DYNAMIC ANALYSIS OF LOCATION TRACKING USING MICROADDRESS RECORDER

Shaveta Bhatia,Reseach Scholar
Faculty of Computer Applications,
Manav Rachna International University
Faridabad, India
Shaveta26@gmail.com

Dr. SabaHilal,Director
Professor and Consultant,D.A.V Institute of Management
Faridabad, India
Saba21hilal@gmail.com

Abstract—The Location Tracking can be considered as one of the most advanced, innovative and practical Location based Services. A place is very important entity to a user with a semantic meaning such as "You are at your Home"," You are in your College"," You are in the park of your Society". MicroAddress Recorder is an easy, portable, free and high quality application for tracking family and friends with mobile device. The application is capable of delivering the geographical information to the user with the place with semantic meaning. The application is experimentally evaluated and the results demonstrate that the application delivers the meaningful information to the user such as longitude; latitude and meaningful name of a place and it also compute the distance between tracked locations and their nearby locations. Further the paper gives the detailed analysis of results with moving user in different areas and also identifies the future work.

Keywords-Location tracking, GeoLBS Activity, Reverse Geocoding, Google Maps, MySql database.

I. INTRODUCTION

Location now provides high quality for world wide customers.Advances in Tracking technology enables the Location based applications with greater significance.Today ,there provides a lot of products avilable in market for tracking of objects or a person.few of them are described here. S911 Bracelet Locator [6] is aultra small GPS location device for real time tracking.it brings an innovation in the market.It provides geofencing capability that provides peace of mind for elder people and workers and security guards..It is a wearable device with assisted GPS technologythat works in both Indoor and Outdoor.The wrist wearing bracelet is basically desinged for health authoroties.S911 Personal Locator[7] is a low cost GPS Location device which is used for emergency calls.The device can also retrives the alertsfor the assistance.These alerts can be send to rlatives,parents or monitoring centre in case of emegencies.The other device called StarFinder Lite[8] which is low cost device for vehicle tracking.It uses GPS/GPRS and GSM.This device is basically used for fleet management of bus,cars and trucks etc.It is also helpful for ATM tracking,Police patrol management etc.Now a days, Location become a new battleground as various services like Google,Microsoft,Nokia battle against one other[9].Location is a cornerstone of various mobile applications. This paper describes a Mobile application called MicroAddress Recorder (GPS Location handling system) which works as an integration of both Mobile Networks and web based data accessibility Section II describe the related studies of Location Tracking. Section III describes the detailed implementation and testing results of the application. and then Implementation process with the testing results of the application. Section IV gives the conclusion and the future work for further research

II. RELATED STUDIES

Andrew Kirmse et al [1] describe how the Location history of various users can be tracked in order to extract the user's Location patterns. A user is tracked with a Mobile phone having GPS.The various Locations where user visited is tracked and the patterns are displayed using Google Latitude history dashboard [2].

Lin Liao[3] describes the Markov Model that can be used to record the user movements of the whole day through the community. The data is checked with different mode of transport. It is a simple model using unlabeled data and can be online inferred.

Ganesh Ananthanarayanan [4] describes StarTrack, a framework to track the coordinates at higher level of abstraction for Mobile applications. This Framework provides the facility for storing, comparing, retrieving and

clustering various tracked places. This framework helps in development and deployment of various tracking based applications.

Yunzhou Zhang et al [10] proposed an algorithm on wireless sensor networks in order to resolve the problem of robot localisationThe System adopted the cricket node to determine the coordinates. But the system gives error while moving robot.

Byung et al [11] provides a push service that informs the user about the Location data of various Mobile terminals for the purpose of safety. It is a personalized service used for alrts, advertisement and distribution control. But the system has various issues regarding the accuracy.

