

# Mobile Based Attendance System Using Ad Hoc, Fused Location

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**Abstract**—Over the years the process of manual attendance has been carried out which is not only time consuming but also provides erroneous result. Automated time and attendance monitoring system provides many benefits to organizations. This reduces the need of pen and paper based manual attendance tracking system. Following this thought, we have proposed a smart location based time and attendance tracking system which is implemented on android mobile application on smartphone reducing the need of additional biometric scanner device. The location of an organization has a specific location, which can be determine by the GPS. Each employee's location can be determined by the GPS using smartphone. This location is defined as a key of time and attendance tracking in our paper. Every Organization has a specific location, which is determine by the GPS. The location of an employee can be determined by GPS device (Mobile Phone, GPS watch or GPS enabled device etc.). If the location of an employee and the location of organization is same (Approx.), then it should be said that, the employee is in the office. This paper use location as a proof of attendance and proposed a new time and attendance system based on location.

**Index Terms**-Location-based service, GPS, locating, time and attendance system, android, Ad Hoc, App.

## 1. INTRODUCTION

Now a days, two types of attendance system are available, i) Manual and ii) Automated. Manual time and attendance systems use paper time cards and time sheets that employees fill out and managers oversee for accuracy. However, time and attendance information is subject to human error when various employees such as workers, managers, and payroll administrators all perform tasks that involve recording the numbers. Employees punch in and out when they arrive at work, go to lunch, take a break, or leave for the day. Generally, managers must add up the minutes and hours worked, using each employee's time card, and fill in a time sheet indicating hours worked for the week. Managers also spend time filling out attendance records based on whether employees punched the clock. A lot of man hours go into calculating time and attendance when using a manual system. Automated time and attendance systems can use electronic tags, bar-code badges, magnetic stripe cards, biometrics (hand, fingerprint, or facial), and touch screens in place of paper cards which employees touch or swipe to identify themselves and record their working hours as they enter or leave the work area. The recorded information is then ideally automatically transferred to a computer for processing although some systems require an operator to physically transfer data from the clocking point to the computer using a portable memory device employed to perform all the necessary calculations to generate employee time-sheets which are used to calculate the employees' wages. An automated system reduces the risk of errors that are common in a manual system, and allows the workforce to be more productive instead of wasting time on tedious administrative tasks. This paper proposed an Automated Time and Attendance System that use Location instead of traditional methods.

## 2. RELATED SURVEY

In this section, we review some related technologies and previous works on the topic of location based application. Geo location is the first step to providing location based services. Existing Systems-We have studied and visited the different websites and the literatures. As per the literature review, the various organizations and individuals have tried to overcome the problems in the traditional attendance system. Some of them are listed below.

### 2.1 E-Beat

E - Beat is an electronic beat constable's night patrolling attendance system to avoid manual recording of time & attendance and to save the time by sign-in / sign-off at different beat points while patrolling. XIPHIA has developed the Electronic Beat. It has features such as Compact, Light-weight, Pocket size, tamper proof. But it has a limitations regarding system specification. It is operable in fixed temp range i.e. 0 to 70° C. Very small memory storage as small as 64kb.it uses the Infra-Red Serial port for data communication which is outdated

### 2.2 MOBILE BASED ATTENDANCE SYSTEM J2ME

This project is based on J2ME technology. Professor enters the attendance to the mobile using keypad. It is a manual process. After saving the absentees or presenters in to the mobile, teacher can edit the attendance list in the mobile. And this attendance details can send to a computer using GPRS. It was developed considering the requirements of that time and has a very little future scope. The system has a limited bounds. It lags behind a lot as when compared to modern day technology such as Windows,

Android, Iphone .it also a platform dependent and version specific. It does not support the GPS technology to reduce the fake attendance.

Other attendance solutions are RFID-based student attendance system. Problem with RFID based systems is that individuals have to carry RFID cards and also the RFID detectors are needed to be installed. The application of attendance system using biometric system has been demonstrated by Simao, Fonseca and Santos with integration of wireless communications. However, the weaknesses of the system has been discovered by Zhang et al.by introducing palm-print which developed an attendance system to record the employee attendance. Meanwhile a similar project has been implemented by Kardry and Smaili which applied wireless Iris recognition attendance management system. In Bio-metric identification security is the main concern; if we lost our biometric identification database then our biometric identification is totally compromised.

