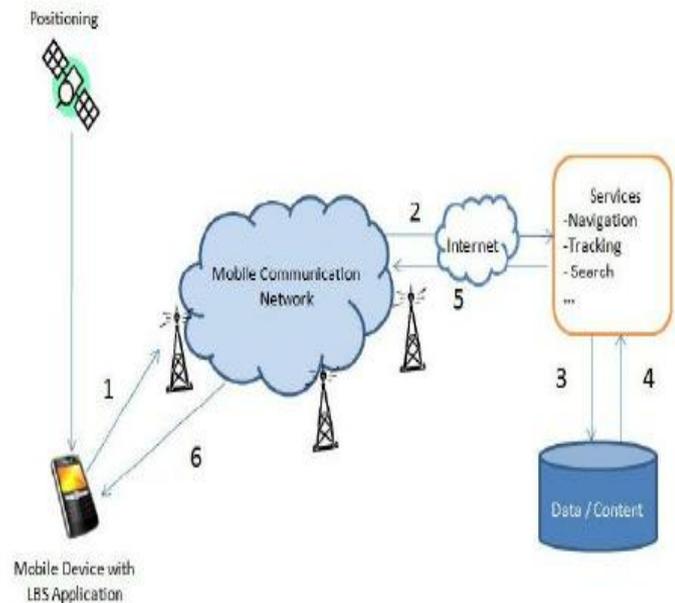


Fig -1: LBS components and Service Process

3. GLOBAL POSITIONING SYSTEM

The Global Positioning System (GPS) is a space based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver. GPS is often used by civilians as a navigation system. On the ground, any GPS receiver contains a computer that "triangulates" its own position by getting bearings from at least three satellites.

The result is provided in the form of a geographic position - longitude and latitude - to, for most receivers, within an accuracy of 10 to 100 meters. Software applications can then use those coordinates to provide driving or walking instructions. Getting a lock on by the GPS receivers on the ground usually takes sometime especially where the receiver is in a moving vehicle or in dense urban areas. The initial time needed for a GPS lock is usually dependent on how the GPS receiver starts. The receiver has a general idea of which satellites to look for because it knows its last position and the almanac data helps identify which satellites are visible in the sky. This

takes longer than a hot start but not as long as a cold start. The GPS receiver has to attempt to lock onto a satellite signal from any available satellites, basically like polling, which takes a lot longer than knowing which satellites to look for. This GPS lock takes the longest. In an attempt to improve lock times, cell phone manufacturers and operators have introduced the Assisted GPS technology, which downloads the current ephemeris for a few days ahead via the wireless networks and helps triangulate the general user's position with the cell towers thus allowing the GPS receiver to get a faster lock at the expense of several (kilo) bytes.

3.1 Working of GPS

Global Positioning System satellites transmit signals to equipment on the ground. GPS receivers passively receive satellite signals; they do not transmit. GPS receivers require an unobstructed view of the sky, so they are used only outdoors and they often do not perform well within forested areas or near tall buildings. GPS operations depend on a very accurate time reference, which is provided by atomic clocks at the U.S. Naval Observatory. Each GPS satellite has atomic clocks on board.

A GPS receiver "knows" the location of the satellites, because that information is included in satellite transmissions. By estimating how far away a satellite is, the receiver also "knows" it is located somewhere on the surface of an imaginary sphere centered at the satellite. It then determines the sizes of several spheres, one for each satellite. The receiver is located where these spheres intersect.

3.2 Latitude & Longitude

Latitude - Lines parallel to equator called latitude.

Longitude - Lines parallel to prime meridian called longitude.

