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Anti-Theft Application to Track and Locate Lost or Stolen Android Based Mobile Devices

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Abstract - As the use of Smartphone, tablets, pamphlets based on android operating system is increasing, many scenarios related with anti-theft have already been proposed and many software based on anti-theft have also been developed, but most of these software are not freely available and it's difficult to identify the thief by just using technologies like Global Positioning System (GPS) Tracking. This Anti-Theft application presents a technique to track the location of stolen android based mobile devices by using additional services like URL link Short Message Service (SMS) instead of MMS along with voice recording feature. The scenario proposed in this work is totally dependent on the hardware of your Smartphone like camera (front &back) and support for URL link messages. Once this software is installed, it will work in the background, stores the current SIM number in a variable and keeps checking continuously for SIM change, whenever SIM gets changed from mobile, it will take snapshots without the permission from the invalid user and then it will send an URL link message of the snap shots to the alternate mobile number and email id, which was provided during registration. The enviable advantage of this software is that it is very easy to configure and keeps running in the background without interrupting the user which aids in identifying the invalid user.

Keywords - *Global Positioning System, Short Message Service, Voice Recording, Anti-Theft*

1. Introduction

Smart phones changes the way we live and it has become an integral part of our lives. It has also changed the way we communicate with each other by providing an advantage of communicating with anyone virtually through email, video-conferencing etc., and it also provides a facility to store data, files, email, contact numbers in phone memory which minimizes the concept of File-System to store personal contacts. Smart phones are acting like a mini palm computer, it is used to store documents, information etc., and also can be shared with anyone through internet. Smart phones provides a large number of functions and utilities for hand-held devices through which it acts as a mini computer in our pocket. Because of its open-source nature a large number of useful functionalities has been developed an android operating system is getting used in many mobile phones. Due to its small-size, it can be stolen very easily and the confidential-information of any organization or personal details stored in the phone memory can be easily exposed. Although there are many tracking application available in the market they are less effective in finding the thief because it is not cost effective since it uses MMS. So it is very important to have an effective tracking system which is cost effective.

A technique is put forward in this application through which the thief who steals any android based mobile phone in which the anti-theft application is installed will capture the image of the invalid user. The location of the invalid user is tracked periodically using GPS and it is forwarded to the predefined number which is given on registration process, this requires internet access. The application can send photos to any other mobile phone, unlike SMS which includes only text, this requires minimum balance. It gives the information about the thief by sending the snapshots as a link and message to the owner's alternate mobile number and mail id. Voice of the unauthorized user is recorded periodically and the audio file is sent to the registered email id. The application is comparatively more cost effective as it sends URL link messages unlike MMS that is used by the existing tracking application. The major objective of this application is to identify theft mobile number and to get back the stolen smart phone. Locate the mobile and track it. The mobile location can be tracked using the GPS. The application aims at user security.

2. Literature Survey

The application AALTm [9] is enables the GPS once a non-authorized SIM card is detected in the mobile device by comparing the Integrated Circuit Chip Card Identification

(ICCID). AALTm has got features like profile change monitoring, call monitoring, SIM card detection, location fetching through GPS. But these features work on the SMS (Short Message Service). The registered SIM is notified about the replacement of SIM. AALTm automatically deletes the incoming and the outgoing messages from the smart phone so that the user is left completely clueless about it. SAPt[10] sends a warning notification to the registered predefined emergency number about the unauthorized SIM change along with the GPS tracked location. The registered number receives the notification of the unauthorized SIM number.

3. Proposed System

The proposed system presents a technique to improve Anti-Theft Application for android based mobile phones by using different services likes Tracking, SMS, Camera and Voice Recording feature. This Application is installed in user's android mobile. If the phone is stolen and the SIM card is changed, our Application which works in the background of the mobile will Track the SIM Card ID. This will trigger the Camera automatically. The image of the invalid user is captured and his/her voice is recorded. These images captured by the Application is stored in a separate Server and it is send via mail to the valid user's registered alternate E mail ID as well as this Server's Link is send as SMS Alert to his/her alternate registered mobile phone. The Application will continuously track the location of the invalid user and it will initiate the Google Earth automatically which will indicate the current location of the invalid user. The proposed system uses various tracking mechanism such as GPS tracking, SIM card identification, capturing the image and recording the voice of the invalid user. It is very cost effective as it forwards the images in the form of URL link message to the registered alternate mobile number instead of sending it as a multimedia message. It provides all requirements unlike the existing tracking application to find the theft mobile and the invalid user.

3.1 Methodology

The process involved in the flow of the Anti-Theft application is depicted in the form of the following steps.

