

Position Detection and Tracking System

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Abstract— The Autonomous position detection and tracking system enhances the accuracy of locating friends and family member's positions by using GPS and standard web technology. This system includes a mobile client, a repository, a web client and a map service. The mobile client is used to find location and send a Popup SMS to user when his/her friends or family members come around the user's area of direction. This location information can be sent to the server and the same information can be managed and viewed using the web client by other users.

Keywords- Position Detection, Popup SMS, Location Based Service (LBS), Global Positioning System (GPS).

I. INTRODUCTION

With rapid development of mobile internet technology and wide usage of Smart Phones, more attentions have been given to network access techniques and interactive applications through mobile phones. Android which is an open source has become most popular smart phone used by people. In recent years, more and more people have started using the smart phone, laptop, PDA and other mobile devices. The number of smart phone users is expected to reach two billion by 2015.

Tracking or detecting the position of people is very important for various reasons such as identifying the culprit, to notify friends about serious issues, to convey an important message etc. For this purpose, Global Positioning System (GPS) is being used widely. This paper proposes the Position Detection and Tracking system using Android which can be used to track friends and family members.

The paper gives the related work in section II. The proposed system is described in Section III, the background information about the technologies used by the proposed system is given in section IV, the proposed system architecture and its modules are explained in section V, the implementation details are presented in section VI. The experimental results are given in section VII.

II. RELATED WORK

Lashkari A.H.et. al. [1] describes a system which is used to locate friends and family by using GPS and Standard web technology. This system is implemented using J2ME & JavaScript, the repository and the web client is implemented

using PHP and MySQL. Siriteanu A.et. al. [2] presents the creation of Social Network in which the users are being alerted when their friends are around. Available Android location services like GPS technology, wireless and mobile towers are used to find an approximate location of a mobile phone running this program and then sharing the location information through the Meet You or via SMS.

Kumar N. [3] describes a system using which you can locate the mobile device using another mobile device by even sitting at your home. The system only requires the inbuilt GPS and GPRS in the device whose location is to be tracked. "Where are you? – A Location Awareness System" is a project that helps you to locate a friend or a known person without informing that person. Li_Liu.et. al. [4] explains the design and implementation of Android mobile operating system based group communication and navigation system. By use of GPS and Google Map, the system implements a geographic location and route planning between user and his friend. The system provides a convenient and efficient platform for users travel and connection between friends.

Shrestha R.et. al. [5] presents android-based location and message sharing system which provides a secured two way communication between web server and android based application. The proposed system uses Java programming language for android mobile user application, PHP programming language as web server, MySQL as external database to store the data. Symmetric cryptography is used to assure secured communication between android device and web server. Chandra A.et. al. [6] discusses Location Based Service which is a key factor for future mobile application. The system is developed with J2ME API based on providing location based service using GPS. The application is implemented as client server system which helps users to locate friends and family with whom he wants to share his location.

Al-Suwaidi G Bet. al. [7] presents Location Based Services (LBS) for mobile applications using Global Positioning System (GPS).The application is implemented as a client-server system that helps users to locate their family members and receive alerts when friends are nearby. Mobile application developed using J2ME API at client side and Server was implemented using PHP and Database MySQL which is open source. J Jayashree.et. al. [8] proposes a mobile

location tracking application in a cellular mobile network based on Location Based Service. The proposed system is implemented as a client server system that helps the users to locate their friends and receive alerts whenever they are nearby.

III. PROPOSED SYSTEM

The paper describes position detection and tracking system which has the following three objectives:

- Develop an android application which can be used to locate the position of the friends and family members.
- This application has an alert mechanism to send a popup SMS to the user when his friends or family members are nearby.
- The data can be shared online.

Some advantages are

- End User tracks his/her own position.
- User can track position of friends and family member.
- It can be used for a social media network.

Some Disadvantages are

- Network connection is necessary.
- Application can be used with GPS enabled handset.

IV. TECHNOLOGY BACKGROUND

GPS:

The Global Positioning System (GPS) is a utility that provides users with positioning, navigation, and timing services. This system consists of three segments: the space segment, the control segment, and the user segment. The space segment consists of a nominal constellation of 24 operating satellites that transmit one-way signals that give the current GPS satellite position and time. The Control Segment tracks the GPS satellites, uploads updated navigational data, and maintains health and status of the satellite constellation. The user segment consists of the GPS receiver equipment and uses the transmitted information to calculate the user's three-dimensional position and time.

