Review of Various Recommendation Techniques for Web Applications

Nitin Mishra
Associate Professor CSE
RCET Bhilai

Neetish Kumar Chandrakar
M.Tech Scholar
RCET Bhilai

Saumya Chaturvedi
Software Engineer

Kare Prashanthi
Assistant Professor CSE
RCET Bhilai

Abstract—Now a days a huge number of users are using the internet. People choose online shopping for their wishes 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. So we evaluate the recommended 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, which are also the most popular applications. A recommender system for an e-commerce site receives information from a customer about which products he is interested in and recommends products that are likely to reach his needs. Todays' recommender system are deployed on hundreds of diferrent sites, serving millions of customers. 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.

Some different types of Recommendation systems are given as below Fig. 1. Different situations demand different techniques for recommendation. In the coming section we will discuss various different recommendation techniques used by various researchers over the years.

In Fig. 1, we can see Recommendation systems can be clearly categorised into various categories. In the coming sections we will analyse the works of people who have done research on various kinds of recommendation systems.
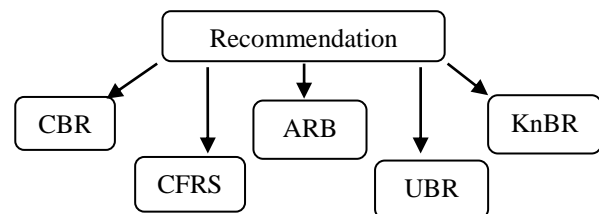
CBRS- Content Based Recommendation System
CFRS-Collaborative Filtering Recommendation System
ARBRS-Association rule based Recommendation system.
UBRS-User based recommendation system
KnBRS-Knowledge based recommendation system

Figure 1. Types of Recommendation System

II. SOME RECOMMENDATION SYSTEMS

Amatriain Xavier, Lathia Neal, Pujol Josep M., Kwak Haewoon, Oliver Nuria, (2010) has proposed a methodology to recommend content based on the opinion of an external source and a reduced number of professionals. So the recommended technique is able to calculate the ratings of a large population by considering a reduced set of professional ratings. The technique's concern is equivalent to traditional CF algorithms, even after using very small professional set.

Chen J., Miller C., Dagher G. G., (2014) has worked on the design of an item recommendation system for small online vendors. This paper is 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.

Chen q., Wang K., Huang W., Tang Z., Wu X., (2011) has proposed to the public library facility scheme that provides several simple queries, which still cannot successfully offer customized information mandatory by the readers who are concerned in some explicit types of books. How to build effective customizable information system for the readers is a very meaningful task. So this paper solves the difficulty by consuming data mining technology to classify information favourites which readers are often concerned about. So we

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defined a new approximation method to calculate the level of interests and this level of interests can effectively achieve the appropriate recommendation.

Danxiang Ai,Hui Z uo and Jun Yang, (2014) has proposed on a new three-dimensional recommendation method appropriate for customer-to-customer e-commerce framework, which discovers the significance among consumers, vendors and goods, and recommends personalized "vendor and good" combinations for consumers, based on historical rankings, vendor features and sale relations. So the proposed methods combines the concepts of both the content-based filtering and the collaborative filtering to calculate vendor to vendor similarities and consumer to consumer similarities, and predict unidentified rankings using a three-dimensional prediction model.

Han Eui-Hong (Sam), Karypis George, (2005) has worked on the experiments of providing recommendation in the domains where no appropriate historical data occur for determining similarity between products or users. This paper has worked on the feature-based recommendation algorithms that overcome the limitations of the existing top-N recommendation algorithms. The new assessment of the recommended algorithms in the real life data sets shows a great assurance as the collective approaches provide 50% improvement concluded by the manual recommendation technique.

Jin-Hu Liu, Tao Zhou, Zi-Ke Zhang, Zimo Yang, Chuang Liu, and Wei-Min Li., (2014) has worked on a mathematical problem based on a distributed network demonstration under the most broadly used algorithm in actual e-commerce recommender techniques, so-called the item-based collaborative filtering. In this paper experiments on real recommender systems designate that to associate new items with specific less dynamic users will statistically produce better performance, namely these new items will have more casuals to perform in other users' recommendation lists.

Jung Jehan, Matsuba Y., Mallipeddi R., Funaya H., Ikeda K., Lee M.,(2012) has proposed on 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 preferences, 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.

Kasliwal N. N., Lade Prof S., Malviya Prof N.,(2013) has worked on the combined data mining technique to find appropriate original centroids and Paths in data clustering method by K-means and C-means algorithm. The processes include data cleansing, pre-processing, and outcome features relative with apriori algorithm to get appropriate features. So the experimental result shows the working environment of both clustering techniques.

Kima K. J., Ahnb H., (2007) has worked on 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, they compared the results of GAK-means to those of a simple K-means algorithm and self-organizing maps.