Step 1. Install the .apk files (Registration & Main Process) in any android pone with front camera.
Step 2. Register giving any alternate number and email-id, this information will be stored in the database using Apache tomcat server.
Step 3.The application auto starts every time the mobile boots up. Then it goes to running mode and will start the main service like checking for SIM change.
Step 4. On restarting the Android Smart phone. If the SIM is correct it will show 'SIM CORRECT'.
Step 5. Else if the application detects a SIM change, it will forward a notification message to the registered alternate number and E-mail ID.
Step 6. Then it will start tracking the location of the new(invalid) user using GPS periodically. The location of the new(invalid) user is forwarded as a message to the alternate number.
Step 7. The application will capture the image of the invalid user periodically also record the voice of the user and the captured images along with the audio file are stored in the jsp server page.
Step 8. The URL link of the jsp server page is sent as a message to the registered alternate number as an alternate to MMS.

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 predefined number.

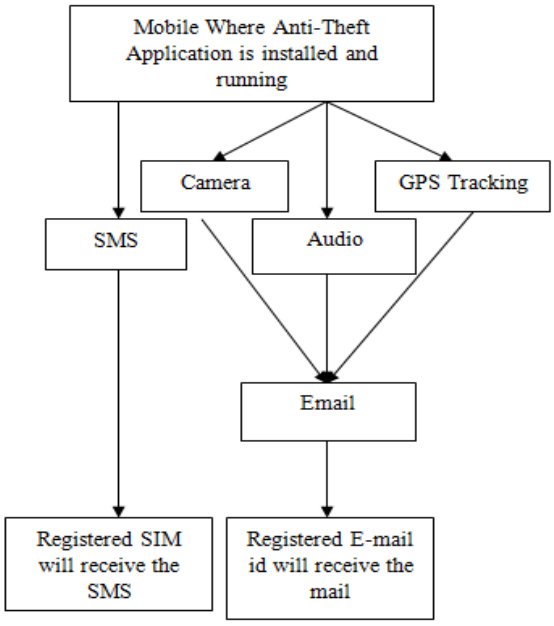

Fig 3.1 System Architecture of Proposed System

4. Experimental Study

In the registration process the application will automatically acquire the IMEI & IMSI number of the phone and the SIM card of the user in which the application is installed. Alternate mobile number, Email-id are given by the user so as to contact in case of losing the phone and also the details of unauthorized user are sent through messages to these number and mail id. Fig 4.1 shows the registration in the application

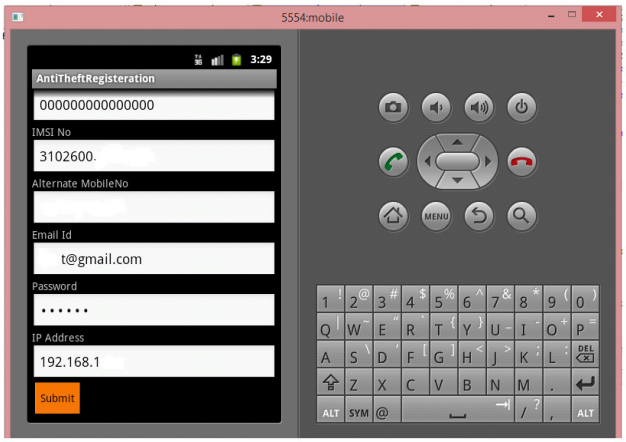

Fig 4.1 Registration

The registered information of the user given during the registration process will get stored in the SQL Database Server. If a new SIM card is inserted in the phone, the application will immediately compare the IMSI number of the new SIM card with the registered SIM card which is stored in the database as shown in the Fig 4.2. If it finds both mismatching then it will immediately forward a notification message to the alternate email-id and the number that is stored in the database.

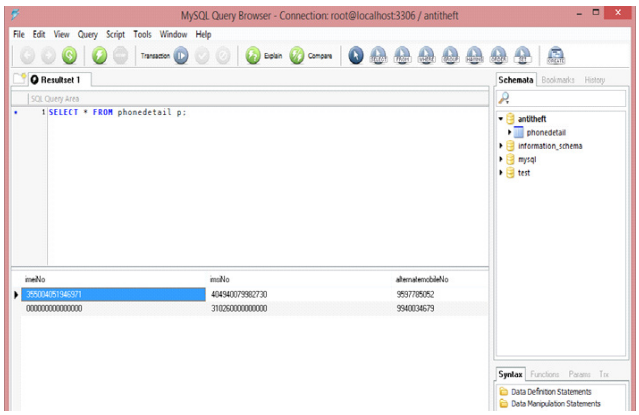

Fig 4.2 Database

If a new SIM is inserted in the phone, the application will identify the SIM change by comparing the IMSI number of the new SIM card with the registered SIM card. Immediately a notification message and E-mail regarding the SIM change will be sent to the alternate registered mobile number and E-mail address. Fig 4.3 is the snapshot of the notification message that is sent to the alternate mobile number regarding the SIM change in the Smartphone. Every time a message is sent, balance will be deducted.

