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# Hybrid Recommendation Solution for Online Book Portal

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*Abstract: Recommendation System is an application which uses information filtering technique to generate personalized preferences and decision making to users. Rapid growth in information technology and availability of web services has increases demand. Web related use like booking tickets for movies, trains, flights, buses, selecting books and newspaper, hotel location etc. are on demand. This technique works on the basis of related items and relevant features or requirements and suggest user according to similarities or common user. This method of recommendation is a useful method which provides suitable suggestions to users. For the administration recommendation system, data research problem has been worked on in the latest years. For it administrations, clients, networks resources are all connected and developed quickly. The method works on learning, suggestion, administration, revelation and customization, and applying it on recommendation provides user with support in decision making and suggestions for data items. In this research work a hybrid recommendation is used for online book portal. Depending upon the quality of book and user demand it will help user in suggesting required book.*
*Keywords: book recommendation; collaborative filtering; K-mean clustering*

## I. INTRODUCTION

Large amount of books are available online, user get confused to choose any particular one. When user attempt to find the book, then according to his choice and interest books are displayed. A trustworthy selection based on cloud service is placed in our paper using collaborative filtering in network. It searches for a set of user requirement in cloud service, then it computes the collection of similar preferences  for the common evaluation of targeted user and obtains recommendation sets for the service of each user. It computes the degree of recommendation for each user and sort the services for user according to the degree of recommendation of the user. In the last few years the use of recommendation system has been increased because by using some techniques it provides user with the selected and interested items of use and display them on the top of list according to user choice of interest. This technique of related items and relevant features or requirements are helpful in suggesting user according to similarities which he searched many times. Recommendation method is useful in providing suggestions which are suitable to users.

### A. Need Of Cloud Computing

The technology which is widely used is the cloud computing, it has large amount of data stored in bulk form. This stored data provides with the services of securing that data in a secure manner. It shares and stores large amount of data that is why called as storing center. The websites like e-commerce have the large amount of data to be stored, this requirement of storage needs a single place to store the large data in an according manner and cloud stores this type of data in an according manner. Users are provided with the on demand services by the mean of Internet. Sharing, configuring, deploying, storing are the services which are delivered to user over Internet. The use of cloud in the proposed work is for storing large data of online websites. Examples of such are : networking sites, emails etc, there data are stored on cloud. Cloud computing delivers services like infrastructure as a service, platform as a service, and software as a services, these services are available to user in the mentioned form and provided as subscription-based services to the customers in a pay-as-per-use form.

### B. Recommendation System

The approach of recommendation system is used for information filtering and based on user preference and rating, which is helpful for any user to purchase items according to there need of interest. Recommendation system directly provides a way to user so that they can search information depending on there interest, can find products of there requirement. Content based filtering, collaborative filtering and association rule mining are used in recommendation system, which recommends items based on the use and interest of people. This approach is beneficial for people who do not have experience of selecting number of options offered by websites.
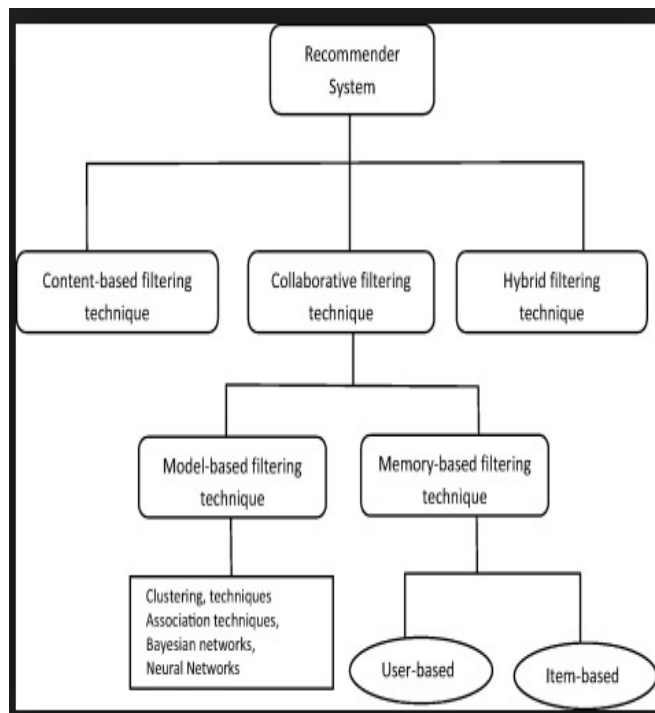
Figure 1. Recommendation system

*C. Need And Use Of Recommendation System*
1) Recommendation System is needed so as to help finding the user interest of item from the large data set
2) Recommendation system by using association rule, collaborative filtering and content based filtering, filters the huge amount of data and provides with the data which is of user interest
3) It is the way of getting user preferences and rating by filtering information
4) Recommendation system suggest users to search items of there need of interest
5) It evaluates number of alternatives to user offered by websites.
6) It appears the list of similarities of items, depending upon the product/items searched.
7) It is a tool for new generation used over Internet, and navigates the information over Internet and retrieves according to preferences.
8) Recommendation system stores students profile and work according to user interest.
9) It directly provides a way to user for searching products depending on there interest and requirement.
10) Recommendation system is an online approach and used in online e-commerce website.

