HYBRID TEMPORAL SEQUENTIAL PATTERN MINING SCHEME USING EFFICIENT MOBILE BEHAVIOR PREDICTION SYSTEM

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Abstract: In the mobile service scheme, location and time based analysis is applied on a variety of mobile service analysis application. Mobile environment various types of services are provided. User behavior analysis is carried out using the sequential pattern mining methods. Sequential pattern mining methods are used to find out the location and time factor. The clustering techniques are help to group up the transactions depends on the transaction history. The all existing techniques mainly focus on discovering mobile patterns from the web logs. But these types of patterns are not exact enough for predictions because the differentiated mobile behaviors along with users and temporal periods are not considered. Cluster-based Temporal Mobile Sequential Pattern Mine is used to locate the Cluster-based Temporal Mobile Sequential Patterns (CTMSPs). A prediction strategy is predicting the subsequent mobile behaviors. The similarities between users are calculated with the Location-Based Service Alignment. A time segmentation approach is presented to find segmenting time intervals . The hybrid temporal sequential pattern mining scheme is using improving the pattern identification and prediction accuracy levels.

Keywords: *Data mining, Hybrid Prediction Model, transportation, mobile environments, Recursive Motion Functions*

1. INTRODUCTION

Devices and systems based on mobile technologies are now common place in everyday life. Such devices and systems include cordless telephones, cellular telephones and pagers, remote car locking systems, two way radios, and wireless networking systems (including wireless local area networks [LANs], Global Positioning System (GPS)–based locators and maps, and electronic monitoring devices for parolees Some of the moments these devices and systems are allowing existing activities to be carried out more effectively; at other times, they enable completely new and various activities [1].

2 PROBLEM STATEMENTS

2.1 Problem Description

Problem Definition

Let $S = <(t_1, l_1, s_1), (t_2, l_2, s_2) \ldots (t_n, l_n, s_n)>$ be an MTS of a user with length equal to n, where item (t_i, l_i, s_i) represents the user requests‟ service s_i in location l_i at time t_i and $t_i < t_{i+1}$ 1 i n. The ascending order of elements in a sequence is determined, using time as the key [2].

The main problem we are addressing in this work is formulated as follows: Given a user‟s current mobile transaction sequence S and the current time t_c, our goal is to develop a framework to predict the subsequent mobile behaviors. We aim to predict the subsequent mobile behaviors using not only S and t_c but also all the mined CTMSPs. The problem of CTMSPs mining is formulated as follows: Given a mobile transaction database D containing a large number of mobile transaction sequences of users and a specified support threshold , the problem is to discover all the CTMSPs existing in the database. In this work, we propose the CTMSP-Mine algorithm and the behavior prediction mechanism for solving this problem.

2.2 Proposed Method

In this section, we describe our system design. Four important research issues are addressed here: Clustering of mobile transaction sequences. Time segmentation of mobile transaction sequences. Discovery of CTMSPs, Mobile behavior prediction for mobile users

