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Nonconvex learning problems with modular solutions

Wednesday, September 17th, 2025

12:10-1:30 PM

SEC 117

Zoom Meeting: Meeting ID: 983 2864 8232

Password: 665123

<https://rutgers.zoom.us/j/98328648232?pwd=gcHifQ9OouKZnUY0EHLe8sjNXaV1oj.1>

Light refreshments will be served in Hill 452, 11:40am

Abstract:

In this talk, we will consider the class of common feature learning problems in machine learning. Given dataset Y , the feature learning problem aims to recover the underlying features A and corresponding coefficients X such that $Y=AX$. In different applications, features A and coefficients X manifest different properties and priors. The natural machine learning formulations are usually nonconvex with multiple local solutions. This talk will show that all the local solutions in such feature learning problems are always structured — a local solution always partially recovers the ground truth features. This benign structural property of local solutions can be leveraged to reliably recover the ground truth in both centralized and distributed/federated settings. Specifically, we will discuss a one-shot framework in the distributed/federated setting, where each edge device recovers one local solution containing some of the true features, and the central server aggregates the true features from different local solutions.

Bio: Yuqian Zhang is an Assistant Professor in the ECE department at Rutgers University. She was a postdoctoral scholar with the Tripods Center for Data Science at Cornell University. She obtained her Ph.D. and M.S. in Electrical Engineering from Columbia University, and B.S. in Information Engineering from Xi'an Jiaotong University. Her research leverages physical models in data-driven computations, convex and nonconvex optimization, solving problems in machine learning, computer vision, and signal processing.

