Anxing Xiao

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Research Interests

My research spans robotic system design, task and motion planning, and human-robot interaction. Currently, I focuses on improving *open-world planning and interaction* for service robots performing *mobile manipulation* in home environments.

Education

National University of Singapore *Jan 2023 - Aug 2027 (expected)*
Ph.D. student in Computer Science; Advisor: Prof. David Hsu

Harbin Institute of Technology, Shenzhen *Aug 2017 - Jun 2021*
B.Eng. in Automation (Rank 1/70); *Visiting Exchange Student* at **UC Berkeley** (2019 Fall - 2020 Summer)

Experience

Adaptive Computing Lab & Smart Systems Institute, NUS *July 2023 – present*
Graduate Research Assistant with Prof. David Hsu Singapore
- Leading the research project of designing systems and algorithms for household robotic assistants. Designed MR remote multimodal interaction system ([P.9] ICRA'25) and long-horizon reasoning algorithm ([T.1]).
- Maintaining robotics infrastructure and conducting research collaborations within the Smart Systems Institute, including model training and real-world robot implementation. ([P.8] RSS'24, [P.11] CoRL'25, [P.12] CoRL'25, [P.13] CoRL'25).

Robotic Perception and Intelligence Lab, SUSTech & CUHK *July 2021 – June 2022*
Research Assistant with Prof. Max Q.-H. Meng Shenzhen, China
- Initiated the autonomous trolley collection robots research projects and built the 3D perception, planning, and control system for trolley collection robots from scratch. ([P.5] ICRA'22, [P.7] IROS'23)
- Mentored undergraduate students in robotics research projects. ([P.3] IROS'22, [P.6] ICRA'23, [P.10] RA-L)

Hybrid Robotics Lab, UC Berkeley *Mar 2020 – Mar 2021*
Undergraduate Research Assistant with Prof. Koushil Sreenath Berkeley, CA, USA
- Designed the first robotic guide dog system and the corresponding hybrid physical human-robot framework to assist humans in navigating through narrow spaces. ([P.3] ICRA'21)
- Contributed to the navigation stack in quadrupedal autonomous navigation with optimized jumping. ([P.2] CASE'21)

Publications

Peer-Reviewed Publications (Google Scholar 446 citations) : * denotes equal contribution, †denotes mentorship

[13] C. Tang, **A. Xiao**, Y. Deng, T. Hu, W. Dong, H. Zhang, D. Hsu, H. Zhang, "MimicFunc: Imitating Tool Manipulation from a Single Human Video via Functional Correspondence ", *Accepted to Conference on Robot Learning (**CoRL**)*, 2025. [Paper] [Website] [Code]

[12] C. Hao, **A. Xiao**, Z. Xue, H. Soh, "CHD: Coupled Hierarchical Diffusion for Long-Horizon Tasks", *Accepted to Conference on Robot Learning (**CoRL**)*, 2025. [Paper] [Video]

[11] J. Zhang, H. Zhang, **A. Xiao**, D. Hsu, "Robot Operation of Home Appliances by Reading User Manuals", *Accepted to Conference on Robot Learning (**CoRL**)*, 2025. [Paper] [Video] [Code]

[10] S. Luo, J. Zhu, P. Sun, Y. Deng, C. Yu, **A. Xiao**†, X. Wang, "GSON: A Group-based Social Navigation Framework with Large Multimodal Model ", *Accepted to IEEE Robotics and Automation Letters (**RA-L**)*, 2025. [Paper] [Video] [Code]

[9] **A. Xiao**, N. Janaka, T. Hu, A. Gupta, K. Li, C. Yu, D. Hsu, "Robi Butler: Multimodal Remote Interactions with a Household Robot Assistant", *International Conference on Robotics and Automation (**ICRA**)*, 2025. [Paper] [Video]

[8] S. Yu, K. Lin, **A. Xiao**, J. Duan, H. Soh, "Octopi: Object Property Reasoning with Large Tactile-Vision-Language Models", *Robotics: Science and Systems (**RSS**)*, 2024. [Paper] [Website] [Code]

[7] B. Xia, H. Luan, Z. Zhao, X. Gao, P. Xie, **A. Xiao**†, J. Wang, and M. Q.-H. Meng, "Collaborative Trolley Transportation System with Autonomous Nonholonomic Robots", *International Conference on Intelligent Robots and Systems (**IROS**)*, 2023. [Paper] [Video]

[6] Y. Chen, Z. Xu, Z. Jian, G. Tang, Y. Yangli, **A. Xiao**†, X. Wang, and B. Liang, "Quadruped Guidance Robot for the Visually Impaired: A Comfort-Based Approach", *International Conference on Robotics and Automation (**ICRA**)*, 2023. [Paper] [Video]

