

**COLLABORATIVE FILTERING RECOMMENDATION USING HYBRID  
METHOD**<sup>1</sup>Binal M. Patel, <sup>2</sup> Prof. Anita Anand<sup>1</sup>P.G. Student(LDRP-ITR)<sup>2</sup>Prof., LDRP-ITR, Gandhinagar

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**ABSTRACT-** *Personalized recommendation systems are producing recommendation and widely used in today's world. Collaborative filtering technique is most successful technique for recommendation. Collaborative filtering is a method of making prediction about interest of user by collecting preferences from many users. The growth of users and products are increase very quickly and its challenge for nearest-neighbor filtering algorithm. Many algorithms proposed so far, where the principal concern is collaborative filtering challenges. This approach can be implemented based on hybrid method which use user and item based clustering. This method improves scalability and accuracy of recommendation system.*

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

**I. INTRODUCTION**

Web personalization recommendation is an important task from the user point of view as well as application 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<sup>[2,3]</sup>. 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<sup>[1,3]</sup>:

**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 under goes phase this problem as it has not sufficient ratings from users. Many algorithms such as kNN<sup>[9]</sup> and Slope One. Popular distance measures include the Manhattan

distance<sup>[9]</sup>. 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.

we propose an efficient CF algorithm based on a new measure called the M-distance, which is defined as the difference between the average ratings of two items. In the initialization stage, we compute the average ratings of items and store them in two vectors, which requires  $O(m)$  space. Scanning the rating dataset then takes  $O(mn)$  time. In the online prediction stage, a threshold is employed to identify similar items. To predict ratings, our algorithm requires  $O(np)$  time compared with the  $O(mnp)$  time of the cosine-based kNN algorithm. Experiments are undertaken on four well-known datasets, and the proposed M-distance is compared with the cosine-based kNN, Pearson-based kNN, and SlopeOne methods.

An item-based collaborative filtering recommendation algorithm using self-organizing map. Firstly, it employs clustering function of self-organizing map to form nearest neighbors of the target item. Then, it produces prediction of the target user to the target item using item-based collaborative filtering. 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.

## II. Related Work

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

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

L. Pradhan, C. Zhang and P. Chitrakar<sup>[3]</sup> 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.

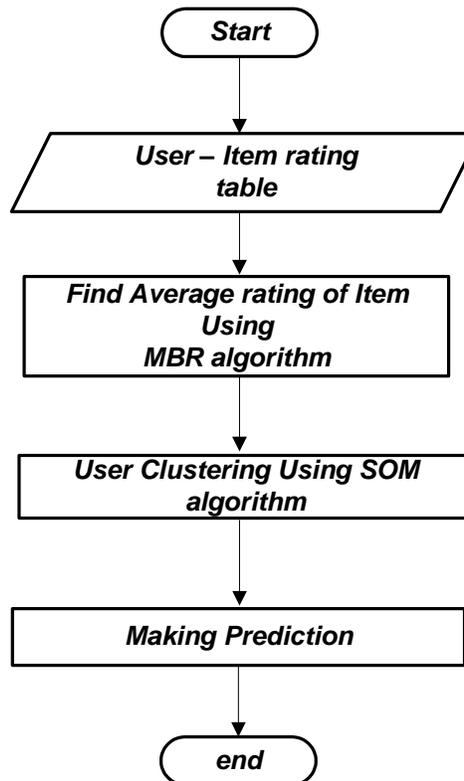
Barjasteh, R. Forsati, D. Ross, A. H. Esfahanian and H. Radha<sup>[4]</sup> propose a novel and general algorithmic framework based on matrix completion that Simultaneously exploits the similarity information among users and items to alleviate the cold-start problem.

C. H. Liou<sup>[6]</sup> 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.

Wu Yang, Rui Tang and Ling Lu<sup>[5]</sup> define hybrid 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. SongJie Gong, HongWu Ye, XiaoMing Zhu<sup>[8]</sup> 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<sup>[9]</sup> 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. F. Zhang<sup>[7]</sup> proposes a personalized book recommendation algorithm that is based on the time sequential collaborative filtering recommendation, combined with students' learning trajectories.

### III. PROPOSED SYSTEM



we propose an efficient CF algorithm based on a new measure called the M-distance, which is defined as the difference between the average ratings of two items. In the initialization stage, we compute the average ratings of items and store them in two vectors, which requires  $O(m)$  space. Scanning the rating dataset then takes  $O(mn)$  time. In the online prediction stage, a threshold is employed to identify similar items. To predict ratings, our algorithm requires  $O(np)$  time compared with the  $O(mnp)$  time of the cosine-based kNN algorithm. Experiments are undertaken on four well-known datasets, and the proposed M-distance is compared with the cosine-based kNN, Pearson-based kNN, and Slope One methods.

User clustering techniques work by identifying groups of users who appear to have similar ratings. Once the clusters are created, predictions for a target user can be made by averaging the opinions of the other users in that cluster. Some clustering techniques represent each user with partial participation in several clusters.<sup>[9]</sup> The prediction is then an average across the clusters, weighted by degree of participation. The idea is to divide the users of a collaborative filtering system using user clustering algorithm and use the divide as neighborhoods.

Collaborative filtering technique has been proved to be one of the most successful techniques. Collaborative filtering is a method of making prediction about interest of user by collecting preferences from many users. This approach can implement with two ways. First is using item clustering and second is using user clustering. Hybrid clustering use item clustering and user clustering. The proposed methods improve scalability and reduce Sparsity of recommendation.

First apply Item based collaborative filtering using MBR algorithm. MBR algorithm reduce sparsity problem. Then we get result matrix and then apply SOM algorithm for User based collaborative filtering. SOM algorithm improves scalability and accuracy of recommendation.

The main intention of this thesis is to develop a method which solves the problem of collaborative filtering and give accurate result of collaborative filtering. Improve Scalability and make recommendation more accurately then previous method.

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