

Employee Monitoring System Using Android Smartphone

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Abstract: Smartphones are very effective tools for increasing the productivity of business users. With their increasing computational power and storage capacity, smartphones allows end users to perform several tasks and be always updated with the latest updates available. In the organization, most of the employees do many activities apart from their office work that is unknown to manager. "Employee Monitoring System using Android Smartphone "provides a tool for managers to track their employee and monitor their official cell phone activities which are other than the official work. The managers can monitor the location of their employee (through GPS). It send Alert message in text format to manager if employee goes outside the approved geographical zone. All incoming & outgoing calls, texts and multimedia messages can be seen and interrupted on receiving from unapproved numbers or calls from banned persons.

Keyword:GPS, Employee tracking, Android, AES Encryption algorithm, K-means algorithm.

I. INTRODUCTION

Android is a mobile operating system developed by Google, based on Linux kernel. Android is designed primarily for touch screen mobile devices. E.g.: Smartphone, tablets. This Android system consists of 4 layers: the Linux kernel, native libraries, the virtual machine, and an application framework. In which Linux kernel provides basic operating system services and hardware abstraction to the upper level software stacks. The Native libraries provides functionalities of web browsing, multimedia data processing, database access, and GPS tracking optimized for a resource-limited hardware environment. The Virtual Memory runs Java code with low memory acceptance. At the top layer of the Android architecture provides a component-based programming framework because of that user can easily build own applications. Traditionally monitoring of employee is done with the manual reports generated by the employee or team leader. Performance of the team is calculated by the team leader or manager. It requires lots of paper work to keep record of employee activity [4]. This application reduced the paper work of manager as well as employee.

The employee can spend time on internet browsing, may access any website which is not come under company policy, and send unnecessary messages or calls. Managers are unaware about that. Therefore a system that gives manager idea like where employee is and what messages he gets and to whom he calls will get.

This Application uses Android based phones which is provided by company. The employee must have android phone and manager can have any kind of mobile phone.

Only alert message can be send on manager's mobile phone. For convenience, the alert messages are stored in the centralized server. Manager can login into server at any time to check detailed updates of employee. All details like incoming call, text and multimedia messages, browsing history, data usage and the timely location update of their Employee.

This application is really very helpful for managers to monitor their employee office cell phone. This application can avoid the unnecessary things happened by the Employee.

II. LITERATURE SURVEY

A. Smartphone monitoring System :

In this paper, application can update the data to Server database. Only all call details of employee are updated on the server. Others details like SMS history, Browsing history, data usage are not get stored on the server. But in proposed system all details are get updated on server without interfacing of any person. [4]

B. Location tracking of the employee is implemented using Global Positioning System :

GPS is designed of or bits. GPS finds the user location by calculating differences in the signals. It is calculated by time required to reach signal from satellite to receiver. After that GPS signals are decoded to find location [6]. In this system user have to provide some input to the system and after that it gives location. But in proposed system there is no requirement of user input. The user's location can be obtained by using Global positioning System.

III. EXISTING SYSTEM

A. Existing System

In Existing System, Location of employee is trace by fixing tags on different location in company premises. It gives exact position of an employee but only incorporate area.

The android devices are connected to each Bluetooth and wireless LAN. The communication link to the management server is managed by wireless LAN. It is very slow. The dynamic pairing of mobile terminal is mandatory. The network is more complex and it is not reliable.

B. Drawbacks of Existing System

Tracking can be done in shorter distance only because RFID tags do not cover larger distance. Android devices are connected to each other via Bluetooth and Wireless

LAN So it becomes very slow [1]. Manage can not get alert message when employee goes outside the corporate area. It uses 2G so it is slow. 2G uses circuit switching. For circuit switching channel has to establish first.

IV. PROPOSED SYSTEM

The proposed system imposes some new functions for the existing system. It uses a Telephony manager to store subscriber id, SIM serial no, etc. All the details like call log, SMS history, Data usage history, web browsing history, location are tracked and recorded. Location of employee is traced by using GPS i.e. Global Positioning System. It can also give location of employee at outside the corporate area.

A. Architecture of Proposed System

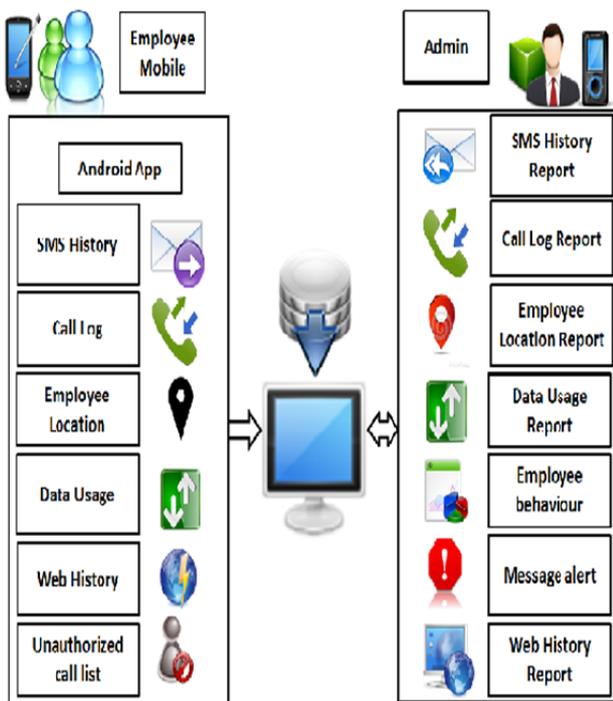


Fig. 1 Architecture diagram of Proposed System

The User of system:

