A MOBILE BASED TRACKING SYSTEM FOR LOCATION PREDICTION OF A MOVING OBJECT

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ABSTRACT

This paper proposes a novel method called location-based delivery (LBD), which combines the short message service (SMS) and global position system (GPS). LBD reduces the number of short message transmissions while maintaining the location tracking accuracy within the acceptable range. The proposed LBD is evaluated using a given moving pattern of the target. Location and positioning information can also be obtained through the global positioning system (GPS). The GPS is widely used for tracking target location because of its high positioning accuracy. This information can be gathered across the network and appropriately processed to construct a global view of the monitoring phenomena or objects. The system allows a user to view the present and the past positions recorded of a target object on Google Map through the internet. The system reads the current position of the object using GPS.A realistic system for tracking a target's movement is developed using GPS. Here it is used to track the locations of bus in real time and uses this information to generate predictions of bus arrivals for the passengers along the route. When this information is disseminated to passengers by SMS, they can spend their time efficiently and reach the bus stop just before the bus arrives, or take alternate means of transport if the bus is delayed. They can even plan their journeys long before they actually undertake them. This will make the public transport system passenger- friendly.

KEYWORDS*- Global positioning system (GPS), Location tracking, Mobile phones, Prediction algorithms, short message service (SMS), LBD.*

1. INTRODUCTION

In today's world the use of Mobiles is of increasingly in use while compared to the use and adoption of Internet. The technological improvements in the recent times have made Mobile Phones very handy and compact. The earlier Mobile Phones so called "Hand Phone" was of size equal to that of a landline and the only difference was that it was wireless. Now we have "Smart Phones" that are the size of our palm. Mobile Computing plays a vital role in today's modern world. Mobile Computing has paved a path for the various modern techniques. Mobile Computing involves mobile communication, mobile hardware, and mobile software. Communication issues include ad-hoc and infrastructure networks as well as communication properties, protocols, data formats and concrete technologies. Today Mobile Computing is so widely used that it has penetrated in all aspects of our lives. Mobile Computing is an active area of research. Most applications available to users today are targeted at teenagers and yuppies and are mostly infotainment applications. For example, music downloader, friend locators and news updates are some of the various applications available. It will take a few more years before which. The

Mobile Applications developed today contains flaws that will have to be rectified and be provided with further advancements that help's the applications to be more efficient. The global position system (GPS) has become a common functionality in handheld devices, and therefore, several location-tracking applications have been developed, including continuous location-tracking of elders and children for safety reasons or to prevent them from being lost car monitoring and tracking, and intelligent transportation systems. Recently, Google has developed the Android platform, which is an open system, offering high flexibility on development. Due to this, it is very useful to develop a GPS navigation system on the Android platform with combing many Google resources. With Google Maps' free navigation functionality, people may prefer the costless service from Google over that of paid services.GPS does not need the support of any kind of internet network to provide information accurately, but if combined with any network it, the accuracy of the system could be enhanced in a much better way.

2. EXISTING SYSTEM

In the Existing systems, a device is equipped with a global system for mobile communications (GSM) modem and a GPS unit. It transmits short messages containing its GPS coordinates to the server at30-s intervals. Although transmitting the geo-location information of a target via wireless networks is effective when both the target and the tracker are within Wi-Fi coverage area, the 802.11 wireless networks are not always accessible. When the target or the tracker is unable to access Wi-Fi, it is impossible to perform location tracking. Therefore, SMS is a relatively more reliable and flexible solution because of its wide spread use. However, SMS is a user-pay service. The transmission cost of a tracking system by the number of SMS transmissions while maintaining the location tracking accuracy is high.

The three delivery methods, time-based delivery distance-based delivery, and proposed LBD, are evaluated using a given moving pattern of the target. In the time-based delivery, a short message is delivered every 30 s. The number of short messages for TBD is fixed because TBD short messages are periodically transmitted regardless of whether the target is moving or is stationary. The number of short messages for DBD significantly decreases as the stationary time increases. The reason is that DBD short messages are not transmitted when the target is stationary. In the distance-based delivery, the fixed threshold is set to 50 m, among other fixed threshold values. The target is assumed to be moving at varying speeds and bearings or stationary for an unpredictable period to characterize a moving object. That is, the target used in this experiment is alternately moving and stationary. The new method proposed to overcome the disadvantages of the existing system has two main goals. One goal is to use an alternative to the existing Wi-Fi system. The other aim is to reduce the number of SMS transmissions by using Dynamic Threshold.

