IOSR Journal of Engineering (IOSRJEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719
PP 11-15

Multidirectional Decision Making System using Collaborative Filtering Methods for Library User Assessment in Outcome Based Education

Dr. L.Santhi
Librarian, PSGR Krishnammal College for Women, Coimbatore, Tamil Nadu, India

Abstract: *Now-a-days Knowledge Discovery is the major problem to the people and it is a difficult task to overcome these problems by using CF algorithms and look for the accurate information at the acceptable time. It is also in the library Science environment to improve the user count and to take positive decisions. Moreover, the library users will be evaluated based on the some quality features such as OBE (Outcome Based Education), Readers' Forum (RF) and Library Orientation Programme (LOP). This study is mainly focuses an analysis using the existing similarity learning models and those are compared with the proposed model, Multidirectional Collaborative Filtering Decision Support Model.*

The proposed Multidirectional Collaborative Filtering (MDCF) model is very useful and effective to obtain good decisions when they are visiting to the library based on the above features.

Keywords: *Knowledge Discovery in Database (KDD), OBE (Outcome Based Education), Multidirectional Collaborative Filtering (MDCF), RF (Readers' Forum), LOP (Library Orientation Programme),SVD(Singular Value Decomposition),PCA(Principal Component Analysis)*

I. Introduction

This Paper examines the library users based on their purpose of visit to the library in outcome based education by using Multidirectional decision making system using Collaborative filtering methods.

Outcome based education is defined as an approach to education in which decisions about the curriculum are driven by the outcomes the students should display by the end of the course- professional knowledge, skills, abilities , values and attitudes- rather than on the educational process.

Collaborative Filtering (CF) is a conventional recommendation and prediction algorithm based on similar attributes, where the users can express their opinions on library features by rating them. CF algorithm is used to collect previous user ratings, to predict ratings on unseen features of individual user, and it recommends to the new users with highest predicted ratings. This feature based method is used to the existing ratings so as to recommend the features to the new users.

However, this method evaluates feature similarity based on explicit and implicit ratings. The proposed feature based CF recommendation technique is the only solution to such type of problems.

II. Review Of Literature

Yingtong Dou, Hao Yang, Xiaolong Deng, A Survey of Collaborative Filtering Algorithms for Social Recommender Systems, The 12th International Conference on Semantics, Knowledge and Grids on Big Data (SKG 2016), 15th-17th August 2016, Beijing, China group focused on collaborative filtering, the and its basic principles and formulas with respect to two basic approaches, the user-based collaborative filtering and the item-based collaborative filtering. Moreover they concentrated only user or item similarity calculation, and compared the differences between using various similarity methods such as cosine-based similarity, revised cosine-based similarity and Pearson-based similarity. They also analyzed few challenges of the collaborative filtering and showed the related works facing the challenges. To solve the Cold Start problem and reduce the cost of best neighborhood calculation, the group does not provide many solutions. At last, the group does not deal with the quality features used in the collaborative filtering algorithm in social recommender system.

The need is seen for the enhancement of Collaborative filtering to implement in the area of Library science and to fulfil the user needs.

M.V.V.R Muralikrishna Rao, Lakshmi Tharun Ponnam , Sreenivasa Deepak Punyasamudram , Siva Nagaraju Nallagulla , Srikanth Yellamati, Mayuri Dalvi , Prof. S.V. Gumaste concentrated on recommender systems with the approach of collaborative filtering by using the algorithms of machine learning which gives feasible results. Selecting the appropriate feature is not regularized and it is not an easy task to identify the best features. The best set of these features have not been used and also the feature is not optimized. The needs for effective feature retrieval and implementation of filtering feature have become essential for easy access of

