Yulai Zhao

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yulaiz@princeton.edu

Research Interests

Machine Learning, Reinforcement Learning, Non-convex Optimization

Education

Princeton University 2022 - Present

- Ph.D in Machine Learning, Department of Electrical and Computer Engineering
- Advisors: Jason D. Lee, S. Y. Kung

Tsinghua University 2018 - 2022

- B.Eng. in Electronic Information Science and Technology, Department of Electronic Engineering
- Advisors: Simon S. Du, Hongwei Chen

Research Experiences

Princeton University, Department of Electrical and Computer Engineering *2022 - Present*

- *Graduate Researcher*
- Focused on the theory of multi-agent reinforcement learning.
- Presented the first provable multi-agent PPO algorithm with convergence rates.
- Completed a first-author paper accepted by ICML 2023.

ETH Zürich, Institute for Machine Learning *Summer 2021*

- *Visiting Student*
- Studied performative prediction, a model in which predictions influenced future data distribution.
- Different from most works studying stable points, directly focused on global optima.
- Showed weak convexity of the performative risks under mild assumptions
- Completed a first-author paper accepted by OPT 2022 (NeurIPS 2022 Workshop).

University of Washington, School of Computer Science & Engineering *2021 - 2022*

- *Research Assistant (remote)*
- Presented a new statistical theory aiming to explain the superior achievements of NLP pre-training.
- Proved that pre-training could significantly improve sample efficiency of downstream tasks.
- Completed a first-author paper accepted as an oral presentation at AISTATS 2023.

University of Washington, School of Computer Science & Engineering *2020 - 2021*

- *Research Assistant (remote)*
- Studied reinforcement learning theory in two-player zero-sum games.
- Investigated policy gradient methods and applied them to both players.
- Provided convergence rates to the Nash equilibrium for the algorithm.
- Completed a first-author paper accepted by AISTATS 2022.

Publications

* denotes equal contribution or alphabetical ordering.

1. Yulai Zhao, Zhuoran Yang, Zhaoran Wang, Jason D. Lee
   Local Optimization Achieves Global Optimality in Multi-Agent Reinforcement Learning
   In International Conference on Machine Learning (ICML) 2023

2. Yulai Zhao, Jianshu Chen, Simon S. Du
Blessing of Class Diversity in Pre-training
In International Conference on Artificial Intelligence and Statistics (AISTATS) 2023
(Oral presentation & notable paper, 2% acceptance rate)

3. Yulai Zhao
Optimizing the Performative Risk under Weak Convexity Assumptions
In NeurIPS 2022 Workshop on Optimization for Machine Learning

4. Yulai Zhao, Yuandong Tian, Jason D. Lee, Simon S. Du
Provably Efficient Policy Gradient Methods for Two-Player Zero-Sum Markov Games
In International Conference on Artificial Intelligence and Statistics (AISTATS) 2022

Awards/Honors

International Conference on Artificial Intelligence and Statistics (AISTATS) Notable Paper *2023*

Scholarship of Academic Excellence *2020*
Awarded to Tsinghua students ranking top 5 %.

Scholarship of Academic Excellence *2019*
Awarded to Tsinghua students ranking top 5 %.

Toyota Scholarship *2019*
Awarded to the department's top 3 out of 260+ students.

Top 10 in the *Infinity of Math* Competition *2018*
Awarded to students outperforming 150+ participants in the school-wide calculus contest.

Programming and Computing Skills

C/C++, Python (NumPy, PyTorch, pandas), MATLAB, Kdb+