Xuanfei Ren

https://xuanfeiren.github.io/ xuanfeir@gmail.com github.com/xuanfeiren

Education

University of Wisconsin-Madison **Madison, USA**
PhD student, advised by Tengyang Xie, Department of Computer Sciences. *Aug. 2024 –*

University of Science and Technology of China **Hefei, China**
Bachelor of Science in Mathematics, specialization in Probability and Statistics. *Aug. 2020 – Jun. 2024*

Publication

- **Xuanfei Ren**, Tianyuan Jin, Pan Xu.
  Optimal Batched Linear Bandits.
  *In Proc. of the 41st International Conference on Machine Learning (**ICML 2024**).*

Research Interests

- Agent Optimization
- LLM Post-training
- Reinforcement Learning
- Learning theory

Research Experience

Exploration for Self-Improving Agentic Systems **University of Wisconsin–Madison**
Work with Dr. Ching-An Cheng (Google Research), Dr. Allen Nie and Prof. Tengyang Xie *Feb. 2025 – Present*

- Contributed to an End-to-end Generative Optimization pipeline OpenTrace to optimize AI agents.
- Researched and applied advanced search exploration methods, utilizing Large Language Models (LLMs) and embedding models to enhance function approximation.
- Designed and implemented meta search algorithms to enhance the optimization process in tau-bench.

Offline Alignment for Language Models **University of Wisconsin-Madison**
Advisor: Prof. Tengyang Xie *Jan. 2025*

- Performed an in-depth literature review on offline reinforcement learning (RL) algorithms.
- Applied offline RL algorithms to enhance alignment in large language models (LLMs).

Offline Reinforcement Learning and Policy Evaluation Theory **University of Wisconsin-Madison**
Advisor: Prof. Tengyang Xie *Sept. 2024 – Jan. 2025*

- Developed theoretical insights into value-based reinforcement learning (RL) algorithms.
- Theoretically analyzed estimation and approximation errors across various policy evaluation methods.
- Designed and conducted experiments to validate theoretical predictions.

Optimal Batched Linear Bandits. **Duke University**
Advisor: Prof. Pan Xu (Department of Computer Science, Duke University.) *Aug. 2023 – Jan. 2024*

- Devised an algorithm striving for asymptotic and non-asymptotic optimality in the linear bandits setting, an achievement previously unattained.
- Adapted the algorithm into a batched version with provable least batch complexity, extending applicablity to common real-world problems.
- Confirmed the algorithm's superiority over existing baseline methods through rigorous experimentation, showcasing its practical efficacy in linear bandits problems.

Skills

English: TOEFL: 108 (R: 29; L: 29; S: 22; W: 28); GRE: 320 (Q: 170; V:150); GRE Subject (Mathematics): 880 (90%).
Programming: C, Python, PyTorch, R, LaTeX, MATLAB, Mathematica.