

Agent-Based Data Mining In Mobile Commerce: An Overview

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Abstract- Data mining technology has emerged as a means for identifying patterns and trends from large quantities of data. The Data Mining technology normally adopts data integration method to generate Data warehouse, on which to gather all data into a central site, and then run an algorithm against that data to extract the useful Module Prediction and knowledge evaluation. Recommendation systems apply statistical and knowledge discovery techniques to the problem of making product recommendations and they are achieving widespread success in M-Commerce these days. We view agents as pieces of code that undertake tasks on behalf of a user of the system. In this paper Agents will do recommendation using Data mining techniques in the context of Mobile Commerce. Recommendations engines are increasingly becoming a popular choice for solving the problem of content discovery enabling the user to find personally relevant content that they might unknown.

Keywords: Mobile commerce, Agents, Agent Based recommendation.

I. INTRODUCTION

Data mining, the extraction of hidden predictive information from large databases, is a powerful new technology with great potential to help companies focus on the most important information in their data warehouses. Data mining tools predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions. Data mining techniques are the result of a long process of research and product development. This evolution began when business data was first stored on computers, continued with improvements in data access, and more recently, generated technologies that allow users to navigate through their data in real time [1].

Data mining is ready for application in the business community because it is supported by three technologies that are now sufficiently mature:

- Massive data collection
- Powerful multiprocessor computers
- Data mining algorithms

Recommendation systems generally infer these decisions by analyzing historical data (interaction between customers and products through sales transaction databases or real-time system capturing the action of customers on the

websites, customer demographics, product characteristics etc) captured by the system. Efficient recommendation systems not only benefit the customers but also the marketers and product companies by boosting their products sales among wide range of potential customers. In this paper we present an overview on method of recommendation by using agents in Mobile Commerce using Data Mining Techniques.

A. Agents

Data mining is a complex system focusing on the distribution of resources over the network as well as for process. The very core of Data mining systems is the scalability as the system configuration may be altered time to time, therefore designing Data mining systems deals with great details of software engineer issues, such as reusability, extensibility, and robustness [5]. The Figure 1 shows Part view of Agent Topology.

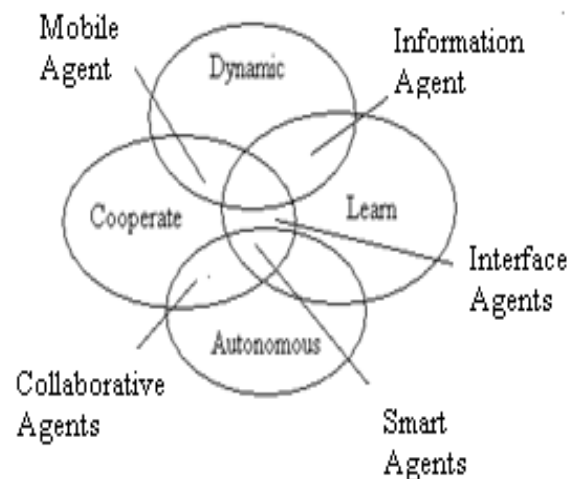


Fig 1: Part view of Agent Topology

Agents offer alternative solutions as they can travel through the system network.

1) *Interface Agent (or User Agent):* this agent interacts with the user (or user agent). It asks the user to provide his

requirements, and provides the user with mined results (may be visualized).

2) *Mobile Agents*: An agent needs to interact with its host system and other agents in order to be useful. Mobile agents are defined as programs which may be dispatched from a client computer and transported to a remote server computer for execution and interaction with other agents [4].

3) *Collaborative Agents*: In order to have a coordinated set up of collaborative agents, they may have to negotiate in order to reach mutually acceptable agreements on some matters.

4) *Information Agents*: Information agents perform the role of managing, manipulating or collating information from many distributed sources [2].

5) *Smart Agents*: Smart agent systems can be developed from simple agents which do not have internal symbolic models, and derives from the emergent behavior of the interactions of the various modules.

