

Real Time Tracking System

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Abstract- There can be several reasons for which we may feel the need to keep track of our employees or subordinates based on their daily location. Hence GPS can be used to track the employees. Every GPS tracking system is a common approach to get employee location information in real-time. We have proposed a GPS tracking system called The Real Time Tracking System that is composed of commodity hardware i.e. GPS enabled Android Mobile as GPS Device and an easy-to-manage user interface via a web server with Google Map software. The system includes a GPS/GPRS module for location acquisition and message transmission, and third party Web Server to temporary store location. Our proposed system is not tested yet but it will show the correct position of the employee to the admin on the basis of the location information sent by the GPS Device through GPRS.

Index Terms-*Android, GPRS, GPS, Tracking*

I. INTRODUCTION

Changing work fields and different occupations need employees to work away from the office premises. For example, delivery boys for delivering orders taken online, employees in architectural firms need to visit sites, etc. Working away from the actual office premises brings in the need for the head person to keep a track of the subordinate workers whether the work is done right and that the employees are not indulged in anything that goes illegal.

Delivery of products ordered online demands more employees for the delivery purposes. Also there are many areas wherein people are more involved in field work away from their office premises. They may try to find shortcuts in completing the work or leaving the field of work before the expected time. Complaints can be registered against such acts. However, we cannot just believe in the complaints registered. We need some proof showing the complaint registered is a genuine one. So if we have the data of the employee's previous location stored with us, we can check if the complaint is true and accordingly take action which will contribute to customer usability. Also the head person may at any time feel the need to check where the employee at that particular time is or payment on hourly basis, are some of the uses of the proposed application - Real Time Tracking System.

This is where our proposed application comes into play. Real Time tracking of employees using Global Positioning System as the name suggests, it uses GPS to track the employees. Our area of concentration in this project is on tracking employees who are involved in field work outside the office premises.. It will help both agency to track the subordinate workers, to get their real time position, changed routes (If any), any personal work being done using agencies property i.e. vehicles, etc, it can also act as an anti-theft application by detecting the position of the employees.

II. PROBLEM DEFINITION

There are many applications similar to the Real Time Tracking System but those applications require GPS/GSM receivers. This made the system bulky and costly.

Example of such tracking system is Vehicle Tracking System using GPS and GSM modems. Also in the applications that are already existing, the admin panel also uses an android app to keep track of the subordinates. However, Real Time Tracking system will focus on using website at the admin panel for efficiency.

Many problems in the present system are costly GPS modules, as they are bulky, they can only be used to track vehicles. Customer needs to pay for SMS and modems are not portable.

Real Time Tracking System will aim at reducing or eliminating the challenges faced as well as making a provision for storing previously tracked details as well. The coordinates will be updated after every 10 seconds.

The stored data i.e. the latitude and longitude which will be saved with date and time stamp will be used to determine which area had largest number of users. Using the stored data i.e. the latitude and longitude with the timestamp, this data can be used to find whether the employees are involved in any illegal activities and whether they perform their work sincerely. This can be done using the data mining technique - Clustering.

III. PROPOSED SYSTEM

The proposed system works in two phases: Tracking and Mapping.

Tracking Phase: The Android application that will be developed will fetch the GPS location of the mobile phone in which it is installed and logged in. After calculating the exact latitude and longitude which is converted into a GPRS packet which holds the coordinates and the user's unique identifier. That GPRS packet is

sent to the server which stores the data in the database.

Mapping Phase: The data is fetched from the database using the identifier of the particular user chosen by the head person who will be using the website. These coordinates will then be displayed on the Google Maps for live tracking. For maps the google maps API will be included in the code (javascript).

Our real-time tracking system is composed of three components, a web server and a database, GPRS & Client application. The GPS tracking is done by GPS enabled android mobile that transmits location information to the server through GPRS. The server is a personal computer that receives the information and put it in the database. The database formats the information in a special form that can search and display using Google Map.

IV. DATAMINING

Clustering: Clustering involves grouping pixels into similarity classes based on spectral characteristics. An example is to find clusters of cities with similar levels of unemployment.

Cluster analysis can be used to detect vehicles halting and staying around some place. From the employee's track records the data corresponding to same location for a long time can be selected, and all legal parking place records, records of actual field of work of that employee, records of crossroads(traffic lights) can be eliminated. After this process of eliminating all permitted halt levels, if there still exist some points close enough to form some clusters, this might refer to some place where most employees prefer to stop their vehicles and stay around. Those are atypical parking places that can be mined or extracted out from employee track record database and this can also be used to detect whether employees are involved in illegal matters at these sites.

V. SYSTEM BUILDING BLOCKS

I. GPS Technology

Global Positioning System (GPS) is a system composed of a network of 24 satellites of the United States, which are originally used in military services, and later allowed for commercial use. The satellite periodically emit radio signal of short pulses to GPS receivers. A GPS receiver receives the signal from at least three satellites to calculate distance and uses a triangulation technique to compute its two-dimension (latitude and longitude) position or at least four satellites to compute its three-dimensional (latitude, longitude, and altitude) position. Once a location is computed, it can calculate an average speed and direction of traveling. Therefore, GPS is a key technology for giving device its position.

