ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 4, Issue 8, August 2017

Design of Location Based Tracking Device

[1] Dr. Rizwan Patan, Divya Sharma

[1] Department of Electronics and Communication Engineering

[1] Galgotias University, Yamuna Expressway Greater Noida, Uttar Pradesh

[1] patan.rizwan@Galgotiasuniversity.edu.in

Abstract: Location tracking in the modern era is becoming really common. It provides App apps innovative technologies in the industry. Position monitoring and control system involve better resource management as well as a drop in the cost of service on their GSM network. The data is transmitted using SMS through GSM network. It improves network flexibility by effectively handling tracking devices that could grow in number as time goes by (GPS) has become a standard feature of handheld devices, and thus multiple location tracking apps such as GPS, GPRS, IMEI amount, etc. have been created. Some techniques are more time consuming, less efficiency and more error rates. Prediction of position is achieved by using the current location, moving speed and goal bearing to forecast its next location. When the difference between the expected position and the real location reaches a certain amount, a short message is sent to the tracker to check its current location. The paper also presents the comparison of various techniques and applications of Location Tracking along with this new approach.

Keywords: GPS, GPRS, Assisted GPS, Location Map API, Google map API, Position tracking, Mobile system.

INTRODUCTION

Location Tracking tends to be an interface between various technologies, such as Wireless Telecommunication Services, Cell Identity, Global Mobile Communication System (GSM), General Packet Radio Service (GPRS), and Geographic Information Systems (GIS). In today's world, mobile production with extreme performance criteria is gaining significant success in the marketplace. Mobile device technology has made significant progress over the past three years in terms of memory capacity, improved processing power and higher transfer speeds to mention only a few output parameters. Real-time tracking devices are typically appropriate for large-scale systems that require real-time data and therefore need a certain amount of monthly budget to meet 3G/EDGE/GPRS mobile internet costs. There are numerous semi-offline systems built and sold on the market which are cost-effective and efficient. Nonetheless, the use of the tracking devices also has

many drawbacks and complications; data transmission through SMS requires specific commands for integrated systems with a large number of devices.

Navigation and placement is one of today's most enormous functions, the most likable and valuable agent for the customer. Such features are included in mobile phones today. If Localization, Positioning, and Telecommunication technology are integrated, they can contribute to future based on different real-time applications. With the introduction of GPS and the universal cellular network it has become possible to track object in real time. Recent advances in mobile technology require Global Positioning System (GPS)-enabled mobile devices to provide a variety of Location-based Services (LBS) in real time. GPS

navigation and location tracking are among all those apps, the most common applications on mobile devices owing to the utility and accessibility during a ride.

The Real Time Online computer receives the location from the satellite in real time and also relays the details to the server. The general online framework for the knowledge transmitted to the computer is focused on GPRS/EDGE/3G. Such electronic monitoring is widely used with activities that involve positions at all times, e.g., transportation, traffic, taxi, etc. The benefits are in accessibility. Owing to the server that acts as a monitor and controller, monitoring and control is also effective. Yet 24-hour knowledge transfer results in high monthly GPRS / EDGE/3 G spending. Expense for the application is also paid as the device provider. The Offline system often collects the current location from the satellite and records different data such as size, date, distance, etc. in its memory storage which is equivalent to an airplane's black box. Not relaying the information to the customer. When it is required, the consumer will verify the recorded data. Therefore there is no cost as the device is not linked to a network. The Semi-Offline collects the satellite's real-time location, and sends it as needed to the customer. Sending data may be based on GPRS/EDGE/3G or in SMS format. The benefit of the semi-offline SMS is to relieve the cost of GPRS/EDGE/3G. Hence the Semi-Offline is actually widely used in the tracking system.

Today Services based on location are characterized as a new emerging, supported and useful technology for a Mobile customer. The places where Location based tools are used include: one is routing where the exact route and instructions can be accessed when moving to a new location. Additionally, there are push systems where advertising and marketing information is sent to the customer for specific geographical region. Second is position monitoring that involves looking for relatives, child safety, drug security for business perspective, car tracking etc. A prototype project is being built to ensure the safety of the commercial public in the mountains.

