

Zhanyi Sun

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Education

Carnegie Mellon University, Pittsburgh, PA

Master of Science in Robotics

Aug 2022 — Present

GPA: 4.00/4.00

Rice University, Houston, TX

B.A. in Computer Science and B.S. in Electrical Engineering

Aug 2018 — May 2022

GPA: 3.94/4.00

Publications

Force-Constrained Visual Policy: Safe Robot-Assisted Dressing via Multi-Modal Sensing

Zhanyi Sun*, Yufei Wang*, David Held[†], Zackory Erickson[†]

Under review at *IEEE Robotics and Automation Letters (RA-L)*, 2024

Project Website, Paper

One Policy to Dress Them All: Learning to Dress People with Diverse Poses and Garments

Yufei Wang, **Zhanyi Sun**, Zackory Erickson[†], David Held[†]

Robotics: Science and Systems (RSS), 2023

Project Website, Paper

ViTCoD: Vision transformer acceleration via dedicated algorithm and accelerator co-design

Haoran You, **Zhanyi Sun**, Huihong Shi, Zhongzhi Yu, Yang Zhao, Yongan Zhang, Chaojian Li, Baopu Li, Yingyan Lin

IEEE International Symposium on High-Performance Computer Architecture (HPCA), 2023

Paper

Supertickets: Drawing task-agnostic lottery tickets from supernet architectures via jointly architecture searching and parameter pruning

Haoran You, Baopu Li, **Zhanyi Sun**, Xu Ouyang, Yingyan Lin

European Conference on Computer Vision (ECCV), 2022

Paper

Human-guided motion planning in partially observable environments

Carlos Quintero-Pena*, Constantinos Chamzas*, **Zhanyi Sun**, Vaibhav Unhelkar, Lydia E Kavraki

International Conference on Robotics and Automation (ICRA), 2022

Project Website, Paper

Research Experience

Student Researcher advised by Prof. David Held and Prof. Zackory Erickson

Sep 2022 - Present

Carnegie Mellon University, Robotics Institute

One Policy to Dress Them All: Learning to Dress People with Diverse Poses and Garments

- Designed and implemented a policy distillation algorithm that enabled training a single Reinforcement Learning agent for dressing different people with diverse poses and garments.
- Conducted a human study with 17 participants of different arm poses and garments and achieved a dressing success rate of 86%.

Force-Constrained Visual Policy: Safe Robot-Assisted Dressing via Multi-Modal Sensing

- Designed and implemented a novel multi-modal learning algorithm that enjoys global perception from visual observation and local control from force information for robot-assisted dressing.
- Conducted a human study with 10 participants and demonstrated the proposed method greatly outperforms prior works in terms of both quantitative dressing success rate and user comfort.

Reward Learning from Vision and Language Foundation Models for Challenging Manipulation Tasks

(Ongoing Project)

- Proposed and implemented a preference-based reinforcement learning framework with VLMs for complex robot manipulation tasks where hand engineering rewards are challenging (e.g., deformable object manipulation).

Student Researcher advised by Prof. Yingyan (Celine) Lin

Jan 2022 - Aug 2022

Rice University, Electrical Engineering Department

SuperTickets: Drawing Task-Agnostic Lottery Tickets from Supernet Architectures via Jointly Architecture Searching and Parameter Pruning

- Implemented a two-in-one training scheme with architecture searching and parameter pruning to identify efficient DNNs from supernet architectures.

- Conducted extensive experiments with 3 CV tasks on 4 datasets, showing the proposed method boosts accuracy and efficiency trade-offs compared to prior work.

ViTCoD: Vision Transformer Acceleration via Algorithm and Accelerator Co-Design

- Designed and implemented a masking method that prunes the attention map up to 90% while maintaining the original performance for Vision Transformer models.
- Implemented reordering algorithms to transform attention map into separate denser and sparser parts and a dedicated two-pronged accelerator that leverages those patterns to boost efficiency.

Student Researcher advised by Prof. Vaibhav Unhelkar and Prof. Lydia E. Kavraki Jan 2021 - Aug 2022

Rice University, Computer Science Department

Human-guided motion planning in partially observable environments

- Designed and implemented a Bayesian Inverse Reinforcement Learning algorithm that interactively learns reward functions from human critiques.
- Designed and implemented an API that leverages human critiques to generate motion plans and demonstrated that our method greatly outperforms baselines by human teaching effort, success rate, and path length.

Constrained-Guided Inverse Reinforcement Learning

- Designed and implemented a novel Inverse Reinforcement Learning algorithm that incorporates human's prior knowledge as extra constraints on the reward function.
- Conducted extensive experiments to demonstrate that the proposed method improves reward learning in terms of accuracy, sample efficiency, and robustness.

Work & Teaching Experience

Software Engineering Intern, Infrastructure Team

May 2020 - Aug 2020

Facebook, Inc.

- Designed and implemented a resource manager service that maintains life cycles of various internal testing platforms.
- Designed and implemented a flexible resource managing API that enables other teams to plug in their testing platforms.

Teaching Assistant

Jan 2020 - Dec 2021

Rice University, Computer Science Department

- Discrete Math and Algorithmic Thinking (COMP 182) Spring 2020
- Reasoning about Algorithms (COMP 382) Spring 2021
- Algorithmic Robotics (COMP 550, Graduate Level) Fall 2021

Skills

- **Programming:** Python, C, C++, Java, MATLAB, Verilog, SQL, PHP
- **Libraries:** PyTorch, TensorFlow, Keras, OpenCV, ROS, MuJoCo, Bullet, Blender
- **Physical Robots:** Experience with Sawyer, Franka Panda, and Fetch.

Professional Service

Conference Reviewer

- Conference on Robot Learning (CoRL), 2023
- IEEE International Conference on Robotics and Automation (ICRA), 2024