

# **"Tracking Android Devices Using GCM"**

Project Report

Submitted in partial fulfillment of the requirements for the degree of

**Bachelor of Engineering**

by

**Siddiq Salman Mohd Tahir Shehzadi Begum (12CO72)**

**Shaikh Mohd Tabrez Mohd Salim Rehana Khatun (12CO69)**

**Khan Intekhab Alam Mohd Nasim Taqdeerunnisa (12CO38)**

**Mohammed Harish Mohammad Danish Hajra Khatoun(12CO43)**

Supervisor

**Prof. Javed Sheikh**

Co-Supervisor

**Prof. Amer Sayed**



**Department of Computer Engineering,**

**School of Engineering and Technology**

**Anjuman-I-Islam's Kalsekar Technical Campus**

Plot No. 2 3, Sector -16, Near Thana Naka, Khanda Gaon,

New Panvel, Navi Mumbai. 410206

**Academic Year : 2015-2016**

# CERTIFICATE



**Department of Computer Engineering,  
School of Engineering and Technology,  
Anjuman-I-Islam's Kalsekar Technical Campus  
Khanda Gaon, New Panvel, Navi Mumbai. 410206**

This is to certify that the project entitled *Tracking Android Devices Using GCM* is a bonafide work of **Siddiq Salman Mohd Tahir Shehzadi Begum (12CO72), Shaikh Mohd Tabrez Mohd Salim Rehana Khatun (12CO69), Khan Intekhab Alam Mohd Nasim Taqdeerunnisa (12CO38), Mohammed Harish Mohammad Danish Hajra Khatoon (12CO43)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **Bachelor of Engineering in Department of Computer Engineering.**

**Prof. Javed Sheikh**

Supervisor/Guide

**Prof. Amer Sayed**

Co-Supervisor/Guide

**Prof. Tabrez Khan**

Head of Department

**Dr. Abdul Razak Honnutagi**

Director

## Project Approval for Bachelor of Engineering

This project entitled *Tracking Android Devices using GCM* by *Siddiq Salman Mohd Tahir Shehzadi Begum, Shaikh Mohd Tabrez Mohd Salim Rehana Khatun, Khan Intekhab Alam Mohd Nasim Taqdeerunnisa, Mohammed Harish Mohammad Danish Hajra Khatun* is approved for the degree of *Bachelor of Engineering in Department of Computer Engineering*.

Examiners

1. ....
2. ....

Supervisors

1. ....
2. ....

Chairman

.....

## **Declaration**

We declare that this written submission represents our ideas in our own words and where others ideas or words have been included, We have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Siddiq Salman Mohd Tahir Shehzadi Begum(12CO72)

Shaikh Mohd Tabrez Mohd Salim Rehana Khatun(12CO69)

Khan Intekhab Alam Mohd Nasim Taqdeerunnisa(12CO38)

Mohammed Harish Mohammad Danish Hajra Khatun(12CO43)

## **Abstract**

### **Title: Tracking Android Devices Using GCM**

Smartphone users are increasing rapidly in this ICT enabled society. With the phenomenal growth of smartphone usage, the burglary of such tiny device is also increasing. Smartphones are easily lost, stolen or misplaced. Security is one of the main concerns for Smartphone users today. This paper proposes a model to return smartphones from any kind of missing. Smartphone become more valuable useful device because it contains more and more sensitive information. Considering the stored information, users are very much concerned to return their phone to maintain regular communication and sharing.

Siddiq Salman Mohd Tahir Shehzadi Begum(12CO72)

Shaikh Mohd Tabrez Mohd Salim Rehana Khatun(12CO69)

Khan Intekhab Alam Mohd Nasim Taqdeerunnisa(12CO38)

Mohammed Harish Mohammad Danish Hajra Khatun(12CO43)

B.E. (Computer Engineering)

University of Mumbai.

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# Keywords And Glossary

## **Keywords :**

GCM, GPS, Tracker, IMEI, cURL, System Application.

## **Glossary :**

### **C**

cURL: An application library for downloading files or performing requests on the Web **D**

Data Access and Extraction Layer: This layer includes tools and data-extraction.

### **F**

Frame Work: a real or conceptual structure intended to serve as a support or guide for the building of something that expands the structure into something useful.

### **G**

GCM: Google Cloud Messaging is a mobile service that enables third-party application developers to send notification data or information from developer-run servers to applications that target the Google Android Operating System.

GPS: Global Positioning System is a space-based navigation system that provides location and time information in all weather conditions.

### **I**

IMEI: International Mobile Equipment Identity is a unique number to identify the mobiles.

### **P**

Presentation layer: aims to present the result in a meaningful and a logical way that covers the user requirements.on.

### **R**

Real Time: a narrative technique whereby events are depicted as occurring entirely within the span of and at the same rate as the depiction.

### **S**

SIM: Subscriber Identity Module.

# Chapter 1

## Project Overview

### 1.1 Introduction

Nowadays, usage of mobile has become a vital part of day-to-day activities of people. We can refer the current time as the era of Smartphones. Suppressing all other traditional communication purpose, smartphones are now at the peak of popularity in their usage of accessing the internet which includes mail access, social networking, mobile shopping, mobile banking etc.

Smartphones contains critical and sensitive data of user like automated call records, photos, videos and saved passwords of Webpages. So losing the smartphone means a very high amount of irrecoverable data loss which may not be affordable in many cases. This claims the need of an intelligent application to be run in mobile to eradicate mobile theft and track the mobile even after change of the SIM and IMEI also.

Google Cloud Messaging (GCM) is a free service that helps Android developers to send data from servers to their Android applications, and upstream messages back to the cloud from the user device. This can be a lightweight message telling the Android app that there is a new data to be fetched from the server. The GCM service handles all the aspects of queuing of messages and delivery to the target Android application running on the target device. It allow 3rd-party application servers to send messages. Android application does not need to be running on a device to receive messages. When the message arrives, system will wake up the Android application via Intent broadcast, as long as the application is set up with the proper broadcast receiver and permissions. Built-in user interface or other handling for message data is not available, GCM simply passes raw message data straight to the Android application that has full control of how to handle it.

The major objectives of the research work have identifying thefts mobile number and to get that smartphone. Locate the mobile and track it. The mobile location can be tracked using the proposed approach.

### 1.1.1 Proposed System Architecture

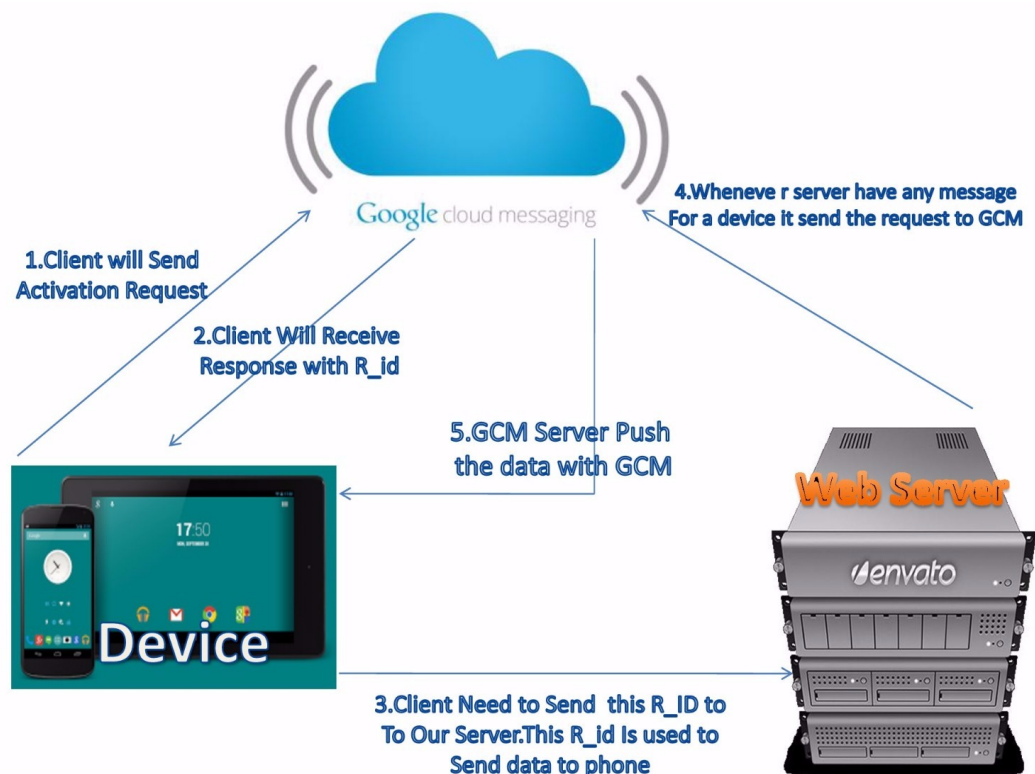


Figure 1.1: System Architecture

Our System Architecture consist of :-

- Android Mobile
- GCM Server
- Web Server

#### a) Android Mobile:

A smartphone or smart phone is a mobile phone with an advanced mobile operating system which combines features of a personal computer operating system with other features useful for mobile or handheld use. They typically combine the features of a cell phone with those of other popular mobile devices, such as personal digital assistant (PDA), media player and GPS navigation unit. Most smartphones can access the Internet, have a touchscreen user interface, can run third-party apps, music players and are camera phones. Most Smartphones produced from 2012 onwards also have high speed mobile broadband 4G LTE internet, motion sensors, and mobile payment mechanisms.

Smartphone ease the work. Smartphone provides one touch access and connect to the world. People used to store Images, Videos, Important Data and sharing of those through Email and

social networking sites like WhatsApp, Facebook, Twitter, Instagram, etc. Nowadays, people are going online like Online Shopping, Online Recharge, Online Transferring of money through Netbanking, Debit Card/Credit Card or Online Cash. Due to this, Smartphone user are increasing rapidly. Smartphone is also costly and in a country like India when mobile phone is lost, it hurts. So the recovery of the Mobile must be ensure.

### **a) GCM Server:**

Google Cloud Messaging (GCM) is a service that enables developers to send data from servers to both Android applications or Chrome apps and extensions. The service provides a simple, lightweight mechanism that servers can use to tell mobile applications to contact the server directly, to fetch updated application or user data. The service handles all aspects of enqueueing of messages and delivery to the target application running on the target device. The free service has the ability to send a lightweight message informing the Android application of new data to be fetched from the server. Larger messages can be sent with up to 4 KB of payload data. Each notification message size is limited to 1024 bytes, and Google limits the number of messages a sender sends in aggregate, and the number of messages a sender sends to a specific device.

### **a) Web Server:**

A web server is an information technology that processes requests via HTTP, the basic network protocol used to distribute information on the World Wide Web. The term can refer either to the entire computer system, an appliance, or specifically to the software that accepts and supervises the HTTP requests. The primary function of a web server is to store, process and deliver web pages to clients. The communication between client and server takes place using the Hypertext Transfer Protocol (HTTP). Pages delivered are most frequently HTML documents, which may include images, style sheets and scripts in addition to text content. A user agent, commonly a web browser or web crawler, initiates communication by making a request for a specific resource using HTTP and the server responds with the content of that resource or an error message if unable to do so. The resource is typically a real file on the server's secondary storage, but this is not necessarily the case and depends on how the web server is implemented.

## **1.1.2 Motivation**

It was all started when our Friend Shaikh Mohd Tabrez lost his Mobile while travelling in Train. His mobile was stolen by some Theif. After College, we went to Railway Police Station and lodge a complaint for your Mobile to be tracked. The Policemen told us once your Mobile is tracked, we will call you. We waited for a month and there was no response from those Policemen. So, once again we visited that Police staion and asked that Policemen. The Policemen told us the same, "Once your Mobile is tracked, we will call you!". But after 3 months, the case was closed and we didnt get our Mobile. There may be many like us who didnt get their mobilephone. So we started to research on different types of mobile trackers in the market. But we didnt got that tracker which could actually track the lost Mobile and those tracker doesnt provide that level of security which should be given to Mobile. So we decided, let create Mobile

Tracker App and will provide that level of Security which should be given to it.

## **1.2 Market Potential of Project**

As the number of Smartphone user are increasing, the security of the devices must be ensure. In India, 123.3 million of people are using Smartphone and India is the third largest smartphone user in the world. By the next year end, it will become the second largest smartphone user by acrossing 200 million of smartphone user. People used to store Images, Video, Data, Saved Webpages and transferring of those through Email or social networking website like WhatsApp, Facebook, Twitter, Instagram, etc. Nowadays, People also used to do Online Shopping, Online Banking, Transferring of Money, Online Recharge and many more by using Credit Cards, Debit Card, Wallets,etc.

