

Chapter 1: INTRODUCTION

1.1.Android as an Operating System

Being a mobile operating system, android OS is a modified version of Linux, originally developed by a start-up, Android, Inc. As Google entered mobile market, it purchased Android and in a bid to encourage independent development works, it released the developer tools under the open source Apache License. The permissive licensing allows the OS and related software to be modified and distributed by enthusiastic developers, network operators & device manufacturers.

1.1.2. Android Versions till Date

Version	Code Named
1.1	Petit Four
1.5	Cupcake
1.6	Donut
2.0/2.1	Eclair
2.2	Froyo
2.3	Gingerbread
3.0/3.1/3.2	Honeycomb
4.0	Ice Cream Sandwich
4.1/4.2/4.3	Jelly Bean
4.4	KitKat
5.0/5.1	Lollipop

1.2. GPS Based Location Tracker

1.2.1. Problem Formulation

The App “Location Tracking” is a GPS service based application which would help us in locating the exact geo-position of user depending upon their current location. Geo-position would be displayed on the map view on our android set and display functioning can analogue to the current usage of Google Map Service. Some Key points about the App:

- Share Locations.
- Creation of free Account in the product.

- Update/Delete Account.
- Searching Locations.
- For restricting user access, user authentication would be supported.
- The app would have additional support in terms of
 - Pin Points on the Map
 - Getting Address from the Map
 - Application User Data Manipulation (password)
 - Zooming In / Zooming Out

1.2.2. Application Overview

In our application, we have used Map Views as supported by Google APIs 2.0 or higher which would allow the use of app in devices starting from Gingerbread itself. We have used GCM as server and SQLite support for remote database use.

Onboard compass & map controllers are enabled. Locations are extracted from the device with the help of the GPS module available. A form of passive GPS use, the device decides on the best content with the information available from different providers. On touching the overlay on the map the location will be visible to the user.

This App enables the user to Share his current location with the assigned groups, consisting of his near and dear ones, he can also notify the group members about his whereabouts and can also instantly press the ‘panic’ button in case of emergency, which will extract the location of the user and instantly share it with the group members, in case the data connection is unavailable, the same will be sent through SMS.

1.3. Summary

This chapter dealt with questions like why the application was created & what does it stand for. Overview or general working principles have been provided. The problem statement for each has been detailed and analyzed well. An introduction into why android was selected as target OS has also been provided.

Chapter 2: BACKGROUND STUDY

Today, we all know Security of their citizens is the major concern of all the countries in the world. Each and every country is making their efforts to provide safe and secure environment for their citizens. Today, almost every person has mobile Phone. So this electronic medium is the easiest way to reach peoples. As we see there are thousands of app available on play store for playing games, learning something, listening music, chatting etc. but as you go through it there is a huge requirement of apps which can provide security to peoples specially women. After seeing this we have come up with an idea of making an android application which can be helpful in providing security to its user. In this application, a user can form of group of peoples. The people of this group can see the location of each other. They can also chat with each other. There is also a 1-tap button by which a user can send his current location to all the peoples present in that group.

We have also refer few research papers as follows:

[1] Location Based Mobile Apps Development on Android Platform:

This paper describes an Android application, designed to serve as a location based time saving and safety ensuring application. In other words this App is a location based service, with three features,

- 1) Tool to announce arrival,
- 2) Handset theft monitoring and
- 3) Emergency call

Feature integrated in it. Tool to announce arrival service is designed to make client's uncertain waiting time known, handset theft monitoring is designed to track user's android device, and emergency call feature is designed to ensure personal safety of the android device user. Development of this application led us to identify few usability concerns and to propose solutions to solve these concerns.

Currently, there are more than 1.5 million android devices are activated in each day and more than 50 billion app downloads from Google play [2] in each month. This indicates the widespread acceptance and usage of mobile device such as android devices among users. There are more and more mobile applications developed on Android operating system.

The main components of hands theft monitoring feature set are:

- Application's internet portal where the user has to create an account registering his device.

- Google maps API with GPS service to locate the device.
- User is required to register his/her account with the application's internet portal.
- The GPS tracing begins as a background service and tracks the device's location.

The main feature of TriTHEapp designed to, ensure personal safety of the android device owner. An

Individual's personal safety is always at question when on walking alone at night or when going on a long adventure trip.

When caught in an unfortunate situation every one wishes there is a help to find them. To make it possible for help to find the person in need, Emergency call feature has been designed to be one of the features in the TriTHEapp application to turn the user's android device into an ultimate safety device.

The main components of the emergency call feature are:

- Phone call service to make the call to the emergency contacts.
- Camera to capture the scene, which can serve as an important evidence.
- User has to choose the emergency call feature from the main menu of the application.
- During the first usage, the user is required to select the contacts to be added to the emergency contact list, ordered based on priority (this list can be edited anytime).
- Whenever walking alone in unsafe locations, the user can open this feature and push on the toggle button and hold on to it.
- The current location of the user/victim is text messaged to all the contacts in the emergency contact list.

With the rapid proliferation of mobile devices with android operating system, android applications will continue to create a buzz in our lives. It is transforming businesses. Industries as enterprises are using mobile applications to give customers, employees and suppliers access to data when and where they need. TriTHEApp android application that we developed will serve as a very useful application to its users upon release to the market. It will enhance the customer service.

[2]A Potential Way for Efficient Information Sharing Based on Mobile Text Messaging:

This paper was inspired by the simple communication method used in mobile devices, short Message Service (SMS) or text messaging, creating an efficient geographical information sharing platform for everyone and volunteer data gathering.

Nowadays most individuals own mobile phones and it has turned to one of the most important and predominant ways of communication and sharing data. Although new generations of mobile phones are capable of using the latest technologies and modern communication methods in most situations, text messaging is still the cheapest and less power consuming method of communication. The objective of this paper was creating an efficient information platform, with the focus on collecting pervasive mobile device information from volunteer mobile owners. It aimed on finding a new way to use mobile devices to handle the environmental issues; this contributed to use mobile devices as sensing nodes, since mobile phones are pervasive and equipped with powerful embedded sensors.

