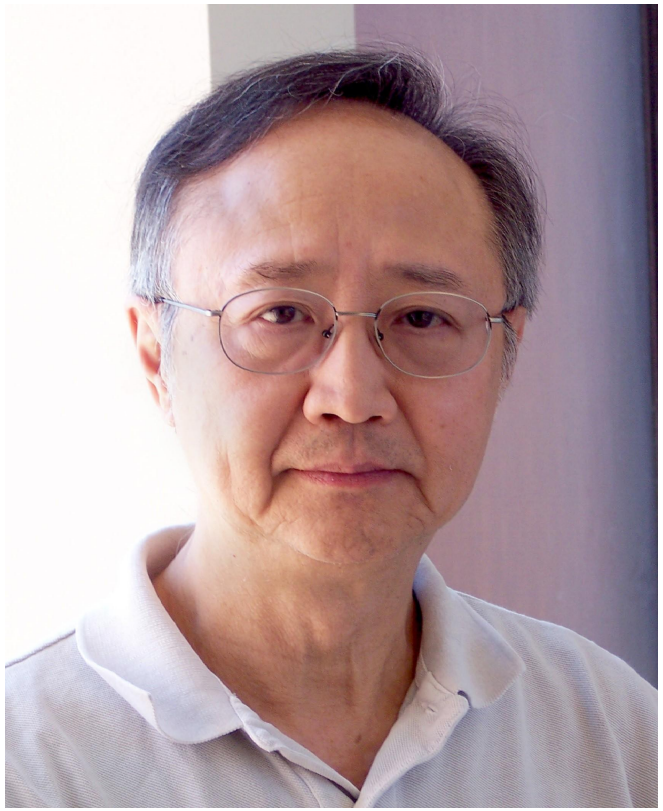
Keynote Title: Deep Learning and a New Approach for Machine Learning
- by Prof. 羅定和 James Ting-Ho Lo, Univ. of Maryland Baltimore County, USA

Abstract:

The essence of modern AI is machine learning, whose state of the art is mainly the highly publicized deep learning at present. Due to its unique capabilities, deep learning is indispensable for many applications. However, its development for a wide range of other applications especially those related to cognitive signal processing has been stagnant. In this talk, some fundamental shortcomings of deep learning will be discussed in connection with big or streaming data. A new approach to machine learning will be proposed, and some results, which actually explain how the biological neural networks encode, learn, memorize, recall and generalize as a "learning machine" will briefly be summarized.



Keynote Speaker: Prof. James Lo's biography

James Ting-Ho Lo is a Professor in the Department of Mathematics and Statistics of the University of Maryland Baltimore County. He received the BS degree from the National Taiwan University and the Ph.D. degree from the University of Southern California and was a Postdoctoral Research Associate at Stanford and Harvard University. His research interests have included optimal filtering, system control and identification, active noise and vibration control, and machine learning. In 1992, he solved the long-standing notorious problem of optimal nonlinear filtering in its most general setting and obtained a best paper award.

Subsequently, he conceived and developed adaptive neural networks with long- and short-term memories, accommodative neural network for adaptive processing without online processor adjustment, and robust/adaptive neural networks with a continuous spectrum of robustness; which constitute an effective systematic general approach to robust or/and adaptive processing for system control/identification/estimation and signal processing.

He has been developing a convexification method for avoiding nonglobal minima in data fitting (e.g., training deep neural networks and estimating regression models), which is ready for application and is nearing a complete solution of the long-standing notorious "local minimum problem", a main obstacle in data fitting.

In recent years, Dr. Lo has also been developing a low-order model of biological neural networks. The model comprises biologically plausible models of axonal/dendritic trees, synapses, spiking/nonspiking somas, unsupervised/supervised learning mechanisms, a maximal generalization scheme, and feedbacks with different delay duration; which integrate into a biologically plausible learning/retrieving algorithm and answer numerous fundamental questions in neuroscience.