

DEPARTMENT OF COMPUTER SCIENCE

PhD Degree Oral Presentation

PhD Candidate:	Mr. XU Lyu
Date	22 March 2024 (Friday)
Time:	3:00 pm – 5:00 pm (35 mins presentation and 15 mins Q & A)
Venue:	DLB637, 6/F, David C Lam Building, Shaw Campus

Concealed Graph Pattern Queries on Large Graphs

Abstract

Graph pattern queries are increasingly found in emerging applications, including social networks, biology analysis, and flow networks. There are various kinds of queries for finding interesting graph patterns. However, graph pattern queries are usually concealed, that is, either the query pattern is preserved due to privacy concerns or the query pattern is unknown that needs to be discovered. Therefore, in this dissertation, we study concealed graph pattern queries on large graphs.

First, we study privacy preserving query services for strong simulation (*ssim*) queries in the database outsourcing paradigm. In such a paradigm, the query structures, should be protected against cryptographic attacks, and hence be concealed. We adopt *ssim* as a practical query semantic for this paradigm. To solve this problem, we propose a secure exact algorithm *ObSSA* and an efficient inexact algorithm *EncSSA* by using the data-oblivious operations.

Second, we study how to outsource the localized graph pattern queries (*LGPQs*) under the same paradigm. *LGPQs* include a rich set of semantics, such as the subgraph isomorphism (*sub-iso*) query, the Subgraph homomorphism (*hom*) query and the *ssim* query. To provide privacy preserving query service for *LGPQs*, we propose the first framework *Prilo*. An optimized framework *Prilo** is also proposed to enable user to obtain query results early.

Last, we study a related scenario where graph patterns, instead of the queries, in the graph data are concealed. We propose efficient algorithms to identify such patterns.

Experimental evaluations are conducted on real world datasets to demonstrate the efficiency and effectiveness of our proposed methods.

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