

SELECT ISSUES IN RECOMMENDER SYSTEMS

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ABSTRACT

Recommender systems are technology based systems that help in personalization by tailoring certain offerings (such as content, services, product recommendations, communications, and ecommerce interactions) to users by analyzing each user interests, opinions, online behavior, and transaction history. Recommender systems have been shown to result in increased sales and greater customer satisfaction. As a result, today recommender systems are a ubiquitous feature in most websites pertaining to ecommerce and social networks. Recommender systems constitute a problem-rich research area as they promise to fulfill the ecommerce dream: a different and personalized store for every single user.

This thesis investigates few of the challenges faced in the area of algorithm development and security of the recommender systems. Security aspects in recommender systems, top-N recommendation problem, cold start problem, trust-aware recommender systems, and concept drift problem are the issues of recommender systems that have been addressed in this thesis.

In case of security aspects, our work provides novel attack strategies that are focused on intelligent use of filler items based on target item rating distribution for mounting effective attacks against user-based collaborative filtering systems and item-based collaborative filtering systems respectively. We have proposed a new algorithm called Weighted Class based Hybrid (WCH) algorithm for solving the top-N recommendation problem. WCH algorithm attempts to address the challenges of both accuracy and scalability by using both content information of items and collaborative filtering techniques to recommend N items.

For trust-aware recommender systems, we provide an approach aimed at improving recommendation quality by reconstructing trust networks based on correlations between users. We also tackle the problem of generating recommendations for cold start user in trust-aware systems. For the cold start problem, we first analyze “whom do cold start users actually trust?” and then suggest strategies to help cold start users select trusted users that will result in better accuracy. We also put forward strategies for reducing the effort required by a cold start in evaluating prospective trusted users. Finally, we have proposed a method to categorize user’s preferences so as to address the issue of changing preferences or concept drift problem. All algorithms and strategies proposed by us have been tested on publicly available MovieLens and Epinions data sets. Through experimental evaluation we have shown that our proposed approaches are the most effective.