RESEARCH REVIEW JOURNALS
Volume-04
Issue-01
January -2019

ISSN: 2455-3085 (Online)
RESEARCH REVIEW International Journal of Multidisciplinary
www.rrjournals.com [UGC Listed Journal]

A Survey of Recommendation Systems Challenges

[1]Sunita, [2]Gurvinder Singh & [3]Vijay Rana

[1]*Research Scholar, Department of Computer Science, Arni University, India*
[2]*Assistant Prof. Department of Computer Science, Arni University, India*
[3]*Assistant Prof. Department of Computer Science, SBBS University, India*

ARTICLE DETAILS

Article History
Published Online: 20 January 2019

Keywords
Recommendation System, Collaborative Content Filtering, Hybrid Filtering

Corresponding Author
Email: *sunitamahajan2603@gmail.com*

ABSTRACT

Today's Recommender System is an exceptionally new district of research in machine gaining knowledge of. The Recommender machine incorporates two top strategies that help in presenting significant suggestions particularly, a Collaborative Filtering set of rules and Content-Based Filtering. In content-based filtering, the version uses specifications of an item to suggest additional objects with comparable properties. Collaborative filtering uses beyond the conduct of the user like Systems that a user previously regarded or purchased, in a summation to any rankings the person gave those objects charge and comparable conclusions made by using different consumer's Systems listing. To expect objects that the user may also discover exciting. This paper introduces a survey of approximately recommendation structures, strategies, demanding situations the face recommender systems and lists some research papers to solve those demanding situations.

1. Introduction

Recommendations to extract online user revel in an Information Retrieval System (IR). The maximum popular procedures collaborative filtering and content-based filtering are used in recommendation gadgets to recommend person experience. It predicates collaborative filtering on the identity of desire styles in a user network. Content-based filtering approaches, in evaluation, best don't forget the beyond choices of a man or woman person and try to analyze the desired version based on a feature-primarily based illustration of the content material of recommendable items.

Due to it had made the capability boundaries of considering best the beyond options of a character person over the past two a long time to combine both algorithmic methods in hybrid techniques

• List & Examples of recommender System

Today's these are the most popular examples of recommender systems Netflix, YouTube, Tinder, and Amazon etc. These systems entice users with appropriate suggestions based on the choices they make.

1. Movie recommendation [Netflix]
2. Book recommendation [Amazon]
3. Music recommendations [Pendura]
4. News recommendation [Yahoo]

1.1 Recommendation System Techniques

Recommendation systems gain the information from user searched data. There are three main techniques are used in recommendation system. These three techniques are explained as below

- ***Collaboration based***
- ***Content filtering based***
- ***Hybrid based***

1.1.1 Collaboration based

Collaborative filtering [9] based structures gather and analyze a user's behavioral records inside the shape of their remarks, ratings, choices, and sports. Grounded on this statistics, then exploits similarities among several users or items to expect lacking ratings and therefore make recommendations. Collaborative filtering (CF) techniques produce consumer-particular pointers of objects primarily based on styles of rankings or usages like purchases without the call for facts about both objects and users.

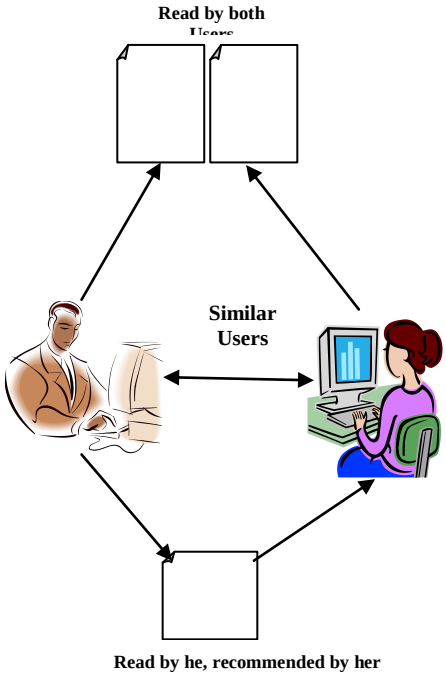

Figure 1 Collaborative Filtering

1.1.2 Content Based Recommender Systems

Content-primarily based filtering strategies are grounded on a description of the item and a profile of the person's tastes [9]. It also recommends gadgets much like those which a person has appreciated inside the object fee listing. The characteristic information includes:

- **Characteristics of Items (Keywords and Attributes)**
- **Characteristics of Users (Profile Information)**

Content based filtering systems can also serve users items based on users' profiles. You can create user profiles based on historical actions. The problem with content-based recommender systems is that they are restrictive. You click on a dress and you see more dresses. The system is incapable of knowing that your interests go beyond liking dresses.

