Hao Li

https://haolirobo.github.io/

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EDUCATION

Stanford University **Stanford, CA** **Sept 2023 to June 2028 (Expected)**
- Doctor of Philosophy in Mechanical Engineering
- Major GPA: 4.104/4.0

Stanford University **Stanford, CA** **Sept 2021 to Sept 2023**
- Master of Science in Mechanical Engineering
- Major GPA: 4.104/4.0

Purdue University **West Lafayette, IN** **Aug 2019 to May 2021**
- Bachelor of Science in Mechanical Engineering
- Major GPA: 3.95/4.0

Shanghai Jiao Tong University **Shanghai, China** **Sept 2017 to May 2021**
- Bachelor of Science in Mechanical Engineering, Tsien Hsue-Shen Honor Program
- Major GPA: 86.54/100
- Purdue – SJTU 2+2 Dual B.S. Degrees Honor Program

RESEARCH EXPERIENCE

Navigation and 3D Surface Reconstruction from Passive Whisker Sensing
Aug 2023 to Present AD**: Mark Cutkosky**
- Designed tactile sensor inspired by whiskers.
- Implement Bayes Filtering and machine learning algorithms that track contact positions on the whisker body when interacting with objects.
- Benchmarked different proximity sensors with whisker sensor.

The OBJECTFOLDER BENCHMARK: Multisensory Object-Centric Learning with Neural and Real Objects
Aug 2021 to Nov 2022 AD**: Fei-Fei Li, Jiajun Wu**
- Designed and implemented four robotic benchmark tasks, including grasping stability prediction, contact refinement, surface traversal, and dynamic pushing.
- Conducted experiments and ablation studies on multi-modal robot learning in all manipulation tasks and demonstrated the distinct value of sight and touch in different tasks.
- Designed and built the visual, acoustic, and tactile data collection pipeline for 100 real-world household objects.

SONICVERSE: A Multisensory Simulation Platform for Embodied Household Agents that See and Hear
April 2021 to Sept 2022 AD**: Fei-Fei Li, Jiajun Wu**
- Developed a new multisensory simulation platform that models continuous audio rendering in 3D environments in real-time, providing a new testbed for many embodied AI and human-robot interaction tasks that need audio-visual perception.
- Proposed a multi-task learning framework for semantic audio-visual navigation and occupancy map prediction, which achieves state-of-the-art results.
- Validated the realism of the simulator by deploying the agents trained in simulation to real-world experiments with a Turtlebot.

See, Hear, and Feel: Smart Sensory Fusion for Robotic Manipulation
Oct 2021 to June 2022 AD**: Fei-Fei Li, Jiajun Wu**
- Built a complete multisensory system for a Franka Emika Panda robot arm, including a third-view camera, two GelSight sensors, and a contact microphone.

▫ Designed the two manipulation tasks: dense-packing task and pouring task and proposed a method with self-attention mechanism to solve these problems.
▫ Implemented the data collection pipeline and conducted experiments to analyze the characteristics of each modality and how they complement each other.
▫ Demonstrated the benefit of fusing multiple sensory modalities for solving complex manipulation tasks.

VRFromX: from Scanned Reality to Interactive Virtual Experience with Human-in-the-Loop
Apr 2020 to Nov 2020
Purdue University, IN AD**: Karthik Ramani**
▫ Developed an end-to-end system framework to make the content creation process easy and generic in Virtual Reality (VR), which supports the authoring of interactive VR scenes from real-world scans.
▫ Designed and implemented an interaction method with point cloud using AI assistance and an interactive behavioral modeling sub-system with an affordance recommender for VR users in Unity engine.
▫ Conducted the integration of the back end deep neural network with the front-end Unity software.
▫ Implemented the user interface design for the entire system to achieve intuitive user experience.
▫ Implemented three different use cases including welding training, remote 3D printing and Robot-IoT task planning using the complete system.
▫ Designed the process of a user study with one of the three use cases—welding training.

PUBLICATION & PRESENTATION (* equal contribution)

1. Lin, M.A., **Li, H.**, Xing, C., Cutkosky, M., 2024. Navigation and 3D Surface Reconstruction from Passive Whisker Sensing. *The International Journal of Robotics Research (2024): Under Review*.

2. Wei, Y.L., Jiang, J.J., Xing, C., Tan, X., Wu, X.M., **Li, H.**, Cutkosky, M. and Zheng, W.S., 2024. Grasp as You Say: Language-guided Dexterous Grasp Generation. *arXiv preprint arXiv:2405.19291.*

3. Ipsita, A.*, Duan, R.*, **Li, H.***, Chidambaram, S., Cao, Y., Liu, M., Quinn, A., and Ramani, K. (October 10, 2023). "The Design of a Virtual Prototyping System for Authoring Interactive Virtual Reality Environments From Real-World Scans." ASME. *J. Comput. Inf. Sci. Eng. March 2024; 24(3): 031005.*

4. Gao, R*, Dou, Y.*, **Li, H.***, Agarwal, T., Bohg, J., Li, Y., Fei-Fei, L., Wu, J. The OBJECTFOLDER BENCHMARK: Multisensory Object-Centric Learning with Neural and Real Objects. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition 2023.*

5. Gao, R*, **Li, H.***, Dharan, G., Wang Z., Li, C., Xia, F., Savarese, S., Fei-Fei, L., Wu, J. SONICVERSE: A Multisensory Simulation Platform for Embodied Household Agents that See and Hear. In *2023 IEEE International Conference on Robotics and Automation.*

6. **Li, H.***, Zhang, Y.*, Zhu, J., Wang, S., Lee, M. A., Xu, H., ... & Wu, J. See, Hear, and Feel: Smart Sensory Fusion for Robotic Manipulation. In *6th Annual Conference on Robot Learning.*

7. Ipsita, A., **Li, H.**, Duan, R., Cao, Y., Chidambaram, S., Liu, M., & Ramani, K. (2021, May). VRFromX: from scanned reality to interactive virtual experience with human-in-the-loop. In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems* (pp. 1-7).

LEADERSHIP AND RESPONSIBILITIES

Course Assistant in CS231N Spr 2023, Stanford, CA **Apr 2023 to Jun 2023**
▫ Designed final project scopes and rubrics.
▫ Led two sessions every week to mentor students.
Course Assistant in AA274A Aut 2022, Stanford, CA **Sept 2022 to Dec 2022**
▫ Led two sessions every week to teach students how to use ROS.
▫ Designed and implemented the final project codebase.
Volunteer Teacher of School of Xingran, Shanghai, China **Sept 2018 to Dec 2018**
▫ Tutored children in poverty or from families with disabilities in rural areas.

HONORS AND AWARDS

Zhulong Innovation Fellowship	Jun 2023
Academic Advancing Scholarship, SJTU	Oct 2020
Howard L. Timms Scholarship, Purdue University	Jun 2020
Dean's List & Semester Honours, Purdue University	Jun 2020, Jan 2020, May 2020
School of Mechanical Engineering Scholarship, SJTU	Oct 2019, Oct 2018
Enrolled in Tsien Hsue-Shen Honor Program, SJTU	Apr 2018

SKILLS AND TECHNICAL STRENGTHS

- **Real Robot experience**: Franka Emika Panda Robot Arm, Turtlebot
- **Design and Prototyping**: SOLIDWORKS, Unity, ANSYS, Pybullet, ROS
- **Programming**: Python, C#, C++, Arduino, LaTeX

ACADEMIC SERVICE

Reviewer for CoRL, RAL, CHI.