Techniques used for tracking location

The location tracking strategies can be focused on with all of today's market cell phones through networks such as GSM (Global Mobile Communication System), GPRS(General Packet Radio Service) and CDMA(Multiple Access Code Division).

Cell Identification

Providing cell phone Location information is a fast, quick and cost-effective technique. This method occurs in cellular networks such as GSM and WCDMA. It decides the Wireless Network servicing cell that the system requires. Base Station Address is sent as Mobile User Location. The accuracy of the procedure for cell recognition depends on the size and density of the cells. Smaller-cell systems have more accuracy, i.e. in rural areas than large-cell systems. The cell detection sensitivity varies from 200 m to 20 km which is unreliable. Through incorporating Time Advance and signal strength, the precision of cell recognition may be improved. But this system is only used when mobile users are 550 m away from base station or more.

Global Positioning System

The following two values can be measured anywhere on Earth, using the Global Positioning System (GPS, a method used to define a position at any place on the globe). The pace and direction of travel (course) as well as the time can be obtained from these coordinates. A total of 28 satellites orbiting the Earth evaluate the position and the time values. Recent mobile technology developments allow Global Positioning System (GPS)-enabled mobile devices to deliver a variety of Location Based Services (LBS)

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 4, Issue 8, August 2017

times. GPS navigation and positioning search are amongst all these apps, the most common applications on mobile devices due to the utility and identification during a visit. Formerly, a visitor wants to scrutinize paper maps or guide books throughout the trip, contributing to holdup and simple urge to get lost. The computer products equipped with navigation functions therefore became more and more common. Through victimizing these mobile devices ' GPS navigation features, passengers can arrive quickly and effortlessly to an unknown destination, Associate in Nursing. Meanwhile, a GPS tracking system is able to map the progress and transmit data of a chosen object that is interested wherever the target has gone.

A GPS navigation system may be a computer capable of receiving GPS signals that make the current position of the unit on Earth important. Developing a GPS navigation system with multiple Google tools is very useful on the Android platform. With the simplicity of Google Maps free navigation, most navigation systems use GPS to get this location for app design, and start navigating when a user chooses a destination or enters its address. Such measures do not seem particularly useful for consumers, though.

Assisted GPS

Assisted GPS addresses the downside of GPS identifying an indoor unit. In the smartphone, the aided GPS receiver will sense and demodulate the weaker signals that GPS receivers need for precision. The A-GPS optimizes air infrastructure traffic. Another benefit of A-GPS is that the user can keep details for safety, and the network operator limits service provider assistance.

Various Radiolocation device

These are the devices that quantify radio signals that are shared with different set of fixed stations between mobile device transceivers. Such systems have tried to obtain the Position but are providing inaccurate results. Few of them, Dead Reckoning, Cosmic, and Loran are icons. Because of environmental factors, some systems have reduced accuracy.

Accelerometers and Electronic Compass

Although GPS is a successful location tracking tool, it has a downside of weak indoor accuracy, long acquisition period and low accuracy in densely populated areas. Hence the alternative solution in today's world is the use of Accelerometers and Compasses in comparison to GPS. This gives better indoor precision and efficient use of resources. We have minus 30 meters of range. But the downside to strategies is: extremely noisy and too complex. Often, the change of direction and orientation contributes to Position errors.

Using the above techniques, positioning is divided into three categories: a self-positioning device where orient is calculated on the basis of calculating appropriate satellite signals. Only GPS technology is used by the Unit. Network positioning device where the signals are transmitted from one or more positions and the resulting data is sent to the central server for position determination. The findings are sent to the recipient by showing location on a map or via SMS. Indirect positioning system where data is passed for greater accuracy between the Self Positioning System and the Network Positioning System. This strategy utilizes Assisted GPS. With the use of several tools to assess the position, each has certain pros or disadvantages. The techniques are used in tandem to gain position accuracy.