In India, 10 to 15 percent of mobile is lost last year and the number is increaing very fast. There are many Application in the market which they do provide the security of the devices. but having those many Application and the recovery of the Mobile is just only 3 to 4 percentage is quite less. This shows that these Applications are not providing that level of Security which should be given to the Smartphone.

So, the Main Aim of our Project is to increase the number of Smartphone Recovery and to increase the Security of the Devices. Our Project will cover all the negatives and provides the Best Security to the Devices.

### **1.2.1 Competetive Advantages of Project**

Our Application will be a System Application and not a Local Application. Other Application can be deleted from the mobile or can be uninstalled from the mobile. But our Mobile Tracker will be installed in a System which cannot be uninstalled or deleted.

The major disadvantages of Other Application is that it can be removed from the System after installation, but our Application cannot be uninstalled from the System. When Formatted or Hard Reset, Our App will remain in the System and start its action when required. Other Application are deleted when the phone is formatted or hard reset.

Our Application doesnt have GUI like others. Having GUI of the Mobile Tracker Application will make the thief alert and he can take the necessary action for it. So we have remove the GUI part to protect the mobile.

Our Application is using the GCM technique. GCM ID is used through which our Application will work and perform the predefined action.

Our Application is not only using the SMS technique but it will work in all the fields. Our Application will sent all the Fetched Data to our webserver and if SIM is available with balance

in it, it will send the data to the alternate number of the End user. From our webserver, the user can view or edit all his activity of his mobile and can track and locate his mobile. People need this type of Application. Not only people but also Police Department needs this Application for their Investigation.

## **1.3 Organization of the Project**

The remaining part of the project is organized as follows.

Chapter 2 presents a review of related work.

Chapter 3 introduces the Software and Hardware Requirement of the project.

Chapter 4 proposes the Project Design of the Project . It represent the architectural design, front end design and database design of the project.

Chapter 5 introduces the system model and some basic assumptions and Dependencies of our work.

Chapter 6 presents the Results and Test cases related work.

Chapter 7 Described the time management and time utilization during the Project implementation.

Chapter 8 Described the Workload distribution.

Chapter 9 provides some concluding remarks and directions of our future work.



# Chapter 2

## Literature Review

### 2.1 Smartphone Tracking Application Using Short Message Service.

#### 2.1.1 Description

In this paper, they have proposed two methods to track the lost mobile. One is the basic method and other one is advanced. The basic method just only include the mobile tracker in which whenever someone changes the SIM the user will be notified about thief's mobile number via SMS messages sent on mobile numbers stored in mobile tracker. In the first basic method, they have suggested to develop an android application using the SIM serial number. The SIM serial number is unique, so they had develop an application using SIM serial number. In the application the user must insert a alternate number to get notification from the stolen mobile. When the theft change the SIM card by his own SIM card then the previous SIM serial number will not match with present serial number, so they have given a condition when this mismatch will occur then a notification will be send to the user's predefined SIM number from the theft number. Thus the user can know number the theft phone number.

In the advanced method, they had develop an application by adding GPS system with the first method. GPS (Global positaioning system) is a great boon to anyone who has the need to navigate either great or small distances. GPS receiver help them to navigate back to a starting point or other predetermined location without the use of maps or any other equipment. The apps will keep updating the location of the stolen phone after every 10 minutes, and each times the location changes, it will send an email to the user. However, the location is sent only on the email address. Basically, the app doesn't require one to configure the settings or create any account. When they have developed an application according to the second method, this application will provide thefts current location to the users predefined email address. Thus the user can know the theft current location and catch the theft and get return his lost smartphone.

### **2.1.2 Weakness**

- They are using the technique of SMS. If the thief change the SIM then all the activity of his mobile will be send to his alternate number. But if the changed SIM doesn't have balance in his mobile then SMS cant be send.
- If the thief Format the mobile then all the application will be removed. Once the Application is removed, then the mobile cannot be tracked.
- The Application is not hidden. The thief will be alert when he will see the Application and can do the necessary action to remove that Application.

### **2.1.3 How we overcome those problem in Project**

To overcome this problem, if the application is System Application then it cannot be uninstalled or deleted from the System. When formatted, the app will remain in the system and will start its action. It will fetch the required Data from the System and then post it our Webserver. From Our Webserver, the User can view his activity of his Mobile and locate his Mobile with the help of some Policemen. In our paper, we have used the GCM technique. GCM server provides the Registration ID with which we will track the device.

Our App doesnt have GUI. The main advantages of not having GUI is that the thief will not be alert about our Application. After lost, the trigger will be activated and it works like a Spying Application. The Fetched Data will be sent to our Webserver when required.

## **2.2 Mobile Tracking Application**

### **2.2.1 Description**

In this Paper, they have described about Personal Tracking Systems. Personal Tracking Systems are the tracking devices specially built up for personal information. The person takes it with him and the information of where he is presently is provided. This system is GPS enabled android mobile phone whose location is tracked. This application provides the functionality of defining the geo-fence areas as safe, risky and highly risky. In today's world, child's safety is a major concern. It becomes difficult for the parents to keep track of their children all the time they are away from home. Hence a need arises to provide a way to do so in order to ensure child's safety. This application is of interest to the parents and police department to restrict the roaming of a mobile user to a predefined geographical boundary. If mobile user breaches this boundary, then a alert message containing mobile's current location is sent to register mobile phone numbers and email ids.

The application aims at providing a simple way-out for ensuring the child's safety all the while he is by his own. The main objectives of this application are as follows:

- The application would provide the ability to divide interested geo-graphical area into different sub zones (e.g. safe, risky, highly risky etc.) and based on breaching of these zones a different alert message would be sent to registered users.
- The application would also provide the ability to automatically send a message to registered users with mobile's current location after user configured time interval.
- On geographical boundary breach, the application would warn user in the form of a message with beep so that mobile user would also be well informed about risk associated with his/her movement.

### 2.2.2 Weakness

- They are using the technique of SMS. If the thief change the SIM then all the activity of his mobile will be send to his alternate number. But if the changed SIM doesn't have balance in his mobile then SMS cant be send.
- If the thief Format the mobile then all the application will be removed. Once the Application is removed, then the mobile cannot be tracked.
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Our App doesnt have GUI. The main advantages of not having GUI is that the thief will not be alert about our Application. After lost, the trigger will be activated and it works like a Spying Application. The Fetched Data will be sent to our Webserver when required.

## **2.3 GPS and GPRS Based Cost Effective Human Tracking System Using Mobile Phones**

### **2.3.1 Description**

This paper proposes a cost effective method of tracking a human's mobility using two technologies viz General Packet Radio Service (GPRS) and Global Positioning System (GPS). The whole system allows the user's mobility to be tracked using a mobile phone which is equipped with an internal GPS receiver and a GPRS transmitter. A mobile phone application has been developed and deployed on an Android Phone whose responsibility is to track the GPS location and send it to a remote location by creating a GPRS packet. As unique identifier we have used mobile's International Mobile Equipment Identity (IMEI) number which will be sent along with the coordinates.

The person's position is further saved in a Mobile Object Database (MOD) for live tracking which is created in MySQL. From MOD the data will be first transferred into an XML file which will be fed as an input to a web application which is developed with JavaScript Ajax based Google Map API integrated into it which will be responsible for the showing the current location of the mobile phone. Most of the applications developed so far use a handheld GPS receiver device for tracking the location, but we have reduced the cost of device by using the mobile phone which has an inbuilt GPS receiver. And further the cost is reduced by using GPRS rather than using Short Message Service (SMS) for communicating the information to the server.

### **2.3.2 Weakness**

- If the thief formats the mobile then all the application will be removed. Once the Application is removed, then the mobile cannot be tracked.
- The Application is not hidden. The thief will be alert when he will see the Application and can do the necessary action to remove that Application.

### **2.3.3 How we overcome those problem in Project**

To overcome this problem, if the application is System Application then it cannot be uninstalled or deleted from the System. When formatted, the app will remain in the system and will start its action. It will fetch the required Data from the System and then post it our Webserver. From Our Webserver, the User can view his activity of his Mobile and locate his Mobile with the help of some Policemen. In our paper, we have used the GCM technique. GCM server provides the Registration ID with which we will track the device.

Our App doesnt have GUI. The main advantages of not having GUI is that the thief will not be alert about our Application. After lost,the trigger will be activated and it works like a Spying Application. The Fetched Data will be sent to our Webserver when required.

## **2.4 Real Time Tracking of Complete Transport System Using GPS**

### **2.4.1 Description**

In this paper they have proposed a GPS tracking system which will track the current position of the vehicle and show it to the user who wants to travel by the vehicle. The system will reduce the waiting time for travelling. The GPS Device will send vehicles current position to the server. The server on request from the client will show the client the current location of the vehicle on the Google Map.

Real Time tracking of all vehicles of travel agency using Global Positioning System as the name suggests, it uses GPS to track any vehicles. Our area of concentration in this project is on tracking travel agency vehicles. It will help both the passengers and the agency to track the vehicles, to get real time position of the vehicles, changed routes (If any), it can also act as an anti theft application by detecting the exact position of the vehicles.

### **2.4.2 Weakness**

- If the thief Format the mobile then all the application will be removed. Once the Application is removed, then the mobile cannot be tracked.
- The Application is not hidden. The thief will be alert when he will see the Application and can do the necessary action to remove that Application.

### **2.4.3 How we overcome those problem in Project**

To overcome this problem, if the application is System Application then it cannot be uninstalled or deleted from the System. When formatted, the app will remain in the system and will start its action. It will fetch the required Data from the System and then post it our Webserver. From Our Webserver, the User can view his activity of his Mobile and locate his Mobile with the help of some Policemen. In our paper, we have used the GCM technique. GCM server provides the Registration ID with which we will track the device.

Our App doesnt have GUI. The main advantages of not having GUI is that the their will not be alert about our Application. After lost, the trigger will be activated and it works like a Spying Application. The Fetched Data will be sent to our Webserver when required.

## **2.5 Technological Review**

### **2.5.1 Android**

Android is a mobile operating system (OS) currently developed by Google, based on the Linux kernel and designed primarily for touchscreen mobile devices such as smartphones and tablets. Android's user interface is mainly based on direct manipulation, using touch gestures that loosely correspond to real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with a virtual keyboard for text input.

### **2.5.2 Java**

In implementing the project, we are making use of java language as the main language. The Tracker have been developed in java. Since java is platform independent and has rich functionality such as sophisticated multi-threading facility therefore java has been roped in to develop this App.

### **2.5.3 Json**

JSON is an open-standard format that uses human-readable text to transmit data objects consisting of attribute-value pairs. It is the most common data format used for asynchronous browser/server communication (AJAJ), largely replacing XML which is used by AJAX.

### **2.5.4 PHP/HTML**

PHP is a server-side scripting language designed for web development but also used as a general-purpose programming language. PHP code may be embedded into HTML code, or it can be used in combination with various web template systems, web content management system and web frameworks.

### **2.5.5 MySQL**

MySQL is an open-source relational database management system (RDBMS). Free support additionally is available in different IRC channels and forums. Oracle offers paid support via its MySQL Enterprise products. They differ in the scope of services and in price. Additionally, a number of third party organisations exist to provide support and services, including MariaDB and Percona.

# Chapter 3

## Requirement Analysis

### 3.1 Platform Requirement :

#### 3.1.1 Supportive Operating Systems :

The supported Mobile Operating Systems for client include:

- Android v4.0 onwards.

Android is a mobile operating system (OS) designed primarily for touchscreen mobile devices such as smartphones and tablets. Android's user interface is mainly based on direct manipulation, using touch gestures that loosely correspond to real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with a virtual keyboard for text input.

### 3.2 Software Requirement :

The Software Requirements in this project include:

- Java
- MySQL
- JSON
- Android Studio



- Bluefish Editor
- HTML/PHP
- Internet Explorer, Mozilla FireFox, Google Chrome etc

In this project, Android Studio is used for creating the System Security App to track the mobile when it is lost. JSON is a language-independent data format. It parse JSON-format data is available in many programming languages. The official Internet media type for JSON is application/json. The JSON filename extension is .json. PHP is used for the connectivity with the database. HTML is used for the website front end.

Java language is the fundamental language being used in the development of the project. MySQL is used as a database for storing the data. MySQL reduces the complexity of maintaining relationships since in Mysql unlike RDBMS we don't need to maintain relationships.

