Study of Location Prediction Techniques for Mobile Devices In Wireless Network

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ABSTRACT
This paper focus on the current mobile system network working for location predicting and managing it. But the technique of current system is not enough to handle this crucial task. It needs some innovative methods. Here various methods for proper positioning of mobile devices are discussed. It defines different traveling strategy with respect to user mobility path pattern for quality service. It uses geographical graphical layout of longitude and latitude for position for prediction. This paper gives detail strategy of LMD (Location Management of Mobile Device) with respect to continuous moment in different geographical areas.

Key Words
MDs, UMPP, QoS, LBS, LOC, SCORM, LOM Longitude , Latitude.

1. INTRODUCTION
In a mobile system, the user must be able to access the services while roaming from one location to another location. The major feature of wireless networks is mobility support, which enables mobile users to communicate with others, regardless of location. As mobile communicate with sensor and in sensor and wireless communication technology enable accurate, automated determination and dissemination of a user's or object's position[1][2]. The mobility and service patterns of Mobile Device (MDs), namely, User Mobility Path Profile (UMPP) is used . For each mobile user, a UMPP consists of detailed information of service requirements and mobility models that is essential to quality of service (QoS) during agile environment. User Mobility Path Profile (UMPP) is a combination of historic records and predictive patterns of mobile device, which serve as fundamental information for mobility management and enhancement of quality of service (QoS) in wireless multimedia networks[1].The data can be explored by exploiting this positional data through location-based services (LBS). LBS functionality user are can show current location of a device.

2. SYSTEM STRUCTURE
The two basic components mobile terminal and base station in the wireless network of a mobile communication system (MCS) play an important role in the Location Management. Mobile Terminals are devices used by Mobile Units (MUs) communicate with others through the MCS. Base stations are usually installed in fixed locations. Mobility management is an important issue in mobile communication systems like cordless systems, cellular systems and mobile satellite systems. There are two tasks related to Location Management based on which component initiates the LM procedures. They are Location Updating (LU), which is initiated by Mobile Terminal and Paging, which is initiated by Base Station. The existing scheme depends on cell ID assignment and network topology. The proposed scheme is using the cell co-ordinate approach is using distance based strategy because of its ability in reducing network traffic and independency of size, shape of cells and network topology. In this paper I have proved that the proposed scheme is cost effective and have better performance than the existing schemes.

3. LOCATION BASED CONTENT AUTHORING AND ACCESS

To collect relevant information about the stations which will be presented to the user at the

various stations can be used to access data. For the data access various stations will also need to be recorded electronically on a map for the user location to access easily[3]. UMP are continuously varying for every base station , then mobile device uses map created on base station in form of data[2][3]. Docendo is the platform used to access client i.e mobile device from base station server . It has following characteristic described:[3]

- The provision of resources in a repository. Resources can have different aggregate levels, from assets to entire position of an user.
- The support of modular reuse and authoring by aggregation , which means that all existing locating data from base station data sections can be modified by any user and can be integrated in a new registration of mobile device .
- The integration of metadata editing in the authoring process in a transparent fashion and
- thus providing a high level of user friendliness for positioning in geographical area.
- The support of collaborative authoring in groups.
- The strict separation of content from layout, thereby enabling server without specialized
- knowledge of data access editors.
- The adoption of data format standards such as Sharable Content Object Reference Model
- (SCORM) and Leaning Object Metadata (LOM) for content and metadata respectively to support location management.

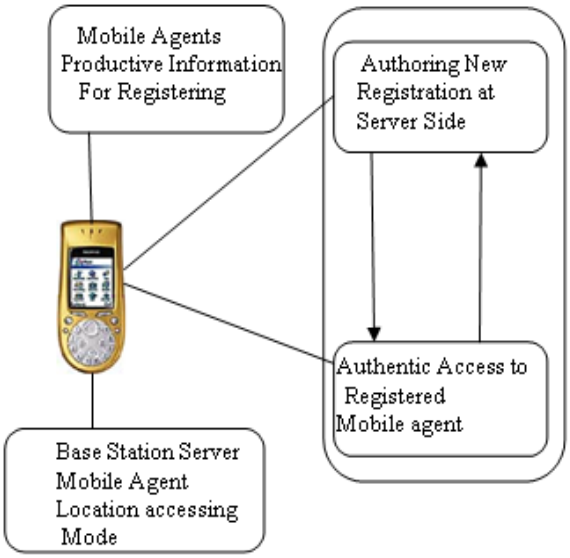

Figure 1: Decendo Based diagram Of Mobile Client To Server

4. LOCATION UPDATION STRATEGY

Location updation strategy are grouped in two ways: Dynamic and static. On dynamic different network topology are covered for different users. They are depend on the changing position of user while connecting in network with other user. While in static strategy there is unique behavior of all users, like in GSM[4]. For this any type of strategy sensor network technology is developed , as sensor nodes are accessed directly using their node ID's or network addresses. At the dynamic or static position of mobile user. Each phone has a unique network address (a phone number, among other unique identifiers) and can be accessed using that identity, this make difficult to update location strategy for mobile user[4][5].

