

GeoGuide: Smart System for Interactive Navigation

Ashok Kori¹, Priyanka Shejwal², Manjusha Shirsath³, Surabhi Pawar⁴

¹G. E. S. R. H. Sapat College of Engineering, Nashik, Maharashtra, India

Abstract - In this paper, we are proposing the implementation of Geo-Guide for setu in order to make automation in the process based on location and implementation of Geo-Messaging using Location based services and Google Cloud Messaging API's of Android. Geo-Fencing can be defined as the process of sending messages tied to a location which means the receiver will not get the message until he enters the vicinity of the specified location. Geo-Fencing can be implemented using Location based services support provided by the Android platform. Location based services can be pull- based or push-based services. Pull based services are where the user sends a query to get the results for example if the user wants to get the nearest petrol bunk he has to send the query as "Where is the nearest petrol bunk". Push based services are where the messages will be automatically pushed to the users based on their location without explicitly requesting/pulling them from the server. Also based on location, system will recommend nearby famous places, peoples or products which user has last visited or purchased. Example – Amazon recommendation for related products.

Key Words: Location based services, Geo Fencing, GCM (Google Cloud Messaging), Recommendation Algorithms.

1. INTRODUCTION

Location based reminder applications are becoming crucial applications in mobile devices. They help users to guide or memorize something important to do in the future and remind users at specific occasions or at particular geographical areas. Traditional reminder applications are time based reminders, i.e., a user enters a reminder message and sets up a reminder time, which could be one time or periodically repeated times. The application displays the reminder message on the screen at the setting time and alerts the user. Recent years have witnessed a rapid development of smart devices. Most smart devices are now equipped with accurate localization capabilities, based on GPS receivers, access points, or triangulation with nearby base stations. Due to the development of localization capabilities, the reminder applications have an additional functionality on more and more smart devices. A user can mark a location when she adds a new reminder. We call this location reminder location. At the same time the application has a provision for interactive navigation. This can be useful in certain areas like government offices where a newbie

doesn't have the knowledge about the procedure at government offices. For example, in SETU karyalaya people are not aware about which form is available at which counter. The smart device alerts the user when she is near the queried location. The smart device periodically queries the localization sensor to detect the user's current location. If the user is within the queried or reminder distance, the smart device alerts the user and pops out the reminder message on the screen. This approach is easy to implement and relatively secure regarding users' privacy. The application uses various recommendation algorithms based on personal preferences and notifies the user accordingly. The system developed minimizes the waiting process in government offices like setukaryalaya for documents to be required. End user don't have to wait unknowingly for information. We are developing a system based on location which will show list of documents required in setu for pan card/ adhar card/ nationality/ domicile etc. Additionally we are adding other features like nearby places, friends, social connect, etc.,

2. LITERATURE SURVEY

1]. RemindMe: An Enhanced Mobile Location-Based Reminder Application -

In terms of ease of use, a hybrid structure consisting of various components is formed for location tagging. First of all, the user tags the locations using the applications such as Google Maps or Foursquare or via the embedded sensors of the Android device. Then, he creates reminders for the tagged locations and when he gets close to this location, the system notifies the user. Our application is separated from

Similar applications with its enhanced location tagging feature. Moreover, by consisting of various services, it is open to innovations on the way to become a social reminder application. The usability test results indicate that *RemindMeis* an effective location based reminder application.

2]. Research on Mechanism of Smart Guide in the Scenic Spots Based on Dynamic LBS -

Considering particular conditions, most of them do not meet the requirements of scenic spot guide separately. After analysis of optimal environment for both GPS and RFID, a seamless Indoor/Outdoor Positioning method is proposed. In this paper, we have discussed the presentation forms of multimedia information, and designed a smart guide service model hierarchy with multi-tiers. Then an approach to smart

guide in scenic spots based on dynamic location service is presented. To verify this, a

Prototype system was developed based on the smart guide service model. A personalized and intelligent self-help guide is archived, which enhances the service capacity of scenic spots, and greatly improves the management efficiency.

3]. A Location-based Personal Task Management Application for Indoor and Outdoor Environments -

Reminders based on the electronic calendar in cell phones are popular, but such reminders are mostly triggered by time. It is also common that some tasks are only meaningful to be performed at a specific location, so it would be useful if reminders for those tasks can be triggered only when the person to be reminded is physically near or located at that location. Therefore, in this research we implement a

Location-based personal task management application for Android-based smart phones and tablets.

3. PROPOSED SYSTEM

3.1 Location-Based Service

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.

Location-based services offer many merits to the mobile clients. The first publicly available smart phone running Android, the HTC Dream, was released on October 22, 2008. The user interface of Android is based on direct manipulation. It means using touch inputs like reverse, pinching, tapping and swiping to manipulate on screen objects that loosely correspond to real-world actions.

