# MULTIPLE TARGETS DETECTION AND TRACKING SYSTEM FOR LOCATION PREDICTION

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Abstract: The global position system (GPS) has become a common functionality in handheld devices, and therefore, several location-tracking applications have been developed like GPS, GPRS, IMEI number, etc., These techniques makes some practical implementation issues as well as prediction issues. Some techniques consume more time, less efficiency and more error rates. In our proposed work we developed a practical system; 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. The entire system has been implemented by using Android operating system with J2EE technologies. The results show our systems have more efficiency and good prediction rate.

#### Keywords: Target system, LBS, Navigation, GPS, SMS, and Android.

#### 1. INTRODUCTION

The Global Positioning System (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. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.

### 1.1 Global Positioning System

Using the Global Positioning System (GPS, a process used to establish a position at any point on the globe) the following two values can be determined anywhere on Earth. Speed and direction of travel (course) can be derived from this co-ordinates as well as the time. The coordinates and time values are determined by 28 satellites orbiting the Earth.

Recent advancements in mobile technology enable Global Positioning System (GPS)-enabled mobile devices to produce a range of period Location based Services (LBS). Among all those services, GPS navigation and placement pursuit are the foremost popular applications on mobile devices owing to the usefulness and recognition throughout a visit. Formerly, a tourist needs to scrutinize paper maps or guide books throughout the trip, leading to holdup and easy to urge lost. Therefore, electronic merchandise embedded with navigation functions became more and additional standard. By victimization GPS navigation capabilities of these electronic devices, the travelers will arrive to Associate in Nursing unknown destination speedily and effortlessly. At the in the meantime, a GPS tracking system is in a position to trace a selected target's movement and relay info involved wherever the target has traveled.

A GPS navigation device may be a device that may receive GPS signals for decisive the device's current location on Earth. It is very useful to develop a GPS navigation system on the Android platform with several Google resources. With Google Maps free navigation functionality, for software style, most navigation systems use GPS to get this position, and begin navigating when a user chooses destination or inputs its address. However, these steps don't seem to be terribly convenient to users.

#### **1.2 Location Tracking**

Location tracking refers to the attaining of the current position of object, stationary or moving. Localization may occur either via multilateration of radio signals between (several) radio towers of the network and the phone, or simply via GPS. To locate the Source using multilateration of radio signals, it must emit at least the roaming signal to contact the next nearby antenna tower, but the process does not require an active call. GSM is based on the signal strength to nearby antenna masts.

Mobile positioning, which includes location based service that discloses the actual coordinates of a mobile phone bearer, is a technology used by telecommunication companies to approximate the location of a mobile phone, and thereby also its user (bearer). The more properly applied term locating refers to the purpose rather than a positioning process.

# 2. EXISTING TECHNIQUES

Lee et al. proposed a real-time location tracking system [1] for childcare or elderly care applications. It transmits the location information of the mobile device to a central GPS application server through the wireless networks. This application allows the server to simultaneously monitormultiple targets (e.g., elders or children). Lita et al. proposed an automobile localization system by using SMS [3]. And, Choi et al. assumed that the location information of a target is transmitted through wireless networks. Their work focused on proposing a geo location update scheme to decrease the update frequency [7]. Hameed et al. proposed a car monitoring and tracking system that uses both SMS and GPS to prevent car theft [5]. Anderson et al. proposed a transportation information system [6]. The proposed system, which is interconnected with the car alarm system, transmits alerts to the owner's mobile phonein the event of a car theft (e.g., activation of the car alarm, starting of the engine) or provides information for monitoring adolescent drivers (e.g., exceeding the speed limit or leaving a specific area). In this system, a hardware device called StarBox, which is equipped with а global system for mobile communications (GSM) modem and a GPS unit, is installed in a vehicle to track the vehicle's location. StarBox transmits short messages containing its GPS coordinates to the server at 30-s intervals. The users can send short messages to the server to determine the expected arrival time of buses at their locations. 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 widespread use (i.e., well-structured worldwide) [6], [8].

However, SMS is a user-pay service. In this paper, a novel method called location-based delivery (LBD), which combines SMS and GPS, is proposed, and further, a realistic system to perform precise location tracking is developed. The objective of this study is to minimize the transmission cost of a tracking system by minimizing the number of SMS transmissions while maintaining the location tracking accuracy. LBD mainly applies the following two proposed techniques: Location prediction and dynamic threshold. 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. The dynamic threshold maintains the location tracking accuracy and number of short messages on the basis of the moving speed of the target. GPS is widely used for target location because of its high positioning accuracy [1]-[3], [6], [8]. Related works have roughly classified the location tracking methods [3], [5], [6], [8], [9] using GPS and SMS as time based delivery and distancebased delivery. Additionally, GPS networks are wellconstructed and widely accessible. Therefore, GPS networks are used, practically, for positioning an object by using triangulation. Time-based delivery is used to periodically transmit location update messages for tracking [3], [6], [10]. By contrast, distance-based delivery is used to transmit location update messages when the distance between the previously reported location and the current location exceeds a fixeddistance threshold [9]. However, SMS is a pay service. Therefore, the objective of this study is to minimize the number of SMS transmissions while simultaneously maintaining the location tracking accuracy. Time-based delivery is effective for tracking a target that is moving erratically. However, it exhibits a crucial flaw when the target remains stationary for an extended period, that is, it continues to periodically transmit many unnecessary short messages. The proposed approach differs from the distance-based delivery in two major aspects. First, LBD transmits a location update message when the distance between the predicted location and the actual location exceeds a certain threshold, rather than when the distance between two continuously reporting locations exceeds the threshold, a typical mechanism adopted by distance-based delivery. Thus, LBD can deliver fewer update messages. Additionally, LBD further reduces the number of required update messages while satisfactorily maintaining the location tracking accuracy because it adopts a dynamic threshold rather than the static threshold used in distance-based delivery. In our proposed work we applied multiple target detection and online map for efficient location determination. Existing methodologies focus on single target and offline processing, so the result prediction may take longer time duration. Those location tracking systems consumes more memory and GPS process consumes more battery power.

### 3. PROPOSED WORK



Figure 1: shows our proposed architecture

These entire architecture built by three major modules location prediction, dynamic threshold and viewing online Google map.

### **3.1 Location Prediction**

The location prediction module, which is built in both the target and the tracker side, uses the information on the current location. Fig.1&2 shows the location tracking and target detection module snap shots. Location prediction is performed by using the current location, moving speed, and



**Figure 2: Location Prediction** 

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.

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Figure.3. Viewing Targets

### 3.2 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.

# 3.3Viewing Map

When the tracker receives a response message from the target, it means that the accuracy of the predicted location is too low. Therefore, the 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. CONCLUSION

The number of SMS transmissions must be minimized while maintaining the location tracking accuracy within the acceptable range to reduce the transmission cost. Our implementation proposes a novel solution; it tracks multiple moving targets. While comparing with existing technique this implementation also send an automated SMS.

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