Department of Electronic Engineering
The Chinese University of Hong Kong

Research Seminar

Pattern Learning or Rule Learning: The Role of Deep Neural Nets

Dong Wang
Associate Professor, Tsinghua University
Deputy Director, AIGE Research Centre

10:00 am, April 8, 2025
Room 222, Ho Sin Hang Engineering Building

Deep neural networks have achieved remarkable success across various research fields, particularly those with abundant data. A key factor in this success is their ability to learn hierarchical patterns. In this talk, we will show how such hierarchical processing can explain our recent progress on mixed speech processing. Moreover, we found that deep learning is not solely about pattern learning. We will demonstrate how, in micro-magnetics simulation, deep neural networks try to learn the rule of spin interactions rather than pattern aggregation. This suggests that we must carefully examine the exact role of neural networks, and design appropriate structures according to that knowledge. Additionally, this talk will share our recent progress in AI general education at Tsinghua University.

About Speaker

Dong Wang is an Associate Professor at Tsinghua University and Deputy Director of the AIGE Research Center. He earned his Ph.D. from the University of Edinburgh and has published over 150 papers in machine learning and speech processing, including in Nature Machine Intelligence and IEEE PAMI. He is also the author of several books, including Introduction to Machine Learning, Artificial Intelligence, Rules of Speech Recognition, and Illustrated Artificial Intelligence. Dr. Wang's recent research focuses on mixed speech processing and AI for science.

In addition to his research, he is deeply involved in AI general education, contributing to both university-level teaching and AI education for primary and middle school students.