## **3.3 Hardware Requirement :**

### **3.3.1 Hardware Required For Project Development:**

- 4 GB Ram.
- 40 GB Hard Disk Minimum.
- Intel Core i3-3xxx

# Chapter 4

## Project Design

### 4.1 Design Approach

Design is the first step in the development phase for any techniques and principles for the purpose of defining a device, a process or system in sufficient detail to permit its physical realization. Once the software requirements have been analyzed and specified the software design involves three technical activities design, coding, implementation and testing that are required to build and verify the software. The design activities are of main importance in this phase, because in this activity, decisions ultimately affecting the success of the software implementation and its ease of maintenance are made. These decisions have the final bearing upon reliability and maintainability of the system. Design is the only way to accurately translate the customer requirements into finished software or a system. Design is the place where quality is fostered in development. Software design is a process through which requirements are translated into a representation of software. Software design is conducted in two steps. Preliminary design is concerned with the transformation of requirements into data.

### 4.2 Software Architectural Designs

Our system follows the three tier architecture. First tier consist of GUI, Comparison tier and the Database.

**1. GUI:** The GUI(Graphical User Interface) in our project deals with the interface for the user where the user enters the name of the product he/she wants to search. The GUI provides a platform for the user to communicate with the database.

**2. Method block:** The method block is the block where the actual processing of our project is done. This block connects the GUI to the database i.e. It acts as a connector as well as communicator which connects the database and helps in transfer of data between the GUI and the database. It's main function is to fetch the details from the mobile and store the data into the

database.

**3. Database:** Database tier is the tier used for the storage of data. This tier contains all the data that is need for the processing of the whole project. The data in this tier is related to the product details such as the name, price and other details that are present on the website regarding the product.

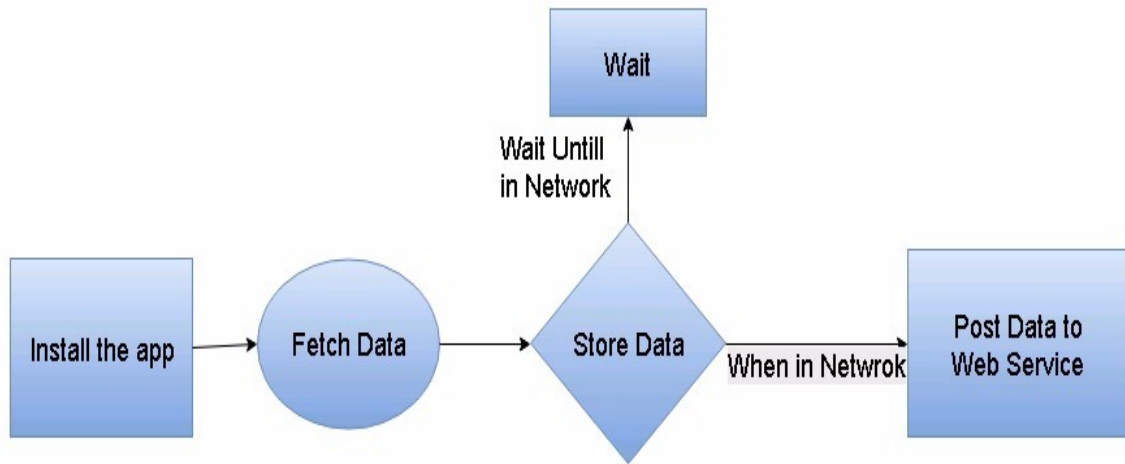


Figure 4.1: Software Architecture Design

### 4.2.1 Front End Designs

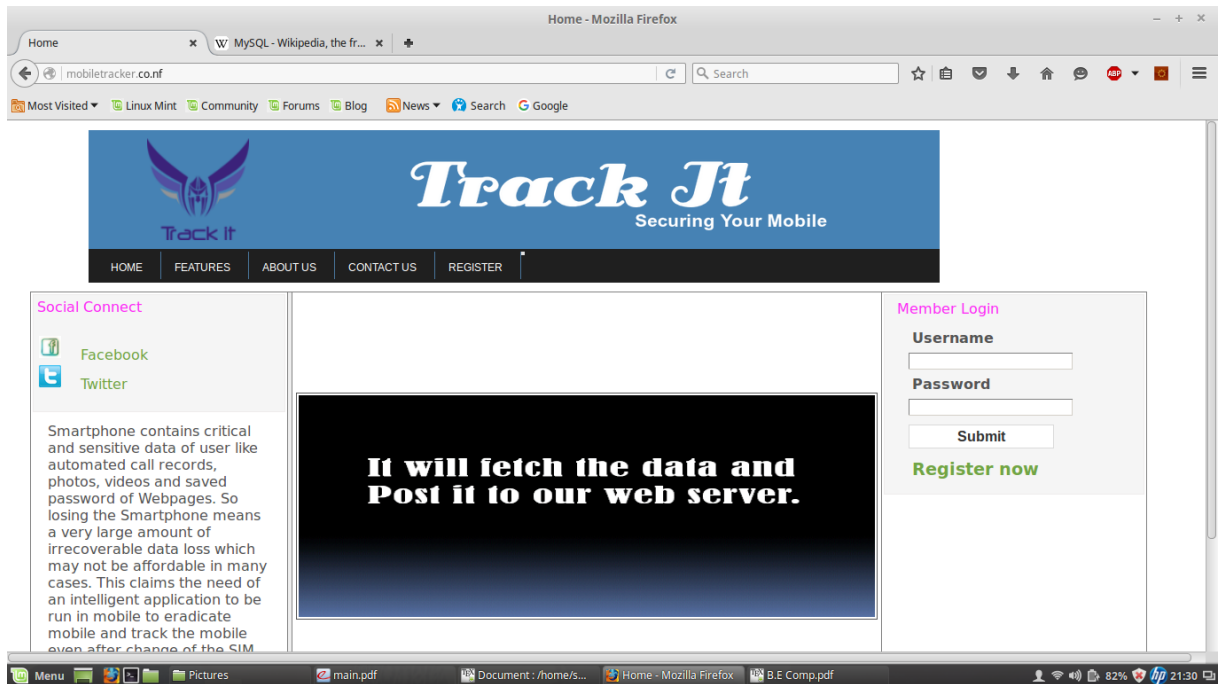


Figure 4.2: Front End Design of Website

This module will help the user to register and login to website and track his mobile.

