Yuhai Wang

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Education

University of Southern California — Los Angeles, CA
M.S. in Analytics; ***GPA: 3.8/4.0*** — *Jan. 2023 – Present*

Tiangong University — Tianjin, China
B.E. in Internet of Things; ***GPA: 3.7/4.0*** — *Aug. 2018 – May. 2022*

Research Interest

My research experience encompasses legged robots, robotic arms, multi-phase reinforcement learning, computer vision (including re-identification and Neural Radiance Fields), and ROS. I am particularly interested in the intersection of robotics and computer vision, aiming to develop generalizable policy learning through learning-based control and robot vision. My goal is to enhance autonomy and adaptability in robotic systems by leveraging advanced computer vision techniques to improve perception and control, enabling robots to operate effectively in dynamic and unstructured environments.

Research Experience

Sensing, Learning, and Understanding for Robotic Manipulation (SLURM) Lab — Los Angeles, CA
Research Assistant, advised by Prof. Daniel Seita — *Sep. 2023 – present*

- Developed a framework for object separation in crowded environments using Isaac Gym for simulation, incorporating displacement-based state representation and multi-phase reinforcement learning. Conducted physical experiments with Allegro and Franka robots, using Realsense D435i and D405 for the vision system, based on the DROID Robot Platform.(ISRR 2024)
- Integrated a quadruped robot(Go2), robotic arm(ARX5), and dexterous hand(Leap), utilizing reinforcement learning-based whole-body control to achieve target poses.(Ongoing)

Institute of AI Industry Research(AIR), Tsinghua University — Remote
Research Assistant, advised by Prof. Guyue Zhou & Prof. Yongliang Shi — *April. 2023 – Sep. 2023*

- Developed a distributed NeRF system with three-stage pose optimization, utilizing Mip-NeRF360 to obtain precise image poses and enhancing robustness through inverted Mip-NeRF360 and truncated dynamic low-pass filters.(IROS 2024)
- Achieved NeRF fusion by calculating coarse transformations between NeRFs in different coordinate systems, demonstrating strong performance in both real-world and simulated environments.

Robotics Research Lab, Tiangong University — Tianjin, China
Research Assistant, advised by Prof. Xuan Xiao — *Oct. 2019 – Aug. 2021*

- Designed and developed a quadruped robot featuring a novel leg mechanism based on a four-bar linkage, and completed kinematic calculations using C language.
- Utilized Webots for robot simulation to achieve two motion postures, and employed MATLAB for controlling the physical robot, successfully conducting experimental tests.(ICRA 2021)

Work Experience

Tsinghua University — Beijing, China
Research Engineer Intern — *Aug. 2021 – Feb. 2022*

- Exported the URDF models of the ARX5 robot arm from SolidWorks and completed its simulation and physical control using MoveIt and ROS. Utilized a RealSense D435i camera to acquire ArUco marker positions, integrating them into ROS to enable the ARX5's end effector to track the position of the ArUco marker.
- Participated in building the simulation environment for the IEEE ICRA2022 RoboMaster University Sim2Real Challenge.

Selected Publications

1. Jiang, Hao; **Wang, Yuhai***; Zhou, Hanyang*; Seita, Daniel. Learning to Singulate Objects in Packed Environments Using a Dexterous Hand. *International Symposium of Robotics Research (ISRR), 2024.* [pdf], [project page].

2. Ye, Baijun; Liu, Caiyun; Ye, Xiaoyu; Chen, Yuantao; **Wang, Yuhai**; Yan, Zike; Shi, Yongliang; Zhao, Hao; Zhou, Guyue. Blending Distributed NeRFs with Tri-stage Robust Pose Optimization. *International Conference on Intelligent Robots and Systems (IROS), 2024.* [pdf]

3. Xue, Yongjiang; Yuan, Xichen; **Wang, Yuhai**; Yang, Yang; Lu, Siyu; Zhang, Bo; Lai, Juezhu; Wang, Jianming; Xiao, Xuan. Lywal: A Leg-Wheel Transformable Quadruped Robot with Picking Up and Transport Functions. *International Conference on Robotics and Automation (ICRA), 2021.* [pdf] [Video page].

Service

ISE 534: Data Analytics Consulting, University of Southern California — Los Angelegs, CA
Graduate Teaching Assistant — *Jan. 2024 – May. 2024*

Agile Robotics workshop@ICRA 2024 — Remote
Reviewer — *April. 2024*

WBCD Competition@ICRA 2025 — Atlanta, GA
Hardware Sponsor — *April. 2024*

School of Computer Science and Technology, Tiangong University — Tianjin, China
Academic Representative — *Aug. 2018 – May. 2022*

Honors & Awards

President's Scholarship — *2019, 2020*
Social Activities Scholarship — *2020*
Outstanding Student Leader Award — *2019, 2021*
Off-campus competition scholarship — *2020*
First Prize in the National Challenge Cup Competition — *2021*
Honorable Mention of the Mathematical Contest in Modeling — *2020*

Skills

Programming Languages: Python, C, Matlab, R, SPSS, SQL

Robotics: ROS, Motion Planning, Mobile Manipulation

Robot Learning: RL (DDPG, PPO), IL (BC), Inverse RL, Hierarchical Learning

Robot Hardwares: Franka, Allegro Hand, ARX5 Arm, Go2 Dog, Leap Hand, Lywal(undergraduate project)

Computer Vision: Re-identification, Diffusion Models, GANs

Libraries: PyTorch, OpenCV, Issac Gym, Mujoco