III. MICROADDRESS RECORDER(GPS BASED LOCATION HANDLING SYSTEM)

MicroAddress Recorder is a Location Tracking application to track the Location of a person. The Person having a mobile is tracked at various concise areas. For example, if a person is in University, the application gives the output whether person is in T Block or E Block. He may be in Staffroom or at gate. This concise data is recorded, store and displayed on a Map through browser. The application works as an integration of web based and mobile networks. The Block diagram of the application is shown in Fig 1.The Satellite provides the Coordinates of the Mobile Client .These coordinates are processed and with reverse geocoding activity, the coordinates are converted into a specific Location. The places or Locations are then matched with the prespecified data stored in MYSql database.MySql Database[14] is an open access database used for various web services.Tha matched locations are then shown on the Screen. The Android Location API and Google API are used to run and display the location on the map. The Android Location API [12] provides a powerful and high level framework to automate the tasks such as Location provider service. Google map API [13] is used for embedding the Google map images on web page or on mobiles. The Map is shown through the web service both on your Mobile phone and on desktop with the help of browser.

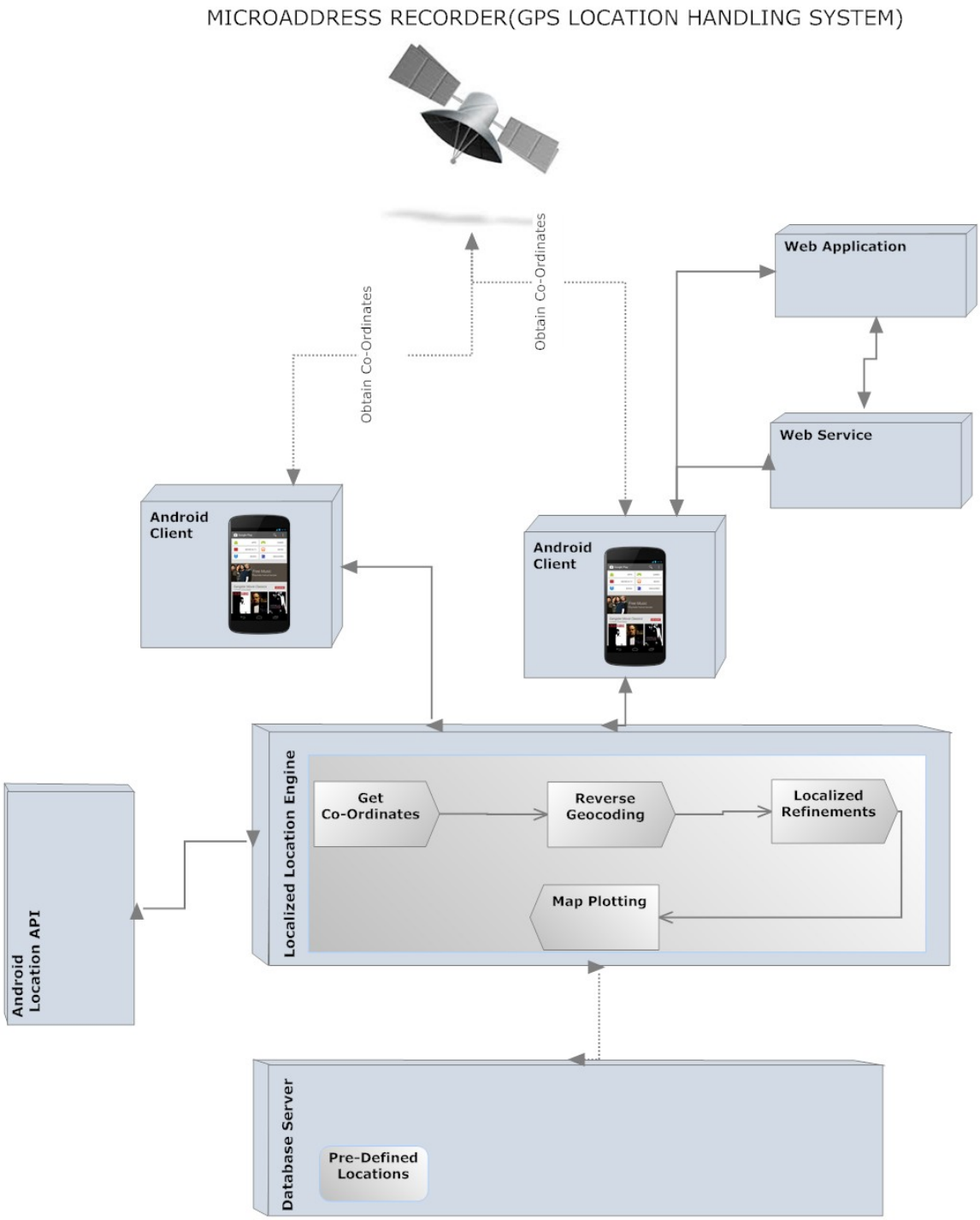

Fig 1. Block Diagram of MicroAddress Recorder.

