Hao Qin

Ph.D. Candidate at the University of Arizona

E-mail: hqin at arizona dot edu
Personal Website GitHub

Education

- **University of Arizona, Tucson, AZ** — United States
  Ph.D. Candidate in Statistic — *Aug. 2020 - Present*
  Advised by Dr. Chicheng Zhang
- **University of Arizona, Tucson, AZ** — United States
  M.S. in Computer Science — *Aug. 2023 - May. 2024*
- **University of Wisconsin-Madison, Madison, WI** — United States
  M.S. in Data Science — *Sept. 2018 - May 2020*
- **Shandong University, Jinan, Shandong Province** — P. R. China
  B.S. in Mathematics — *Sept. 2014 - Jun. 2018*

Research Experience

- **Research Assistant, University of Arizona** — Tucson, AZ
  Under the supervision of Dr. Chicheng Zhang — *Aug. 2020 - Present*
  - **Inverse Reinforcement Learning (on-going)** Investigating the limitations of existing Inverse Reinforcement Learning (IRL) algorithms, particularly their suboptimal performance in dynamic and noisy environments. Addressing challenges in solving alignment and superalignment problems, which require accurate estimations of real-world models that are often inaccessible. Focused on developing enhanced IRL algorithms that deliver improved theoretical guarantees and superior empirical performance compared to state-of-the-art approaches.
  - **Reinforcement Learning (on-going)** Developing novel algorithms to solve reinforcement learning problems with optimal efficiency. The approach leverages the posterior sampling principle, an underexplored area in the literature. This new algorithm is designed to outperform existing methods based on optimism in the face of the uncertainty principle, offering improved performance and robustness.
  - **Multi-armed Bandits** Developed the Kullback-Leibler Maillard Sampling (KL-MS) algorithm for the k-armed bandit problem, demonstrating its superiority over the Maillard Sampling (MS) algorithm and Thompson Sampling. A key feature of KL-MS is its ability to provide a known sampling probability, a unique attribute among stochastic bandit algorithms. This feature proves especially valuable for unbiased estimation in offline policy evaluation by granting access to the underlying sampling probabilities.

Teaching Experience

- **Graduate Assistant, University of Arizona** — Tucson, AZ
  Teaching Assistant
  - CSc 352 Operating Systems — *Spring 2024*
  - Math 112 College Algebra (Lecturer) — *Fall 2023, 2022, 2021*
  - Math 263 Intro to Statistics and BioStatistics — *Spring 2022*

Working Experience

- **Amazon Applied Scientist Intern** — 2024 summer, Seattle, WA
  Developing a solution for email preference optimization at Amazon Business using contextual bandits. The goal is to enhance customer click-through rates by identifying and delivering emails that are most likely to appeal to individual customers, thereby improving engagement and personalization.
- **Statistical Consultant, University of Arizona** — 2023, Tucson, AZ
  Providing statistical advice and support to peers, researchers, and faculty members. Analyzing data and helping with the interpretation of results. Enhancing personal skills in statistics, problem-solving, communication, and collaboration

Publications

- **Hao Qin**, Kwang-Sung Jun and Chicheng Zhang. *Kullback-Leibler Maillard Sampling for Multi-armed Bandits with Bounded Rewards*, **NeurIPS**, December 2023. Available: link.
- **Hao Qin**, Kwang-Sung Jun and Chicheng Zhang. *Maillard Sampling for Multi-armed Bandits with one-parameter exponential family distributions*

Presentations and Posters

- **Hao Qin**, Kwang-Sung Jun and Chicheng Zhang. *Kullback-Leibler Maillard Sampling for Multi-armed Bandits with Bounded Rewards*, **ITA**, March 2024.
- **Hao Qin**, Chicheng Zhang. *Multi-armed Bandits with Bounded Rewards: a Short Survey and Kullback-Leibler Maillard Sampling*, November 2023. link