Notice of the Final Oral Examination
for the Degree of Doctor of Philosophy

of

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MSc (University of Victoria, 2012)
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"Trustworthiness, Diversity and Inference in Recommendation Systems"

Department of Computer Science

Wednesday, September 14, 2016
1:00 P.M.
Engineering and Computer Science Building
Room 468

Supervisory Committee:
Dr. Kui Wu, Department of Computer Science, University of Victoria (Co-Supervisor)
Dr. Venkatesh Srinivasan, Department of Computer Science, UVic (Co-Supervisor)
Dr. Alex Thomo, Department of Computer Science, UVic (Member)
Dr. Hong-Chuan Yang, Department of Electrical and Computer Engineering, UVic, (Outside Member)

External Examiner:
Dr. Carson Kai-Sang Leung, Department of Computer Science, University of Manitoba

Chair of Oral Examination:
Dr. Jutta Gutberlet, Department of Geography, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Recommendation systems are information filtering systems that help users effectively and efficiently explore large amount of information and identify items of interest. Accurate predictions of users' interests improve user satisfaction and are beneficial to business or service providers. Researchers have been making tremendous efforts to improve the accuracy of recommendations. Emerging trends of technologies and application scenarios, however, lead to challenges other than accuracy for recommendation systems. Three new challenges include: (1) opinion spam results in untrustworthy content and makes recommendations deceptive; (2) users prefer diversified content; (3) in some applications user behavior data may not be available to infer users' preference.

This thesis tackles the above challenges. We identify features of untrustworthy commercial campaigns on a question and answer website, and adopt machine learning based techniques to implement an adaptive detection system which automatically detects commercial campaigns. We incorporate diversity requirements into a classic theoretical model and develop efficient algorithms with performance guarantees. We propose a novel and robust approach to infer user preference profile from recommendations using copula models. The proposed approach can offer in-depth business intelligence for physical stores that depend on Wi-Fi hotspots for mobile advertisement.