MANAGING LOCATION BASED INFORMATION SERVICES IN MOBILE COMPUTING

C.G.Thomas[1] & Majed Hussain[2]

Abstract- A location-based service (LBS) is a software-level service that uses location data to control features. As such LBS is an information service and has a number of uses in social networking today as information, in entertainment or security, which is accessible with mobile devices through the mobile network and which uses information on the geographical position of the mobile device. LBS can be used in a variety of contexts, such as health, indoor object search, entertainment, work, personal life, etc. LBS is critical to many businesses as well as government organizations to drive real insight from data tied to a specific location where activities take place. LBS include services to identify a location of a person or object, such as discovering the nearest banking cash machine (ATM) or the whereabouts of a friend or employee. LBS include parcel tracking and vehicle tracking services. LBS can include mobile commerce when taking the form of coupons or advertising directed at customers based on their current location. They include personalized weather services and even location-based games. They are an example of telecommunication convergence. While networked computing devices generally do very well to inform consumers of days old data, the computing devices themselves can also be tracked, even in real-time. In this paper we try to use those Location Based Information using Android as the Platform and explore the issues, challenges and solutions in a brief manner.
Keywords – Location Based Services, LBS, Android Location Services, Nearest Available Services.

1. INTRODUCTION

The ability of location-based services is a software level service and information service that uses location data to control the features. In today's social networking there are number of uses in entertainment or security,which is accessible with mobile devices through the mobile network and which uses information on the geographical position of the mobile device.LBS is a basic organizations and in addition government associations to operate from genuine understanding information fixing to a particular area where exercises can occur. The spatial examples where the area related administrations and information can give its most effective and helpful perspective where the area has a shared factor in these exercises and that can be utilized to better include examples and connections

LBS integrates the administrations to distinguish a location of a person or protest, for example to finding the closest keeping money machine (ATM).It also follows the vehicle following administrations.LBS can incorporate portable business when appearing as coupons or promoting coordinated at clients in light of their present area. They combine the customized climate benefits and area based diversions.Mobile computing is human–computer communication by which a PC is relied upon to be transported during normal usage, which takes into account transmission of information, voice and video.Mobile computing involves mobile communication, hardware, software. Communication issues include framework organizes and correspondence properties.

2. LOCATION AWARENESS AND ITS WORKING IN MOBILE COMPUTING

Users frequently need to connect and also need to interface with the system from different areas, including from the office, remote locations, or from home. We can appoint a separate security approach for each semantic that can expose your organizations to programmer while computerizing the process.To ensure the system, you should set up the conditions to trigger this programmed exchanging or area mindfulness by applying the best security arrangement to a customer or server. The best security approach is normally dependent upon the area from where a client interfaces.You can dole out an arrangement of conditions to each gathering's area that consequently chooses the right security approach for a client's situation. Conditions incorporate data, for example, the system settings of the PC that started the system get to ask. An IP address, MAC address, or the address of an index server can likewise work as a condition**.**The security strategy in the comfort can change the administration server refreshes the approach on the customer, or the customer downloads the arrangement. On the off chance that the presentarea isn't legitimate after the refresh, at that point the customer changes to another substantial area, or the customer utilizes the default area.

---

[1] Asst. Professor, Department of Information Technology, AIMIT, St. Aloysius College (Autonomous), Mangaluru, Karnataka, India
[2] M.Sc. (ST) III SEM, Department of Information Technology, AIMIT, St. Aloysius College (Autonomous), Mangaluru, Karnataka, India

Figure 1.   Location Based Services

3. APPROACHES TO DETERMINE THE LOCATION MANAGEMENT

The clients are typically made a request to enter their area (e.g. as a postal code) keeping in mind the end goal to channel benefit choices in light of the clients. In the more present origination of remote LBS, the client's area is resolved naturally, without requiring him or her to unequivocally give it. There are various systems that have been produced for programmed area recognizable proof: some more suitable for open air conditions, and some better for indoor areas. In this area, we first diagram the significant specialized ways to deal with deciding area, and after that survey a scientific classification of LBS where it can approach to the location

