Improvised Book Recommendation System Based on Combine Features of Content Based Filtering, Collaborative Filtering and Association Rule Mining

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Abstract— **The online market is growing fast and so the expectations of the people are too. Recommendation systems can help most of the market and make it very easy to get what we want. This paper focuses on how can we give the best customer experience with an improved recommendation system which can help you in getting things that you would like quickly and get the best of all things. Here we focus on solving the problem by the help of filtering. The filtering can be of two types. Collaborative filtering, where you get the latest trends known to you and the other is content-based filtering. Here you will get the recommendation on the basis of the content in the book which will give you the insight of what you are truly looking for. This research will help in enhancing the recommendation system which cannot just help in book recommendation but will revolutionize the world of e-learning. Here we are trying to solve the problem by combing the collaborative based filtering with the content based filtering.**

Keywords— Content Based Filtering, Collaborative Filtering, Book recommendation System, Prediction Algorithm

I. INTRODUCTION

The Age is more about being fast and being best. People want something where they can find what they like instantly in no time. This era has so many electronic books and so it has become a need to have a system that can recommend the book. The technology is growing fast and now they want the best book on their table. We need technology that can help us in finding the most relevant and appropriate resources so that they can learn on various tops and come up with good ideas. The recommendation system that can encourage the learning cycle and make the decision making in this era much simpler and easy.

A recommendation system is a great tool that can help you in enhancing your decision-making skills. This system helps the people in the better understanding of the product you can get the insight of what the book is about and according to the rating, trends and content of the book, the analysis of the best book can be done easily. There are many approaches on to how this can be done but the content based filtering approach and collaborative filtering approach helps the best in solving the problem.

The two main approaches can be of great help in the recommendation. Now the content based filtering the content similarities are understood and according to that there is filtering of material done and thus recommendation can be given. The collaborative filtering is done by the items that the customers have liked. In this system, the quality of the item is taken into consideration. For example, the filtering helps in understanding the user choice by their rating. This is the best in helping to give a proper recommendation.

The process of recommendation given by the process of recommending similar items on the basis of different similarities. Many different patterns are observed and according to that, this is done. This system is built to understand the experience of the system and make the recommendation system more accurate. The machine learns by the experience of the users and gives the appropriate recommendation.

This technique can be incorporated in many online market algorithms, thus increasing the overall efficiency and effectiveness of those portals. Popular sites like bookrix.com and kindle have a vast dataset, with huge number of customers followed by enormous quantity data, using associative rule mining can drastically reduce the computation power. In the upcoming sections we will see, how combining content based filtering and collaborative filtering with associative rule mining can help us manage such large customer base with an ease

II. LITERATURE REVIEW

Recommender systems are mainly categorized as the content-based filtering, collaborative filtering, and hybrid approaches Collaborative filtering recommender system became one of the most researched techniques, as collaborative filtering technique recommends items based on user-based approach and item-based approach. Content-based recommender systems, it deals with profiles of the users that were created at the beginning.

In paper [1] they have come up with new hybrid based recommendation method that combines the content based, collaborative recommendation system to improve the

accuracy of system. This method let them increase the accuracy and also reduce the sparsity.

In paper [5] they have come up with a unique algorithm that uses associative rules to recommend/predict learning materials. A blend of machine learning and associative rule mining on a vast data set in really a mind blowing invention.

III.   MODELLING

The whole system can be divided into different modules. In this, we aim on solving the problem by the help of filtering. Here the filtering can be of two types. Collaborative filtering and Content-based filtering. In collaborative filtering you get the latest trends known to you. While in content-based filtering you will get the recommendation on the basis of the content in the book which will give you the insight of what you are truly looking for. We are mainly focusing on combining two filtering method to increase the accuracy and storing the result so the result can be used to increase the speed of filtering.

Content Based Filtering:

Content-based filtering is also known as cognitive filtering, it recommends items based on a comparing between two major aspects. A user profile and the content of the items. The content of each item is descriptive and based upon words that are used to build a document. User profile is built up by analyzing content of an items which have been seen by himself.

The only source content-based filtering system uses is a text file, to get information. Each text file is holding several items and out of which few items gets ranked based on how closely their description matches to a particular user profile.

This filtering technique is having three main principal terms that are:

- Content analyzer

- Profile learner and

- Filtering component

Content analyzer and profile learner helps to analyses and sort recommended content.

To represent the content, we need to transform all this data into a vector space model which provide a algebraic representation of the same. Which makes a pool of words where the term frequency and document frequency will decide the ranking of each word. Whereas the filtering component is responsible to deliver the final recommendation for individual user.

Associative Rule Mining:

Associative Rule mining are 'If-Then Statements'. They help in understanding the relationship between data, identifying patterns and understand the co-relations and improve the mining efficiency in Transactional and Relational Dataset.

At basic level, Associative mining involves making use of machine learning and neural network to analyses data patterns and co-relational between data, It identifies frequent 'If-Then' associations, which are called as associative rules.

An association rule has two parts: an antecedent (if) and a consequent (then). An antecedent is an item found within the data. A consequent is an item found in combination with the antecedent.