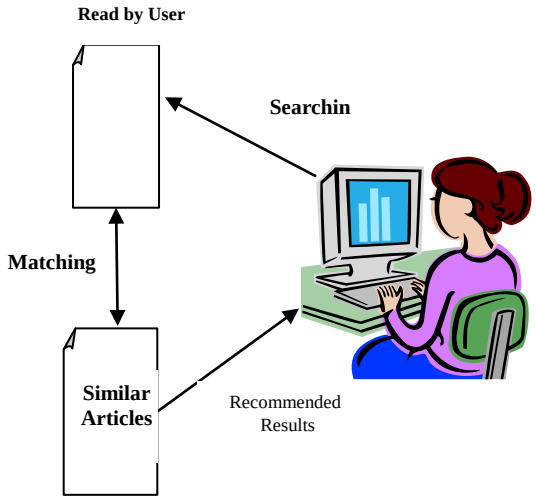

Figure 2 Content-Based Filtering

1.1.3 Hybrid based

In a hybrid approach, we merge the two recommended techniques content-based and collaborative filtering to get the best advantage and gaining better result and reduce the issues and challenges of these applications [8]. Merging these different methods achieve high performance and alleviate problems and challenges rise by using content based or collaborative filtering only.

2. Literature Review

In this section we will discuss research papers studying recommender system techniques Table 1 discusses others papers and solutions they used to overcome recommender system challenges, dataset, applications, research gap for the every paper.

In the proposed study describe jokes on content based recommendation system by using K-NN method and Wordnet synsets to overcome the collaborative filtering problems. Jester is online jokes recommendation system. [1]

In the proposed system describe the applications in IOT context and provide new recommendation techniques basis of real world IOT system. [2]

In the proposed system is based on movie-Lens recommendation system with five different type personalities. This recommendation system is based on user rating. These rating is based on user personality with the help of rating proposed system identify user behavior. [3]

The hybrid-filtering recommender system [4] using machine learning and Facebook Fan Page data to achieve the high satisfaction of recommending the item to users and accuracy also, solve cold start problem. In this algorithm to extract from yahoo, movies and Facebook fan pages were used content-based filtering. Also then compare the output results of this algorithm with others recommender system like, Netflix, YouTube, and Amazon.

In proposed [5] a hybrid movie recommender system based on collaborative filtering technique. In this paper, to address the scalability and accuracy of the movie recommender system they used fuzzy, a c-means technique for finding a neighborhood for users.

Table 1 Research Gap

Authors	Techniques	Dataset	Application Area	Method	Research Gap
[1]	Collaborative Filtering	Jester online jokes website	Jokes recommendation System	WordNet synset with K-NN method	To test more content based algorithms
[2]	IOT with Recommendation system	AGILE Project	IOT Domain System	Technology in IOT	Real time Recommendation system on IOT
[3]	Content Based Filtering	Movie-Len dataset	User Personality investigation based System	Movie-Len recommendation System	To analysis Social media user personality
[4]	hybrid-filtering recommender system	Machine learning and Facebook Fan Page data.	Fetch user search content	Solve cold start and accuracy problems	Increase customer satisfaction.
[5]	hybrid-filtering recommender system	————	movie recommender system	Fuzzy system , and c-means	scalability and Accuracy of the movie recommender system.

3. Issues and Challenges

3.1 Cold Start Problem

Cold start problem arises mainly when we have a new user to the site or when adding a new item to the system. Firstly, how we would recommend items to the new user we don't know his interests and he didn't rate any item yet. Secondly, to whom we can recommend this new item to others, even no one rate this item neither it's good or bad to be likely by users [9].

3.2 Synonymy

Synonymy arises when an item is represented with two or more different names or entries having similar meanings [10]. In such cases, the recommender cannot identify whether the terms represent different items or the same item. For example, a memory-based CF approach will treat “comedy movie” and “comedy film” differently. The variation in using descriptive terms is greater than commonly thought and the excessive usage of synonym words decreases the performance of CF recommenders. Since item contents are thoroughly ignored, therefore, the recommender does not consider the latent association between items. This is the reason why new items are not recommended as long as these are rated by the users. To alleviate the problems of synonymy, different techniques including ontologies [11], the Single Value Decomposition (SVD) techniques [12], and Latent Semantic Indexing (LSI) could be used.

3.3 Privacy

Privacy is one of the important challenges in recommender systems. Recommender systems to recommend items matching their interests, we must know some information about the user data. Users need to know which information needed to recommend more preferably items to him, and how it applied [8].

3.4 Shilling Attacks

It happens, if a malicious user or competitor enters into a system and starts giving false ratings on some items either to increase the item popularity or to diminish its popularity [6].

3.5 Gray Sheep:

Gray sheep occurs in collaborative filtering systems where the opinions of a user do not equate with any group and consequently, is unable to obtain the benefit of recommendations [6].