4.1 Instance Updation:

There is every instance entry of connecting in network of user whenever he travel from one cell to another cell propose to use a data based abstraction that does not rely on the node identities of the physical devices. A layer of virtual sensor nodes is superimposed on the physical sensor network. A virtual sensor node at any point in space is based on data samples taken at that point.

4.2 Never Update Strategy:

The user never update its location and consequently for connection in network with second user. As the number of user in a system increase , the number paging signals would also increases.

4.3 Movement Based Strategy:

The users movement is updated for every predefine states for every movement of mobile user 'M'. It is noted for ever movement of user if it is already registered. As the movement may travel in nearer cell or distanced cell.

4.4 Distance Strategy:

As mobile user travels at long distance from its current state then it have to hand over registered link to the current cell position of user mobile 'M'. The location of mobile device may travel in radius 'R' of spherical area of geographic map. This help him for proper positioning with respect to current server registered.

5. DISTANCE BASED UPDATION STRATEGY

For this strategy graph can be plotted with considering initial point for 'N' number of travelling and we can position it for every i^{th} position[6]. As it is considered here for two dimension, longitude as x-axis and latitude as y-axis. As initial position coordinate is 'X0' and 'Y0' and for i^{th} position coordinate is Xi and Yi respectively[5][6]. Equation for positioning mobile device can be given as-

$$Distance(Di^{th})=(Xi-X0)^2+(Yi-Y0)^2 \quad \cdots\cdots\cdots\cdots (1)$$

For next movement of mobile device other than nearer cell , if it travel at long distance cell, suppose at 'k^{th}' position then equation become-

$$Distance(Dk^{th})=(Xk-Xi)^2+(Yk-Yi)^2 \quad \ldots\ldots\ldots\ldots..(2)$$

And total distance travel by mobile device can be located by equation-

$$Total\ Distance = [(Xk-Xi)^2+(Yk-Yi)^2]-[(Xi-X0)^2+(Y-Y0)^2] \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

And average distance travel by mobile device is-

$$Average\ Distance = \frac{TotalDistance}{(Di^{th}+Dk^{th})} \quad \ldots\ldots\ldots (4)$$

This equation can only satisfy only when they lie perfectly on longitude or longitude if they are scattered position other than longitude and latitude then above equation does not satisfy it needs angle of deviation with it for its prefer location and distance from current registration. The above equation diagram can be given as-

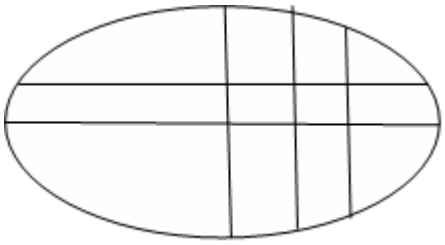

Figure2: Positioning at Different Distance .

6. GAUSS–MARKOV MODEL FOR MOBILE MOVEMENT

Mobile nodes often have to change speed during the course of motion. We assume that mobile nodes move at inconstant velocity and the velocity change follows a Gauss–Markov process. According to [7][8], the 1-D discrete version of the Gauss-Markov mobility model can be described as:

$$v_n=\alpha\, v_{n-1} + (1-\alpha)\mu + \sigma\sqrt{1-\alpha^2}\, w_{n-1} \quad \cdots\cdots\cdots\cdots (1)$$

where v_n is a mobile velocity during the n-th period, α the memory level, which reflects the relationship between v_{n-1} and v_n, μ the mean of v_n, σ^2 the variance of v_n, and w_n an uncorrelated Gaussian process with zero mean, unit variance. w_n is independent of v_n.

7. ANALYSIS OF LOCATION PREDICTION TECHNIQUES FOR MOBILE DEVICES

This paper is exploring techniques to find position of mobile device. But it has major drawback for system is that it only able to determine the position of mobile device if it is at perfectly lie on longitude or latitude. But this techniques fails, if it deviate in cell or travel long distance with change in the deviation. It only tells the in which cell it lie it does not tell exact point of location. So it needs more research on the location management . It can be removed with help of exact angle deviation at longitude and latitude with respect to current cell positioning.

8. CONCLUSION

This paper focuses on drawback of current mobile system of location management with respect to its position. Only longitude and latitude method are insufficient for predicting location. The cell gives position but not exact one which is very useful in the location management. It also needs to continue predicting position of a mobile device with distance traveled by user from current cell to another may neighbor cell or other. This is given by general accessing methods. So this need more research and new techniques of location management in mobile computing. LMD requires future research because current methods are not enough for predicting positions of mobile devices.

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