II. MOBILE COMMERCE

Mobile Commerce (M-Commerce) is any transaction, involving the transfer of ownership or rights to use goods and services, which is initiated and/or completed by using mobile access to computer-mediated networks with the help of an electronic device [2]. In the context of mobile commerce, mobile marketing refers to marketing sent to mobile devices. Companies have reported that they see better response from mobile marketing campaigns than from traditional campaigns. Mobile campaigns must be based on the global Content Generation or what is called Generation C and four other 'C's: Creativity, Casual Collapse, Control, and Celebrity. The M-commerce sector has been growing year over year throughout the world offering thousands of products.

Choosing a suitable product from among so many options is challenging for customers. With recommendations technologies, customers are automatically exposed to various products that they might like, without the need to search or browse for specific items. Recommendation systems generally infer these decisions by analyzing historical data.

III. AGENT-BASED DATA MINING

Agent-based approaches are becoming increasingly important because of their generality, flexibility, modularity and ability to take advantage of distributed resources.

Agents are used for information retrieval, entertainment, coordinating systems of multiple robots, and modeling economic systems. They are useful in reducing work and information overload, in complex tasks such as medical monitoring and battlefield reasoning. An intelligent agent can use domain knowledge with embedded simple rules and using the training data it can learn and reduce the need for domain experts. In the interpretation of what is learned, a scanning agent can go through the rules and facts generated

and identify items that can possibly contain valuable information [3].

A. *Data Preparation*: Data preparation in data mining involves data selection, data cleansing, data preprocessing, and data representation.

B. *Data cleansing*: could be automated through the use of an intelligent agent with a rule base. When a record is added or updated in a relational database, a trigger could call the intelligent agent to examine the transaction data.

C. *Data preprocessing*: also requires domain knowledge, since there is no way to know the semantics of the attributes and relationships like computed or derived fields, could be automated using rules and basic statistical information about variables.

IV. AGENT-BASED DATA MINING IN MOBILE COMMERCE

Consider a supermarket with a large collection of items. Typical business decisions that the management of the supermarket has to make include what to put on sale, how to design coupons, how to place merchandise on shelves in order to maximize the profit, etc. Analysis of past transaction data is a commonly used approach in order to improve the quality of such decisions [7].

The major advantage of using intelligent agents in automation of data mining is indicated as their possible support for online transaction data mining. When new data is added to the database, an alarm or triggering agent can send events to the main mining application and to the learning task in it, so that new data can be evaluated with the already mined data.

The following architecture (Fig 2) shows Agents are providing recommendation in order to predict the behavior of user in Mobile commerce.

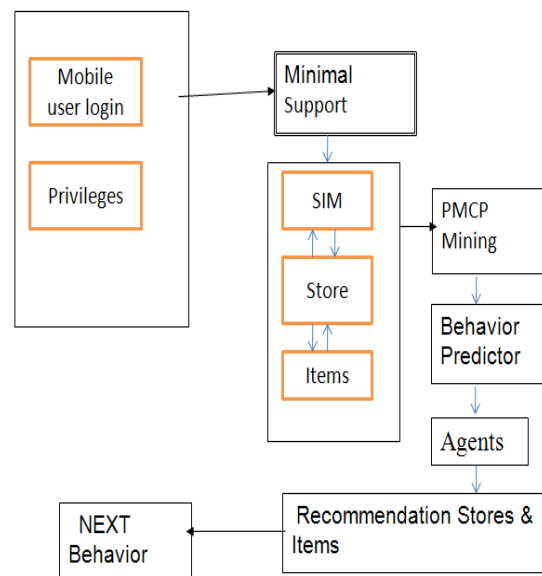


Fig 2: Architecture of Mobile Commerce Behavior Prediction by Agents

1) Similarity Inference Model (SIM) for measuring the similarities among stores and items, which are two basic mobile commerce entities 2) Personal Mobile Commerce Pattern Mine (PMCP-Mine) algorithm for efficient discovery of mobile users' Personal Mobile Commerce Patterns (PMCPs); and 3) Mobile Commerce Behavior Predictor (MCBP) for prediction of possible mobile user behaviors in order to recommend stores or items which is previously unknown to user [6].

