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Design and Implementation of Object Tracking System Using Smart Phones

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Abstract — To find out the location of unknown area, user need to call and ask some others where they are. In "Internet and computer Geo-Location tracking" the user can be tracked by the tracker by providing the IP address. But "Tracking using GPS in smart phones" helps user to find out the location of the person with the mobile number. "Tracking using GPS in smart phones" uses a mobile application based on providing Location Based Services (LBS) using Global Positioning System (GPS) as a location provider. This application offers the service to get users current location and shows the same on Google Map. The location is updated when the user moves from one place to another. The main objective of this work is to design and implement a client server system that helps users to locate their family members and receive alerts.

Keywords— Location based services, Global Positioning System, Internet and computer Geo-Location tracking, Object Tracking, Google Map.

I. INTRODUCTION

Generally a tracking system is used for the observing of persons or objects on the move and supplying a timely ordered sequence of respective location data to a model.Tracking an object is difficult, because the object can change its position with respect to time. There are many methods to track an object. Location based services are used to track an object in mobile phones. Geo-Location tracking is used to track the object with the known IP address of the system.

The GPS is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites.GPS receiver uses to calculate its three-dimensional location (latitude, longitude, and altitude) plus the current time. GPS has become a widely used aid to navigation worldwide, and a useful tool for map-making, land surveying, commerce, scientific uses, tracking and surveillance. In addition, GPS has, in the words of the website gps.gov, become a mainstay of transportation systems worldwide, providing navigation for aviation, ground, and maritime operations. Disaster relief and emergency services depend upon GPS for location and timing capabilities in their life-saving missions. The accurate timing provided by GPS facilitates everyday activities such as banking, mobile phone operations, and even the control of power grids. Farmers, surveyors, geologists and countless others perform their work more efficiently, safely, economically, and accurately using the free and open GPS signals.

Geo-location is the identification of the real-world geographic location of an object.Internet and computer geo-location can be performed by associating a geographic location with the Internet Protocol (IP) address or MAC address. Geo-location usually works automatically looking up an IP address on a service and retrieving the registrant's physical address.

This paper is organized as; section II explains a literature review, section III discuss about internet and computer geo-location tracking, section IV describe tracking using GPS in smart phones, section V shows experimental results, section VI denote performance analysis followed by conclusion and future scope in section VII.

II. LITERATURE REVIEW

The concepts of Wireless Integrated Network Sensors, GPS tracking and object and metal detection and tacking of vehicles with in the country [1].Using this concept a stranger or any object crossing the border where the army cannot reach in regular can be identified. There is no method to send the appropriate data collected to the higher authorities and after proper conformation of the strangers and also is no method to find out the details of the strangers from the database of the criminals available with the military authorities.

The predictive information obtained from the Kalman filtering formulation is exploited as the additional measurement inputs for the location estimator [2].Geometric-assisted Predictive Location Tracking (GPLT) algorithm can provide consistent accuracy for location estimation and tracking even under the environments with insufficient signal sources. The algorithm used is little difficult to implement. A better algorithm can be used to improve the performance.

An open, extendable, and scalable system that supports the delivery of context-dependent content to mobile users[3]. The system enables users to receive content from multiple content providers that matches their demographic data, active profiles, and context such as location and time. The system also allows users to subscribe to specific services. The context matching component should be improved to allow for more advanced matching.

An embedded Internet globalize satellite navigation system design, providing end-user with client-server architecture running signed applet, able to cross website or receiving data from server to get the latest information [4].In real time interconnection, a user GPS also able to send 3D position data automatically updating server's database, changing2D database into 3D database. For traffic network, there are only plane coordinates available currently. The height data is absent. Resources provided by different web sites differ from each other. If the user wants to fetch some data, he has to sign up at every site. Besides difficult integration, sometimes the user just occasionally needs a map.

In the wireless communications, geo-positioning, and consumer electronics, an infrastructure is emerging that enables location-based services that rely on the tracking of the continuously changing positions of entire populations of service users, termed moving objects[5].The algorithms that modify an initial road-network representation, so that it works better as a basis for predicting an object's position ; to use known movement patterns of the object, in the form of routes; and, to use acceleration profiles together with the routes. It is possible to improve the performance of segment-based tracking by automatic re-segmentation of the underlying road-network representation. The creation and incremental maintenance of acceleration profiles is not present. To achieve widespread use of advanced stream queries, a high-level, or even graphical, context matching language is desirable.

