Department of Computer Science

Learning from Complex Data with Novel Objectives

Mingrui Liu
Rafik B. Hariri Institute for Computing at Boston University

Hosted by Vincent Oria

DATE: Friday, March 12, 2021
TIME: **11:00 AM - 12:00 PM**
LOCATION: https://njit.webex.com/njit/j.php?MTID=m09b856740f917d1fb70f1bd0a1680601

web.njit.edu/cs/CS_Seminar/

Abstract: Classical learning paradigm with traditional objective function is not sufficient to learn efficiently from complex data (e.g., imbalanced data, unlabeled data), since the traditional objective function is usually not a good indicator of the default performance metric people care about in practice. To bridge this gap, the learning systems have to be equipped with the ability to handle novel objectives. My research empowers the learning systems with provably efficient algorithms for optimizing several novel objectives, including maximizing the Area under the ROC Curve (AUC) and training Generative Adversarial Networks (GANs).

This talk will showcase a few results. First, I will focus on provably efficient algorithms for online AUC maximization with both linear model and deep neural network to learn from imbalanced data. The main result is that AUC maximization can be reformulated as a min-max objective and algorithms with fast convergence rates are established.

Second, I will focus on principled adaptive gradient algorithms for training Generative Adversarial Networks (GANs) to learn from unlabeled data. In sharp contrast to heuristics algorithms which usually diverge and need lots of human's tuning efforts, the proposed algorithm provably converges with a fast adaptive rate and with minimal parameter tuning.

Bio: Mingrui Liu is a postdoctoral fellow at Rafik B. Hariri Institute for Computing at Boston University, working with Francesco Orabona. Previously he obtained his Ph.D. at The University of Iowa in August 2020 under the supervision of Tianbao Yang. His research interests include machine learning, convex and non-convex optimization, deep learning, online learning, continual learning, and distributed learning. He serves as a senior program committee member of IJCAI and program committee members of ICML, NeurIPS, ICLR, AISTATS, UAI, AAAI.