LITERATURE REVIEW

This research addressed various techniques of localization and some of their practical strategies, with an emphasis on precision. Time-based

positioning algorithms are usually preferred to those requiring AOA measurements because of their high resolution capability within the time domain. Though these algorithms make for very precise placement, they do present several difficulties for realistic systems (require dedicated hardware installation) [1]. This paper aims to provide a new application called "False Position" to allow user-friendly GPS navigation on mobile phones. Our technology improves both the communication layer and the handover of the network layer using the knowledge powered by Fake Position from the Cell Tower mobile phone.

Apparently, the creation of GPS systems has many drawbacks including inefficiency in promoting mobile phone indoor positioning. False Position utilizes Cell Tower accessed text files to mimic a GPS receiver's functionalities [2]. This paper describes a novel approach for developing a basic GPS (Global Positioning System) receiver system for applications such as navigation, mapping, and monitoring. This system is designed to provide various orientation and navigation criteria, such as latitude, longitude, distance, height, current place name etc. This method often provides information on the satellites presented in terms of the number of satellites being monitored, the number of satellite ID / PRN (Pseudo Random Noise), and parameters such as satellite signal SNR (Signal to Noise Ratio), azimuth, and height. All of the details occurs on the Graphical User Interface (GUI) [3]. This paper describes a monitoring application method, called a mobile tracker that uses location-based services (LBs) such as GPS or global mobile network system (GSM) to monitor a mobile device. This program allows the user to monitor a mobile device through the established geographic position and send alerts if it is out of the area around an interest point, previously identified by the framework administrator [4].

This article reflects on applying the location tracking program for children in every school attendance. You will display such suggested tracking devices as wrist watches, anklets or in I chips. Included in the infant package are ARDUINO, Global Positioning System, Global Mobile Contact and Receiver Network for mobile kin. It is very important for the safety of women [5]. This paper explores the ideal mobile location tracking means and employed a creative scheme by incorporating the Kalman filter into the localization cycle particularly since it has fantastic tracking features. Kalman filter is very efficient when monitoring in two dimensions because of its reliable performance, since it facilitates prediction of past, present and future conditions, even when operating in uncertain environments. We demonstrate that changes in location monitoring performance are obtained by applying the Kalman GSM tracking filter [6].

In this literature a framework is installed in any smartphone utilizing JAVA technologies and MYSQL to store databases and provides security for user information by Advanced Encryption Standard algorithm on the client side and server side by Rivest cipher 6 algorithms then deployed the check in the area of college campus or organization [7]. This paper addressed the system MAE: cumulative effects of system architecture, application, server, and performance. User feedback has shown to some degree that in a mobile platform, the MAE program improves the seniors encountered. There is no clear client smartphone monitoring and alert program for multi-users being used in nursing homes to our best of understanding. The elderly walk more easily and comfortably while the aides are given the authority to locate their positions as appropriate [8].

LOCALIZE INTELLIGENCE ALGORITHM

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 4, Issue 8, August 2017

The software is built on the Mobile Phone edition of Android 4.0. The software UML module is shown in figure no. 1 The Software Steps are:-

1. The Android Server collects from the Satellite the Signals and Coordinates.

2. We are building a Localized Position System. The Motor works in two parts:

(A) Position Engine: the engine operates in accordance with the Android Location API. The procedure is as follows:

(i) Get Coordinates: The Android Server Coordinates obtained from the satellite will be taken.

(ii) Reverse Geocoding: The Coordinates obtained are then translated to a geographical location.

(iii) Localized refinement: Localized data (user defined locations) is now tailored to each geographical location. The positions identified by the user or pre-specified locations are stored on the app server in the database named SQLite.

(iv) Plotting System: This Machine plots the Standardized Locations and charts them. The Engine is operating with the Google map API in cooperation.

