



THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering
Seminar

**Graph Representation Learning and its applications:
A System Modeling & Performance Analysis Perspective**

By

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Time : 12:30pm to 1:30pm

Venue : Rm801, HSH Engineering Building, CUHK

Abstract

Recently, Graph Representation Learning using Neural Networks, aka Graph Neural Network (GNN), has emerged as a powerful modeling and machine learning tool due to its high expressive capability and wide range of potential applications. Existing uses of GNNs already include the study of biological networks, drug discoveries and recommender systems, etc. However, key research problems in the design and applications of GNNs remain. In this talk, I will discuss some of those challenges and our solutions. Topics to be covered include: (1) the need to model heterogeneous relationships or hidden factors within a network, (2) the lack of high-quality labelled data in many real-world graph analytic tasks and (3) the design of GNNs for large-scale time-evolving graphs with rich node and edge attributes. I will also share some experience and preliminary findings of our ongoing work in designing novel GNNs to tackle real-world system modeling and performance analysis problems across different domains: example applications include anomaly detection in e-payment networks, latency prediction of microservice-based cloud-native applications, spatial-temporal traffic forecast for 5G networks, Know Your Customer (KYC) cross-channel personalization and program deobfuscation for software security analysis.

Biography

Wing C. Lau is an Associate Professor in the Department of Information Engineering and the Director of the Mobile Technologies Centre (MobiTeC) at CUHK. He received the B.S.(Eng) degree from the University of Hong Kong and the M.S. and Ph.D. degrees in Electrical and Computer Engineering from the University of Texas at Austin. Before returning to academia, Wing worked in the US industry for a decade: He was a Member of Technical Staff with the Performance Analysis Department, Bell Laboratories, Holmdel, New Jersey, where he conducted research in high-speed networking protocols and systems. He also had a stint with Qualcomm, San Diego, California where he designed the architecture and protocols for Next Generation Wireless services and actively contributed to their standardization in the Internet Engineering Task Force (IETF) and 3GPPs. Prof. Lau holds 19 U.S. patents and his research findings have culminated in more than 130 publications in major international conferences and journals. His recent research interests include: Security and Privacy of Online Social Networks, Single-Sign-On protocols and Mobile Payment Systems; Resource Allocation and Optimization for Cloud Computing/ Big Data Processing Systems; Graph Representation Learning, Online Learning algorithms and their applications. Wing is/ has been a Technical Program Committee member of ACM Sigmetrics, MobiHoc, IEEE Infocom, SECON, WiOpt, ICC, Globecom, WCNC, VTC and the International Teletraffic Congress. He also served as a Guest Editor for the Special Issue on High-speed Network Security of IEEE Journal of Selected Areas in Communications (JSAC). For their work on Single-Sign-On service security, Wing and his team received the 2018 Internet Defense Prize from USENIX and Facebook.

**** ALL ARE WELCOME ****