### 3. THE PROPOSED LOCATION BASED TIME AND ATTENDANCE SYSTEM

#### 3.1 System Overview

The proposed system provides a solution to manual attendance taking problem. This system is a location based smart time and attendance tracking system based on the concept of web services which is implemented as an android mobile application. The employee has to install the respective APK file from play store developed for them on their android devices. At first it is important to accept all the permissions of the app that are locations and images. At the same time one employee can save their information through the login window which is used as the first time registration.

#### 3.2 System Architecture

The smart, location based time and attendance tracking system is a client-server approach and follows specific hardware and software architecture. Integrating the hardware and software is the main challenge here and the hardware and software works together. The whole system has been divided into Three major categories 1) App for mobile 2) SERVER 3) DATABASE.

The software architecture consists of: the database, the application program and the server. Database: The database consists of a number of tables, which stores records. We used apache derby database which is easy, fast and efficient and can store a large number of records and requires a little configuration.

Application Program: The application program is developed with Android programming language using ANDROID STUDIO. The application program provides user interface to both the employees and office server. Programming in Android is simple, user friendly and android offers an excellent data connectivity. Server: The server is deployed on the personal computer using apache-Tomcat7. Tomcat7 is free, robust and easy to deploy.

Then the application sends the location and user Id to Time and Attendance Management Software for further process. After processing the data the management software store the information to Database.

#### 4. Flow of Operation

Since location-based time and attendance system uses Mobile Application and a time and attendance management software for processing data. So, the flows of operation of the Mobile application are:- 1) Determine the location using GPS 2) Check the location with pre-stored (office/workspace) location 3) Encrypts user ID and Location 4) Send information to the system Fig. 3 shows the flows of operation of Mobile application. First, the application figure out the location using GPS. Then, its check the location with pre stored (office/workspace) location, if location matched then the application makes a data packet containing user ID and location , encrypt them and send it to the management system.

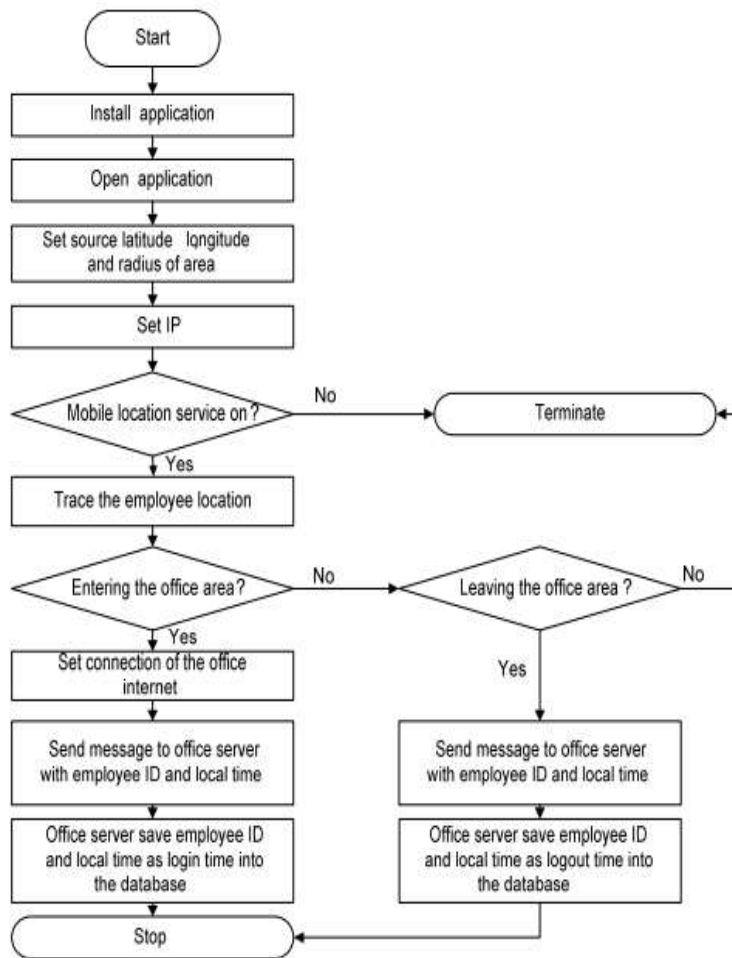


Figure 1. Flow Operation of Mobile Attendance Management System

Fig.1 shows the flows of operation of the management system software. The software first receives the information from the mobile application. Then its decrypt the information and check for validation. After passing the validation steps it store the information to the database according to the user ID.