Popular algorithms that uses Association rules are AIS, SETM, Apiori etc.

IV.   ALGORITHMS
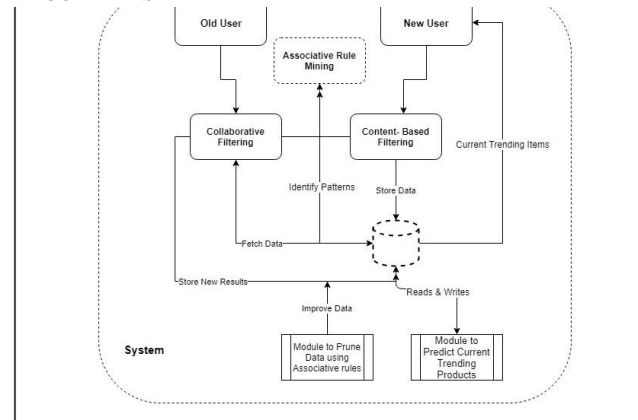
Working:-

Our system is combination of collaborative filtering and content-based filtering. The filtering is dependent on the whether the user is new or old. If the user is new then collaborative filtering is used, as it gives recommendation by making automatic predictions for estimated interests or tastes of a user to certain items by collecting information from other users. Example, if user A and user B have a reading history that overlaps strongly and user A has recently read new book that user B has not yet been, then this book also recommended to user B. The result of collaborative filtering is stored so that it can be used later for improve the speed of filtering results.

On the other hand for old users content-based filtering is used, this filtering method analysis the old usage of the user and gives the result. For example, suppose if user reads book with tag or genre action then similar type of book will be recommended to the user. But result is combination of what user will like and trending topics for old user because possibility is that user may like new type of content. This type of filtering is possible because old data is available on that users.

Thus for new users collaborative filtering is used and for old user combination of collaborative filtering and content-based filtering.

Algorithm: -

The implementation of this recommendation system is done by combing both the collaborative filtering and the content-based filtering.:-

1) We will get the learning material the user model and the user rating model combined to have a data set and training data set.

2) Then there will be collaborating and content- based filtering algorithm that will do the process.

3) The recommendation system starts with the selection of the top N nodes and the best prediction rating. This system detects the number of neighbors and the nearest neighbors get selected.

4) Getting the accuracy of the recommendation.

V.   RESULTS

We aim to build a successful and improvised recommendation system by establishing the success of the following performance measures.

- Privacy **-** Recommender systems usually have to deal with privacy concerns because users have to reveal sensitive information. Building user profiles using collaborative filtering can be problematic from

a privacy point of view. Many European countries have a strong culture of data privacy, and every attempt to introduce any level of user profiling can result in a negative customer response.

- Robustness **-** When users can participate in the recommender system, the issue of fraud must be addressed.

- Trust **-** A recommender system is of little value for a user if the user does not trust the system. Trust can be built by a recommender system by explaining how it generates recommendations, and why it recommends an item.

- Speed **-** Recommender system reduce the cost of a user's time in order to reach to desired results faster.

- Accuracy & Relevancy **-** Recommender system should be capable of providing recommendations that match or closely match to the user's preferences.

VI.   CONCLUSION AND FUTURE WORK

With a unique blend of Content based filtering and Collaborative based filtering, we can create an algorithm that will distinguish both new and old users and recommend them appropriate flavours of book, thus increasing the chances of sale.

There are many other systems that uses combination of Content and Collaborative base filtering but they are not designed to handle vast quantity database, and are not feasible. With use of powerful data manipulation language *'python'* we can handle such large data with an ease.

No doubt there are lots of changes this algorithm need, but as time passes, with invention of new the accuracy and effectiveness of this algorithm increases drastically. With use of a custom designed neural network, learning rate can increased thus improving the precision of prediction.

REFERENCES

[1] S.Pandya, J.Shah, N.Joshi, H.Ghayvat, S.C.Mukhopadhyay, M.H.Yap, "A Novel Hybrid based Recommendation System based on Clustering and Association Mining" 1SEAT, Massey University, Palmerston North 2Parul University, India 3Manchester Metropolitan University, UK.

[2] Rudolf Turnip, Dade Nurjanah, Dana Sulistyo Kusumo "Hybrid Recommender System for Learning Material Using Content-Based Filtering and Collaborative Filtering with Good Learners' Rating" Telkom University Bandung, Indonesia.

[3] D. Almazro, G. Shahatah, L. Albdulkarim, M. Kherees, R. Martinez, and W. Nzoukou, "A Survey Paper on Recommender Systems," Arxiv Prepr. arXiv, vol. abs/1006.5, no. 5, pp. 129–151, 2010.

[4] A. Sunita and L.M.Lobo ,"Combination of machine learning algorithms for recommendation of courses in E-Learning System based on historical data", Knowledge based System,Springer journal 2014, 13-19 September 2014,Vol 51, pp 1-14.

[5] A.Sunita, "Data preparation strategy in e-learning systemusing association rule algorithm", International Journal of Computer Applications 2012,10-17 March 2012Vol 41,No 3,pp 35-40.