IV. IMPLEMENTATION AND TESTING

The application consists of various activities. It is an integration of Mobile Network and web application.

A. Application run on Mobile

The activity through which the main screen is shown on the Mobile phone is LBS Geocoding Activity. The retrieval of coordinated and the display of Location is done through Localized Location engine. The coordinates are retrieved through class Coordinates.java.The code for this class is shown below.

```
package com.javacodegeeks.android.lbs;
Public class Coordinates {
 Private double latitude;
 Private double longitude;
 String PlaceName;
 public Coordinates(double lat,double Lon, String arg)
 {
  this.latitude=lat;
  this.longitude=lon;
  this.PlaceName=arg;
 }
 public void setPlaceName(String arg)
 {
          this.PlaceName=arg;
 }
 public String getPlaceName()
 {
          return this.PlaceName;
 }
public void setLatitude (double lat)
{
          this.latitude=lat;
}
public double getLatitude ()
{
          return latitude;
}
public void setLongitude(double lon)
{
          this.longitude=lon;
}
public double getLongitude()
{
          return longitude;
}
}
```

Simultaneously with reverse geocoding the coordinates are converted into location and displayed on the screen. The screenshot of the mobile application is shown in fig 2and Fig 3.The Fig 2 shows the coordinates of my Home and also display the Location “You are at your home”. Fig 3 shows the coordinates of Society Gate and also display the Location” You are at Society gate”.