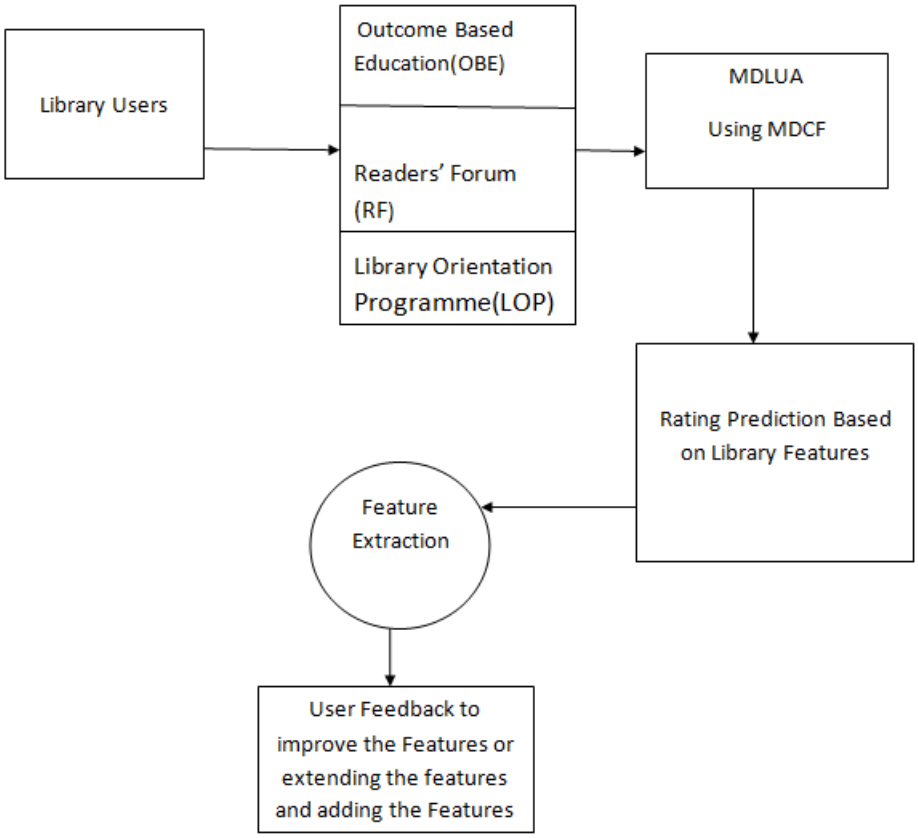
relevant information. From the above literature in the field of recommender system using few recommendation methods are classified into three categories, such as Content based Filtering, Demographic and Hybrid systems. Hence, the analysis of existing models to incorporate quality features and users' responses through multidirectional CF model , to establish the new user awareness application about to know the library resources which was not discussed by the national research groups.

III. Objectives Of The Study

The following objectives are framed.

1. To identify the irregular users who do not visit the library frequently, and to make them to visit based on quality features.
2. To find out the effect of internal assessment through OBE based system.
3. To know the users who have knowledge on digital and print resources.
4. To find out the students whose reading behavior are found to be maximum level.
5. To maximize the students to visit using the features of Decision making system.

IV. Conceptual Framework



Library User Assessment Framework

V. Scope And Methodology

Survey method was used for collecting data from the students. There were also general observations made during the research to understand the knowledge of the users about the resources available in the Library.

VI. Multidirectional Collaborative Filtering

It is aimed to provide an effective online user prediction method by using multidirectional CF methods using few existing features.

6.1 Feedback based collaborative filtering

The Feedback based collaborative system works as per the previous user experience using library features through the personalized recommendations based on prior implicit feedback. These systems passively track different sorts of user behavior, such as user entry history, reading habits and reference activity and in

order to identify user preferences. Unlike the much more extensively explored feedback, may not have any direct input from the users regarding their preferences.

Unique properties of implicit feedback on internal dataset can be identified. Treating the internal data as the indication of positive and negative preferences are associated with various features at various levels. This will lead to a effective feature model based on internal feedback and recommendations from the existing users. It is suggested a scalable optimization procedure, to rate the features based on user data size. The algorithm is to be used effectively within this recommender system to establish a new cost effective method so as to know the users performance. It compares favorably with all the other existing methods as well.

6.2 Neighborhood based collaborative filtering

Most of the collaborative filtering system follows a neighborhood-based technique. In this approach, a number of users will be selected based on their similarity to the active users. A prediction of active user is to be made by calculating the weighted average of the ratings of the selected users. Instead of just relying on the most similar person, a prediction is normally based on the weighted average of the recommendations of multiple users.

