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Implementation of GPS Based Staff Attendance System Using Geo-Fence Technique

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ABSTRACT: GPS Attendance systems is developed for Staff. The conventional system is accepted method to keep track the attendance of the staff. The process of biometrics and manual attendance tracking is one of the highly regarded and researched for modifications and improvement. With the emergence of the GPS enabled device in smart phone, there is a need to introduce a smart phone as a medium to clock in and clock out for staff attendance. This paper will discuss the geo-fence technique and its implementation for mobile attendance android based application. The technique is suitable for analysing the location and boundaries of a GPS mobile. From the implementation conducted the application functions well to keep track staff attendance records.

KEYWORDS: : GPS, mobile attendance, Time, GEO-fence technique, Attendance tracker

I. INTRODUCTION

To have an secured record of staff attendance is not an easy task because of authorization issues and limited kiosk of clock in and clock out. Many companies/colleges/office employees are using thumbprint (biometric) which is expensive and also it cannot be accessed from outside of the colleges as the device is fixed. GPS attendance system using android mobile helps employer to record their attendance in much easier and cheaper way. The objective of this paper is show how the implementation of android attendance application developed using geo-fence technique to examine the location of a person using a GPS android phone. it is a system that is designed to minimize inputs from users.

The application is developed on the android platform with GPS and WIFI technologies. to operate the system user just have to tap on application and turn on the finger authentication then whenever they will enter the geo-fence location attendance will be marked automatically and will be recorded into the database by the help of GPS. Apart from this, the paper will be showing the algorithm to verify the boundary of GPS location which we have created using geo-fence to make a virtual boundary around a particular area/location.

II. PROBLEM FORMULATION

As a fast growing organization, biggest challenge is to manage staff/employee attendance. Biometric system is an exact case to address this problem, which includes fingerprint recognition. Many systems use it without considering its limitation in terms of efficiency and failure where users are applicable, which is exactly what our system planned to eliminate and overcome. The biometric based on fingerprint needs some extra devices to or scanner which can be connected to the system and it also costly, high maintenance device. Geo-Fence based attendance system surplus additional cost of scanner and easy to maintain as well, because now-a-days everyone has Smartphone's.

III. METHODOLOGY

In proposed system one of the major factor is user authentication. Employee has a unique identification number based on authentication. This number is saved in employees device. To use this they have to first install the required system APK files into their android device. The GPS in the mobile has to be on when system is running. If the GPS is off the attendance will not be marked and process will not go further because the GPS helps to trace the location of employee/staff. When employee/staff enters the gate of college/office area, the system automatically tracks the employee/staff location with time and attendance is recorded in the system as the login time. When the employee/staff leaves the college/office area the data with employee/staff id and time will be stored in system as logout time.

ANALYSIS OF THE DESIGN

The proposed system is the solution to the existing systems lie biometric, manual attendance, etc. this system is location based system which can be install in any internet and GPS enabled Smartphone. It is important to save the location of the office/college area by entering the latitude, longitude and radius of the area and this can be done using Geo-Fence technique. the employee/staff location is track when he enter the Geo-fence location (i.e. the area of office/college created by geo-fence technique). The system automatically update the attendance in the database for any employee/staff that falls under the range of college/office location.

GEO-fencing

Geo-fencing is a service based on location in which app or software uses GPS, RIFD, WI-FI or cellular data to define a geographical boundaries. Its functions allows an application to activate when a device crosses a geo-fence area and enters (or exists) the boundaries setup by the one. The alert message is sent by the SMS. Most of the Geo-fence application subsume with Google Earth that allows us to define boundaries on top of a satellite view of geographical area. Some of the applications define boundaries by using longitude and altitude or through web based maps.

With the alert function, where the location-aware device of a location-based service (LBS) user enters or exits a geo-fence, the device receives a generated notification. This notification might contain information about the location of the

Device that is suitable to notify parents when th leves pre-defined areas. Other applications that used the GPS are as follows;

- Car tracking system [1,2].
- Child tracking system [3]
- Patients tracking system [4]

GEO-fence query

As discuss earlier, to set/capture a boundary of location with multiple coordinate, geo-fence technique is used. With this technique, area using a map such as Google Map will be created around the working site area by the human resource department staff



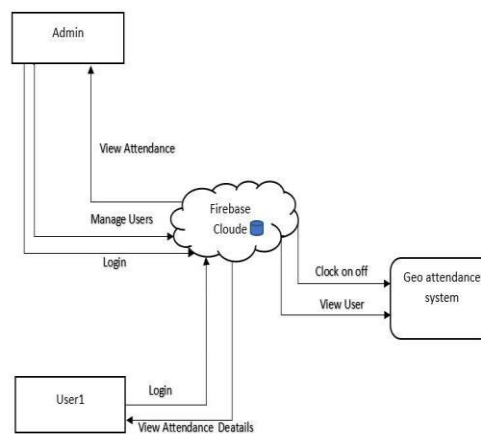
Figure-1. Virtual boundary using geo-fence technology

Figure-1 shows the virtual boundary using geo-fence query. With the query, the users can create a virtual boundary of the maps. In database the coordinate values of the area will be stored. The system will compare the GPS of the staff that work at the site at the particular time whether they are in the boundary or outside the boundary. The staff can only clock in or clock out within the boundary.

