

An Online Recommendation System

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Abstract- In this paper we are going to give information about, Recommendation systems that are defined as the techniques used to predict the rating one individual will give to an item or social entity. These items can be Books, Movies, Restaurants, and things on which individuals have different preferences. These preferences are being predicted using two approaches the first one is a Content-Based approach which involves characteristics of an item, and the second is Collaborative filtering approach which takes into account user's past behavior to make choices.

Keywords- Collaborative Filtering; Content-Based Filtering; Literature Survey; Solution to a problem.

1. Introduction

Recommendation systems are a tool that helps users to search through records based on their preferences it is beneficial to both service providers and users. They reduce transaction cost of finding and selecting items in an online shopping environment. Recommendation systems have also proved to improve decision making process and quality. Recommended systems identify

recommendations autonomously for individual users based on past purchases and searches, and on other users' behavior.

2. Related work

Recommender system is defined as a decision making strategy for users under complex environments. Recommender system was defined from the perspective of E-commerce as a tool that helps users search through records of knowledge which is related to users' interest and preference. Recommender system was defined as a means of assisting and augmenting the social process of using recommendations of others to make choices when there is no sufficient personal knowledge or experience of the alternatives. Recommender systems handle the problem of information overload that users normally encounter by providing them with personalized, exclusive content and service recommendations. Recently, various approaches for building recommendation systems have been developed, which can utilize either collaborative filtering, content-based filtering or hybrid filtering [9–11]. Collaborative filtering technique is the most mature and the most commonly implemented. Collaborative filtering recommends items by identifying other users with similar taste; it uses their opinion to recommend items to the active user.

3. Recommendation System

3.1. General concept:

If there is no sufficient knowledge it assists users to make choices. Some of the practical applications that use such type of systems include online books, amazon prime, etc.

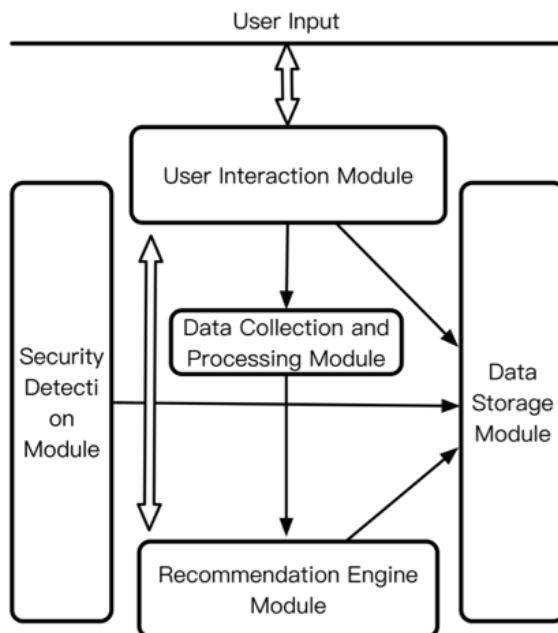


Figure 1. Working

3.1.1 Collaborative Filtering

Collaborative filtering system works by collecting user feedback in the form of ratings for an item and exploiting similarities in rating behavior among several users that determines how to recommend an item.

This can be achieved by 2 techniques and they are:

- User-based Collaborative Filtering
- Item-based Collaborative Filtering

3.1.2 User-based Filtering

User-based filtering is a straightforward algorithmic interpretation of the core premise of collaborative filtering: find other users whose past rating behavior is similar to that of the current user and use their ratings on other items to predict what the current user will like.

Pearson Correlation:

$$s(u,v) = \frac{\sum_{i \in I_u \cap I_v} (r_{u,i} - \bar{r}_u)(r_{v,i} - \bar{r}_v)}{\sqrt{\sum_{i \in I_u \cap I_v} (r_{u,i} - \bar{r}_u)^2 \sum_{i \in I_u \cap I_v} (r_{v,i} - \bar{r}_v)^2}}$$

Prediction Function:

$$p_{u,i} = \bar{r}_u + \frac{\sum_{u \in N(i)} s(u,u) (r_{u,i} - \bar{r}_u)}{\sum_{u \in N(i)} |s(u,u)|}$$

3.1.3 Item-based Filtering

User-based collaborative filtering suffers from scalability problems as the user base grows. To extend collaborative filtering to large user bases and facilitate deployment on e-commerce sites, it was necessary to develop more scalable algorithms. Item-based collaborative filtering takes a major step in this direction and is one of the most widely deployed collaborative filtering techniques today.

Similarity Matrix:

$$s(u,v) = \frac{\sum_{i \in I_u \cap I_v} (r_{u,i} - \bar{r}_u)(r_{v,i} - \bar{r}_v)}{\sqrt{\sum_{i \in I_u \cap I_v} (r_{u,i} - \bar{r}_u)^2 \sum_{i \in I_u \cap I_v} (r_{v,i} - \bar{r}_v)^2}}$$

Prediction Function:

$$p_{u,i} = \frac{\sum_{j \in S} s(i, j)(r_{u,j} - b_{u,i}) / \sum_{j \in S} |s(i, j)| + b_{u,i}}$$

4. Purposed Work

- If there is no sufficient personal knowledge it assists users to make choices.
- Predicts the rating that one individual will give to an item or social entity.
- Based on the preferences it helps users to search through records.

