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E-commerce Recommendation based on Users Rating Data

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Abstract - *Recommending appropriate product items to the target user is becoming the key to ensure continuous success of Ecommerce. Today, many E-commerce systems adopt various recommendation techniques, e.g., Collaborative Filtering (abbreviated as CF)-based technique, to realize product item recommendation. Overall, the present CF recommendation can perform very well, if the target user owns similar friends (user-based CF), or the product items purchased and preferred by target user own one or more similar product items (item-based CF). While due to the sparsity of big rating data in E-commerce, similar friends and similar product items may be both absent from the user-product purchase network, which lead to a big challenge to recommend appropriate product items to the target user. Considering the challenge, we put forward a Structural Balance Theory-based Recommendation (i.e., SBT-Rec) approach. In the concrete, (I) user-based recommendation: we look for target user's "enemy" (i.e., the users having opposite preference with target user); afterwards, we determine target user's "possible friends", according to "enemy's enemy is a friend" rule of Structural Balance Theory, and recommend the product items preferred by "possible friends" of target user to the target user. (II) likewise, for the product items purchased and preferred by target user, we determine their "possibly similar product items" based on Structural Balance Theory and recommend them to the target user.*

Key Words: Ecommerce, Recommendation system, collaborative filtering, structural balance theory, user neighbourhood algorithm.

1. INTRODUCTION

With the popularity of network, E-commerce has gained fast development and accumulated a huge number of faithful online users all over the world. Through E-commerce, users can browse, compare and select the product items that they like in a more convenient manner, which brings great facility to the Ecommerce users.

Today, many E-commerce companies (e.g., Amazon, eBay, Best buy) have provided various product items to their massive online users. Generally, in each E-commerce company, there are a variety of product items that are ready to be compared, selected and purchased by target users. Therefore, from the perspective of E-commerce companies, accurately predicting target users' preference and further recommending appropriate product items to him/her, is becoming the key to ensure the continuous success of Ecommerce companies .In view of this, many recommendation approaches are brought forth, e.g., the well-known Collaborative Filtering (i.e., CF)-based recommendation. Concretely, through observing the big rating data in user-product purchase network, we can determine the similar friends of target user, or the similar product items of target user' preferred product items, and further put forward CF recommendation methods [7-9], such as item-based one, user-based one, or hybrid one.

In general, the traditional CF-based recommendation approaches can work very well, when the target user has one or more similar friends (i.e., user-based CF), or the target user's purchased and preferred product items own one or more similar product items (i.e., item-based CF). However, due to the null or insufficient feedback incentive in E-commerce applications, many online shopping users are not willing to give their ratings on product items after the purchase behaviour, which generates a big but sparse user-product rating matrix. In this situation, for the target user, his/her similar friends and similar product items are both absent from the user-product purchase network, which may lead to a failure of traditional CF-based recommendation approaches and bring a big challenge for accurate product item recommendation for the target user. Considering the above challenge, we put forward a Structural Balance Theory-based Recommendation (i.e., SBT-Rec) approach over big rating data in E-commerce. Different from the traditional CF-based recommendation approaches where we look for "similar friends" or "similar product items" directly, in SBT-Rec, we first look for the target user's dissimilar "enemy" (i.e., opposite of "friend"), and what is more, we glance for the "possible friends" of E-commerce target user, in line with "enemy's enemy could be a friend" rule of Structural Balance Theory; after, the product items preferred by the target user's

2. LITERATURE SURVEY

The successful research organisation which has been entrusted with the market research will collect the data, analyse it and interpret its findings. Afterwards, the analysis agency are during a position to report its conclusions, analysis limitations and implications of study. In the recent decade, the C2C e-commerce has developed very fast and played a key role in the internet transaction. The results additionally disclosed that perceived worth exerted a stronger influence on purchase choices of repeat customers as compared to it of potential customers. Perceived trust exerted a stronger influence on purchase decisions of potential customers as compared to that of repeat customers.

3. EXISTING SYSTEM

Product item recommendation has been a hot research topic in E-commerce domain. Through analyzing the existing big user-product rating data, we can recognize user interest and preference precisely and further recommend appropriate product items to the target user, so as to improve the on line product sales significantly. Many people have investigated this recommendation problem and put forward various solutions. However, existing work only discusses the objective quality prediction, without considering the subjective preferences of different users

3.1 PROPOSED SYSTEM

Considering the above challenge, we put forward a Structural Balance Theory-based Recommendation (i.e., SBT-Rec) approach over big rating data in E-commerce. Different from the traditional CF-based recommendation approaches where we look for "similar friends" or "similar product items" directly, in SBT-Rec, we first look for the target user's dissimilar "enemy" (i.e., antonym of "friend"), and furthermore, we look for the "possible friends "of E-commerce target user, according to "enemy's enemy is a friend" rule of Structural Balance Theory. Afterwards the merchandise things most popular by the target user's "possible friends" square measure considered the advice candidates for target user; likewise, for the product items preferred by target user, we 1st confirm their "possibility similar product items" supported "enemy's enemy could be a friend" rule of Structural Balance Theory, and regard them because the recommendation candidates for target user.

Algorithm:

Input: User rating matrix RM and an active user au.