On the other hand, the contribution of this paper was to create an efficient centralized data gathering platform, for geographical information systems, which is both user-friendly and especially transparent for the user.

This paper detailed the justification for pursuing text message communication for a potential way of efficient resource sharing. Thus through this a globally accessible information platform is created which is capable of receiving spatial information via SMS from anywhere anytime.

[3]Location - Aware Mobile Crime Information Framework for Fast Tracking Response to Accidents and Crimes in Big Cities.

Recently the number of accidents and crimes are arising in many big cities. Mobile applications with location aware systems can be utilized in providing location information of the crime. The problem is that location information provided by mobile phones has not been fully utilized. Mostly mobile phones used for its main functions which are for calling and messaging. This paper argues that location information can be used for reporting accident and crime, so that a quick and fast response can be achieved. This study proposes a framework of mobile crime information assistance to help the users (victim) from locus delict (location where accident or crime happened) with location aware capabilities. Using this framework, mobile app can send and receive location of crimes including the scenes (images) to the nearest police station or central police station. The system can offer a facility to track the location of the nearest police station by accessing a built-in database with a combination of Google map APIs and send the scene/image of the crime location as one complete set

of report to the police station. This will allow the police to find the location of the accident right away and increase the safety of the resident in big cities.

This study proposed a Mobile Crime Assistance Architecture (MCIAA) for mobile devices which is Constructed with servers using public IP addresses and the police databases that exist around the server environment. The application prototype was developed using android. This application reads the longitude and latitude coordinates and the position will be listed on the site and it will also get the location of existing police stations that are around. When there is a crime, a set of accident/crime information will be sent to the police station closest to the accident by executing the application from the mobile phone. The next section presents the related work on location awareness and is followed by the model on crime information assistance in Section 3, and Section 4 discussed the LBS on Android framework. The results based on simulations of the proposed approach and the search position model are discussed in Section 5. Section 6 presents the conclusion of this study.

Chapter 3: Requirement Analysis

3.1 Overview

This Section provides a brief introduction to the various services essentially required by the application to run and perform optimally.

3.2 Software Requirements

The software components required by the Application are described below:

3.2.1 Android Operating System

The Application is intended to be deployed on the Android Operating System for smartphones. The Target version is Android KitKat although it is compatible with any Android version higher than Android Froyo.

3.2.2 Google Play Services

The Application extensively uses the Google Maps services and various other dependencies that rely on Google Play Services for their deployment, so Google Play Services must be installed on the host system.

3.2.3 Network Services

The user in case of any emergency can send his/her location to specified members through SMS service which will be provided by the Network Service Provider.

3.2.4 GPS and Locations Services for Android OS (v2.0)

The Application's location tracking and positioning functionalities are provided by the help of the GPS and Locations API provided by Google, which is essential for accurate and precise location

information. The Maps Activity in the application uses these functionalities for accurately locating the user.

The Software Components required for Development Process are:

Android Studio

The Application Development is extensively done in Android Studio IDE, provided by google for free. The Whole Application was compiled, edited and tested using Android Studio, The Application was tested using the AVD, although the final deployment is done on the Phone.

3.3 Hardware Requirements

The Hardware Requirements for the Application are:

- Android Smartphone
- At least 256 MB of RAM

The Hardware requirement for the Development Device is:

- Any system with preinstalled JDK tools.
- At least 2GB RAM.

3.4 Functional Requirements

- The User details must get stored in the databases on the 'signup' button click.
- The splash screen must appear for only 2 seconds.
- The Login Page must appear every time application opens, after the first launch.
- User must get redirected to the welcome page after login.
- Maps and Group Activity must open on their respective button clicks.
- User must be able to locate himself/herself on the Map in the Maps Activity on current location button click.
- In Map Activity User must be able to search locations.

- In Map Activity User must be able to notify selected group members about his/her location.
- User must be able to Change the view of the map.
- In Groups Activity user must be able to add, modify, view and delete whichever group member he/she wants to.
- In welcome activity user must be able to quit the app on tapping the back button twice.

3.5 Non Functional Requirements

3.5.1 Usability

- The application must have a registered user.
- Users must be notified against every wrong entry in either the signup page or the login page.
- The Data entered in the fields must be stored into the databases.
- The Data must be fetched from the databases efficiently.
- User must be notified about his current location.
- Internet Connectivity should remain turned on for maps navigation.
- Application must start with a notification sound.

3.5.2 Reliability

- Components of the project code will be tested alongside the implementation phase to ensure that they are functional.
- The location services are provided by the Google, which is tried and tested over years.
- The Database 'SQLite' is implemented, which reliably provides all the RDBMS services to the application.

3.5.3 Performance

- The Insertion and extraction of the data from the databases shouldn't consume more than a second.

- Error Notifications (implemented using a widget called ‘Toast’) should be crisp and of conveniently short duration enough to effectively catch the attention of the user.

3.5.4 Compatibility

- The Application must only run on Android devices, no other platform is supported as of now.

3.5.5 Implementation

- Application will be implemented in Java for Android API.

3.6 User Requirements

The user is required to have a basic knowledge of operating Android powered phones and must be acquainted with Google maps interface, although the easy to understand interface of the Application makes it easy for the user to easily comprehend the use of the application.