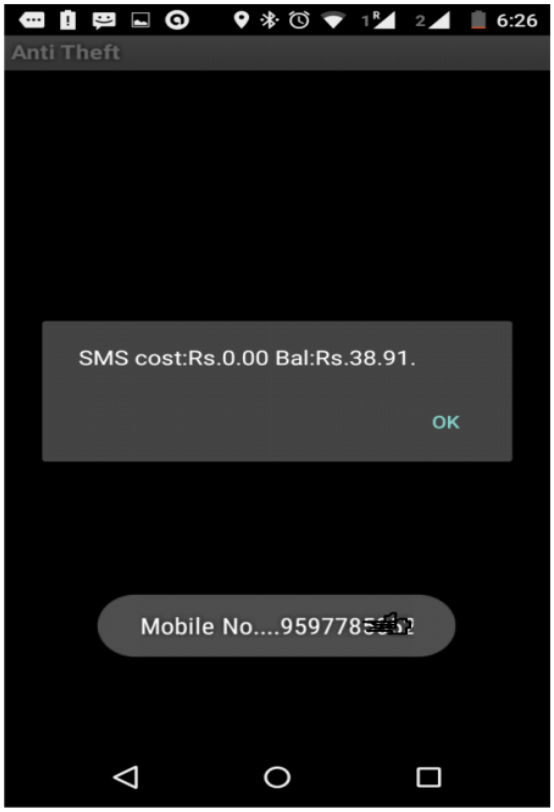

Fig 4.3 Notification message sent to alternate number

Fig 4.4 shows the snapshot of the notification mail sent to the registered E-mail address.

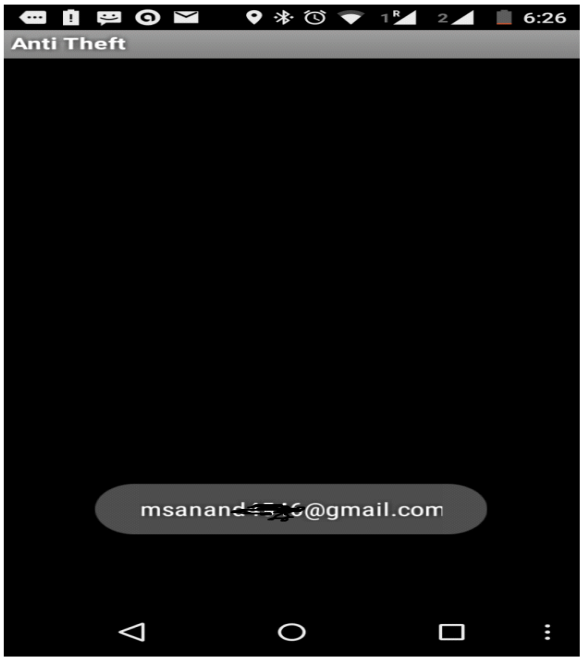

Fig 4.4 Notification message to alternate Email-id

Once the application finds the user to be unauthorized by comparing the IMSI number of his SIM card with the registered SIM card. The application will start tracking the location of the invalid user and the details of his current location will be sent to the alternate mail id and number as shown in Fig 4.5.

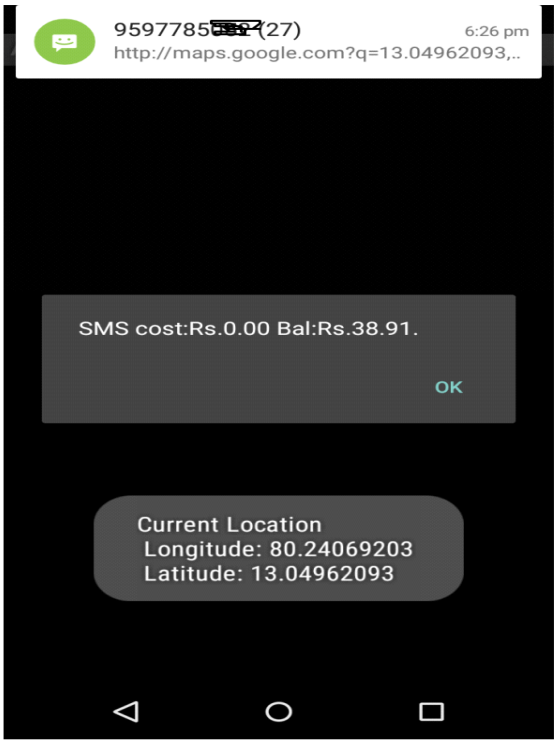

Fig 4.5 Location Tracking

Fig 4.6 Image Captured

The camera is triggered once the invalid user's SIM is identified by the application and the image of the invalid user is captured by the application.
Fig 4.6 shows the captured image of the unauthorized-user.

The voice of the invalid user is recorded by the application without his/her knowledge once after the detection of the invalid SIM in an periodical interval of time.

5. Conclusion

Anti-Theft Application To Track And Locate Lost or Stolen Android Mobile Based Devices is a unique & efficient application which is used to track the lost/misplaced Android phone. The application uses GPS tracking, records the voice and captures image of the unauthorized user. The application deploys security solution that meets user's immediate requirements by providing the images of the thief via SMS and email, which makes easy for the user to identify the thief. Hence helps in finding the lost or misplaced mobile. With the advent of time, technology is evolving every day. The application will further be developed and improved.

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