Smart Shopping Based on the Mobile Commerce Pattern Mining and Prediction

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Abstract: ***In this Paper We Propose an application for the mining and prediction of mobile users movements and purchase transactions together. Here we provide an application for the customers Android phone by which they can view the offers provided by various shops at the mall they are at. The application provides the user with information about which all shops a particular product is available and which shop provides the best offer. By using this application we can make the Live shopping by the customer without having to go to each shop and enquire. Framework for this application having components for finding the similarity between the Items and Stores,efficient mobile commerce pattern mining and a facility for the behaviour prediction of mobile users. In Addition to that planned to add a credit system for the users as well as the prediction of Items and offers based on their Interests which we can collect at the time of registration for the new customers. As of now the experimental evaluation of the Framework have been done. But in this paper I planned to bring the same for Live shopping based on location based systems.***

Keywords: Pattern Mining, Similarity Inference, Behavior Prediction.

1. Introduction

In this information age, information plays a major role, success, and thanks to the technologies, we have been collecting large amounts of information. At the beginning, with the discovery of computers and means for mass digital data storage, we started collecting and storing of all sorts of data. Unfortunately, the collections of data stored on disparate structures very rapidly became overwhelming. This initial process has led to the creation of the structured databases and Database Management Systems (DBMS). The efficient database management systems have been very important assets for management of a large amount of data and especially for efficient and effective retrieval of particular information from a large collection if needed. The contribution of database management systems has also led to recent massive gathering of all sorts of information available. Now a days, we have far more information than we can handle: from business transactions and scientific data, to satellite pictures, text reports and military intelligence etc. Information retrieval is simply not for decision-making. Handling with huge collections of data, we have now created new needs to help us make better managerial choices. These needs are the automatic summarization of data, extraction of the “essence” of information stored, and the discovery of patterns in the raw data.

The nontrivial extraction of implicit, previously unknown and potentially useful information from data in databases refers Data Mining, also known as Knowledge Discovery in Databases (KDD.By taking consideration data mining is actually part of the knowledge discovery process. In this, it proposes a novel framework, called Mobile Commerce Explorer (MCE), for mining and prediction of mobile users’ movements and purchase transactions under the context of mobile commerce.In this paper, propose an application having a novel framework, called Mobile Commerce Explorer (MCE), for mining and prediction of mobile users’ movements and purchase transactions under the context of mobile commerce. The framework having three major components: one for measuring the similarities among stores and items, which are two basic mobile commerce entities; other for efficient discovery of mobile users’ Personal Mobile Commerce Patterns and the third one for prediction of possible mobile user behaviours. To our best knowledge, this is the first work that facilitates the customers movements and transactions based on mining and prediction.

2. Background on Web Mining

2.1 What is Patternweb Mining?

Pattern Mining is the application of mining items or patterns to discover useful knowledge from the Collection of patterns. In this application dealing with two types of patterns such as customers Moving patterns and purchase patterns. These two can be captured together as mobile commerce patterns for the mobile users.

As an earlier study on data mining first done the study on aspects of concept hierarchy such as automatic generation and encoding techniques in context of data mining .lots of studies are done for pattern mining .It seems that most of the earlier studies which uses the candidate set generation and test approach were not a good choice when we are dealing with large no of patterns or long patterns.so we are using the structure called FP-Tree based on an efficient FP-Tree based mining method.

In recent years, a number of studies have been done the usage of data mining techniques to discover useful rules/patterns. Mining association rules are proposed to find important items in a transaction database.Agrawal and Srikant, propose the Apriori algorithm to mine the association rules. Park et al., propose the improvement on performance of an association rule mining of DHP algorithm rnce of an association rule mining. Pei et al. propose an algorithm named WAP-Mineto efficiently discover web access patterns in web logs, without candidate generation using a tree-based data structure. Sequential pattern mining first introduced to search for time-ordered patterns, known as

sequentialrns within transaction databases. Regarding the studies considering the relation between location and service, Chen et al., propose the path traversal patterns for mining web user behaviors. Tseng and Tsui,first study the problem of mining associated service patterns in mobile web environments. SMAP-Mine has been proposed by Tseng for efficient mining of users'sequential mobile access patterns, which are based on the FP-Tree .

