THE HONG KONG
POLYTECHNIC UNIVERSITY
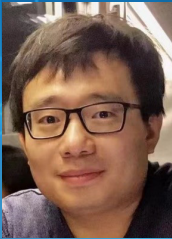香港理工大學

Department of Computing
電子計算學系

RESEARCH SEMINAR

Non-convex Games for Machine Learning: Models, Algorithms, and Applications

Dr Songtao LU
Senior Research Scientist
IBM Thomas J. Watson Research Center

Date : 7 December 2022 (Wed)
Time : 10:00 am - 11:00 am
Online via ZOOM

Abstract

The rapid advances in sensor, communication, and storage technologies have made data acquisition more ubiquitous than at any time in the past. Making sense of data of such a scale is expected to bring ground-breaking advances across many industries and disciplines. However, to effectively handle data of such scale and complexity, and to better extract information from quintillions of bytes of data for inference, learning, and decision-making, increasingly complex mathematical models are needed. These models are often highly non-convex, unstructured, and can have millions or even billions of variables, making existing methods no longer applicable.

In this talk, I will present a few recent works that design accurate, robust, and scalable algorithms for solving non-convex machine learning problems. My focus will be given to discussing the theoretical properties of a class of gradient-based algorithms for solving a popular family of structured non-convex min-max games. I will also showcase the practical performance of these algorithms in applications such as adversarial learning, trustworthy learning, and generalization of this class of games for functional constrained optimization and meta-learning. Finally, I will briefly introduce some extensions of our framework to other emerging problems, such as safe reinforcement learning (RL), multi-agent RL, etc.

About the Speaker

Songtao Lu is currently a senior research scientist with the mathematics of artificial intelligence (AI) group at the IBM Thomas J. Watson Research Center, Yorktown Heights. He obtained his doctoral degree in electrical engineering from Iowa State University in 2018. He was a post-doctoral associate with the department of electrical and computer engineering at the University of Minnesota Twin Cities from 2018 to 2019, and an AI resident at the Thomas J. Watson Research Center from 2019 to 2020. Dr. Lu is a recipient of the best paper runner-up award of UAI (2022), the outstanding paper award of FL-NeurIPS (2022), the IBM research accomplishment award (2021), and the ICML (2019) and AISTATS (2017) travel awards. His recent works have been published at multiple top-tier AI and machine learning conferences, including ICML, NeurIPS, AAAI, ICLR, UAI, IJCAI, AISTATS, etc. His primary research interests lie in machine learning, optimization, AI, and data science.

WE DRIVE INNOVATION THROUGH
SMART COMPUTING