Android:

Android is a mobile operating system which offers a unified approach to application development. Developers need to develop applications using Android and these applications can run on numerous different devices, as long as the devices are powered using Android.

Google Maps:

Google Maps provides a map of an open Application Programming Interface (Google Maps API). Developers can easily link the Google Maps service to their application.

PHP:

PHP is a server side scripting language that is embedded in HTML. It is used to manage dynamic content, databases, session tracking, even build entire e-commerce sites and it is integrated with a number of popular databases.

My SQL:

MySQL is a fast, easy-to-use RDBMS being used for many small and big businesses. MySQL works on many operating systems and with many languages including PHP, PERL, C, C++, JAVA, etc. MySQL works very quickly and works well even with large data sets.

V. PROPOSED SYSTEM ARCHITECTURE

The Proposed System architecture is shown in Fig. 1 and consists of the following six modules:

- 1) Mobile client.
- 2) Repository.
- 3) Web client.
- 4) Map service.
- 5) Message Alert system for detection of Position of Friends.
- 6) Data (Documents, Audio, Video) sharing center.



Figure 1. System Architecture

Mobile client:

The mobile client consists of a mobile phone and a GPS receiver which can be used to find the location of family and friends. The mobile client can send a Popup SMS about the location to the user when someone is nearby.

Repository:

The repository consists of all the information about the users, location maps, and the location-related results.

Web client:

The information in the repository can be managed and viewed using the web client. The user receives the location information from the web client on their mobiles.

Map service:

The map service is an agent based which provides both the mobile and the web client with map data. The map service uses GPS to track the position of friends or family members. The location information is updated to web client every time by the mobile phone.

Message Alert system:

The message alert system deals with detecting position of our friend and family member and update on server. It sends location update to the user when friends are within specific range from him/her.

Data sharing center:

This module deals with sharing of data such as Image, Audio, Video and Document.

VI. IMPLEMENTATION

The proposed system is implemented using Android. The database used is MySQL and user can access the database using PHP as interface. Mobile Client system consists of five modules such as Register/Login module, GPS module, Notification module, Data sharing module and Chatting module.

The functioning of the proposed system is as shown in Fig.2. The Data flow diagram of the proposed system is as depicted in Fig. 3.

Register/Login module is used to provide registration of new user and login to the system. Register interface takes user

information and after the registration is successful, user can login to the system. The user is validated using validateUser().

GPS module deals with position based services. Using this module, user can find his/her own position, friend position and family member position. The position tracker tracks the position using trackPosition() method. The position tracker can be set for a particular friend using setTracker() and the tracker can be switched off using cancelTracker(). The location of a particular friend who is tracked can be found by getLocation().

Data sharing module deals with sharing the data such as Image, Text, Audio and Video. The user desired files can be uploaded using imageUpload(), uploadVideo(), uploadDocument(). The desired files can be downloaded using downloadDoc(), downloadVideo(). The image files can be saved using saveImage().

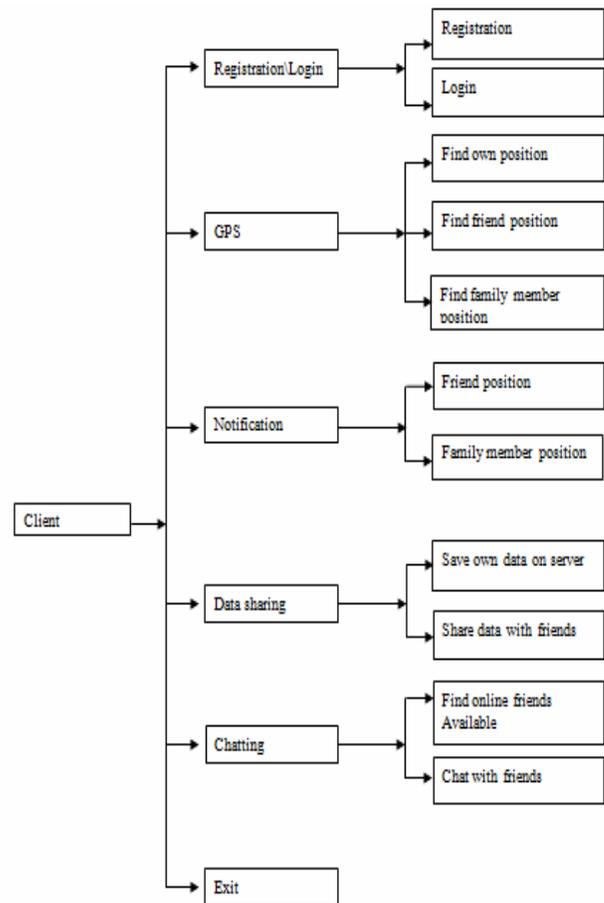


Figure 2. Functional module of system

Notification module sends a notification to the user when his/her friends or family members come around the user's area of direction. A notification is given to the user in the form of a

popup message having the location information along with light or sound or vibration using Notification().

