

THE LOCATION BASED ATTENDANCE SYSTEM

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ABSTRACT

Attendance systems were created prior to the introduction of the mobile device to the market. The traditional system and the web-based system are both recognized methods for tracking staff attendance. Some businesses implement a safe and costly system, such as RFID and thumbprint technology. With the introduction of GPS-enabled devices in smart phones, there is a need to introduce smart phones as a means for clocking in and clocking out for staff attendance, particularly for those who work off-site. The geo-fence method and its implementation for a mobile attendance android-based application will be discussed in this paper. The method is appropriate for analyzing the position and boundaries of a GPS mobile enabled device, particularly for employees working away from the office or outstation . From The application works well to keep track of staff attendance data after implementation was completed.

Keywords: GPS, Mobile Attendance, GEO-Fence Technique.

I. INTRODUCTION

Because of authorization issues and the short window for clocking in or out, keeping track of secured staff attendance is a difficult job. Some employees are using thumbprint technology, which is costly for a business and cannot be used outside of the workplace because the device is permanently installed on a college campus. The attendance management method for the college's staff is made much simpler and less expensive by mobile technology.

The purpose of this paper is to demonstrate how a geo-fence technique was used to create a mobile attendance application that analyzes a person's location using a GPS smart phone. It is a method that was created to require the fewest user inputs possible. Using GPS and WiFi-3G technologies, the suggested application was created for the Android operating system. Users only need to tap the application to use the system, and the database will log their attendance. The system will activate with a single touch be able to access an employee's information using their IMEI number and record their precise position along with a time and date. It is crucial to keep track of this data in order to monitor attendance. To ensure the accuracy of the data and the legitimacy of the device, the manager will verify the IMEI number and the phone. In addition, this paper will demonstrate an algorithm to create a virtual geo-fence around a specific location in order to validate the GPS location's boundary.

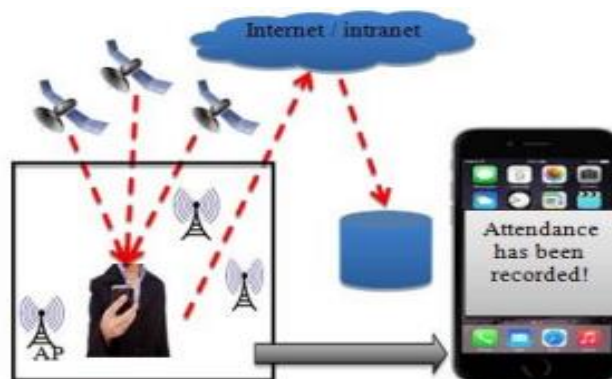


Figure 1

Figure 1 depicts a system overview showing how a smart phone can identify a sent staff position. The info will then be transmitted to a central computer. All of the data will be kept in a computer and compared to data that is already there. This is done to show whether participation is clocking in or clocking out. Finally, the database's

data can be accessed and updated by the administrator and employees. The remainder of this essay is structured as follows: The associated research on the technology and applications is covered in Section 2. The architecture and suggested algorithm for the mobile attendance application are presented in Section 3. The execution is covered in Section 4, which also serves as the paper's conclusion.

II. RELATED WORK

Global Positioning System tracking (GPS)

Many applications use GPS to monitor their targets. By identifying the GPS unit that is installed in a device, GPS enables the tracking of an item. The GPS position can be found by a satellite when a person is carrying that device. A GPS device is now integrated into the majority of modern smartphones. This part will go over related technology for GPS-based tracking systems.

Location based queries

Rajachandrasekar et al. categorized Location Based Queries (LBQ) into four types as follows [1];

- i) Range queries (RQ) Range queries enable to retrieve nearby locations within a specified range of the GPS location. Someone with a GPS enabled device can search nearby object using this queries. The application such as a store locator usually used this kind of queries.
- ii) Nearest neighbor queries (NNQ) For NNQ, the nearest objects return to the specific location based on the queries.
- iii) Navigation queries (NQ) With NQ, the user with GPS location can be instructed to follow the path to certain destination.
- iv) Geo-fence queries (GFQ) GFQ enables a user to create virtual boundaries of an area consist a number of coordinates. These coordinate represent the new specific area on the map. With these boundaries, much application can be implemented such as child tracking system and car tracking system.