Handset Based	Basic positioning approach	Strengths	Weaknesses
GPS	Triangulation technique utilizing timing signals from 4 satellites out of a framework of 24 satellites.	i.Highly correct Network ii. High infrastructure not required	There are no indoor services in urban areas
Forward Link Triletration	The versatile unit times the entry of signals from different base stations, yet sends the timecontrasts to an area processor to decide areathroughtriangulation	Lower complexity and cost for listening device	Modification need to be handsetSystem investment required
Observed Time difference and enhanced observed time difference	Timing signals are sent from numerous base stations and programming in the handsetperforms triangulation computations to decidearea	Augment peace for user	Some qualification to handsetSome network investment
Time of Arrival(TOA) and time difference of Arrival(TDOA)	Triangulates the area of the supporter utilizing timing of signs sent from the versatile unit to no less than three diverse cell locales.TDOArequires synchronization among base stations andutilizes contrasts in landing time.s	Greater validityThan Cell ID. TOA does notrequire any device qualifications	New equipmentneeded at base stations.TDOA requires qualification to device
Angle of Arrival(AOA)	Figures the position of the supporter in light of the heading (edge) of the arriving signal into at least two base stations	No device qualification	Problem caused by multiple path at base stations
Multipath analysis	Decides area by looking at example of gathering from endorser with past gathering designs put away in a database	No handset qualification	New receivingEquipment needed at base device

Figure 2.   Location Management approaches

4. LOCATION BASED APPS DEVELOPMENT THROUGH ANDROID

We as a whole realize that area based versatile applications enable you to scan for places like silver screens, eating joints, and shops which are close by. Today is the time of versatile applications and Geo-location. There were times when we required an appropriate address or an area manage with the correct headings to achieve our goal. Presently it is extremely hard to discover a man or place physically. Geo location-based portable application advancement acts as the hero. Geo-location innovation has opened the entryways for some new start up thoughts and foundations which would never have existed without this

innovation. The capacity to coordinate Geo-location into portable applications has revealed new sorts of market systems and changed the entire stream of connection with the purchaser.

How do Geolocation App works?

Utilizing the Geo Tag or GPS area of a cell phone, an awesome area based application improvement arrangement can be made for any industry space. Different area based applications can be created, similar to climate ready frameworks, animals trackers, and area based commercial frameworks. In a Geo location-based application, where the area is a gold dig for information examination, you can without much of a stretch track the conduct of any individual, vehicle, or creature, or any unmistakable question. With area based application advancement, you can furnish clients with continuous outcomes for your administrations in their closeness. Let us understand the building of geolocation based mobile android device:-
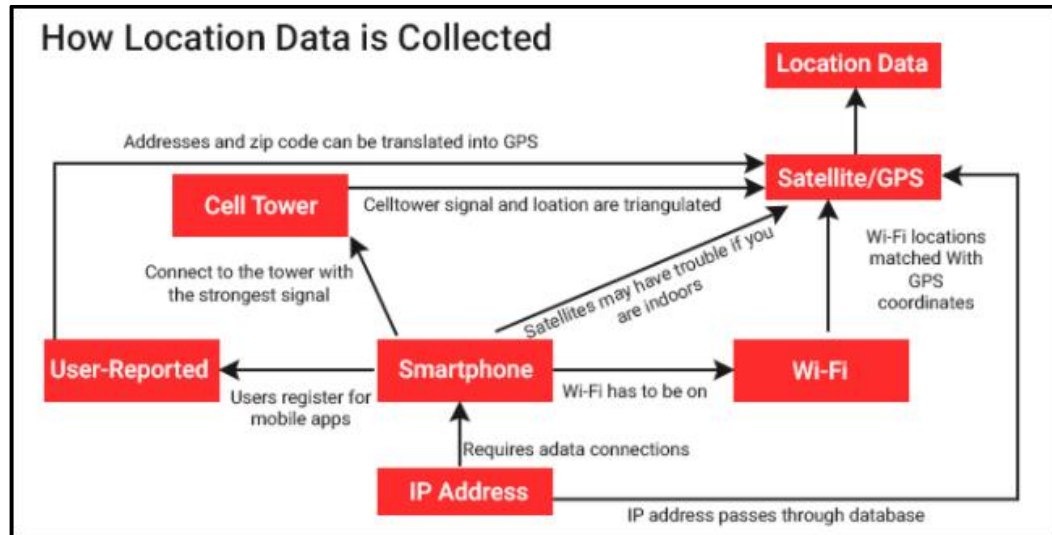

