

DEPARTMENT OF COMPUTER SCIENCE

MPhil Degree Oral Presentation

MPhil Candidate:	Mr. GENG Yu
Date	April 30, 2024 (Tuesday)
Time:	9:00 am – 11:00 am (35 mins presentation and 15 mins Q & A)
Venue:	Zoom ID: 910 0996 2829 (The password and direct link will only be provided to registrants)
Registration:	https://bit.ly/bucs-reg (Deadline: 12:00 nn, 29 April 2024)

Memory-Efficient Learning Algorithms for Feature and Relation Extraction with Applications to Genomics Data and Clinical Notes

Abstract

Clinical and genomics data are widely available, supporting personalized medicine and scientific discovery. A key challenge is efficiently extracting salient features and their relationships from raw data to facilitate downstream analytics tasks. For genomics, this includes extracting the regulatory relationships among genes, known as Gene Regulatory Network (GRN) Reconstruction. In clinical data, extracting relationships between entities in clinical notes is vital, particularly for Adverse Drug Event (ADE) Extraction, which is crucial for pharmacovigilance.

Firstly, we propose novel methods for GRN Reconstruction, leveraging Hilbert-Schmidt Independence Criterion (HSIC) to capture complex nonlinear relationships among genes and reduce false positives. We further use Factorization Machines (FM) to decrease false negatives. Secondly, we introduce a memory-efficient FM model that applies element-wise feature mapping and binarizes model parameters, enhancing performance while reducing memory requirements, which is beneficial for resource-constrained devices. Lastly, our research enhances ADE Extraction by integrating biomedical knowledge into Transformer models and utilizing Generative Pre-trained Transformer (GPT) for data augmentation, improving identification accuracy and contributing to efficient pharmaceutical analysis.

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