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Improving Employee Tracking and Monitoring System Using Advanced Mechanism

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Abstract-- *Smartphones are proving very essential and effective tools for increasing the storage capacity and computational power. They allow end users to perform several tasks and keeps them updated to the point. Our proposed system "Improving Employee Tracking and Monitoring System using Advanced Mechanism" allows to monitor the employee's cell phones provided by organization. Activities such as incoming calls, outgoing calls, missed calls, SMS history, web history, data usage, unauthorized call lists and websites are stored on centralized server. Manager can see and monitor all the history by logging into centralized sever. Employee's current location can also be tracked by Manager through GPS. If an employee is going outside the company premises then manager can get alert message in SMS format. Employee's behavior is calculated by using number of unapproved calls and exceeding data usage (good/bad/average/loyal). The device provided to the employee should be android based. The Manager can have any device. This system is very helpful for Manager as it can find out the activities done by employee.*

Keywords: Android, GPS, Emlpoyee's behavior.

I. INTRODUCTION

Android is operating system which supports large number of applications in Smartphone. Android is an open source. It allows developers to develop applications and sale them in android market. Android operating system proves to be powerful and most popular operating system which makes life more comfortable and advanced for users. Android is a mobile operating system developed by Open Handset Alliance. Some of the features and specifications of Android are: 1. Application framework which enables replacement and reuse of component, 2. Dalvik Virtual Machine: It is optimized for mobile device, 3. Optimized Graphics: It is powered by a custom 2D graphics library; 3D graphics based on the OpenGL ES 1.0 specification, 4. Integrated browser: It is based on the open source web kit engine, 5. SQLite, 6. Media Support, 7. GSM Technology, 8. Camera, GPS, compass, 9. Bluetooth, EDGE,3G,WiFi.

Android system is based on Linux version 2.6 which provide services like memory management, security, network stack, driver model and process management. Android provide SDK for development of different new application. Android consists of four layers: 1. Linux Kernel, 2. Libraries, a. Android Runtime, 3. Application framework, 4. Applications.

Linux kernel is the basic layer which consists of hardware driver which are essential for controlling and communicating with hardware. Libraries are the next layer which consist native libraries. Native libraries includes surface manager, media framework, SQLite, Webkit, OpenGL. Android runtime consist two main parts: Dalvik Virtual Machine, Core java libraries. DVM is like a JVM which is developed by Dan Bornstein of Google which is used for executing application. DVM requires '.dex' files which is built from .class file at the time of compilation. D VM allows multiple instances of virtual Machine simultaneously which also provide security, isolation, threading and memory management. Core java libraries provides most of the functionalities defined in javaSE libraries .Applications are the top layer in android architecture where our application are gone fit.

Android consists of four main components: Service, Activity, Content Provider, Broadcast Receiver. Services include background process. Activity consists of GUI screen. Content provider has database like content DB, Bookmark DB, message DB. Broadcast receiver contains all the information about call logs. Employee monitoring system provides tracking of employee's cell phone which is in Wi-Fi.

A. Abbreviations and Acronyms

GPS- Global Positioning System, XML-Extended Markup Language

B. Literature Survey

1) "New safety support System for children on school route using mobile ad-hoc network" (year-2011) .This paper was published by authors AtsushIto, Yoshaiaki kukuda, Tomoyuki Ohta. This paper was based on domains like mobile ad-hoc network which also lacks in Android terminal connected in wireless LAN dynamic paring of mobile terminal is mandatory. 2) "Track your Buddies"

(year-2013) This paper was published by authors Anjor Jadhav, Savita Kharj, etc. The published paper has some disadvantages like, tracking is done by fixing tags in different location for identifying the exact position of an buddy i.e, a friend via .Mobile. 3) "Secure Mobile Business Information on processing". This paper was published by the authors Kuntze Rieke ,Diederich, Sethmann, Mustafa, Detken. In theyear2010. This paper is refer by us to achieve the goal of overcoming the possibility of data loss during the message transfer. 4. Android based remote monitoring system (year-2012). As this paper was published on the existing technology like 2G and 3G network which were inefficient to handle the data properly. This paper is taken into the base papers to achieve the goal of data transfer without any loss of data packets. 4)"SAR operation based on call log and location details using GPS and Android Smartphone".(year-2011) this paper does not avail the services to trace the history of data usage of web and unauthorized calls.

