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News Recommendation Systems: A Comparative Study

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Abstract: A recommendation system is a solution offers separate and specialized set of information. New era of technology enhance the involvement of web world and web solutions have become crucial part of daily life. A study concludes that personalized solutions have sought much attention due to wide scope of features and facilities. A News Recommendation System is a solution which not only suggests relevant news and articles but also recommends solution as per popularity and user requirement. Several recommendation systems are proposed based on knowledge, content and usage. This paper investigates the role of recommendation system on such papers.

Keywords: News Recommendation, Web Mining, Content Mining.

I. INTRODUCTION

The growing internet world and hectic schedule of daily life create so much difficulty for internet Users to find desired information. This situation becomes worse when user try to search information and get irrelevant information. Inadequate knowledge of search tool and large amount of data gives poor performance to retrieve or extract desire information. Recommendation systems offer intellectual practice based on user preference.
The complete study concludes that "An extensive application or tool that involves user preference or self collected knowledge for predicting user desire and explores the best possibility of relevancy among information is known Recommendation System." or it can be state that "Recommendation System is tool that provides pre specified knowledge based information". Recommendation System may useful in various fields such as news, marking, shopping, product search etc. News recommendation system offers collection of relevant news, articles, and suggestions based on user interest. They may offers news based on news popularity and visits. News ranking, priority, area, impact etc may be the core logic behind any news recommendation system according to

1. Offering news articles to on-line newspaper readers, based on a prediction of reader interests.
2. Offering customers of on-line retailer suggestions about what they might like to buy based on their past history of purchases and/or product searches.

A recommendation system can be classified according to their technique behind knowledge mapping and recommendation taught. They are explained as follows;
1. Knowledge based recommendation system
2. Content-based recommendation system
3. Collaborative-based recommendation system
4. Demographic recommender

1.1Knowledge based recommendation system
Knowledge systems recommend suggestions or solution by generating manually or automatically a number of conclusions and decision rules. It emphasizes on explicit field knowledge about the requirements and user preference.

On the other hand, manually generated decision rules or drawn conclusions may be biased and not suitable for personalized systems. This system associated with different drawbacks such as bottleneck problem during knowledge processing and inherit problem during user profile creation and linking with existing information. A automatic knowledge based system is recommended where input of data may be subjective and can vary according to requirement.

1.2Content base recommendation system:
Traditional Content based recommendation system based on user preference and content exist at data source. It compares and extracts the information from web pages and data sources and match with user preference. It also uses popularity calculations and frequent uses to find most used and most demanding content. It uses this concept to evaluate and sort content according to demand and popularity. Generally, it observes the description associated with items or existing content and compare with user preference.

In many Web-based personalized applications such as e-commerce and e-learning sites, several techniques for document modeling, information filtering, and techniques for deriving information from the pages content are proposed. In such application, user profiles are generally described as vectors so that every entry of vectors represents a weight or an interest degree of each item in the Web pages.

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1.3Collaborative based recommendation system:
Collaborative-based or so called social-based are an alternative approach to the previous approaches, aiming to improve the limitations of content-based approach. It exploits the other user's profiles in the same community and recommends new items not previously rated or seen by the user based on the assumption that similar users have similar interests in the same community. Therefore, recommendations take places based on the user similarity and recommend items from the interesting list of other people in the same community.

1.4Demographic based recommendation system:
A demographic recommender system provides recommendations based on a user's demographic profile which involves user's demographic data such as gender, age, date of birth, education, and other personal features

II. LITERATURE REVIEW

Cui [1] et. al. proposed solution to implement intelligent recommendation system for personalized services. Proposed method is based on SVM technology which is used to analyze web pages and collect browsing history and building user choices. Based on user interest and usage can help to decide user interest and item or news for better suggestion. Content web mining can be help to observe the frequency of interest as well as usage to derive interest model. .Net technology has been used to implement news recommendation system using content mining concepts. In this paper also apply the Hierarchical model to make the result more accurate.

Nagini [2] et. al. web mining is kind of data mining technique which is used to extract information from web data. Internet has millions of data and knowledge extraction from large data is the big challenge. User can't get results frequently. Subsequently, user always demands specific and accurate results. To overcome this problem author's proposed recommendation system based on popularity. Rank Improvement algorithm is used to calculate the popularity of news content and derive the most frequent news. Proposed system calculate re-ranking and maximum occurrence to derive most useful news content for users.

Kliegr[3] et. al. present about the experiment to evaluate the performance of association rule using classification algorithms for online and offline recommender system and also work on the information overloading problem. They consider CLEF NewsReel 2014 Challenge and solve the problem using Association Rule Classification & Classification Based on Associations (CBA) through ARC algorithm. Both of them focus on the performance optimization and find the reduce number of association rule without affecting the accuracy Proposed solution not only reduces overhead but also increases accuracy.
ARC approach on online task: To obtain the great result with ARC approach online task to recommending news article on real website and focus on top interacted and recent data.
ARC approach on offline task: In this approach to investigate the performance of ARC algorithm on the offline task to recommend problem cast as a standard classification task and compare the result with machine learning algorithm.