The road network, in which the object is moving, a segment-based policy that represents and predicts an object's movement according to the road's shape[6]. Map matching is used for determining the road on which an object is moving. For all representations, the predicted position of a moving object is updated whenever the deviation between it and the actual position of the object exceeds a given threshold. The update load of the database was not taken into account.

The geo-location update scheme that minimize the update frequency while satisfying the Quality of Service(QoS) of application service[7].In location based navigation service (LBS-NS), mobile users am provided with navigation instructions that are custom-tailored geo-location the of the users**.**

III. INTERNET AND COMPUTER GEO-LOCATION TRACKING

The tracking system uses geo-location to track the object.The IP address or the domain name of the system should be known;with the IP address the location of the object can be tracked. The location of the object is given in map.The user name and password is saved in a database.The user authentication is provided by the data stored in the database.The tracking system can be easily accessed by any people who are not much aware of the technical aspects. It can be implemented by all since its costs less. Software requirement is very less; hence it can be easily implemented.

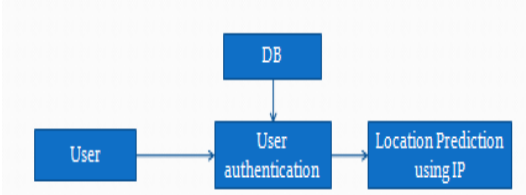

Fig.1 Architecture of Internet and Computer Geo-Location Tracking

As shown in fig.1 the user has to enter the web page by providing user name and password.The user name and password is saved in the database in server.After the authentication is given to the user, they have to enter the IP address or Domain name of the system they want to track.The location of the system is provided in Google map.

In the Internet and Computer Geo-Location Tracking system, only common locations and important locations can be tracked.

The local locations cannot be accurately located.The exact distance of the object from our location cannot be tracked.The user needs a desktop or laptop to track the location of the object.The IP address of the system should be known to track the system.The IP address of all the system cannot be accessed easily.

IV. TRACKING USING GPS IN SMART PHONES

The tracking system using GPS in smart phones will help user to find out friends locations as well as the distance from user's location. The tracking system using GPS in smart phones will also allow user to see all friends on Google map as well.

The tracking system allows tracker to select user for his location updates. To uploads user's current location. It

shows friends location on Google Map. It shows distance in kilometers for friends away from user.

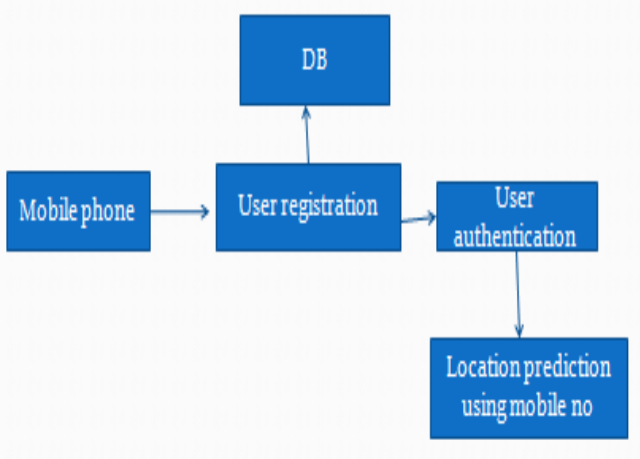

Fig. 2 Architecture of tracking using GPS in Smart phones

As shown in fig.2 the user has to register the Location in the app in the mobile. The latitude and longitude of the user has to be given for registration. Along with that the password and the phone number should be given for security purpose. The data entered will be saved in the database. It will be fetched while providing authentication to the user.To track the location of the friend the user has to select the view friend option in the app. The user's mobile number and the password have to be given.The location of the user will be provided in map using GPS. The exact location of the user can be tracked using this system. The exact distance from the user and the tracker can also be determined using this system.