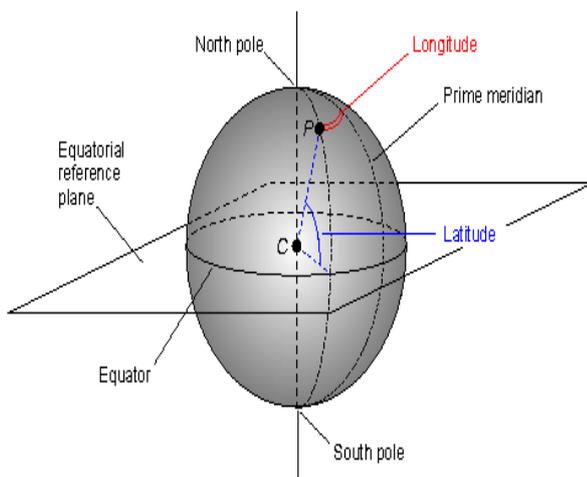


Fig -2: Representations of Latitude & Longitude

3.3 Android: Mobile Operating System

Android delivers a complete set of software for mobile devices: an operating system, middleware and key mobile applications. Android was built from the ground-up to enable developers to create compelling mobile applications that take full advantage of all a handset has to offer. It was built to be truly open. Android is built on the open Linux Kernel. Android support LBS Application Programming Interfaces (APIs). Location service allows finding out the device current location. The application can request for periodic update of the device location information. The application can also register a intent receiver for proximity alerts like when the device is entering and existing from an area of given longitude, latitude and radius.

On a basic level, android is a distribution of Linux that includes a Java Virtual Machine (JVM), with Java being the preferred programming language for most Android applications. The Android Software Development Kit (SDK) includes a debugger, libraries, a handset emulator, documentation, sample code and tutorials. Android's official integrated development environment is Eclipse using the Android Development Tools (ADT) plug-in. SQLite database support is integrated into the Android platform. The ADT plugin includes an Android emulator that allows for the simulation of GPS and Wi-Fi. The Android emulator is depicted.

3.4 Android Location API

These are the different classes present under Location API package to retrieve the Location information of the user.

a. Location Manager-

The class provides access to the location service. It also provides facility to get the best Location Provider as per the criteria.

b. Location Provider -

It is an abstract super class for location providers. A location provider provides periodic reports on the geographical location of the device.

c. Location Listener -

This class provides call back methods which are called when location gets changed.

d. Location Manager -

The class provides the application to choose suitable Location Provider by providing access to set of required properties of the Location Provider. Android also provide an API to access the Google maps. So with the help of the Google maps and the location APIs the application can show required places to the user on the map.

3.5 SQLite

SQLite is a software library that implements a self-contained, zero-configuration, transactional SQL

database engine. SQLite is the most widely deployed SQL database engine in the world. The source code for SQLite is in the public domain.

4. MODULES IN ANDROID APPLICATION

a. Profile Change Based On Location or Area

In this module of project we are going to implement automatic profile changing facility means using this feature of our android app, the profile of user's mobile device will automatically change according to places where person goes. The user needs to register the particular places/location for which he wants to change the profile. And accordingly the profile changer will work in that particular registered perimeter only. Here first the user's mobile device will locate using GPS technology then according to place the profile of mobile will change. Sometimes the person forgets to change the profile of mobile phone at certain places, so this app will help which automatically change profile.

b. Location Based Reminder

In this module of project, alerts to be display after entering to a specified zone/area. Smart phone user can set the remainder for any work with location. When user can reach that location, location will be detected and then automatically it can receive the remainder for the work that already set by the user. In this location can be track by using the GPS.

c. Weather Detection of Current Location

In this module of project, we can detect the temperature of current location of the smart phone user and display it to user.

d. Sending Emergency Message to Members

In this module of project, the emergency message is send to specific contact member by automatically considering the current location of user. The user does not require to creating a messages because by default message is already present there. At the time of sending automatically insert the current location of the user & message is send to members which are already present in the contact list.

5. CONCLUSION

In today's fast moving world people tends to reduce their work effort and also save their time. This application intelligently provides the services as per locations, thus reducing human efforts. One of the best ways to personalize information services is to enable them to be location based. It is an excellent tool that helps us in our daily life. We might forget to mute our phone

before entering into any important meeting and lose the impression of the delegates sometimes. So using this application the user can focus on his daily activities without worrying to monitor his mobile device. It also provides the location based reminder, sending message in case of emergency & weather detection which is very important in day to day life. The behavior of the model is totally depends on internet connection or Wi-Fi networks.

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