

Zhaoyi Zhou

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EDUCATION

Carnegie Mellon University

Ph.D. in Electrical and Computer Engineering

- Main research areas: Foundation models, reinforcement learning

Starting August 2024

Pittsburgh, PA, USA

Tsinghua University

B.E. in Computer Science and Technology (Yao Class)

- Selected coursework: Machine Learning, Theory of Computation, Game Theory, Algorithm Design
- GPA: 3.97/4.00

September 2020 - June 2024

Beijing, China

PUBLICATIONS AND PREPRINTS

- Free from Bellman Completeness: Trajectory Stitching via Model-based Return-conditioned Supervised Learning.
Zhaoyi Zhou, Chuning Zhu, Runlong Zhou, Qiwen Cui, Abhishek Gupta, and Simon S. Du.
Accepted by International Conference on Learning Representations (ICLR) 2024. (31% acceptance rate)
(ORAL presentation at Foundation Models for Decision Making (FMDM) workshop of NeurIPS 2023.)
- Convergence Rates for Localized Actor-Critic in Networked Markov Potential Games.
Zhaoyi Zhou, Zaiwei Chen, Yiheng Lin, and Adam Wierman.
Conference on Uncertainty in Artificial Intelligence (UAI) 2023. (31% acceptance rate)

SELECTED HONORS

- Yao Award, Recognition Prize (presented by Dean Andrew C. Yao of IIIS), Tsinghua University, 2023;
- Scholarship of Academic Excellence, Tsinghua University, 2023 & 2022;
- Scholarship of Scientific Innovation, Tsinghua University, 2023 & 2022;
- Scholarship of Comprehensive Excellence, Tsinghua University, 2021.

RESEARCH EXPERIENCE

University of Washington

Research Intern. Supervisors: Simon Shaolei Du & Abhishek Gupta

Led research in offline reinforcement learning (RL).

February 2023 - August 2023

Seattle, USA

- Discovered freedom from Bellman completeness requirement as an advantage of return-conditioned supervised learning (RCSL) over dynamic-programming (DP) based offline RL methods.
- Conducted both theoretical and empirical analysis on explicit examples to demonstrate strength of RCSL over DP-based methods in near-deterministic environments given expert dataset.
- Theoretically prove that RCSL cannot do trajectory stitching, a limitation of RCSL observed in previous literature.
- Developed model-based return-conditioned supervised learning (MBRCSL) framework, which enables trajectory stitching of RCSL while avoiding Bellman completeness requirements.
- Tested MBRCSL on offline RL benchmarks, in which MBRCSL outperforms state-of-the-art model-based and model-free offline RL algorithms.

California Institute of Technology

Research Intern. Supervisor: Adam Wierman

Led research in networked multi-agent RL.

February 2022 - February 2023

Remote

- Introduced the class of networked Markov potential games as relaxation of Markov potential games (MPG), encompassing practical examples such as Markov congestion game.
- Designed localized actor-critic algorithm with linear function approximation, overcoming the curse of dimensionality.
- Derived the first finite-sample bound for multi-agent competitive games that is independent of the number of agents.
- Developed localized stochastic approximation (SA) framework as foundation of localized multi-agent policy evaluation.
- Derived finite-time convergence result of localized SA via a reduction approach.

PROJECT EXPERIENCE

Parameter-free Stochastic Optimization

Student Researcher, IIIS, Tsinghua University

June 2023 – December 2023

Beijing, China

- Designed stochastic DoWG algorithm, a stochastic optimization method without manual parameter-tuning.

- Derived universal convergence rates of stochastic DoWG for smooth and non-smooth convex functions, matching optimal rate of tuned stochastic optimization methods up to an extra logarithm factor.
- Derive optimal step size for stochastic gradient descent (SGD) variants given strongly-convex objective functions.

OTHERS

Software: Python, C/C++, Go, Verilog, MATLAB

Languages: English (Fluent), German (Fluent), Chinese (Native)