Figure 3: Location Based Services algorithm Block Diagram

4.1 Geo location App building technology:-

4.1.1 GPS

Today all cell phones are outfitted with Global Positioning System chips inside. GPS catches the area and timing which satellites send from space. To decide area with exactness inside around sixty feet, a cell phone needs information from no less than four satellites.

4.1.2 CELL ID

There are times when a GPS flag is inaccessible. In such cases, we can utilize the data from cell towers. Portable systems help in figuring out which cell tower the client uses and contrasts it and the base-stations database. This technique works great in significant urban areas.

4.1.3 Wi-Fi

Wi-Fi decides the position of the client a similar way the Cell ID does. Wi-Fi does it all the more precisely, as it covers littler ranges. With Wi-Fi, we can decide the area in two diverse ways. The first is RSSI (Receive a Signal Strength Indication). It alludes to the signs from the telephone inside a Wi-Fi point's database. The second one is utilized as a part of oftentimes went to places. It utilizes profiles of a few areas which are in Wi-Fi systems, and in this manner are called remote fingerprints. It distinguishes the client's position precisely, inside two meters. Once the area is caught, administrations like Google Maps Geo-location or Map Kit Framework are utilized to put it on a genuine guide. In this manner, Google Maps APIs for OIS and Android gadgets offer the execution of Geo-location applications, giving you of all the data about your area, itemized maps, adjacent spots, and numerous different highlights.

4.1.4 Geo-fencing

Geo-fencing utilizes GPS in the client's cell phone for deciding that they are so near a specific point. It likewise enables you to know whether clients are outside or inside a building, or have quite recently entered or abandoned it. Geo-fencing helps in sending offers or coupons to purchasers and in this way gives a customized involvement.

4.1.5 Maps and Navigation

There are an assortment of navigational applications which on the double strike a chord at whatever point we discuss maps and route. Such applications incorporate Google Maps, Waze, an assortment of compasses, and significantly more.

4.1.6 Geo-social Apps

Such applications are more about a social part than Geo-location. Clients share content in light of their areas in applications like Facebook and Instagram. This class additionally incorporates spilling administrations like Periscope.There also apps like Uber and OLA where we can book the cab as their applications and book rooms OYO etc.