After all analising all the previous methods and techniques we comes to the conclusion with experemtal evaluation that SIM is the more precise method to find the store and item similarities.Based on these values of similarities the prediction can be done more accurately.Since the method called MCBP consider not only the pattern support but also the weighted matching score between pattern premises and user mcommerce behavior in bahavior prediction.Besides, the prediction technique MCBP in MCE framework integrates the mined PMCPs and the similarity information from SIM to achieve superior performs.

3. Problem Definition

The Objective of the problem is to capture and obtain a better understanding of mobile users data mining has been widely used for discovering valuable information from complex datasets. SMAP-Mine is used for efficient mining of users' sequential mobile access patterns, based on the FP-Tree. Chen et al. proposed the path traversal patterns for mining mobile web user behaviors. While the aforementioned studies have been conducted for discovery of mobile patterns, few of them consider the personalized issue. Since patterns considered to be mined in these studies are typically comes from all users, they do not want to reflect the personal behaviors of individual users, especially when the mobile behaviors have chance to vary a lot among different mobile users. The Objective is to mine mobile commerce behavior of individual users to support m-commerce services at a personalized level.

Our application is based on the mobile commerce pattern mining and behavior prediction for live shopping.In this paper, we formulate the idea of implementing a framework called Mobile Commerce Explorer for the customers who need a smart shopping by saving their time and energy as well.For that we need to have good solution for finding the item similarity,method for behavior prediction and pattern mining. We can show that the framework for our proposed system as in the following figure.

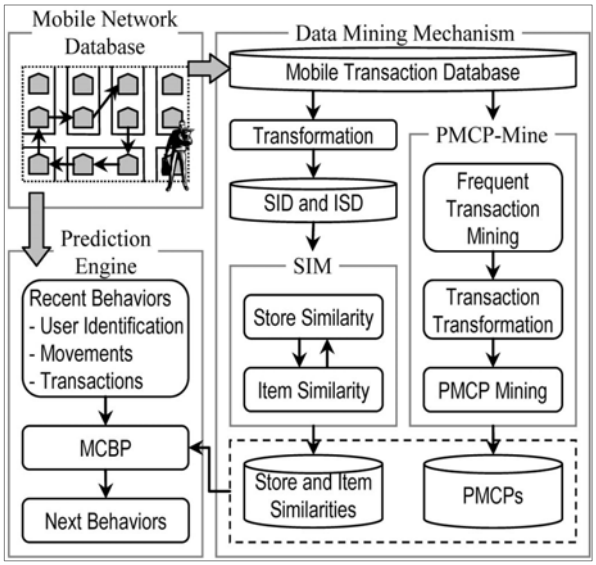

Figure 1: Framework for our proposed system

Owing to the rapid development in the web 2.0 technology, many stores have made their store information, such as business hours, location, and features available online, via mapping services such as Google Map.In Addition to that user trajectories can be detected by GPS-enabled devices, when users move around. There usually is an entangling relation between moving patterns and purchase patterns since mobile users are moving between stores to shop for desired items. The moving and purchase patterns of a user can be captured together as mobile commerce patterns for mobile users. To capture and obtain a better understanding of mobile users' mobile commerce behaviors, data mining has been widely used for discovering valuable information from complex data sets.

SMAP-Mine is used for efficient mining of users' sequential mobile access patterns, based on the FP-Tree. Chen et al. proposed the path traversal patterns for mining mobile web user behaviors. Yun and Chen proposed a method for mining Mobile Sequential Pattern (MSP) by taking moving paths of users into consideration. While the aforementioned studies have been conducted for discovery of mobile patterns, few of them considered the personalization issue. Since patterns mined in these are from all users, they are not reflecting the personal behaviours of the individual users, especially when the mobile behaviours of these users may vary a lot among different mobile users. In this paper, we proposed an application with an aim at mining mobile commerce behavior of individual users to support m-commerce services at a personalized level.

Similarity Inference Model: An essential task in the framework is to determine the similarities among the stores and items at a particular Mall.This can be solved by using store and item category ontology. Even if, the store or item ontology may not match with the mobile transaction database. The goal is to automatically compute the store and item similarities from the database containing mobile transaction informations, that captures mobile users' moving and transactional behaviors in terms of movement among stores and purchased items. From the database,the following information are available: 1) for a given store, which items

are available for sale; 2) for a given item, which stores sell this item. The information can help to infer which stores or items are similar. People usually purchase similar items in certain stores, these stores may be considered as similar. So a a parameter-less data mining model, named Similarity Inference Model, to compute store and item similarities. Before computing the SIM, there are two databases SID and ISD, from the mobile transaction database. For every pair of stores or items, SIM assigns them a similarity score. Based on this heuristics, if two stores provide many similar items, they are likely to be similar; if two items are sold by many dissimilar stores, they are not likely to be similar.