3.7 UML Diagrams

3.7.1 Use Case View

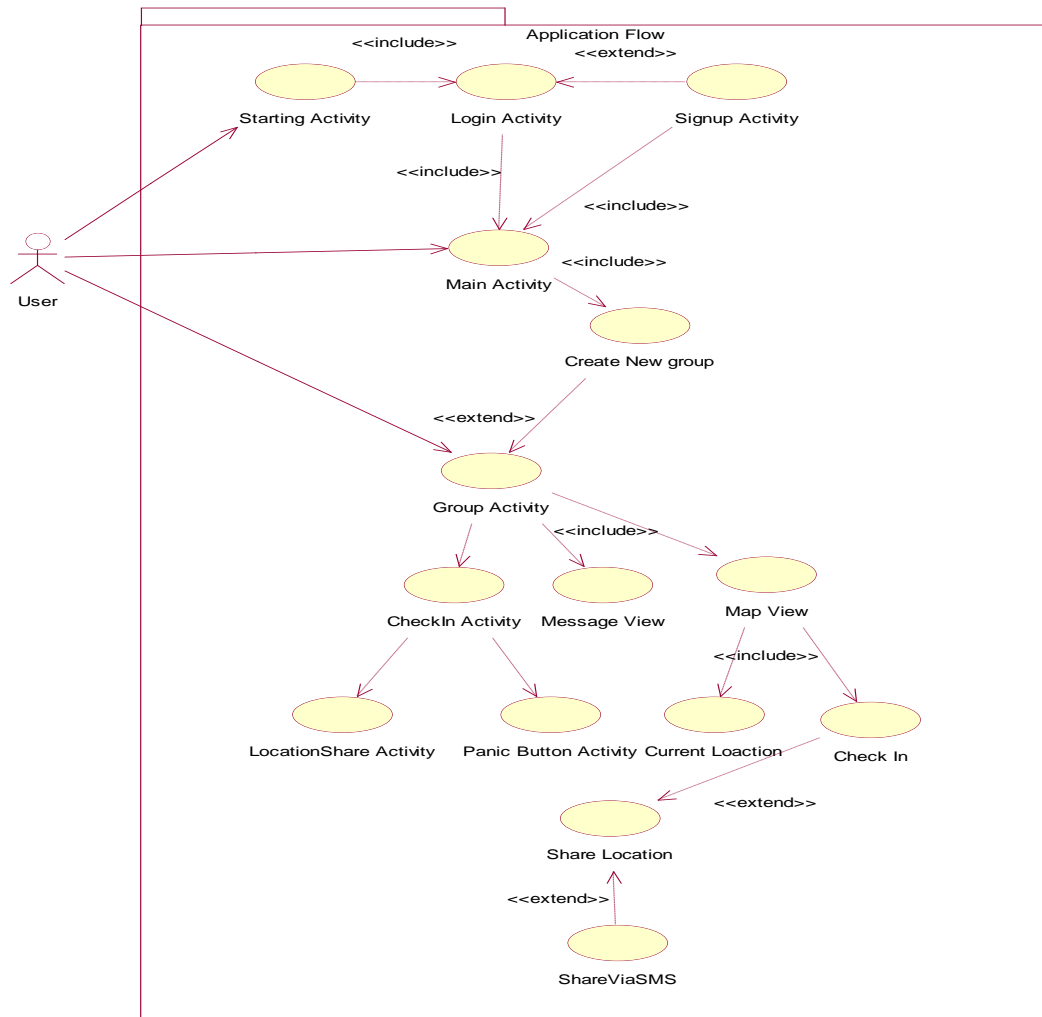


Fig. 3.1

3.7.2 Class Diagram

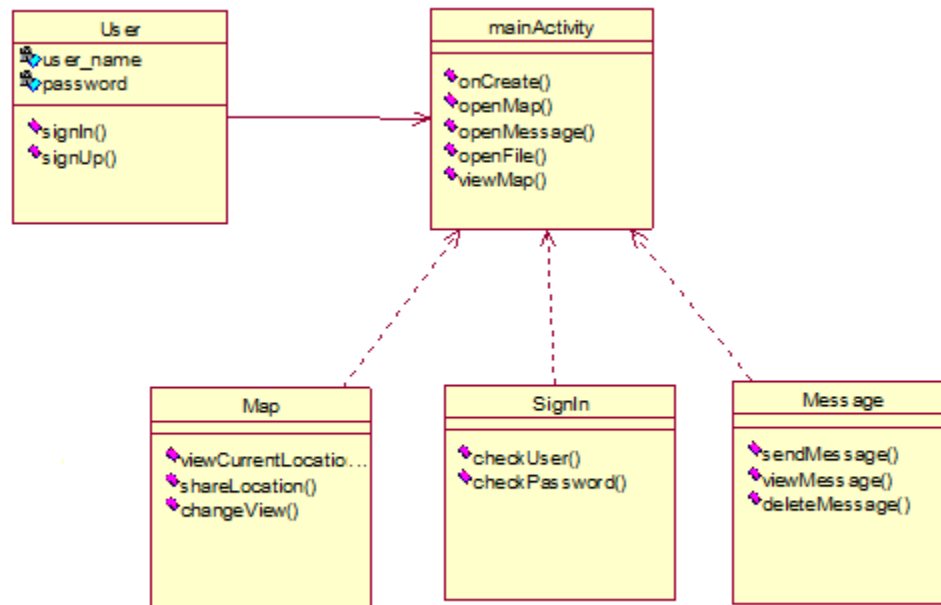
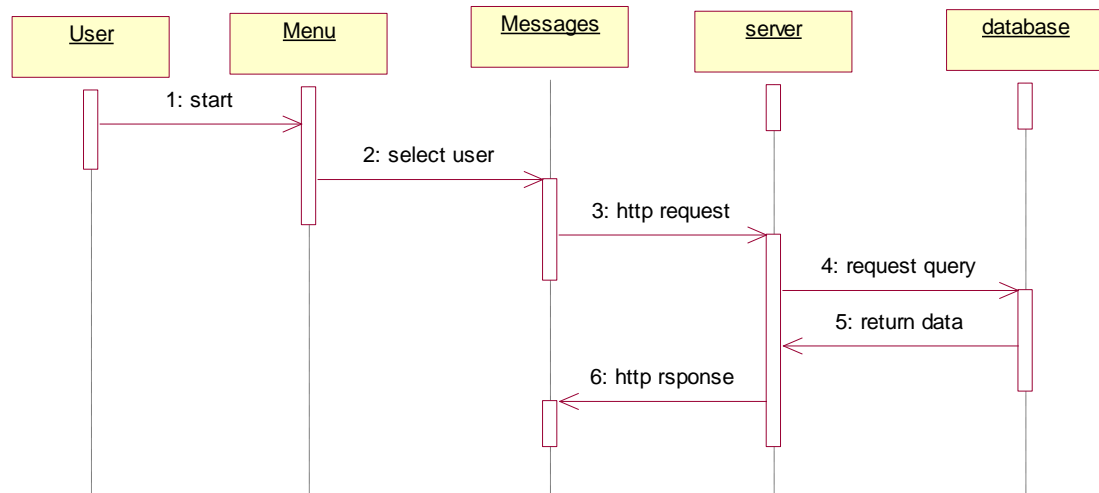