Mobile User gets login into the system by giving his/her Username and Password which will be validated by the Server. Privileges are Type of Logins (For eg. User – Who is going to do Purchase, Profile – To View the Profile, Product Deplorer – Who is going to deploy the Product and so on).

Recommendations are done based on Minimal Support Count (MSC), the user who crossed the MSC the prediction is from his own purchasing history, for Fresh User (who has not crossed MSC) the prediction is from Overall Database. The problem of discovering all item set can be decomposed into two sub problems [8]:

1. Find all sets of items (item sets) that have transaction support above minimum support. The support for an item set is the number of transactions that contain the item set. Item sets with minimum support are called large item sets, and all others small item sets based on this MSC is determined.

2. With MSC use PMCP- Mine algorithm to give recommendation.

The Recommendation given by Agents will make your Transaction easier in the Mobile like small device in order to finish the Transaction easier and Faster and able to achieve the higher performance.

Database mining is motivated by the decision support problem faced by most large retail organizations.

Data records also contain customer-id, particularly when the purchase has been made using a credit card or a frequent-buyer card [9]. Catalog companies also collect such data using the orders they receive. Based on this transaction can be done using Credit Card over here.

The problem of measuring “similarity” of objects arises in many applications, and many domain-specific measures have been developed, e.g., matching text across documents or computing overlap among item-sets [11]. There have been two studies on measuring the similarity between two objects. The first one is based on multiple-level hierarchical structures. The Second one is sequence alignments [12].

Customer ID	Customer Sequence
1	<(T-Shirt) (Jeans Pant)>
2	<(Basic C) (First Java, C++) >
3	<(Soap) (Shampoo)>
4	<(Coffee Powder) (Milk)>
5	<(Pen) (Ink)>

Table: 1 Customer- Transaction Sequence

Consider the Table 1 Transaction can be made based on the earlier transaction. So that the Customer-Transaction sequence is made in order to do recommendation [10].

A. Performance Evaluation

In Mobile-Commerce applications, low precision in predictions may lead to high penalty in business cost. Hence, the precision is more important than the recall for behavior prediction. From Figure 3 we will come to know that the Performance is improved when the recommendations are done by agents.

Performance can be evaluated in terms of following measures Speed, Security, Accessibility and efficiency. The experimental results show that the framework (Recommendation using Agents) achieves a very high precision in mobile commerce behavior predictions.

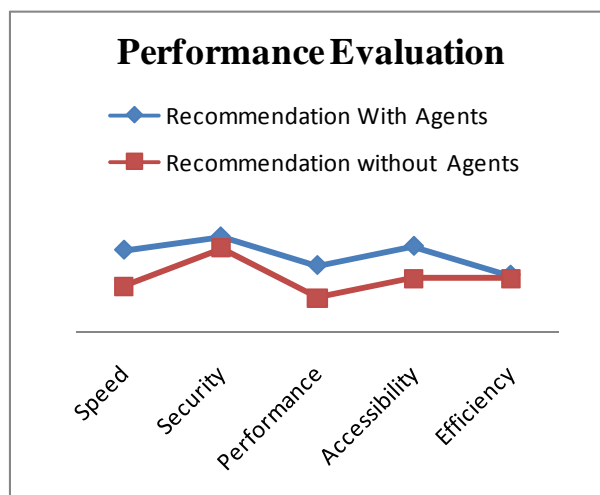


Fig 3: Performance Chart

V CONCLUSION

In this Paper we have presented an overview of Agent based Data mining systems that exist today. We have also defined the common components like Agents, Mobile commerce, Data Mining and have given a description to their strategies and architecture.

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