GPS Using Attendance Management System

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ABSTRACT:The use of mobile devices has become part of our daily routine. Recently, mobile devices like mobile phones are equipped with global positioning system (GPS) receptors that allow us to get the device's geographic position in real time. Location Based Services (LBS) are regarded as a key feature of many future mobile applications. GPS serves well for most outdoor applications. however, its dependence on satellites makes it ineffective for indoor environments. Using this location tracking system we are trying to build automatic attendance system using smart mobile phones.

KEYWORDS: GPS, Google Maps, *data sharing,Mobile Phone Detection System*

INTRODUCTION

Tracking the location of any object or person, generally termed as localization, has been very interesting topic of practical application and active research. This has improved reach of persons to unknown locations with much ease. Tracking locations of an object or a person while it is moving (termed as navigating), has been very popular in the research community since very long. It involves the use of Global Positioning System (GPS) technology to continuously track mobile objects while they navigate. GPS systems work by communicating directly with at least three GPS satellites (four in case of 3-dimensional tracking) to trace the latitude and longitude coordinate values of an object's current location.

Now-a-days, even moderately priced smart-phone devices are equipped with GPS units that contain anantenna that uses the battery power of the device to communicate with the GPS satellites. This communication occurs at a data rate of around 50 bits per second and for long durations to precisely identify the current location of a device. This communication is very costly in terms of the power consumption of the smart phone device and the time taken, though after delayed initial start-up, it quickens a bit. Even then, it requires continuous communication with the satellites for continued tracking of the device, or while navigating.

The smart phones now-a-days are essentially equipped with other sensor units that communicate locally to do their tasks. Some of them include the accelerometer, the magnetometer and the gyroscope. The product cost as well as operational cost of these sensors is much cheaper than the use of GPS units.In proposed work, devised a technique that uses

combination of these 'local' sensors as a very cheap and efficient alternative to the costly GPS. The accelerometer, the magnetometer and the gyroscope have been used in combination to provide continuous location information of a moving object. This strategy ensures that costly satellite communication is avoided, and local calculations are used to generate latitude longitude coordinate values of the successive locations. This process starts as soon as the initial location of the device is identified, which can be performed either using GPS initially, or by using known location points from a map. The initialization step starts by asking the user to provide some initial information to calculate the foot-count and footstep length. The walking or running pattern of a person is then identified using the device. After that, the latitude-longitud values of each successive step of the user movement are

generated locally using smart phone sensors. This happens without using the costly GPS. One more advantage the proposed strategy provides is that it is equally capable of generating good location details even in indoor conditions where GPS suffers badly. This is true even in the case where GPS gets constrained by signal interference and cloudy weather conditions.

LITERATURE OF REVIEW

1. Computerized Attendance System

A desktop application developed by S. K. Jain, U. Joshi, and B. K. Sharma (2010) , in which all the list of registered students in a particular course will be displayed when the lecturer start the application. The attendance is done by clicking a check box next to the name of the students that are present, and then clicked on register button to mark their presence. But in this also, human involvement for attendance tracking is needed. [1]

2. Bluetooth Based Attendance System

In 2013, Vishal Bhalla, Tapodhan Singla, Ankit Gahlot and Vijay Gupta , have proposed the attendance system which can take attendance using Bluetooth. In this project, attendance is being taken using instructor's mobile phone. Application software is installed in instructor's mobile telephone enables it to query student's mobile telephone via Bluetooth connection and through transfer of student's mobile telephone Media Access Control (MAC) addresses to the instructor's mobile telephone, presence of the student can be confirmed. The problem of this proposed system is student's phone is required for attendance. If student didn't carry the mobile phone with him without mobile phone his presence will not considered in Bluetooth Based Attendance System. The second problem of this proposed system is , in case of students' absent if his mobile is given to his friend then also present is marked, so presence of student is not necessary only phone should be in coverage area. [2]

3. Fingerprint based Attendance System

In 2013, Seema Rao and Prof.K.J.Satoa proposed one new system for employee attendance using fingerprint. This system checks one fingerprint template with all templates stored in the database, like wise it checks for all employee which will take more time. The main

problem in this case is it is very time consuming as it check one fingerprint with all the temple stored in the database.[3]

(Neha Verma, Komal Sethi and Megha Raghav, 2013) Fingerprint recognition based identification system is designed for student identification. This system is being designed for taking attendance in institutes like NIT Rourkela. In this system, fingerprint template matching time is reduced by partitioning database. In this system all students of every class has to stand in a long queues to make attendance, again this system is suffering from fingerprint device , and one most important disadvantage is that it is work within short distance.

