SHUN ZHANG

shunzh@umich.edu shunzh.github.io San Francisco Bay Area

Research interests: Reinforcement learning; large language models; automatic code generation; value alignment.

EXPERIENCE

Research Scientist, *MIT-IBM Watson AI Lab* Jun. 2022 - Present
Postdoctoral Researcher, *MIT-IBM Watson AI Lab* Oct. 2021 - Jun. 2022
Postdoctoral Researcher, *IBM-NJIT* Aug. 2020 - Oct. 2021

- Research and publish papers on **reinforcement learning** and **large language models**, with a focus on competitive-level code generation, reinforcement learning from human feedback, and AI for electric circuit design automation.

Graduate Research Assistant, *University of Michigan* (Ann Arbor, MI) Sep. 2015 - Apr. 2020

- Conducted research and published papers on **preference elicitation** and **AI safety in reinforcement learning**.
- Designed active learning algorithms to improve a learning agent's performance and guarantee safety in domains with uncertain objectives.

Software Development Engineer Intern, *Amazon* (Seattle, WA) Jun. - Aug. 2014

- Created a WebRTC-related internal tool to resolve cross-departmental communication issues.

Software Development Engineer Intern, *Semantic Designs* (Austin, TX) Jun. - Aug. 2013

- Created a user interface for a programming language analysis tool for better visualization.

EDUCATION

Ph.D. in Computer Science and Engineering, *University of Michigan* Sep. 2015 - Apr. 2020

- Dissertation: Efficiently Finding Approximately-Optimal Queries for Improving Policies and Guaranteeing Safety
- Advisors: Satinder Singh, Edmund H. Durfee

M.S. in Computer Science, *University of Texas at Austin* Aug. 2015

- Master thesis: Parameterized Modular Inverse Reinforcement Learning
- Committee members: Dana Ballard, Peter Stone

B.S. in Computer Science, *University of Texas at Austin* May 2014

PUBLICATIONS

- **Adaptive Online Replanning with Diffusion Models**
  Siyuan Zhou, Yilun Du, **Shun Zhang**, Mengdi Xu, Yikang Shen, Wei Xiao, Dit-Yan Yeung, and Chuang Gan
  Conference on Neural Information Processing Systems (NeurIPS), 2023
- **Planning with Large Language Models for Code Generation**
  Shun Zhang, Zhenfang Chen, Yikang Shen, Mingyu Ding, Joshua B. Tenenbaum, and Chuang Gan
  International Conference on Learning Representations (ICLR), 2023
  paper

- **Hyper-Decision Transformer for Efficient Online Policy Adaptation**
  Mengdi Xu, Yuchen Lu, Yikang Shen, **Shun Zhang**, Ding Zhao, and Chuang Gan
  International Conference on Learning Representations (ICLR), 2023
  paper
- **Prompting Decision Transformer for Few-shot Policy Generalization**
  Mengdi Xu, Yikang Shen, **Shun Zhang**, Yuchen Lu, Ding Zhao, Joshua B. Tenenbaum, and Chuang Gan
  International Conference on Machine Learning (ICML), 2022
  paper
- **Power Converter Circuit Design Automation using Parallel Monte Carlo Tree Search**
  Shaoze Fan, **Shun Zhang**, Jianbo Liu, Ningyuan Cao, Xiaoxiao Guo, Jing Li, and Xin Zhang
  ACM Transactions on Design Automation of Electronic Systems (TODAES), 2022
  paper
- **From Specification to Topology: Automatic Power Converter Design via Reinforcement Learning**
  Shaoze Fan, Ningyuan Cao, **Shun Zhang**, Jing Li, Xiaoxiao Guo, and Xin Zhang
  International Conference on Computer Aided Design (ICCAD), 2021
  paper
- **Efficiently Finding Approximately-Optimal Queries for Improving Policies and Guaranteeing Safety**
  Shun Zhang
  Ph.D. Dissertation, 2020
  paper
- **Querying to Find a Safe Policy Under Uncertain Safety Constraints in Markov Decision Processes**
  Shun Zhang, Edmund H. Durfee, and Satinder Singh
  AAAI Conference on Artificial Intelligence (AAAI), 2020
  paper
- **Minimax-Regret Querying on Side Effects for Safe Optimality in Factored Markov Decision Processes**
  Shun Zhang, Edmund H. Durfee, and Satinder Singh
  International Joint Conference on Artificial Intelligence (IJCAI), 2018
  paper
- **Modeling Sensory-Motor Decisions in Natural Behavior**
  Ruohan Zhang, **Shun Zhang**, Matthew H. Tong, Yuchen Cui, Constatin A. Rothkopf, Dana H. Ballard, and Mary M. Hayhoe
  PLoS Computational Biology, 2018
  paper
- **Approximately-Optimal Queries for Planning in Reward-Uncertain Markov Decision Processes**
  Shun Zhang, Edmund H. Durfee, and Satinder Singh
  International Conference on Automated Planning and Scheduling (ICAPS), 2017
  paper
- **Determining Placements of Influencing Agents in a Flock**
  Katie Genter, **Shun Zhang**, and Peter Stone
  Autonomous Agents and Multiagent Systems (AAMAS), 2015
  paper
- **Autonomous Intersection Management for Semi-Autonomous Vehicles**
  Tsz-Chiu Au, **Shun Zhang**, and Peter Stone
  Handbook of Transportation, 2015
  paper

ACADEMIC SERVICES

Conference Reviewer

- IEEE ITSC 2014, AAAI 2019, AISTATS 2023-24, CVPR 2023, ICML 2023, NeurIPS 2023, ICLR 2024.

SKILLS

Research

Reinforcement learning, optimization, deep learning, large language models, active learning, learning and planning under uncertainty.

Programming languages

Proficient in Python (numpy, PyTorch). Experienced in Java, C++, C, Matlab.