ONLINE BOOK RECOMMENDATION SYSTEM BY USING COLLABORATIVE FILTERING AND ASSOCIATION MINING

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ABSTRACT: Recommendation systems are used to make suggestions for things to buy or things to see. By reducing the size of the informational database, they point people in the direction of products that can satisfy their needs. For recommending items, a variety of strategies have been developed, including association, collaborative, and content mining methods. In order to improve performance, this research combines collaborative-based filtering and association rule mining to address the issue of data sparsity. The outcomes are displayed, and the suggested recommendation algorithms outperform the existing ones and address problems like data sparsity and scalability.

Keywords *– Collaborative filtering, Association rule mining.*

1. INTRODUCTION

A recommendation system is a type of information filtering that predicts user ratings and preferences in order to assist users in making purchases that are in line with their interests and needs. The best example of a recommendation system is Amazon.com's suggested reading list for books. A recommendation system points users in the direction of products and information based on their areas of interest. Product recommendations are made using the following technologies: content filtering, collaborative filtering, and association mining. Content filtering suggests products based on the user's past preferences and his profile. By projecting the user's preferences to those of other users, collaborative based filtering analyses the user's activity. Finding connections and correlations between things in a big database is what association mining does. A condition of the type X Y, where X and Y are two sets of things, is an association rule. It indicates that it discovers a relationship between X and Y, i.e., it discovers opportunities to purchase Y things when we purchase X. A user who is very active can only rate a small number of items that are present in the database. Data sparsity problem refers to the situation when a popular item can only be rated by a small

number of consumers. It is sometimes referred to as the "new user difficulty" because it can be challenging to propose any items when a user is brand-new because they haven't given any of the items a rating yet. As a result, making recommendations is challenging.

Since the internet's potential has been accepted and understood, a vast quantity of information is now accessible online. The World Wide Web is a significant research area for this reason. Sarwar, et al. introduced and examined the effects of various similarity algorithms, demonstrated the experimental findings using the prediction MAE graph, and also argued that the size of the neighbourhood influences the accuracy of the forecast. In the initial step of collaborative filtering, Hongwu Ye proposed a method for locating the nearest neighbour through a self-organizing map that creates a group of the nearest neighbours. The use of association mining fills up empty space. As a result, they suggested combining SOM and association mining to deal with the problem of data sparsity. By combining item categorization with an item-based collaborative approach, Hengsong Tan et al. established a novel method to deal with the problem of data sparsity. This method categorizes an object based on its features and then generates predictions for those for which ratings are not available.

2. LITERATURE REVIEW

Improved Collaborative filtering approach based on User similarity Combination

The recommender system is commonly utilised in e-commerce and aids in assisting clients in making informed choices. Collaborative filtering is remains one of the most popular and effective recommendation technologies, despite the recommender system having access to many different algorithms. The fundamental problem with collaborative filtering is similarity computation. We suggested an enhanced similarity model that incorporates three similarity impact variables to reduce the calculation's variance in order to increase the precision and calibre of recommendations. The advantages of our suggested approach over the conventional similarity measure are that it fully utilises rating data and addresses the issue of co-rated items. Four datasets were used in the trials to confirm the suggested algorithm's effectiveness. Results demonstrate that the suggested strategy is suitable for sparse data and can successfully improve the recommender system's preferences.

Book recommendation System for Digital Library based on User profile by using Association rule

Information data is expanding quickly because management systems are being used widely. On the one hand, there are many informational resources available to people. On the other side, locating the right information becomes more time-consuming and challenging. Book recommendations are one of the options for university libraries, which have massive book collections and readers that read a lot. This study

suggests a user-profile-based method for lending library books that uses association rules to generate a model. The outcome demonstrates that a new association rule technique is appropriate for use with library recommender systems.

Book Re-commendation system based on Collaborative filtering and association rule mining for college students

In e-commerce websites, recommendation systems are tools that assist users in finding the right products. The number of websites selling books online has expanded due to the quick development of internet technology, which has boosted rivalry between them. For students reading textbooks, this study proposes an online book suggestion system. The primary goal of this article is to create a method for suggesting the best books to students based on their budget and publisher. This is built on the integration of association rule mining, user-based collaborative filtering, and classification.