### 4.2.2 Component Diagram

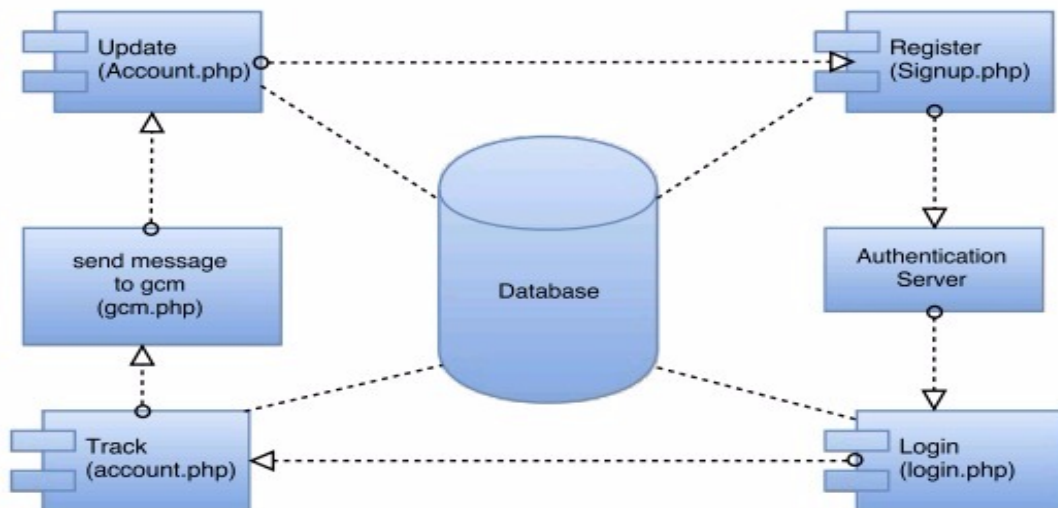


Figure 4.3: Component Diagram of Tracking Android Devices Using GCM

### 4.2.3 Deployment Diagram

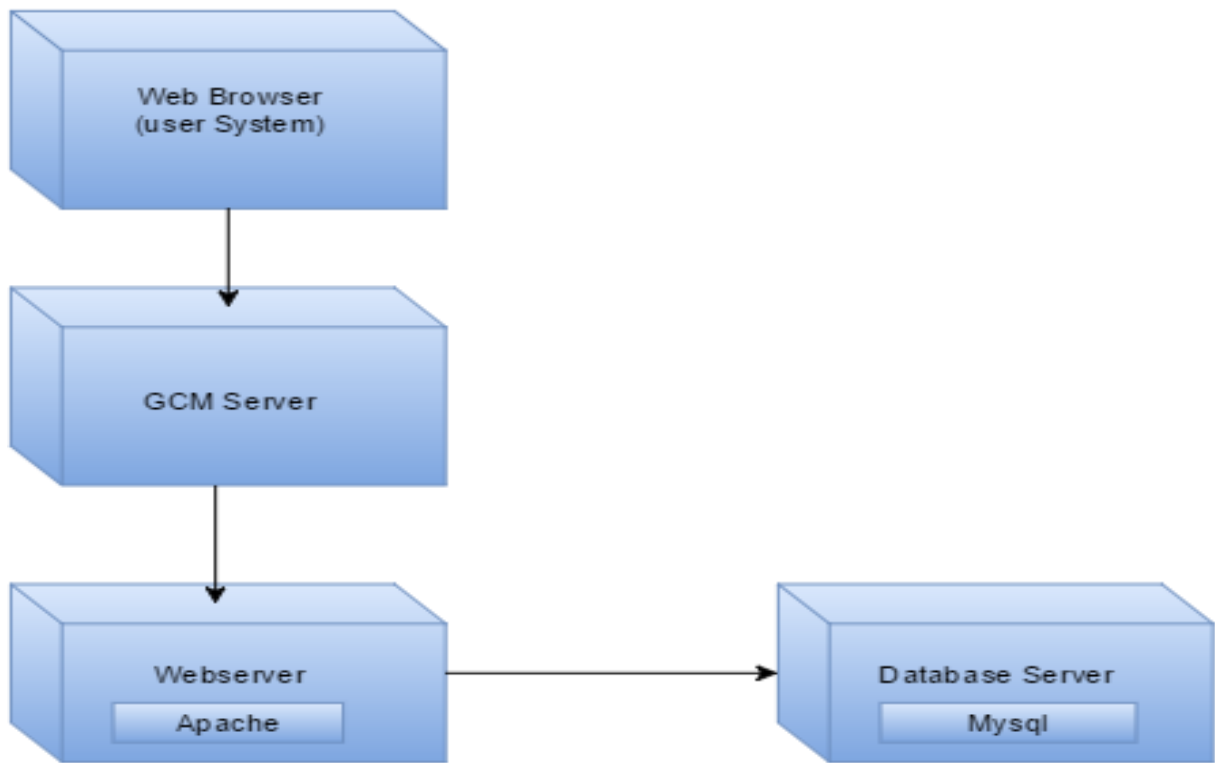


Figure 4.4: Deployment Diagram of Tracking Android Devices Using GCM

### 4.3 Database Design

#### 4.3.1 E-R Diagram

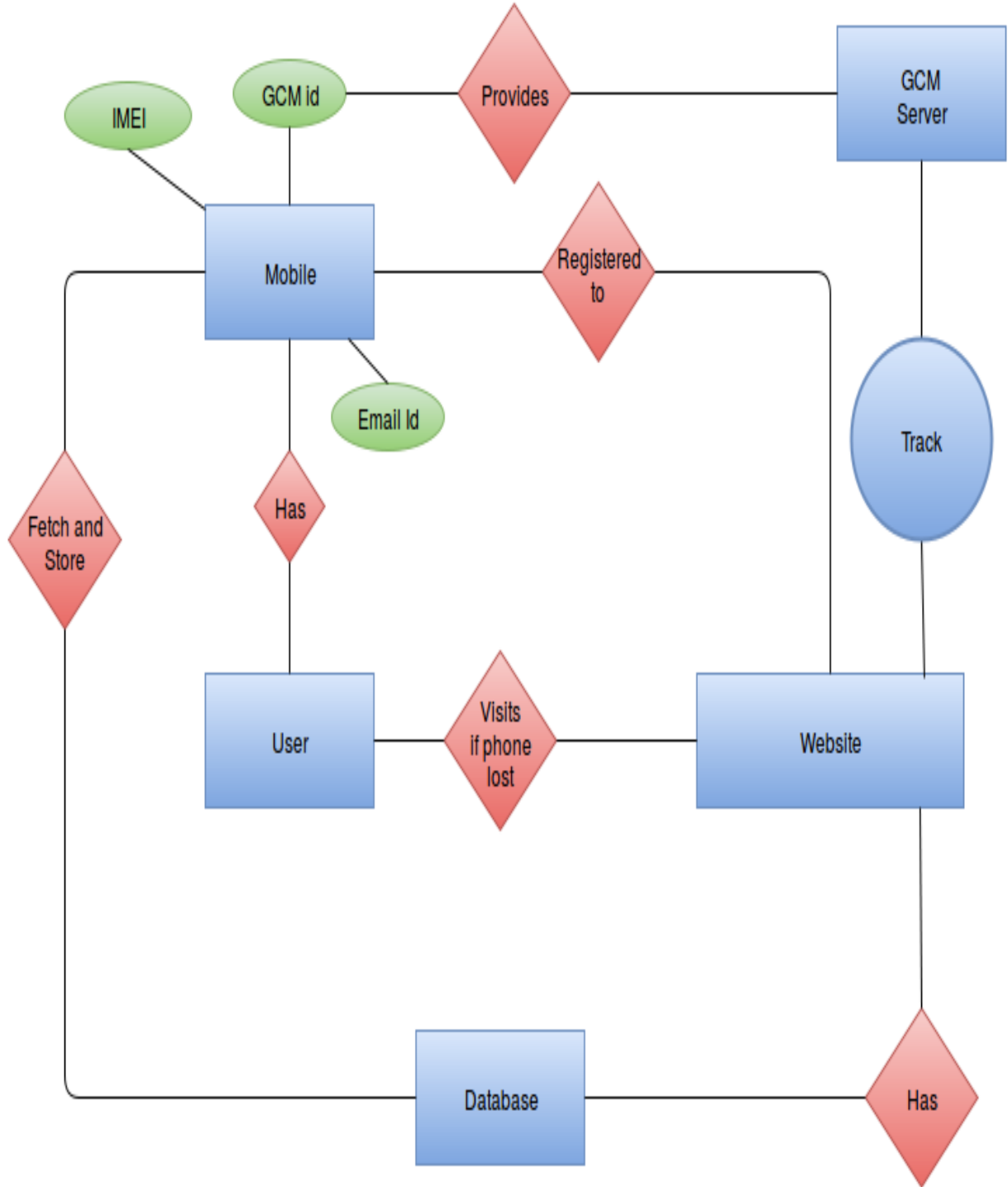


Figure 4.5: E-R Diagram of Tracking Android Devices Using GCM

## 4.4 Work-flow Design

### 4.4.1 Flow Diagram

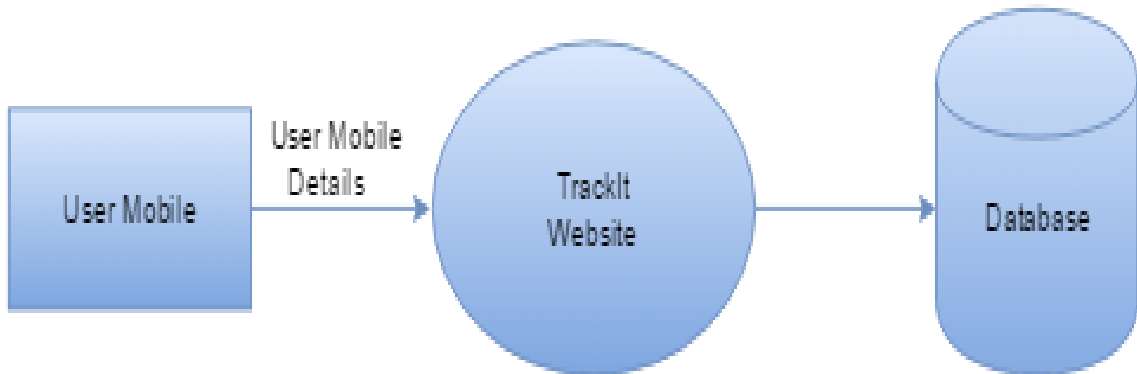


Figure 4.6: Level 0 DFD of Real Time Product Analysis system

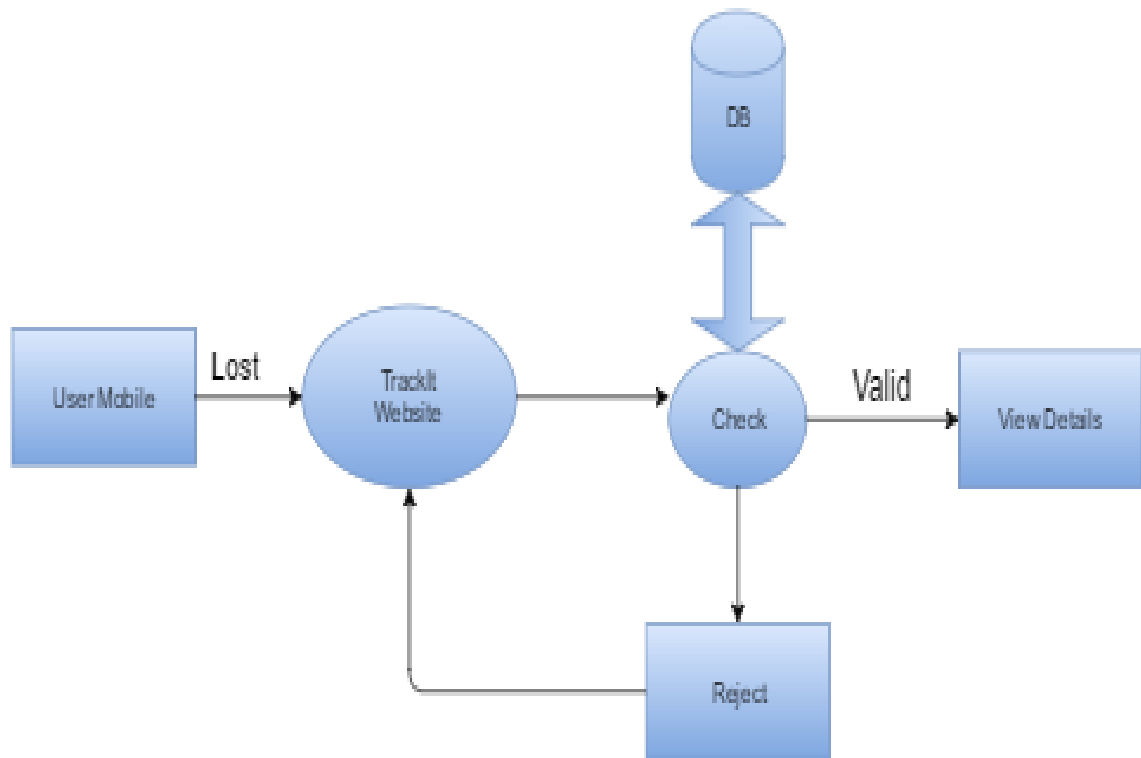


Figure 4.7: Level 1 DFD of Real Time Product Analysis system

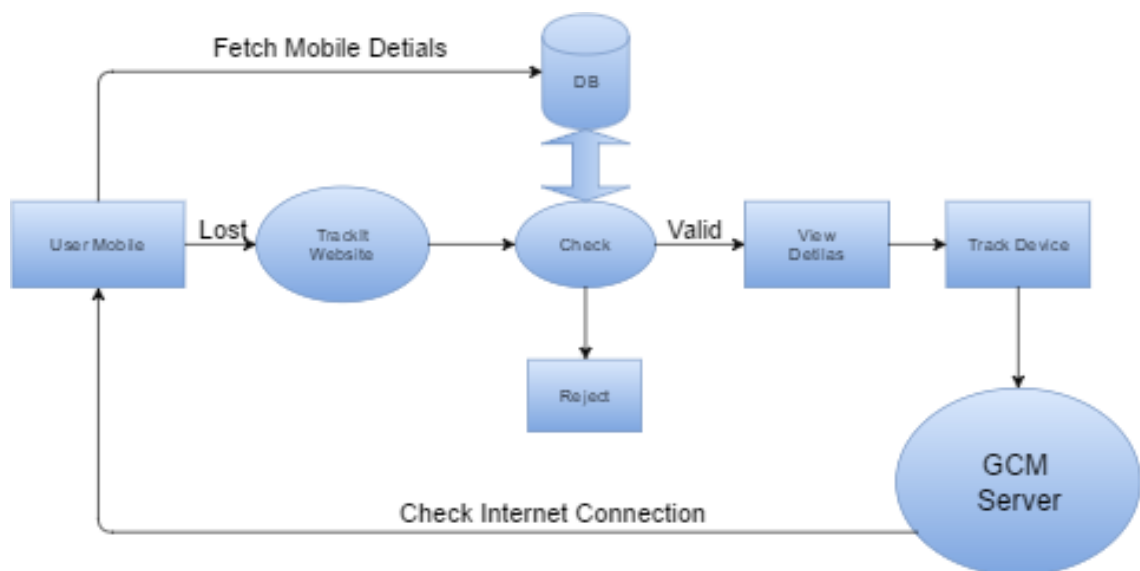


Figure 4.8: Level 2 DFD of Real Time Product Analysis system



# Chapter 5

## Implementation Details

### 5.1 Assumptions And Dependencies

#### 5.1.1 Assumptions

The following Assumption was taken into consideration:

- The Application is made as a System App and therefore it can not be uninstalled from the System. So, we are behaving as System Program Developer of the Android Device. It is assumed that this Application has been installed in the Android Mobile System by the Developers which cannot be removed from the Mobile System. The local database is assumed to be scalable and robust so that it can store huge amount of data with time and maintain consistency of the data.
- The search algorithm has to very optimize in performing the search. As soon as the user queries the database the search algorithm is assumed to bring the required and accurate results. The user interface should be simple and clean that allows soothing effect to the user.

#### 5.1.2 Dependencies

The dependencies are as follows:

- To send and receive data, it requires internet. So the app service depends on Internet. With Internet, App services will work. It also depends on the state of mobile whether it is switched ON or OFF. For fetching location, GPS or location must be switched ON.
- MySQL is used as a database for storing the data. MySQL reduces the complexity of

maintaining relationships since in MySQL unlike RDBMS we dont need to maintain the relationship.

## 5.2 Implementation Methodologies

1. Installation of Application.
2. User has to register once for his mobile. While registering, user Email ID will be taken from the user and on clicking the Submit button, GCM ID and IMEI along with Email Id will be saved in our Web server.
3. User has to register in our website with the same Email Id that he has registered on his mobile.
4. If the user lost his mobile or his mobile is stolen, then he can login in our website and can search for his mobile. He can request for service of our App through our website.
5. The Application wait for the network. As soon as the mobile come into network, it will check, is there any request for its service from GCM Server. If yes, the Application will fetch all the required data like SIM serial number, IMEI number, GPS Location, SIM Network Name, etc and Post it to our website.
6. Same is for location, If thief user start the location then the app will check for request from GCM server. If yes, the Application will fetch all the required data like SIM serial number, IMEI number, GPS Location, SIM Network Name, etc and Post it to our website.
7. If thief user restart his mobile phone, then the same function will happen.
8. With the help of these details, he can track and locate his mobile.

## 5.3 Detailed Analysis and Description of Project

**Registration of Mobile ::** In this module, the user has to register his mobile by giving his emailID. When the user will click on Submit button, his IMEI of the mobile number will be fetched and gcmID will be created. Then, the emailID, gcmID and IMEI of the mobile number will be converted into Json format and will be stored into the database.

**Registration of User ::** In this module, the user has to register himself by giving his credentials and most importantly with same emailID that he has given in his registration of mobile. The details like email ID, Username, Mobile number and Password. All these details will be save into the MySQL databse and when required, User can track his mobile by login with his credentials.

**Data Fetching from Mobile ::** Whenever the user will request for Application service from our Website, the App will fetch the details like IMEI of the mobile number, SIM Serial Number, Wifi Mac Address, Network Name, Android Device ID, and location if it is switch ON. If user switch ON the location for any purpose, the location will be fetched and App will check 'is there any request from the user'. If yes, it will send the location along with all details like IMEI of the mobile number, SIM Serial Number, Android Device ID, etc to the Web Server.

**Conversion of Data into JSON Format ::** In this module, the data which has been fetch from the user mobile will be converted into JSON format before sending it to the Webserver. JSON is a language-independent data format. It parse JSON format data is available in many programming languages. The official Internet media type for JSON is application/json.

