Notice of the Final Oral Examination
for the Degree of Master of Science

of

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BSc (University of Victoria, 2015)

"Escalation Predication Using Feature Engineering: Addressing Support Ticket Escalations within IBM's Ecosystem"

Department of Computer Science

Wednesday, July 26, 2017
11:00 A.M.
Engineering and Computer Science Building
Room 660

Supervisory Committee:
Dr. Daniela Damian, Department of Computer Science, University of Victoria (Supervisor)
Dr. Alona Fyshe, Department of Computer Science, UVic (Member)

External Examiner:
Dr. Julia Rubin, Department of Electrical Engineering, University of British Columbia

Chair of Oral Examination:
Dr. Ulrich Mueller, Department of Psychology, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Large software organizations handle many customer support issues every day in the form of bug reports, feature requests, and general misunderstandings as submitted by customers. Strategies to gather, analyze, and negotiate requirements are complemented by efforts to manage customer input after products have been deployed. For the latter, support tickets are key in allowing customers to submit their issues, bug reports, and feature requests. Whenever insufficient attention is given to support issues, there is a chance customers will escalate their issues, and escalation to management is time-consuming and expensive, especially for large organizations managing hundreds of customers and thousands of support tickets. This thesis provides a step towards simplifying the job for support analysts and managers, particularly in predicting the risk of escalating support tickets. In a field study at our large industrial partner, IBM, a design science methodology was employed to characterize the support process and data available to IBM analysts in managing escalations. Through iterative cycles of design and evaluation, support analysts' expert knowledge about their customers was translated into features of a support ticket model to be implemented into a Machine Learning model to predict support ticket escalations. The Machine Learning model was trained and evaluated on over 2.5 million support tickets and 10,000 escalations, obtaining a recall of 79.9% and an 80.8% reduction in the workload for support analysts looking to identify support tickets at risk of escalation. Further on-site evaluations, through a tool developed to implement the Machine Learning techniques in practice, showed more efficient weekly support-ticket-management meetings. The features developed in the Support Ticket Model are designed to serve as a starting place for organizations interested in implementing the model to predict support ticket escalations, and for future researchers to build on to advance research in Escalation Prediction.