香港浸會大學理學院
HKBU Faculty of Science

DEPARTMENT OF COMPUTER SCIENCE

PhD Degree Oral Presentation

PhD Candidate:	Mr Peipei YI
Date	20 August 2018 (Monday)
Time:	9:30 am - 11:30 am (35 mins presentation and 15 mins Q & A)
Venue:	RRS732, Sir Run Run Shaw Building, HSH Campus

"Graph Query Autocompletion"

Abstract

The prevalence of graph-structured data has led to a rejuvenation of research on graph data management and analytics. Several database query languages have been proposed for textually querying graph databases. Unfortunately, formulating a graph query using any of these query languages often demands considerable cognitive effort. Yet, in a wide spectrum of graph applications whose consumers are not proficient query writers. Hence, it is important to devise intuitive techniques that can alleviate the burden of query formulation. In this dissertation, we study the graph query autocompletion problem. We provide techniques that take a user's graph query as input and generates top-k query suggestions to help the query formulation process in a visual environment.

Firstly, we study visual query autocompletion for graph databases. Techniques for query autocompletion have been proposed for web search and XML search. However, a corresponding capability for graph query database is in its infancy. We propose a novel framework for graph query autocompletion (called AutoG). First, we formalize query composition that specifies how query suggestions are formed. Second, we propose to increment a query with the logical units called c-prime features. Third, we propose algorithms to rank candidate suggestions. Fourth, we propose a novel index called feature DAG (FDAG) to further optimize the ranking.

Secondly, we propose user focus-based graph query autocompletion. AutoG provides suggestions formed by adding subgraph increments to arbitrary places of an existing query. However, humans can only interact with a small number of recent software artifacts. Hence, many suggestions could be irrelevant. We present the GFocus framework that exploits a novel notion of user focus of graph query. Intuitively, the focus is the subgraph that a user is working on. We formulate locality principles to automatically identify the focus. We propose novel ranking functions for generating popular and comprehensive query suggestions only at the focus. We propose efficient algorithms and an index for ranking the suggestions.

Thirdly, we propose graph query autocompletion for large graphs. Graph features that have been exploited in AutoG are either absent or rare in large graphs. To address this, we present Flexible graph query autocompletion for LArge Graphs, called FLAG. In particular, FLAG allows augmenting users' queries using subgraph increments with wildcard labels, which summarize query suggestions that have similar increment structures but different labels. We propose an efficient ranking algorithm and a novel index to optimize the online suggestion ranking.
Detailed analysis and extensive experimental studies consistently demonstrate the effectiveness and robustness of our proposed techniques in a broad range of settings.

*** ALL INTERESTED ARE WELCOME ***