

Recommender Systems for Web Intelligence

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***Index Terms*—Recommender System, Personalization, Trust, Information Overload**

I. INTRODUCTION

Information overload has become a serious concern with the explosive growth of resources available through the Internet. Web users are commonly overwhelmed by huge amount of information and are faced with the challenge of finding the most relevant and reliable information in a timely manner. It is critical to use intelligent agent software systems to assist Web users in finding the right information from an abundance of Web data. Significant research has been undertaken to build support tools that ensure the right information is delivered to the right people when they access the Internet. Recommender systems are one way of helping users to deal with such information explosion by recommending items (e.g., information and products) that match users' personal interests. Recommender systems represent tools for efficient selection of the most relevant and reliable resources, and the interest in such systems has increased dramatically over the last few years [1]. Since the appearance of the first paper [2] on collaborative filtering in recommender systems, Web based recommender systems have been developed in many application domains [3]–[5]. In this special issue, two papers present the application of recommender systems.

Zhuhadar and Nasraoui propose a hybrid recommender system for recommending teaching and learning materials in a real online learning repository. The proposed system integrates recommendation making techniques into an E-learning search engine. An important contribution of this paper is to rank the recommendations based on learners' semantic profiles.

Peischl, Zanker, Nica and Schmid address the problem of recommending appropriate effort estimation methods for software project management. In their paper, they present a knowledge-based recommender system that uses a constraint-based reasoning mechanism for selecting the effort estimation methods that best match the software development project's characteristics. In addition, the paper also discuss the possibility of

providing explanations to the recommended items and repairing or modifying the user's input in order to get more accurate recommendations.

The most popularly used recommendation technique is collaborative filtering which generates recommendations to a target user based on the preferences of like-minded users who have similar interests as the target user [2], [6]. The data used to calculate the similarity between users is usually the users' ratings to items. In order to be comparable, it is needed that the two users rated common items. However, in a typical domain, the number of items is huge and the overlap between users' commonly rated items is very small. In some application domains, users' rating data may not be available. Therefore, exploiting other information for making recommendations becomes desirable. In general, a user is much more likely to believe statements from a trusted person than from a stranger [7]. The possibility of people taking recommendations made by trusted friends is higher than that of taking recommendations made by strangers. Recently, incorporating users' trust information into recommender systems has been gaining more and more attention [8]–[11]. Instead of based upon opinions from similar users, trust based recommender systems generate recommendations based on opinions from trusted users. In this special issue, four papers are related to trust and trust in recommendation making.

Bhuiyan conducted an online survey to investigate the relationship between trust and user interest similarity. In his paper, he provides a review to the state of the art research work on trust in online social networks and the results of the online survey. The result of the online survey shows that there is a strong positive relationship between trust and interest similarity.

Fazeli, Zarghami, Dokoochaki, and Matskin propose a trust-aware collaborative filtering recommendation framework. They present a semantic mechanism to build up the trust relationships between users based on rating information and a measure called T-index to find the most trustful or reliable neighbors. The experiment result provided in their paper shows the improvement to the prediction coverage and accuracy of recommendations.

Lorenzi, Baldo, Costa, Abel, Bazzan, and Ricci present a trust model and an application of the trust model in a

multi-agent recommender system. The problem addressed in this paper is the communication and trust among multiple recommendation agents. The trust model can help an agent find trusted agents to perform specific recommendation tasks and also help agents become experts in recommending specific items. Within the system, the agents can communicate with each other and one agent can exchange information with another trusted agent if necessary. Their experiments show that the collaboration between the trusted agents is helpful for improving the recommendation performances.

Chen, Bu, Zhang, and Zhu discuss the trust transitivity in trust networks, specifically, the measurements for computing derived trust degrees and the complexity of computing trust degrees. The main contribution of their paper includes two measurement methods for measuring transitive trustworthiness, called Max-min and Max-mean algorithms, respectively. They also prove that the complexity of measuring the max-min trust degree and the max-mean degree is polynomial and NP-hard, respectively.

This special issue also includes a paper about user profiling for finding user information needs. Even the application field of this paper is information filtering, the model proposed in this paper is applicable to other application domains. Zhou, et al propose a novel two-stage information filtering model. The main contributions of this paper include a rough set decision rule based user profiling model, a threshold setting method, and a pattern based filtering model. Extensive experiments have been conducted to evaluate the performance of the proposed two-stage filtering system and the effectiveness of the proposed threshold setting method in filtering out irrelevant documents. The experimental results show that the proposed system outperforms some benchmark models such as BM25 and SVM.

This special edition of JEWTI focuses on the application and trust issue in recommender systems. Contributions have been collected through the International Workshop on Web Personalization, Reputation and Recommender Systems (WPRRS09) conjunction with 2009 IEEE/WIC/ACM International Conference of Web Intelligence. This special edition contains expanded versions of papers originally presented at WPRRS09. We believe this special edition provides novel perspectives that will help the development of recommender systems.

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