Linden Greg, Smith Brent, and York Jeremy, (2003) has worked on the personalized recommendation systems to the online store for all customer. The store variations are based on customer interests, presentation programming labels to a software engineer and baby toys to a new mother. They click-through and exchange amounts via important processes of Web-based and email promoting effectiveness exceed than those of untargeted contents such as excellent advertisements and top-seller lists.

Maneeroj S., Takasu A., (2009) has proposed on a hybrid recommender method that operates hidden structures. The main problem in this paper is the cold start problem. The proposed method first extracts unknown features from items denoted by a multi-attributed record using a probabilistic model. We evaluate the recommended method using a movie data set and displays that the recommended method achieves good performance for small rankings information.

Motoki Zaizen, Daisuke Kitayama, and Kazutoshi Sumiya, (2014) has worked on a classifications are being used by some ecommerce sites to recover user knowledge of online customers as they can be a respected source to the user. In this paper, they offered a menu recommendation system for a restaurant. The application provides user with menu recommendation depending on the users past preferences and the time of the day.

Park D. H., Kim H. K., YoungChoi, Kim J. K., (2011) has proposed into eight categories each of recommendation fields and eight categories into data mining techniques. The review and classification framework was independently verified. Findings of this paper indicate that the research field of movie received most research field. So this paper helps anyone who is interested in recommender systems research to suggest insight for future research.

Shanker A. T., Kumar Abhay, Barman A. G., (2014) has worked on the recommend books that are of buyers' interest. This paper presents book recommendation system based on combined features of content filtering, collaborative filtering and association rule mining.

Sarwar B., Karypis G., Konstan J., and Riedl J., October (2000)has worked on numerous techniques for evaluating huge scale buying and favourite data for the resolution are generating valuable recommendations to customers. So this paper recommended by a set of algorithms such as dimensionality reduction, K-nearest-neighbour, traditional data mining and collaborative filtering on two different data sets. The first data set was web-purchasing operation of a

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large E-commerce enterprise where as the second data set was composed from Movie Lens, Movies recommendation sites.

Senecala S., Nantela J., (2004) has proposed to investigate consumers' usage of online recommendation sources and their influence on online product choices. A 3 (websites) × 4 (recommendation sources) × 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.

Sohail S. S., Siddiqui J., Ali R., (2013) has suggested on a recommendation technique based on opinion mining to suggest top ranked books on dissimilar discipline of the computer science branch. Based on the necessity of the consumers and reviews collected from them we have characterized and reviews of the users. Finally, top 10 ranked books are registered.

SunZhong, Xiaomeng T., Haijiao S., (2013) has recommended on the occurrence of e-textbooks for lecturers and students offer huge teaching resources. In this paper, they select the e-Textbooks of Primary English on the e-Book platforms and present a personalized recommendation mechanism.

Tung W.F., (2014) has worked on 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. This paper, offers the complete decision measures of group ranking orders.

Xiao B. and Benbasat I., (2014) has proposed to resolve the problem by using data mining techniques to classify information favourites which readers are frequently worried about. According to the readers' favourites, using a elaborated and classified way to categorize readers' interest in dissimilar reading level, lower the interest of the description or remove the excess, to form an current set of rules. This paper suggests a new calculation method to calculate the level of interests and this level of interests can well achieve the proper recommendation.

Yan C. M., Tang T.J. T., (2011) has proposed on a new three-tier RS architecture including the customer tier, the third-party server tier and the vender 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.

Zaizen Motoki, Kitayama Daisuke, and Sumiya Kazutoshi, (2014) has proposed on a method for determining degree of shops specialty based on a viewpoint extracted by using category structures of online shops to build a recommender system for specialty shops based on viewpoints of items browsed by users. In addition, to verify our method, they

calculated the degree of specialty of shops in rakuten.co.jp based on the viewpoint "Emergency Supplies."

Zhang Li Feng, Yang Shu Wen, Zhang Ming Wang, (2014) has proposed on a recommendation system model based on dissimilarity clustering and association rules, using dissimilarity algorithm reduces the computation complexity of the clustering process, reduce the clustering of the running time, and improves the real-time recommendation.

Zhang Fuzhi, Wang Huan, Yi Huawei, (2014) has proposed on a technique to solve the sparsity problem by creating the small-world implicit trust network. The building of small-world implicit trust network is based on user grouping and implicit trust relationship between users. So this paper is based on an adaptive recommendation algorithm (ARA) which in turn based on the created small-world implicit trust network. So the New results on the three tested datasets in dissimilar Sparsity levels show that the concept of ARA algorithm is better than that of the current recommendation systems.

III. CONCLUSION

After understanding the work of people discussed in the papers we reached to the conclusion that proper data storage is very necessary for proper recommendation. After data storage, comes the techniques to extract knowledge from that data. The more efficiently we extract the information from the data sources the more good recommendation will it be. Lastly techniques used vary with the amount of information we have in the data. It is generally seen that more the data more correct the recommendation we can provide with some exceptions of contradictory data. Lastly we can say as recommendation is for users so correctness of recommendation varies from user to user.

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