Haochen Zhang

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Education

Ph.D. in Statistics, The Pennsylvania State University, 2023–Present.

Advisor: Dr. Lingzhou Xue

B.Sc. in Statistics, Peking University, 2019–2023.

Research Interests

Reinforcement Learning: designing provably efficient RL algorithms or federated RL algorithms with applications to healthcare and autonomous driving.

Interdisciplinary Research: developing models for complex natural systems, including EEG-based neural decoding for biomedical applications and AI-driven heat-alert systems for climate resilience.

Publications

1. **Gap-Dependent Bounds for Federated Q-Learning.**
   Haochen Zhang, Zhong Zheng, and Lingzhou Xue (2025).
   The Forty-second International Conference on Machine Learning (ICML).
   Available at arXiv.

2. **Gap-Dependent Bounds for Q-Learning using Reference-Advantage Decomposition.**
   Zhong Zheng, **Haochen Zhang** (co-first author), and Lingzhou Xue (2025).
   The Thirteenth International Conference on Learning Representations (ICLR).
   (Spotlight, 3.26% acceptance rate)
   Available at Openreview and arXiv.

3. **Federated Q-Learning with Reference-Advantage Decomposition: Almost Optimal Regret and Logarithmic Communication Cost.**
   Zhong Zheng, **Haochen Zhang** (co-first author), and Lingzhou Xue (2025).
   The Thirteenth International Conference on Learning Representations (ICLR).
   Available at Openreview and arXiv.

Preprints

1. **Regret-Optimal Q-Learning with Low Cost for Single-Agent and Federated Reinforcement Learning.**
   Haochen Zhang, Zhong Zheng and Lingzhou Xue.
   Submitted to The Thirty-Ninth Annual Conference on Neural Information Processing Systems (NeurIPS).

Honors and Awards

Gold Medal in the 2018 Chinese Mathematical Olympiad (CMO).

Second Prize in the 2020 National Undergraduate Mathematics Competition of China (Class A)

Second Prize in the 2021 National Undergraduate Mathematics Competition of China (Class A)

Poster Presentations

Poster Presentation on "Gap-Dependent Bounds for Federated Q-learning", The Forty-Second International Conference on Machine Learning (ICML), Vancouver, Canada, July 2025.

Poster Presentation on "Federated Q-Learning with Reference-Advantage Decomposition: Almost Optimal Regret and Logarithmic Communication Cost", The 2025 C. R. and Bhargavi Rao Prize Conference, University Park, PA, May 2025.

Poster Presentation on "Gap-Dependent Bounds for Q-Learning using Reference-Advantage Decomposition", The 2025 C. R. and Bhargavi Rao Prize Conference, University Park, PA, May 2025.

Poster Presentation on "Federated Q-Learning with Reference-Advantage Decomposition: Almost Optimal Regret and Logarithmic Communication Cost", The Thirteenth International Conference on Learning Representations (ICLR), Singapore, April 2025.

Spotlight Poster Presentation on "Gap-Dependent Bounds for Q-Learning using Reference-Advantage Decomposition", The Thirteenth International Conference on Learning Representations (ICLR), Singapore, April 2025.

Poster Presentation on "Federated Q-Learning with Reference-Advantage Decomposition: Almost Optimal Regret and Logarithmic Communication Cost", Penn State's AI Week Research Forum, April 2025.

Poster Presentation on "Gap-Dependent Bounds for Q-Learning using Reference-Advantage Decomposition", Penn State's AI Week Research Forum, April 2025.

Teaching

The Pennsylvania State University

Lab Instructor and Teaching Assistant. STAT 200: Elementary Statistics. Fall 2024.

Service

Ad-Hoc Reviewers

Since 2023, I have reviewed papers for the following conferences:

International Conference on Learning Representations (ICLR)

Conference on Neural Information Processing Systems (NeurIPS)