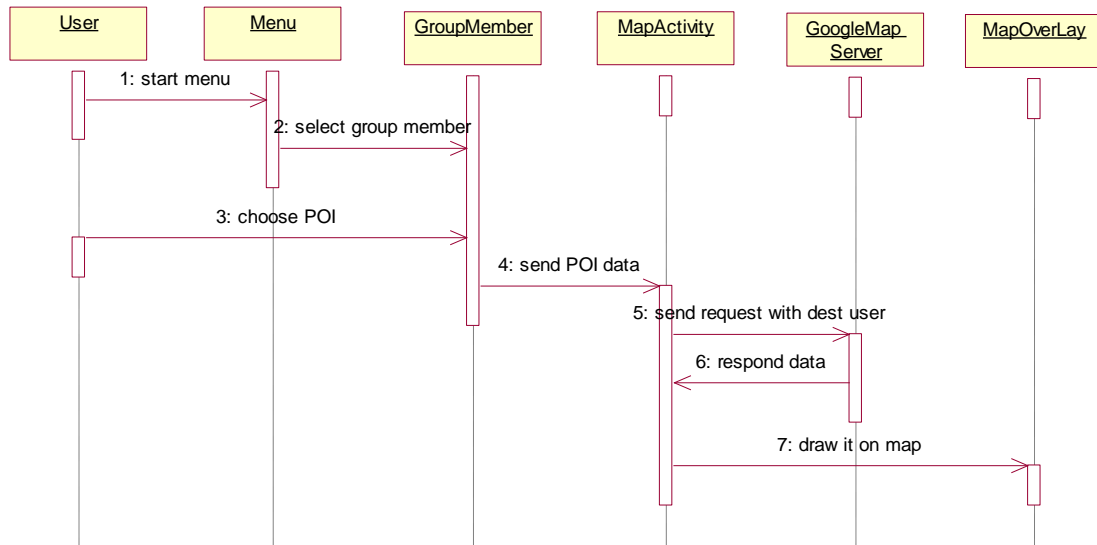
Fig. 3.2

3.7.3 Sequence View



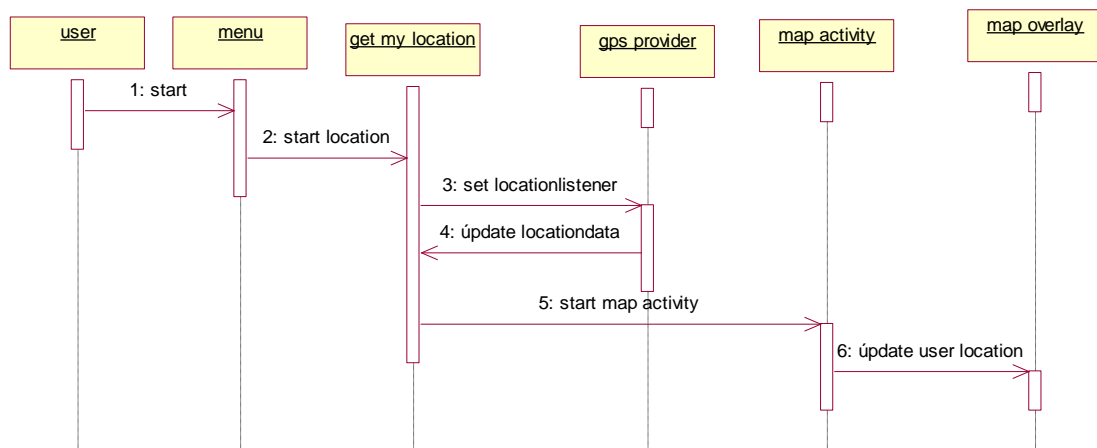
For message

Fig. 3.3



For group creation

Fig. 3.4



For location tracking

Fig. 3.5

3.7.4 Activity View

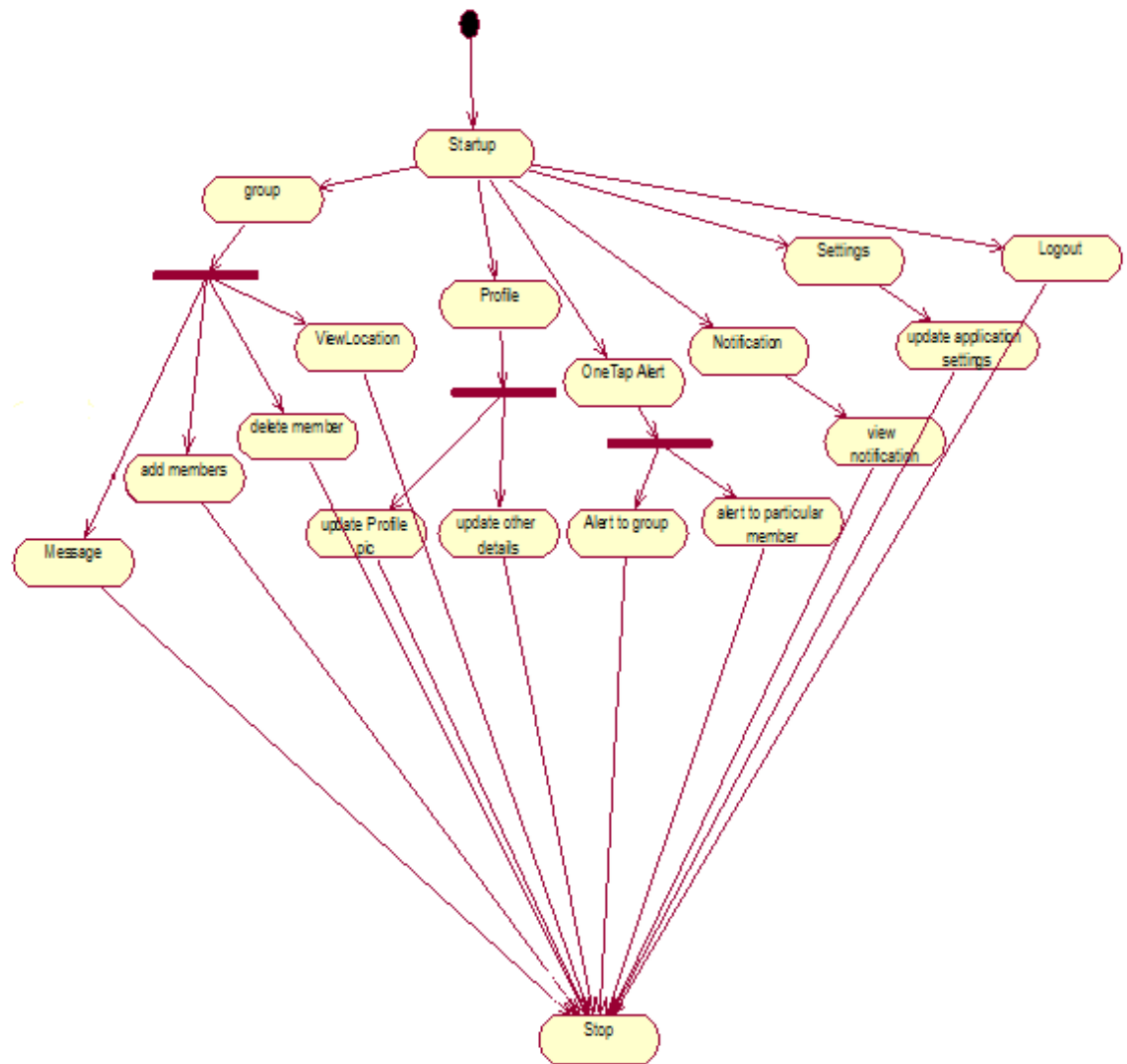


Fig. 3.6

Chapter 4: Detailed Design

SPLASH SCREEN: It is the starting activity (Page) of the Application, displaying the Project topic.

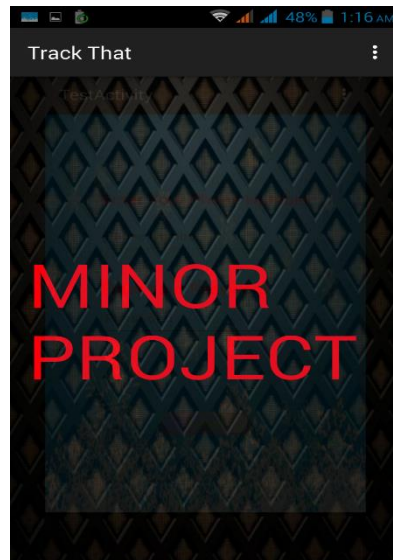


Fig. 4.1. Splash Screen