V. EXPERIMENTAL RESULTS

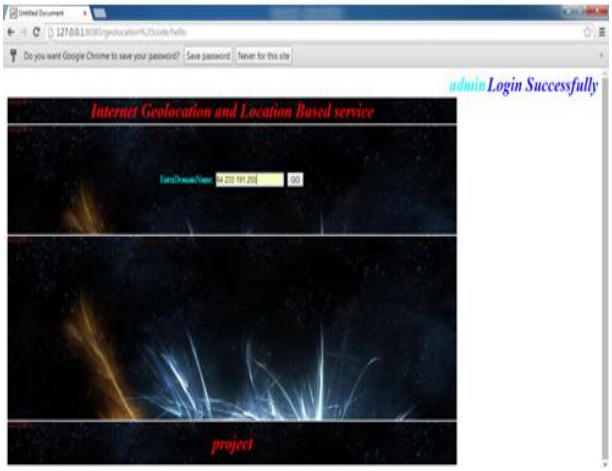

Fig.3User location search

As shown in fig.3 the IP address of the user has to be given by the tracker to find the location the tracker wants to track.

Fig.4 User location in Google map

As shown in fig.4 the location of the user is provided in Google map with the latitude and longitude.

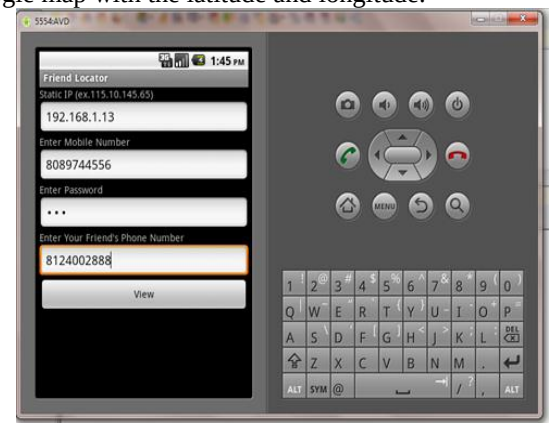

Fig.5 Login Page

In the Tracking System application, the user has to register the phone number and their location with the latitude and longitude. The password must also be provided for the security purpose. The tracker can track the person only whose phone number is known to him. As shown in fig.5 to view the location of the user the tracker has to enter the view page. The mobile number of the tracker and his password has to be given. Then the mobile number which the tracker wants to track should be given. The password is provided for the security purpose.

Fig.6 Location of user in Google map

If the view button is clicked then the location of the user on the Google map will be provided along with the distance from the user and the tracker. As shown in fig.6 the location of the user will be provided along with the latitude and longitude.

VI. PERFORMANCE ANALYSIS

Table 1 Comparison of Internet and Computer Geo-Location Tracking and Tracking using GPS in Smart Phones

Internet and Computer Geo-Location Tracking		Total value		Intention to use	
		Utilitarian	Hedonic	Utilitarian	Hedonic
	Average	2.85	2.48	1.82	1.94
	Standard deviation	1.61	1.43	1.13	1.47
Tracking using GPS in Smart Phones	Average	3.34	2.39	2.16	1.59
	Standard deviation	1.63	1.38	1.46	0.98

Average = Sum of respondents / Total no of respondents. (1)

Standard Deviation=Σ(X-M)2/(N-1) (2)

M=Σ(X)/N (3)

Where, Σ represents the Sum

X = Individual respondent

M = Mean of all respondent

N = Sample size (number of respondent)

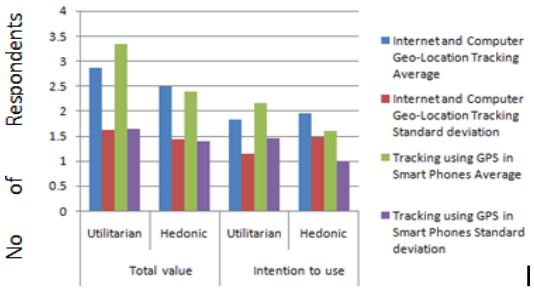

Fig.7 Comparison graph of Internet and Computer Geo-Location Tracking and Tracking using GPS in Smart Phones

The Performance of Internet and Computer Geo-Location Tracking and Tracking using GPS in Smart Phone are compared in Table1. As shown in fig.7the performance of Tracking using GPS in smart phones are best than the internet and computer Geo-location tracking.

VII. CONCLUSION AND FUTURE SCOPE

The tracking method through GPS in Smart Phone is best because it gives the distance between the user and the exact location of the user. Since the application is implemented in mobile phone it is easy to access it from anywhere.In the internet and computer Geo-Location tracking only the location of the important IP address are located. The desktop or laptop is not needed to access the location as in existing Geo-location tracking system.

In future, location tracking applications through SMS can be developed.The number of SMS transmissions can be minimized for maintaining the location tracking accuracy within the acceptable range to reduce the transmission cost.

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