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### RESEARCH ARTICLE

# SPOTTER: A MOBILE TRACKING ANDROID APPLICATION

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*Abstract— Now a days we are surrounded by a great numbers of advance technologies such as smartphone technology, GPS, internet etc. Imagine something that could be built up by summing up these advance technologies, how wonderful and powerful that resultant would be. And “Spotter” an android based mobile phones tracking application is an example of combination of technologies aforesaid. Spotter uses the android platform to get installed on the smartphone and it extract the current location of the phone using the GPS provided in the smartphones. It can also get the co-ordinates using the network based technology e.g. GSM or 3G (GSM in our case). Once the Location co-ordinates are extracted, they are send to a remote database over the network from where the user can get the location, but first they have to authenticate themselves. Some icing on the cake is also provided i.e. some additional features that made it a powerful tracking application. Such as handling it through SMS, taking images when wrong password entered, reactivating itself on reboot and many more.*

*Keywords- Smart phones, SMS, GPS, GSM, GPRS, image*

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## I. INTRODUCTION

Mobile phone tracking refers to the attaining of the current position of a mobile phone, stationary or moving. Localization might occur either via multi-lateration of radio signals between (several) radio towers of the network and therefore the phone, or just via GPS. To find the phone victimization multi-lateration of radio signals, it should emit a minimum of the roaming signal to contact the consequent close antenna tower, however the method doesn't need an active call. GSM is predicted on the signal strength to closest antenna masts. Mobile positioning, which incorporates location-based services that disclose the particular coordinates of a mobile phone bearer, is a technology utilized by telecommunication companies to approximate the location of a mobile phone, and thereby also its user (bearer). The more properly applied term locating refers to the purpose rather than a positioning method. Such service is obtainable as an option of the class of location-based services (LBS). Currently, A-GPS enabled handsets are still highly dependent on the Location-Based Service (LBS) carrier system, therefore handset device selection and application necessities square measures still not apparent. Enterprise system integrators would like the abilities and data to properly select the items which will work the appliances and geographics.

## **TECHNOLOGY**

We can broadly classify Localization-Based Systems into:

### **Network-based**

Network-based techniques utilize the service provider's network infrastructure to spot the location of the mobile phones. The network-based techniques have advantages (from a mobile operator's purpose of view) is that they will be implemented non-intrusively, without affecting the handsets. The accuracy of network-based techniques varies, with cell identification because the least correct and triangulation as moderately accurate, and newer "Forward Link" timing methods as the most accurate.

### **Handset-based**

Handset-based technology needs the installation of client software on the handset to determine its location. This method determines the location of the handset by putting its location by cell identification, signal strengths of the house and neighbor cells, which is continuously sent to carrier. In addition, if the handset is also equipped with GPS then significantly more precise location information is then sent from the handset to the carrier. The key disadvantage of this technique (from mobile operator's point of view) is the necessity of installing software on the handset.

### **Hybrid**

Hybrid positioning systems use a combination of network-based and handset-based technologies for location determination. One example would be some modes of Aided GPS, which might each use GPS and network data to calculate the location. Both types of information are thus used by the telephone to make the location more accurate (i.e., A-GPS). Alternatively tracking with both systems can also occur by having the phone attain its GPS-location directly from the satellites, then having the knowledge sent via the network to the person who is trying to locate the telephone. Services permitting such cellphones embrace Google Maps. Different examples would be E-CellID and LTE's OTDOA. There are also hybrid positioning systems which combine several different location approaches to position mobile devices by WiFi, WiMAX, GSM, LTE, Information Processing addresses, and network atmosphere knowledge.

## **II. PROBLEM STATEMENT AND ASSUMPTIONS**

### **Spotter**

Spotter is an Android based Mobile Tracking Application. A tracking service is running on the mobile which uses the network connection to the server to know current status of the mobile (whether stolen or not). And once the mobile is stolen it will write the co-ordinates of the location where the mobile phone is at present, in the database at the server. To track the location of the device, the application uses hybrid technology. The A-GPS and GSM network both are used to get as accurate location as possible. As hybrid location technology is used in spotter, the power consumption is greater with respect to using either network or A-GPS technology. The device can be pinned down to an atmost accuracy of radius 5 meters as Indian Regional Navigation Satellite System (IRNSS) has a limited number of satellites. Once the spotter is activated, the subsequent actions take place:

#### **Before phone is lost**

- 1) A service will run in background and will check the database regularly for the status of the phone.
- 2) If the device is restarted, the service will reactivate itself and auto start.