## II. RELATED WORK

Proposed work depends upon the description of techniques and methodology developed by authors regarding the research. The publishers publish the overviews of author depending upon the research and description about title. Base work estimates the accuracy for nearest neighbor which is shown through a graph in result analysis and the proposed work shows the better accuracy as compared to the existing work. Bogers et al. In[1] described about new trend in Content-based recommendation system, a survey on recommendation system for book is performed so that best recommendation can be selected. Author identifies a workshop on (CBRecSys) content-based recommendation system. This workshop focuses on issuing the platform for the dedicated research and new trends in CBRecSys. Metadata and content are the vital aspects in the domain of recommendation. W. Croft et al. In[2] introduces that in generating personalized recommendation system to evaluate effectiveness, information retrieval metrics is applied. Mean reciprocal rank and overall precision is also applied. But the overall user's satisfaction is measured and created by personalized recommendation system. Ranking is also done for the higher recommendation.
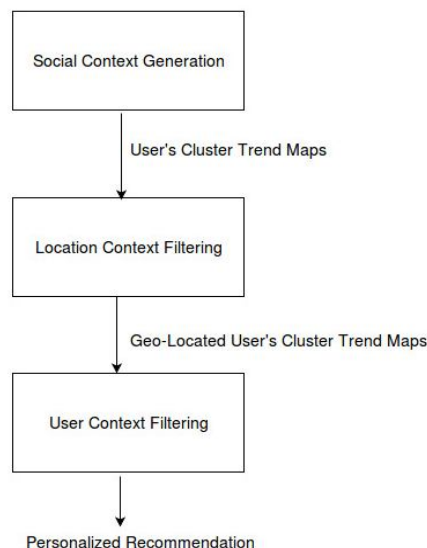
Figure 2. Personalized Recommendation System

R. Andersen et al. In[3] described about trust based recommendation system in which trust is the important aspect for choosing and recommending items. Many of the website, digital libraries and online shopping sites have adopted Book recommendations, so that there user knowledge can be facilitated by selecting the interested books from the available items. The recommendation of book can be of type that the user is not aware of, so it creates problem for the user to select specific one. system of Amazon. To check the overall performance of personalized recommendation system, the score of the top recommends are generated. The high ranking book scores were related. The scores achieved of top recommendation for book is which when compared should be least with personalized recommendation system. J. Koberstein et al. In[5] proposed that ranking is done for each book and prioritize is set for each book so that the degree of prioritize will increase. It identifies the friends and determines the books which are used in priority catalog. Significant comparison is done for achieving processing time. The comparison done is more, then to minimize it personalized recommendation is applied and the blocking strategy for the sets of candidates yield are created to recommend books for consideration.

Table 1. Comparative table

| AUTHOR | TITLE | PROPOSED WORK |
|---|---|---|
| Bogers [1] | Workshop on new trends in content-based recommender systems. | A survey on recommendati-on system for book is performed so that best recommendation can be selected. |
| W. Croft [2] | Generating personalized recommendation system to evaluate effectiveness. | Mean reciprocal rank and overall precision is also applied. But the overall user's satisfaction is measured and created by personalized recommendation system. |
| R. Andersen [3] | Trust-based Recommendation Systems | Many of the website, digital libraries and online shopping sites have adopted Book recommendations, so that there user knowledge can be facilitated by selecting the interested book. |
| G. Linden [4] | Item-to-item Collaborative Filtering | To check the overall performance of personalized recommendation system, the score of the top recommends are generated. |
| J. Koberstein [5] | Ranking of item for degree of prioritize | Significant comparison is done for achieving processing time. The comparison done is more, then to minimize it personalized recommendation is applied |

## III. PROBLEM DOMAIN

### A. Overview

Proposed work is based on creating and deploying a recommendation system which will help user in recommending books. This online system helps to get reviews and rating of books and provides recommendation according to rating and reviews of users. Large amount of data are available and through online book recommendation user can search for the required book which will display on the top list. Also user can read the reviews and feedbacks given by people about the book.

