

Using Hybrid Recommendation to Improve Book Recommendation System

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Abstract: Now a days a huge number of users are using the internet. People prefer online shopping for their needs more and more. After doing literature review it is clear that no single algorithm is suitable in every domain some algorithm/method work well in one domain but fail in another domain. So this paper proposes a hybrid recommender method. The proposed method first calculates the correspondence of users from their ratings. Both correspondences among items and users are used for calculating unknown rating of a user to an item. We evaluate the proposed method using a Books data set.

Keywords: hybrid recommendation method, historical data, multidimensional association rule, FP-Tree algorithm.

I. INTRODUCTION

Recommendation system:-The concept of recommendation system was first proposed by Resnick and Varian in 1990. Recommendation system as an automated system people provide recommendations as input, and then system aggregates and directs them to appropriate recipients. The recommendation system applied in e-commerce is defined as giving recommendation about the products to their customers and provides them the information in order to make the decision.

about the purchase or provide product information to meet the need of their customers. Recommendation system can be classified as content-based recommendation, collaborative filtering recommendation are the most popular applications. [15] A recommender system for an ecommerce site receives information from a customer about which products she is interested in and recommends products that are likely to meet her needs. [1] today's recommender systems are deployed on hundreds of different sites, serving millions of customers. [17] An interesting method in this attempt is called frequent pattern growth or FP growth. First of all, it compresses the database representing frequent items into a frequent pattern tree, which retains the itemset association information.

Association rule mining:-Association rule mining finds interesting association and correlation relationship among large

data set of items [2]. Market basket analysis is considered as a typical example of association rule mining. In market basket analysis customer buying habit is analysed for finding association between different items customer put together in their shopping cart [16].

Hybrid recommendation: - A hybrid recommendation method uses extracted latent features. [12] Hybrid recommendations, which consist of two or more algorithms, are usually used.

Hybrid method has good performance for small number of ratings.

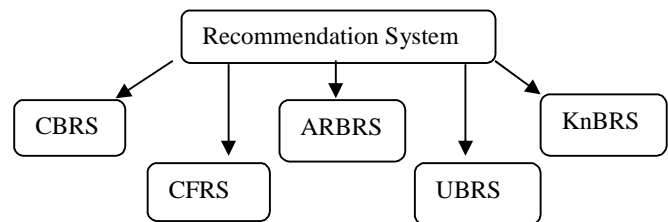


Fig 1: Types of Recommendation System

II. RELATED WORK

[2] In this paper, recommendation system must recommend books that are of buyer's interest. This paper presents book recommendation system based on combined features of content filtering, collaborative filtering and association rule mining.

[3] In this paper, the design of a item recommendation system for small online vendors. This paper calculated to address the requirements of vendors with small data pools and incomplete processing power, and is tested for accurateness, competence, and scalability on real life data from a small online vendor.

[4] In this paper, proposes a new three-tier RS architecture including the customer tier, the third-party server tier and the vendor e-store tier based on the customers' perspective. In the proposed RS, customer information and recommendation module are built in the customer tier. By the help of the third-party server, cross-store recommendation is provided from the customer relative information. [5] In this paper, proposes the