C. Existing System

In existing system, mobile terminal is connected to 3G network. Identification of the employee location is done by fixing tags in different location. There is a communication link to management server which is managed by 3G network and is costly than WiFi network. In the existing system tracking of outgoing, incoming calls and SMS is done. Calculating employee behavior is not feasible.

D. Drawback of existing system

The Manager is not able to trace out the activities of Employee like unauthorized call history, unauthorized web history and unauthorized list in the mobile. The Manager can't get the information about Employee's behavior. Also alert messages are not received on Manager's phone or device.

E. Proposed System

In this system Managers can monitor their Employee's office cell phone by implementing some functions for employee monitoring. All call logs like incoming and outgoing calls, SMS, texts and multimedia messages can be seen by Manager. Manager can also interrupt to monitor their employee through GPS (i.e. Global Positioning System). The Manager can access history of where the employee have been and set up alerts if their employee is going outside the organization area. Android terminal is basically connected to WiFi network for data transfer between two mobile terminals easily and effectively. Tracking can be made easily without any distortion. Data is stored and retrieved at high speed because of Wifi network. This system has Android based cell phones for software to be run. Employee should have Android based cell phone while the Manager can have any mobile device, as they are only going to receive SMS alerts. The alerts are stored in the centralized server like call logs and multimedia messages and the timely updates of their employee's location. Managers can login into centralized server and view details of their Employee's mobile usage whenever needed. Employee's behavior is calculated by Manager using k-means clustering algorithm. AES encryption algorithm is used to send messages securely to mobile terminals.

F. Features of the proposed system

All day to day activities like SMS,MMS, calls, data usage, unauthorized call/website list of Employee is tracked by Manager. Location details are also known of Employee. If the Employee crosses some specified area then alert message will be sent to Manager's mobile in a SMS format. Manager may later login and view the details of a particular employee by logging into the centralized server and calculate the behavior of employee based on that.

G. Architecture of proposed system

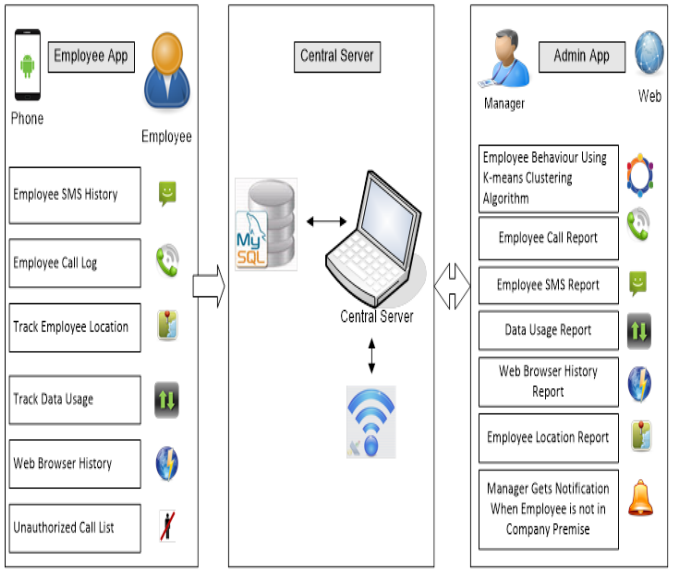

Fig a. Architecture of Proposed System

Call Logs:

Call logs should show the details of the incoming and outgoing calls and history from employee's phone like date, time and phone number. So Employee should not use their company cell phone for personal use. If they call unapproved number from employee list, it will be logged onto to server and recorded.