Chatting module is mainly to implement word communication among friends. For chatting, user can search for the friends available online. The information about the friends who are online can be retrieved using getOnlineFriends(). The user can chat with his friends who are online using sendMessage() and receiveMessage().

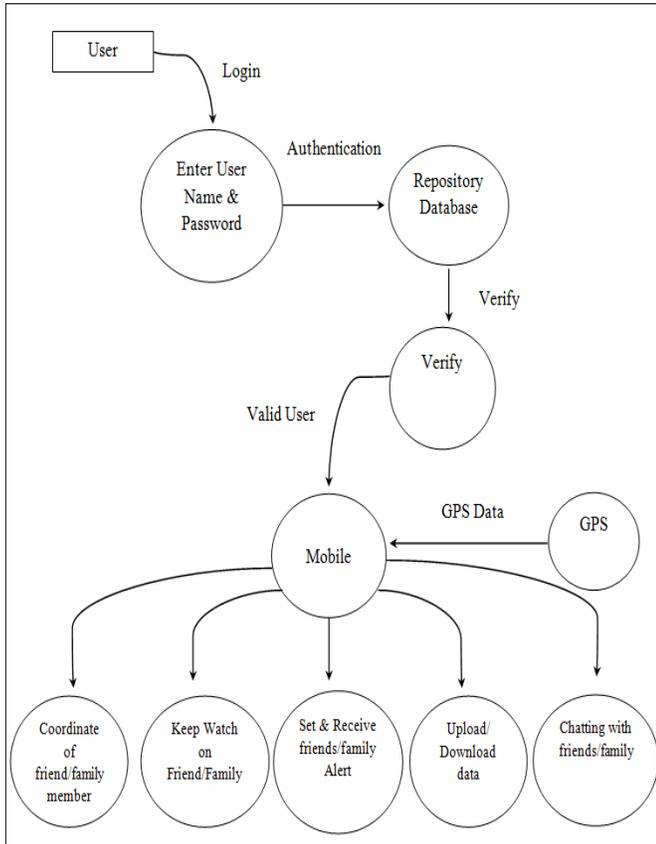


Figure 3. Data Flow Diagram of the proposed system

VII. EXPERIMENT AND RESULTS

The experimental setup consists of a single machine which acts as server running windows OS, an android powered smart phone with GPS. The server and phone are connected via Internet.

Register/Login Module: The user can register to the application by providing the user information. After the successful registration, the user can login by providing email and password as depicted in Fig.4.

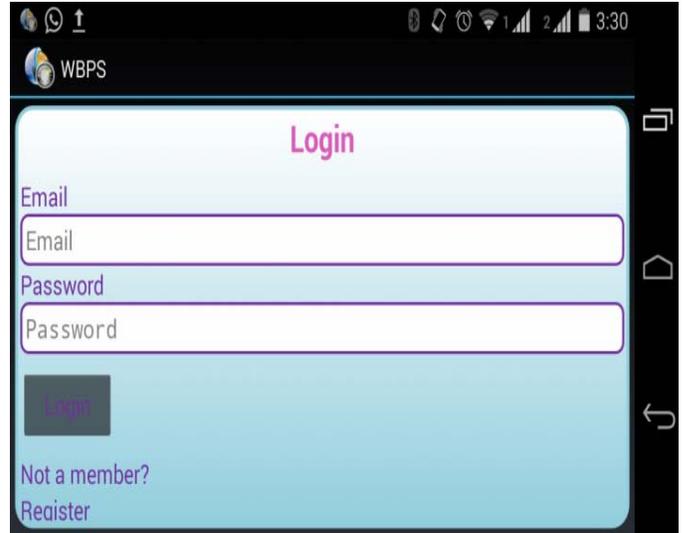


Figure 4. Register/Login module

GPS Module: The user can track his own position by selecting the Self-tracker. The self-tracker effectively detects the user's position as in Figure.5.