SIGNUP PAGE: The Splash Screen follows the User sign up/Registration page which allows user to create his/her account when the application is installed for the first time.

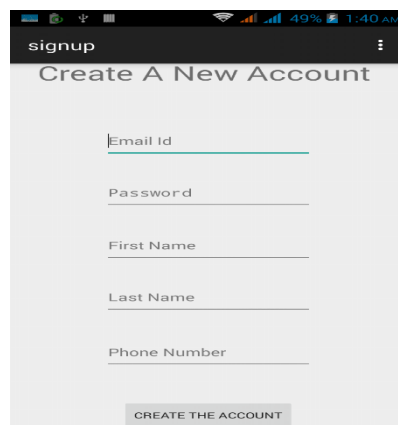


Fig. 4.2. SignUp screen

LOGIN PAGE: The user is required to login to use the application.

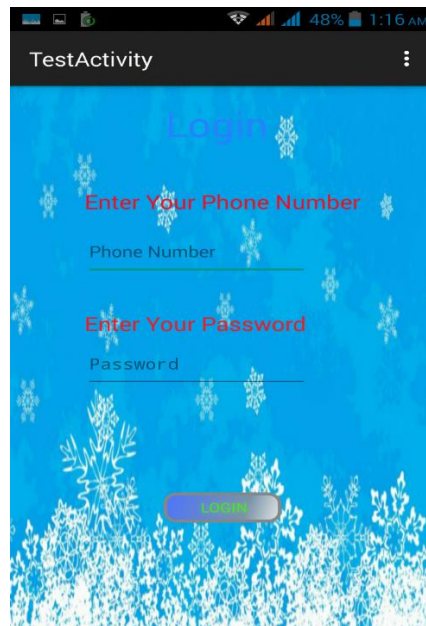


Fig. 4.3 Login screen

- **Maps**: The map activity is used to display the user's current location in the map. It can also be used to search places and send the user's current location to group members.

