

Attendance System Using GPS, Fingerprint Scanner with Machine Learning & Data Analytics

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Abstract

The android application will provide an easy and secure way to take and validate attendance in an organization like schools, colleges etc. Use of location in our application enables the organization to validate the same. A person won't be able to cheat as application keeps track of time and location and authenticity of the user. Only after the presence of person for full time, application will make the attendance. This will reduce the overhead of maintaining bundles of registers and will able to reduce the fraud. It will also be able to analyze data and tell the chances of person if he/she will be present coming week or not. This will be possible through data analytic and machine learning.

Keywords: *Android app, fingerprint scanner, location, GPS, cloud, machine learning, data analytics.*

I. INTRODUCTION

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. But still the automated system has not been able to provide a hack proof, low cost and easy to use attendance system. With the starting era of Internet of Things, it is the internetworking of physical devices,

vehicles, buildings and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data and the smart phones playing a major role in it. The project aims to use smart phones with Bio-metric Fingerprint Scanner and the Global Positioning System technology to make a hack proof, easy to use and practically extremely low cost attendance system. The traditional and modern way of attendance system is time consuming, hack prone as well as large setup and maintenance cost. Keeping a track of people's presence during work without any discrepancy has always been a tough challenge. The problem is to find a way to eliminate the present disadvantages and provide a simple means to takes attendance. The solution to the problem is provided by the use of smart phones having GPS, Fingerprint sensor and an internet connectivity. The proposed system will eliminate the present difficulties and provide a simple means to solve the problem. The system can also provide predictive nature of attendance of person analyzing the past records stored in cloud.

II. PROPOSED SYSTEM

The traditional and modern way of attendance system is time consuming, hack prone as well as large setup and maintenance cost. Keeping a track of people's presence during work without any discrepancy has always been a

tough challenge. The problem statement states to find a way to eliminate the present disadvantages and provide a simple means to take attendance. The solution to the problem is provided by the use of smart phones having GPS, Fingerprint sensor and an internet connectivity. The proposed system will eliminate the present difficulties and provide a simple means to solve the problem. The system can also provide predictive nature of attendance of person analyzing the past records stored in cloud. Using just tapping of finger on mobile fingerprint scanner the record is maintained on the cloud. The GPS tracks the location on authentication of user and monitors the location of user thus providing secure and simple way of managing the attendance system. The Location & Fingerprint Sensor Based Attendance has been built to eliminate the time and effort wasted in taking attendances in schools and colleges. It also greatly reduces the amount of paper resources needed in attendance data management as stored on cloud. This is an android mobile app. It's built to be used for school/college faculty so that they may take student attendance on their phones. It also provides secure method.

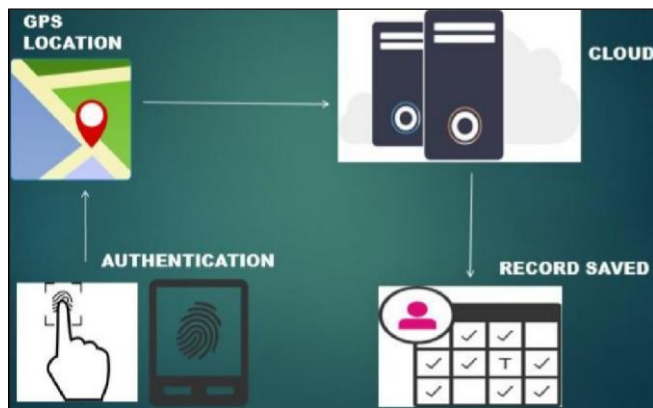


Fig. Basic working of Modules

III. MODULES

The main modules of the project:

- Authentication- Using the user's fingerprint.
- GPS Location - User's current location.
- Record Saving- Upon successful completion the record being saved on cloud.
- Data Analytics- Algorithm to predict the absence.

Module 1

Authentication: The authentication is done using the fingerprint of the device owner. The device has record of the fingerprint of the user which when placed on device scanner matches with the present fingerprint and authenticates if both the fingerprint matches or else fails to go to next activity which is the next module.[3] `<uses-permission android: name = "android.permission.USE_FINGERPRINT"/>`. The fingerprint is checked using android key store manager, android key guard manager and android fingerprint manager. The layout of activity is designed by xml code.

Module 2

GPS Location: The authentication is done proceeds to this activity. The GPS location of the current device is sent over regular intervals that helps in monitoring the position of the user through tracking of the user's device. Example: A student is having a class of 30 minutes then location is sent every 10 minutes that makes it 3 times. If the location is still inside the campus building the attendance is marked positive or else no attendance is given for that subject. The location can be used in app by giving location permission [3]`<uses-permission android : name = "android.permission.ACCESS_FINE_LOCATION"/>`. The ALERT TRIGGER can be used to send location over intervals during the duration of certain time.

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Module 3

Record Saving on Cloud: The record is saved on cloud after successful completion of above module's criteria. The record can be saved in many ways like server global, local server, cloud. The record is saved on cloud using a database management system like MYSQL.

Module 4

Data Analytics: The diagram below shows the detailed processes and tasks carried out on the data in the record saving module and data analysis module. The data on successful verification and checking comes to this module. This module deals with data analytics.

Analysis of data is a process of inspecting, cleansing, transforming, and modeling data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, in different business, science, and social science domains. The module attendance++ adds attendance by 1 if the user is marked of the attendance, the user is marked out if absent. The data analytics part is for the staff or teacher to see the particular student/user 's prediction absence or presence. The first phase is to check the previous attendance record of the student. The prediction algorithm predicts absence or presence of the user based on the previous record of the student, the student's absence record is analyzed with the absence day (Mon, Tues, Wed...) along with the time of the day he/she misses the class. Based on it the prediction is calculated for presence true or false.

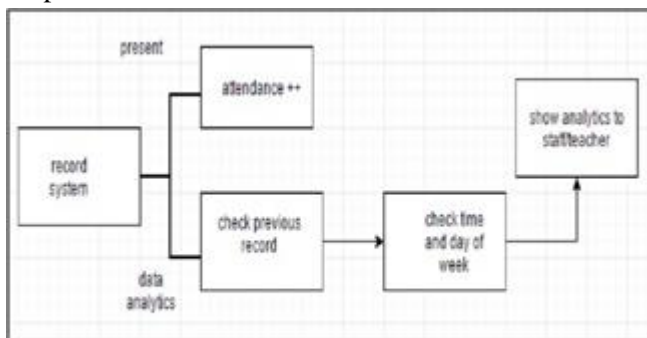


Fig. Cloud and Data Analytics Module

IV. CONCLUSION

This system introduces 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 student coordinate inside the area border depicts that student is present in the institution. We will develop this system for android platform which enables all android mobile devices to use this application effectively. At the end, we find that, the application will be really useful. The tracker unlike others is free of cost. In near future this project will be prove to be a helpful to organizations and schools.

V. REFERENCES

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