emergence of e-textbooks for teachers and students provides massive teaching resources. In this paper, chose the e-Textbooks of Primary English on the e-Book platforms and presents a personalized recommendation mechanism. [8] This study is to advance a novel recommendation provision using a single group ranking order technique “Mining Maximum Consensus Sequences from all Users’ Partial Ranking Lists (MCSP)”. It is capable of determining the product’s order recommendations based on k-item candidate orders and maximum consensus sequences. In this paper, offers the complete decision measures of group ranking orders. [9]In this paper suggest a novel clustering algorithm founded on genetic algorithms (GAs) to effectively segment the online shopping market. Genetic algorithms are understood to be real on NP-complete overall optimization problems, and they can offer decent near-optimal solutions in reasonable time. In this paper applied K-means clustering whose initial seeds are optimized by GA, which is called GAK-means, to a real-world online shopping market segmentation case. In this study, we compared the results of GAK-means to those of a simple K-means algorithm and self-organizing maps. [10] In this paper to solve the problem by using data mining technology to identify information preferences which readers are often concerned about. According to the readers’ preferences, using a characterization and hierarchical way to categorize readers’ interest in different reading level, lower the interest of the description or remove the excess, to form an effective set of rules. In this paper propose a new approximation method to calculate the level of interests and this level of interests can effectively achieve the appropriate recommendation. [11]In this paper to investigates consumers’ usage of online recommendation sources and their influence on online product choices. A 3 (websites) \times 4 (recommendation sources) \times 2 (products) online experiment was conducted with 487 subjects. Results indicate that subjects who checked product recommendations certain recommended goods double as frequently as subjects who did not check recommendations. So this type of creation also had a significant impact on the tendency to follow creation recommendations. [12]In this paper offers a hybrid recommender method that operates hidden features. The main problem discussed in this paper is the cold start problem. To grip this problem, the offered system first abstracts hidden features from objects denoted by a multi-attributed record using a probabilistic model. We evaluate the proposed method using a movie data set and shows that the proposed method achieves good performance for small ratings information.[13] In this paper propose an interactive evolutionary programming based recommendation system for online shopping that estimates the human preference based on eye movement analysis. Given a set of images of different clothes, the eye movement patterns of the human subjects while looking at the clothes they like differ from clothes they do not like. In other words, the human preference can be measured by using the fixation count and the fixation length using an eye tracking system. Based on the level of human preference, the evolutionary programming suggests new clothes that close the human preference by operations such as selection and mutation.

The proposed recommendation is tested with several human subjects and the experimental results are demonstrated.[14]In this paper using integrated data mining processing technique to find appropriate initial centroids and Vectors in data clustering process by K-means and C-means algorithm. The processes include data cleansing, preprocessing, and finding features relation with Apriori algorithm to get appropriate features. So the experimental result shows the working environment of both clustering techniques.[15]In this paper using numerous techniques for evaluating huge scale buying and favorite data for the resolution are generating valuable recommendations to customers. This paper using a group of algorithms such as traditional data mining, nearest-neighbor collaborative filtering, and dimensionality reduction on two different data sets. The first data set was web-purchasing transaction of a large E-commerce company where as the second data set was collected from Movie Lens Movies recommendation sites.

III. PROBLEM IDENTIFICATION

Whenever we visit any website then we are provided with many options according to our necessity. The recommendation system applied in e-commerce is defined as giving recommendation about the products to their customers and provides them the information in order to make the decision about the purchase or provide product information to meet the need of their customers.

The problem identification part is divided into four cases:-

Case:-1 When for the first time any new user U_1 visits a website for which we are not having historical data. The problem here is what we have to recommend to this new user U_1 .

Case:-2 For a user U_2 who is already having an account for a website. What we should recommend to this user U_2 who only visits but never purchases or likes any book.

Case:-3 For a user U_3 who is already having an account for a website. What we should recommend to this user U_3 who only likes the book and visits various books but never purchases it.

Case:-4 what the recommend to the user U_4 who only purchases book.

IV. PROPOSED SOLUTION

The proposed solution is will help to provide better recommendation in book sale domain. It will provide user with more correct and better options and hence increase the sale of the e-commerce website implementing our solution. There are basic steps are as follows:

1. We create a system for collecting rating data set from users. Generated data items through users to apply multidimensional association rules using FPGrowth algorithm. Finally generated results we are recommend to users.

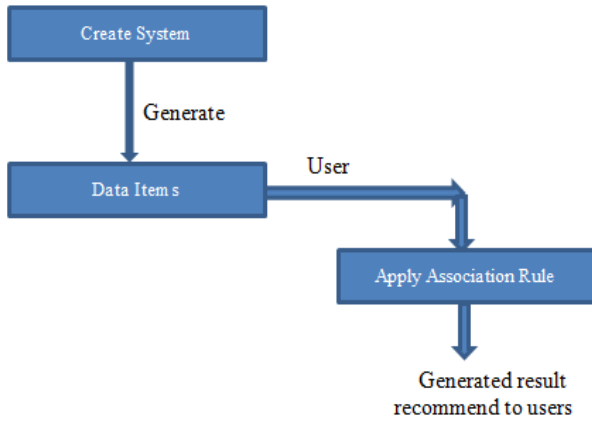


Fig. 2: Flow of work The problem identification part is listed below:-

Case:-1 the solution to the case 1 will be to provide books name by year wise sorting and show them randomly. If the user is having 1st login then he is recommended with top 10 books. And suppose he visits to only 3 books. Then in the 2nd login now the user will be recommended with the previously visited 3-books and with 7 other new books which we have selected randomly by year wise sorting.