Since the store similarity and item similarity are interdependent, compute them iteratively. For the store similarity, consider that two stores are more similar if their provided items are more similar. Given two stores sp and sq, we compute their similarity sim(sp; sq) by calculating the average similarity of item sets provided by sp and sq. On the other hand, for the item similarity, consider that two items are less similar if they are sold by many dissimilar stores. Given two items ix and iy, we compute their similarity by calculating the average dissimilarity of store sets that provide ix and iy.

Based on the inference, compute both the store similarity and the item similarity repeatedly. Initial status of the similarities between the same stores and the same items both are 1, or they are 0. In each of the computation, SIM first uses the item similarity to find out store similarity, and can recomputes the item similarity from the store similarity itself. Then, all the values in the store or item similarity matrix are normalized to the value range between 0 and 1. The inference process ends when the computation comes at a stable state, which is to be decided by the differences of store similarity and item similarity.

Pattern Mining: PMCP-Mine algorithm is used to mine the personal mobile commerce patterns efficiently. The PMCP-Mine algorithm is divided into three main phases: 1) Frequent-Transaction Mining. A Frequent-Transaction can be describe as a pair of store and items indicating frequently made purchasing transactions. In this phase, first discover all Frequent-Transactions for each individual users. 2) The Mobile Transaction Database Transformation which is based on the all Frequent-Transactions of these users, the original mobile transaction database can be reduced by deleting infrequent items. The main purpose of this is to Enhance the database scan efficiency for pattern support counting. 3) PMCP Mining which is mining all patterns of length k from patterns of length k -1in a bottom-up fashion.

Frequent-Transaction Mining: In this phase, mine the frequent transactions ie the F Transactions for each user by applying a modified Apriori algorithm. At first, the support of each (store, item) pair is calculated for each user. The patterns of frequent one-transactions are obtained when their support satisfies the user-specified minimal support threshold Tsup. A candidate Two-transaction, indicating that two items are purchased together in the transaction,which is generated by joining two frequent One-transactions where their user identifications and stores are the same. Finally, the same procedures are repeated until no more candidate transaction is generated.

Mobile Transaction Database Transformation: In this phase, use F-Transactions to transform each mobile transaction sequence S into a frequent mobile transaction sequence S'. The main objectives and advantages of the transformation are: 1) item sets are represented as symbols for the efficient processing, and 2) transactions with insufficient support are eliminated to reduce the database size.

Personal Mobile Commerce Pattern Mining: In this phase, mine all the PMCPs from the frequent mobile transaction database. Frequent PMCPs can be obtained from the frequent-transaction mining phase.In the mining algorithm, we are using a tree which is two-level and named Personal Mobile Commerce Pattern Tree (PMCP-Tree) to maintain the obtained PMCPs. the upper level of the PMCP-Tree keeps track of the frequent mobile transactions. In Addition, the lower level of the PMCP-Tree maintains the users and paths where PMCPs occurs. Hence all the PMCPs are captured in the PMCP Tree. The goal of a PMCP-Tree is to efficiently generate candidate mobile commerce patterns because PMCP-Tree can quickly compare two patterns to check whether they have the same first and last transactions.

Behavior Predictor: In this section, it is described how to use the discovered PMCPs to predict the user's future mobile commerce behaviors which include movements and transactions. The Current pattern-based prediction models, based on the pattern selection strategy of exact matching, that the similarity between the different locations is treated as 0. These prediction strategies may lead to the prediction failures if there is no existing pattern to match. To overcome this problem, integrate the similarities of stores and items which are obtained from SIM into the mobile commerce behaviour prediction. First define the premise and consequence of a PMCP. The most basic pattern-based prediction strategy is to choose the pattern with highest support from all the patterns whose premise matches the user's recent mobile commerce behavior. Hence the prediction strategy is named Support Only (SO) in this paper. In the mobile commerce behavior prediction, the longer pattern match represents that this pattern is better matched for recent mobile commerce behaviors.

