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Personalized Recommend System Combining User Interest and Social Circle

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Abstract— ***With the dawn of social network and its attractiveness, people are interested to share their experience, such as rating, reviews, etc. which helps to recommend the items of user interest. The potential growth of the internet results the use of social networks such as Face book, Twitter, linked-in etc. which produces huge amount of information (data), which leads to overwhelming. To overcome overwhelming, Personalized Recommendation System have been expansively used. In this paper, we discussed importance of Recommendation Systems, different methodologies and social factors, which influence Personalized Recommendation System. A deeper understanding of these social processes around user preference can help in creating better models of preference and lead to more effective personalization strategies.***

Key words— *social networks, recommended system, interpersonal interest, association rule.*

1.INTRODUCTION 1

In recent years, online platforms have emerged which thrive on the activity of their users who share some social connections. Social networks such as face book, twitter are handling large scale of information by recommending user interested items and products. RS has wide range of applications such as research articles, new social tags, movies, music etc. According to the user input and different attribute items can be recommended, which is closely related to user interest. people interact and form social connections with other users. At the same time they also express their preferences towards items through their rating, sharing, editing, or consuming activities. Availability of this additional social context has opened up new avenues for personalization closeness in a social network likely implies similar preferences. Recommendation system (RS) has been successfully used to solve problem overwhelming. Social networks such as face book, twitter are handling large scale of information by recommending user interested items and products. RS has wide range of applications such as research articles, new social tags, movies, music etc. According to the user input and different attribute items can be recommended,
which is closely related to user interest. Survey shows that more than 25 percent of sales generated through recommendation. Over 90% peoples believe that products recommended by friend are useful and 50% people buy the recommended products or items of their interest. Google+ introduced "Friends Circle" to filter the contacts according to different activities and strategies, which helps users to be closer to their friends. In a large web space, recommendation helps to find items of user interest . Collaborative filtering and content based filtering are widely used methodologies for recommendation. For Data Mining works cold start has been a serious problem. Even though we have many algorithms to work on Data Mining, cold start has made people to step back in analyzing the functionality of those algorithms lead to little decrease in creativity and optimizations in data mining algorithms. Cold start can be described as unavailability of data for modeling algorithms. Web is always dynamic, so it very difficult to predict the user interested items in time. Personalized RS constitutes factors such as interpersonal interest, person's interest and interpersonal influence. Personalized RS is helpful to recommend the items on social networks with the aim that recommended items should based on their historical behavior and interpersonal relationship of social networks. The increasingly popular online social networks provide additional information to enhance pure rating-based RS . Recommendation in traditional system focuses on pair of (buyer, item) whereas social recommendation focuses on triplet (seller, buyer, item) which enhances the more appropriate items of user interest. The quality of the recommendation can be achieved with the help of user interpersonal interest in social network. Several social-trust based RS have recently been proposed to improve recommendation accuracy. The interpersonal relationship in the friend's circle of social networks and social contexts helps to solve sparsity problem.

2.Sparsity Problem 2

Sparsity problem is one of the major problems encountered by recommender system is data sparsity has great influence on the quality of recommendation. The main reason behind data sparsity is that most users do not rate most of the items and the available ratings are usually sparse. In collaborative filtering technique it is important that the more users are required to be rated the item. Though high rating given by few users leads to problem of sparsity. To prevail over the sparsity problem, one can use user profile information [6] while calculating user similarity item with others. Similarity in users can be identified with the aid of age, area code, gender, demographic segment etc. Sparsity problem also resolved by associative retrieval framework and related spreading activation algorithms. Sparse rating

matrix can used to resolve the sparsity problem. Item based mining and associative retrieval technique also used to overcome the problem of sparsity. demographic segment etc. Sparsity problem also resolved.

3.Scalability 3

Scalability is the property of system indicates its talent to handle emergent amount of information in a stylish manner. With vast growth in information over internet, it is obvious that the recommender systems are having an explosion of data and thus it is a big dispute to handle with continuously growing demand. Some of the recommender system algorithms deal with the computations, which increase with growing number of users and items. Method projected for treatment scalability problems are based on approximation mechanism .Even if they advance routine, most of the time they result in correctness reduction. Scalability problem can be resolved by pre-processing; clustering and user based collaborative filtering. In pre-processing noisy data is cleaned and transformed to the recommendation system. Clustering helps to group the similar items with intra cluster distance as small as possible and inter cluster distance as large as possible. Used based collaborative filtering uses the person's profile. Personalised recommendation algorithm also used to overcome the problem of scalability. It is also overcome by using association retrieval.