Location based App development in android code is:

```
import android.app.Activity;
import android.content.Context;
import android.location.Criteria;
import android.location.Location;
import android.location.LocationListener;
import android.location.LocationManager;
import android.os.Bundle;
import android.widget.TextView;
import android.widget.Toast;
publicclassShowLocationActivityextends Activity implementsLocationListener {
privateTextViewlatituteField;
privateTextViewlongitudeField;
privateLocationManagerlocationManager;
privateString provider;

/** Called when the activity is first created. */
@Override
publicvoidonCreate(Bundle savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.main);
latituteField = (TextView) findViewById(R.id.TextView02);
longitudeField = (TextView) findViewById(R.id.TextView04);

// Get the location manager
locationManager = (LocationManager) getSystemService(Context.LOCATION_SERVICE);
// Define the criteria how to select the locatioin provider -> use
// default
    Criteria criteria = newCriteria();
provider = locationManager.getBestProvider(criteria, false);
    Location location = locationManager.getLastKnownLocation(provider);

// Initialize the location fields
if (location != null) {
System.out.println("Provider " + provider + " has been selected.");
onLocationChanged(location);
    } else {
latituteField.setText("Location not available");
longitudeField.setText("Location not available");
    }
  }

/* Request updates at startup */
@Override
protectedvoidonResume() {
super.onResume();
locationManager.requestLocationUpdates(provider, 400, 1, this);
  }

/* Remove the locationlistener updates when Activity is paused */
```

```
@Override
protectedvoidonPause() {
super.onPause();
locationManager.removeUpdates(this);
    }

@Override
publicvoidonLocationChanged(Location location) {
intlat = (int) (location.getLatitude());
intlng = (int) (location.getLongitude());
latituteField.setText(String.valueOf(lat));
longitudeField.setText(String.valueOf(lng));
    }

@Override
publicvoidonStatusChanged(String provider, int status, Bundle extras) {
// TODO Auto-generated method stub

    }

@Override
publicvoidonProviderEnabled(String provider) {
Toast.makeText(this, "Enabled new provider " + provider,
Toast.LENGTH_SHORT).show();

    }

@Override
publicvoidonProviderDisabled(String provider) {
Toast.makeText(this, "Disabled provider " + provider,
Toast.LENGTH_SHORT).show();
    }
}
```

5. APPLICATIONS OF LOCATION BASED INFORMATION

An extensive variety of administrations that depend on clients' area data have been considered, in spite of the fact that the business sectors are not yet develop. The fundamental point is to recollect that area is just a valuable piece of information that can be utilized to channel access to many sorts of geological data administrations (GIS). There are various approaches to abuse area to give more significant data, or determine new administrations. It can be especially effective when joined with other client profile data to offer customized and area touchy reactions to clients recognize five gatherings of utilization ranges: correspondence, armada administration, steering, well-being and security, and stimulation. We can likewise characterize administrations as per whether they apply to shoppers, business clients, or representatives in a firm. Probably the most regularly examined administrations are quickly depicted beneath.

5.1 Emergency, Safety and Medical/Health Services

As noted before, numerous legislatures are moving to require cell administrators to build up the capacity to consequently distinguish supporters' areas in case of a crisis. This information would then be sent to the suitable open security noting direct (PSAP) toward arrange the dispatch of crisis work force. These are not really income creating administrations in their own right, yet it is conceivable to consider therapeutic and well-being administrations that would be offered on a business premise, especially if LBS were joined with tele medicine strategies that would enable physiological information to be transmitted back to human services suppliers.

5.2 Information Services

Versatile clients can be given an extensive variety of limited data. Climate estimates, vacation spots, points of interest, eateries, service stations, repair shops, ATM areas, theaters, open transportation alternatives (counting plans) are only a couple of cases of the sorts of data that would be more helpful if sifted by the client's area. Gazetteer administrations interface present and noteworthy geographic names to spatial information. More advanced administrations will rely upon the improvement of wealthier geological data frameworks. For instance, a question about nearby venues may be reached out to concentrate just on those playing a particular motion picture. Or, on the other hand, as opposed to search for specific sorts of organizations, a

client may enter a particular item, and request all organizations in the territory that convey it. In the event that the database incorporates other item data, for example, costs and different terms, at that point continuous correlation shopping might be possible on the way or even inside stores.

5.3 Transaction and Billing

Cell administrators are starting to offer diverse rates in light of the area of guests (e.g. in an assigned home territory). Internet business administrations may incorporate utilization of the remote gadget to make instalments for tickets at theatres and on open transportation, candy machines, and for products in shops to accelerate checkouts. Frequently this capacity requires that remote gadgets trade instalment data with neighbourhood POS gadgets. In the US, for instance, an organization called Merchant Wired is putting remote LAN s into shopping centres with the goal that little stores can have this capacity

5.4 Mobile Office

Numerous applications are focused to workers that are out of their workplaces. When all is said in done, these will be inside data frameworks applications, however may include banding together with area based specialist co-ops for their usage. A few applications need to do with the arrangement of area delicate data, for example, updates or changes to client account data when field delegates are in closeness to particular clients. Given the constrained screen space of portable units, even messages may be separated so just those that re basic or pertinent would be sent to a field operator, while others stay on the server. Booking applications may likewise consider the area of labourers.