**Track Mobile ::** Whenever user track for the mobile from the My Account page, then with the help of gcmID it will reach to mobile when mobile is in network. It will fetch all the details and send it to the Web Server. Through all this details, with the help of police men , the user can track and locate his mobile.

## 5.4 Usecase Diagram

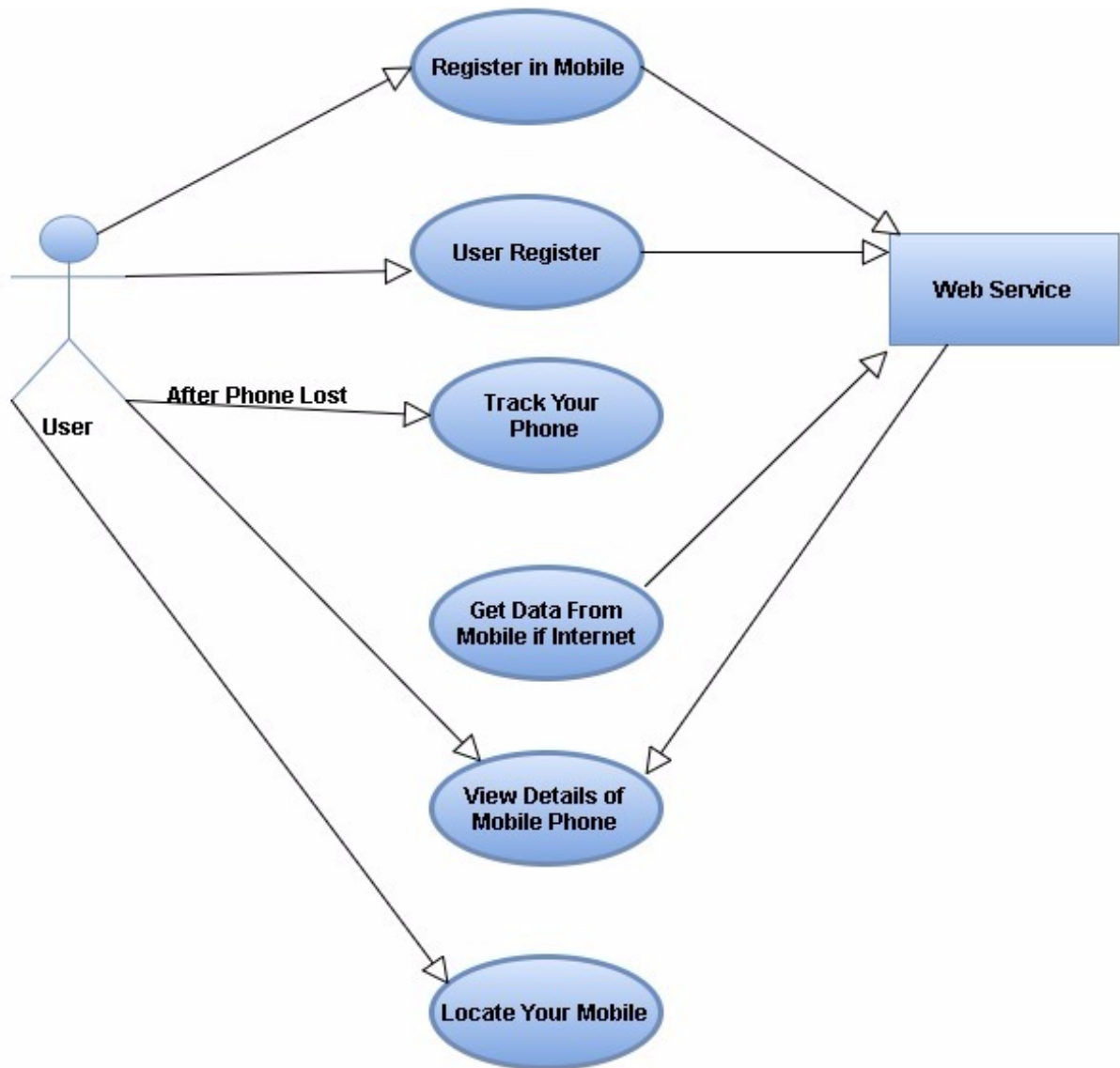


Figure 5.1: Usecase Diagram

### 5.4.1 Usecase Report

Title:	Tracking Android Devices using GCM
Description:	Tracking Android Devices using GCM, provide the way to user that allows him to track his mobile phone when lost. When mobile phone lost, user has to track his mobile phone from the website and send the push notification with the help of GCM Server. When mobile phone comes in network, it will send all the required details and send it to the Webserver. This tends to increase transparency of tracking mobile and also increase the recovery number of lost mobile.
Primary Actor:	User.
Preconditions:	User visit the Website when mobile phone lost.
Post conditions:	User Track the Mobile.
Main Success Scenario:	<ol style="list-style-type: none"> <li>1. User track the mobile through website with the help of GCM Server and when mobile came into network, it will fetch all the required details &amp; stores that info in the database.</li> <li>2. User will track and locate his mobilephone.</li> </ol>
Frequency of Use:	User can use any number of time.
System Requirement:	Normal. No Specific Requirement.
Trigger:	A GCMServer, which receives the gcmID from the webserver fetches the mobile details periodically & stores that info in the database

Table 5.1: Usecase Report

## 5.5 Class Diagram

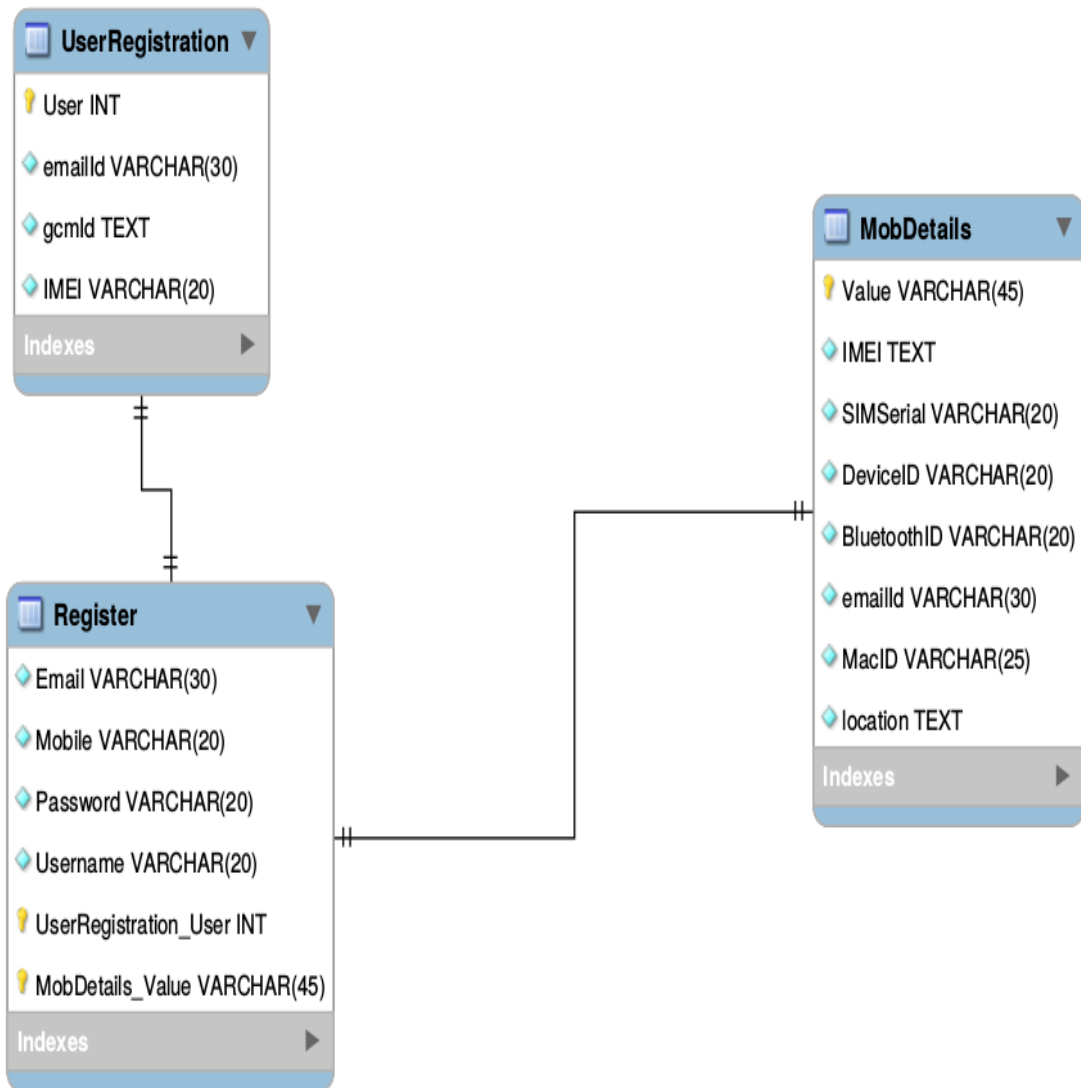


Figure 5.2: Class Diagram

### 5.5.1 Class Diagram Report

Title:	Tracking Android Device using GCM
Description:	Tracking Android Devices using GCM, provide the way to user that allows him to track his mobile phone when lost. When mobile phone lost, user has to track his mobile phone from the website and send the push notification with the help of GCM Server. When mobile phone comes in network, it will send all the required details and send it to the Webserver. This tends to increase transparency of tracking mobile and also increase the recovery number of lost mobile.
Primary Actor:	User
Preconditions:	User visit the Website when mobile phone lost.
Post conditions:	User Track the Mobile.
Website :	<ol style="list-style-type: none"> <li>1. This Entity Website will trigger the Application with the help of GCM server and will fetched all the required details from the mobile, when required and store it into the database..</li> <li>2. After fetching all the details, it will display the result to user.</li> </ol>
Mobile Tracking Application:	Through this System App, It includes the registration process of the User Mobile. And when required, the user will trigger the App from the website and will fetched all the required details and store it into the database.
Database:	Database is used for storing the required details fetched from the user mobile by the System Tracker Application.

Table 5.2: Class Diagram Report

# Chapter 6

## Results and Discussion

### 6.1 Test cases and Result

We have tested our application in following cases:

First we register our mobile through our System App. With this, the user email ID, along with GCM Registration Id and IMEI of his mobile are stored in our database. Then, we signup with the same email ID, along with other details like Mobile no, Name and Password.

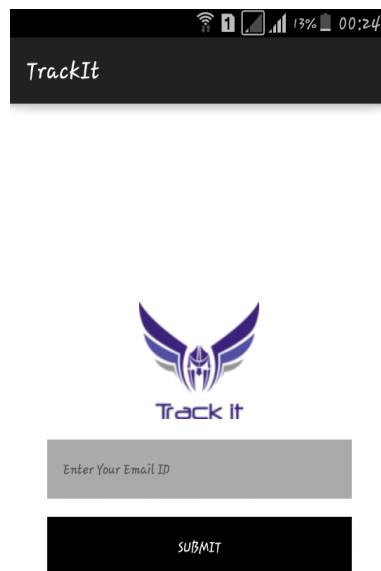


Figure 6.1: Register Mobile with App



After registering the mobile, we signup with the same email Id in our website.

