YIXUAN HUANG

Ph.D. student at University of Utah ⋄ Personal Website

EDUCATION

University of Utah, Salt Lake City, UT *Aug 2020 - Current*
Ph.D. in Computer Science Overall GPA: 3.97/4.0
Advisor: Prof. Tucker Hermans
Selected Coursework: Robotics, Robot Control, Robot Learning, Motion planning, Computer Vision

University of California, San Diego, La Jolla, CA *Sep 2018 - Jun 2019*
Exchange student Overall GPA: 3.91/4
Advisor: Prof. Sicun Gao
Senior Coursework: Deep Learning, Machine Learning, Operating System, Computer Networks

Northeastern University, Liaoning, China *Sep 2016 - Jun 2020*
B.E. in Computer Science and Technology (**top** student in the department)
Department of Computer Science and Engineering Overall GPA: 93.2/100, Rank: 1/278
Coursework: Discrete Mathematics, Statistics and Probability, Numerical Analysis, Electronic Theory

PUBLICATIONS

Y. Huang, J. Yuan, C. Kim, P, Pradhan, B. Chen, F. Li, and T. Hermans. Out of Sight, Still in Mind: Reasoning and Planning about Unobserved Objects with Video Tracking Enabled Memory Models (2024 IEEE International Conference on Robotics and Automation (ICRA)). (Uner Review); [Project Website] [Paper]

Y. Huang, N. C. Taylor, A. Conkey, W. Liu, and T. Hermans. Latent Space Planning for Multi-Object Manipulation with Environment-Aware Relational Classifiers (IEEE Transactions on Robotics (T-RO)). (Under review); [Project Website] [Paper]

Y. Huang, A. Conkey, T. Hermans. Planning with Learned Multi-Object Relations Using Graph Neural Networks (2023 IEEE International Conference on Robotics and Automation (ICRA)); [Project Website] [Paper]

Y. Huang, M. Bentley, T. Hermans, A. Kuntz. Toward Learning Context-Dependent Tasks from Demonstration for Tendon-Driven Surgical Robots (2021 International Symposium on Medical Robotics); ***(Best Paper Award Finalist & Best Student Paper Award Finalist)*** [Project Website] [Paper]

Y. Huang, M. Bentley, R. Benny ,T. Hermans, A. Kuntz. Learning Context-Dependent Tasks from Demonstration and Partial-View Point Clouds for Tendon-Driven Surgical Robots (Journal of Medical Robotics Research (JMRR)). (In Preparation);

RESEARCH EXPERIENCE

Reasoning and Planning for Unobserved Objects with Memory Models Mar 2023 - now

- Leverage a memory model and video tracking model to reason about the disappearance and reappearance of multiple objects.
- A real-world system to rearrange multiple unobserved objects to achieve some human-specified goal relations.
- Achieved sim-to-real transfer without fine-tuning.

Efficient Long Term Planning with Multiple Objects and Environments Sep 2022 - Mar 2023

- A novel framework to explicitly represent partial-view environments including tables and bookshelves.
- The first work to reason about how relations among multiple objects and environments change based on robot actions.;

· Achieved efficient long-term planning with graph search and learned object semantics.

Planning with Multi-Object Relations Using Graph Neural Networks May 2021 - Sep 2022

· Proposed a novel graph neural network framework for multi-object manipulation to predict how inter-object relations change given robot actions.;
· Achieved multi-step planning to reach target goal relations.;
· Showed our model trained purely in simulation transfers well to the real world;
· A system to rearrange a variable number of objects with a range of shapes and sizes using both push and pick and place skills.

Learning from Demonstration for Tendon-Driven Robot Jan 2021 - Dec 2021

· Significant steps toward the automation of context-dependent surgical tasks learned from demonstration;
· Proposed three learning approaches to directly learn the context embedding from 3D partial-view point cloud to remove the burden of directly giving specific context;
· First use of contextual learning for producing complex trajectories for surgical robots and first instance of LfD in continuum robots;
· A system to perform learned tasks in novel context not seen during the demonstrations;
· A system to apply our approaches trained in simulation to real-world tendon robot without any fine-tuning;

Safe Reinforcement Learning Jan 2019 - May 2020

· Proposed a novel model-based curriculum for solving safe reinforcement learning problems such as avoiding obstacles with an autonomous car;
· Leveraged model-based methods to plan safe actions and trained a safeguarding policy from these actions through imitation;
· Improved performance with lower sample complexity compared to Constrained Policy Optimization;

HONORS AND AWARDS

2021 International Symposium on Medical Robotics Best Paper Award Finalist	*Nov 2021*
2021 International Symposium on Medical Robotics Best Student Paper Award Finalist	*Nov 2021*
2021 International Symposium on Medical Robotics NSF Travel Award	*Oct 2021*
University of Utah School of Computing Department Fellowship	*Aug 2020*
National Scholarship (top 2% of degree cohort)	*Nov 2017 & 2018*
Northeastern University Excellent Student (top 2% of degree cohort)	*Dec 2017 & 2018*
Runner-up in National Mathematical Modeling Competition in China	*Oct 2017*
First Place in Provincial Mathematical Modeling Competition	*Oct.2017*

SKILLS

Computer Languages	C/C++, MATLAB, Python (TensorFlow, PyTorch), Java, VHDL
Software & Tools	IsaacGym, ROS, Gazebo, PyBullet, HTML, LaTeX

SERVICE

Reviewer	ICRA (2023, 2024), CoRL 2023