Output: recommended items set of size N for the active user au

K: Number of users in the neighbourhood N_{au} (k) of the active user au.

N: Number of items recommended to the active user au.

I^c_{au}: Items which have not yet rated by the active user au.

CN_{au}: Candidate neighbours of the active user au.

$P_{au\,j}$: Rating prediction of items *i* for the active user au.

1: CN_{au} :U, then compute similarity between active user au and each user $u \in CN_{au}$:

2: for each item $i \in I^c_{au}$ do:

3: Find the k most similar users in CN_{au} to comprise neighbourhood $N_{au}(k)$:

4: Predicate rating score $p_{au\,j}$ for item I by neighbourhood $N_{au}(k)$:

5: end for

6: Recommend to the active user au the top N items having the highest $p_{au,j:}$

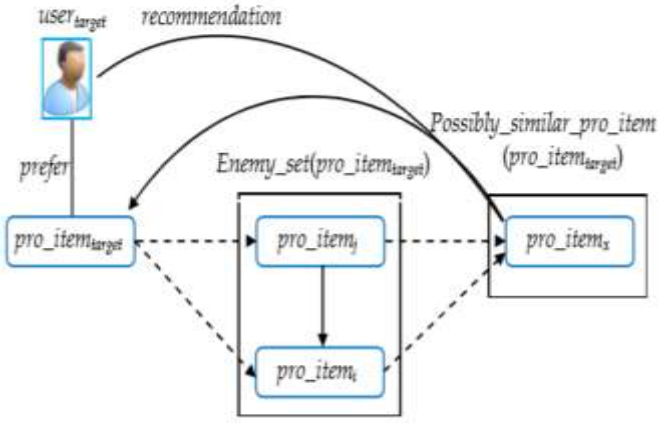

Fig -1: Architecture diagram

Data collection – huge data will be stored in database, when the user requests for item, the data need to be cleaned and normalized.

Recommendation module –based on the users rating the recommendation algorithm will suggest the items to the target user.

User interface –User will search, view and select the item.

The user need to register and then login to the web application. After successful registration user profile will be created and the user can request for item and also specify there requirement and this data is stored in database now the data is sent to recommendation module and here the past behaviour of the user is Processed and is compared with his friends data, ratings and a new item is suggested to the target user. Once the user is satisfied by the item they can rate the item and this is again stored in database for other users recommendation .once after recommendation Post processing of data is done. Now the user can search for items and view the choices suggested to them and select one among and rate a product

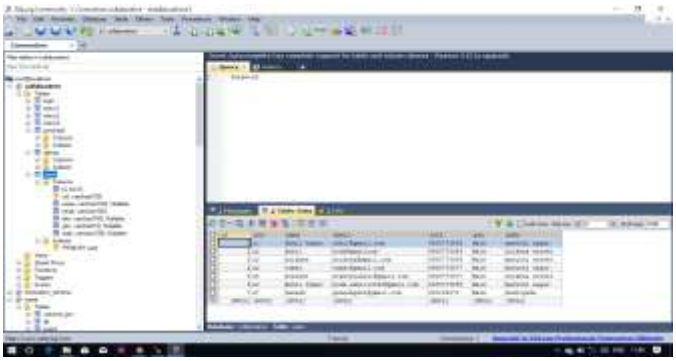

Fig -2: Result of register users in SQL

Fig -3: Result of ratings given by users

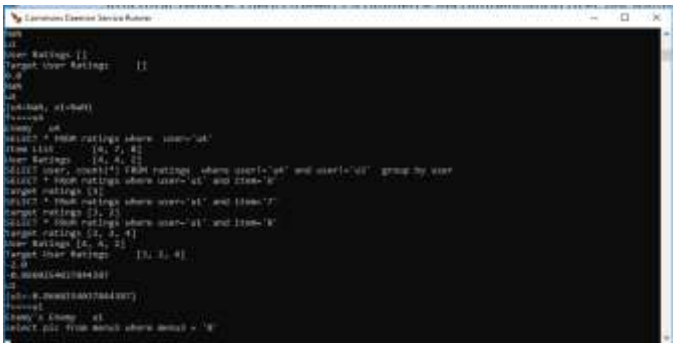

Fig -4: Calutation for recommendation user rating

4. CONCLUSION

According to the big rating data in E-commerce, a novel product item recommendation approach named SBT-Rec is brought forth in this paper, for dealing with the specific recommendation situations when the target user has no similar friends and the product items preferred by target user have no similar product items. On one hand, SBTRec makes full use of the valuable structural balance information hidden in user-product purchase network for precise recommendation, by considering "enemy's enemy is a friend" rule and "enemy's friend is an enemy" rule in Structural Balance Theory; on the other hand, SBT-Rec integrates both user-based CF recommendation and itembased CF recommendation, so as to improve the recommendation recall. Through a set of experiments deployed on MovieLens-1M, we further validate the feasibility of SBT-Rec.

In the upcoming research, we hope to analyse and investigate automated similarity threshold setting method, to accommodate the personalized requirements from different E-commerce users. Besides, we will take the time aware user ratings into consideration, so as to improve the applicability of our proposal in dynamic recommendation applications.

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