

Reprint

ISSN 1997-2571 (Web Version)

# Journal of Innovation & Development Strategy (JIDS)

*(J. Innov. Dev. Strategy)*

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**Volume: 9**

**Issue: 2**

**August 2015**

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*J. Innov. Dev. Strategy 9(2): 70-74 (August 2015)*

## **A TRACKING APPLICATION FOR LOST OR STOLEN ANDROID MOBILE-PHONES USING FACE DETECTION**

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## A TRACKING APPLICATION FOR LOST OR STOLEN ANDROID MOBILE-PHONES USING FACE DETECTION

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Accepted for publication on 28 July 2015

### ABSTRACT

Islam MR, Uddin MP, Nitu AM, Rabbi MF, Islam MM (2015) A tracking application for lost or stolen android mobile-phones using face detection. *J. Innov. Dev. Strategy*. 9(2), 70-74.

At present android Smartphone is one of the most commonly used and popular Smartphones. In the few years the market of android Smartphone has been booming. Due to over popularity of android Smartphone, security is one of the most important issue. Losing or stolen mobile phone is a very common incident for mobile phone users. At present there are a few android phone tracker applications in the market for tracking the lost or stolen android mobile-phones. These provide some basic features for tracking a phone. But, users want more reliable features to get back the lost phones. This paper introduces a phone tracker application for android device using face detection. This application will help to get the image of that person, who is currently using the phone. After identifying an unauthorized access of the phone the application will take an image using hidden front camera with face detection and send it to a preset mobile number. Thus, this application will help to get the image of the user, who will use the lost or stolen mobile-phone.

**Key words:** *Smartphone, Android, hidden front camera, phone tracker, lost or stolen phone, face detection*

### INTRODUCTION

In recent years, a dramatic increase has taken place in the number of Android smartphones and importance in the daily life. Android powers millions of mobile devices in more than 190 countries. Its popularity is growing fast and this is the largest installed base for any mobile platform. Every day million customers power up their Android devices and start looking for games, apps and other digital content (Tesfay 2012). This leads to a rising motivation for ensuring the dependability of mobile applications. Reliability is particularly significant for responsive mobile apps such as online banking, business management, storing a huge data, military domains or health care. Storing or collecting important data or documents in the mobile phone users are at all times scary of losing, also to theft or personal inattention about the mobile phone. Nowadays android phone or any mobile phone theft by or lost is a daily occurrence and this is increasing overtime. According to a statistics from Mobile Telecommunications Authority or crimes reported to the police in USA, over 12,000,000 cell phones are lost every year (Enck 2011). In UK, according to the latest Home Office statistics, which is based on crimes, reported to the police, about 700,000 phones are stolen yearly. According to the Australian Mobile Telecommunications Authority, about 100,000 cell phones are lost or stolen every year. There are total 3.1 million mobile phones have lost every year across the world (Leyden 2002). After losing android mobile phone users suffer a lot. Such as losing valuable data stored in the mobile phone memory, SIM card, economical lose, loss of contact details in the SIM etc. So this is becoming important for the mobile phone user to get back the mobile. This research will propose a system for phone tracking in the android platform which will be open source and most of the mobile phone users can use this in their android devices.

### ANALYSIS OF PRESENT SYSTEMS

To get back the lost phones some of the existing systems are available. Some of these apps are Android Lost, Cerberus, Where's my droid, Android Theft, Android Device Manager, Lookout and Seek Droid Lite etc. Some of these applications have features that can help a user to find the missing phone by triggering this to ring off the hook and send its GPS location to users email ID or when worse comes to worst, allow the user to swab the data from the missing Android Smartphone remotely. But the main drawback is that only few of them can be installed after when the phone is lost. The rest of them are defensive measures, meaning that the user must already have them prior to something awful happens to their mobile device. The features of these applications are Read received and sent text messages, lock phone, erase SD card, wipe phone, start alarm with flashing screen, locate by network location data or GPS, record sound from microphone, taking picture from rear camera and front camera (Lim 2012). Mondal *et al.* (2013) proposed a smartphone tracking application based on SMS. A mobile tracking application based on GPS has been proposed by Kinage *et al.* (2013). Also there are some methods available for protection the mobile from lost or theft. Some of the methods are given below:

**Keeping details:** Making a record of all information of the mobile phone and keeping this in a secured place. Including the elements such as pin or security lock code, phone number, color and appearance details and the IMEI number of GSM phones.

**Adding a security mark:** This system use an ultra violet (UV) pen to print house number and the post code onto both battery and mobile handset. This makes it simply identifiable as the phone if stolen or lost. It would

also be excellent if writing the alternate email ID or contact number on the phone. This may help the finder of the mobile to contact with the owner if he intends to return it. Ultra-violet pen marking will wear off each couple of months, thus reapply it when the owner feel essential.

**With the network operator register the phone:** By using the IMEI number, it may be capable to block the mobile device and account details.

