

# Web Recommendation System: A Systematic Survey

B.Rajeswari

Reg.No:18211192162020  
Sadakathullah Appa College,  
Tirunelveli, India. Affiliation  
of Manonmaniam  
Sundaranar University

Dr.S. Shajun Nisha

Assistant Professor & Head ,  
Sadakathullah Appa College,  
Tirunelveli, India

Dr.M. Mohamed Sathik

Principal ,  
Sadakathullah Appa College,  
Tirunelveli, India.

**Abstract:** The internet has grown to be a vast source of informations. It provides platform for lots of e-commerce establishments. These e-commerce web sites have very huge sort of records about the products. So it is tough for the customers to choose best product according to their needs. To overcome the problem of information surplus, many Recommendation strategies had been proposed in advance. A personalized recommendation gadget can deal with this issue. There are still challenges in Recommender system 1) The complexity and vagueness of web sites gives way to development of complex tree description. 2) Attributes of items and user behavior are subjective, vague and imprecise. Hence there will be uncertainty in representing features and its associations. To handle this, hybrid tree structures are developed. Then fuzzy based tree approaches is developed for web recommendation. Experimental results on an Australian business dataset and the Movie lens dataset show that the proposed recommendation approach have good performance and handled tree-structured data efficiently.

**Key words:** Recommendation system, Tree techniques, web based system, fuzzy techniques

## I. INTRODUCTION

E-commerce internet-websites are offering new commercial enterprise portals and huge quantity of product statistics, so customers spend increasingly more time browsing the internet so that the right information or product can be found. One solution to conquer with this problem is to increase a customized Recommendation device. This system retrieves the data desired with the aid of the purchaser and allows him in figuring out which product to buy.

In CF systems ratings are expressed as binary values. Rating more than three considered as favorable item and less than three as object, disliked. Same score could have extraordinary meaning to exclusive users so rankings depend upon the unique human thinking technique.

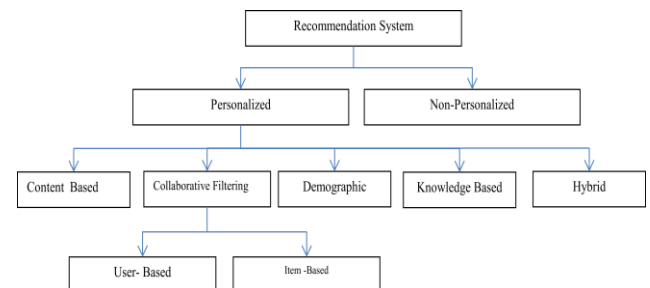
Sometimes, Item attributes and customer behavior are subjective and inaccurate. These all the reasons for uncertainty. To reduce uncertainty Fuzzy principle is used to represent object functions and person behavior. Fuzzy concept represents item and user possibilities as vector as a result.

Items or person profiles in a B2B environment have complex systems, which includes tree systems. So recommendation systems have infrequently used inside the B2B environment. For instance, a business in a B2B utility environment, there are numerous product categories.

This may also have many of subcategories, under which there may be multiple specific merchandise, which collectively shape a tree shape. In advance tactics, an item is commonly described as a unmarried value or a vector. The fuzzy desire models can not deal with tree-structured information in a Web-primarily based B2B environment. This have a look at clear up challenges like, Tree dependent records, tree dependent person possibilities, uncertainty in consumer options, and personalization problem in Recommendation device and advise a fuzzy tree based consumer preference tree based totally recommendation system.

## II. LITERATURE SURVEY

### Recommendation System Techniques



1) Collaborative Filtering: A collaborative filtering recommendation system suggest objects to the person totally based upon the recommendation of similar consumer's. Similarity of customers is discovering using the records (rankings) of users. If two users preferred an object in the earlier period then they would like an item in the future additionally. 2) Content primarily based Recommender Systems: Content primarily based advice gadget advocate items to the person based totally at the items bought in the earlier time and profile of the consumer then person profiles are compared with the brand new items .Items which matches with the consumer profile are advocated to the user. 3) Knowledge base Recommendation machine: There are many objects which are not bought regularly so those items have very much less ratings. In this situation knowledge based system is used. User offers his Options for the objects then items are advocated based totally on those alternatives. 4) Demographic: This approach use information of the consumer like age, gender, place, career and so on. This demographic statistics is used to discover similar users.

Items are endorsed based totally on ratings of similar customers. 5) Hybrid Recommendation machine: this approach combine all the techniques.

III. ISSUES IN RECOMMENDATION SYSTEM

1) Data Sparsity: When there is very much less ratings about objects then it is very tough to suggest item to the customers.CF structures suffer from this hassle.

2) Cold Start: The two types of cold start problem are, new consumer and new item. Since there is no information about the new items, it is complex to recommend items.

3) Scalability: It is the capability of recommendation gadget to address developing amount of statistics. Information about the consumer and object grows hastily at the net. CF systems becomes costly to deal with growing amount of records and offers inaccurate suggestions.

4) Over Specialization: Recommendation structures advise items primarily based on previous records. User’s does not get diversified pointers.

[1]. This paper proposes a Tag based totally collaborative filtering Recommendation approach for non-public getting to know Environments (PLE), s. Here 16 different tags primarily based collaborative Filtering recommendation algorithms are applied and compared in phrases of accuracy and user delight. PLE beginners have Different hobby and alternatives so there is no similarity in their studying resources. User generated tags are mixed with traditional collaborative filtering recommendation. <User-item> Relation converted into the <user, item, tag> relation. The result shows that item based totally K-manner clustering Algorithm gives first-rate overall performance in offline assessment. Whereas within the person assessment user primarily based Apriori Algorithm ranked First. The end result of assessment suggests that there is no relation among quality of person experience and high recommendation accuracy measured via statistical degree.

