



Research Article

Remote Tracking of Android Smartphones

SUMESH PREMRAJ

Student

Computer Science & Engineering Department
M S Ramaiah Institute of Technology
Bangalore, India

MEERADEVI A K

Assistant Professor

Computer Science & Engineering Department
M S Ramaiah Institute of Technology
Bangalore, India

Abstract - The Purpose of the paper is to trace out the status and progress of the employee mobile and the relevant information is transferred to the mobile of the project manager and updated in the web server. The employee's problem related to the company can be monitored by the project manager and he can also track the employee's current location through the GPS. In existing system, the CBI alone can trace the mobile phone of any person with the help of unique IMEI number in telephone exchange. So there is no possibility to trace any information regarding the employee's mobile details by the project manager. So to overcome, this system was implemented.

Keywords: Smartphone, remote access, Android, Real Time Monitoring, SMS.

I. INTRODUCTION

Mobile phones are becoming more technologically advanced and offer more features. Specially, Smartphones are having more advanced computing capability than a feature phone. Smart phones can run applications and can access the internet directly unlike cell phones rely on a carrier to get that. The reason Smart phones can run applications because these phones have CPU, memory and all other stuff that allows PCs to do the same thing [2]. In proposed system, the monitoring system is used to monitor the employee's mobile information. The monitoring system contains Mobile applications and Web applications which bring all the mobile information of the employee to the corresponding project manager mobile and it is updated in the centralized server. Monitoring system is really very helpful for the project manager to monitor the employee through mobile phones. By using this system, the employee's problem related to the company can be monitored by the project manager and he can also track the employee's current location through the GPS. A mobile phone is a powerful multimedia device, and with it, people have access far beyond in marketing and business field. The information about the missed calls, incoming and outgoing calls, like source or destination mobile number, call duration, incoming and outgoing content of text messages, locations with address, speed, date and timings can be seen and interrupted by the manager, who can monitor where the employee are (through GPS), access a history of employee location.

II. EMPLOYEE MONITORING SYSTEM

A. Objective

The main objective of the 'Remote Tracking of Android Smartphones' is to trace out the status and progress of the employee mobiles and update the information to the manager mobiles and also to the

centralized web server. The project has two components: Android app developed in Eclipse, and website built with PHP and MySQL. Android was used due to its large user base and the PHP/MySQL combination was used because most webhosting services support them.

III. ANALYSIS PHASE

A. Existing System

Existing employee tracking systems have limited capabilities and are restricted by their architecture. They use mobile ad-hoc networks constructed from mobile phones with Bluetooth functions for tracking. This restricts their range because Bluetooth can only function for a few hundred feet at best. Other systems use tags which collect information of employee as they pass by. These tags form a mesh network that can track the devices. This also has the limitation of being unable to track the employees if they go out of range.

B. Proposed System

The proposed system of "Remote Tracking of Smartphones (Android)" will have a Mobile Implementation and Web Implementation which will bring in all the mobile information of employee to the corresponding manager mobile and also to the centralized server. The information about the missed calls, incoming and outgoing calls, like source or destination mobile number, call duration, incoming and outgoing content of text messages, locations with address, speed, date and timings can be seen and interrupted by the manager, who can monitor where the employee are (through GPS), access a history of employee location[5].

Research Article

C. Advantages of the Proposed System

- The manager can easily track the employee's day to day activities like SMS and call information.
- It also brings the current location of the employee.
- Easy to implement and add functions.
- Secure against suspicious individuals.
- Low cost.

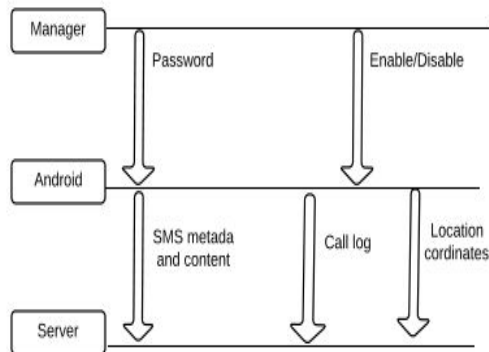


Figure A: Flow diagram of remote tracking system.

The Android application accesses the Android messaging database which stores text messages and reads the metadata and content of incoming messages. It reads the call logs. It requests location information every few minutes to keep track of the device. It also uses a built-in android system API call to get the unique SIM identifier [3], which is used to call the device as shown in figure A.

IV. DESIGN AND IMPLEMENTATION

A. Mobile Application Module

The mobile application runs as a background process in the employee's mobile phone and it will monitor incoming and outgoing SMS, calls and identifies the location change. There are three sub modules in mobile application. They are

I) Monitoring SMS: This applications register for incoming and outgoing SMS and MMS in order to monitor the employee[6]. When the employee sends or receives any SMS or MMS in mobile, the same content and the details about the mobile number will be send to the project manager's mobile with the date and time. At the same time it will send the HTTP request to the web server as shown in figure B.

