

A SURVEY OF COLLABORATIVE FILTERING-BASED RECOMMENDER SYSTEMS

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***Abstract-**Today is the digital age, more and more information is available electronically. All the available information is not of much of use for all the users. So effective retrieval of information is very essential. When a system gives some recommendation it must be useful for the user.*

Key Words

Cold start Problem, Collaborative Filtering(CF), Content based (CB) Recommender System, Hybrid Recommender System, and Recommender System (RS).

1. INTRODUCTION

Recommender System is an information retrieval system that is used to recommend something to a user [e.g.: movie, music etc.]. Collaborative filtering is one of the best personalization techniques powering the adaptive web. Collaborative filtering may be defined as the process of evaluating and filtering items based on the choice of other peoples having similar tastes. *Collaborative filtering* arrives at a recommendation that's based on a model of prior user behavior. This technique analysis behavior of a single user or more effectively also analysis the behavior of other users having the similar tastes. While taking the users behavior into consideration, CF uses group knowledge to give a recommendation based on similar users. In CF recommender system, multiple users are clubbed automatically and then based on this collaboration, the users having the similar taste are filtered and then recommendations are made.

2. ALLIED WORK

The recommendation systems are broadly divided into four main categories

2.1 CONTENT BASED RECOMMENDER SYSTEM

Content based recommender system are those system that makes recommendations based on the items liked by the user in the past

2.2 COLLABORATIVE FILTERING RECOMMENDER SYSTEM

CF recommender system gives recommendations based on the items liked by the users with similar taste in the past.

2.3 KNOWLEDGE BASED RECOMMENDER SYSTEM

Knowledge-based systems works on specific domain knowledge. Based on this knowledge, the system analysis how the item is useful to the user and ultimately recommends that item to the user if that is useful for the user.

2.4 HYBRID RECOMMENDER SYSTEM

These systems made recommendations by combining any of the above technique. These systems combine the RS in order to overcome disadvantages of one RS and utilize the advantages of other RS.

3. LITERATURE SURVEY

The concept of Recommender system was introduced in mid-1990s. Now the Recommendation has become a field of research in itself as there is a huge commercial value associated with this

field. The use of the recommender system has increased exponentially and has a tremendous commercial value. **Jia Zhou and TiejianLuo [2]** has published a paper on Collaborative Filtering applications. The paper describes about the collaborative filtering techniques which were currently in used in this generation. This paper states that the CF techniques used in this generation can be divided into two methods and these methods are heuristic-based method and model-based method.

J. Ben Schafer, Dan Frankowski, Jon Herlocker, and ShiladSen[1], has published a paper on Collaborative filtering recommender system. CF has been defined as one of the potent personalization technique powering the adaptive web. It describes the various collaborative filtering techniques that b combines together the opinions of huge interconnected peoples on the

Jianming He and Wesley W. Chu [3],has published a paper: A Social Network-Based Recommender System (SNRS).
Internet.

This paper has presented a new criterion of RS that can gather information in social networks, including the preferences of users, general acceptance of items, and social friends influence. From this information various recommendations are made by the model based on this information. Extraction of data from an online social network, and analyzing that huge data set to reveals that friends have a tendency to select the same items and give similar ratings.

LinyuanLü, MatúšMedo, Chi Ho Yeung, Yi-Cheng Zhang, Zi-Ke Zhang,Tao Zhou [4], Recommender system reviews recent developments in the Recommender Systems and discusses the various major challenges. There is comparison of all the available algorithms and their role in future development.It is very common that Researchers of a same lab often consume a large amount of time searching for articles relevant to their current project. While having similar interests, they conduct individual, time consuming searches. While they may share the results afterwards, they are unable to take advantage of previous search results during the search process.

Nitin Agarwal, EhteshamHaque, Huan Liu, and Lance Parsons [5], Research Paper Recommender Systems: A Subspace Clustering Approachwhich proposes a Research Paper Recommender System that prevents such time consuming searches by adding existing search engines with recommendations based on previous searches performed by others in the lab.

4. KEY CHALLENGES

Here we discuss the key challenges for CF systems.

TRANSPARENCY.The meaning of Transparency is different in different applications. Sometimes the aim of CF system is to help the user to make a best decision. Other times its goal may be to help the user to decide whether a particular recommendation is fit for his mood or goal. The challenges of developing effective transparency include (a) choosing whether to trace the workings of an algorithm, or to put together an independent argument that justifies the results of the algorithm; (b) what data to use, including other items, other users, or metadata; and (c) how to present the results to the user.

EXPLORATION VERSUS EXPLOITATION. Cold start problem is one of the longest standing challenges in recommender systems. It is very challenging to deal with new items,

new users, for which the RS has not yet gathered enough information to provide effective recommendations. When the information is not collected to make recommendations, the percentage of recommendation for this item will be 0% to any user. One of the approaches to overcome this problem is to present the user with items he is likely to like (exploitation) turn wise and low information items to get his input so they can be effectively recommended to other users (exploration). The problem can be modelled by estimating the value provided to this user by a good recommendation, and comparing it to the value obtained for the community by getting this user's input on a low information item. One of the key component of the estimate must be the risk of taking away the user if he is shown too many irrelevant items.

5. CONCLUSION

It is clear that RS are having a very huge commercial value now a days as the internet has a very powerful impact on many businesses (most). Most of the marketing is done online now in order to reach to a very large set of audience. Based on various researches CF has been seen as one of the best techniques for recommendation purposes. CF works on the principle of clubbing information of various items which are liked by similar users and after analyzing this information, CF makes the recommendations.

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