A weightage is given to a person's ratings which are determined by the correlation between the person and the person for whom to make a prediction. To measure correlation between users and features, the Pearson correlation coefficient can be used. In this example a positive rating has the value of 1 while a negative rating has the value –1.

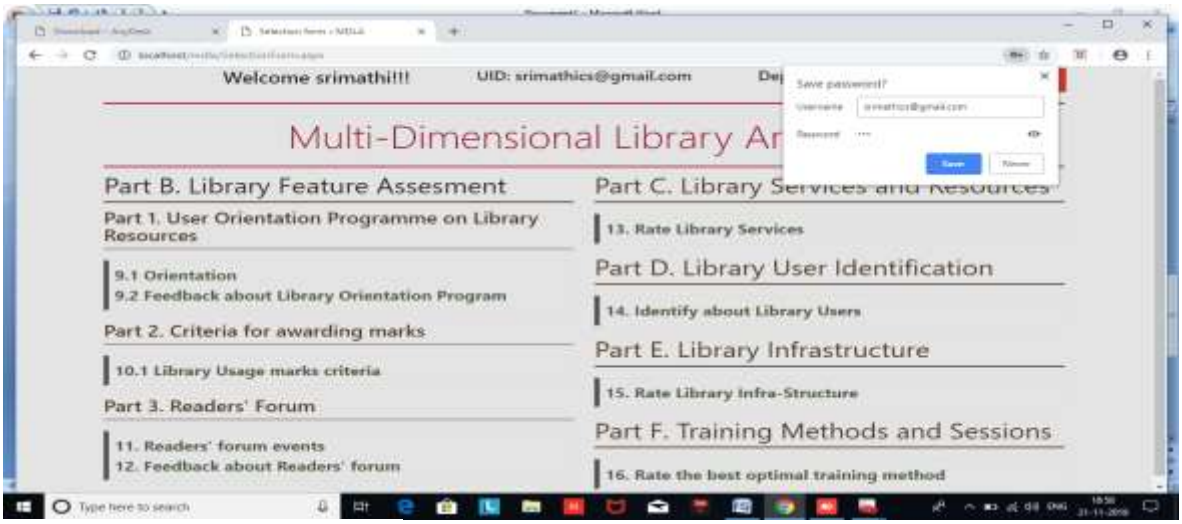
VII. Proposed System-Multidirectional Library User Assessment (MDLUA)

Multidirectional similarity learning is proposed in Collaborative Filtering method which has three quality features that are used to improve the strength of library users.

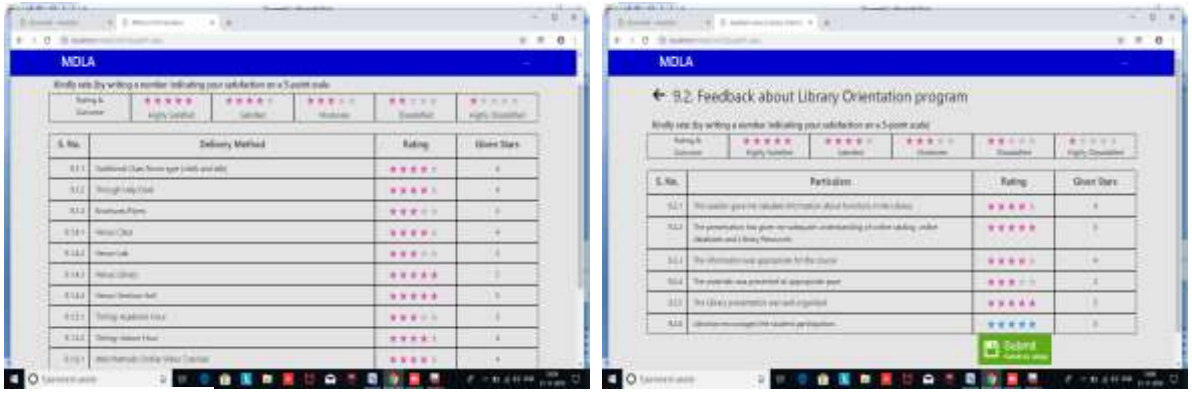
1. The First feature is **"*Library Orientation Programme"*** which is used to give awareness to the new users about online, offline resources and digitized resources available in the library. This facilities and availability can be disseminated by such programme through practical sessions.
2. The second feature ***"OBE"*** is used to assess the users performance, whether the users access the library for their academics purpose based on No.of transactions, and No.of Books referred.
3. The Third feature **"*Readers' forum"*** is used to improve the library strength internally and to promote the reading skills based on conducting some book reviews, news article reading and observations of current information.
4. The above proposal is to be implemented technically by Principle Component Analysis which is used to predict ratings by using multiple attributes. Feature Reduction is applied to reduce the feature size after feature selection process which will be done later. It can be implemented using Singular Value Decomposition, hence, this similarity model will be more appropriate if the similarities between users and items are jointly learned. MDCF supports for decision makers to make an effective selection of resources in the library environment at the end.
5. The MDCF method is to be implemented technically by using ASP.NET framework with support of Sql Server database.

