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Introducing Hybrid Technique for Optimization of Book Recommender System

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Abstract

E-Commerce has already entered into the Indian market for online shopping. People are more inclined towards online shopping which has changed the complete market scenario. There are several online shopping portals offered by organizations such as, Amazon, Flipkart, Snapdeal, Junglee, Jabong, and others, which are enjoying their online market share. As the number of online buyers and traders are increasing, effective business techniques need to be adopted to handle the large amount of data generated every day. Recommendation Systems play an important role in filtering this data and providing adequate information to the users. Various techniques like Collaborative Filtering, Content-based, and Demographic have been adopted for recommendation but there are several drawbacks causing these techniques to fail in providing effective recommendations. Therefore, it is necessary to identify more distinguishing features for optimizing these techniques. This can be achieved through utilizing the strengths of various techniques in a hybrid manner. This paper describes an effective hybrid technique for book recommendation with the use of Ontology for user profiling to increase system efficiency.

Keywords: Recommender System; Hybrid Technique; Ontology

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1. Introduction

Recommender systems are software tools and techniques which provides suggestions to the user for the item or services useful for them. Recommender systems perform an important role in finding the customer interests[1]. This is the main reason behind their wide acceptance in most of the e-commerce businesses like online shopping and services. Today's internet user doesn't want to spend much time looking for a particular item of their interest. He/ She expect it to be taken care by the system and provide intelligent solutions. On the other hand, online traders want to know the users' interest so that they can convert these users into their long term customers. Knowing likes and dislikes of customer will always give traders an upper hand over the other traders. This gives rise to the need of recommender systems.

There are many techniques used for recommendation. These are classified on the basis of different knowledge sources. Knowledge sources include **users' features** like age and gender, **item/service features** like keywords, genre and **user-item preferences data** like rating, purchase history, etc. This user-item preference data creates a user profile which plays an important role in recommendations. Existing recommendation techniques use these user and item features for recommendation but they are not sufficient to provide effective recommendations. User profiling and improving existing techniques is the main challenge today.

2. Literature Survey

According to survey, techniques used for recommendation are classified on the basis of knowledge sources[9]. For instance, Collaborative Filtering technique works on user-item preference data, Demographic Recommendation technique uses user information while Content-based technique is based on item features.

Collaborative Filtering technique filters out the recommendation with the help of user behaviour in the form of ratings[5, 8]. This technique generates rating for an unrated item for the user, based on the commonalities among users and their ratings. Recommendation quality is directly proportional to the size of rating dataset. This technique suffers from cold start problem for a new user and a new item. This is so because user with few ratings is difficult to categorize and item with few ratings cannot easily be recommended. Also users with unusual tastes will not get recommendation as per expectations because it's quite difficult to find their co-relation with other users to extract ratings. As Collaborative Filtering recommendation works on rating history, change in user preference over a period of time affects the recommendation quality.

Demographic recommendation technique[2] uses only the information about users. This technique finds co-relation between the users based on their demographic profile. Items preferred by users having similar demographic profile are recommended. Demographic technique suffers from cold start problem for new item, as new item has not been preferred by any user of the same demographic profile. Privacy is the main concern while gathering demographic information of the users. This is due to two reasons: 1) It's difficult to get relevant recommendation when a person is looking for an item for other person belonging to different demographic profile. 2) User is reluctant to give their personal information on internet.

Content-based technique uses item features and user preference to provide recommendations[10]. In this technique, item features like keywords are used to describe items, while user preference indicates the items liked by the user. It recommends items that are similar to the items preferred by the user. This technique suffers from cold start problem for new user as user preference is not traced. Since it recommends similar items based on user preference and item feature, crossed genre items preferred by the user cannot be recommended.

Hybrid technique[3] combines two or more recommendation techniques to predict recommendation. Using Hybrid technique, it is possible to overcome the drawbacks set by one recommendation technique and sum up advantages of different recommendation techniques. For example, Collaborative Filtering technique have problem when limited user-item ratings are available whereas Demographic and Content-based technique do not use rating data and therefore can overcome cold start problem. There are various ways to combine recommendation techniques to achieve effective hybrid recommendation.

3. Methodology

The proposed system is a Book Recommender System which uses hybrid technique to predict recommendations. It