GEO-fencing

In order to designate geographic boundaries, geo-fencing uses the global positioning system (GPS) or radio frequency identification (RFID). Due to its functionality, an application can be set to launch whenever a device enters (or exits) the specified boundaries and crosses a Geo-fence. An email or SMS can be used as the warning. The majority of geo-fencing software programs integrate with Google Earth, enabling us to set boundaries on top of a satellite view of a particular geographic region. Using user-made and Web-based maps or longitude and latitude, some applications determine boundaries. When a geo-fence is entered or exited, the location-aware device of a location-based service (LBS) user gets a generated notification thanks to the alert function. The address of the event could be disclosed in this notification.

- ♣ Car tracking system.
- ♣ Child tracking system
- ♣ Patients tracking system

GEO-fence query

Geofence search As previously discussed, the geo-fence method is used to capture the border of a location with multiple coordinates. Using a map like Google Map, the human resource department staff will use this method to construct the area of a working site. The virtual border using a geo-fence query is shown in Figure 2. Users can define a virtual limit for the maps using the query. The database will be used to record the area's coordinate values. The system will compare the GPS of the personnel on-site at a specific moment to determine whether they are inside the limit or not. outside the limit. Only within the boundary can the employees clock in or out.



Figure 2: Virtual boundary using geo-fence technology.

The technology has been applied in the actual world. By simulating the data gathered, Song et al. used the geo-fence method to extract information about the truck loading and hauling times of a heavy construction operation [2]. This data allows for the monitoring of the activities' time management. The hardware input differs for the attendance system's use in order to reduce the input required to validate a person. Table 1 compares various initiatives that are comparable.

Author	Mohd Firdaus Mahyidin [6]	Ruchika et. al. [7]
Project Name	Student Attendance Using RFID System	GPS and GPRS Based Cost Effective Human Tracking System Using Mobile Phones
Technology	Radio frequency Identification (RFID)	Global Positioning System (GPS)
Disadvantages	Student tends to lose or misplace their student card so this system cannot be performed without student card	- Tendencies of failure in transmitting a data packet to server using GPRS are high. - Slow Internet connection when using GPRS

III. DESIGN AND PROPOSE ALGORITHM FOR MOBILE ATTENDANCE SYSTEM

The system's data and process movement. For managing staff and maps, the administrator will build a database. The staff can use the application to clock in and out, update personal information, and check attendance reports based on the information given. The system will automatically check the boundary to ensure that each employee is located where they should be using the information given by the admin.

Figure 3's context diagram depicts the system's data and process movement. For managing staff and maps, the administrator will build a database. The staff can use the application to clock in and out, update personal information, and check attendance reports based on the information given. The system will automatically check the boundary to ensure that each employee is located where they should be using the information given by the admin.

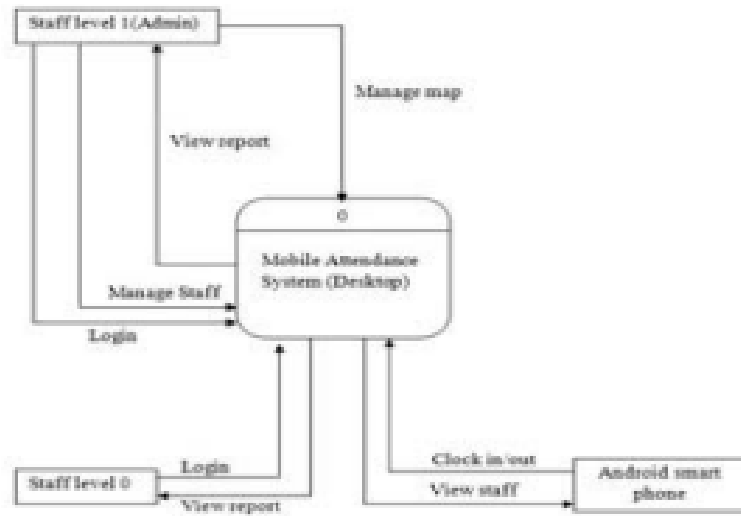


Figure 3: context diagram depicts

The proposed boundary algorithm uses the GEO-fence approach.

Two components, called clock-in and clock-out, will call the next algorithm. Based on data supplied by admin, the algorithm will instantly verify the boundary for each staff member. The algorithm will be able to identify employees who work across various locations for the same company using a set of GPS locations that are specific to each employee. The system won't enable the staff to be clocked in if they are outside the boundaries.