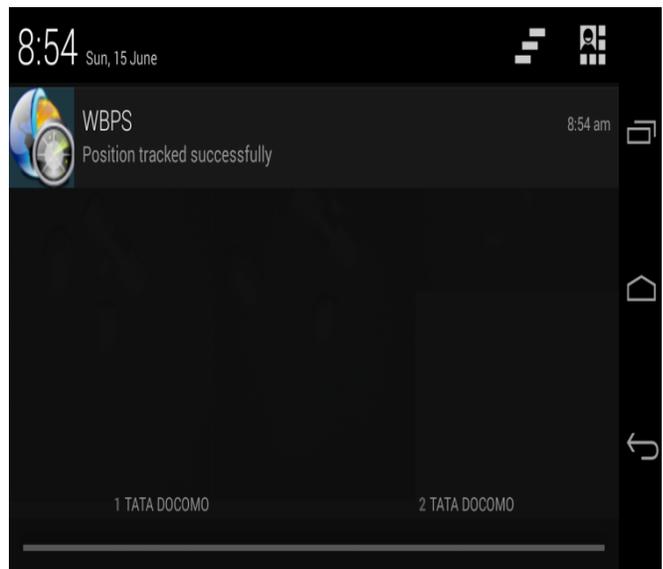


Figure 5. Self Tracker to track users own position

The user can track his friend/family member position that is nearby to the user by starting the Friend tracker option in the developed application. The user's friend Pramod position is detected by the application as in Fig.6.

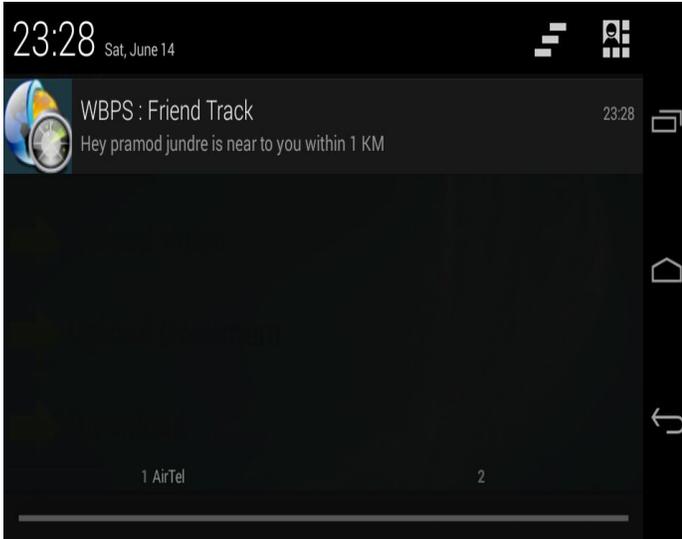


Figure 6. Tracks friend position

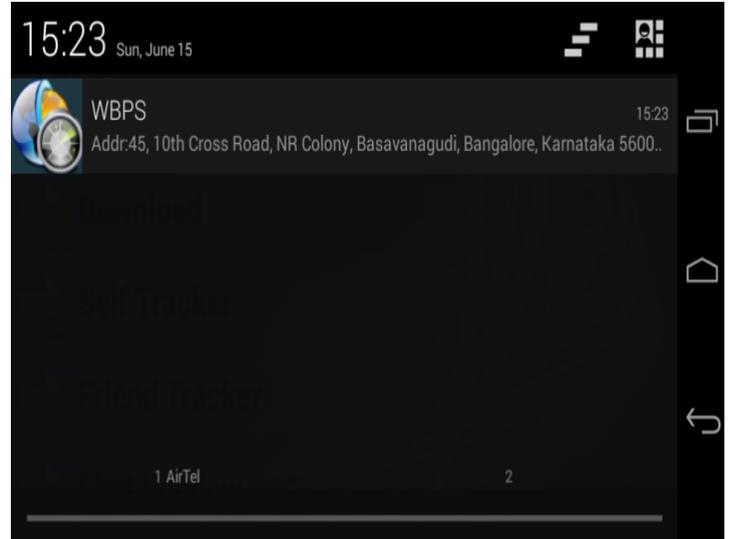


Figure 8. Notification about desired friends/family member position

Data Sharing Module: The registered users can upload the desired information such as image, video, documents etc. into the server. This information can be shared by the user to his friends using Web Client as in Fig. 7.

Chatting Module: The user can identify the friends/family members who are online as in Fig. 9.