#### **After phone is lost**

- 1) It locks the screen of the phone, with only one button to call the owner or enter a password to regain access to the device.
- 2) A tune will ring loudly (in regular intervals of time).
- 3) Co-ordinates of the current location will be written in the database on the server.
- 4) SMS having Landmark location will be sent on Phone (secondary).
- 5) Image send on phone(secondary) as well as it save on database.
- 6) The location of the phone can be viewed on the map after logging in into the account on the website.

## **IMPLEMENTATION**

Models used for the development of the spotter, sequence of development of each module and how each module was developed. For the ease of understanding the whole working of spotter the data flow of the project is discussed.

The algorithm designed for the development of the spotter is mentioned and, all the classes and their methods required for the implementation of the algorithm were discussed. User Defined Classes which were made for specific tasks such as Sms Read, Connectivity Gps Tracker etc and how they are doing that were discussed in this chapter.

### **Model Used**

Firstly We Followed “Build and Fix” Model for the implementation as at that time we were not handling the database at that time. i.e. for checking the working of the code we used simple file handling concepts. E.g. we build code for checking the current scenario of the phone from the file on the server. As features to be incorporated in the Spotter increases, we started following the “incremental model”. Actually we applied “Build and Fix” in the “Incremental Model”.

Features incorporated incrementally are:

- i. Created activity for activation/deactivation.
- ii. Designed Logo of spotter for icon.
- iii. Created Activity for user’s registration.
- iv. Created launcher activity to check whether the user already exists.
- v. Autostart activity to restart the application on reboot.
- vi. Created a database on local server and connected it with the phone.
- vii. Update user’s information on the database from phone.
- viii. Designed a Website and connected it with the Database.
- ix. Modify current status of phone through Website..
- x. Send SMS to secondary number on location change at regular intervals.
- xi. Send SMS to secondary number on SIM change.
- xii. Extracted co-ordinates.
- xiii. Update co-ordinates on database.
- xiv. Update images on database.
- xv. Used Google API to show the location of the device on the satellite map.
- xvi. Created LockScreen activity to display a Lock screen when the device is lost.
- xvii. Provided an automatic call button to call the user on the secondary number.
- xviii. While entering an exit key automatic call to owner.
- xix. Ring an alarm when a message with text “ALARM” is received.

We followed incremental model for the each functions mention aforesaid. But several times for implementation of new function some old were modified e.g. SMS on location change was modified after Co-ordinate extraction using GPS tracker.

### **III.WORKING**

Step 1. Start of process.

Step 2. Install the application. After installing the application on the Smart phone, it will ask for registration including secondary no.

Step 3. It will be set to start running in background every time the device operating system restarts.

Step 4. Restart the Android Smart phone.

Step 5.If the SIM is flipped the application will ask for password if we enter three time wrong password it sends SMS regarding longitude and latitude to the secondary no. and capture image which will be stored in database.

Step 6.The application auto starts every time the mobile boots up. Then it goes to running mode and will start the main service which continuously listens for the incoming location.

The application installed will be running in the background & won’t be shown in the task manager as well. Once the mobile phone is lost, this application enables the user to track a mobile device and to receive notification via SMS to a secondary number.