Message History:

Manager should get multimedia messages with date and time along with message history from employee cell phone like text messages (inbox/draft/sent).

Web Browser History:

The module should show the web browser history of an employee and store web details on server. Server database has list of authorized sites stored.

Data Usage:

Data usage statistics should be shown in the terms of MBs of data. Manager can easily keep watch on data usage of employee's cell phone.

Unauthorized call/website list:

Manager should maintain the list of unauthorized websites and that websites should not be accessed byemployee. Managers can disapprove the international calls for the employee.

Tracking by GPS:

Employee location details can be retrived by using GPS. If employee goes outside the specified zone then notification is sent to managers.

Employee Behavior:

With K-means algorithm employee's behavior is calculated. Firstly number of unapproved calls, exceeding data usage is calculated for each employee and then K-means algorithm is applied on these parameters to calculate mean of different clusters. Each cluster indicates different employee behavior i.e. good/loyal/average/bad.

Basic block diagram:

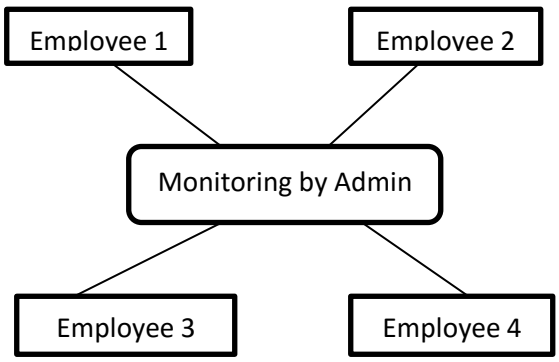

Fig b. Block diagram

H. Requirements

A. Hardware and Software

Operating system needed for terminal is Android (any version). Server side system will be Windows 07 based. Client side will be an android phone having SDK 2.3 or above. Software using will be SDK for Android, JDK 7, Eclipse and Tomcat.

I. Algorithms

We are using two algorithms, one for calculating the behavior of Employee's and another for encryption to encrypt message sent by one terminal to another terminal.

A. AES Encryption Algorithm :

AES is based on a design principle known as a substitution-permutation network, and is fast in both software and hardware. Unlike its predecessor DES, AES does not use a Feistel network. AES is a variant of Rijndael which has a fixed block size of 128 bits, and a key size of 128, 192, or 256 bits. By contrast, the Rijndael specification *per se* is specified with block and key sizes that may be any multiple of 32 bits, both with a minimum of 128 and a maximum of 256 bits. AES operates on a 4×4 column-major order matrix of bytes, termed the *state*, although some versions of Rijndael have a larger block size and have additional columns in the state. Most AES calculations are done in a special finite field. The key size used for an AES cipher specifies the number of repetitions of transformation.

B. K-Means Clustering Algorithm:

k-means clustering is a method of vector quantization, originally from signal processing, that is popular for cluster analysis in data mining. *k*-means clustering aims to partition *n* observations into *k* clusters in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster. This results in a partitioning of the data space into Voronoi cells.

Given a set of observations ($\mathbf{x}_1$, $\mathbf{x}_2$, ..., $\mathbf{x}_n$), where each observation is a *d*-dimensional real vector, *k*-means clustering aims to partition the *n* observations into *k* sets ($k \leq n$) $\mathbf{S} = \{S_1, S_2, ..., S_k\}$ so as to minimize the within-cluster sum of squares (WCSS):

$$\arg\min_{\mathbf{S}} \sum_{i=1}^{k} \sum_{\mathbf{x}_j \in S_i} \|\mathbf{x}_j - \boldsymbol{\mu}_i\|^2$$

Where $\boldsymbol{\mu}_i$ is the mean of points in S_i.

II. CONCLUSION

Using this system it is possible to track all the activities of employee's cell phone which is provided by particular organization and it is also possible to know manager behavior of employee's according to their cell phone activities like Incoming and Outgoing call history, SMS history, Web history, Data usages. It is also possible to track employee's current location.

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