4. Face Recognition based Attendance System

(Muthu Kalyani.K and Veera Muthu.A, 2013) has proposed Face Recognition based Attendance System, where we use a CCTV camera to be fixed at the entry point of a classroom, which automatically captures the image of the person and checks the observed image with the face database using android enhanced smart phone. It is typically used for two purposed. Firstly marking attendance for student by comparing the face images produced recently and secondly, recognition of human who are strange to the environment i.e. an unauthorized person. For verification of image, a newly emerging trend 3D Face recognition is used which claims to provide more accuracy in matching the image database, The main problem of this system is recognized face will compare with all the entire database for authenticate the individual attendance.[4]

5. Mobile Based Attendance System

In 2013, Dr. S. Ramnarayan REDDY, Deepanshu GOYAL and Ankit BANSAL, tried to implement a system which overcomes the limitations of the existing approach by taking the attendance through teacher's mobile phones. Doing the same work on mobile phone not only saves our resources but also enables the user to get easy and interactive access to the attendance records of student.[5]

In paper [6], the author proposes an application "Locating Friends and Family Using Mobile Phones with Global Positioning System (GPS)" based on client-server architecture that helps the users to locate their family members and receive alerts when their friends are nearby. The mobile application was implemented using J2ME where the most recent APIs and other older APIs were combined together in order to make the application reliable on all types of mobiles. The server was implemented using PHP since PHP guarantees that the server would not be overloaded. The type of the Database used in thesystem Wa s MySQL.

In paper [7], a technique is given to send GPS coordinates of a mobile through a SMS to other mobile phones. Two algorithms, Kalman Filter and Velocity Renovation, which can be used in conjunction with GPS, are used as a basis for location tracking. The first coordinates are generated from a GPS assisted mobile on Google map, this location is then sent through SMS to another person. The latter can then seethe exact location ofthe sender on his map with an accuracy of 0.57m.

In paper [8], two techniques were described to locate and track cellular phones using digital cellular mobile telephony networks. The first technique is based on time of arrival (TOA) methods with a minimum of three base stations required, while the later uses angle of arrival (AOA) methods that require only two base-stations, though greater accuracy is possible with three. Both TOA and AOA methods were examined for a multipath fading environment.

There are already several applications in the market that offer tracking systems and anti theft applications. Anti theft applications like mGuard [9]. Tracking applications such as, Mobile Tracking System 1.14 [10], AccuTracking [11], and PhoneBak (also an anti theft application), are already rooted in the mobile phone

PROPOSED SYSTEM

Attendance Management System is software developed for daily attendance in schools, colleges and institutes. It facilitates to access the attendance information of particular student in particular class. The information sorted by the operators, which will be provided by the teacher for a particular class. This system will also help to evaluating attendance eligibility criteria of student. The purpose of developing the attendance management system is computerized the tradition way of taking attendance. Another purpose for developing this software is to generate the report automatically at the end of the session or in between the session. The scope of the project is the system on which the software is installed, i.e. the project is developed as a desktop application, and it will work for a particular institute.Later on the project can be modified to operate it online.

Attendance Management System basically has two main modules for proper functioning.

• First module : admin which has right for creating space for new batch. Any entry of new faculty, updating new subject if necessary, and sending notice is done in this module.

• Second module : handled by the user which can be a faulty or an operator. User has right to making daily attendance, generating report.

Attendance can be taken in two ways :

• On the basis of Subject and month, Attendance Management System

• On the basis of Class,Attendance Management System

METHODOLOGY

- **GPS**

GPS or Global Positioning System is a network of orbiting satellites that send precise details of their position in space back to earth. The signals are obtain by GPS receivers, such as navigation devices and used to calculate the exact position and time at the vehicles location.

GPS is known for its military uses and first developed by the US to aid in global intelligence efforts at the height of the Cold War.

Ever since the early 1980s, however GPS has been freely available to anyone with GPS receiver. Airlines, shipping companies, trucking firms, and everywhere use the GPS system to track vehicles.

How GPS works?