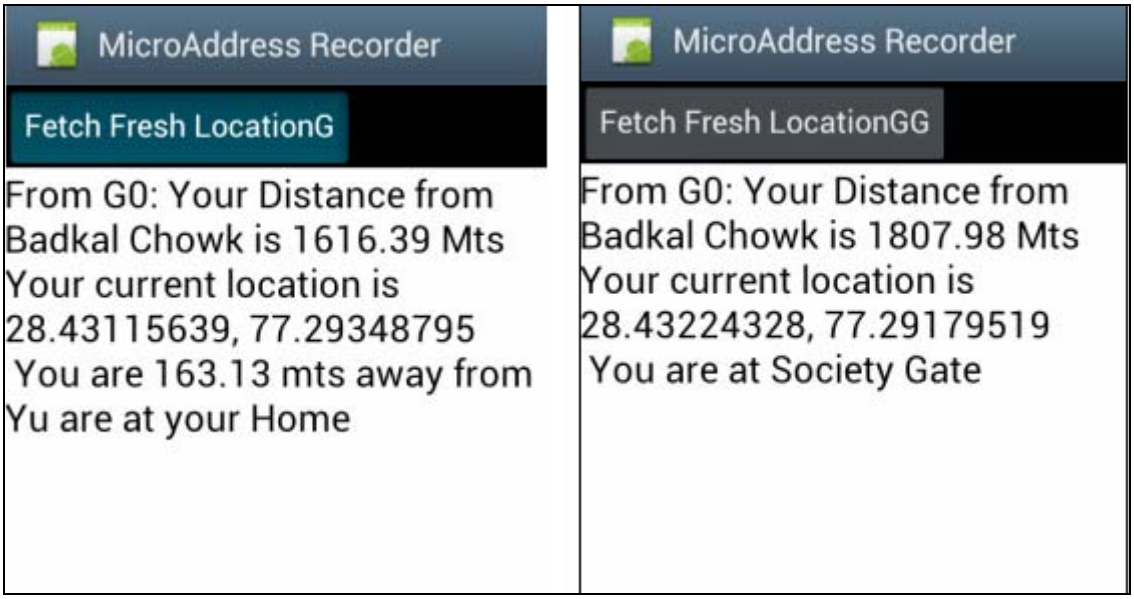

Fig 2 Location and coordinates at your Home Place. Fig3. Location and Coordinates at your Society Gate

Extensive Testing is done on 100 locations through Android Mobile Samsug Galaxy GT-S7562 with in a city of Faridabad.Few of Locations with their Coordinates are shown in Table 1.

TABLE 1. Longitude, Latitude and place of different areas of Faridabad

Sno	Longitude	Latitude	Location
1	28.398197	77.29346	Around NIT 3 A Block
2	28.43227	77.29173	You are at your society gate
3	28.42997507	77.29590134	You are nearby PNB Bank, Sec 21C market.
4	28.42690962	77.29693808	You are near asian hospital
5	28.44054522	77.29598704	You are on sec 46 road nearby Tree anadi seva
6	28.43428158	77.30302914	You are at kapir Vihar
7	28.43432274	77.30308135	You are at Kartik Vihar
8	28.43052151	77.29195577	Chugi nearby society
9	28.4311563	77.2919577	prem Society
10	28.4311563	77.29348795	Downfall chownk nearby mandir
11	28.4309943	77.29328989	shop near Mandir,Sec 21C
12	28.4310354	77.29332744	mandir ,Sector 21C
13	28.43099105	77.2982957	place very nearby mandir,sec 21C
14	28.43202391	77.29225865	Home
15	28.4502743	77.2867559	You are in staff Room
16	28.45034961.77	77.28667234	Class nearby staffroom
17	30.911785	75.848785	Ludhiana Station
18	28.47069424	77.29713197	Anupama Home
19	28.46938652	77.29799073	nearby Anupama Home in parking
20	28.4660634	77.29799073	nearby anupama Home IRIS

B. Application runs on Web

The above work is executed on a Mobile.Simontaneously the application is also run on browser through web service. The Web application displays the results on the map. It stores the Coordinates and the Location in Mysql database. User can see all the locations retrieved through Mobile. The Home page displayed on the web is shown in Fig 4.

