TRACKITUP-An Android Application to Track Multiple Users

Priya N V[1], Saipriya G[2], Varshini H S[3], Yashaswini K[4]

[1,2,3,4]*Department of Computer Science and Engineering, Jyothy Institute of Technology, Bangalore, India*
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Abstract - *At the present situation, the location of a person can be shared with another person or can be tracked using navigation technologies. But tracking among a group of users, friends or family through these applications is not possible. While communicating with others, security and privacy plays an important role. Henceforth, there is a need for an application that can allow multiple users to track each other in a safe and a secure way. Tracking based applications have been quite popular in recent times. Most of them have been limited in tracking an individual (e.g. location sharing). However, not much work has been done towards design of a group tracking system. This research work is an attempt to design such group tracking system. This application, Trackitup would allow multiple users to track each other simultaneously with the help of GPS and make sure that accessing is safe and secure. It would allow users to create or join new groups through new unique codes and also provide a simple user-friendly interface.*

Key Words: tracking, user, group, location, security

1. INTRODUCTION

Android is an operating system as well as a programming platform for smart phones and other mobile devices. It has been developed by Google. It can run on different devices produced by various manufacturers. It includes a software development kit for including the original code and assembling the software modules so as to create applications for the Android users. It also provides a marketplace for distributing the developed apps. Altogether, it represents an entire ecosystem for mobile based apps.

Earlier, the Android development was extended using the *Eclipse* platform with the *Android Development Kit* (ADK), provided by Google. This is based on IntelliJ IDEA, which is an IDE that supports Android, but is quite expensive.

The Android Studio IDE has certain advantages like, the gradle dependency manager which is also based on IntelliJ, is largely used world-wide. This is the great power of the platform editor as it provides more options to the developer at the time of development.

Android Studio can be installed on Windows, Linux and, OSX operating systems and it has been recommended by Google itself that the hardware must at least have a memory of 4 GB and a free hard disk space of around 1GB, but it is strongly recommended that the system must have more memory, as

it was noted that Android Studio is still a little slow. Java must be installed on the machine via the *Java Development Kit,* so that it can be utilized for all Java development classes that would be present on the machine.

In today's world tracking systems have become popular. There have been many applications that support tracking another person, a vehicle, pets and so on. Application that allows users to track each other through their android phones, has a wide scope, since, mobile communication is the most common mode of communication. It basically works on tracking the positioning of mobile phone with the help of location-based services that disclose the co-ordinates of the device.

2. LITERATURE SURVEY

Mobile phones provide a convenient and a common platform for the detection of personal information such as location. The system is able to trace the location of a friend, and then this information is processed further to be displayed on the user's phone.

The system can trace the location of a group of friends on a screen and the group function is a feature of the system which sets it unique from previous projects in the same area. Another different feature of the system is the option to set dynamic reminder as per the user's needs.

Software life cycle model describes the phases of the software cycle and the order in which those phases would be executed. Each phase produces an output required by the next phase in the life cycle. Requirements are converted into a design. Code is produced according to the design and this phase is called development phase. After coding and developing, the testing verifies the output from the implementation phase against requirements. Here, the agile development cycle is meant for the development of the code of the proposed system. As per the key principle of agile development, the testing is integrated throughout the lifecycle, allowing regular inspection of the working product as it develops. [1]

As there exists a great demand for smartphones, mobiles, iPhones, and all the gadgets emerging today, it's important for the mobile users to have the location based services. This application provides a client server system that helps the user to track their friends, and receive the alert message when nearby, based on the radius defined by the administrator.

Two methods are proposed to increase the accuracy of positioning system in cellular networks: - a two-step position determination method and a one-step method. In the two-step position determination method, the position determination is performed as the first step by applying optimization techniques along with NLOS mitigation technique to produce initial position approximation. In one-step position determination method, a scheme is proposed for the position determination, which handles the two processes in a single step. [2]

This application uses an automated mechanism for time and attendance monitoring errors of the manual system is reduced and optimal amount of time is conserved. But these systems usually require heterogeneous devices to be located in the organization, which is expensive.