3. IMPLEMENTATION TECHNIQUE

A method called LBD that is location based delivery is used to track the movement of object. The three main features of the proposed LBD approach are a well-defined SMS format, location prediction module, and dynamic threshold module.LBD uses a proprietary SMS format. The location prediction module, which is built in both the target and the tracker side, uses the information on the current location, moving speed, and bearing

of the target to predict its next location. The dynamic threshold module, which is used only on the target side, minimizes the number of short messages by dynamically adjusting the threshold TH according to the moving speed of the target. The tracker periodically updates the location of the target on the local screen according to the predicted location. However, when it receives a short message response from the target, it means that the predicted location is far from the actual location. For more accurate location tracking, the tracker updates the target's location using the information encoded in the received message, rather than its prediction. Here, we use the GPS technique to estimate the latitude and longitude value which can be used to track the location. GPS technique is not like the Wi-Fi technique that is able to cover only a short distance.

The features are described as follows:

3.1 SMS Format:

SMS is the most widely used data application worldwide. The proposed system uses SMS to transmit location update messages and assumes that the message delay between the tracker and the target is negligible. A short message is transmitted from the mobile station (MS) to the GSM base station (BTS) through a wireless link and is received in the backbone network of the service provider. The mobile switch centre (MSC), home location register (HLR), and visitor location register (VLR) determine the appropriate short message service centre (SMSC), which processes the message by applying the "store and forward" mechanism. If the recipient is unreachable, the SMSC queues the message for a retry at a later time. Two types of SMS are SMS query and SMS response. SMS query includes two commands, Start and Stop, which refer to the starting and stopping of the tracking action, respectively. SMS response, the latitude and longitude fields contain the GPS latitude and longitude information of a target, respectively. SMS received by the passenger consist of information about present target location, when the target will reach tracker location.

3.2 Location Prediction:

The location prediction module, which is built in both the target and the tracker side, uses the information on the current location. Location prediction is performed by using the current location, moving speed, and bearing of the target to predict its next location. When the distance between the predicted location and the actual location exceeds a certain threshold, the target transmits a short message to the tracker to update its current location.

3.3 Dynamic Threshold:

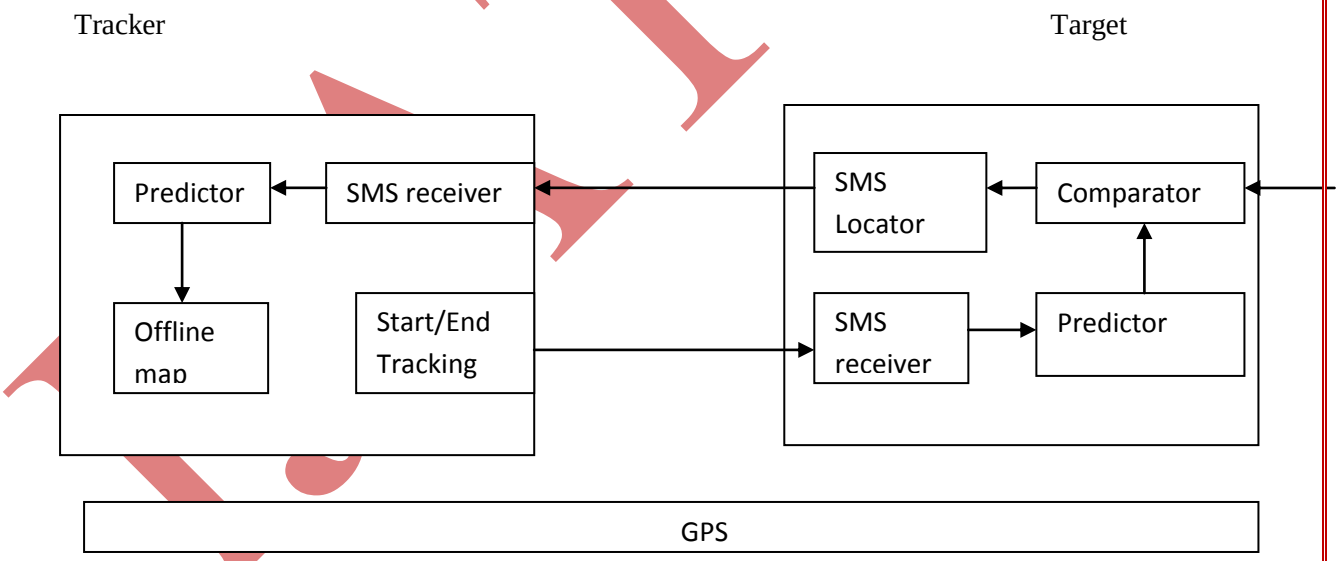
The dynamic threshold module, which is used only on the target side, minimizes the number of short messages by dynamically adjusting the threshold TH according to the moving speed of the target. Threshold TH affects both the number of transmitted short messages and the location accuracy. A large threshold reduces the number of short messages as well as the location accuracy; that is, there is a large difference between the predicted location and the actual location. By contrast, a small threshold requires relatively an increased number of short messages; however, it increases the location tracking accuracy.