5.5 Entertainment

There are numerous potential outcomes for area particular stimulation administrations utilizing a cell phone. One of the all the more outstanding area benefits now being used is an amusement called Bot-fighters, built up the gaming organization It's Alive and offered by Telia Mobile (Norris, 2003).3 In this diversion, endorsers utilize the area assurance capacity of the system and SMS messages sent from their cell phones to find and "shoot" nonexistent robots (different players). They should be sufficiently close to the objective to have the capacity to "hit" them. New forms utilizing Java-prepared handsets have considerably greater usefulness, and the amusement is spreading to different markets like the UK (Norris, 2003). Other excitement applications that have been talked about incorporate dating administrations, DJ asks for in clubs, individual to-individual informing in a shut setting like a show.

6. ISSUES OF LOCATION BASED SERVICES:

Mobility turned out to be a piece of our own freedom. Additionally the market saw this pattern in Geo-improvement and responded with an expanding accessibility of area construct benefits that fundamentally keep running in light of our cell phones. These administrations enhance our portability encounters, however in the meantime concern our security, when specialist co-ops are presently prepared to do persistently following the area of a client. Amid a travel. One of the main powerless purposes of an area based administration is simply the administration, far before alternate parts of the localization and correspondence that e.g. can be rendered secure by utilizing direct flags rather than radio-based localization or visually impaired mark. Be that as it may, a sheltered area based administration infers the utilization of a trustful server. Trustful servers are unfortunate for majorly three reasons:

1. Numerous suppliers would prefer not to hold up under the obligation that accompanies a trustful server,
2. Numerous clients are not willing to put stock in an outsider, which may deflect the reception of numerous area based administrations and
3. A solitary trusted server may get a solitary purpose of assault and for this situation bargain many clients' security.

7. CONCLUSION

Our diagram of area based administrations uncovers that the market potential is believed to be noteworthy, driven to a limited extent by the organization of programmed area distinguishing proof frameworks for crisis reaction. There are, in any case, noteworthy boundaries to overcome. Innovative obstructions result from the decent variety and cost of ways to deal with area assurance, making a mind boggling set of decisions for administrators and potential interoperability issues that, if unsolved, are probably going to smother improvement. There are many energizing administrations a work in progress, and some have been working effectively in such markets as Japan for quite a while. Imaginative applications, for example, area based recreations have accomplished a following in Sweden and been brought into different markets. Regardless of the guarantee of LBS for buyers, in any case, security concerns, nature of administration issues, reasonable access to area data, and the absence of gauges for innovation and specialist organizations may block advertise improvement and speak to basic arrangement issues to be settled.

8. REFERENCES

[1] Abowd G, Atkeson C, Hong J, Long S, Kooper R and Pinkerton M (1997) Cyberguide: A mobile context-aware tour guide. Wireless Networks 3(5): 421-433

[2] Adams P, Ashwell G and Baxter R (2003) Location-based services – an overview of the standards. BT Technology Journal 21(1): 34-43

[3] Anckar B and D'Incau D, (2002) Value creation in mobile commerce: Findings from a consumer survey. The Journal of Information Technology Theory and Application (JITTA) 4 (1): 43-64

[4] Bakos JY (1997) Reducing buyer search costs: Implications for electronic marketplaces. Management Science 43(12): 1676-1692

[5] Barnes SJ (2002) Provision of services via the Wireless Application Protocol: A strategic prospective. Electronic Markets,12 (1)

[6] Clarke, I (2001) Emerging value propositions for M-commerce. Journal of Business Strategies 18(2)

[7] Beinat E (2001) Privacy and location-based services. GeoInformatics September