4.Basic Matrix Factorization 4

(Base MF) approach, which does not take any social factors into consideration. The task of RS is to decrease the error of predicted value using **R** to the real rating value. Thus, the Base MF model is trained on the observed rating data by minimizing the objective function.

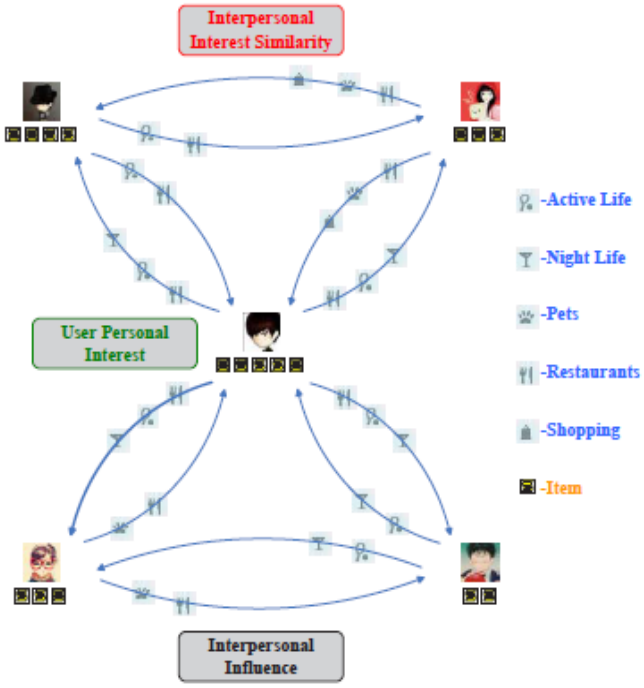
4.1 Circle Con Model 1

The Circle Con model has been found to outperform Base MF and Social MF with respect to accuracy of the RS. The approach focuses on the factor of interpersonal trust in social network and infers the trust circle.

5.Context MF Model 5

Demonstrate the significance of social contextual factors (including interpersonal influence and individual preference) for item adopting on real Face book and Twitter style datasets. The task of Context MF model in is to recommend acceptable items from sender to receiver. Here, the factor of interpersonal influence is similar to the trust values in Circle Con model. Moreover, individual preference is mined from receiver's historical adopted items. User rated items has more influence than individual preference in Context MF model, because it easier for the recommended items of our model to be transformed into purchase rate than the adopted items in Face book style social networks. It is observed that neigh bours in the social network have similar interest, Context matrix factorization helps to identify similar.

Fig -1. Three main social factors in our recommendation model, including user personal interest, interpersonal interest Similarity, and interpersonal influence. The items under users are historical rating records, which can be used to mine users personal interest. The category icon on line between two users denotes their interest similarity. And the boldness of the line between users indicates the strength of interpersonal influence.



The proposed personalized recommendation approach fuses three social factors: user personal interest, interpersonal interest similarity, and interpersonal influence to recommend user interested items. The illustration of our approach is shown in Fig. 1. Among the three factors, user personal interest and interpersonal interest similarity are the main contributions of the approach and all related to user interest. Thus, we introduce user interest factor firstly. And then, we infer the objective function of the proposed personalized recommendation model. At last, we give the training approach of the model. Here in after we turn to the details of our approach.

5.1 User Interest description 1

Besides the trust values between friends in the same category , user interest is another significant factor to affect users' decision-making process, which has been proved by psychology and sociology studies .Moreover, demonstrated the effect of Context MF model with consideration of both individual preference and interpersonal influence. However, there are two main differences of the user interest factor in our model to individual preference in Context MF.

1)The independence of user interest:

It means we can recommend items based on user interest at a certain extent. In other words, we utilize user's connection with the items to train the latent feature vectors, especially for the experienced users.

2) Interest circle inference:

we divide the tested social network into several sub-networks, and each of them corresponds to a signal category of items. Considering the cold start users who has a few rating records, we use friends' interest in the same category to link user latent feature vector.