Adnan et. al.[4] consider fuzzy logic to suggest news using content web mining. Fuzzy logic gives an opportunity to observe the value between 0 to 1. Suppose, 0 represents false and 1 represents true then fuzzy logic can help to estimate the degree of truth between 0 to 1. Recommender system represents user preference and proposed solution for performing low overhead solution. A diversity of procedure have been proposed for performing recommendation, including content-based, collaborative, knowledge-based and other techniques. Proposed solution uses fuzzy logic to estimate most relevant set of news. In this approach by using the Fuzzy membership function and inference rule find the similarities on the articles by taking the user rating.

Lu.et. al. [5] explore that content based filtering extract the most frequent use items where collaborative filtering predict the interest for long time users and gives interest of related users. Proposed system gives the solution for both rich as well as long-tail users' news. Authors proposed a hybrid technique to integrate both Content-based & Collaborative Filtering approach. Combining this two approach is not simple way but benefits of proposed solution are strongly observed. Performance gain is observed in the implementation.

Fortuna et. al.[6] gives an approach for recommending news articles on a large news portal. They consider web server log to refer usage of news and find popular news based on content and category classification. Proposed solution gives a accurate window of suggestions. In this approach firstly analyze the online news publisher to find out the pattern of user to read different news on the web and then predict most likely articles to read by the particular user.

Husinet. al. [7] performs observation on online newspapers and concludes it as conventional hardcopy papers. They usage web usage and web content along with Malaysian news paper as data reference and perform web content mining to conclude most useful content for users. They uses web usage mining to observe user profile and derive combine architecture using both content and web mining. They consider web server logs as the primary data source for web usage mining and Malaysian online newspaper website, BeritaHarian as source for web content mining to filter out most useful news content for user.

To better understand the work done in this filed a comparative study has been performed which not only compare about the problems and proposed solutions but also enlist the advantage and disadvantage of proposed solutions. It is shown in table1.

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III.COMPRETIVE STDUDY

TABLE I

Reference	Problem Domain	Proposed Approached (method)	Dataset Detail	Implementation Strategy
[1]	In which can recommend news information for users according to their browsing history, and the experiments show satisfactory results	A method based on One-Class SVM than use hierarchical model to make the result more accurate.	In this use network data of 2012 issued by Sogou Labs,	The proposed solution to implement intelligent recommendation system for personalized services. Content web mining can be help to observe the frequency of interest as well as usage to derive interest model.
[2]	In this paper Information overloading problem obtain.	They present "Rank Improvement" algorithm that will re-rank the results by classifying them into relevant groups	In which use query suggestion AOL dataset is and Flikr dataset is used for image recommendations.	They built a prototype application that demonstrates the re-ranking Process and search results optimization. These are basically machine learning algorithms used for ranking.
[3]	Reduce the number of association rules substantially while not affecting accuracy.	Evaluation of multiple Association Rule Classification (ARC) algorithms in the CLEF NewsReel'14 challenge. Obtained by the CHAID decision tree inductionalgorithm.	CLEF#26875 o_-line dataset	In which to implement the ARC and CBA for online and offline Recommendation task and investigate the possible optimization.
[4]	In which low over head problem is obtain.	Method implements fuzzy logic to find a set of articles related to other articles which can be recommended to a reader	In which use bdnews24.com	Our method implements was based on traditional c means algorithm and another was based on its fuzzy counterpart e.g fuzzy c means algorithm
[5]	To bring both Content-based Filtering and Collaborative Filtering approaches together.	They propose a Content-based Collaborative Filtering approach (CCF) They discuss the performance gains and insights in news topic recommendation in Bing.	In this use Bing news reading dataset.	In which to implement hybrid technique to integrate both content based and collaborative filtering approach on both rich and long tail user news to implement the preformance.
[6]	In which also have information over loading problem on large news portal.	They evaluated the approach on a large dataset, comprising one month of access logs from a large news portal.	In this Dataset use web server access logs obtained from a large online news portal for the period of one month.	In which focus on interpretatively of develop model to analyze the predictive performance of each single feature and their combination went article read by the user and give a accurate window of suggestion.
[7]	This paper solve the problem to obtain Optimum and efficient News	Recommend news articles to users. Web usage mining techniques in deriving	In which use Berita Harian from January 2012	In this to improve an existing technique on capturing user profiles from Web server logs

	Suggestion	user profiles and find a novel way to combine the user profiles with Web content pages.		
[8]	Information overloading	An approach for fast content-based news recommendation, based on cosine-similarity search.	SME.SK,	This method computed the list of similar articles for every article in the dataset
[9]	To improve the quality of recommender systems by utilizing Users' context.	They propose a novel method for context-aware recommendation, which incorporates several features into the ranking model	In which use Real word datasets,	They propose several types of ranking features that react various contextual effects.
[10]	In this to resolve ambiguity problem.	OF-IDF method is employed to represent the unstructured text.	news database of 2010 proposed byHogen boom F, Vandic D, Frasincar F, et al	They conducted an experiment to compare the new approach with the baseline method which applies the classic TF-IDF weighting and the cosine similarity

IV.CONCLUSION AND FUTURE WORK

The study of proposed solution and related recommender system conclude that a wide scope of development is observed in the field of recommendation system. However, in most cases general occurrence of words is the basis for recommendation system. In future to overcome this problem derive the alternative mechanism to overcome the cons of existing system and gives better solution.

Study also concludes that still there is needed to increase diversity of news recommendation and retrieve most accurate results. On the basis of above study will help to refine popular and effective news content according to user desire.

In future we will developed recommendation system to not only observe the news content on user preference or popularity basis but also refine article on priority and impact basis.

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