## 5. METHODOLOGY

User authentication is one of the major factors in the proposed system. Every employee is authenticated based on his/her unique user identification number. This unique identification number is the number which is given by the office. The identification number along with other information is also saved in the employee device. At first employee has to install the required system APK files into their android device. Mobile location service has to be on when the system was running. If mobile location service is off then the whole process will not go further. Mobile location service helps to trace the employee location. When the employee enters the office area, android device of the employee has to be connected to the internet and on click a message is sent to the office sever with the employee id and local time of the device which is counted as login time of that employee. When employee leaves the office area, a message is sent to the office server with employee id and local time which is counted as logout time. Figure 1 depicts the overall methodology of our proposed system. Here is the complete flow of the process in the application.

## 6. IMPLEMENTATION

The hardware requirements are Android GPS Ad Hoc System enable phone or tabs or any device that is used as a user identification tools. A time and Attendance Management Software which interacts with user device is required. The software is also connected with Database for storing data. There are several tools/ methods are available for developing time and attendance management software such as

### 6.1 DISCRPTION

#### 6.1.1 SERVER SIDE TECHNOLOGY-

##### Xampp

XAMPP is a completely free, easy to install Apache distribution containing MariaDB, PHP, and Perl. The XAMPP open source package has been set up to be incredibly easy to install and to use. We use xampp to deploy apache server.

##### PHP

PHP (recursive acronym for PHP: Hypertext Preprocessor) is a widely-used open source general-purpose scripting language that is especially suited for web development and can be embedded into HTML. We Use PHP script to store the data into database and fetch data from database.

### MySQL

(My SQL) is an open-source relational database management system (RDBMS). MySQL is a free, open-source database management system (DBMS for short). A DBMS is a system that manages databases and connects them to software. We use MySQL to create and manipulate database.

### JSON

JSON (JavaScript Object Notation) is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate. It is based on a subset of the JavaScript Programming Language. We use JSON to pass the data from android to the PHP script and then decode it.

## 6.1.2 CLIENT SIDE TECHNOLOGY

### JAVA

The Java programming language requires the presence of a software platform in order for compiled programs to be executed. Oracle supplies the Java platform for use with Java. The Android SDK is an alternative software platform, used primarily for developing Android applications.

### ANDROID STUDIO

Android Studio is the official integrated development environment (IDE) for the Android platform. We use Android Studio to make this application.

### XML

XML In computing, Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable. " We use XML to make the layout of the application.

**Google Maps** is a web mapping service developed by Google. It offers satellite imagery, street maps, 360° panoramic views of streets (Street View), real-time traffic conditions (Google Traffic), and route planning for traveling by foot, car, bicycle (in beta), or public transportation. We use Google maps to locate the User.

## 7. DEPENDENCIES

In Android Studio, Gradle is a custom build tool used to build android packages (apk files) by managing dependencies and providing custom build logic. We use several API's to make this application working.



```
'com.android.support.test.espresso:espresso-core:2.2.2'  
'com.google.android.gms:play-services-location:11.0.2'  
'com.android.support:appcompat-v7:26.+'  
'com.android.support.constraint:constraint-layout:1.0.2"junit:junit:4.12'  
'com.mcxiaoke.volley:library-aar:1.0.0'
```

## 8. CONCLUSION

This paper introduce a smart, location based time and attendance tracking system using android application which use location as the core component of attendance tracking using smartphone. The area is set for tracking using GPS and employee coordinate inside the area border depicts that employee is present in the organization. We developed this system for android platform, but we are focusing on developing this system for iOS platform as well in neat future. The coordinates of an organization and an employee can be determined by the help of GPS device, both coordinate are same means employee is present in the organization. We currently developing the system for Android enable smartphones/ Tabs. In future we extend our system for iPhones and other mobile phones.

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