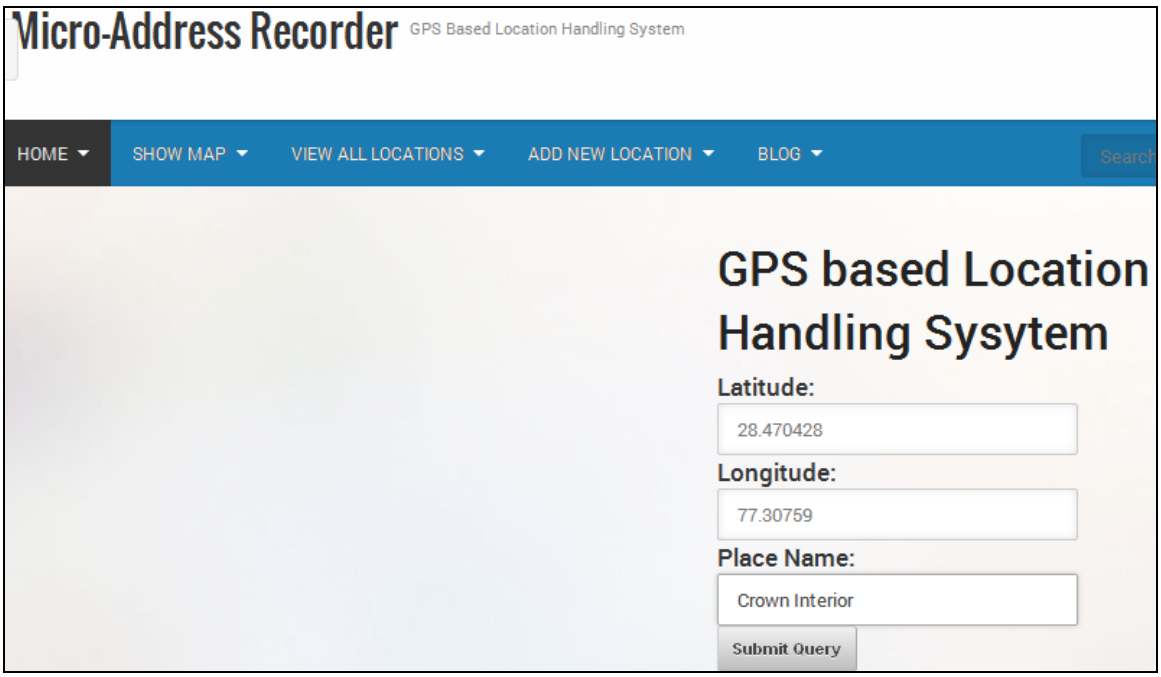

Fig 4. The Home page of GPS based Location handling system

The above Home page has various Menus. When user clicks show map menu, the last 10 locations retrieved are shown on a Map. Fig 5. Shows the Locations retrieved on map.

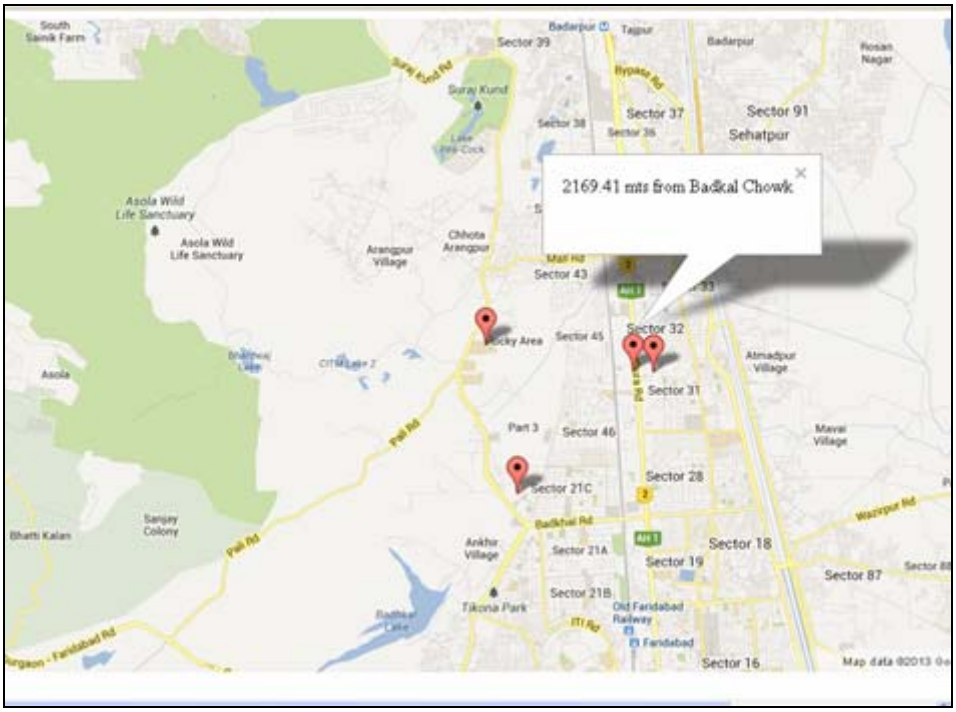

Fig 5. Locations retrieved are shown using Google Maps[5]

When we click view all Locations menu. All the locations retrieved through mobile already stored in database are shown to user. The fog 6 shows the locations retrieved and stored in database. The locations are retrieved in JSON or XML.