3)personal Interest Description:

According to the natural item category tags of rating datasets, we can get category distribution of the item, which can be seen as the naïve topic distribution of the item *Di*.

Fig -2: Tree structure of categories of items.

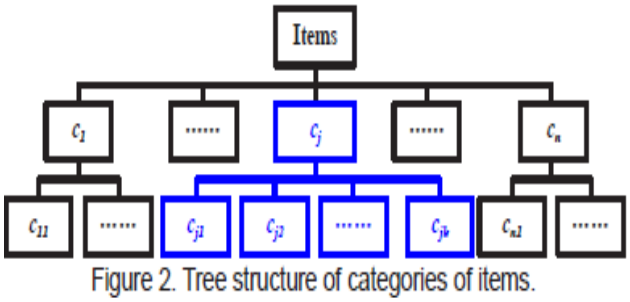
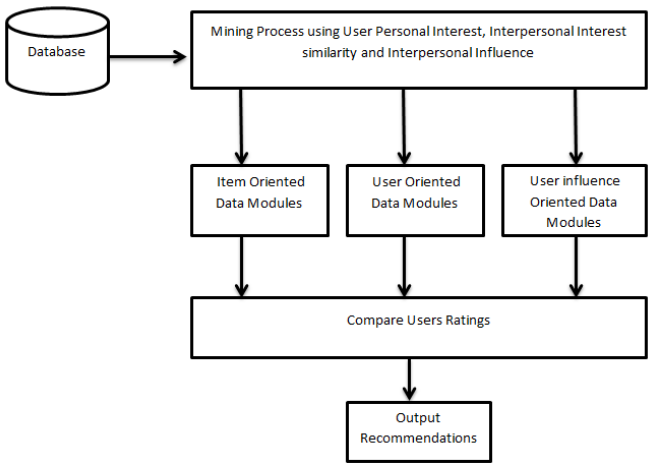


Figure 2. Tree structure of categories of items.

Fig -2 to extract the topic distributions of items.

The first level of the tree structure is the big category of items. For example, we have 8 big categories: #1**Active Life**, #2**Beauty and Spas**, #3**Home Services**, #4**Hotels & Travel**, #5**Night Life**, #6**Pets**, #7**Restaurants**, and #8**Shopping.** The second level is the subcategory of each big category in the first level.

Fig -3: Systems Architecture



The main aim of our method is to give accurate recommendations to the users according to user's personal interest, so we will combine user interest and social circle in such a way that, it will give better recommendations than the previous recommendation techniques. So our proposed recommendation system will contain following modules:

1.Item oriented data modules
2.User oriented data modules
3.User influence oriented data modules

1.Mining Item oriented Data modules

By using user interest description we define user's personal interest. and using this personal interest related to items, we scan the database for the item for which particular users interested in.

2.Mining user oriented Data modules

In this, we will take in to consideration the individual user interest as well as other users interest and compare them by using collaborative filtering technique and by using this user oriented data, we will scan the database.

3.Mining user influence oriented Data modules

In this, we will mine the database on the basis of individual user interest which is influenced by other user's interest which are in similar social circle.

4.Dynamic mining of weighted ratings on the basis of user preferences

In this, we will take the user preferences item oriented mining, user oriented mining and user influence oriented mining process, which are then combined. And after this particular weight is assigned to these user ratings and by using this data personalized recommendations are given to the user.

After finding the user oriented, user similarity and inter personal influence oriented data, next task is to combine all these data and arrange this data according to similarity with user personal interest and give the recommendations to the users. For this purpose we will use BiClustering and Fusion Technique. The Output of this step will be the output of our proposed system, i.e. Recommendations.

6.Conclusion

This paper provides various existing methods used for personalized recommendation. By reviewing these recommendation techniques it is observed that, in most of the recommendation techniques Cold start problem and Sparsity problem of Data set occurs. So, to overcome these problems we have proposed some modifications in a personalized recommendation technique in which we can use a Bi Clustering and Fusion Technique at the end of previous personalized recommendation technique. It will give the accurate recommendations according to user personal interest and it will also solve the problem of Cold start user and sparsity of Datasets in effective manner.

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