3.6 Scalability measure

Scalability measure the ability of the system to work effectively with high performance while growing in the information. Recommender system needs to recommend items to the users without any change while the number of users increased or the number of items increased too. To achieve this we need more computations and get expensive [7].

4. Conclusion

In the previous few years, recommend they have used systems, to have the various answers to mitigate records and cognitive overload trouble by suggesting related and relevant objects to the users. Many advances have been made to get an excellent and pleasant-tuned recommender device. Designers face several prominent issues and demanding situations. Although, researchers had been running to deal with these issues and have devised solutions that by some means and up to a degree an attempt to solve those problems, however, we need a lot to do to get to the preferred aim. In this studies article, we centered on those outstanding problems and challenges, mentioned what has been finished to mitigate these issues, and what desires to be carried out inside the shape of different research possibilities and guidelines that may be accompanied in managing at least issues like a chilly-begin trouble, Synonymy, Privacy, Shilling Attacks, grey sheep and scalability measures.

References

[1] Alharthi, H., & Inkpen, D. (2015, April). Content-based recommender system enriched with wordnet synsets. In *International Conference on Intelligent Text Processing and Computational Linguistics* (pp. 295-308). Springer, Cham.

[2] Felfernig, A., Polat-Erdeniz, S., Uran, C., Reiterer, S., Atas, M., Tran, T. N. T., ... & Dolui, K. (2019). An overview of recommender systems in the internet of things. *Journal of Intelligent Information Systems*, *52*(2), 285-309.

[3] Karumur, R. P., Nguyen, T. T., & Konstan, J. A. (2018). Personality, user preferences and behavior in recommender systems. *Information Systems Frontiers*, *20*(6), 1241-1265.

[4] Lee, Maria R., Tsung Teng Chen, and Ying Shun Cai. "Amalgamating Social Media Data and Movie Recommendation." Pacific Rim Knowledge Acquisition Workshop. Springer International Publishing, 2016.

[5] Katarya, R., & Verma, O. P. (2016). A collaborative recommender system enhanced with particle swarm optimization technique. *Multimedia Tools and Applications*, *75*(15), 9225-9239.

[6] Shah Khusro, Zafar Ali and Irfan Ullah. "Recommender Systems: Issues, Challenges, and Research Opportunities". Information Science and Applications (ICISA) 2016, pp.1179-1189.

[7] Soanpet .Sree Lakshmi and Dr.T.Adi Lakshmi. "Recommendation Systems:Issues and challenges".(IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 5(4) ,2014, pp.5771-5772.

[8] Hadeer Mahmoud , Abdelfatah Hegazy , Mohamed H. Khafagy," An approach for big data security based on Hadoop distributed file system", 2018 International Conference on Innovative Trends in Computer Engineering (ITCE), Aswan, 2018, pp. 109-114.

[9] Lalita Sharma and Anju Gera. "A Survey of Recommendation System: Research Challenges". International Journal of Engineering Trends and Technology (IJETT), vol 4(5) 2013, pp.1989-1992.

[10] Su, X., Khoshgoftaar, T.M.: A survey of collaborative filtering techniques. Advances in Artificial Intelligence 2009, 4 (2009)

[11] Lau, A., Tsui, E., Lee, W.: An ontology-based similarity measurement for problem based case reasoning. Expert Systems with Applications 36, 6574–6579 (2009)

[12] Billsus, D., Pazzani, M.J.: Learning collaborative information filters. In: ICML,pp. 46–54 (1998).

[13] Panigrahi, Sasmita, Rakesh Ku Lenka, and Ananya Stitipragyan. "A Hybrid Distributed Collaborative Filtering Recommender Engine Using Apache Spark." Procedia Computer Science 83 (2016): 1000-1006.

[14] Lee, Maria R., Tsung Teng Chen, and Ying Shun Cai. "Amalgamating Social Media Data and Movie Recommendation." Pacific Rim Knowledge Acquisition Workshop. Springer International Publishing, 2016.

[15] Xie, Li, Wenbo Zhou, and Yaosen Li. "Application of Improved Recommendation System Based on Spark Platform in Big Data Analysis." Cybernetics and Information Technologies 16.6 (2016): 245-255.

[16] Radhya Sahal, Mohamed helmy Khafagy, Fatma A. Omara: Exploiting coarse-grained reused-based opportunities in Big Data multiquery optimization.J. Comput. Science ,volume 26,2018,pp: 432-452.

[17] Marwa Hussien Mohamed, Mohamed Helmy Khafagy, Mohamed HasanIbrahim . "From Two-Way to Multi-Way: A Comparative Study for Map-Reduce Join Algorithms". WSEAS Transactions on Communications, Volume 17, 2018, pp. 129-141.