The following output screens shows the details of users general Information, Library Feature Assessment through Library Orientation Programme , Readers' forum, Awarding marks on library resources and its ratings. Feedback from the users about library orientation programme also collected. Comparison also has to be done before and after orientation programme.

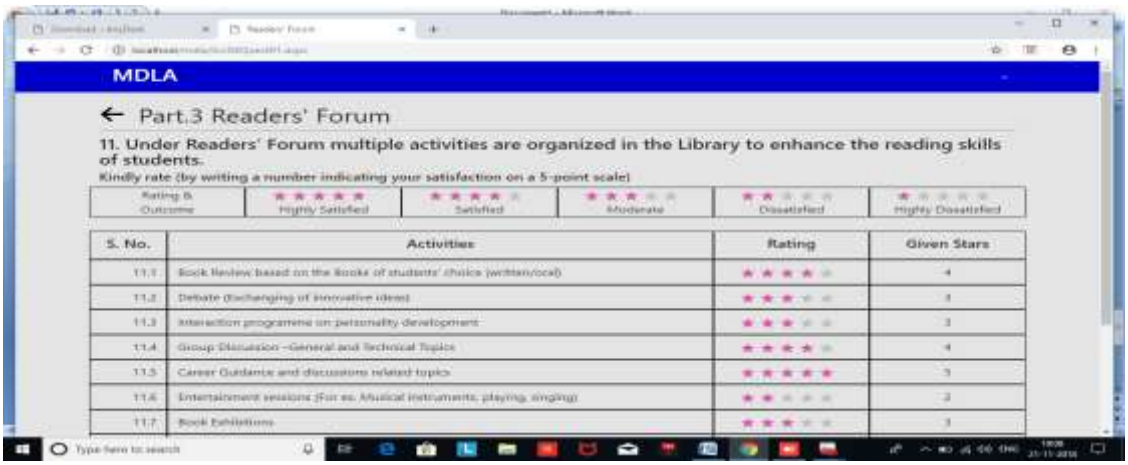
Multidirectional User Assessment Home Screen