3.2 Components of LBS

Location-Based services (LBSs) comprise the automatic tailoring of information and services based on current location of the user. The availability of various wireless interfaces such as Bluetooth, RFID, Wi-Fi etc. and external positioning technology like GPS in most of the mobile devices motivates the researchers and telecom operators to work in the field of providing LBSs to mobile users.

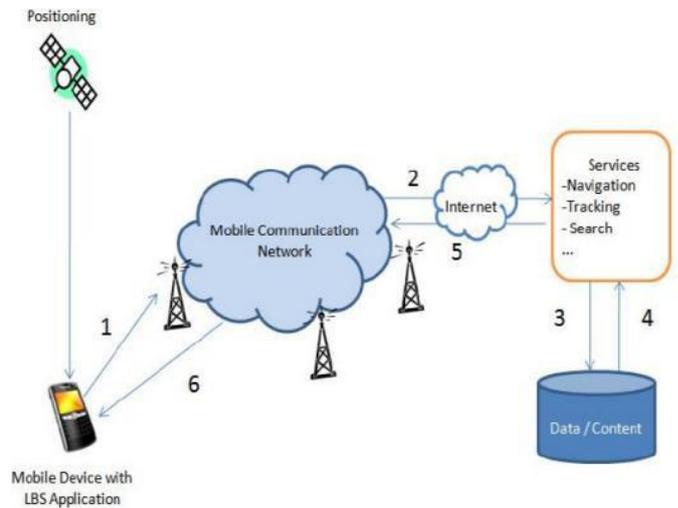


Fig -1: Location Based Service

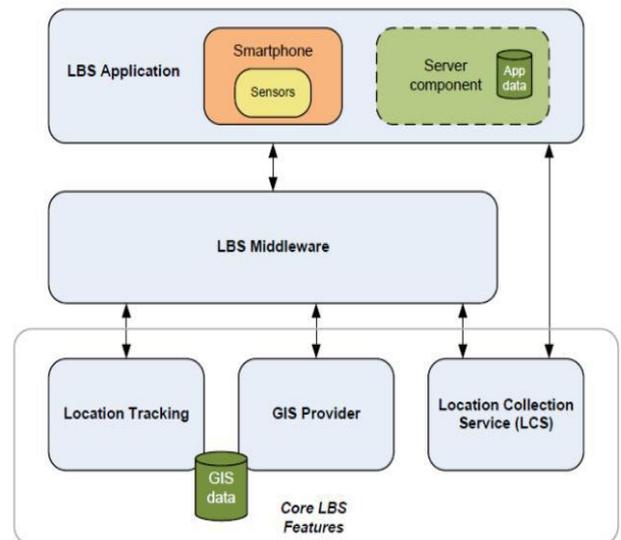


Fig -2: LBS Components

Layer	Function	Examples
Application	Providing or determining application-specific data	Urbanspoon
Mapping	Rendering a user's current location and other points of interest on a map	Google Maps API, Microsoft Live Maps
Geocoding	Converting a civic address (street address) into geographic coordinates (latitude & longitude) ⁹ or vice versa	Yahoo Maps API, geocoder.us, Google Maps API
Geolocation	Determining a user's location based on observed information such as wireless access point or cell tower identifiers	Skyhook, Google Gears API

Fig -3: LBS Layers

3.3 Android

Android is an operating system which runs apk files for accessing services like LBS using internet, for games, for audio player, video player etc.

Android support LBS APIs. Location service allows to find out current location of a device. Also device can request for periodic update of the device location. It can also register a proximity alerts like device is entering and existing from a range of given longitude, latitude and radius.

3.4 Calculate distance between two locations

Using GPS current location of user is taken. List of documents and location of each building in setu is stored on firebase cloud. Distance between user location and location of buildings in setu is calculated. List of documents are fetched from firebase based on min distance between user and building. Also location of Xerox shops and document attested person's location is shown on map.

