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Interdisciplinary Data Sciences Consortium **Seminar Series**

March 1, 2019, 2:00-3:00pm

Location: ISA 3050

Featuring Dr. Susana Lai-Yuen
Industrial Engineering
University of South Florida

Title: Multi-objective Convolutional Neural Networks for Medical Image Analysis

Abstract: Deep learning with convolutional neural networks (CNN) have achieved state-of-the-art results for many computer vision tasks such as image classification, object detection, and segmentation. In particular, CNNs have been successful towards automating medical image segmentation, which is an important task for identifying structures in medical images for analysis. However, adapting an existing CNN architecture to a specific medical dataset for segmentation remains a challenging task that requires extensive expertise and time to fine-tune the hyperparameters. Hyperparameter optimization approaches that automate the search have been proposed but they have mainly focused on optimizing the segmentation performance without considering the network size. In this presentation, I will introduce our work on a multi-objective adaptive convolutional neural network (AdaResU-Net) for medical image segmentation that is able to automatically adapt to new datasets while minimizing the size of the network. I will present the architecture of our AdaResU-Net and a multi-objective evolutionary algorithm (MEA) for evolving different AdaResU-Net networks to optimize both segmentation accuracy and model size. Finally, I will present the results of our model on segmenting various anatomical structures from publicly available medical image datasets.

To learn more, visit: <http://www.eng.usf.edu/~laiyuen/>



Biography: Susana Lai-Yuen is an Associate Professor of Industrial and Management Systems Engineering at the University of South Florida. She received her Ph.D. degree in Industrial Engineering from North Carolina State University. Her research interests are in the areas of machine learning, deep learning, data analytics, and computational geometry with various applications including medical image analysis, healthcare, manufacturing, and computer-aided decision support systems. She has also worked on the design of medical devices and technologies and has six U.S. Patents and several patent applications.

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