



The Chinese University of Hong Kong



Department of Biomedical Engineering

Time: 10:00am, 17 April 2023 (Monday)

Venue: ERB1122 Computer Lab

Integrating Interpretable Machine Learning into Medical Image Segmentation for Organ-Specific Quantitative Analysis



Mr. LEE Ho Hin

Ph.D candidate of Computer Science

Vanderbilt University

Abstract

Across decades, significant efforts have been demonstrated to integrate machine learning into different visual recognition tasks in medical domain, especially for medical image segmentation. Image segmentation provides pixel/voxel-wise localization of each organ/tissue target and allows both researchers and clinicians to perform quantitative measures for investigating biomarkers. However, annotating volumetric labels are time-consuming and limited interpretability of the learned feature is demonstrated in current models. In this talk, we will discuss the progress of adapting machine learning models from Convolutional Neural Networks to Vision Transformers. With the basis of current networks, we adapt multiple semantic meanings into the extracted feature with contrastive learning to enhance the feature interpretability, thus leading to a significant improvement in model performance. With the generated segmentation across large population cohort, we further generate organ-specific reference templates to investigate the corresponding imaging biomarkers in healthy condition.

Biography

Ho Hin Lee received the B.S. degree of biomedical engineering from The Chinese University of Hong Kong in 2017 and the M.S. degree of biomedical engineering from Columbia University. Currently, he is a fourth year Ph.D candidate of Computer Science in Vanderbilt University, supervised by Dr. Bennett A. Landman. His current research focuses on innovating explainable optimization strategies in convolutional neural networks for medical image segmentation and generating organ-specific reference template to align multi-scale context (e.g., from cell to organ) for clinical investigation. During his Ph.D career, he has published more than 30 papers, including Medical Image Analysis, MICCAI and ICLR.

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

For enquiries, please contact Ms. Joyce Chan, Department of Biomedical Engineering at 3943 8278