DEPARTMENT OF COMPUTER SCIENCE

PhD Degree Oral Presentation

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Time:	9 Sept 2016 (Friday) 1:30 pm – 3:30 pm (35 mins presentation and 15 mins Q & A)
Venue:	RRS 732, Sir Run Run Shaw Bldg., HSH Campus

"Inferring Users' Multi-Attribute Preferences from Their Reviews for Augmenting Recommender Systems in e-Commerce"

Abstract

By now, people are accustomed to getting some personalized recommendations when they are finding movies to watch, music to listen, and so on. All of these recommendations come from recommender systems, and can aid the process of the decision making to avoid the problem of "information overload". Over the years, there has been much work done both in the industry and academic on developing new approaches for recommender systems. However, there are still some hurdles in adapting recommender systems to a broader range of real-life applications. In the e-commerce environment especially with the so called high-risk products (also called high-cost or high-involvement products, such as digital cameras, computers, and cars), because a user does not buy the high-risk product very often, it is normal that s/he is not able to rate many products. For the same reason, the current buyer is often a new user because s/he would not afford to buy the same kind of high-risk product before. The traditional recommender techniques (such as user-based collaborative filtering and content-based methods) can thus not be effectively applicable in this environment, because they largely assume that the users have prior experiences with products. Thus, the "data sparsity" and "new users" are two typical challenging issues that the classical recommender systems cannot well address in high-risk product domains. In some recommender systems, a new user will be asked to indicate his/her preferences on some aspects in order to address the so called cold-start problem via collecting some preferences. Such collected preferences are usually not complete due to unfamilaring with the product domain, which are called partial preferences.

In this thesis, we propose to leverage some auxiliary data of online reviewers' opinions, so as to enrich the partial preferences. With the objective of developing more effective recommender systems for high-risk products in e-commerce, in our work, we have exerted to derive reviewers' preferences from the textual reviews they posted. Then, these recovered preferences are leveraged to estimate and supplement a new buyer's preference with which the product recommendation is produced. Firstly, we propose a novel clustering method based on Latent Class Regression model (LCRM), which is able to consider both the overall ratings and feature-level opinion values (as extracted from textual reviews) to infer individual reviewers' weight feature preferences, that represent the weights the user places on different product features. Secondly, we propose a method to estimate reviewers' value preferences (i.e., the user's preferences on the product's attribute values) by matching their review opinions to the corresponding attributes' static specifications. Thirdly, we investigate how to combine weight preferences and value preferences to model user preferences based on Multi-Attribute Utility Theory (MAUT) with the purpose of providing higher quality product recommendations. Particularly, it was shown from our experimental studies that the incorporation of review information can significantly enhance the recommendation accuracy, relative to those without considering reviews. As the practical implication, our proposed solutions can be usefully plugged into an online system to be adopted in real-ecommerce sites.

*** ALL INTERESTED ARE WELCOME ***