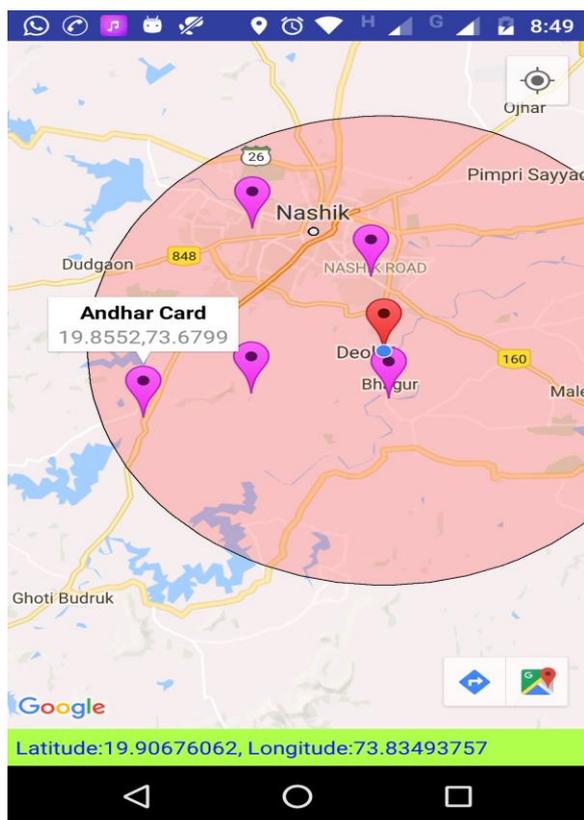


Fig -4: Radius on Google map & setu office buildings Locations (Pink markers), User's current Location (Red marker)

Distance between two locations are calculated using formula as shown below:

```
earthRadius = 3958.75; // miles (or 6371.0 kilometers)
dLat = Math.toRadians(lat2-lat1);
dLng = Math.toRadians(lng2-lng1);
sindLat = Math.sin(dLat / 2);
sindLng = Math.sin(dLng / 2);
a = Math.pow(sindLat, 2) + Math.pow(sindLng, 2)*Math.cos(Math.toRadians(lat1))*Math.cos(Math.toRadians(lat2));
c = 2 * Math.atan2(Math.sqrt(a), Math.sqrt(1-a));
dist = earthRadius * c;
```

3.5 Android Location API

Different classes under Location API package are:-

Location Manager - This class is used to access the location service. Also it provides facility for getting the best Location Provider ex. GPS or Cell Network.

Location Provider- It is an abstract super class for location providers. Also it provide periodic reports for the geographical location of a device.

Location Listener- This class provides callback methods. When location gets changed this class is called.

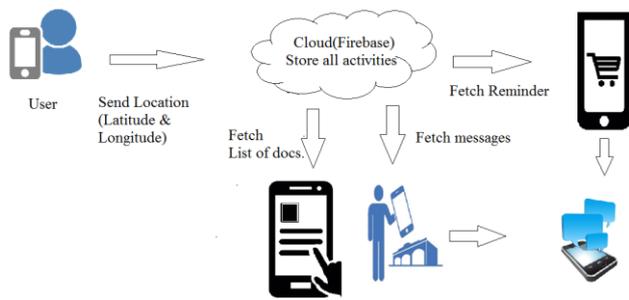
Criteria- This class is used to choose suitable Location Provider.

Android provide an API to access Google maps. Using this user can find places on Google maps also can use different services of location based service.

3.5 System Architecture

Location- When GPS is enable current location of user is taken as an input to the application.

```
String bestProvider =
locationManager.getBestProvider(criteria, true);
Location location =
locationManager.getLastKnownLocation(bestProvider);
double latitude = location.getLatitude();
double longitude = location.getLongitude();
```



System Architecture of Geo-Guide

Fig -5: System Architecture

The current location of the user is fetched through location based services, by means of GPS the latitude & longitude is taken and then sent to cloud services for example firebase which stores all activities in the database for respective users registered in the database. Firebase provides different web services which fetches list of docs or messages in real time with high accuracy. The android system services are used to fetch reminders and notify the user accordingly by push messages or alert dialogues.

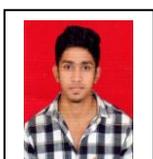
4. CONCLUSIONS

The proposed system shows the required list of documents at various government offices like setu and notifies user for reminders, people around within the range specified (in Km) by the user. The system can also create new events which user can subscribe on their interest basis. Events can be managed on the Google Map.

REFERENCES

- [1] "RemindU: A Secure and Efficient Location Based Reminder System", Xinxin Zhao, Lingjun Li, GuoliangXue Arizona State University, 2014.
- [2] "The Narrator: A Smart Data Offloading System for Interactive Navigation in Museums", A. S. Ali, Member, IEEE.

BIOGRAPHIES



Ashok Kori is currently a student of GESRHSCOE, Nashik From the University of Savitribai Phule Pune.



Priyanka Shejwal is currently a student of GESRHSCOE, Nashik From the University of Savitribai Phule Pune.



Manjusha Shirsath is currently a student of GESRHSCOE, Nashik From the University of Savitribai Phule Pune.



Surabhi Pawar is currently a student of GESRHSCOE, Nashik From the University of Savitribai Phule Pune.