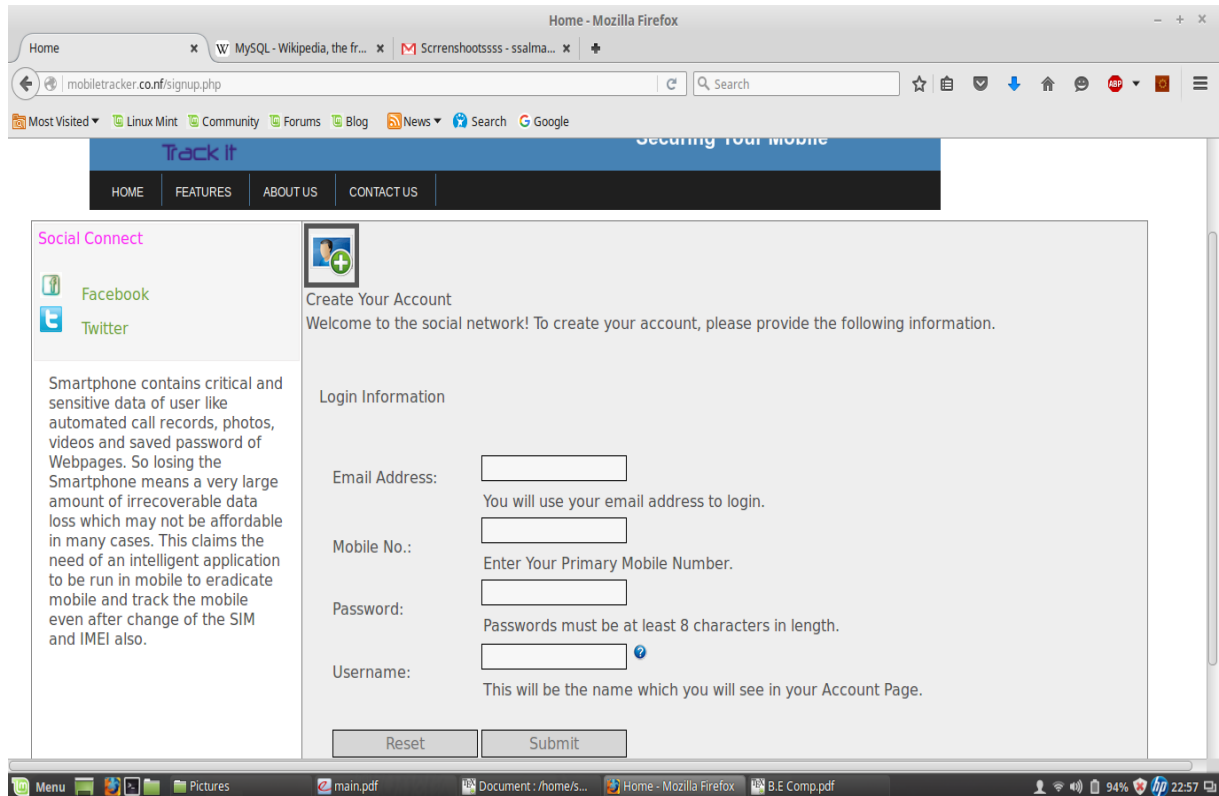


Figure 6.2: SignUp Page

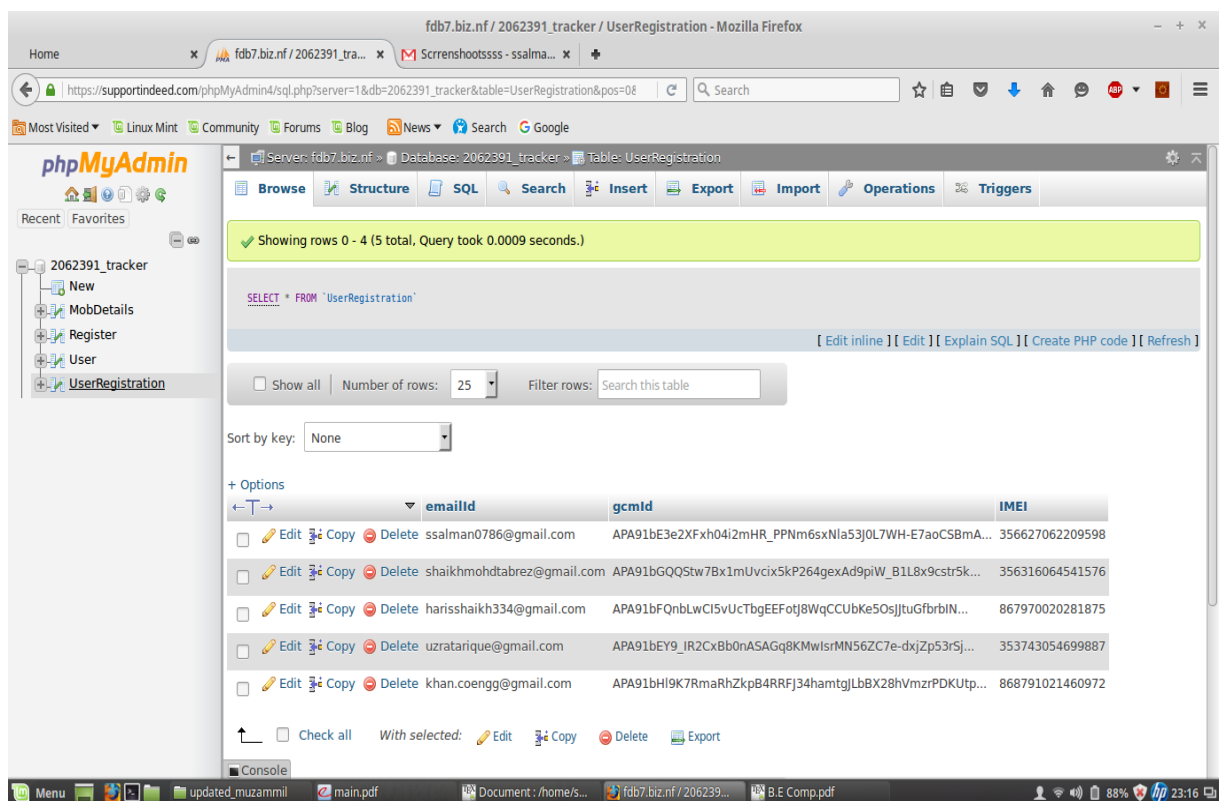


Figure 6.3: User Mobile Data Storage

Following Values are stored in database as shown.

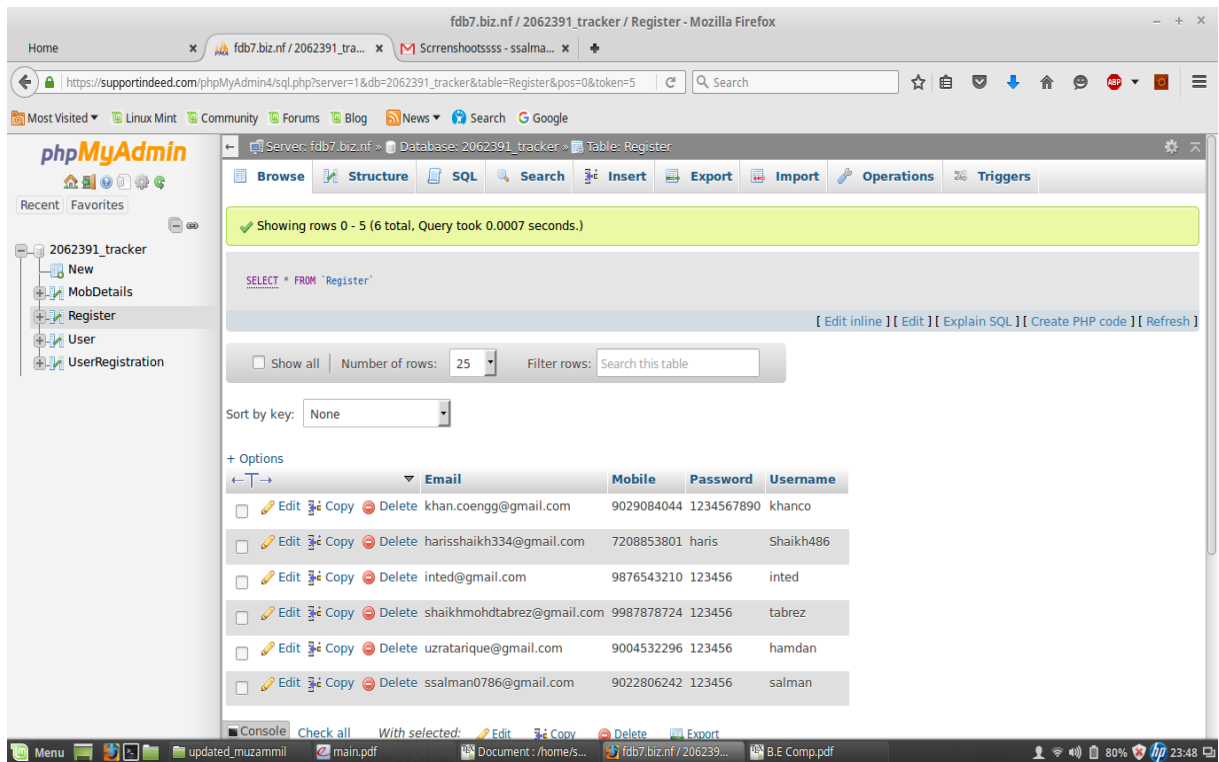


Figure 6.4: User Register Login Data

After Registration, we login with the same email Id and try to search my mobile phone and we got the result.

Our Homepage and Login page as follows :-

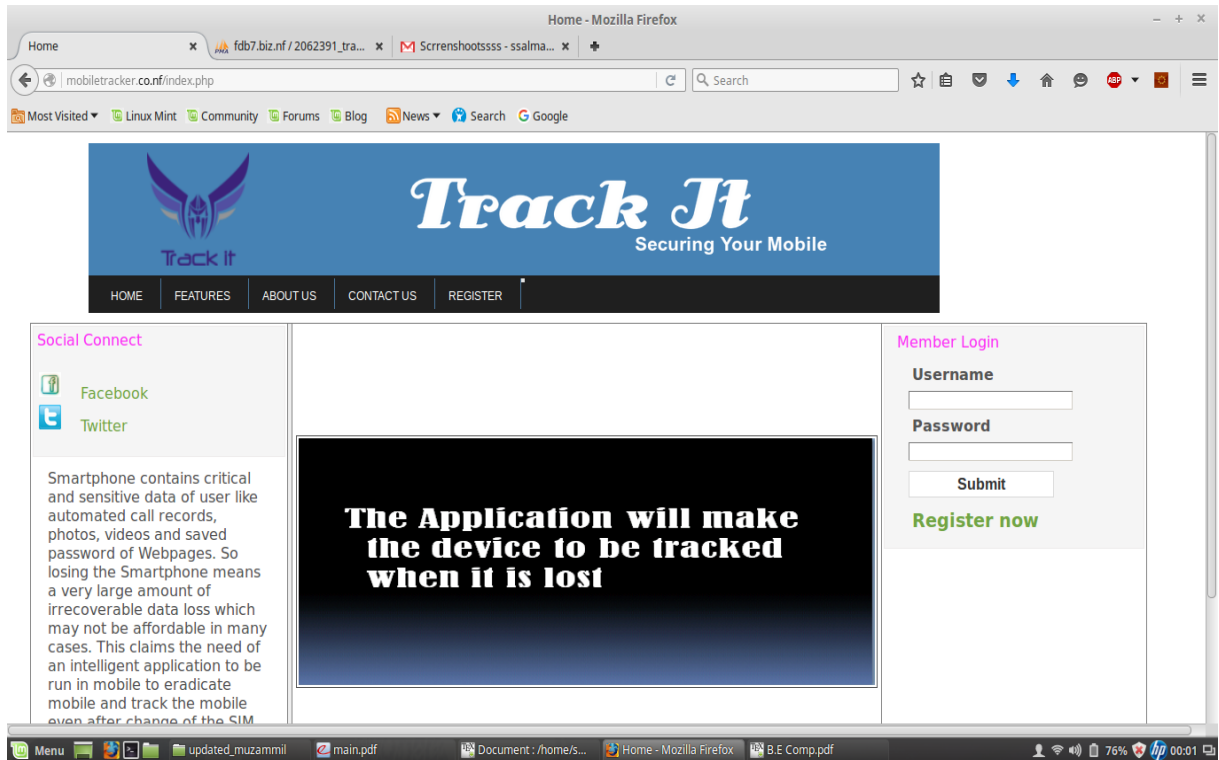


Figure 6.5: User Login Page

In our websites there is a Home page of our websites.