Case:-2 the solution to the case 2 will be to recommend books name on the basis of users previous historical data (previous login details). If in the 1st login, if he has seen 20 books then in the next login top 10 books we will recommend to that user.

Case:-3 the case 3 was where the user visits and likes the books, but doesn't purchases it. Sometime later in future he sign in, the problem was what to recommend. Suppose, in the previous login, he has visited 20 books and has liked some of them. Then, later in future login, this user will be recommended those books which he has liked reviewed previously based on the historical data.

Case:-4 the solution to the case 4 was where the user only purchases books and he doesn't visits or likes any books. In this case we will recommend those books related to his previous purchased details. Like, for example; the user has purchased C-language book, then in his future login, we will recommend more books related to C-language based on different author or its advanced version.

Association Rule Extraction: - Association rule mining discovers interesting association and correlation relationship between huge data set of books.

Let $I = \{1, 2, \dots\}$ be a set of items. An association rule can be represented by this form $A \rightarrow B$, where $A \subset B$, $B \subset A$ and $A \cap B = \emptyset$. [17] Association rule extract the pattern from the database based on the two measures minimum support and the minimum confidence. The support and confidence measures are described as stated in.

Support: the rule $(A \rightarrow B)$ holds in transaction set D with support s , where s is the percentage of the transactions in D containing U .

$$\text{Support } (A \cup B) = P(A \cup B) \quad (1)$$

Confidence: the rule $(A \rightarrow B)$ has confidence c in the transaction set D , where c is the percentage of transactions in D containing A that also contain B .

$$\text{Confidence } (A \rightarrow B) = P(B/A) \quad (2)$$

In general association rule mining can be thought of as a two step process.

- Generating all item sets having support greater than or equal to the user defined minimum support.
- Generate all the rules having the confidence factor greater than or equal to the user defined minimum confidence.

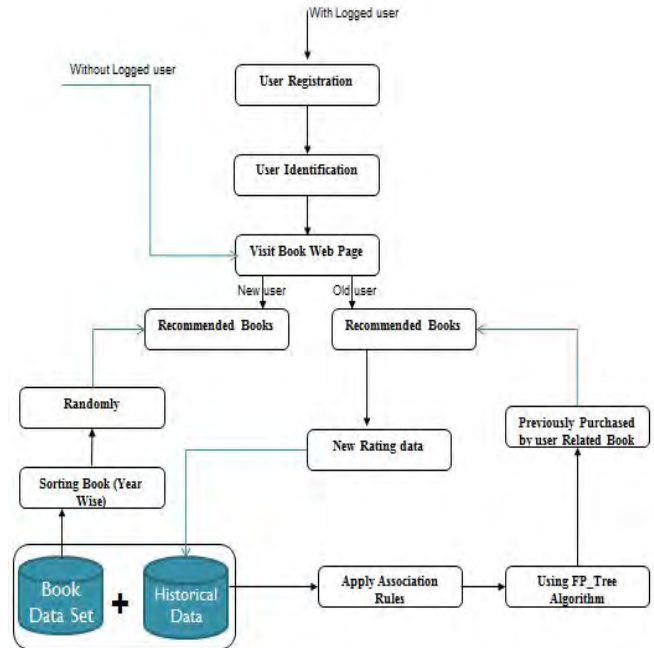


Fig. 2: Process of our Recommendation System

Registration Table: - Registration table stores the information about all the users Register by the website. It is shown in the table 1.

TABLE I: REGISTRATION TABLE

Field Name	Description
u_id	User Id's
u_name	User's Name
pwd	password
email	User's Email Id

Book Information Table: - Book information table stores the information about all the books sold by the website. It is shown in the table 2.

TABLE II: BOOK INFORMATION TABLE

Field Name	Description
Book_id	Book Id's
Book_name	Book's Name
Book_isbn	Book ISBN Number
Book_author	Book's Author Name
Book_year/pub	Book's Year of Publication
Book_edition	Book's Edition
Book_price	Book's Price
Book_publisher	Book's Publication
Branch_name	Book's Branch name
Subject_name	Subject Name

V. EXPECTED CONCLUSION

Our work will help to provide better Recommendation in book sales domain. It will provide user with more correct and better options and hence increase the sale of the ecommerce website implementing our solution.

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