THESIS INFORMATION

Thesis title: **"Developing the location prediction algorithm of mobile users according to data mining techniques"**

Major: Electronic Engineering

Code: 62 52 70 01

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1. Abstract

Location prediction of Mobile Users (MUs) is one of the important issues in mobile computing systems. Managing mobility of mobile users in the mobile networks includes methods of storing and updating location information. Mobility prediction may be defined as the prediction of a mobile user moving to certain cell in the coverage area of the cellular networks. By predicting the path of mobile users, the service providers can efficiently allocate resources to ensure quality of service for the mobile networks.

Location prediction applications include automatic bandwidth adjustment, the location-based services, smart handover, etc. However, the applications require the execution time of the User Mobility Patterns Mining (UMPMining) algorithm be instantaneous. In this thesis, we propose two new algorithms named Find_UMP_Reduce_Complexity and Find_UMP_Reduce_Transaction for mining next location of a mobile user. In Find_UMP_Reduce_Complexity algorithm, we make to reduce the complexity of the UMPMining algorithm. In Find_UMP_Reduce_Transaction algorithm, we perform to reduce the number of transactions of the paths database. Results of our experiments show that our proposed algorithms outperform the UMPMining algorithm in terms of the execution time.

In addition, we also developed the incremental algorithm (named UMP_Online algorithm) in order to enhance the running speed of the algorithm when adding new data. The benefits of applying the UMP_Online algorithm are the system can run online in real time. Therefore, we can perform above applications effectively.

To improve the accuracy of the mobility prediction, we propose a data classification method by time. The experimental results show that the input data classification has increased the prediction accuracy.

2. Main Result

New contributions of my thesis are summarized as follows:

The first contribution:

We make reduce the execution time of the UMPMining algorithm by performing self-connection in the candidate generation algorithm (improved 1). We continue to reduce the execution time of this algorithm by reducing the complexity of the algorithm. In order to reduce the complexity of the UMPMining algorithm, we mapped the paths database of mobile users to the paths matrix (improved 2).

The second contribution:

In the second contribution, we make reduce the number of transactions of the candidate patterns generation algorithm. By applying the set theory, we have reduced the number of transactions started from the second loop onward.

The third contribution:

We propose the UMP_Online algorithm to avoid scanning of full database again, this algorithm executes to mine the new dataset (new transactions are added to the database). Therefore, the mobile service providers can supply their applications more efficiently (advanced Quality of Service).

The forth contribution:

We propose a method to improve the accuracy of the mobility prediction of mobile users (the data classification by time).

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