[5] **A. Xiao***, H. Luan*, Z. Zhao*, Y. Hong, J. Zhao, J. Wang, and M. Q-H Meng, "Robotic Autonomous Trolley Collection with Progressive Perception and Nonlinear Model Predictive Control", *International Conference on Robotics and Automation (**ICRA**)*, 2022. [Paper] [Video]

[4] **A. Xiao***, W. Tong*, L. Yang*, J. Zeng, Z. Li, and K. Sreenath, "Robotic Guide Dog: Leading a Human with Leash-Guided Hybrid Physical Interactions", *International Conference on Robotics and Automation (**ICRA**)*, 2021.
Best Service Robot Paper Finalist. [Paper] [Video] Media coverage: [Daily Mail] [New Scientist] [Tech Xplore] [Daily Californian] [Independent] [Futurism] [China Daily] [DeepTech (Chinese)]

[3] Z. Jian, Z. Lu, X. Zhou, B. Lan, **A. Xiao**†, X. Wang, and B. Liang, "PUTN: A Plane-fitting based Uneven Terrain Navigation Framework", *International Conference on Intelligent Robots and Systems (**IROS**)*, 2022. [Paper] [Code]

[2] S. Gilroy, D. Lau, L. Yang, E. Izaguirre, K. Biermayer, **A. Xiao**, M. Sun, A. Agrawal, J. Zeng, Z. Li, and K. Sreenath, "Autonomous Navigation with Optimized Jumping through Constrained Obstacles on Quadrupeds", *International Conference on Automation Science and Engineering (**CASE**)*, 2021. [Paper] [Video] Media coverage [Video Friday]

[1] Y. Wu, **A. Xiao**, H. Chen, S. Zhang, Y. Liu, "Amphibious Robot's Trajectory Tracking with DNN-Based Nonlinear Model Predictive Control", *International Conference on Advanced Intelligent Mechatronics (**AIM**)*, 2020. [Paper]

Technical Report (Preprint):

[1] S. Chen, **A. Xiao**, D. Hsu, "LLM-State: Expandable State Representation for Long-horizon Task Planning in the Open World", [Paper] [Video]

Selected Awards and Honors

- NUS Research Scholarship *2023*
- **Best Paper Award Finalist for Service Robotics at ICRA '21** *2021*
- Dean's Award at HITsz. *2021*
- First-class Undergraduate Academic Scholarship. *2018-2021*
- National Scholarship. *2018*

Professional Responsibilities

- *Journal Reviewing:* IEEE T-RO, IEEE RA-L, IEEE T-IE, IEEE T-ASE.
- *Conference Reviewing:* ICRA '22 '23 '24 '25, IROS '22 '24 '25, CoRL '25.
- *Mentorship*
  - Zhengzhe Xu [P.6], Now PhD Student @ HKU *2021 - 2022*
  - Yanbo Chen [P.6], Now MS Student @ Tsinghua Univ. *2021 - 2022*
  - Xiao Zhou [P.3], Now MPhil Student@ HKUST *2021 - 2022*
  - Shangyi Luo [P.10], Now MS Student@ NUS *2024 - 2025*
- *Teaching Assistantship*
  - NUS CS2109S Introduction to AI and Machine Learning *Spring 2024*
  - NUS CS6244 Advanced Topics in Robotics *Spring 2025*
- *Student Area Search Committee*: School of Computing, National University of Singapore *Spring 2025*

References

- **Prof. David Hsu (IEEE Fellow).**
  Provost's Chair Professor.
  Department of Computer Science. National University of Singapore.
  Relationship: PhD supervisor.
  Email: dyhsu@comp.nus.edu.sg
- **Prof. Max Q.-H. Meng (IEEE Fellow).**
  Department head, Chair Professor.
  Department of Electrical and Electronic Engineering, Southern University of Science and Technology
  Relationship: RA supervisor.
  Email: max.meng@ieee.org
- **Prof. Koushil Sreenath.**
  Associate Professor.
  Department of Mechanical Engineering, University of California, Berkeley.
  Relationship: RA supervisor.
  Email: koushils@berkeley.edu

Skills

- **Programming:** Python, C/C++, MATLAB, HTML
- **Softwares & Tools:** ROS, PyTorch, CasADi, OpenCV, LCM, Solidworks, Gazebo, Git, LaTeX
- **Hardware:** Multiple Motors and Sensors, Arduino, Raspberry Pi, Basic Mechanical Design