Simin Liu

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www.siminl.com

Interests

My research topics are control and planning for robotics and machine learning.

Education

Ph.D. in Robotics, Carnegie Mellon University
2019-2025 (expected)
Advisors (2021 –present): John Dolan, Changliu Liu, safe and adaptive robotics
Advisor (2019 –2020): David Woodruff, mathematics and machine learning
Coursework: nonlinear and adaptive control, RL, modeling and estimation for robotics, ML, statistics, convex and nonlinear optimization

B.S. with High Honors in EECS and Mathematics, University of California, Berkeley
2015-2019
Advisor: Sergey Levine, deep reinforcement learning for robotics
Coursework: linear systems control (grad level), AI, mathematics for control and robotics (linear algebra, analysis, abstract algebra, probability)

Current projects

(1) Real-time planning around dynamic obstacles and (2) neural network verification for networks in perception and control

Publications

S. Liu, J. Dolan, and C. Liu, "Safe Control Under Input Limits with Neural Control Barrier Functions", in 6th Annual Conference on Robot Learning, 2022.

W. Zhao, T. He, T. Wei, **S. Liu**, and C. Liu, "Safety Index Synthesis via Sum-of-Squares Programming", arXiv preprint arXiv:2209.09134, 2022. Under submission at 2023 American Controls Conference.

Y. Li, H. Lin, **S. Liu**, A. Vakilian, and D. Woodruff, "Learning the Positions in CountSketch". Under submission at 2023 International Conference on Learning Representations.

S. Liu, T. Liu, A. Vakilian, Y. Wan, and D. Woodruff, "Learning the Positions in CountSketch", arXiv preprint arXiv:2007.09890, 2020.

A. Nagabandi*, I. Clavera*, **S. Liu**, R. S. Fearing, P. Abbeel, S. Levine, and C. Finn, "Learning to Adapt in Dynamic, Real-World Environments Through Meta-Reinforcement Learning", in International Conference on Learning Representations, 2018.

Awards

UC Berkeley undergraduate research honors 2019
Selected for Combinatorics, Algorithms, and AI for Real Problems program:

prestigious undergrad research program at University of Maryland 2018
Computing Research Association GHC research scholarship 2018
Microsoft GHC scholarship 2017
Top 10% of teaching assistants in UC Berkeley EECS 2017–2018
Inducted to Tau Beta Pi, Eta Kappa Nu, and Phi Beta Kappa:
national engineering, computer science, and liberal arts honor societies 2016
UC Berkeley College of Engineering Dean's List 2016–2019
William M. Olson/Warren E. Taylor Science and Engineering scholarship 2015
ACES-NM Young Asian-American Student Award 2015
Jane Street Unboxed scholarship 2015

Talks

"Safe Control Under Input Limits with Neural Control Barrier Functions"
October 2022, Safe Autonomous Systems Lab, UCSD
July 2022, PhD Speaking Qualifier, Robotics Institute, CMU

"Dealing with sample inefficiency in deep reinforcement learning for robotics"
July 2020, Session for Women in Machine Learning workshop at ICML

Teaching

Graduate Student Instructor, CMU
2021-2022
(1) modeling, estimation, and control for robotics, (2) mathematics for robotics

Undergraduate Student Instructor, UC Berkeley
2016-2019, top 10% instructor by student ratings
(1) intro to artificial intelligence, (2) algorithms in computer science, (3) intro to electrical engineering

Skills

Programming languages: Python (daily use), C++ (learned in courses)
Tools: PyTorch (proficient), TensorFlow (proficient), ROS (proficient)

Industry

Software Engineering Intern, Microsoft
Summer 2017
Worked on natural language processing at Cortana, applying ML tools like gradient boosting to classify the intent of Cortana queries.

Software Engineering Intern, Microsoft
Summer 2016
Prototyped a chatbot assistant for meeting scheduling. This successful demonstration preceded the serious adoption of chatbots in Teams, Microsoft's workplace messaging platform.