3.4 Viewing map:

Electronic maps are stored in the tracker's mobile phone in advance to avoid a massive increase in the transmission cost for obtaining online maps. The SQLite database is embedded to save the map information in the mobile phone. Map updates the target location information according to the received message rather than according to its prediction. Particularly, the messages from the target are received by the SMS Receiver on the tracker side. The SMS Receiver extracts the location information (e.g., coordinate, speed, and bearing) from the received message and passes it to the Map, which in turn displays and marks the target location on a map.

4. SYSTEM ARCHITECTURE:

The Architecture shown in Fig 1 consists of tracker and target side build on GPS and Android . The process starts when the tracker that is passenger starts the application by switching the start tracking switch present in the tracker side. When this information is received by the SMS receiver on the tracker side that application is launched, it will start predicting its location and compare its current location with the previous one, and if exceeds the threshold then through SMS locator, it will send SMS to the tracker having location details and the time. The information is received by the SMS receiver on the tracker side, as for SMS receiver , it will longitude and latitude values, so the correct position will predicted by the SMS receiver at the tracker side and displayed on the Map.



When tracker login using the username and password, their location is updated using GPS shown in Fig 2, then once started message comes, they can track the target and select their target being displayed on the screen shown in Fig 3.After selecting the desired target, the application starts tracking the target and sends a message to the tracker showing the distance left and time of reach to the tracker as shown in Fig 4. If they want to get the exact location, they can view map as shown in Fig 5.

Fig 2. Login page

Fig 3.Tracking system is started to track the target

Fig4.Target sending SMS about its location

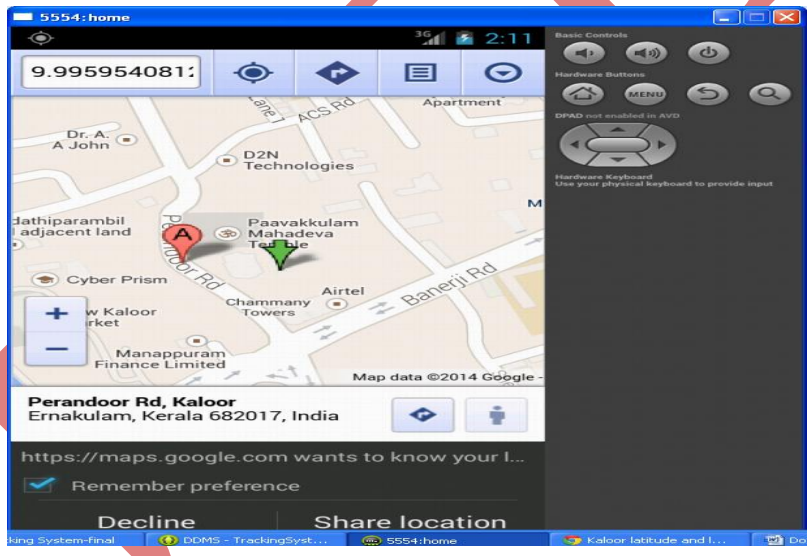


Fig 5. Tracker can view map to find correct location

5. CONCLUSION

By adopting location prediction and dynamic threshold mechanisms, Mobile based tracking system can reduce the number of SMS transmissions while maintaining location accuracy within an acceptable range. It provides free and open source navigation and tracking system. The proposed system tracks the current location of all the buses and estimates their arrival time at different stops in their respective routes. Estimates are updated every time the bus sends an update. It distributes this information to passengers using SMS. This system uses a approach LBD, the number of short messages required is significantly reduced as compared with time based delivery (TBD) and distance based delivery (DBD). In addition, LBD achieves an acceptable location tracking accuracy. Finally, the use of a dynamic threshold reduces the required number of short message transmissions compared with the fixed threshold.

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