Fig 6. Locations stored in database

C. *Change in Locations while moving continously updated on Mobile and Web*

When a person is moving, the change in the longitude, latitude and distance continuously change within 5 sec and in between 1m of range. Testing is done for 100 of Locations. Few of them are shown in Fig 7,Fig 8 and Fig 9.

Fig 7. Ist Iteration: Person is moving nearby places of Badkhal chownk shown using Google Maps[5]

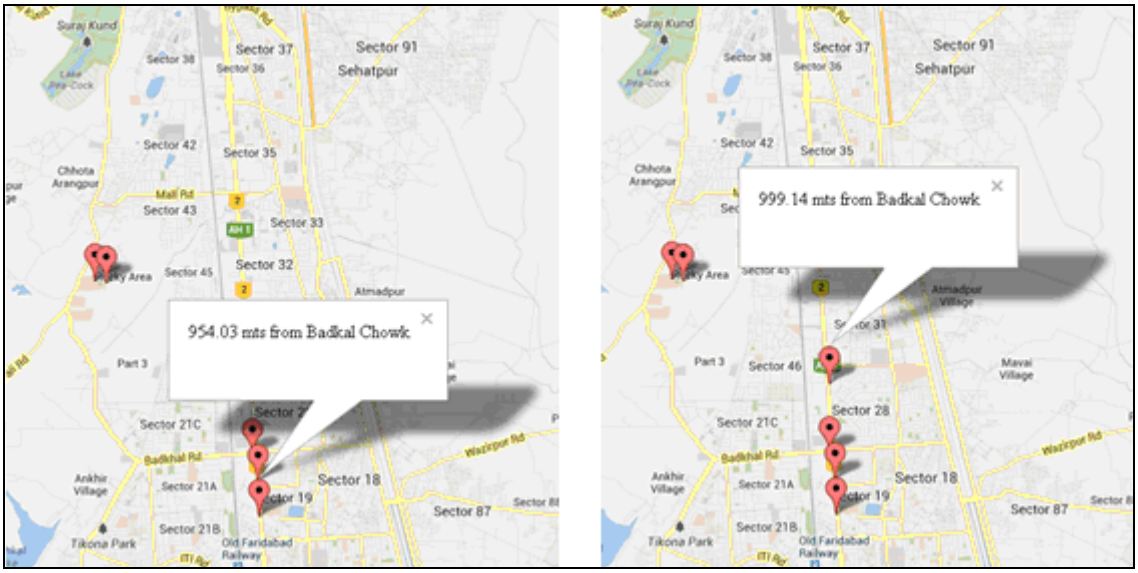

Fig 8. IInd Iteration: shows distances of various places from Badkhal chownk shown using Google Maps[5]