### B. Detailed Problem Statement

Recommendation system is very helpful for those who don't have any experience evaluating the alternatives which the websites offered. People getting millions of search result in which they get confused to select one, so it helps user with the information to decide which item to buy, of there interest. Existing recommendation system is different from proposed system. Existing system only recommends items with rating of it and does not recommend the item which is not rated. Combination of collaborative filtering and association rule mining is used in proposed work. For searching similarities in items collaborative filtering is used which is helpful in recommending items to user while the vacant rating is filled using association mining. Then the users are targeted, these are the prediction target for the target items using collaborative filtering. So, both the methods are used to manage the problem arises in recommendation system. Existing system is facing the issue of rating and review which is highlighted in the concluded work so that some techniques can be evaluated to overcome the rising issue. The system here evaluated has the major issue, that is it only works on rating and reviews of user. This rating and review mainly works as trust based recommendation, where trust should be maintain to work further

## IV. METHODOLOGY USED

### A. Collaborative Filtering

Recommender system uses a technique called Collaborative Filtering (CF). General and narrow are two senses of collaborating filtering. Narrow sense of collaborative filtering defines an automatic prediction method which by collecting information based on user preferences can describes the interest of user. This approach of collaborative filtering works on the assumption, like if a user A have the same preference of item which B also prefer then A will check for the opinion and preference of B on different choice of items or issues, which is a random property. Proposed work concluded working on Book Recommendation and through the example of Book only we can describe collaborative filtering easily. Where, user taste is observed for different kinds of books and with the prediction made, shows the list of information of liked and disliked book.
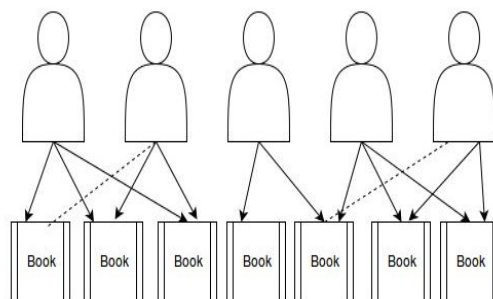


Figure 3. Collaborative Filtering for Book Recommendation

### B. K-Mean Clustering

In the year 1967 Macqeen proposed an algorithm K-mean algorithm. This is the learning and a clustering algorithm which is used in data mining as a K-mean clustering algorithm. For large data clustering it is popularly used in data mining. For k objects selections this algorithm is used, it is the initial cluster center. Here, distance is calculated between cluster center and object, then is assigned to the closest cluster. Average of all cluster is calculated and updated and then iteration of process starts.

K-mean clustering can be explained as :-

Input data, where database = N

N = { $p_1$, $p_2$, $p_3$, $p_4$, …...., $p_n$ }

n number of data objects, and

k number of cluster,

Output :-

Randomly k objects are selected from N datasets,  and cluster center ($q_1$, $q_2$, $q_3$,......., $q_k$),

Distance is calculated between cluster center and object,  then is assigned to the closest cluster

## V. PROPOSED WORK

*A. Proposed Solution*

Proposed work contributes that recommendation system recommend items to user from the millions of search result, with the problem of evaluating alternatives from the websites many technique are used. Classification considers only rule and pattern used for prediction and generates group for rules which classifies data. It is a data mining technique which is used for decision making and prediction. Collaborative filtering collects user preferred item and creates database of the preferred items. It is a personalized recommendation based on similarities of interested products. In other words we can say it is a method of rating for products by the predicted targeted user. Association rule mining creates correlation among large data, which is helpful in many business for decision making.  Book Recommendation system mainly focuses on extracting useful information so that effective books can be recommended to user. Book recommendation is based on quality of content of book, its price range, publisher and author. Also based on interest and rating of book. This is the system with which user can get the effective information and recommended search from the recommendation that is required to recommend the best which is needed for the purpose.  The recommendation system used here is a book recommendation system. User depends on this system for the recommendation of items. Proposed system used here is for recommending books called Book Recommendation System.

## VI. RESULT ANALYSIS

*A. Experimental Analysis Requires Three Inputs*

1) Collaborative Filterin
2) Cluster siz
3) Points in cluster

Low collaborative filtering maximum value with low cluster size gives better accuracy. Considering different collaborative filtering maximum value for same cluster unit and try to compare accuracy with existing work.