A Collaborative Approach for Web Personalized Recommendation System

For recommender systems, collaborative filtering (CF) is a significant and well-liked technology. However, existing CF approaches struggle with issues like data scarcity, inaccurate recommendations, and large prediction errors. The fact that typicality-based CF locates users' "neighbours" based on user typicality degrees in user groups is a distinctive characteristic of the method (instead of the co-rated items of users, or common users of items, as in traditional CF). We are aware of no previous research on investigating CF suggestion by combining object typicality. Additionally, it can make forecasts that are more accurate while making fewer big-error predictions.

3. METHODOLOGY

People who lack the necessary personal experience to assess the variety of options presented by a Website can benefit from a recommender system. It gives consumers information to aid in selecting the goods they should buy. The proposed method differs from existing recommender systems in that the latter simply take user ratings into account when making recommendations for items. When ratings are unavailable for an item, it does not suggest it.

LIMITATIONS:

- Recommendation systems are tools used in e-commerce websites that help users find the correct products within the data base.
- The outcome demonstrates that the new association rule algorithm is appropriate for use as a library book recommender.

The suggested approach combines association mining with collaborative filtering. When appropriate, association mining is utilised to fill in the gaps left by collaborative filtering to uncover similarities between objects that will aid

the system in making recommendations. Next, item-based collaborative filtering is used to anticipate the relationship between the target user and the target item. Thus, combining both approaches can help recommender systems tackle the problems of data sparsity and cold start.

ADVANTAGES:

- The suggested approach combines association mining with collaborative filtering.

- Collaborative filtering is used to compare products that are similar to one another so that the system can recommend items, and association mining is used to fill in the missing ratings when they are needed.

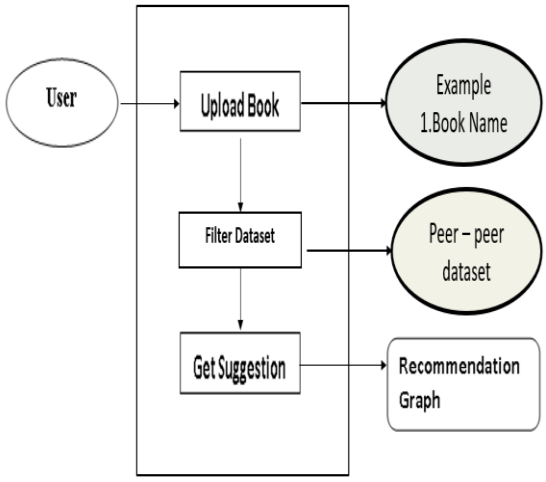

Fig.1: System architecture

The architecture of an online book recommendation system using collaborative filtering and association mining is shown in the diagram above. The collaborative filtering and association mining techniques are combined in the online book recommendation system. When appropriate, association mining is utilised to fill in the gaps left by collaborative filtering to uncover similarities between objects that will aid the system in making recommendations. Next, item-based collaborative filtering is used to anticipate the relationship between the target user and the target item. Thus, combining both approaches can help recommender systems tackle the problems of data sparsity and cold start.

4. IMPLEMENTATION

Through the use of the opinions of other users, collaborative filtering attempts to anticipate the users' opinions. It employs two strategies:

A. Prediction of an association rule.

B. A suggestion.

Two types of collaborative filtering exist:

1) User-centered Teamwork in filtering Similarity between is demonstrated in this Algorithm similarity metrics are calculated for various users before being applied to forecast ratings.

2) Item-based Collaborative Filtering: This Algorithm uses similarity measures to determine

the similarities between various things and then uses those results to forecast ratings.