IV. DESIGN AND PROPOSE ALGORITHM

Context diagram

Figure-2 shows a flow of data and processes within the system. Admin will create a database for staff and map management. The staff can use the application for clock in, clock out, update personal information and check for attendance report by the information provided. The system will automatically check the boundary of the correct location of each staff by using data provided by admin

**Figure-2.** Context diagram**The propose algorithm for boundary based on GEO– fence technique**

The following algorithm will be call on by two modules, which are clock-in and clock out. The algorithm will automatically check the boundary for each staff based on information provided by admin. The algorithm will be able to recognize the staff in organization and works in different location by a set of GPS locations belong to certain staff. If the staff is out of the boundaries, the system will not allow the staff to be clocked in and his attendance will not be marked.

Start

Step1: Login/sign by Staff (Get the user ID and pin)

Step 2: Searching For GPS Location

Step 3: Check the boundary of the staff

3.1 Get current GPS location for staff

*If the staff within Location

*Save the attendance record to database.

*Else

*Clock on and clock out in not allowed

*go to Step2.

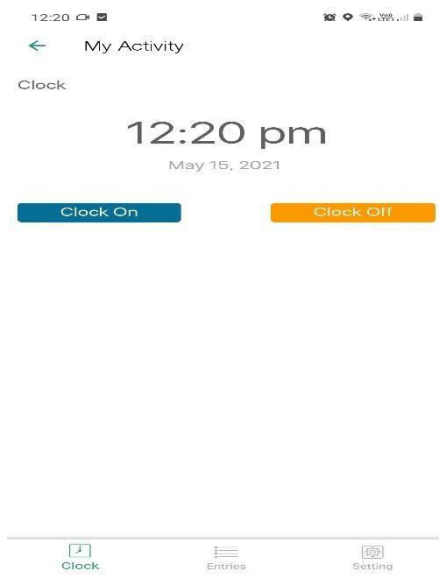
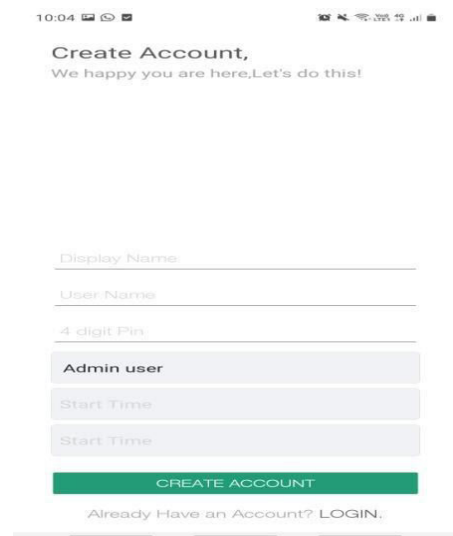
Step 4: End

Mobile attendance system using GPS allows to marks attendance of the staff by android smart phone by enabling there location/GPS in the smart phone to get staff current location to enable user to on clock when in the valid location or off clock when not in valid location. It is convenient to record staff working hours. The system provides ease to



administrators to manage, view and track staff's attendance performance. This virtual boundaries of the location of office/colleges/schools can be created in this system by using geo fence technique so that system will be able to determine the staff's in valid location or not.

As the conclusion, this system/application can be applied for tracking and recording staff attendance more securely and in an effective way.





V. CONCLUSION

The GPS mobile attendance system developed contains Android smart phone, GPS technology, Wi-Fi access point and a server. The function of entire system is very simple and easy to understand. To get staff location and to automate clock on and clock out attendance in real time the GPS receiver is embedded in the system. To a database IMEI number and GPS information is transferred. The GPS attendance system is possible option for replacing current attendance methods such as biometric. From the implementation, the system has successfully tested in real situation outside the building. It helps the process of taking staff attendance efficiently and cost effective when the user is away from office or outstation. GPS mobile attendance system is a must-have application for those staffs that value every minute of their working time. The future scope of the app is to develop for other phones as well such as Symbian, Blackberry, and IOS.

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