[2].This paper proposes a personalized Recommendation method primarily based on Three Social Factors ,Personal hobby method consumer–item dating and interpersonal have an effect on and interpersonal interest similarity approach person-user courting of social networks.Probablistic matrix Factorization is used Experiments are achieved on 3 datasets MovieLens and yelp. This method gets rid of the trouble of bloodless start and statistics sparsity.

[3].This paper proposes a advice device for real estate web sites that helps users in purchasing new houses or homes. Recommendation system is advanced by way of combining case based totally reasoning (CBR) and Ontology. Earlier structures supports single characteristic search systems but this machine support multivalued seek gadget. User search behaviors are studied and a knowledge base is ready.

Then the semantic meaning of attributes and relationship between them is defined by ontology. Result shows that this approach is efficient and affordable for housing search in real estate websites.

[4] This paper proposes a hybrid collaborative filtering recommendation approach based on user preferences and item features. Traditional collaborative filtering recommendation approach has challenges like 1). Data

sparsity 2).scalability 3). Similarity-: similar items can have different names and meaning so recommendation system would treat them as different items. To solve these challenges a recommendation algorithm is proposed based on user preferences and item –features. User preferences are determined from previous ratings of user over a period of time and then using similarity matrix find similar users. An item is additional represented as vector of different features. Every feature has given weight. If a feature is visible in different items then it becomes the preference of user. The proposed algorithm is more accurate than other traditional CF methods. It also removes the problem of data sparsity to some extent.

[5].This paper proposes a new approach of content based Recommendation system that is based on Transfer learning. This approach solves the problem of data sparsity when there is lack of information in target domain but there is sufficient information in other domain. A behavior graph model is prepared .From the user preferences .this graph is then converted into the tree called Behavior tree. For each tree in source domain a corresponding tree in target domain is find out. BGM method is compared with other cross domain methods like KNN cross domain method. The result shows that performance of BGM is better than KNN.

[6].A hybrid recommendation approach for e- learning environment is proposed. Two types of attributes are considered for learning resources 1.Explicit attributes like subject and name of the publisher 2.Implicit attributes can be extracted from the historical ratings of learners. Explicit attribute based RS and implicit attribute based RS prepared and combined to give accurate recommendation, s for learners. In EAB-RS ,a Learner preference tree (LPT) is prepared for each learner from historical logs and ratings then similarity between learners is find out and rating prediction for resources is given by NNCF Algorithm. In IAB-RS ,implicit attributes are extracted using Genetic algorithms(GA) then similar users are find out and finally rating prediction is done by NNCF. This recommendation approach resolves the problem of Data sparsity, cold start and provide more diverse recommendation list.

Paper	Technique	Algorithm Used	Description
[1]	CF Based	k-means clustering, Apriori, NBC, KNN, etc.	Results shows that user experience does not relate with high recommendation accuracy
[2]	CF Based	ProbabilisticOtic matrix factorization	Removes the problem of cold start and data sparsity
[3]	Knowledge Based	Case Based reasoning and ontology	Gives multiattribute search system
[4]	Hybrid CF Method	TF-IDF model	1.More accurate than other CF methods 2. Removes the problem of data sparsity to osme extent
[5]	Content Based	BGM method	Solve the problem of data
[6]	Hybrid	Nearest Neighbor	1.Remove cold start

	approach	CF	and data sparsity issue
[7]	Collaborative Filtering	Fuzzy C- means, Grey Wolf	2.Gives diversified results It gives better Recommendation
[8]	Collaborative Filtering	k-means, Cuckoo Search Optimization	High Performance, more accurate

V. EXISTING SYSTEM

Existing Recommendation system handles the tree structured data. User preferences are fuzzy means they cannot be expressed by a number so fuzzy set theory is used to describe complex preferences of users. User preferences are collected by two ways. 1) Intentionally Expressed preferences: This is directly given by the user. Items have different features that forms the tree structure.so user preferences are in tree structures. User assigns a preference value to each feature which is expressed in terms of fuzzy set. Suppose expressed as T1. 2) Extensionally Expressed preferences: These preferences are constructed from the items previously purchased or experienced by the user. Each item represents a tree associated with a preference value given by the user. Suppose expressed as T2. The users Fuzzy preference based tree is constructed by combining T1 and T2. There are two steps for combining the two trees. a) There is a need to find the parts of tree are which matches conceptually. For this a conceptual similarity Tree mapping algorithm is used. b) Fuzzy preference tree matching algorithm is used to construct Fuzzy preference tree of user.

Fuzzy preference Recommendation Approach: This system takes two inputs a) Maximum conceptual tree similarity mapping between two trees T1 and T2. b) Fuzzy preference tree node This system calculates prediction rating of user u for item I by prediction rating algorithm.

5. CONCLUSION

This paper proposes a recommendation approach for e business or e-commerce websites that have very complex product/services categories. User’s fuzzy preference tree is compared with the target item tree and predicted rating of the item is calculated by this approach This recommendation approach solve the

- 1) Cold start issue more efficiently than other approaches because new user preferences are added with the previous preferences.
- 2) Data sparsity issue because user-item matrix is not considered here for similarity.
- 3) Scalability issue because user fuzzy preference tree updated efficiently.
- 4) In future we will work on developing methods for group recommendations.

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