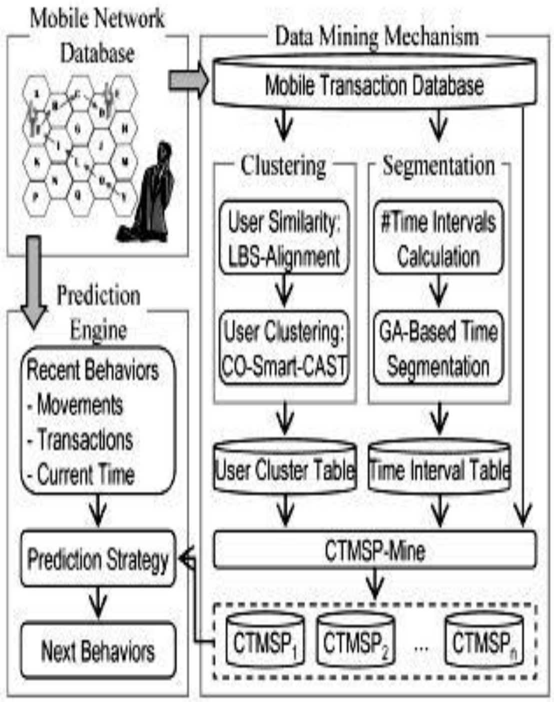

Figure 1: System framework

2.2.1 System Framework

Fig. 3.1 shows the proposed system framework. Our system has an „offline" mechanism for CTMSPs mining and also an „online" engine for mobile behavior prediction. While mobile users move within the mobile network, the information that includes time, locations, and service requests will be stored in the mobile transaction database. An example of mobile transaction database are contains seven records. In the offline data mining mechanism, we design two techniques and the CTMSP-Mine algorithm to discover the knowledge. First, we propose the CO-Smart-CAST algorithm to cluster the mobile transaction sequences. In this algorithm, we propose the LBS-Alignment to evaluate the similarity of mobile transaction sequences. Second, we propose a GA based time segmentation algorithm to find the most suitable time intervals. After completing clustering and segmentation, a time interval table and a user cluster table are produced, respectively. Third, we propose the CTMSP-Mine algorithm to mine the CTMSPs from the mobile transaction database based to the user cluster table and the time interval table. In the online prediction engine, we propose a behavior prediction strategy to predict the subsequent behaviors along with the mobile user"s previous mobile transaction sequences and current time. The main objective of this framework is to give mobile users a precise and efficient mobile behavior prediction system [2].

2.2.2 Clustering of Mobile Transaction Database

In a mobile transaction database, users in the different user groups may have different mobile transaction behaviors. The first step tackle cluster mobile transaction sequences. We proposed a parameter-less clustering algorithm CO-Smart-CAST [2].

Before performing the CO-Smart-CAST, we have to generate a similarity matrix S, based on the mobile transaction database. The entry Sij in matrix S represents the similarity of the mobile transaction sequences $_i$ and $_j$ in the database. A mobile transaction sequence can be viewed as a sequence string, where each element in the string indicates a mobile transaction. The major challenge we have to tackle is to measure the content similarity between mobile transactions [2].

3. SYSTEM TESTING

The mobile service and location prediction system is tested with its operations and results. System testing is the important stage in the software development life cycle. The functionalities and requirements are analyzed in the testing phase. The testing includes unit testing, integration testing and acceptance test methods. The test cases are used to verify the testing results. Test cases are prepared with reference to the customer requirements. The mobile service management model is tested using unit testing and user acceptance testing methods.

4. SYSTEM IMPLEMENTATION

4.1 Implementation procedure

After proper testing and validation, the question is If system is implemented or not. Implementation has all those activities that take place to transfer from old system to new system. The new system fully replacing an existing manual or automated system or it may be a major modification to an existing system. In other case, proper implementation is essential to provide a reliable systemto meet institute requirements.

5. CONCLUSION

The availability of common, basic interactive elements increases the user transfer of learning between devices and services and develops the overall usability of the whole interactive mobile environment. Such a transfer becomes even more important in a world of ubiquitous mobile telecommunication devices and services. Simplifying the learning procedure for end -users will allow the reuse of basic knowledge between different terminal devices and services and lead to a faster and easier adoption of new technologies **.**

In this system, we have proposed a novel method, named CTMSP-Mine, for discovering CTMSPs in LBS environments. Furthermore, we have proposed novel prediction strategies to predict the subsequent user mobile behaviors with help of the determined CTMSPs. In CTMSP-Mine, we first propose a transaction clustering algorithm named CO Smart-CAST to form user clusters depends on the mobile transactions us e proposed LBS-Alignment similarity measurement. Then, we utilized the genetic algorithm to generate the most suitable time intervals. To our best knowledge, this is the initial work on mining and prediction of mobile behaviors associated with user clusters and temporal relations.

A series of experiments were conducted for evaluating the performance of the proposed methods. The experimental results show that CO-Smart-CAST method achieves high-quality clustering results and the proposed CBSS strategy find out highly specific results for user classification.

Meanwhile, our GA-based method finds the most proper and correct time intervals. For behavior prediction, CTMSP is shown to outperform other prediction methods are precision and F-measure. The experimental analysis shows proposed methods are efficient and accurate under various conditions. Location and time based analysis is applied on a variety of mobile service analysis application. User behavior analysis is carried out using the sequential pattern mining methods. Cluster-Based Temporal Mobile Sequential Patterns (CTMSP) algorithm is used for the sequential pattern mining process. The integrated CTMSP model identifies the user behaviors. Clustering techniques are used for the pattern extraction process. Mobile sequential patterns are identified with temporal and spatial information. The system also predicts the user movements. Time segmentation based approach.

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