MIAO LU

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Education

Stanford University — *Stanford, USA*
Ph.D. student in Operations Research, Department of Management Science & Engineering — *2023 - present*

University of Science and Technology of China — *Hefei, China*
B.S. in Mathematics and Applied Mathematics, *summa cum laude* — *2018 - 2022*

Research Interests

My research interests are primarily in designing and analyzing both *robust* and *efficient* machine learning methods, with a special focus on theoretical foundations. With such a goal, I work broadly across the theory and application of reinforcement learning and deep learning. Currently I'm also interested in large language models and its interaction with decision making.

Publications

[7] Benign Oscillation of Stochastic Gradient Descent with Large Learning Rates
Miao Lu*, Beining Wu*, Xiaodong Yang, Difan Zou
NeurIPS 2023 Workshop on Mathematics of Modern Machine Learning (**M3L**)

[6] Double Pessimism is Provably Efficient for Distributionally Robust Offline Reinforcement Learning: Generic Algorithm and Robust Partial Coverage
Jose Blanchet†, Miao Lu†, Tong Zhang†, Han Zhong†
Neural Information Processing Systems (**NeurIPS**) 2023
Extended version *under review at* Mathematics of Operations Research (**MOR**)

[5] Maximize to Explore: One Objective Function Fusing Estimation, Planning, and Exploration
Zhihan Liu*, Miao Lu*, Wei Xiong*, Han Zhong, Hao Hu, Shenao Zhang, Sirui Zheng, Zhuoran Yang, Zhaoran Wang
Neural Information Processing Systems (**NeurIPS**) 2023, **Spotlight**

[4] Pessimism in the Face of Confounders: Provably Efficient Offline Reinforcement Learning in Partially Observable Markov Decision Processes
Miao Lu, Yifei Min, Zhaoran Wang, Zhuoran Yang
International Conference on Learning Representation (**ICLR**) 2023

[3] Welfare Maximization in Competitive Equilibrium: Reinforcement Learning for Markov Exchange Economy
Zhihan Liu*, Miao Lu*, Zhaoran Wang, Michael I. Jordan, Zhuoran Yang
International Conference on Machine Learning (**ICML**) 2022

[2] Learning Pruning-Friendly Networks via Frank-Wolfe: One-Shot, Any-Sparsity, and No Retraining
Miao Lu*, Xiaolong Luo*, Tianlong Chen, Wuyang Chen, Dong Liu, Zhangyang Wang
International Conference on Learning Representation (**ICLR**) 2022, **Spotlight**

[1] Learning Robust Policy against Disturbance in Transition Dynamics via State-Conservative Policy Optimization
Yufei Kuang, Miao Lu, Jie Wang, Qi Zhou, Bin Li, Houqiang Li
Association for Advancement of Artificial Intelligence (**AAAI**) 2022

(Note: authors with * contributed equally to the work, and † represents alphabetical order.)

Experiences

University of Hong Kong, Department of Computer Science and Institite of Data Science — *Hong Kong SAR, China*
Research assistant hosted by Prof. Difan Zou, working on deep learning theory — *Apr.2023 - Aug.2023*

Ubiquant Investment, AI Department — *Shanghai, China*
Quantitative research intern, applying deep learning techniques in quantitative trading tasks — *Jun.2022 - Sep.2022*

Awards and Honors

The 41st Guo Moruo Scholarship (highest honor and scholarship from USTC) — *Dec.2021*
Chinese National Scholarship (highest scholarship from Ministry of Education of China) — *Nov.2019, 2020*

Invited Talks

INFORMS annual meeting (invited presentation on publication [6]) — *Oct.2023*