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Start
1. Login by Staff ( Get the userID and
  IMEI number)
2. Searching For GPS location
3. Check the boundary of the staff
  3.1 Read GPS coordinates for
  particular staff
  3.2 CreatePolyLine for the
  coordinates
  3.3 Get current GPS location for
  the staff
  • If the staff within the
  boundaries of PolyLine
    • Send the userID, IMEI
    Number to clock in and
    clock out module
    • Save the attendance record
    into database.
    • Notify the user for
    successfully clock-in or
    clock-out processes
  • Else
    • Clock-in and Clock-out
    process not allowed
    • Go to 2
End
  
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The implementation of mobile attendance system

A GPS-enabled Android smart phone is used in the mobile attendance system, which uses the staff's smart phone's GPS location to determine the staff's present location and allow users to clock in or out and update their attendance records when the staff is in a legal location. It is appropriate to keep track of employees' job hours. The system makes it simple for managers to monitor and measure employees' attendance behavior. This system can use the geo fence technique to establish virtual boundaries around a company location so that it can assess whether or not the staff is actually there.

As a result, this product can be used to monitor and document staff attendance in a more efficient and secure manner.

IV. OUTPUT OF THE PROJECT

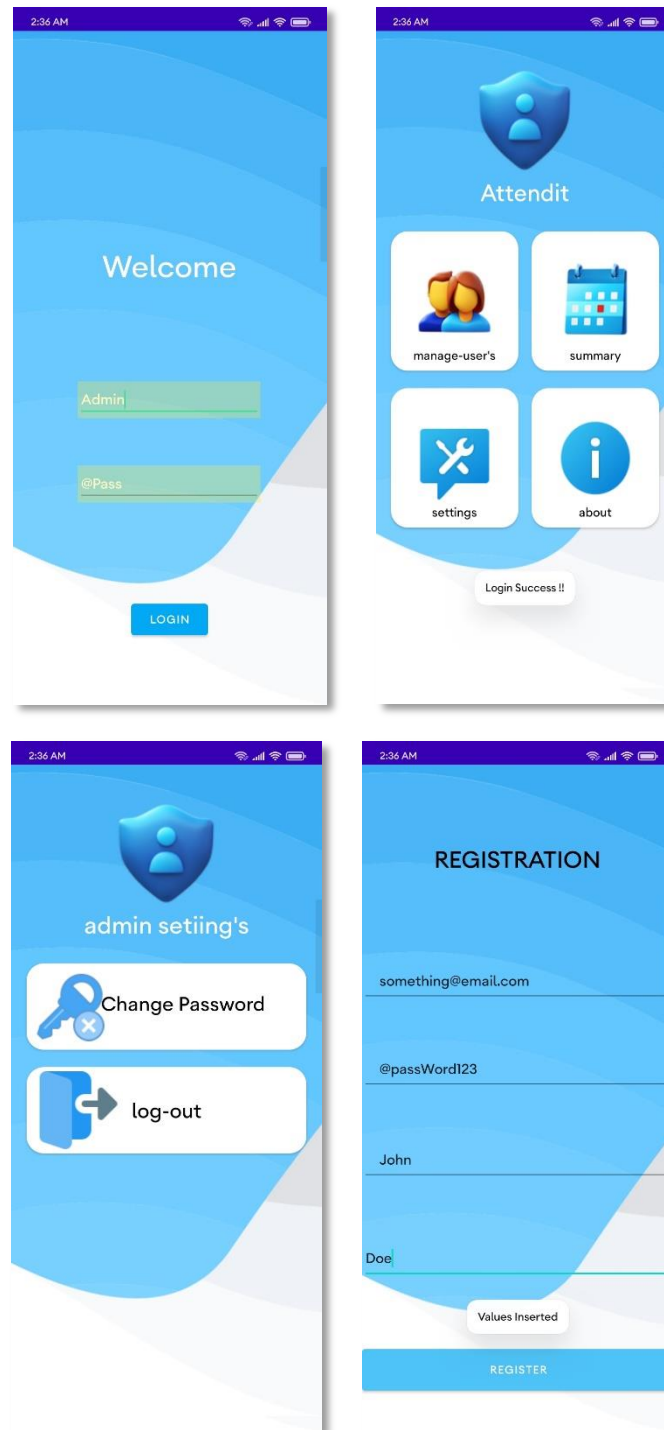


Figure 4: shows the main interface for MAS application. Staff must enter their staff id and password for login to the system.

V. CONCLUSION

The Mobile Attendance System (MAS) created includes a mobile phone running Android and GPS. technology, a computer, and a Wi-Fi access point. The structure as a whole has a very straightforward purpose. By pressing a button on the phone, it uses the GPS receiver built into a smart phone to locate staff members and simplify clocking in and out attendance in real time. The smart phone's IMEI number and GPS data are uploaded to a directory. The system could take the place of the present reporting procedures. The system has undergone

effective testing since its implementation outside the building. When the user is gone from the office or outstation, it facilitates the efficient and affordable process of taking staff attendance.

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