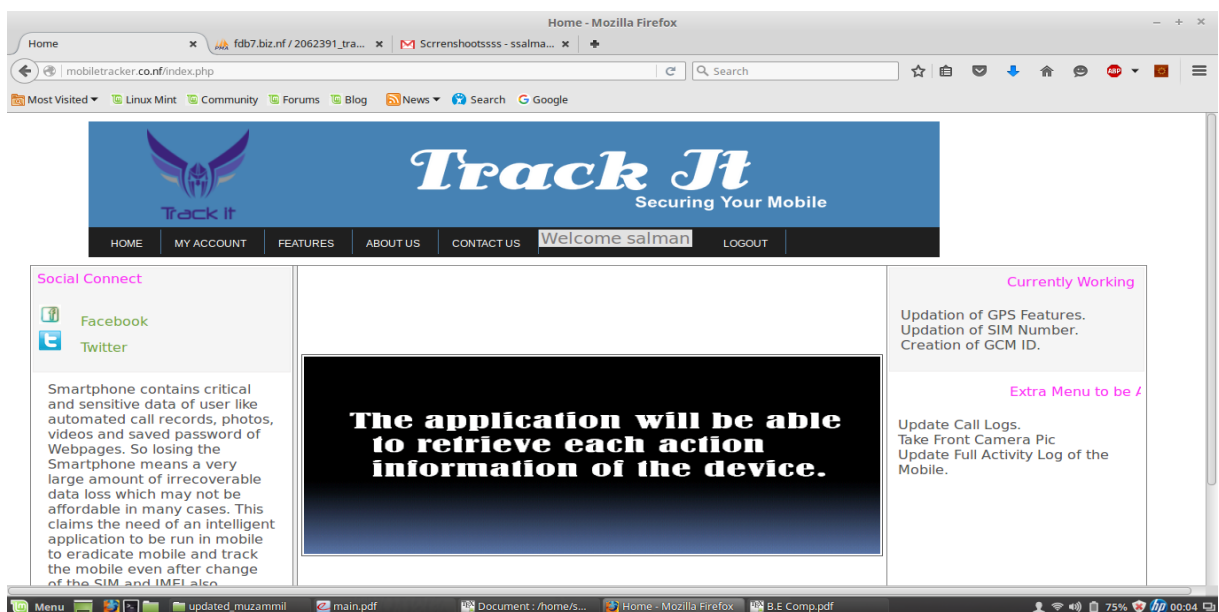


Figure 6.6: Home Page

For locating our mobile phone we move to the My Account tab and then click on Search/Track button.

The screenshot shows a web browser window displaying the 'Track It' website. The page title is 'Track It Securing Your Mobile'. The navigation menu includes 'HOME', 'MY ACCOUNT', 'FEATURES', 'ABOUT US', 'CONTACT US', and a user profile 'Welcome salman' with a 'LOGOUT' link. A red banner reads 'YOUR MOBILE RECORDS ARE HERE AS SHOWN'. Below this is a search bar with 'Resource id #78' and a 'Search' button. The search results are displayed in a table with the following data:

Sr.No	IMEI Number	SIM Serial Number	Android Device ID	Bluetooth Address	Email ID	Wifi MAC Address	Location
1	356627062209598	8991153690000656731	76a14df01a38706f	9C:D3:5B:99:A5:C8	ssalman0786@gmail.com	9C:D3:5B:99:A5:C9	Cell phone location is not available. It may be because your location settings are of
2	356627062209598	8991153690000656731	76a14df01a38706f	9C:D3:5B:99:A5:C8	ssalman0786@gmail.com	9C:D3:5B:99:A5:C9	Cell phone location is not available. It may be because your location settings are of
3	356627062209598	8991153690000656731	76a14df01a38706f	9C:D3:5B:99:A5:C8	ssalman0786@gmail.com	9C:D3:5B:99:A5:C9	Cell phone location is not available. It may be because your location settings are of
4	356627062209598	8991153690000656731	76a14df01a38706f	9C:D3:5B:99:A5:C8	ssalman0786@gmail.com	9C:D3:5B:99:A5:C9	Cell phone location is not available. It may be because

Figure 6.7: Search Page/My Account page

These search result will display the products details which is available on Mobile phone. If Sim Card and location is not available then we will not get those details. If the their user restart the mobile then it will fetch all the details and post it to our website. And same is for location. When user will switch ON the location then it will automatically fetch all the details along with the location and post it to our webserver.

Home - Mozilla Firefox

mobiletracker.co.nf/account.php

Resource id #78 Search

Sr.No	IMEI Number	SIM Serial Number	Android Device ID	Bluetooth Address	Email ID	Wifi MAC Address	Location
1	356627062209598	8991153690000656731	76a14df01a38706f	9C:D3:5B:99:A5:C8	ssalman0786@gmail.com	9C:D3:5B:99:A5:C9	Cell phone location is not available. It may be because your location settings are of
2	356627062209598	8991153690000656731	76a14df01a38706f	9C:D3:5B:99:A5:C8	ssalman0786@gmail.com	9C:D3:5B:99:A5:C9	Cell phone location is not available. It may be because your location settings are of
3	356627062209598	8991153690000656731	76a14df01a38706f	9C:D3:5B:99:A5:C8	ssalman0786@gmail.com	9C:D3:5B:99:A5:C9	Cell phone location is not available. It may be because your location settings are of
4	356627062209598	8991153690000656731	76a14df01a38706f	9C:D3:5B:99:A5:C8	ssalman0786@gmail.com	9C:D3:5B:99:A5:C9	Cell phone location is not available. It may be because your location settings are of
5	356627062209598	8991153690000656731	76a14df01a38706f	9C:D3:5B:99:A5:C8	ssalman0786@gmail.com	9C:D3:5B:99:A5:C9	<a href="http://maps.google.com/?q=19.08663345,72.838093">http://maps.google.com/?q=19.08663345,72.838093</a>
6	356627062209598	8991153690000656731	76a14df01a38706f	9C:D3:5B:99:A5:C8	ssalman0786@gmail.com	9C:D3:5B:99:A5:C9	Cell phone location is not available. It may be because your location settings are of
7	356627062209598	8991153690000656731	76a14df01a38706f	9C:D3:5B:99:A5:C8	ssalman0786@gmail.com	9C:D3:5B:99:A5:C9	Cell phone location is not available. It may be because your location settings are of
8	356627062209598	8991153690000656731	76a14df01a38706f	9C:D3:5B:99:A5:C8	ssalman0786@gmail.com	9C:D3:5B:99:A5:C9	<a href="http://maps.google.com/?q=0.0,0.0">http://maps.google.com/?q=0.0,0.0</a>

Figure 6.8: Searched Mobile Result

# Chapter 7

## Project Time Line

### 7.1 Project Time Line Matrix

	①	Name	Duration	Start	Finish
1		1(a) Requirement Gathering	8 days	1/1/16 8:00 AM	12/1/16 5:00 PM
2	📅	1(b) Confirm Requirements	1 day	13/1/16 8:00 AM	13/1/16 5:00 PM
3	📅	2(a) Front-end User Interface	7 days	14/1/16 8:00 AM	22/1/16 5:00 PM
4	📅	2(b) Backend Database Designing	10 days	23/1/16 8:00 AM	5/2/16 5:00 PM
5	📅	3(a)Frontend Coding	12 days	6/2/16 8:00 AM	23/2/16 5:00 PM
6	📅	3(b)Database Creation	10 days	24/2/16 8:00 AM	8/3/16 5:00 PM
7	📅	3(c)Coding for Screens, Tables	8 days	10/3/16 8:00 AM	21/3/16 5:00 PM
8	📅	3(d)reation of test case	9 days	20/3/16 8:00 AM	31/3/16 5:00 PM
9	📅	4(a)Testing	7 days	2/4/16 8:00 AM	12/4/16 5:00 PM
10	📅	5(a)Deployment	2 days	13/4/16 8:00 AM	14/4/16 5:00 PM ▼

Figure 7.1: Time Line Matrix

## 7.2 Project Time Line Chart

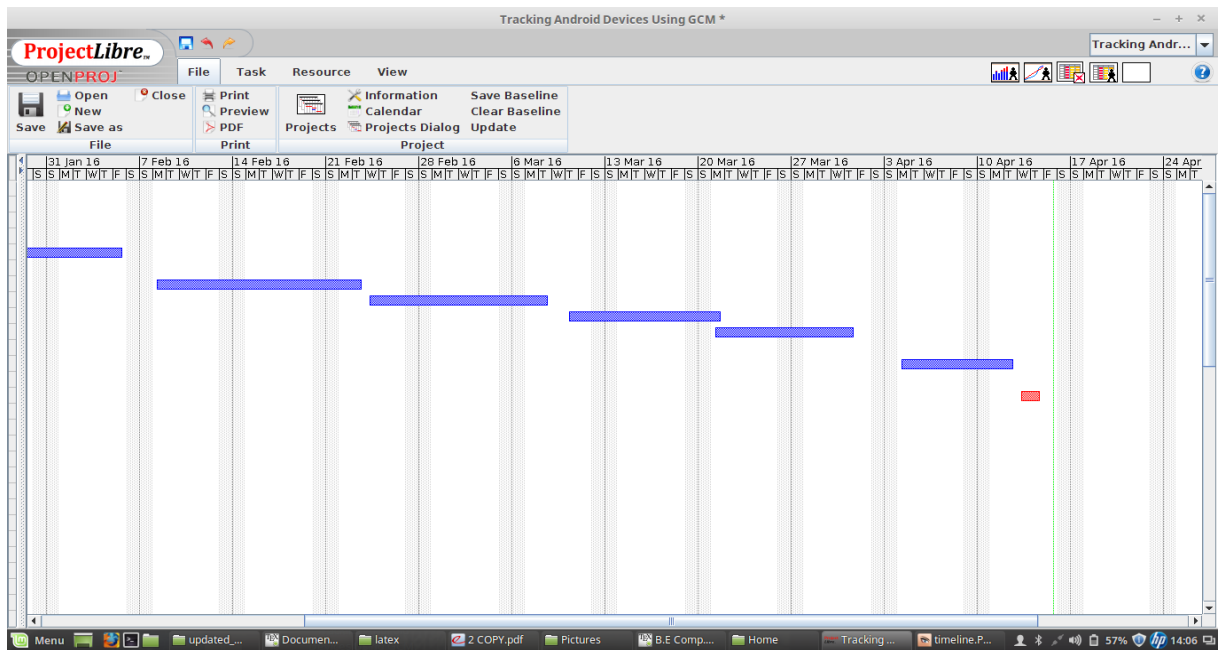


Figure 7.2: Time Line Chart

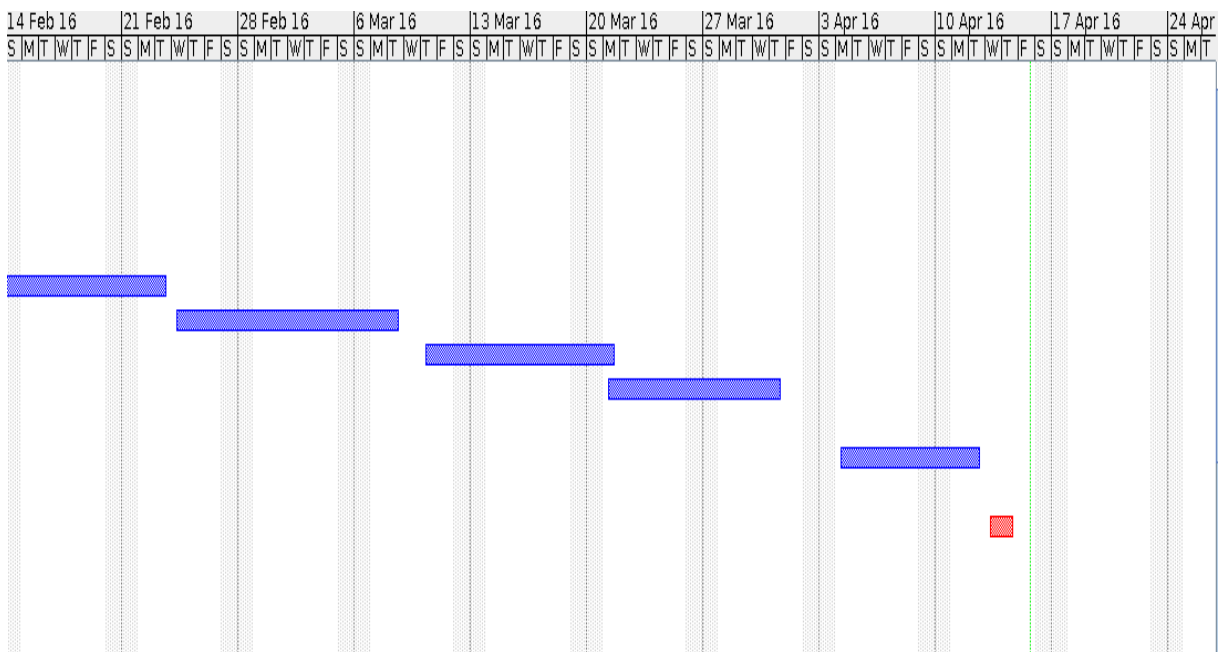


Figure 7.3: Time Line Chart

# Chapter 8

## Task Distribution

### 8.1 Distribution of Workload

#### 8.1.1 Scheduled Working Activities

Activity	Time Period	Comment
Requirement Gathering	08 Days	Requirement gathering has took placed through searching on internet and taking the ideas, sharing the views among group members and share the idea with the experts.
Planning	04 Days	Planing has done by Reviewing of literature of IEEE papers and by taking the walkthrough.
Design	04 Days	Designing has done by creating UML diagram, By creating Charts.
Implementation	90 Days	Implementation has done by first creating the backend and then front end module by module.
Testing	10 Days	Testing has done by installing App on different Android device and track it through our website.
Deployment	05 Days	Deployment has done by installing project on the server.