5. Methodology

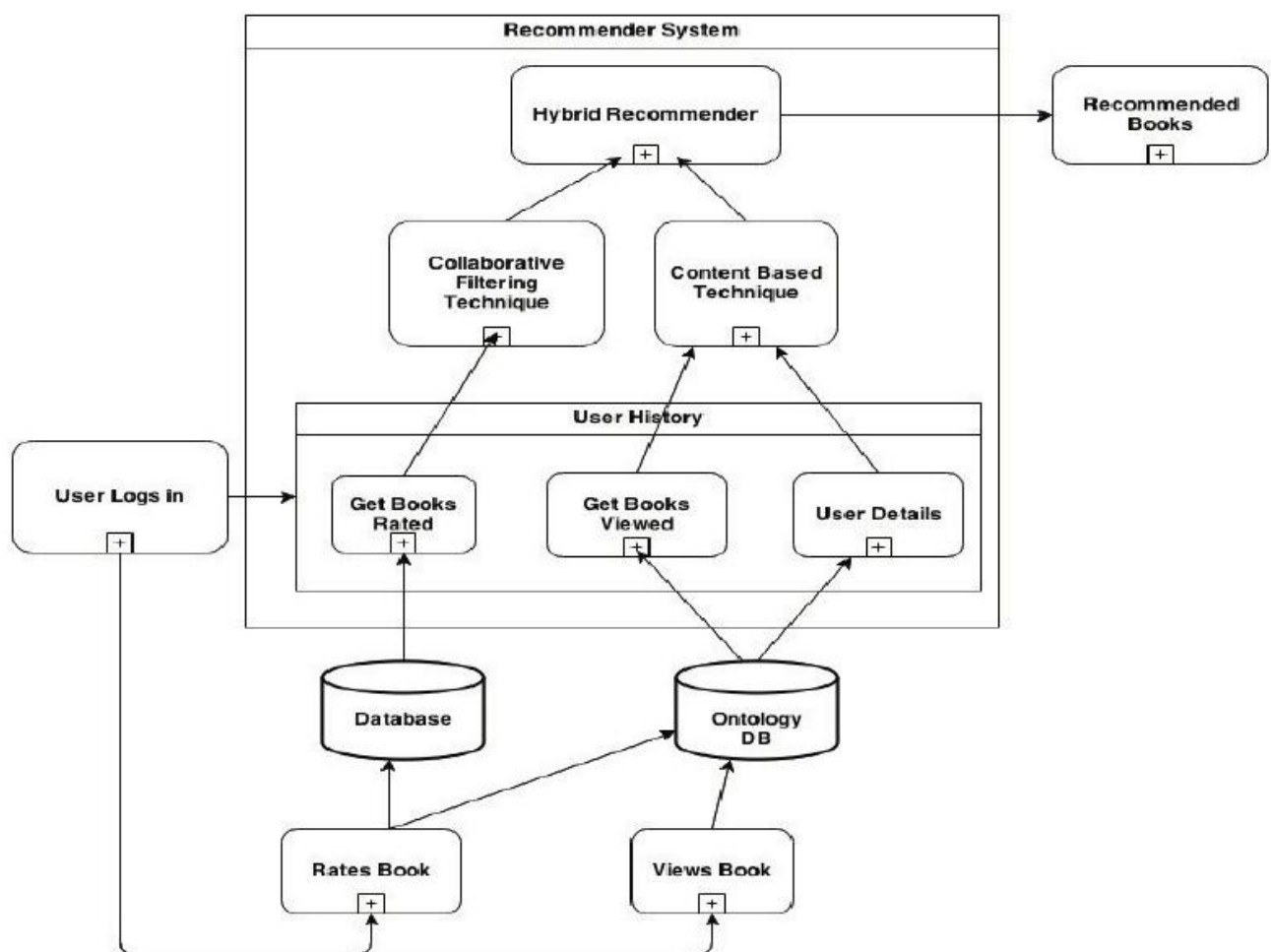


Figure 2. System Architecture

6. Conclusion

The Several recommendation systems have been proposed that are based on collaborative filtering, content-based filtering, and hybrid recommendation methods but these have some problems which are the challenges for research work. It is required to work in this research area to explore and provide new methods that can reduce the challenges and provide the recommendation for a wide range of applications while considering the quality and privacy aspects. Thus, the current recommendation system needs improvement for present and future requirements of better recommendation qualities.

7. References

- Francesco Ricci, Lior Rokach, Bracha Shapira and Paul B. Kantor - Recommended Systems Handbook; First Edition; Springer Verlag New York, Inc. New York, NY, USA, 2010.
- Tariq Mahmood and Francesco Ricci, "Improving recommended systems with adaptive conversational strategies", 20 ACM conference on Hypertext and Hypermedia, pp. 73–82, ACM, July 2009.
- X. Su and T. Khoshgoftaar, "A survey of collaborative filtering techniques," Advances in Artificial Intelligence, vol. 2009, pp. 19, August 2009.
- Michael J. Pazzani and Daniel Billsus, "Content Based Recommendation System."
- Boddu Raja Sarath Kumarmaddali and Surendra Prasad Babuan, "Implementation of Content-Boosted Collaborative Filtering Algorithm", IJEST.
- Breese J, Heckerman D, Kadie C. Empirical analysis of predictive algorithms for collaborative filtering. In: Proceedings of the 14th conference on uncertainty in artificial intelligence (UAI-98); 1998. p. 43–52.
- Zhao ZD, Shang MS. User-based collaborative filtering recommendation algorithms on Hadoop. In: Proceedings of 3rd international conference on knowledge discovering and data mining, (WKDD 2010), IEEE Computer Society, Washington DC, USA; 2010. p. 478–81. doi: 10.1109/WKDD.2010.54.
- Zhu X, Ye HW, Gong S. A personalized recommendation system combining case-based reasoning and user-based collaborative filtering. In: Control and decision conference (CCDC 2009), Chinese; 2009. p. 4026–28.
- Melville P, Mooney-Raymond J, Nagarajan R. Content-boosted collaborative filtering for improved recommendation. In: Proceedings of the eighteenth national conference on artificial intelligence (AAAI), Edmonton, Canada; 2002. p. 187–92.