Zhaoyi Zhou

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EDUCATION

Institute for Interdisciplinary Information Sciences (IIIS), Tsinghua University — Expected June 2024
B.E. in Computer Science and Technology (Yao Class) — Beijing, China

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

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 — Feb. 2023 - Aug. 2023
Research Intern. Supervisors: Simon Shaolei Du & Abhishek Gupta — Seattle, USA
Led research in offline reinforcement learning (RL).

- 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 — Feb. 2022 - Feb. 2023
Research Intern. Supervisor: Adam Wierman — Remote
Led research in networked multi-agent RL.

- 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 — June. 2023 - Present
Student Researcher, IIIS, Tsinghua University — 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)