Table 8.1: Scheduled Working Activities



### 8.1.2 Members activities or task

Member	Activity	Time Period	Start Date	End Date	Comment
M1, M2, M3, M4	Requirement Gathering	4 Days	01/01/16	04/01/16	M1 and M2 has performed the searching for project requirement on the internet by reviewing the related literature and by analysing the related project which is already available in the market. Regularly inform to the other member of team.
M1, M2, M3, M4	Analysing of the requirement	3 Days	05/01/16	07/01/16	M1, M2, M3, M4 done the requirement analysing of project by sharing the ideas, and by discussing on related information which is gather by the M1, And M2. M3 and M4 has created the list of requirement after every meeting.
M1, M2, M3, M4	Finalysing the requirement	1 Day	08/01/16	08/01/16	Whole team finalize the requirement. M1 and M4 has created a list of finalise requirement.
M1, M2, M3, M4	Planning	4 Days	09/01/16	12/01/16	Planning has done by walkthrough and by analysing the available product. M3 and M4 creates a list of funtion which will be implement in the project. Each and every module were discuss in every group meeting and M1 and M2 creates a blue print for project .

M2, M4	Front End design	4 Days	13/01/16	16/01/16	M2 and M4 creates the UML diagram for front end of the system and data flow diagrams and informed to the whole team regularly.
M1, M3	Back End design	4 Days	13/01/16	16/01/16	M1 and M3 creates the UML diagram for back end of the system and data flow diagrams and informed to the whole team regularly.
M3, M4	Installation of tools and technology for front end	1 Days	17/01/16	17/01/16	M3 and M4 installed the all the require tools which is use for front end design.
M1, M2	Installation of tools and technology for back end	2 Days	17/01/16	19/01/16	M3 and M4 installed all the require tools which is use for back end design.
M3, M4	Implementation of GUI	4 Days	20/01/16	24/01/16	M3 and M4 creates the GUI of the project and informed to other member.
M1, M2	Implementation of RegisterActivity in Tracker App	10 Days	20/01/16	10/02/16	M1 implemented the Tracker and discuss on it with other team member
M3, M4	Implementation of SplashActivity in Tracker App	10 Days	20/01/16	02/02/16	M3, M4 implemented the scraper and discuss on it with other team member
M1, M2	RegisterActivity connectivity with the database	4 Days	02/02/16	06/02/16	M1 and M2 makes the connection to the database. M1 and M2 Explain the codes to the other member of team.

M3, M4	Implementation of Util Function	8 Days	07/02/16	14/02/16	M3 and M4 makes the different methods to get mobile details and discuss on it with other team member regularly.
M1, M2	Implementation of GCM Intent Service	4 Days	06/02/16	10/02/16	M1 and M2 created the intent service through which data will be send .
M3, M4	Broadcast Receiver	4 Days	11/02/16	14/02/16	M3 and M4 created the broadcast receiver that mobile phone will listen.
M1, M2	Implementation of Boot Up Receiver.	10 Days	15/02/16	25/02/16	M1 and M2 implemented the boot up receiver when mobile phone will reboot, it will send the data to website.
M3, M4	Data gathering into database	2 Days	15/02/16	17/02/16	M3 and M4 gather the data of mobile details and save into the database.
M1, M2	Implementation of getting the GPS location	8 Days	26/02/16	04/03/16	M1 and M2 created the method to get the location from the mobile when it is requested and when location is ON.
M3, M4	Implementation of Tracking the device from website.	8 Days	26/02/16	04/03/16	M3 implements the tracking page through which the user will send the request to his mobile(send msg to gcm)

M1,M2	Connectivity with the GCM Server.	2 Days	05/03/16	07/03/16	M4 makes the connectivity with the GCM Server. And informed to the other member of team.
M1, M2, M3, M4	Integration of all modules	10 Days	16/03/16	25/03/16	M1, M2,M3 and M4 integrated all the module. Implemented whole system properly.
M1,M2	Testing with Different Android Devices.	2 Days	26/03/16	28/03/16	M1 and M2 performed the testing on different version of Android Devices and noted down results and discuss with other member of team.
M3, M4	Testing with Different Android Devices	5 Days	26/03/16	30/03/16	M3 and M4 performed the testing on different version of Android Devices and noted down results and discuss with other member of team.
M1, M2, M3, M4	Deployment		30/03/2016		

Table 8.2: Member Activities and Task

# Chapter 9

## Conclusion and Future Scope

### 9.1 Conclusion

In this Project,we Proposed an efficient model to track the lost/misplaced Android Device. The Application is expected to perform the defined action based upon the data which has been fetch from the Mobile in a predefined format which will help the end user to locate the lost mobile.

### 9.2 Future Scope

- In Future, we will make App which can track other device like Laptops.
- Same Application for Other Operating Systems like iOS, Windows, etc.
- Adding the ability to share the track via Whatsapp and Social networking sites.
- Addition of Hardware if the Security of Software is comprised.

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# Chapter 10

## Appendix I

India is the third largest smartphone user in the world with over 123.3 Million of people are using smartphone. India to overtake US by 2016 by crossing 200 Million of Smartphone user. Blackbox machine is used for flashing of the mobile.

Lots of mobile get misplaced, lost or stolen every year and this number is also increasing rapidly. But the recovery of the mobile is very less. According to Resource, Only 2 to 3 percent of mobile is recovered. These number should be increased. Our Project aims to increased the recovery number of lost mobile.

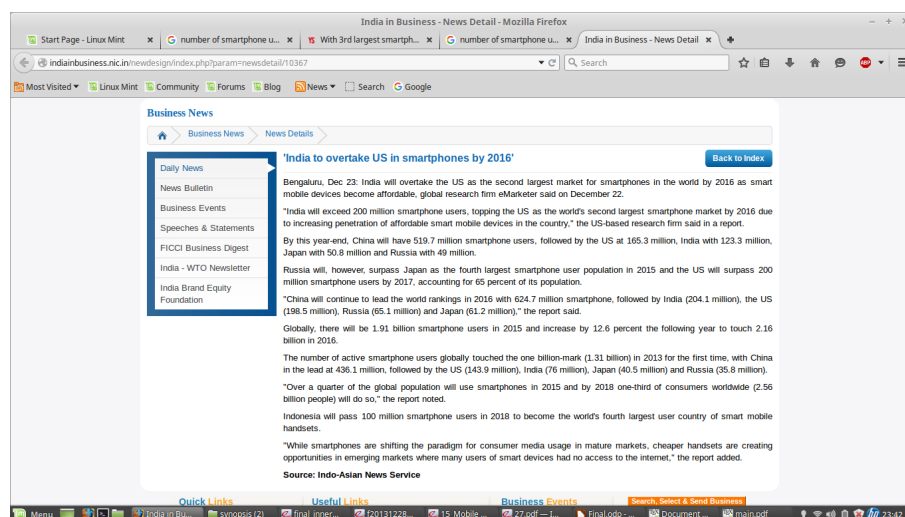


Figure 10.1: India to Overtake US.

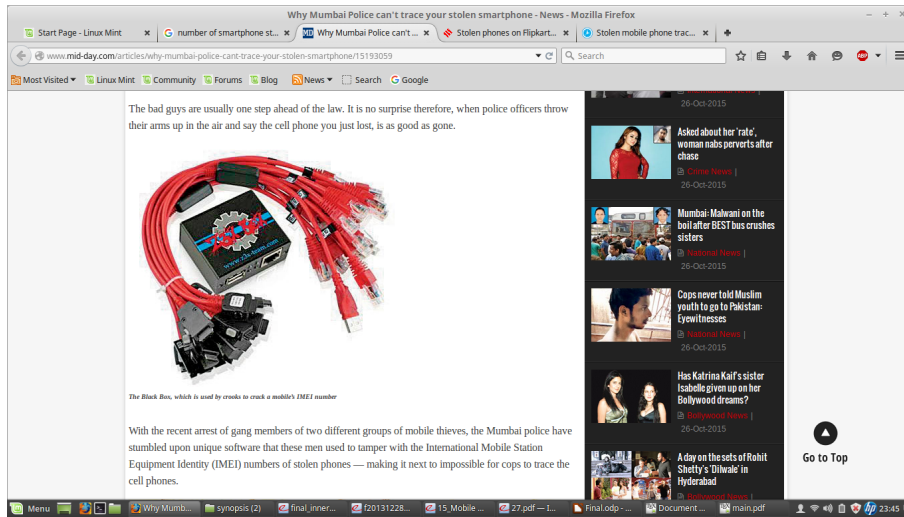


Figure 10.2: BlackBox used by thief.



Figure 10.3: BlackBox used by thief.



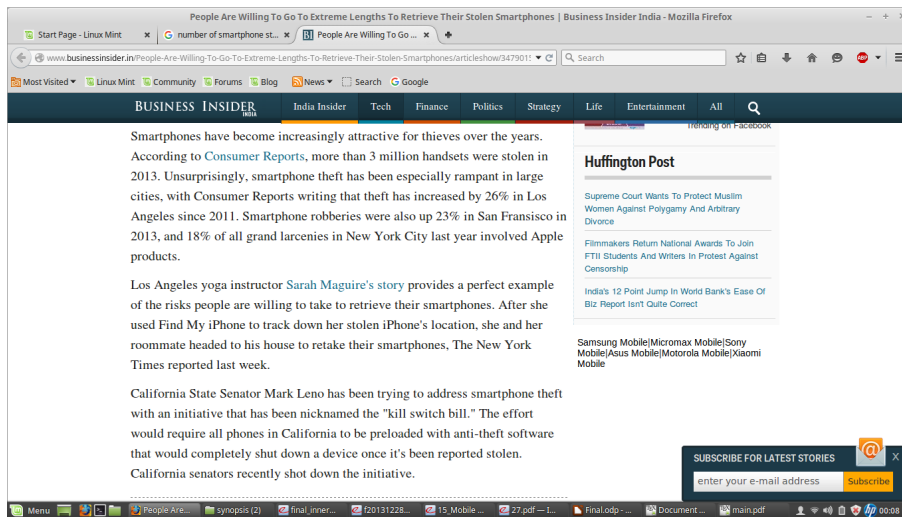


Figure 10.4: Mobile Lost in US.

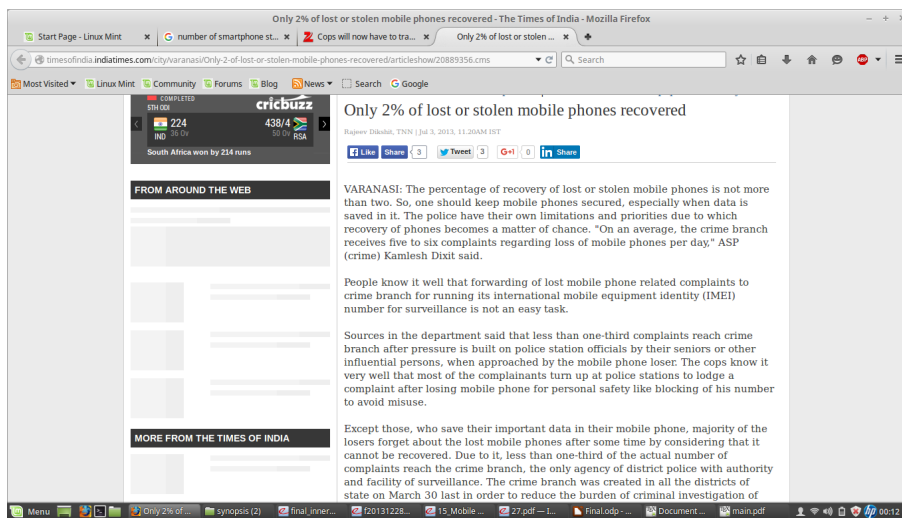


Figure 10.5: Only 2 Percent of mobile recovered.

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**Salman Siddiq**

Roll No.12CO72

(Department of Computer Engineering)

University of Mumbai.

**Shaikh Mohd Tabrez**

Roll No.12CO69

(Department of Computer Engineering)

University of Mumbai.

**Khan Intekhab Alam**

Roll No.12CO38

(Department of Computer Engineering)

University of Mumbai.

**Mohammed Harish**

Roll No.12CO43

(Department of Computer Engineering)

University of Mumbai.