1. Any Employee :
An Android application is developed and installed on the android smart phone. This application is run on client side. All details are stored on SQLite database and further updated on server.
2. Admin :
Manager has authority to login on server and check all details. The server uses a MySQL database. MySQL is a relational database, which uses Structured Query Language. It stores data in tabular format. So it is easy to understand. MySQL is reliable and flexible. Centralized server contains details like incoming call, text and multimedia messages and the timely location update of their Employee. So for detailed data manger can login on server.

A. Features

1. Record of incoming and outgoing calls.
 2. Text and multimedia Messages.
 3. Browser history.
 4. Data Usage.
 5. Current Location of employee.
 6. Alerts to Managers.
 7. Unauthorized call List
 8. Behavior of Employee
1. Record of incoming and outgoing calls :
Employee can use their office cell phone for their personal calls or he/she may get call from an unapproved number from employee list[2]. All this things get updated on server. Call Logs should show the details of incoming and outgoing calls history from employee's phone like date, time, and phone number.
 2. Text and multimedia Messages :
Manager can get the message history from employee cell phone like text messages and multimedia message with date and time.
 3. Browser History :
The module can show the web browser history of employee's phone and update these details on server. List of authorized sites is maintained in server database[2].
 4. Data Usage :
This module gives data usage in the form of MBs of data. Manager can easily know the data usage of each employee.
 5. Current Location of employee :
By using GPS employee location can be traced.
 6. Alerts to Managers :
If employee goes outside of corporate area then a notification message is sent to managers Phone.
 7. Unauthorized Call List :
Managers can get list of persons which are not in employee. Managers can dis-approve the international calls for the employee.
 8. Behavior of Employee:
It considers number of unapproved calls, exceeding data usage is calculated for each employee. Then k-means clustering algorithm is applied on the above information. K-means divide employee into different clusters. This parameter can be added to calculate the employee behavior.

V. ALGORITHM

A. AES Algorithm:

AES is based on a design principle known as a substitution permutation network. AES work fast on both software and hardware. The block size is 128 bits. Key size is 128, 192, or 256 bits.

AES operates on a 4x4 column major order matrix of bytes, termed the state. The key size used for an AES cipher specifies the number of repetitions of transformation rounds that convert the input, called the plaintext, into the final output, called the cipher text. The number of cycles of repetition is as follows:

- 10 cycles of repetition for 128-bit keys.
- 12 cycles of repetition for 192-bit keys.
- 14 cycles of repetition for 256-bit keys.

Each round consists of several processing steps, each containing four similar but different stages, including one that depends on the encryption key itself. A set of reverse rounds are applied to transform cipher text back into the original plaintext using the same encryption key.

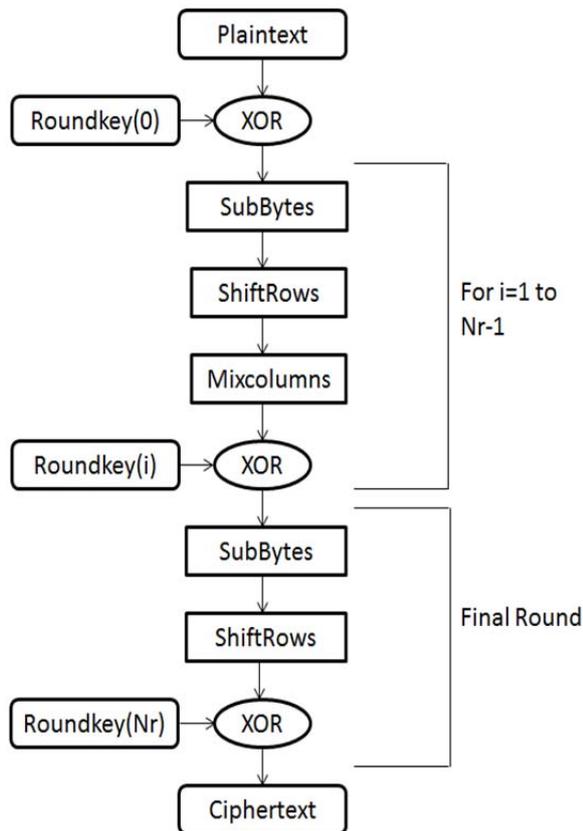


Fig. 2 Flow of AES Algorithm

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. Each Observations Belongs to the cluster with nearest means.

Consider, X_1, X_2, \dots, X_n Set of Observations. K-means clustering aims to partition the n observations into k sets ($k \leq n$)

$S = \{S_1, S_2, \dots, S_k\}$ so as to minimize the within-cluster sum of squares.

$$arg \min_s \sum_{i=1}^k \sum_{X_j \in S_i} ||X_j - \mu_i||^2$$

Where μ_i is the mean of points in S_i

VI. CONCLUSION

In this paper, newly proposed system is introduced to monitor employee's office cell phone and track location of employee. By using K-means algorithm overall behavior of employee can be judge.

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