Table 2. Accuracy Comparison table

| Nearest Neighbor | Accuracy of Previous work | Accuracy of Proposed work |
|---|---|---|
| 10 | 0.76 | 0.85 |
| 20 | 0.75 | 0.82 |
| 30 | 0.73 | 0.8 |
| 40 | 0.72 | 0.76 |
| 50 | 0.7 | 0.74 |

The below figure shows the accuracy comparison with the previous work, defining the maximum accuracy for all nearest neighbor nodes 10, 20, 30, 40 and 50 with high accuracy level.  Proposed result defines the improvement of accuracy level on the basis of collaborative filtering, cluster size and points in cluster.
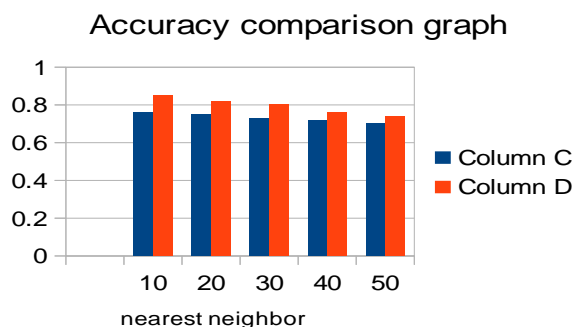
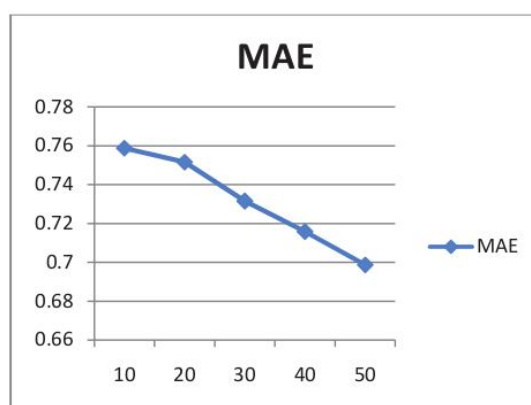Figure 4. Comparison graph for accuracy (for proposed work)



Figure 5. Graph representation for accuracy( Base paper graph)

Comparing base paper with proposed work is performed for security measures. Proposed work proves that the calculation of accuracy is maximum in this approach as compared to previous work.

## VII. CONCLUSION

List of books based on its rating and content are searched using collaborative filtering and content-based filtering. The recommendation system mainly depends on quality of book recommended and the rating of book given by the existing users. The association of interesting books are done using Association Rule Mining. It also generates relationship among large data sets and recommend the efficient and effective book. This system of recommendation is most importantly for students, for there academic purpose and for people who requires best book for general purpose.

## IX. FUTURE WORK

Recommendation is a best approach for searching any kind of items, books, movies, hotels newspapers, booking tickets etc. but proposed work depends only on rating and reviews of user. It only recommend those items which are rated by people, if the item is not rated then that item will not be recommended nor displayed to user. This issue can be overcome in future because it decreases the performance of the system. So to increase the overall performance, implementation can be done subsequently, this is the future development of proposed work.

## REFERENCES

[1] Bogers, T., Koolen, M., & Cantador, I. Workshop on new trends in content-based recommender systems:(CBRecSys 2014). In Proceedings of the 8th ACM Conference on Recommender systems (pp. 379-380). ACM, 2014.

[2] W. Croft, D. Metzler, and T. Strohman, Search Engines: Information Retrieval in Practice, Addison Wesley, 2010.

[3] R. Andersen, C. Borgs, J. Chayes, U. Feige, A. Flaxman, A. Kalai, V. Mirrokni, and M. Tennenholtz, Trust-based Recommendation Systems: an Axiomatic Approach, WWW, pp. 199-208, 2008.

[4] G. Linden, B. Smith, and J. York, Amazon.com Recommendations: Item-to-item Collaborative Filtering, IEEE Internet Computing, 7(1), pp. 76-80, 2003.

[5] J. Koberstein and Y.-K. Ng, Using Word Clusters to Detect Similar Web Documents, KSEM, pp. 215-228, 2006.

[6]   Ms. Praveena Mathew, Ms. Bincy Kuriakose, Mr.Vinayak Hegde, "Book Recommendation System through Content Based and Collaborative Filtering Method" published in IEEE International Conference on Data Mining and Advanced Computing (SAPIENCE), 16-18 March 2016.

[7]   Pijitra Jomsri, "Book Recommendation System for Digital Library Based on User Profiles by Using Association Rule" published in IEEE Fourth International Conference on Innovative Computing  Technology (INTECH), 2014.

[8]   Salil Kanetkar, Akshay Nayak, Sridhar Swamy, Gresha Bhatia, "Web-based Personalized Hybrid Book Recommendation System" IEEE International Conference on Advances in Engineering & Technology Research (ICAETR -2014).

[9]   Nursultan Kurmashov,"Online Book Recommendation System" Twelve International Conference on Electronics Computer and Computation (ICECCO), 2015

[10]  T. Mather, S. Kumaraswamy and S. Latif, "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance," Sebastopol, CA: OReilly Media, Inc., 2009.

[11]  Y. Park and K. Chang, "Individual and Group Behavior-based Customer Profile Model for PersonalizedProduct Recommendation.," Expert Syst. with Applications, vol. 36, no. 2, pp. 1932–1939, 2009

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