香港浸會大學理學院
HKBU Faculty of Science

DEPARTMENT OF COMPUTER SCIENCE

PhD Degree Oral Presentation

PhD Candidate:	Mr. HUANG Jinbin
Date	17 November 2023 (Friday)
Time:	10:00 am – 12:00 nn (35 mins presentation and 15 mins Q & A)
Venue:	1) DLB637, 6/F, David C Lam Building, Shaw Campus 2) ZOOM (Meeting ID: 993 672 03480) (The password and direct link will only be provided to registrants)
Registration:	https://bit.ly/bucs-reg (Deadline: 12:00 nn, 16 November 2023)

Scalable Structural Diversity Search in Massive Graphs

Abstract

Structural diversity, the number of social contexts inside an user's contact neighbor-hood, is an important factor in the social information diffusion process on social networks. A recent study has shown that users with larger structural diversity tend to have higher probability to be affected during the social contagion. The goal of structural diversity search is to compute the top-k users with highest structural diversity. Previous research works focus on studying online algorithms to solve the top-k structural diversity search problem, in which two cohesive subgraph models t-component and t-core are adopted to identify the social contexts inside a user's contact neighborhood with an input model parameter t. Their studies suffer from two limitations: (i) The query results are sensitive to the input model parameter; (ii) The social context identified by the two cohesive subgraph models of t-component and t-core may be inaccurate because of their weak decomposability. In this dissertation, we conduct a comprehensive study to the structural diversity search problem to address the above limitations.

First, to address the first limitation, we propose a parameter-free structural diversity model to automatically models various kinds of social contexts without parameter t. To solve the parameter-free structural diversity search problem, an efficient pruning-based top-k search algorithm and a CPU-based parallel algorithm are proposed.

Second, we focus on the structural diversity search problem based on the truss-based structural diversity model. The truss-based model has better decomposability and is beneficial to more accurate identification of social context. We first propose an online pruning algorithm to reduce the search space. An offline GCT-index is also proposed to save the structural information and further improve the query efficiency.

Third, we investigate the problem of GPU-accelerated structural diversity search. We present a general framework to utilize the GPU to accelerate the online algorithms for structural diversity search for three structural diversity models. We first propose efficient GPU-based solutions for the structural diversity computation under three structural diversity models respectively. Moreover, we propose a work stealing strategy to optimize the workload balancing problem.

Comprehensive experiments are conducted to demonstrate both the effectiveness and efficiency of our proposed models and techniques.

***** ALL INTERESTED ARE WELCOME *****