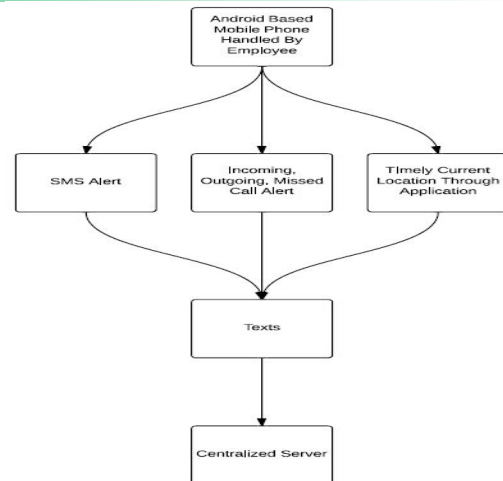


Figure B. Flow diagram of proposed system

II) Monitoring calls: The background applications are useful to monitor the call information's like source or destination mobile number, time of call, call duration and missed calls. These details will be sent to the project manager mobile through SMS format. At the same time the same information is send to the web server as shown in figure C.

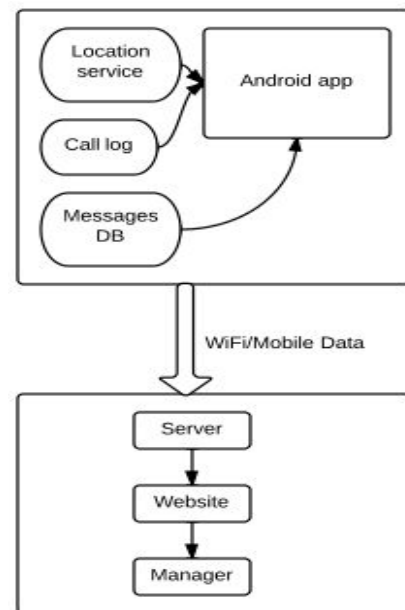


Figure C. System Architecture

III) Monitoring geolocation: The background application identifies the location change and sends the Geo-Location details like Latitude, Longitude, speed and time to the project manager mobile in SMS format and also to the centralized server at the configured interval of time and distance. Date/time, speed and the address details are also shown in the Google map with the routes plotted in the map and the route paths are in the different colors according the speed of that vehicle.

B. Web Application Module

The web application is built with PHP and MySQL, and runs on a LAMP server. It receives data from the Android app, verifies the data, inserts it into the database, and later retrieves and presents them on the website for the manager to see.

Data from the Android app is sent in JSON as POST data. This JSON data is received and converted to PHP arrays, then checked for errors or missing fields, and finally inserted into the database. We use the mysql class in PHP for database access[10]. When the manager logs into the website, he is presented with a list of phone numbers that are being tracked [7]. This number is mapped to the SIM number and used for all operations on the backend, as the phone number itself is publicly known and can be spoofed easily by a malicious third party to insert fake data. The web application stores a rolling list of the last ten calls and message content. It also stores all known location coordinates. The location coordinate history is stored forever because it is more useful to track employee movements. This data can later be used to analyze employee movement patterns over larger intervals of time [9], say a quarter or a year.

The Android application sends the last ten calls and SMS content on a loop with an interval of five minutes (which is the defined interval), and this data might be duplicated if no new calls or SMS have been used in the interval. To avoid duplication and redundancy of data in the database, code has been written to check if the data exists in the database before inserting it as shown in figure C. A manager can register new users on the web front end for tracking by entering the phone number (which will then be shown on all tracking screens) and the SIM number (which is sent by the Android app when it sends data). Deleting requires only entering the phone number, as the system looks up the SIM number, deletes all existing records of the tracked user and removes the user details from the user table.

V. CONCLUSION

Remote Tracking System was developed with PHP and MySQL 5 on the webserver, and Java for Android app. Remote Tracking System is developed for monitoring the status of the employee mobiles by sending data to the centralized server from the software running on the employee mobiles. This System sends the information such as SMS, and GPS to UI implementation on the web server for use of the manager.

VI. FUTURE WORK

The proposed system is used for manager to monitor their employee's location of Android-based mobile phones during working hours.

Future enhancements may include

- Using batching technique to send data in intervals. In the current system, each record is sent as it is read from the device, enclosed in separate JSON objects through HTTP POST requests
- Sending data when user wakes up the device (instead of when it is in deep sleep mode). Android devices enter a low power, deep sleep state when the device is left unused and no background activities are running.
- Disabling GPS sensor when WIFI networks are found.
- Encryption of data from the device for more security. This is important in a corporate environment, when employee information is confidential, and privacy is governed by laws.

REFERENCES

[1] <http://strife.pl/2011/12/android-how-to-send-request-post-to-the-server-full-application/>

[2] <http://www.ijettjournal.org/volume-4/issue-5/IJETT-V4I5P107.pdf>
<http://stackoverflow.com/questions/16868120/accessing-posted-json-data-in-php-script>

[3] <http://www.lornajane.net/posts/2011/posting-json-data-with-php-curl>

[4] <http://hmkcode.com/android-send-json-data-to-server/>

[5] <http://osamashabrez.com/simple-client-server-communication-in-android/>

[6] <http://info-track.com/employee.pdf>

[7] <http://mpkrishi.org/krishinet/HindiSite/Pmis.pdf>

[8] <http://www.iseing.org/emcis/emcis2010/proceedings/accepted%20refereed%20paper/s/c77.pdf>

[9] <http://faculty.cua.edu/martink/JBEEmployeeMonitoring.pdf>

[10] <http://www.lornajane.net/posts/2011/posting-json-data-with-php-curl>