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SURVEY PAPER ON BOOK RECOMMENDATION SYSTEM AND COMPARATIVE STUDY ON TYPES OF ALGORITHMS USED

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ABSTRACT--- *Recommender system (RS) is a technique that helps to make a decision processes by providing suggestions of any type of content to be of use to a user being closely related. The personalized recommendations are making rank lists of books. In this ranking, Book RS try to predict the most suitable books based on the user’s preferences and constraints. Recommender systems are classifying according to the techniques used to make a recommendation: Content-based systems, Collaborative Filtering (CF), and Hybrid. This paper surveys various Machine learning techniques and algorithms employed to uplift the accuracy of Book recommendation system.*

Keyword--- *Machine Learning, Prediction, Collaborative-Filtering, Content-Based, Hybrid*

Recommender systems are tools that, designed for interacting with large and complex information spaces

and prioritizing items that are likely to be interest to the user. An important part of many on-line e-commerce applications like Amazon.com, Netflix, and Pandora is personalized recommendations. Briefly, RSs are based on the informational components like: information about user, purchasing or any other similar action. To implement the functions of RS, identify the items that are preferential to the user a made recommendations based on such preferences. For this, the system has to be able to predict the utility of some of them, or at least compare the utility of some items and decide what items to recommend based on this comparison. The recommender systems are classifying according to the technique that are employed to made recommendation:

I. INTRODUCTION

Content-based systems, which find the items that are similar in content to the user has previously

liked or matched the users' attributes by check the item properties. An approach uses the description.

In Collaborative Filtering (CF), is recommending item to a user, based on the past ratings of all users collectively. CF classify into two types : User-based and Item based. User-based CF works like, for instance, a user U and a set of other users V whose ratings are similar to the ratings of the selected user U and uses the ratings from those like-minded users to calculate a prediction for the selected user U. In Item-based CF, build an item-item matrix determining relationships between pairs of items and using this matrix and data on the current user, infer the user's taste

II. LITERATURE SURVEY

Ms. Praveena Mathew, Ms. bincy kuriakose and Mr. Vinayak hedge [1] proposed a Book Recommendation System (BRS) through the combined features of content based filtering (CBF), collaborative filtering (CF) and association rule mining to produce efficient and effective recommendation. The existing systems lead to extraction of irrelevant information and lead to lack of user satisfaction. So, they proposing a hybrid algorithm, which combines two or more algorithms, to help the recommendation system to recommend the book based on the buyer's interest. They use association rule mining algorithm, ECLAT (Equivalence class clustering and bottom up lattice traversal). ECLAT will helps to find out the frequent item set. It uses depth first searching technique. In one scan, it will categorise. Cosine similarity is used for the similarity measuring in content and collaborative filtering. They use item-item filtering in collaborative filtering. The basic finding that achieved through this proposed work is to recommend the books based on the buyer's interest and increase the productivity and credibility. Using association rule mining algorithm to finds interesting association and relationship among large data set of books and provides an efficient recommendation for the book.

Yongen Liang and ShimingWan [2] proposed a method, which can mine products by understanding the user's preferences. It is a personalised technology with

collaborative filtering. It is book recommendation system,

which is for a university library. Here only provide the recommendation service to the registered users. The collaborative filtering uses both user-user filtering and item-item filtering. The important job of the collaborative filtering is to calculate the similarity of the books and users or reader then, recommend. Cosine similarity is using for the similarity measuring in collaborative filtering. Then find out or predict the rating for the particular book, which the targeted user may like or give. One of the most important problems of collaborative filtering is cold start. That is, when a new user joins then they have no data about that user. They have no previous purchase history or borrow history. Therefore, here they propose a solution that Expert and new book recommendation. Expert and new book recommendation module will recommend the books as if Best-selling, newbooks arrived, classical books... in short, it will recommend the books at the top rating or popular books.

Dharmendra Pathak, Sandeep Matharia and C. N. S. Murthy [3] proposed an efficient and best unique hybrid recommendation algorithm, by providing the recommendation more satisfying the user's desire. Here the hybrid recommendation is a combination of collaborative, content and context based recommendation algorithms. The main input of collaborative filtering is rating i.e, votes of so many people, content based data that is the information about the users like their interest, date of birth, priorities... and the context based data that is the behavioural datas like date, taste, mood, weather... Cosine similarity is using for the similarity measuring. There are subject priorities according to the user's previous history. If they purchase a book then check, the purchased book is different subject priority from the subject priority has already set? If yes, then reset the subject priority³ and then subject priority². The subject priority¹ will not change. Based on calculations and results they concluded that the proposed Hybrid book recommendation algorithm is best among the others.

