Alan (Jialiang) Zhao

Robot manipulation and robot learning.

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Education

Massachusetts Institute of Technology — Cambridge, MA — *Jan. 2022 - now*
PhD candidate — GPA: 4.8 / 5.0 — Mechanical Engineering and CSAIL
Advisor: Prof. Edward Adelson — Research Topic: Robot manipulator design, control

Carnegie Mellon University — Pittsburgh, PA — *Aug. 2018 - May 2020*
M.S. in Robotics, ***Research Track*** — GPA: 4.09 / 4.0 — The Robotics Institute (RI)
Advisor: Prof. Oliver Kroemer — Research Topic: Robotic Manipulation and Robot Learning

University of California, Berkeley — Berkeley, CA — *Aug. 2017 - May 2018*
Visiting Student & Researcher — GPA: 4.0 / 4.0 — EECS Department
Advisor: Prof. Ruzena Bajcsy, Dr. Robert Matthew — Research Topic: Design and Control for Upper limb Exoskeleton

Beijing Institute of Technology — Beijing, China — *Sept. 2014 - May 2018*
Bachelor of Science in Automation — GPA: 95.8 / 100, Rank 1 / 200 — School of Automation

Professional Experience

Nuro Inc. — Mountain View, CA — Jan. 2021 - Jan. 2022
Full-time Robotics Engineer
Autonomous vehicle behavior and planning.

National Robotics Engineering Center — Pittsburgh, PA — Jun. 2020 - Dec. 2020
Full-time Robotics Research Engineer
Precise, robust robotic grasping and autonomous assembly.

Epson Canada (Robotics Research Team) — Toronto, ON — July, 2019- Sept, 2019
Intern, Robotics research
Robust and fast robotic bin-picking of deformable parts.

Research Topics

Diffusion policy for manipulation | MIT CSAIL — May 2023 - Now
- Investigate the compositionality of diffusion policy to train robotic policies from multi-source data, including teleoperation data, simulation data, and videos of human demonstrations.
- Study methods to leverage tactile sensing data for contact-rich manipulation with diffusion policy.

Tactile sensing for manipulation and novel end-effector development | MIT CSAIL — Jan 2022 - Now
- Investigate using tactile sensing to locate and reconstruct in-hand objects with sub-millimeter accuracy.
- Design robot end-effectors (hands and fingers) that incorporate multiple sensing modalities (touch sensing, proprioceptive sensing, etc), and use such end-effectors to devise novel manipulation policies.

Efficient reinforcement learning for manipulation | CMU RI — 2019 - 2021
- Developed a method to represent manipulation policies as compositions of hierarchical object-centric controllers to improve RL efficiency.
- Reduce the dimensionalities of state spaces and action spaces by causal reasoning.

Precise Grasping and Assembly | RI and NREC, Carnegie Mellong University — 2018 - 2020
- Precise Grasping: developed a system to plan robust and precise robotic grasps by estimating post-grasp object displacement as a probabilistic distribution.
- Robotic Assembly: solved gear insertion and bracket assembly problems in millimeter accuracy by planning task-oriented grasps.

Selected Publications

- ***J. Zhao*** and E. Adelson. "GelSight Svelte: A Human Finger-shaped Single-camera Tactile Robot Finger with Large Sensing Coverage and Proprioceptive Sensing" *International Conference on Intelligent Robots and Systems (IROS)* 2023, ***Best Overall Paper Award Finalist***
- ***J. Zhao*** and E. Adelson. "GelSight Svelte Hand: A Three-finger, Two-DoF, Tactile-rich, Low-cost Robot Hand for Dexterous Manipulation" *IROS workshop on Visuo-Tactile Perception, Learning, Control for Manipulation and HRI (RoboTac)*, 2023
- ***J. Zhao***, M. Bauza, and E. Adelson. "FingerSLAM: Closed-loop Unknown Object Localization and Reconstruction from Visuo-tactile Feedback" *IEEE International Conference on Robotics and Automation (ICRA)*, 2023
- T. Lee, ***J. Zhao***, A. Sawhney, S. Girdhar, O.Kroemer. "Causal Reasoning in Simulation for Structure and Transfer Learning of Robot Manipulation Policies" *IEEE International Conference on Robotics and Automation (ICRA),* 2021
- ***J. Zhao***. "Learning to Plan Precise and Task-oriented Grasps for Autonomous Robotic Assembly" *Master thesis, Carnegie Mellon University,* 2020
- J. Liang, M. Sharma, ***J. Zhao***, A. LaGrassa, O.Kroemer. "Learning to Compose Hierarchical Object-Centric Controllers for Robotic Manipulation" *Conference on Robot Learning (CoRL),* 2020 (presentation + ***plenary talk***)
- ***J. Zhao***, D. Troniak, O.Kroemer. "Towards Robotic Assembly by Predicting Robust, Precise and Task-oriented Grasps" *Conference on Robot Learning (CoRL),* 2020 (presentation)
- ***J. Zhao***, J. Liang, O.Kroemer. "Towards Precise Robotic Grasping by Probabilistic Post-grasp Displacement Estimation" *Field and Service Robotics (FSR),* 2019 (presentation)
- ***J. Zhao***, H. Ma, J. Shi, and Y. Liu. "Introduction and Initial Exploration to an Automatic Tennis Ball Collecting Machine." *IEEE European Conference on Mobile Robotics (ECMR),* 2017 (presentation)
- J. Shi, H. Ma, and ***J. Zhao***. "Web-Based Human Robot Interaction via Live Video Streaming and Voice." *International Conference on Intelligent Robotics and Applications (ICIRA)*, 2017. Lecture Notes in Computer Science, vol 10462. Springer, Cham
- ***J. Zhao***, Q. Gao. "Annotation and Detection of Emotion in Text-based Dialogue Systems with CNN." arXiv:1710.00987