Based on the above discussion, the second prediction strategy named Integration of Support and Matching length (ISM). The idea of ISM is to incorporate both the pattern support and matching length into the mobile commerce behavior prediction. In ISM, design a scoring function to compute the matching score between the premise of a PMCP and user's recent mobile commerce behavior. The presence of PMCP having the highest score is used to predict the next mobile commerce behavior. However, the predictions fail if there is no pattern to match in pattern-based predictions. To overcome this problem, incorporate the store and item similarities into the mobile commerce behavior prediction. Accordingly, propose MCBP, which measures the similarity score of every PMCP with a user's recent mobile commerce behavior by taking store and item similarities into account.

In MCBP,the three considerations that we have to given are the premises of PMCPs with high similarity to the user's recent mobile commerce behavior which taken as prediction knowledge, more recent mobile commerce behaviors potentially have a greater effect on next mobile commerce behaviour predictions and PMCPs with higher support provide greater confidence for predicting users' next mobile commerce behavior. Based on these considerations, we propose a weighted scoring function to evaluate the scores of PMCPs. For all PMCPs, we can calculate their own pattern score by the weighted scoring function.

4. Existing Systems

As an existing system, there is having a novel framework, called MCE, for mining and prediction of mobile users' movements and transactions in mobile commerce environments. The framework, comprises of three major techniques such as SIM for measuring the similarities among stores and items, PMCP-Mine algorithm for efficiently discovering mobile users' PMCPs and MCBP for predicting possible mobile user behaviours. To our best knowledge, this is the first work that facilitates mining and prediction of personal mobile commerce behaviours that may recommend stores and items previously unknown to a user. The experimental Evaluation of the framework have been done. The framework achieves a very high precision in mobile commerce behavior predictions. The MCBP prediction technique used in the framework integrates the mined PMCPs and the similarity information from SIM to achieve superior performs in terms of the precision, F-measures as well as the recall. The experimental results show that the framework and three components are highly accurate under various conditions.

The Existing system for our application area is that the customer who wants to purchase items needs to be go around each shops & the search about the particular offers provided by each shops at the mall they are at. There is having these facilities for online shopping but the live shopping is not possible. This existing Condition Seems to be time consuming & tiresome.

V. Proposed System

We propose an application for live shopping by the customers. By this application the customer who is having Android phone can view the various offers provided by different shops in a mall during their shopping.For that we are planned to implement the framework for mobile commerce pattern mining & prediction for the mobile users movements and transactions.Inadiition to that the propsed system will have a credit system which helps the regular customers for getting the additional benefits based on their purchase history.For the newly registered customers there wont be no more purchase history for predicting their next movement.In tose cases we are planned to solve the situstion by making use of an adittional fascility that the customers can have the ability to note their Interests during the registration.Hence can do the predictions & provide the details of offers based on their Interests.

5. Modules

The proposed system contains 6 modules

- Registration and approval module
- Database management module
- Product and category management module
- Similarity Inference module
- Pattern mining and prediction module
- Billing Module

The first module is for the registration of Mall,Shops as well as the Users.Here all the shops malls and users who wish to use the application can register. Second one is for all database handling such as connectivity and updation/deletion/selection management etc. Third module for Add/edit/delete category by the Admin and Add/edit/delete products by the shops.Hence each shops have capability to update their own Item storage details as well as their new offers.Similarity Inference module is for finding the Shop and Item similarities.Purchase history management User Identification and mined data analysis are done at the pattern mining and prediction module. The billing module is for product purchase mangement and Add/edit/delete the bills.On the basis of billing of each individual customer we like to add one more facility that can provide a credit based system for getting the additional benefits to the customers based on their purchasing.That is they can get additional benefits if they are the regular customer having a very appretiatable billing history.

6. Conclusion

In this paper, we proposed a new application for the customer to make their shopping more lively by saving their time and money by making use of all the best offers provided at each individual shops.The credit system helps the customers to have some credit points based on their purchase and can make use of the additional banefits provided to them according to the credits.In addition to that here provides the functionality for newly registered customers who don,t have previous purchasing histry,to get the predictind based on their Interests which we are enterd at the time of customer registration.Also we provides a credit system for the customers based on their billing history.Through these we can provide the facility for customers that they can get additional benefitd from each individual shops based on their purchasing History.

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