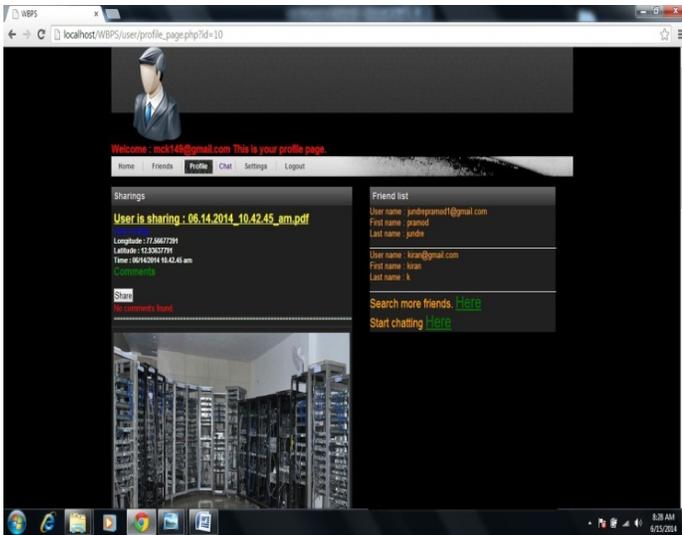


Figure 7. Data sharing

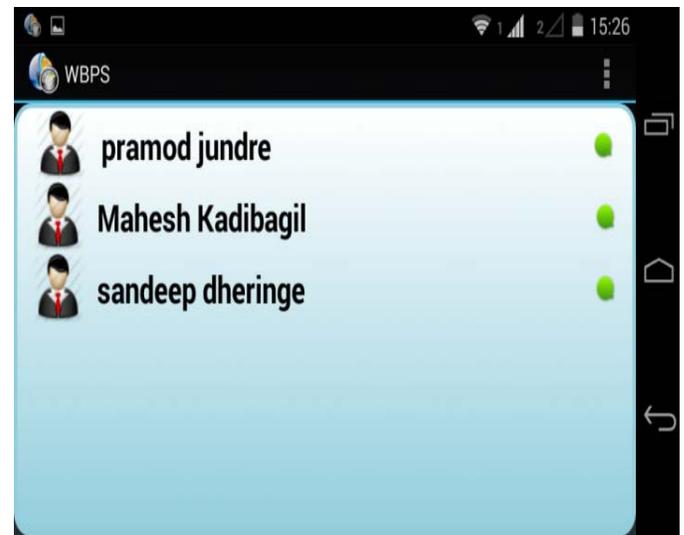


Figure 9. Online Friends

Notification Module: The tracked position detail of the friend is given as notification to the user. The position details includes the information such as Cross, Area Name and City as in Fig.8.

The user can chat with the desired friend/family member who is online. The user Mahesh is chatting with his friend Sandeep who is online as in Fig.10.

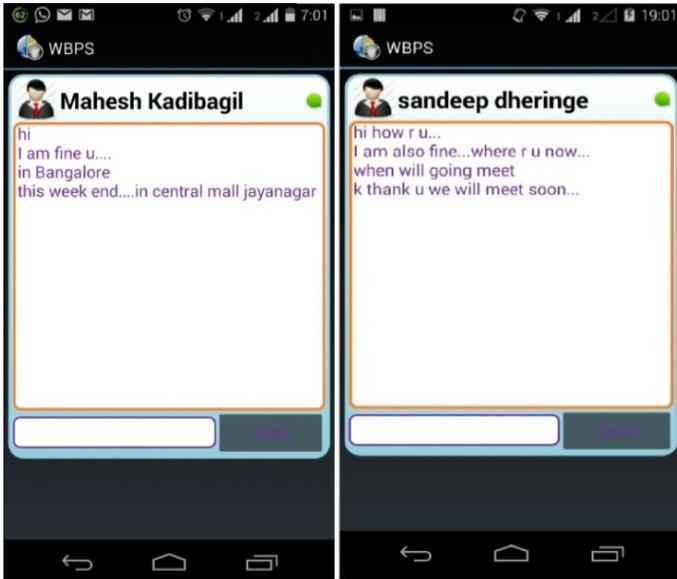


Figure 10. The user chatting with his friends

CONCLUSION

The proposed system uses GPS and Web Technology in order to enhance the positioning experience. The position detection and tracking system effectively alerts the user about the position of a person using mobile phone. This location and position of person information can be shared online. As a future work, the proposed system can be implemented to update the tracked position details to the social networking websites such as Facebook, Twitter etc.

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