In this paper, by considering the popularity of smartphones, there is a usage of smartphone for the time and attendance tracking purpose which is implemented as an Android application.

This application communicates with the remote server in which the database is located. Internet connectivity is needed for connecting to the database in the remote server. The proposed system does not require any kind of peripheral device other than the smart. Any employee crossing the area border with a smartphone and the running application will be tracked automatically. [3]

This GPS based application is an application developed in order to provide on-time security to the adolescent child through the technological rearing.

This application is specially developed for the parents to track their adolescent child's activity by monitoring his/her entire call logs, duration of each call log, messages sent and received, GPS location with the help of IMEI number. The parent receives this data in the form of an alert SMS to the smart device. [4]

This application requires a regular mobile phone which is equipped with a GPS receptor and is connected to GSM. It gives the data regarding the user's location through a web server to other people. This application uses a technique to send GPS co-ordinates to other phones via SMS, based on the GPS technology and allows the user to view their location on Google maps.

The main advantage of this system is that it provides user the ability to locate a friend and send their own location via SMS and share the location through a web server. [5]

3. METHODOLOGY

TrackItUp, focuses mainly on a set of users tracking each other as a group. Each individual user gets registered with

the application using a unique code and shares this code with other users in order to form a group. New users who wish to join this group can register with the same code and use the application. After successful registration, people in the group can track each other simultaneously, in a secure way. If the user wishes to form another group, he can do so by registering with another unique code.

- Choosing a basic front end look of the application and creating it through XML files
- Adding the additional widgets like buttons, spinner, checkbox, progress bar and setting the views through XML layouts
- Implementing functionalities or working of each of the widgets through Java files
- Creating newer pages by adding a new activity each time
- Modifying dependencies based on permissions required
- Connecting firebase database in order to save the details of the registered person
- Establishing a connection between the computer system and the android phone and run the application
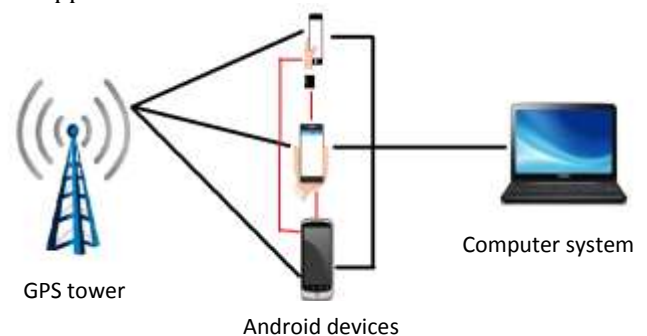

GPS tower

Android devices

Computer system

Fig-1: General representation of working of this application

Working: The computer system is connected to an android device. The application would run on the Android Studio software and the application gets installed on the respective android device.

After having installed the application on the android device, the user then registers into the application by entering the required personal details such as name, phone number, password and unique key code.
He can use either the same or a different unique code depending on the group he wishes to join.

The users will have to enable GPS locator and must be willing to permit certain location based requests.

The user can then add many trusted users into a group or can create, participate or join other groups.

Once group is created, they can mutually track each other, share unique keys and manage groups.

4. DATAFLOW DIAGRAMS

LEVEL 0:

The below diagram shows the overall working of this application.
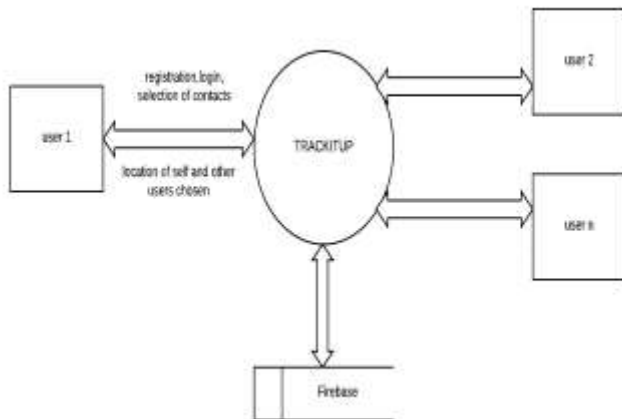

Fig-1: Level 0 DFD

The working is as follows:

- The 'n' number of users are connected to the application- Trackitup.

