STUDY OF MOBILE AND VEHICLE TRACKING SYSTEM USING GSM/GPS)

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Abstract: *There is a need to implement a realistic approach to track mobile and vehicle assets due to the heterogeneity involved in smart interconnected devices, cellular applications, and surrounding (GPS-aware) environments. Current tracking systems are expensive and not very efficient over wireless data transmission systems where cost is based on the rate of data being sent. It is an efficient and improved geographical asset tracking solution and conserve valuable mobile and vehicle resources by dynamically adapting the tracking scheme by means of context-aware personalized route learning techniques. This study hoe the system intend to perform this tracking by proactively monitoring the context information in a distributed, efficient, and scalable fashion. Context profiles which indicates the characteristics of a route based on environmental conditions are utilize.*

KEYWORDS *:GPS, GSM, TRACKING SYSTE, MOBILE*

INTRODUCTION

In this urban life transportation is very common. A lot of accidents happens on the road every day .Therefore the need of security and monitoring is developed. To resolve such problems, a system is developed using GPS and GSM technologies and an application is introduced in this research work.

Various problems:

1. In critical condition (when mobile or vehicle is stolen), one is confused what to do.
2. If one has something expensive and he wants to check it regularly.
3. To find the shortest path available while travelling.

All these problems are overcome by the system.

Tracking system is very important in today's world. This can be useful in monitoring, tracking of the theft vehicle, mobile and various other applications.

IMPLEMENTATION AND ANALYSIS

Implementing system involves several hardware and software. On the side of moving tracked objects, it consists of hardware of monitoring system, GPS and GSM modules and application of monitoring system. Information received by OpenMTC gateway will be forwarded to the user application, which has previously subscribed to it using the OpenMTC APIs encoded data in base64. The data is processed and adapted by Google map format then displayed in form of Google map. The data received from the GPS module as event that triggers the process in the system. This crucial data is processed becoming information that consists of three parts namely longitude, latitude and time position. This information is sent from monitoring module to OpenMTC platform gateway.

This system has Global Positioning System (GPS) which will receive the coordinates from the satellites among other critical information. The system is microcontroller based that consists of a global positioning system (GPS) and global system for mobile communication (GSM). This paper uses only one GPS device and a two way communication process is achieved via a GSM modem. GSM modem, provided with a SIM card uses the similar communication process as we are using in regular phone.

Monitoring unit

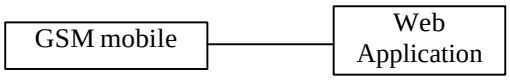

Figure 1- Monitoring unit Architecture

The monitoring unit consists of a GSM mobile and a Web Application. The GSM mobile gets the position of longitude and latitude of the vehicle and then by typing those co-ordinates in web application. The owner of vehicle can get the exact location of the vehicle.

Their User Interface (UI) uses web-based and client-server map display solutions for displaying an asset's position and status. They have researched to understand the behavior of typical traffic generated by a mobile device for reporting GPS data it is using latitude and

longitude code of geographic location to detect device location. It also gives google map link which can be used on google map to find location of the asset.

Mobile and any other asset tracking denotes the management of the dynamic location of the assets. This tracking component is essential for many organizations to keep track of their valuable mobile assets (such as smart phones) in real time and precisely manage their routing. A significant amount of current research and development is trying to take advantage of the tracking functionality. The main theories employed in our mobile asset tracking scheme are overviewed as follows:

Context awareness is the ability to use contextual information such as network infrastructures for decision making. It plays an important role in mobile distributed systems since it enables the adaptation of mobile devices to the users. An agent is an entity that represents a person or a software application, which executes a set of tasks either independently or by interacting with other agents. They can reside together in one agent platform or in several remote platforms. They can move from one platform (location) to another either in intra- or inter fashion. Policies are rules or conditions set by the user in order to govern the behavior of entities within a specific domain. It is a set of factual and behavioral specifications that are included on every computing element and resource within a domain Each policy.

This techniques need to be developed to transform a sequence of location measurements, with inherent errors, into smooth and reliable estimates of the dynamic state of the asset. This study is to design efficient solutions to improve GPS-utilized asset tracking solutions. We intend to conserve valuable mobile resources and create an accurate, scalable, and cost effective (i.e., balanced transmission cost) route tracking and learning mechanism for the mobile assets. We aim to adaptively adjust the transmission interval of the geographical tracking data (geodata) so that it is reported only when needed. We aim to personalize the adaptive tracking algorithm for mobile assets as well. Thus, the tracking scheme aims to improve the selective reporting procedure to:

1) Generate better route traces fitting the geographical maps to reduce processing time and increase correctness,

2) Optimize data bandwidth used to reduce communication cost and time, and

3) Optimization of time consumed to save battery life of the mobile devices.

SOFTWARE PROGRAM

The software programming is done in 'C 'language. Data (co-ordinates) received by GPS from the satellites is defined in the software. The mobile number of the user should be included in the software programming in order to receive the location values from the SIM card which we are using in GSM modem. The protocol consists of set of messages. These messages are ASCII character set. GPS receives data and present it in the form of ASCII comma – delimited message strings. '$' sign is used at the starting of each message. The locations (latitude and longitude) have the format of ddmm.mmmm. i.e. degrees minutes and decimal minutes. The software protocol consists of the GGA (global positioning system fixed data) and GLL (geographic position latitude/longitude). But in this system we are using CGA only. The flow chart of the system is given as:

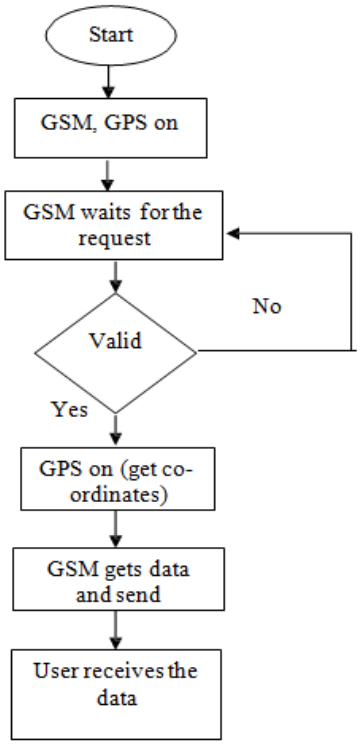

Figure 2- Program flow chart of the tracking system

WEB APPLICATION

Tracking System represents the complete output of the system. In this system two applications are developed that are linked to each other. The first one is used to get the data i.e., the initial position of the vehicle (starting point) and as system will receive the

different co-ordinates (longitude and latitude) switching to the next one will be done to get the distance travelled b/w the two positions. The application will run on WAMP server and will run only if the internet is in use. WAMP server homepage is shown in diagram.

Various features of web Application are:

- Both the applications are user friendly .i.e. new users can be easily comfortable.
- Since the applications are HTML based user can easily modify according to his requirements
- Gives the exact location of the target.

The applications also alerts about the distance travelled by the target

MOBILE ASSET AND VEHICLE TRACKING ALGORITHM

It is done with two ways i.e., GPS and GSM tracking. In GSM tracking it uses sms or call tracker and internet tracking system and in GPS tracking it takes location by GPS device installed in mobile phone. An overview of the architecture deployed to track routes based on geographical coordinates and report the tracked routes to the database server.

a. Fixed Interval Algorithm

The fixed interval algorithm is derived from a GPS functionality that is commonly used. As the name indicates, the algorithm sends specific data to the database server after every fixed interval of time, i.e., it uses one variable to keep track of the time change in the mobile asset and relates it with frequency. It knows at what time the last point was reported and when the next point will be sent. If the calculated time interval is larger than the predefined Minimum Update Interval (generally set as 1 minute and above), the device sends the data to the server (which is later analyzed), otherwise discards it. This simple reporting strategy falls short in terms of cost versus benefit as the customer usually pays a penalty (to the service provider) for transmitting excessive data.

b. Radius Algorithm

The radius algorithm is mainly related with the distance between the tracked points, i.e., it deals with points that are within a specified radius from the device. It keeps track of the last

location data reported to the database server and the distance between the last and the current location. Only if the value of the calculated distance is more than a certain predefined distance (Minimum Radius in mtrs), the device sends the current point to the server. Along with the radius variable it also involves the fixed time interval, using which it checks the frequency to send the data

c. Direction Algorithm

The direction algorithm keeps track of the change in direction (i.e., angle) of the mobile asset so that a set of location data with similar angle will not be reported, i.e., it keeps track of the last sent point and the current point and the angle between the new points. Along with the degree variable and Azimuth calculation it also involves the fixed time interval, using which it checks the frequency to send the data to the database server.

LIMITATION

a. Law Enforcement Disadvantages

A disadvantage of law-enforcement access to mobile-tracking technology is the sheer number of inquiries. Sprint Nextel, a wireless-service provider has law-enforcement agencies with GPS location information on its customers in September 2008 and October 2009, according to a Sprint Nextel, the manager at the ISS World conference in October 2009, the number of inquiries and the time required to respond can prohibit law enforcement from acquiring valuable time-sensitive information during a criminal investigation.

b. Location Service Disadvantages

Location services accurately track a signal to within several yards. The same technology that can save lives can also provide a framework for invasion of privacy. According to Electronic Frontier Foundation, privacy "is the ability of an individual to move in public space with the expectation that under normal circumstances their location will not be systematically and secretly recorded for later use." Applications like Google Latitude when downloaded to a cell phone--provides simple social location tools. Google's Latitude records location history which opens the door for future requests. As a result, law-enforcement agencies can request information on the historical whereabouts of users which poses invasion-of-privacy concerns.

FUTURE SCOPE

Camera based tracking:

This study can be further enhanced by the use of camera and by developing a mobile based application to get the real time view of the vehicle asset's instead to check it on PC, which would be more convenient for the user to track the target.

a) **Sim card changed notifications**: get notification when mobile device sim card has changed by sms.

b) **Wipe data:** wipe user personal data from mobile device for security.

c) **Lock phone:** lock phone remotely and stop phone or vehicle functions.

d) **Current call logs and sms:** get currently used call and sms details and use for manual tracking.

e) **Wifi based device tracking:** use wifi device based information for tracking device.

CONCLUSION

The study about the system that controlling theft of mobile and vehicle. The system is about making vehicle more secure by the use of GPS, GSM technology and a web application.

The geo-tracking service is essential for organizations that recognize the value of mobile asset tracking for increasing productivity, improving asset utilization, and visibility. Though many adaptation approaches are made available in recent years, only few of them are suitable for real-time adaptation, to result in an efficient tool for geodata retrieval and context knowledge discovery. The aim of our study is to discuss furthering of the geotracking mechanism, making it cost efficient, by utilizing context monitoring schemes. The fundamentals of four types of algorithms (fixed interval, radius, direction, and speed) along with the combined Waterfall strategy have been described. We studied such a distributed policy-based context-aware mechanism to optimize reporting and generate precise traces which are more fitting with actual routes to give realistic and cost effective route tracking. We use learning-capable adaptive profiles with agent utilization to make dynamic reporting and routing more economical and logical. Our main contribution is personalizing the tracking algorithm for mobile assets 1) with reduced overhead and increased user transparency, 2) with geo-referenced predefined routes and route characteristics, and 3) by using mobile

agents (requires less bandwidth to complete tasks when compared with client-server approaches).

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