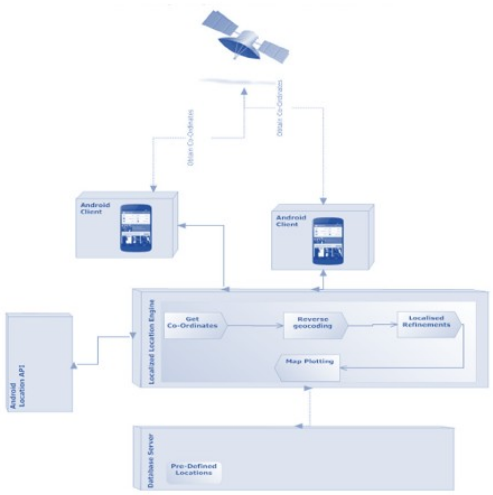

Figure 1: UML package Diagram

The SQLite is a light weight database engine that uses a small amount of memory and is used on mobile phone with different operating systems such as Android [9]. The Android Location API [10]includes interfaces and groups used for Services based on locations. Google maps API provides Map for apps utilizing data from the Google map. The algorithm is tested on the Android 4.0 Mobile Phone. The findings provide Coordinates of Longitude and Latitude for predetermined app positions. Third, it displays all of the Locations on a map with their names. For examples, if an individual has entered his house, a map shows his place with the House Place name. It also provides Longitude and Latitude of special place co-ordinates.

REFERENCES

[1] M. A.Landolsi, A. H., A. S., H.-R. Khan, and R. A., “Performance Analysis of Time-of-Arrival Mobile Positioning in Wireless Cellular CDMA Networks,” in *Trends in Telecommunications Technologies*, 2010.

[2] W. Premchaiswadi, W. Romsaiyud, and N. Premchaiswadi, "Navigation without GPS: Fake location for mobile phone tracking," in *2011 11th International Conference on ITS Telecommunications, ITST 2011*, 2011.

[3] P. K. Gaikwad and S. J. Pawar, "Implementation of real-time GPS receiver system for providing navigation based services and SMS tracking," in *2015 International Conference on Industrial Instrumentation and Control, ICIC 2015*, 2015.

[4] L. C. M. Varandas, J. J. P. C. Rodrigues, and B. Vaidya, "mTracker: A mobile tracking application for pervasive environment," in *24th IEEE International Conference on Advanced Information Networking and Applications Workshops, WAINA 2010*, 2010.

[5] J. Saranya and J. Selvakumar, "Implementation of children tracking system on android mobile terminals," in *International Conference on Communication and Signal Processing, ICCSP 2013 - Proceedings*, 2013.

[6] Y. Salih and A. S. Malik, "Comparison of stochastic filtering methods for 3D tracking," *Pattern Recognit.*, 2011.

[7] S. A. Rokade and R. S. Shirsath, "Location Awareness and Sharing System in Disruption Tolerant Network using Step Counting Algorithm," *ICSTSD*, 2016.

[8] C. H. Yoong, "Enterprise Mobile Tracking and Reminder System: MAE," *Int. J. Interact. Mob. Technol.*, 2012.

[9] J.-H. Park, G. Oh, and S.-W. Lee, "{SQL} {Statement} {Logging} for {Making} {SQLite} {Truly} {Lite}," *Proc. Vldb Endow.*, 2017.

[10] M. O. Pratama, "Google Maps API," *ilmukomputer.com*, 2012. .

[11] P.Andrew , J.Anishkumar , Prof.S.Balamurugan , S.Charanyaa, " A Survey on Strategies Developed for Mining Functional Dependencies", International Journal of Innovative Research in Computer and Communication Engineering, Vol.3, Issue 2, February 2015.

[12] SV Amridh Varshini, R Kaarthi, N Monica, M Sowmiya, S Balamurugan, "Entity Relationship Modeling of Automated Passport Management System", International Journal of Innovative Research in Science, Engineering and Technology , Vol. 4, Issue 2, February 2015

[13] T.Kowshiga, T.Saranya , T.Jayasudha , Prof.M.Sowmiya and Prof.S.Balamurugan " Developing a Blueprint for Preserving Privacy of Electronic Health Records using Categorical Attributes,", International Journal of Innovative Research in Computer and Communication Engineering, Vol.3, Issue 2, February 2015.

[14] P. Lavanya, R. Meena, R. Vijayalakshmi, Prof. M. Sowmiya, Prof. S. Balamurugan , " A Novel Object Oriented Perspective Design for Automated BookBank Management System", International Journal of Innovative Research in Computer and Communication Engineering, Vol.3, Issue 2, February 2015.