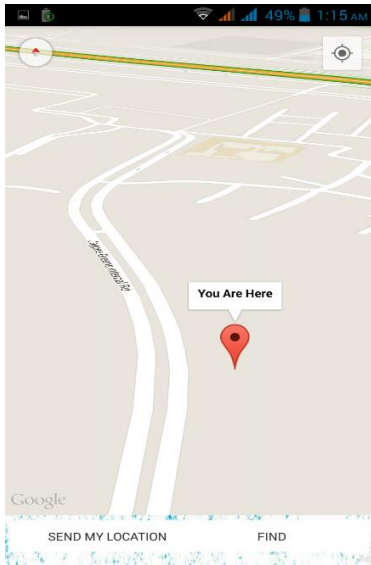


Fig.4.4 Map-1

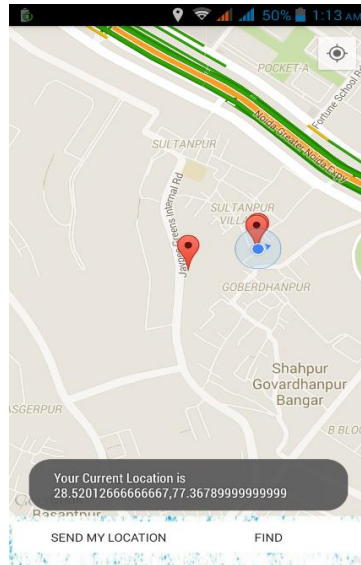


Fig. 4.5 Map-3

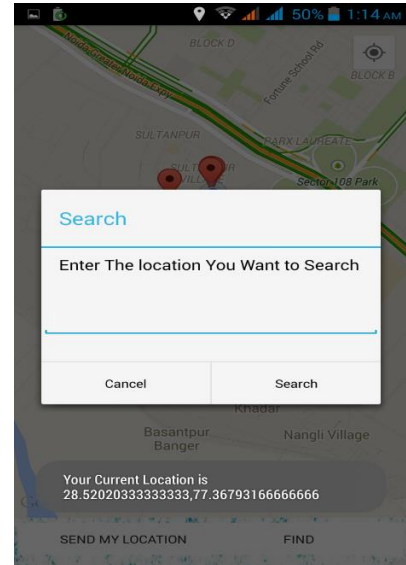


Fig. 4.6 Map-3

- **Group activity**: It includes all the functions related to a group such as create group, add and delete group members and modifying details of a group member.

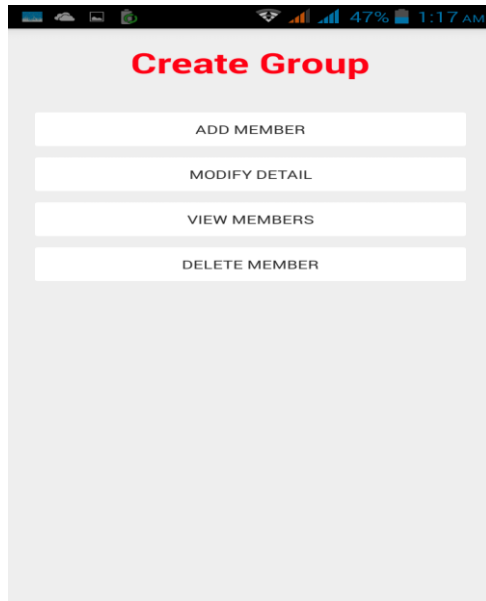


Fig. 4.7 Create Group

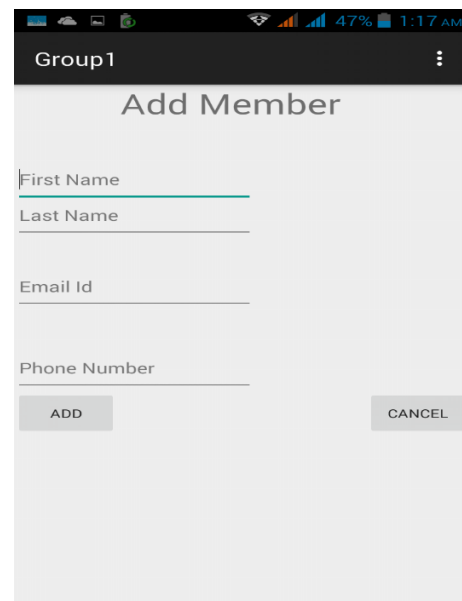


Fig. 4.8 Group (Add Members)

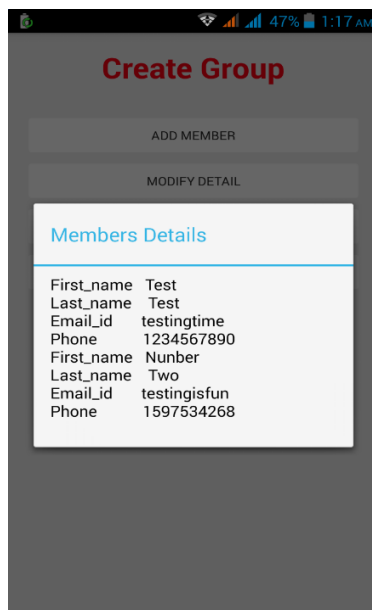


Fig. 4.9 View members

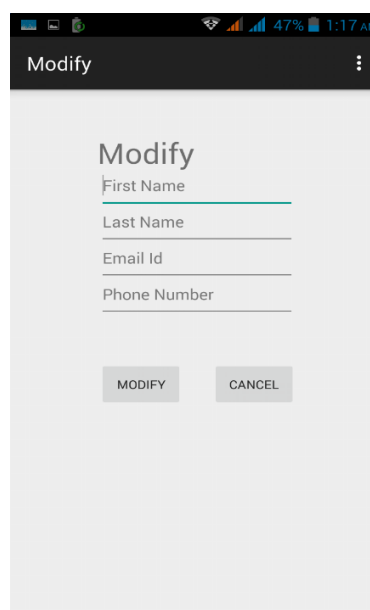


Fig 4.10 Modify details

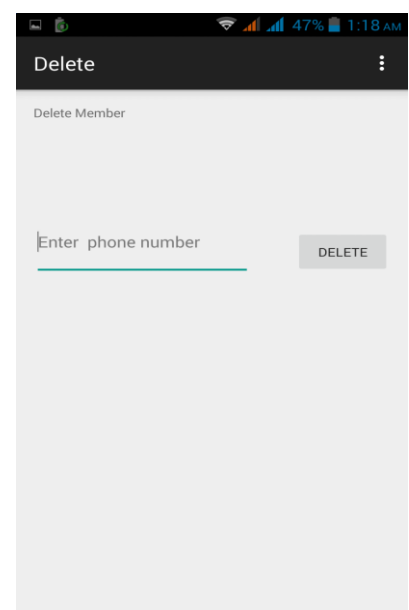


Fig. 4.11 Delete Membe

Chapter 5: Implementation

This application is designed using java, GCM and SQLite in backend. It has been taken into consideration that a secured account of the user is created with the registration being done by the username and password being stored securely.