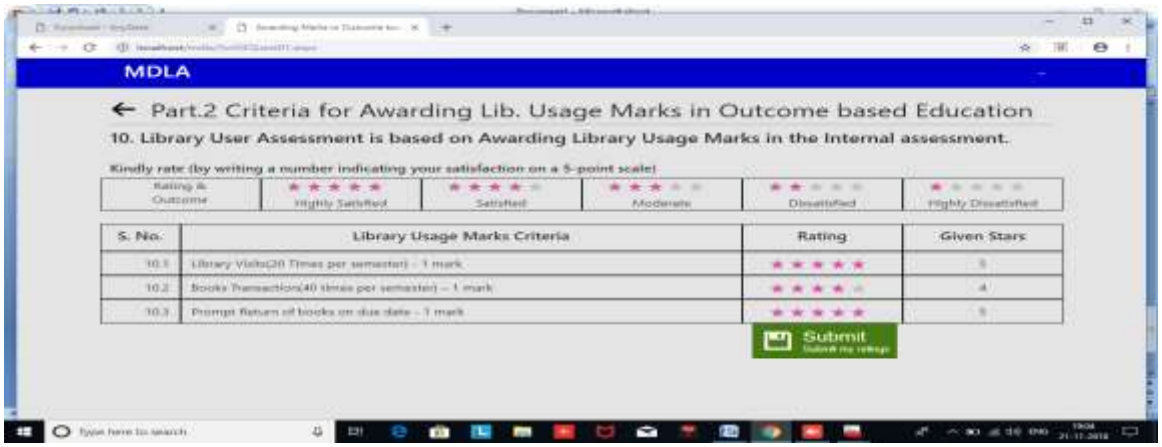
7.1 Library Orientation Programme



7.2 Readers forum



7.3 Outcome Based Education



VIII. Conclusion And Scope For Future Work

Combining three quality features in this recommendation technique was improved the predictive performance, which is generally consistent with similar findings in recommender systems. By using the standard user-based and feature based collaborative filtering approach is an integral part of this technique in order to minimize the non-essential features and to maximize the performance between the standard CF recommender systems.

The above multidirectional similarity prediction model is designed and implemented by using ASP.Net framework with support of sql server database. This cost effective methods was very effective and provided desired solutions to the learner users and existing library users. The model is functionalized to the user and feature similarities simultaneously. Initially, system is to be implemented by similarity measures separately for user rating prediction and feature rating prediction.

Secondly this learning model is implemented to learn both user and feature simultaneously using bidirectional similarity. Finally, the proposed work is combined two earlier similarity models to find user similarity and feature similarity, with and without using quality features. Proposed model is composed with multiple effective prediction strategies. Experimental results was significantly outperforms with the predefined ones. Furthermore, the online version of the prediction algorithm is very effective and more efficient for handling new users. In future this model is extended with RFID technologies, Social Media, and Web Methods.

Acknowledgement: The present work was given and financial assistance from **ICSSR,** New Delhi.

References

[1]. Dou ,Yingtong, Yang, Hao and Xiolong Deng,Bejing,China, "A Survey of Collaborative filtering algorithms for Social Recommender Systems",IEEE Explore, 40-46 ,(2017).

[2]. Beel, Joeran, Langer, Stefan, and Gipp, Bela, "TF-IDuF: A Novel Term-Weighting Scheme for User Modeling based on Users' Personal Document Collections", iConference (2017).

[3]. Rao,,Muralikrishna "Collaborative Filtering Recommender System with Randomized learning rate and regularized parameter",IEEE Explore, DOI**:** 10.1109/ICCTAC.2016.7567331, (2016).

[4]. Ponnam , Lakshmi Tharun, Punyasamudram , Sreenivasa Deepak, Nallagulla , Siva Nagaraju and Yellamati, Srikanth "Movie Recommender System using item based collaborative filtering technique",IEEE Explore, DOI**:** 10.1109/ICETETS.2016.7602983 ,(2016).

[5]. Liu,Haifeng, Kong,Xiangjie ,Bai,Xiaomei, Wang,Wei, Megersa Bekele,Teshome ,and Xia,Feng, "Context-Based Collaborative Filtering for Citation Recommendation",IEEE Access, 1695 - 1703 (2015).

[6]. Yan, Yan,Liu,Tianlong ,Wang,Zhenyu , "A Music Recommendation Algorithm based on Hybrid Collaborative Filtering", Springer, 233-240, (2015).

[7]. Beel,Joeran, Bela,Gipp, Stefan,Langer, and Corinna,Breitinger," ResearchPaper Recommender Systems: A Literature Survey", International Journal on Digital Libraries, 1–34, Doi: 10.1007/s00799-015-0156-0, (2015).

[8]. Dalvi,Mayuri,Gumaste, S.V. "Review Paper on Collaborative Filtering", International Research Journal of Engineering and Technology (IRJET),900-904, (2015).