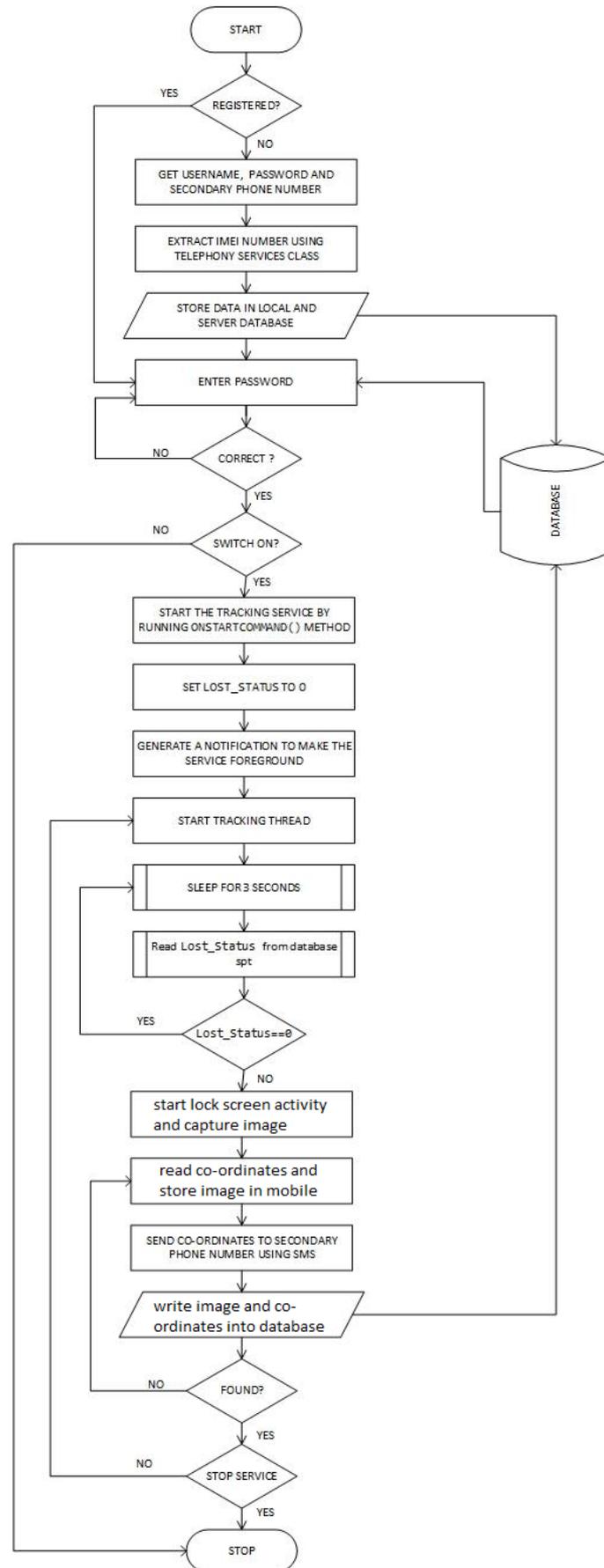


Fig 1. flow chart of spotter

#### IV. ADVANTAGES

Spotter is still an idea. But it may be advantageous in following things

1. Business:

We can track our employee's location where they are active.:

2. Child Safety:

Parents can track their children. Is they in safe place or not?

3. Misplace of Mobiles:

If mobile is lost by someone he/she can track the device with users network.

4. Data Privacy:

If anyone lost his phone, if he/she has this application then no need to worry because no one can access mobile without user ID and Password.

#### ii. Application:

1. Android mobiles

To track the location with exact co-ordinates.

2. Hiding data

Provide security by not giving access of mobile to unknown.

#### DISADVANTAGES:

Although many mobile social or media applications have arisen, really killer ones gaining mass acceptance are still impeded by the limitations of the wireless technologies and current mobile, among which unpredictable or unstable connection bandwidth and lifetime of battery are the most difficult one.

1. Android Only

2. Persistent Internet Connection.

3. Continues Updation.

4. Compulsory GPS for various features

#### V. CONCLUSION

From our experiences while developing this application, we conclude that android operating system provides a very comfortable and tidy platform to the developers to design and develop applications that are very useful, user-friendly and cost efficient. It allows the developer to access many resources like GPS, call, internet and many more. Being an open source operating system, Android has an active community of developers and enthusiasts who use the Android Open Source Project (AOSP) source code to develop and distribute their own modified versions of the operating system. The application 'Spotter', can be used to successfully track lost or stolen mobile phones on the condition that the device is connected to a working internet connection at least once for marking the device's lost status. After marking the device's status, the geographical co-ordinates can be obtained using SMSs only. The application has a very easy-to-use interface and works on a very simple fashion. Spotter application is very light-weight, therefore it doesn't overload the CPU. It consumes less battery power when the phone is not lost. With little improvisations we can greatly reduce the power consumption by the application after the phone is lost.

The application can run on almost all android smartphones available in the current market, since it is made to work on Android version 2.3.3 or above. Spotter can also work on device without a GPS hardware, but with a lesser accuracy. Due to unavailability of our country's own GPS satellites, sometimes the area of the location provided by the application can have a greater radius. The power of this application can be greatly increased by integrating it with the operating system itself.

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