There are three parts to a GPS system: a constellation of between 24 and 32 solar-powered satellites orbiting the earth in orbits at an altitude of approximately 20000 kilometers, a master control station and four control and monitoring stations and GPS receivers such as the one in a car.

Each satellites is in orbit allows receiver to detect at least four of the operational satellites. The satellites send out microwave signals to receiver where the built-in computer uses these signals to work out your precise distance from each of the four satellites and then triangulates your exact position on planet to the nearest few meters based on distances.

Signals from just three satellites are needed to carry out this trilateration process; the calculation of your position on earth based on your distance from three satellites. The signal from the fourth satellite is redundant and confirm the results of initial calculation. If the position calculated from distances to satellites "A-B-C" do not match the calculation based on "A-B-D" then other combinations are tested until consistent result is obtained.

The process of measuring distance from satellite to GPS receiver is based on timed signals. at 16h45m precisely, the satellite may begin broadcasting its signal. The GPS receiver will also begin running the same random sequence at 16h45m local time, but does not broadcast the sequence. When the receiver picks up the signal from the different satellites, there will be a time lag, because the microwaves take a fraction of a second to travel from the satellite to the receiver. The time lag is easily converted into distance to each satellite. The slight difference between signals from each satellite is used to calculate the receiver's position.

- **GPS Tracker:**

GPS tracking is surveillance of location through use Global Positioning System track the location of an entity . The technology can pinpoint longitude, latitude, ground speed, and course direction of the target.

The GPS is constellation of 24 well-spaced satellites that orbit Earth and make it possible for people with ground receivers to pinpoint their geographic location. The location accuracy is anywhere from 100 -10 meters for most equipment. Accuracy can be pinpoint to within one meter with special military-approved equipment. GPS equipment is widely in science and has

now become sufficiently low-cost so almost anyone can own a GPS and many do smartphone, tablet or GPS navigation device.

- **Latitude, Longitude:**

Latitude and longitude are angles that define points on sphere. Together, angles comprise coordinate scheme that can locate or identify geographic positions on surfaces of planets such as earth.

Latitude is defined with respect to equatorial reference plane. This plane passes through the center *C* of the sphere, and also contains the great circle representing the equator. The latitude of point *P* on the surface is defined the angle that straight line, passing through both *P* and *C*, subtends with respect to equatorial plane. If *P* is above the reference plane, the latitude is positive (or northerly); if *P* is below the reference plane, the latitude is negative (or southerly). Latitude angles can range up to +90 degrees (or 90 degrees north), and down to -90 degrees (or 90 degrees south). Latitudes of +90 and -90 degrees correspond to the north and south geographic poles on the earth, respectively.

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- **JSON:**

JSON or JavaScript Object Notation is a lightweight text-based open standard designed for human-readable data interchange. Conventions used by JSON are known to programmers, which include C, C++, Java, Python, Perl, etc.
□ JSON stands for JavaScript Object Notation.

□ The format was specified by Douglas Crockford.

□ It was designed for human-readable data interchange.

□ It has been extended from the JavaScript scripting language.

□ The filename extension is **.json**.

Uses of JSON
□ It is used while writing JavaScript based applications that includes browser extensions and websites.

□ JSON format is used for serializing and transmitting structured data over network connection.

□ It is primarily used to transmit data between a server and web applications.

□ Web services and APIs use JSON format to provide public data.

□ It can be used with modern programming languages.

Characteristics of JSON
□ JSON is easy to read and write.

□ It is a lightweight text-based interchange format.

□ JSON is language independent.

- **PDO:**

PDO is an acronym for PHP Data Objects. PDO is a lean, consistent way to access databases. This means developers can write portable code much easier. PDO is not an abstraction layer like PearDB. PDO is a more like a data access layer which uses a unified API (Application Programming Interface).

CONCLUSION

Various computerized system which is being developed by using different techniques for "Attendenc System" and "Mobile Phone Detection System". Based on this review a new approach for "College Attendance Management System with Mobile Detector" is proposed to be used for various colleges or academic institutes. So that GPS attendance management system , which will track location of student to mark the attendance.

Today, all the parents has anxiety about the use of mobile phone, less attendance and lower academic performance of their children. There is a requirement of computer-based student attendance management system with Mobile Phone detection facility, which will assist the faculty for maintaining attendance of presence.

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