

Data Science Seminar

Hosted by the Department of Mathematics and Statistics

- Date: Tuesday, October 10, 2023
- Time: 12:00pm - 1:00pm
- Room: Whitney Hall 100E
- Speaker: Dr. Yiming Ying (SUNY University at Albany)
- Title: Interplay between Generalization and Optimization via Algorithmic Stability.

Abstract

In this talk, I will delve into our analysis of stochastic gradient methods (SGMs), focusing on the interplay between generalization and optimization within the framework of statistical learning theory (SLT) and discuss their applications. The core concept for our study is algorithmic stability which is a notion in SLT to characterize how the output of an ML algorithm changes upon a small perturbation of the training data. Our theoretical studies significantly improved the existing results in the convex case and led to new insights into understanding the generalization of deep neural networks trained by SGD in the non-convex case. I will also discuss how to derive lower bounds for the convergence of existing AUC optimization algorithms which further inspires a new direction for designing efficient algorithms. Additionally, I will touch on extensions to differential privacy and minimax problems.

Biography of the speaker: Dr. Ying is a Professor in the Department of Mathematics and Statistics at UAlbany and the founding director of the machine learning lab (ML@UA). With a Ph.D. in mathematics from Zhejiang University, China (2002), he completed postdoctoral training in applied math and machine learning in Hong Kong and the UK. Dr. Ying's research spans Statistical Learning Theory, Trustworthy Machine Learning, and Optimization. He is the recipient of the SUNY Chancellor's Award for Excellence in Scholarship and Creative Activities (2023) and the University of Exeter Merit Award (2012). He currently holds editorial roles at Transactions on Machine Learning Research, and Neurocomputing and is the managing editor for Mathematical Foundation of Computing. Additionally, he serves as an Area Chair for leading machine learning conferences including NeurIPS, ICML, and AISTATS.

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