- The user provides input in the form of user credentials like name, phone number, password, email id, unique code, etc., during registration; details like name and password while logging in to the application.

- The user also provides input to the application in the form of clicking(for selection) an option of their choice, for the processes such as selection of contacts, choosing a group, and for updating certain data.

- The application performs the processing of data on the basis of the user input and the choice thus made.

- The application generates an output in the form of display of the corresponding event, validation of the inputted data for its authenticity, or the output can also involve storage of entered data into the database i.e., the firebase in this case.

- The data in the firebase can be either updated, inserted or deleted, depending on the choice made by the user.

LEVEL 1:

This level depicts the basic modules that exist within the project component. The user interacting with the application can communicate with these three basic modules:
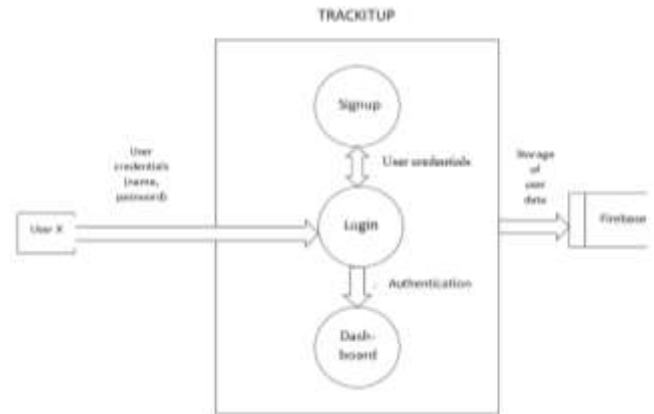

Fig-2: Level 1 DFD

Login:

- The user enters the basic details like name and password. If the user has not yet been registered or is newly joining a group, then he might be redirected to the signup page by choosing the 'Signup' option .

- If the user already has a valid account, he can directly login by entering the valid data.

- The correctness of the user entered data is checked in order to ensure data authentication.

Signup:

- If the user is new or he wishes to join a different group ,he enters the necessary details like name, phone number, password, email id and unique code, in the signup page.

- The user can then access his account after successful registration.

Dashboard:

- After successful registration, the user can log in and he is directed to the dashboard page where the actual work of the application can be experienced.

- This page includes four main options namely, share code, contacts, settings and current location.

- The user can share the code through options like gmail, messenger, drive, whatsapp, etc,

5. IMPLEMENTATION

Fig-1: Splash page

- The splash page appears for a predefined time of few seconds, showing the logo and the name of this application, "Trackitup".
- Login page is loaded directly after the splash page, especially for the first time users. It contains user name and the password field. The new user can click on signup button inorder to register, while an already existing user can directly login using the appropriate user credentials.
- After successfully logging in, the actual dashboard of the application is displayed. The spinner consists of the user names. On selecting any one, the user details such as the user name, address, phone number, last synced date and time are displayed.

Fig-2: Navigational panel

- Onto the left of the dashboard screen is the navigation panel, which opens up on clicking the 'menu' symbol on the left top end of the dashboard. This contains 'my contacts', 'share', 'settings' and 'logout' options.

- The contacts list in the application opens on clicking the 'my contacts' option. It provides an option to place a call to the people in the list.

Fig-3: List of users

- In the dashboard, the spinner provides a drop down list that presents the names of users in that group.
- The map, a sliding panel at the bottom of the dashboard screen can be dragged out to use map option.

Fig-4: Marker showing multiple users' current location

- This figures shows the google map with multiple users in the group being tracked simultaneously, and each user is represented with a marker.
- On clicking the marker, the user name and his current address is displayed.

6. RESULTS

This application allows multiple users to track each other simultaneously through location access i.e., GPS. It allows users to create or join new groups through new unique codes, thereby providing a safer approach through a simple user-friendly interface.

7. CONCLUSIONS

GPS is a wonderful tool of this century that offers much functionality. This application thereby provides the facility to not just track each other but also track many users simultaneously.

This application follows an approach to track users without compromising for privacy and security. Future enhancements would include features for the betterment of our project.

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