Dynamic Recommendation for E-commerce users

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Abstract - *Various E-commerce organizations, now a days, with the booming culture of E-commerce, rely on websites, to attract new customers and retain the old customers, and hence to have the growth of the organizations. The part of methods for achieving these goals is the use of recommendation system. This system uses traditional data mining techniques to generate a list of products which will be at maximum according to the user's expectations. Using traditional web-usage mining techniques in an enhanced manner, valuable patterns and hidden knowledge can be discovered. This project aims at exploring this dynamic knowledge to E-commerce users, whether they are registered or unregistered users of the organization's services at their websites. The project proposes a new algorithm called Behaviour based rational technique that uses web-log files for tracking user's dynamic behaviour, draws out lexical patterns, to generate more accurate recommendation list of items. The results of comparison between proposed system and traditional recommendation system prove that proposed system yields good quality accuracy and diminishes the limitations of traditional system*

Key Words: E-commerce, recommendation system, web mining

1. INTRODUCTION

To attract the customers to their website, today's E-commerce organizations follow different software strategies, one of which is Recommendation system. The Recommendation system makes a great use of concepts of data mining, and its subcategories like web mining, web-usage mining etc., to extract the knowledge from databases that include product details and user's historical transactions, as well as, from the data obtained by the user's behaviour on their website. User's behaviour can be in terms of his purchase patterns, his clickstreams over particular URLs, and his preferences. Taken all this into consideration, a list of products is generated, with the maximum probability that the user will purchase the product from the list. The list hence can be called as recommendation list. In this paper, we explain the main concepts related to recommendation system, and also explain a new technique, Behaviour Based Rational Technique, which is enhancement of traditional recommendation techniques, which can generate a dynamic recommendation list, and gives better results over traditional systems.

2. RELATED WORK

In [2], Zan Huang, Daniel Zeng, Hsinchun Chen study various recommendation systems along with comparison. In [4], Prajyoti Lopes, Bidisha Roy, suggest web personalization along with the use of collaborative filtering. However, there are problems associated with this method like scalability and it doesn't consider some deeper characteristics which can be useful for better recommendation. Therefore, in [5] same authors propose better recommendation system based on web-usage mining. In [3], B. Naveena Devi et al. implement web-usage mining intelligent systems in E-commerce field. In [1], how web usage mining used for web personalization is thoroughly explained by Rajesh et al.

3. E-COMMERCE SYSTEMS

A simple term-commerce simply means the exchange of goods, in terms of buying and selling, on a large-scale. The 'E' prefix stands for 'Electronic'. Hence the term E-commerce means the activity of commerce done on an electronic network. In a deeper sense, the activities related to commerce such as choosing a product, buying and selling, transferring the money, when done over an electronic network, or Internet or simply computer network, constitute E-commerce.

E-commerce facilitates such trading of products and services over wide range, over the world, beyond cultural as well as national boundaries. Through attractive websites, the customer is provided real-time information of products, such as their coverage in market. The website also provides real-time view of products through means of image, video, audio and other media. Because of wide range of E-commerce services, and ever increasing number of customers across the world, the respective organizations are bound to provide the best services.

Considering above, E-commerce organizations try to maintain their already registered customers and even attract newer customers. They apply several strategies for that. Some organizations make available more and more products, some advertise more easy payment modes, and some tell their wide offline reach along with online reach to the corners of the world. Since last few years, organizations are attempting to make changes over their websites, including some strategies such as using recommendation system. When user 'travels' over website, his interest is counted and he is suggested products he most likely to purchase. So, because user doesn't need to waste his much of time over that particular site, user is automatically attracted to it.

4. RECOMMENDATION SYSTEM

As seen previously, recommendation system tracks user's historical as well as online behaviour, counts user's interest and accordingly suggest him products and services. The recommendation system uses concepts from data mining, web mining etc. Better recommendation system may be characterized by two measures, *1. Accuracy*: It can be defined by how the generated recommendation list is according to user's interest, and *2. Ability to be dynamic*: It can be defined by the capability of the system to accommodate dynamic, changing online behaviour of user. In the subsequent sections, we discuss the traditional recommendation techniques, their effectiveness and some few drawbacks. We also discuss the proposed innovative Behaviour Based Rational technique, how to it brings enhancements to traditional systems and obtains better results.

5. EXISTING TECHNIQUES

1.2 Collaborative Filtering

Collaborative filtering methods gather the abundant data or information generated from use's behaviours, preferences etc. and analysis on the data is carried out to infer the user's interest, based on their similarities with other users. This technique is also called as People-to-People correlation. One common strategy this technique uses to correlate other users' information for current user for whom recommendation list is generated is: 1) Find set of users that share the same rating patterns as the current user, 2) From that set, find a subset of users that show same behaviour as the current user. 3) From them, calculate a prediction for the current user. Collaborative filtering even assumes that the past behaviours of user will be the same in future. It means the items that user chose in part as interesting, the user will like in the future too.

5.2 Content Based Filtering

Content based filtering methods are based on a description of the item and a profile of the user's preference. In a content-based recommender system, keywords are used to describe the items; beside, a user profile is built to indicate the type of item this user likes. In other words, these algorithms try to recommend items that are similar to those that a user liked in the past (or is examining in the present). In particular, various candidate items are compared with items previously rated by the user and the best-matching items are recommended. This approach has its roots in information retrieval and information filtering research.

6. PROPOSED SYSTEM

The proposed system uses web-usage mining technique for better recommendation system. The system proposes a new algorithm called Behaviour based rational technique, that uses traditional techniques as well as web-usage mining to bring enhancement over traditional system.

6.1 Behaviour Based Rational Technique

This technique provides dynamic recommendation as per user's changing behaviour. It constructs lexical patterns by converting sequence of products visited into meaningful character string. This technique is suitable for all users (registered as well as unregistered). The entire technique is divided into two steps: 1) capturing traversal patterns and converting to lexical patterns, 2) recommendation generation method.

6.2 System Architecture

The system takes into consideration user input which is his behaviour on E-commerce website. The navigational data is maintained in web-log files. This unstructured data is preprocessed and convert into structured format. The Behaviour based rational technique is applied on the structured data to generate dynamic recommendation list.
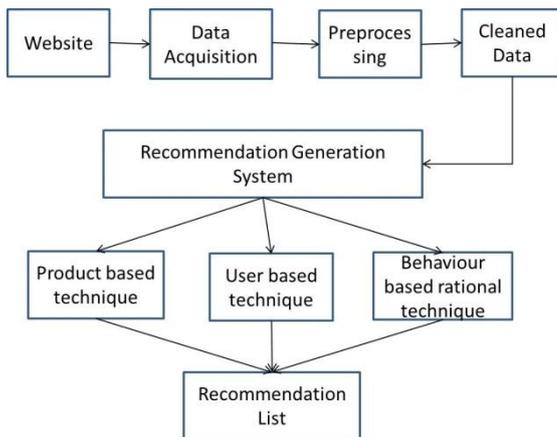
ISO 9001:2008 Certified Journal

Fig- 1: System Architecture

7. CONCLUSION

The proposed system suggests an enhanced technique called Behaviour based rational technique which uses web-usage mining on web-log files for generating recommendation list according to dynamic behaviour of user, both register and unregistered. The algorithm has more accuracy and precision than traditional recommendation technique. The proposed system, along with the behaviour based rational technique, also uses some traditional technique that take account the product-to-product relationship as well as user-to-product relationship. The key input of the system is user's clickstreams.

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