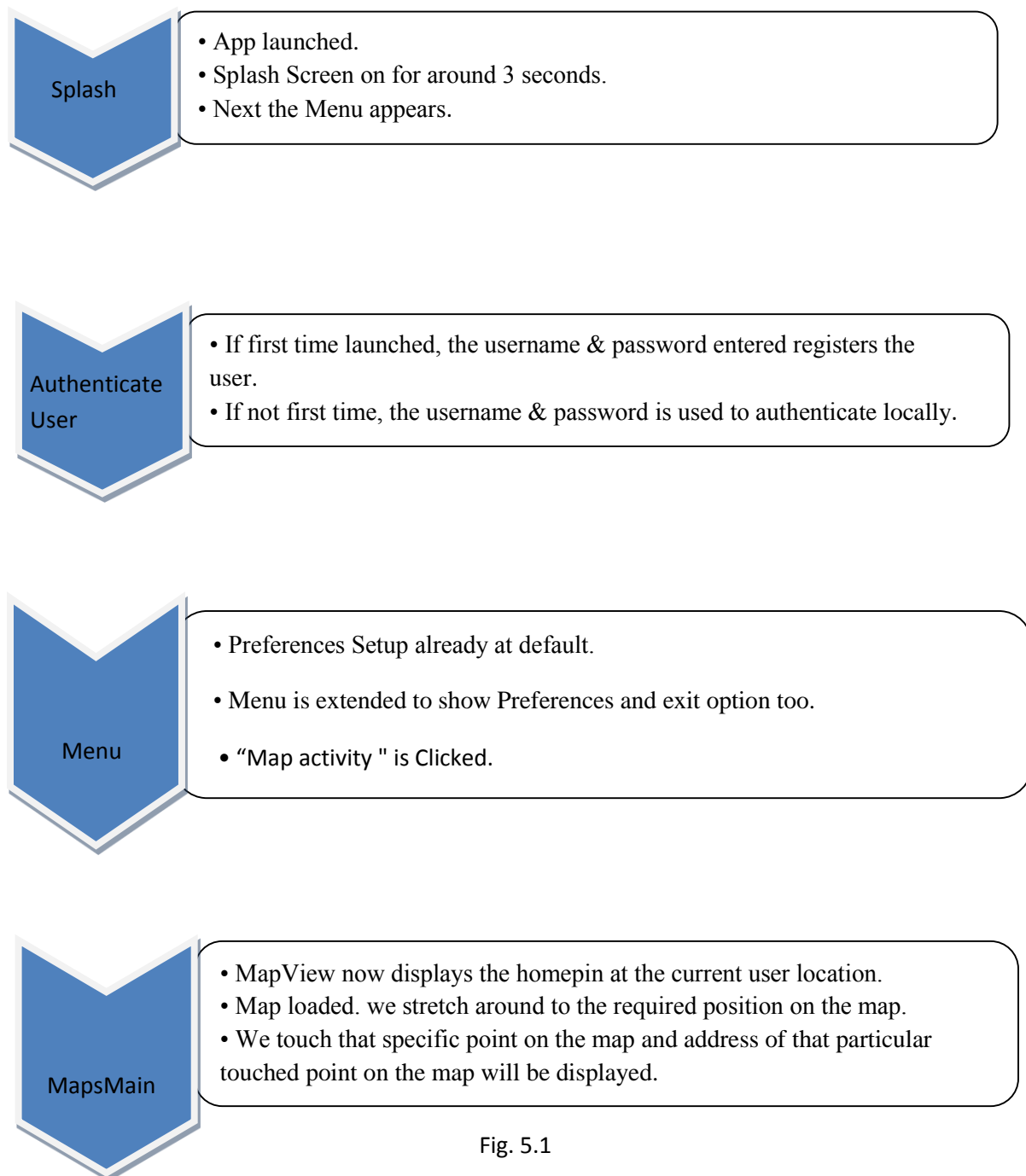


Fig. 5.1

There are two possible actions in map activity. Firstly send their own location to group members and secondly search for any place in map.

