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COMPARISON OF COLLABORATIVE FILTERING ALGORITHM

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Abstract - *Collaborative filtering recommendation is widely used in today's world. Main problem in CF algorithm is scalability and cold start problem. Many algorithms used to solve this problem but they take more time to calculate Recommendation.To get more accuracy we use hybrid method. In hybrid method first we compute the average rating of items and store them in two vectors and then identify similar items then we compute user similarity and finally make recommendation. Proposed CF algorithm gives more accurate recommendation.*

Key Words*: Hybrid Recommendation System, Collaborative filtering, Customer segmentation, Product recommendation, Sequential Rule*

I. Intoduction

Web personalization recommendation is an important task from the user point of view as well asapplication point of view. Personalization recommendation used organization to make customer centric website. Personalised recommendation systems helps organization to enable loyal and lasting relationship to customer by providing individualized information. Collaborative filtering technique is most effective personalised recommendation technique. Many researchers have proposed various kind of collaborative filtering (CF) technique. Collaborative filtering technique use customer ratings on items. There are two method in CF as User based collaborative filtering and Item based collaborative filtering [2,3]. In User based CF we first find User's interesting items and then find other user who have similar interest. So , as first it find user User's neighbor based on similar interest and then combine neighbor users' ratings. Item based CF is same as User based CF. It consider a set of Items, the target user already rated and compute how similar they are to the target item under recommendation. The challenges of this two CF is following[1,3]:

Sparsity: Even as users are very active, there are a few rating of the total number of items available in a user item ratings database. As the main of the collaborative filtering algorithms are based on similarity measures computed over the co-rated set of items, large levels of sparsity can lead to less accuracy.

Scalability: Collaborative filtering algorithms seem to be efficient in filtering in items that are interesting to users. However, they require computations that are very expensive and grow non-linearly with the number of users and items in a database.

Cold-start: An item cannot be recommended unless it has been rated by a number of users. This problem applies to new items and is particularly detrimental to users with eclectic interest. Likewise, a new user has to rate a sufficient number of items before the CF algorithm be able to provide accurate recommendations.

Collaborative filtering algorithm is very efficient when no of customer and items are less. If no of customer and items are increase its gives poor result.There is a scalability problem. There is another problem in collaborative filtering technique, an item cannot be recommended unless it has been rated by a number of users. New items introduce it undergoes phase this problem as it has not sufficient ratings from users. Many algorithms such as kNN [9] and Slope One.

Popular distance measures include the Manhattan distance[9].A traditional Clustering approach has been also used to increase the performance of recommendation process. Collaborative filtering is based either on similarities between users or Items, to form a cluster of users or items respectively.we analyses collaborative filtering using clustering techniques. These techniques consist user clustering, item clustering and hybrid clustering which based on user and item clustering.In the era of big data, we are often faced with the situation in which data are updated quickly. Under this situation, one key issue concerns how to design new distance measure with lower time complexity and good performance.

II. Related Work

To solve the problems of scalability and sparsity in the collaborative filtering SongJie Gong Zhejiang [1] proposed a personalized recommendation approach joins the user clustering technology and item clustering technology.

J. Wang and J. Yin[2] shows the calculation of similarity among users by adjusting the positive and negative similarity and transferring the similar relationship in social network.

L. Pradhan, C. Zhang and P. Chitrakar[3]present how multi-view clustering can be used to cluster users or items leveraging information from multiple modalities and improve the accuracy of CF-based rating prediction systems. In this paper there is use Yelp business rating dataset to test approach on user-restaurant rating prediction.

Barjasteh, R. Forsati, D. Ross, A. H. Esfahanian and H. Radha[4]propose a novel and general algorithmic framework based on matrix completion that

Simultaneously exploits the similarity informationamong users and items to alleviate the cold-start problem**.**

Wu Yang, Rui Tang and Ling Lu[5] definehybrid method face cold start problem and the diversity problem of content based. so, solution of this problem is Fused method which shown in this paper.In this method first use content based method to extract user's existed interest firstly then find out similar user set and predict user's potential interest by collaborative filtering.This approach make offline compare the last profile of users and generate recommended results.

C. H. Liou[6]was proposed based on student's rating to recommend the personalized articles in an online forum. Experiment result shows that the proposed method performs well compared to collaborative
filtering (CF) method.

F. Zhang[7]proposes a personalized book recommendation algorithm that is based on the time sequential collaborative filtering recommendation, combined with students' learning trajectories.

SongJie Gong, HongWu Ye, XiaoMing Zhu [8] develop an algorithm to solve problem of about prediction accuracy, response time, data sparsity and scalability. they presented an item-based collaborative filtering recommendation algorithm using self-organizing map. The item-based collaborative filtering recommendation algorithm using self-organizing map can efficiently improve the scalability and promise to make recommendations more accurately than conventional collaborative filtering.

Zheng, F. Min, H. R. Zhang and W. B. Chen[9] propose an efficient CF algorithm based on a new measure called M-distance, which is defined as the difference between the average ratings of items. There is use hybrid method to get more accuracy.

III. COMPARISON OF COLLABORATIVE FILTERING ALGORITHMS

Algorithm used	Method	Efficiency
K-means algorithm[1]	Collaborative filtering method	The collaborative Filteringmethod is more scalable and more accurate than the traditional one.
User based CF algorithm[2]	Collaborative filtering method	More similar users can be found as the neighbors. So the proposed algorithm obtains best prediction and recommendation accuracy.
Multi-view clustering algorithm which called CONMF[3]	Collaborative filtering with multi-view clustering method	Multi-view clustering produced better results than the other methods in comparison with all datasets.
DecRec algorithm[4]	Factorization model	It gives better performance guarantees on the estimation error of DecRecalgorithm.
User based CF algorithm (EUP,FUP,PUP)[5]	Fused method	Fused method is better than the traditional content-based method on
		F- score and Diversity, and is equal to hybrid Method.
K-nearest neighbor algorithm[6]	Article recommendation method	The proposed method could recommend the better personalized articles to students than the typical CF Method.
Time Sequence based CF algorithm[7]	Collaborative Filtering Method	This method is combines knowledge learning systems of college students a new way for universities' book recommender systems.
SOM algorithm[8]	Collaborative Filtering Method	This method gives better prediction accuracy, response time and scalability.
MBR(M-distance based Recomm-endation) algorithm[9]	M-distance method	Compared with KNN, K-means algorithms, the MBR algorithm exhibits good accuracy.

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