SHENAO ZHANG

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EDUCATION

Northwestern University *Sep. 2023 - Present*
Ph.D. student in IEMS (Industrial Engineering & Management Sciences) *Evanston, IL*
Advisor: Prof. Zhaoran Wang

Georgia Institute of Technology *May 2020 - May. 2022*
M.S. in ECE (Electrical and Computer Engineering), GPA: 3.81/4.00 *Atlanta, GA*
Advisor: Prof. Tuo Zhao and Prof. Bo Dai

South China University of Technology *Aug. 2016 - May 2020*
B.Eng. in EE (Electronic and Information Engineering, Innovation Class) *Guangzhou, China*

University of California, Berkeley *Jan. 2019 - May 2019*
Visiting student at the Department of EECS, GPA: 3.90/4.00 *Berkeley, CA*

RESEARCH INTERESTS

My research centers around Large Language Models (LLMs) and Reinforcement Learning (RL). I'm currently interested in the efficient alignment of LLMs and autonomous LLM agents with advanced planning capabilities, with the ultimate goal of building models that actively synthesize data, learn to reason, and self-improve to achieve super-human intelligence. Previously, I developed data-efficient decision-making algorithms with applications to robotic and multi-agent systems.

PREPRINTS

[13] **Shenao Zhang**, Zhihan Liu, Boyi Liu, Yufeng Zhang, Yingxiang Yang, Yongfei Liu, Liyu Chen, Tao Sun, Zhaoran Wang, "Reward-Augmented Data Enhances Direct Preference Alignment of LLMs", *Preprint.* [PDF]

[12] **Shenao Zhang**, Donghan Yu, Hiteshi Sharma, Ziyi Yang, Shuohang Wang, Hany Hassan, Zhaoran Wang, "Self-Exploring Language Models: Active Preference Elicitation for Online Alignment", *ICML 2024 AutoRL Workshop* (Best Paper Award). [PDF]

[11] **Shenao Zhang***, Sirui Zheng*, Shuqi Ke, Zhihan Liu, Wanxin Jin, Jianbo Yuan, Yingxiang Yang, Hongxia Yang, Zhaoran Wang, "How Can LLM Guide RL? A Value-Based Approach", *Preprint.* [PDF]

[10] Xiaoyu Chen, **Shenao Zhang**, Pushi Zhang, Li Zhao, Jianyu Chen, "Asking Before Action: Gather Information in Embodied Decision Making with Language Models", *Preprint.* [PDF]

PROCEEDINGS

[9] Zhihan Liu*, Miao Lu*, **Shenao Zhang**, Boyi Liu, Hongyi Guo, Yingxiang Yang, Jose Blanchet, Zhaoran Wang, "Provably Mitigating Overoptimization in RLHF: Your SFT Loss is Implicitly an Adversarial Regularizer", *Neural Information Processing Systems (NeurIPS)*, 2024. [PDF]

[8] Zhihan Liu*, Hao Hu*, **Shenao Zhang***, Hongyi Guo, Shuqi Ke, Boyi Liu, Zhaoran Wang, "Reason for Future, Act for Now: A Principled Framework for Autonomous LLM Agents with Provable Sample Efficiency", *International Conference on Machine Learning (ICML)*, 2024. [PDF]

[7] Feng Gao*, Liangzhi Shi*, **Shenao Zhang**, Zhaoran Wang, Yi Wu, "Adaptive-Gradient Policy Optimization: Enhancing Policy Learning in Non-Smooth Differentiable Simulations", *International Conference on Machine Learning (ICML)*, 2024. [PDF]

[6] **Shenao Zhang**, Boyi Liu, Zhaoran Wang†, Tuo Zhao†, "Model-Based Reparameterization Policy Gradient: Theory and Practical Algorithms", *Neural Information Processing Systems (NeurIPS)*, 2023. [PDF].

[5] Zhihan Liu*, Miao Lu*, Wei Xiong*, Han Zhong, Hao Hu, **Shenao Zhang**, Sirui Zheng, Zhuoran Yang, Zhaoran Wang, "Maximize to Explore: One Objective Function Fusing Estimation, Planning, and Exploration", *Neural Information Processing Systems (NeurIPS)* (Spotlight), 2023. [PDF].

[4] **Shenao Zhang**, Wanxin Jin, Zhaoran Wang, "Adaptive Barrier Smoothing for First-Order Policy Gradient with Contact Dynamics", *International Conference on Machine Learning (ICML)*, 2023. [PDF]

[3] **Shenao Zhang**, "Conservative Dual Policy Optimization for Efficient Model-Based Reinforcement Learning", *Neural Information Processing Systems (NeurIPS)*, 2022. [PDF].

[2] **Shenao Zhang**, Li Shen, Lei Han, Li Shen, "Learning Meta Representation for Agents in Multi-Agent Reinforcement Learning", *Conference on Lifelong Learning Agents (CoLLAs)* (Oral), 2023. [PDF]

[1] **Shenao Zhang**, Li Shen, Zhifeng Li, Wei Liu, "Structure-Regularized Attention for Deformable Object Representation", *NeurIPS Workshop on Object Representations for Learning and Reasoning*, 2020. [PDF]

INTERNSHIP EXPERIENCE

Microsoft GenAI *Jan. 2024 - June 2024*
Student Researcher *Advisor: Donghan Yu*
- Worked on active preference elicitation for online alignment [12].

ByteDance AML *June 2024 - Sep. 2024*
Research Intern *June 2023 - Aug. 2023*
- Worked on sample-efficient RL with the policy prior provided by LLMs [11]. *Advisor: Yingxiang Yang*

Microsoft Research (MSR), Asia *Feb. 2023 - May 2023*
Research Intern *Advisor: Li Zhao*
- Worked on autonomous LLM agents [9].

Tencent AI Lab *Aug. 2019 - Sep. 2020*
Research Intern *Advisors: Li Shen, Lei Han and Li Shen*
- Worked on the representations and generalizability of multi-agent RL algorithms [2].
- Proposed an attention mechanism for visual representation of structured data [1].

TEACHING EXPERIENCE

Head TA of the graduate course CS 7648: Interactive Robot Learning (Fall 2021) at Georgia Tech.

SELECTED PROJECTS

Object Detection *May 2019 - Oct. 2019*
Project paper: Coarse-to-Fine Attention, advised by Bo Wu. Related patent. *Columbia University*

Cloth Simulation using OpenGL Shader *Jan. 2019 - May 2019*
Project website: ffjmmm.github.io/CS184-final/webpage, advised by Ren Ng. *UC Berkeley*

PROFESSIONAL SERVICE

Conference Review: NeurIPS 2020-24, ICLR 2022-24, AISTATS 2022-24, ICML 2022-24, COLM 2024.
Journal Review: Neurocomputing, Transactions on Pattern Analysis and Machine Intelligence (TPAMI).

HONORS AND AWARDS

NeurIPS Scholar Award *2022-2023*
ICML Travel Award *2023*
Georgia Tech Level A Premier Merit-Based Scholarship *2020-2021*
SCUT Study Abroad Global Education Scholarship *2019*
Second Prize in the China Undergraduate Electronics Design Contest *2018*
Third Prize in the Intel Undergraduate Embedded System Contest *2018*
Outstanding Freshman Scholarship (Awarded to 30 among 6,500 students) *2016*