Ahmed.M. Omran [4] proposed a Hybrid Recommendation system that will answer for the questions like, which book to buy? Which financial service to choose? Which website to visit next? First

phase, collaborative filtering that is based on user behavior by calculating the statistical correlation between the internet users' profiles using Pearson correlation Factor by considering the number of visits to various websites for each user to estimate the type and the strength of correlation among users. Then, Second phase applies content based filtering according to the content of websites by computing the relative similarity between each pair of websites and build, a pairwise comparison matrix to find the most nearby websites to the most visited users' websites. In collaborative filtering, from the browsing history, collect the websites, which that user visited. Then make the user profile with this data and record how many times that particular user visited in each site. Also make neighbourhood that is, find the similar users to that particular user. Spearman statistical method is the way of finding the users that have a common behavior. Content based filtering is the second phase. Here by using the text data mining technique that commonly used in content-based technique i.e., TF-representation filter the data to predict items to users determine the similarity between websites by counting the words of the main pages and applying one of the data mining techniques to find the category to which website belongs. There are five criteria to set the similarity of each couple of websites i.e., Category, Service, Language, Rating, and Interactive. The Euclidean distance is using for similarity measuring.

Adli Ihsan Hariadi, and Dade Nurjanah [5] proposed a hybrid-based method that combines attribute based and user personality based methods for book recommender system. In this paper, they are implementing the MSV-MSL (Most Similar Visited Material to the Most Similar Learner) method, and they are saying that, it is the best method among hybrid attributes based methods. The personality factor is used to find the similarity between users when creating neighbourhood relationships. The hybrid attribute will calculate the recommendation scores of rated books from neighbors using the similarity scores between a target book and its neighbors and between the active user and that user's neighbours. The score of book b from user u , denoted as $score_{u,b}$. This is for finding the Most Similar Visited Material to the most Similar Learner. It uses the values from both content and collaborative. Then use the result

of hybrid as recommendation. That is the Most Similar Visited Material to the most Similar Learner.

Anand Shanker Tewari, Abhay Kumar and Asim Gopal Barman [6] proposed a book recommendation system based on combined features of content filtering, collaborative filtering and association rule mining. When a buyer search for a book, then it will be store as a purchase history or a search history. When the buyer is offline the recommendation perform some filtration for recommending to buyer and the results are stored in the buyers web profile. When the buyer comes online next time, the recommendations will be generated automatically. In content based filtering, web Usage Mining (WUM) is used to provide relevant information to the buyers. web Usage Mining (WUM) typically extracts knowledge by analyzing historical data such as web server access logs, browser caches, or proxy logs. It helps to possible to model user behavior and, therefore, to forecast their future movements. web Usage Mining stores the user's behavior on the internet and processes that data. Item based collaborative recommendation Algorithm is using and Cosine similarity is using for the similarity measuring. Intersect the results from the association rule mining and the content, collaborative filtering.

Binge Cui and Xin Chen [7] proposed a novel book recommendation system. The readers will be redirect to the recommendation pages when they cannot find the required book through the library bibliographic retrieval system. It is an online book recommendation system for a library and it is based on web service. After login, a user search for a book with keywords like a book title, or with author name... at that time bibliographic retrieval system will search for books with the same keywords. If found any result in the recommendation system, then send

these keywords to web Books Retrieval Module. In web Books Retrieval Module, it search on the online bookstore based with keywords by creating accounts on these online book stores like amazon... by the librarian or the admin of the online book recommendation system. Therefore, when the keyword comes to the web retrieval module, it searches as user on these online bookstores by login in. The result getting from these online bookstores will give to the user as recommendation results. According to the

recommendation from users, the statistic and analysis module will calculate the value of that particular book. Then according to this value of book, the Auto-Order Module will produce a book order automatically based on the analysis results. When the purchased books have shelved, Book Storage System will send a report to the Short Message and Email Notification Module. Then it will notify the readers that have recommended the purchased books using Message and Email server.

Kumari Priyanka, Anand Shanker Tewari and Asim Gopal Barman [8] Personalised Book Recommendation System Based On Opinion Mining Technique. An online book recommendation; especially consider the specific features of the book that a particular user already purchased. Here, not only consider the feature but also consider the reviews given by the user for the books. So, here uses the technique that opinion mining or sentiment analysis to classify the reviews or comments from the different users for different book into positive or negative. For this, naïve bayes algorithm will perform the text classification. The classification of the review will helps to identify the user's preference and the books rating.

