University of Victoria | Graduate Studies

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

of

MAHSA DANESHMANDMEHRABANI

MSc (Brock University, 2017)
BSc (Sharif University of Technology, 2015)

"Truss Decomposition in Large Probabilistic Graphs"

Department of Computer Science

Tuesday, December 17, 2019
11:00 A.M.
Engineering Computer Science Building
Room 467

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. Alex Kuo, School of Health Information Science, UVic

Chair of Oral Examination:
Dr. Scott McIndoe, Department of Chemistry, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Truss decomposition is an essential problem in graph mining, which focuses on discovering dense subgraphs of a graph. Detecting trusses in deterministic graphs is extensively studied in the literature. As most of the real-world graphs, such as social, biological, and communication networks, are associated with uncertainty, it is of great importance to study truss decomposition in a probabilistic context. However, the problem has received much less attention in a probabilistic framework. Furthermore, due to computational challenges of truss decomposition in probabilistic graphs, state-of-the-art approaches are not scalable to large graphs.

Formally, given a user-defined threshold k (for truss denseness), we are interested in finding all the maximal subgraphs, which are a k-truss with high probability. In this thesis, we introduce a novel approach based on an asynchronous h-index updating process, which offers significant improvement over the state-of-the-art. Our extensive experimental results confirm the scalability and efficiency of our approach.