5. EXPERIMENTAL RESULTS

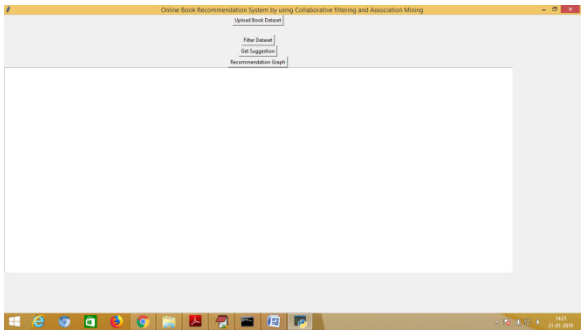

Fig.2: Home screen

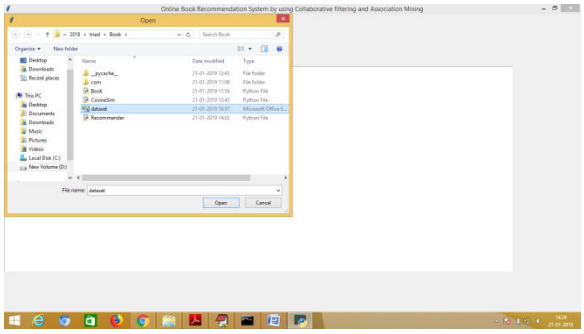

Fig.3: Upload book dataset

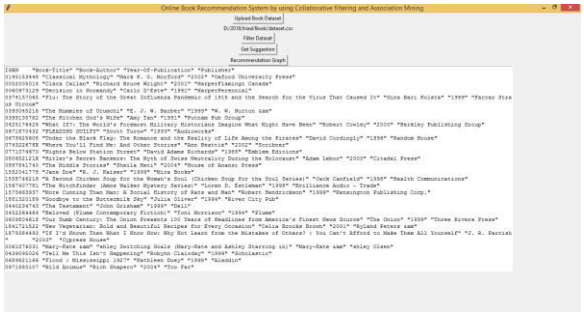

Fig.4: Book dataset loaded

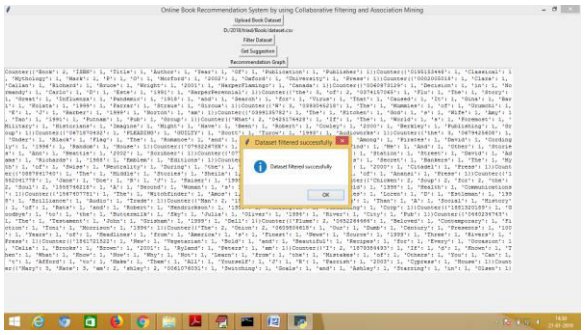

Fig.5: Filter dataset

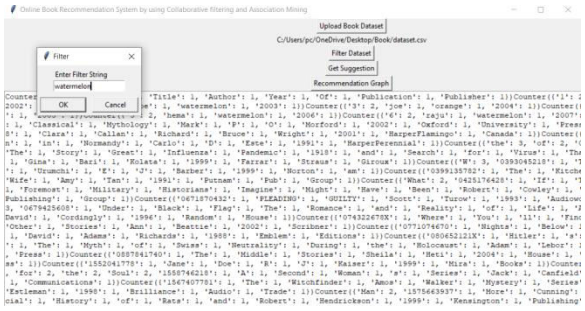

Fig.6: Get suggestion

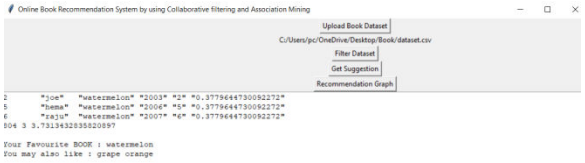

Fig.7: Result

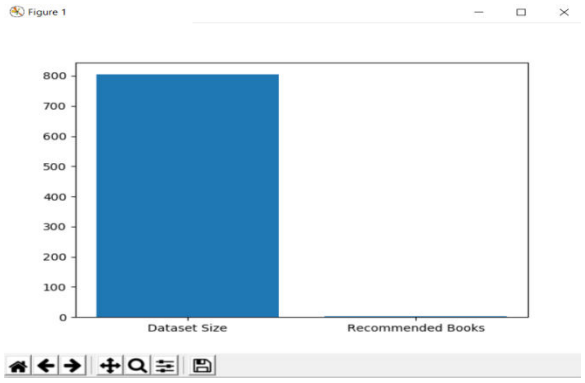

Fig.8: Recommendation graph

6. CONCLUSION

New methods for ranking and presenting things of user interest have been developed in response to the growing demands for online information. Item-based Collaborative Filtering is used in this paper. to generate ratings The data sparsity issue can be solved and useful recommendations can be produced through item-based collaborative filtering. Finally, the similarity calculation results demonstrate good accuracy.

7. FUTURESCOPE

The purpose of a book recommendation system is to foresee a buyer's interests and recommend books to them accordingly. By filtering, a book recommendation system can take into account a variety of factors, including book content and quality. Additionally, future improvements will allow us to increase the recommendation system's accuracy and speed.

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