Raymond J. Mooney and Loriene Roy [9] proposed a Content-Based Book Recommending Using ML tools for Text Categorization. They describe a content-based book recommending system that utilizes information extraction and machine-learning algorithm for text categorization. Learning individualized profiles from descriptions of examples, on the other hand, allows a system to uniquely characterize each patron without having to match his or her interests to another's, Items are recommended based on information about the item itself rather than on the preferences of other users. They

have been exploring content-based book recommending by applying automated text-categorization methods to semi-structured text extracted from the web. The current prototype system, LIBRA (Learning Intelligent Book Recommending Agent), uses a database of book information. The system then learns a profile of the user using a Bayesian learning algorithm and produces a ranked list of the most recommended additional titles from the system's catalog. Overall, the results are quite encouraging even when the system gives relatively small training sets. LIBRA is an initial content-based book recommender, which uses a simple

Youdong Yun, Danial Hooshyar, Jaechoon Jo and Heuiseok Lim [10] proposed a method to utilise user review data extracted with opinion mining for product recommendation systems. In order to improve the predictive ability of the CF technique, they propose a recommendation system that utilities opinion mining based not only on quantitative data but also on reviews after a purchase. First, it can consider the user's preferences objectively, compared with conventional recommendation methods, using purchase reviews in the recommendation system written by the user. Second, it shows that the performance of the recommendation system increased using reviews data extracted with opinion mining in the recommendation system. Therefore, here CF algorithm can consider not only numerical ratings but also textual reviews. In brief, they aim to improve the performance of the recommendation system-using hybrid CF that benefits from opinion mining.

TABLE I. COMPARATIVE STUDY OF DIFFERENT ALGORITHMS

YEAR	AUTHOR	PURPOSE	METHOD MENTIONED	INFERENCE
2016	Ms. Praveena Mathew, Ms. bincy kuriakose and Mr. Vinayak hedge	Book Recommendation System Through Content Based And Collaborative Filtering Method	Combined Features Of Content Based Filtering (CBF), Collaborative Filtering (CF) And Association Rule Mining	ECLAT categorize in one scan. Cold start problem. Data Sparsity.
2018	Yongen Liang and ShimingWan	The Design And Implementation Of Books Recommendation System	Collaborative filtering.	Expert module helps to control cold start but they don't consider users interest. Cold start problem. Data Sparsity.
2013	Dharmendra Pathak, Sandeep Matharia and C. N. S. Murthy	Nova: Hybrid Book Recommendation Engine	Combination Of Collaborative, Content And Context Based Recommendation Algorithms.	Subject priorities according to the user's previous history. Cold start problem. Data Sparsity
2018	Ahmed.M. Omran	A Novel Recommender System For Websites	Hybrid method.	Cold start problem. Data Sparsity
2017	Adli Ihsan Hariadi, and Dade Nurjanah	Hybrid Attribute And Personality Based System For Book Recommender Recommendation	Hybrid-based method	User personality based. Cold start
2014	Anand Shanker Tewari, Abhay Kumar and Asim Gopal Barman	Book Recommendation System Based On Combine Features Of Content Based Filtering, Collaborative Filtering And Association Rule Mining	Combined Features Of Content Filtering, Collaborative Filtering And Association Rule Mining.	Web Usage Mining Cold start
2009	Binge Cui and Xin Chen	An Online Book Recommendation System Based On Web Service	Content based	It requires the help of other online book stores.
2015	Kumari Priyanka, Anand Shanker Tewari and Asim Gopal Barman	Personalised Book Recommendation System Based On Opinion Mining Technique	Content based and Opinion Mining Technique	Identify the user's preference and the books rating. Cold start
2000	Raymond J. Mooney and	Content-based Book Recommending Using	Content-based&Text Categorization	Helps to find the relevant topic.

	Loriene Roy	Learning For Text Categorization		Partially control cold start. Popularity bias.
2017	Youdong Yun, Danial Hooshyar, Jaechoon Jo and Heuseok Lim	Developing A Hybrid Collaborative Filtering Recommendation System With Opinion Mining On Purchase Review	Collaborative Filtering With Opinion Mining	User personality based. Cold start problem. Data Sparsity
2020	Jian Shen, Tianqi Zhou and Lina Chen	Collaborative Filtering-based Recommendation System For Big Data	Collaborative filtering	Gets more data to study. Cold start problem. Data Sparsity

CONCLUSION

A Recommendation System is an act of trying to regulate the future work of the E-commerce industry. The prediction of user's interest of books or any other item could yield remarkable profit and change in the field of decision-making, retail business, hotel business, tourism, digital content, movie databases. From this literature survey, we found that, the most suitable algorithm for predict books for users by considering their preference and by avoiding cold start problem is, the item based collaborative filtering with opinion mining on reviews. This algorithm will be a great benefit for users as well as the owner.

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- [3.] Nova :Hybrid Book Recommendation Engine By, Dharmendra Pathak, Sandeep Matharia And C. N. S. Murthy
- [4.] A Novel Recommender System for websites by, Ahmed.M.Omran.
- [5.] Hybrid Attribute and Personality Based Recommender System for Book Recommendation By, Adli Ihsan Hariadi, Dade Nurjanah.
- [6.] Book Recommendation System Based On Combine Features Of Content Based Filtering, Collaborative Filtering And Association Rule Mining By, Anand Shanker Tewari, Abhay Kumar And Asim Gopal Barman.
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