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

of

AKSHAY KHOT

BEng (University of Mumbai, 2013)

"Engineering Scalable Influence Maximization"

Department of Computer Science

Thursday, December 14, 2017
11:00 A.M.
Engineering and Computer Science Building
Room 130

Supervisory Committee:
Dr. Alex Thomo, Department of Computer Science, University of Victoria (Supervisor)
Dr. Venkatesh Srinivasan, Department of Computer Science, UVic (Member)

External Examiner:
Dr. Issa Traore, Department of Electrical and Computer Engineering, UVic

Chair of Oral Examination:
Dr. Juliana Saxton, Theatre Department, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

In recent years, social networks have become an important part of our daily lives. Billions of people daily use Facebook and other prominent social media networks. This makes them an effective medium for advertising and marketing. Finding the most influential users in a social network is an interesting problem in this domain, as promoters can reach large audiences by targeting these few influential users, thus keeping the marketing costs low. This is the influence maximization problem, where we want to maximize the influence spread using as few users as possible. As these social networks are huge, scalability and runtime of the algorithm to find the most influential users is of high importance.

We propose innovative improvements in the implementation of the state-of-the-art sketching algorithm for influence analysis on social networks. The primary goal of this thesis is to make the algorithm fast, efficient, and scalable. We devise new data structures to improve the speed of the sketching algorithm. We introduce the compressed version of the algorithm which reduces the space taken in the memory by the data structures without compromising the runtime. By performing extensive experiments on real-world graphs, we prove that our algorithms are able to compute the most influential users within a reasonable amount of time and space on a consumer grade machine. These modifications can further be enhanced to reflect the constantly updating social media graphs to provide accurate estimations in real-time.