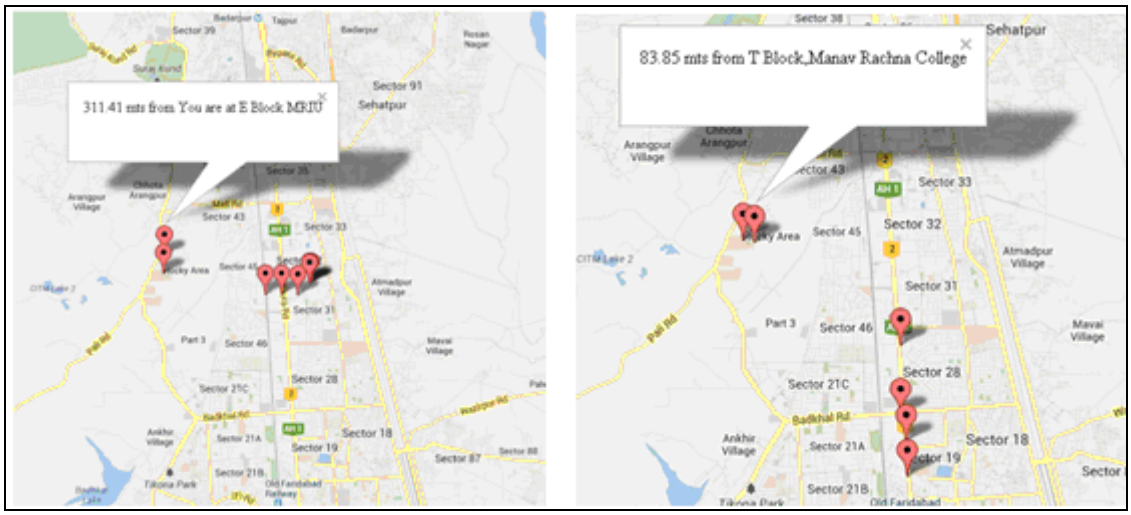

Fig 9. IIIrd Iteration. Person is moving in different blocks in a college shown using Google maps[5]

Ist Iteration shows that a person is moving on a Badkal road .continously moving points are continously defined in fig 7. Itration 2 shows the diatnaces of different place from Badkhal chownk,when Person is moving.

D. Updation of distance with their nearby Locations while moving.

We had tested different areas. The change in distance is updated with respect to nearby Place. The distance is changed within 1m of range. Change of distance checked at various areas is shown in Table 2, 3, 4 & 5.

TABLE 2. Change in Longitude and Latitude with distance nearby Mandir

Latitude	Longitude	Location	Distance from Badkhal Chownk
28.4309943	77.29328989	Shop near Mandir,Sec 21C	1630.1
28.43099105	77.2982957	place very nearby mandir,sec 21C	1630.81
28.4310354	77.29332744	Mandir ,Sector 21C	1628.4

TABLE 3. Change in Longitude and Latitude with distance in your society

Latitude	Longitude	Location	Distance from Badkhal Chownk
28.43202391	77.29225865	Home	1757.62
28.432031	77.2921576	at lift,4th floor, Society	1756.31
28.43243035	77.29228963	Third Floor, Society	1755.05
28.43240036	77.2922409	IInd Floor, Society	1754.6
28.4295966	77.29215966	You are at Society Gate	1710.81

TABLE 4. Change in Longitude and Latitude with distance in the College Block

Latitude	Longitude	Location	Distance from Badkhal Chownk
284502709	77.28687391	You are at Ist Floor,T Block	2353.75
28.4801505	77.28655593	You are at T Block, gate	2361.95
28.45014946	77.28657955	you are at second gate,T block	2362.74

TABLE 5. Change in Longitude and Latitude and distance within College Block from nearby location

Latitude	Longitude	Location	Distance from T Block
28.4502743	77.2867559	You are in staff Room	83.85
28.45034961	77.28667234	Class nearby staffroom	87.88
28.4495246	77.28654315	T Block Gate	28.52
28.4494442	77.28522738	MRCE Gate	27.64

The above dat ashows that the application updates the Location within 1m of distance.Table 3 and 5 shows that the distance calculated from very nearby Location.This application gives Longitude,Latitude and name ogf the place on the Mobile phone,and simontaneously it provides the Location also displays on the Map. On Browser. One can check the Location on map on Mobile phone or on your desktop or Laptop.All the Locations are stored in MySql database.

V. CONCLUSION AND FUTURE WORK

The paper analysed the anonymous usage of Location Tracking.The paper describes the implementation and extensive testing of application called MicroAddress Recorder.This is an advanced and diversified accurate Location tracking application for family and friends.The aim of the application is to provide more accuracy for family members to search their near ones in a micro areas rather than a broad area.The application also calculated the nearby distance of tracked Location in order to reach a good performance level.

There are two directions for Future work.One is to track the different mobile users by storing their IMEI numbers in database in order to resolve the problems of non reliabilty of Sim Cards.Second is to provide the privacy to preserve the user locations.

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