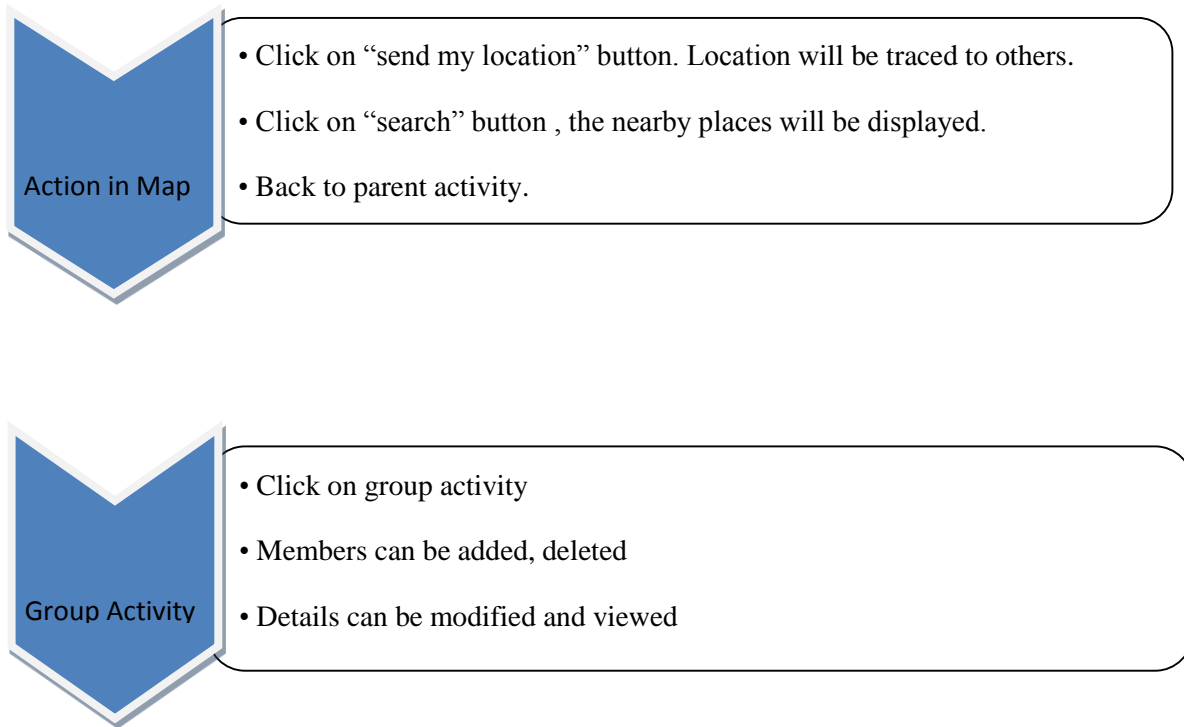


Fig. 5.2

Chapter6: Testing Report

S. No.	Test Cases Description	Expected Output	Actual Output	Remark
1.	Splash Screen Activity	Display Splash Screen for 2 sec.	Splash Screen displayed for 2 sec.	Desired Output
2.	Signup with information as directed	User registered	Successfully Registered	Desired Output
3.	Signup with invalid information	Error Message displayed	Message Displayed	Desired Output
4.	Signup with email id length less than 6	Error Message Displayed	Error Message Displayed	Desired Output
5.	Signup with email id length greater than or equal to 6	No error message	No error Message	Desired Output
6.	Signup with Password length less than 7	Error Message	Error Message	Desired Output
7.	Login with any other Information than Databases	Error Message displayed	Message Displayed	Desired Output
8.	Login again after visiting an activity with Valid Details	Successful Login	Error Message displayed	Undesired Output
9.	Display User name on welcome Page	Name Displayed	Data from database fetched successfully	Desired Output
10.	Button Click on Welcome page	Open respective activity	Successfully Opened	Desired Output
11.	Check GPS is ON or OFF on MapsActivity Launch	Redirect to Turn on GPS Activity	Redirected	Desired Output
12.	Click on My location Button	Display Current Location	Current Location Displayed	Desired Output
13.	Click on Find Button	Display Entered Location	Location Displayed	Desired Output
14.	Click on Send My location Button	Location Shared to all group through SMS	Location Shared	Desired Output
15.	Click on send my location button	Location shared through internet	Location not shared	Undesired Output

16.	Click on add member button	Add member page launched	Page launched Successfully	Desired Output
17.	Enter valid info. to add member	Member added	Successfully added	Desired output
18.	Enter invalid/ blank info.	Error message displayed	Message displayed	Desired Output
19.	Enter valid info. to modify the detail of member	Detail modified	Successfully modified	Desired output
20.	Enter invalid/ blank info.	Error message displayed	Message displayed	Desired Output
21.	View Member details	Member details displayed	Details viewed Successfully	Desired Output
22.	Click on delete member button	Delete member page launched	Page launched Successfully	Desired Output

Chapter 7: Conclusion and Future Work

Conclusion

At the end, we find that, the application was really useful. The tracker unlike others is free of cost. The project taught us many innovative things to work on. The android platform by Google was the novice technology we learnt. We came to know all the installation needed to program on android like the SDK, Eclipse ADT—in that are very important from developers point of view. We learnt the android architecture. Also the research papers help us understand the location based services for the cell phones. We now know how to establish connection with Google server using private key. We also learnt how to use Google Map API interface, which again requires a private key. We also came to know how to interact with the storage of the android device. We learnt the concepts of Geo coding. The most important thing we learnt is how a project progresses through various stages of software development cycle through weekly updates versions and presentation.

Possible Future Work

- Tracker can be modified so as to implement Google Maps V3 APIs. They are more advanced & support 3D projections.
- The UI can definitely be improved by using Action Bars & other new end graphics introduced in latest versions of Android.
- Extending the application with some distance algorithms like dijkstra shortest path and including more parameters like speed, distance, it can be used for as a GPS.
- Photo tagging: LBS can be used to tag the photos clicked from camera and can be showed on the map on the location where they were clicked.

Gantt chart

TASK	PERSON RESPONSIBLE	DATE
Project discussion	All the group members	01.02.2015
Requirement Gathering	Nitesh , Shreyans	04.02.2015
Synopsis	All the group members	18.03.2015
Project planning	Nitesh, ketan	21.03.2015
Timeline of project	All the group members	06.04.2015
Designing	Ketan, Saurav	25.04.2015
Architecture	Shreyans, Saurav	1.05.2015
Coding	All the group members	5.05.2015
Testing	Nitesh,Shreyans	6.05.2015

REFERENCES

- [1] Travis Cornelius, New Boston Series 2015: Android Application Development tutorials Travis Cornelius, Available from:” <http://www.mybringback.com/series/android-basics/>” Accessed: April 23, 2015.
- [2] Lars Vogel 2015: Android Development Tutorial Available From: <https://www.vogella.com/tutorials/> Accessed: April, 2015
- [3] Google Code, Available from: <http://code.google.com> Accessed: April 29, 2015
- [4] Android Dev Guide, Available from: <http://developer.android.com/guide/index.html> Accessed: April, 2015
- [5] Research paper: Sekar, B.; Liu, J.B.,” Location Based Mobile Apps Development on Android Platform”, Industrial Electronics and Applications (ICIEA), 2014 IEEE 9th Conference, 2014, pp. 2148 – 2153.
- [6] Research paper: Yazdi, N.T. ; Chan Huah Yong, ”A Potential Way for Efficient Information Sharing Based on Mobile Text Messaging” , Green and Ubiquitous Technology (GUT), 2012 International Conference, 2012 , pp. 172 - 175
- [7] Research paper: Mantoro, Teddy; Feriadi; Agani, Natori; Ayu, Media A.; Jatikusumo, Dwiki, ” Location - Aware Mobile Crime Information Framework for Fast Tracking Response to Accidents and Crimes in Big Cities”, Advanced Computer Science Applications and Technologies (ACSAT), 2014 3rd International Conference, 2014, pp. 192 - 197