**Use the security PIN feature or lock code to lock the phone:** It will make it less important to a thief and reject them access to private numbers stored on the mobile SIM card.

**File a police report instantly:** A police report refers as evidence that will make the wireless supplier more helpful, especially if insurance is concerned.

**Request an urgent, formal inquiry from the carrier:** occasionally this can avoid (or at least delay) the carrier from initiation a collections tainting and effort the credit, if matters get horrible.

Analyzing the present application we have come to a decision that they have certain drawbacks. Some of the major drawbacks are such as not a better opportunity to get the clear image using front camera, they have some difficulties to use, not cost effective, and thief can understand the tricks etc.

## PROPOSED SYSTEM

Our proposed system Phone tracker will solve the drawbacks of the present android application for tracking an android phone. This proposed system for tracking or getting a face will run in background. After rebooting the android phone or powered up the front camera will run in background. There will be no surface preview of the camera. The front camera will work in hidden mode. After identifying an authorized access the front camera will start by default. After taking a picture it will send an MMS (Multimedia message Service) to a preset mobile-phone number.

### A. Advantages of Proposed System

This proposed system has some advantages are as follows:

- **Easy to use and install:** There are no difficulties in the application to use. Just the users have to install the application and set some features to get the response from lost android Smartphone.
- **The application will work automatically:** After install the application the users have nothing to do.
- **Cost effective:** After identifying an unauthorized access it will need a very little cost.
- **Better possibility to get a clear face of a person:** This application will take a photo only after detecting a face. So there is a better chance to get a clear with a recognizable face.

### B. Working Steps of the Proposed Tracker

To use this application the users must have to set the phone number in the application where he/she want to get the response from the installed apps. The settings of the application are very simple. After installing the application the user have to launch the application and set the phone number with country code and password. It is also very simple to check whether the phone is authorized or unauthorized. When the application will start, there shows a popup box in screen to give any number. If the number is matched with the given password then it will be an authorized access, otherwise it will be an unauthorized access.

### C. Structured Analysis

The structured analysis mainly focuses on logical systems and functions, and aims to convert business requirements into computer programs and hardware specifications. The ways with diagrams for structured analysis are illustrated below.

#### 1. Use-case Diagram

The use-case diagrams for the phone tracker are shown below:

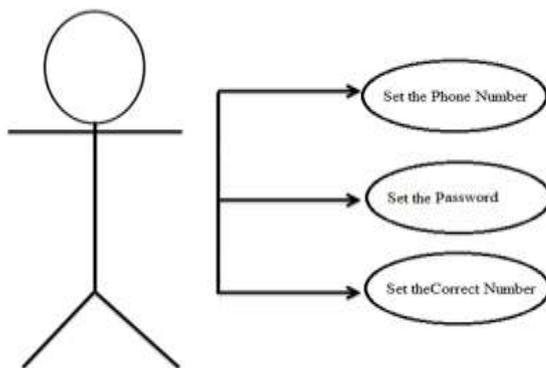


Fig. 1. Use-case Diagram for Authorized Access

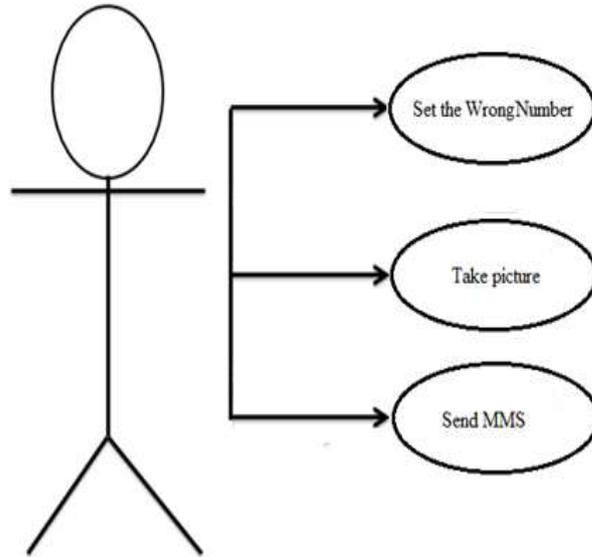


Fig. 2. Use-case Diagram for Unauthorized Access

**2. Activity Diagram**

An activity diagram describes the parallel and conditional activities, use cases and system functions at a detailed level. The activity diagram of the developed system is shown below:

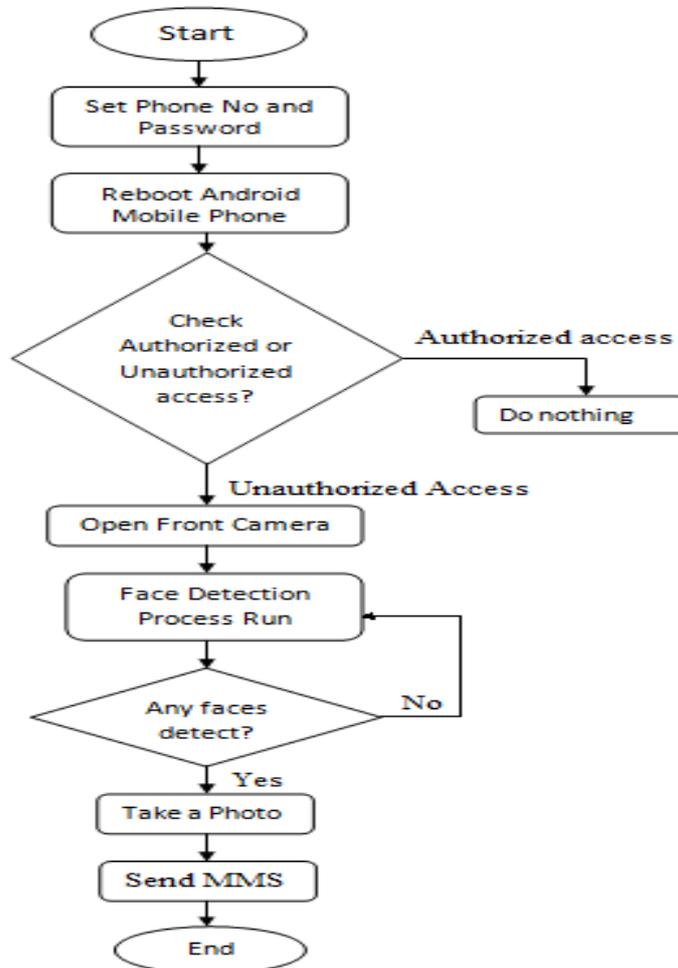


Fig. 3. Activity Diagram

**D. Tools and Technologies**

To develop the phone tracker the latest tools and technologies such as Android Operating System, Android Virtual Device, Java Programming Language, Java Platform, Extensible Markup Language (XML), Java Development Kit (JDK), Software Development Kit (SDK) and Eclipse have been used

**E. Requirement Analysis**

As the research is based on usage of two devices, we have divided the research requirements in two parts. These are summarized in the following tables.

**1. Development Requirements**

Table 1. Development Requirements

Devices	A personal computer		Android Virtual Device
Hardware requirements	Processor	Pentium IV or higher	Android Virtual Device can be configured with Eclipse IDE. Need to have Android OS version 4.0 or higher support.
	RAM	128 MB or higher	
	Disk space	128 MB	
Software requirements	Operating system	Windows – XP, Windows – 7, Linux or any other OS	

**2. User Requirements**

To use the developed application the user needs an Android OS-based smartphone with version 4.0 or higher, Internet support in the phone and good resolution in the front camera of the phone.

**F. Working Steps of the Application with some Snapshots**

At first, the users have to set the phone number and password. There is an option to set phone numbers where the user will get picture via MMS, and password option is for setting an authorized access. Setting of the application is shown in the following figure.



Fig. 4. Setting of the Application

**1. Checking Authorized or Unauthorized Access**

It is also very simple to check whether the phone is authorized or unauthorized. When the application will start there shows a popup box in screen to give any number. If the number is matched with the given password then it will be an authorized access, otherwise it will be an unauthorized access. This is just an illusion. After reboot the phone a popup box will be shown in mobile screen like below.



Fig. 5. Authorized or Unauthorized Access

## 2. Face Detection in Visible mode

A very important part of this application is face detection. The camera will not take a picture until there is no face detection. After detecting the face the application will take a photo and send a MMS to the preset mobile number. Face detection technology is used in this application to get a clear face of a person. The face detection will like below.

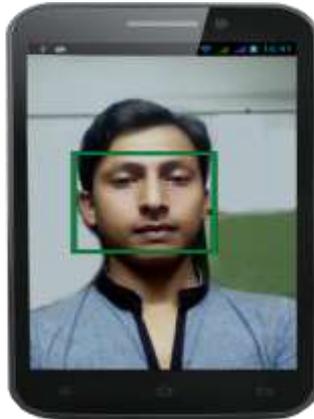


Fig. 6. Face Detection in Visible Mode

## CONCLUSION

As Android smartphone is the cheaper smartphone than any other smartphone with easy use in the world, the use of android phone is increasing rapidly. Day by day its popularity is growing so fast. The mobile phone users are now much dependent on android phone because of its versatile functionalities. They can store a lot of data, and private documents. But rate of lost or theft of mobile phone is also increasing. If the phone is lost or stolen by someone, it will be very tender for the mobile phone user. So the user needs to get back his/her mobile phone. This developed phone tracker application will help to get back the lost phone with taking the thief's picture automatically. The application is user friendly and cost effective. This application will help much more to catch the person who got the phone or has stolen the phone. However, in future a network based technique can be embedded with the developed tracker to track the location of the lost phone.

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