II. GPRS

General Packet Radio Service (GPRS) is a packet oriented mobile data service on the 2G and 3G cellular communication system's global system for mobile communications (GSM). GPRS was originally standardized by European Telecommunications Standards Institute (ETSI). GPRS usage is typically charged based on volume of data transferred, contrasting with circuit switched data, which is usually billed per minute of connection time. Sometimes billing time is broken down to every third of a minute. Usage above the bundle cap is charged per megabyte, speed limited, or disallowed.

GPRS is a best-effort service, implying variable throughput and latency that depend on the number of other users sharing the service concurrently, as opposed to circuit switching, where a certain quality of service (QoS) is guaranteed during the connection. In 2G systems, GPRS provides data rates of 56–114 kbit/second. 2G cellular technology combined with GPRS is sometimes described as 2.5G, that is, a technology between the second (2G) and

third (3G) generations of mobile telephony. It provides moderate-speed data transfer, by using unused time division multiple access (TDMA) channels in, for example, the GSM system. GPRS is integrated into GSM Release 97 and newer releases.

III. Google Map

Google Map is very popular free software that provides maps by satellite images around the world. Google Map is a version of Google Earth that shows the maps on-line using with a web server and a web browser. The program provides plug-ins for community to show objects in the program.

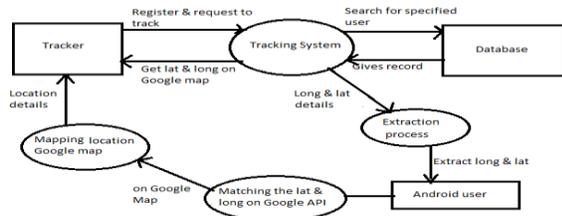
Such objects are, for example, 3D objects of skyscrapers using Sketch Up software, pin objects to indicate a point of interest (POI), and line objects to show a track. To show such objects, Google Earth utilizes its own programming language called KML (Keyhole Markup Language) which is an extensible markup language (XML) that is written to describe how the objects are rendered. The KML-based objects can also be used with Google Map to show line and pin objects. In our proposed system, we employ Google Earth software and Google Map as our choices of track displays to show locations of the employees.

Algorithm

1. GPS Device receives the GPS coordinates and sends it to the server after every fixed time.
2. The server receives the information from the GPS Device and stores it.
3. The admin requests for a particular employee or can check position of all users at the same time. (different users will be shown by their minute size photographs)
4. The server processes the request and shows the latest position to the client.

(SPI-protocols used to transfer data) mode for data read/write.

System Diagram



VI. IMPLEMENTATION

A. GPS Tracking Module

The GPS Tracking Module is based on the GPS enabled android device. The android device must be based on version 2.2 or more. This type of mobile device can have the access to GPRS service. Android Mobile with the employee gets its position using GPS. From that position we get the latitude, longitude & time. And we have to send that position to Web Server through GPRS. This process repeat after every 10 seconds i.e. set by Admin of the system.

B. GPS-Tracking Firmware

The firmware of the GPS Tracking module is written and compiled using an open source compiler. The firmware performs three phases, the initialization, the GPS position reading, and the GPS data formatted and transmitted to Web server via GPRS networks. The initialization phase prepares the module for reading and transmitting location information. It is composed of three functions. The first function is to initialize the GPS Device for GPS reading. The second function is to initialize GPRS/GPS module to set up parameters to warm up GPS engine, to make a connection to a GPRS network. The third function is to initialize MultiMedia Card (MMC- used for solid state storage) module into Serial Peripheral Interface

C. Admin Web Server

The admin web server receives the information through GPRS. The storing function formats the receiving data into our database that is designed to provide real-time query response for real time tracks and to provide search query response for the post- analysis of employee tracks. To keep a check on the employees, he will enter that particular name for location, and the server sends the location information to the admin.

Hardware

A Cell Phone (handset) : With GSM support, 1GB RAM, 1GHz processor.

A server : A PC or laptop with 1GB RAM to be used as server.

SIM cards : GSM SIM card (supports-900,1850,950)

Software

Server:

OS: Windows Server 2003

Firewall: Windows Firewall or any other firewall.

Database: SQL Server 2005

Client Device:

OS: Android 4.0(ICS) or later

Tools & Technologies

GPS (Global Positioning System), GPRS (General Packet Radio Service)

VII. CONCLUSION

In this paper we have proposed a GPS tracking system which will track the current position of the employee and show it to the admin who wants to track him. The GPS Device will send employee's current position to the server. The server on request from the admin will show the

client the current location of the vehicle on the Google Map.

VIII. REFERENCES

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