

Liu DAI

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Research Interest

My research interests lie in Embodied AI. My goal is to empower active agents with advanced skills in the complex and open world, through designing more robust algorithms and building more diverse environments, especially with the help of generative and foundation models.

Education

Tongji University

B.ENG. IN COMPUTER SCIENCE, COLLEGE OF ELECTRONIC & INFORMATION ENGINEERING

- GPA: 88.0/100 Overall Ranking: 4/113 (Top 3.5%)

Shanghai, China

Sep. 2019 - Jun. 2024

University of California San Diego

VISITING STUDENT RESEARCHER AT SU LAB, JACOBS SCHOOL OF ENGINEERING

- Advisor: [Prof. Hao Su](#)

California, USA

Mar. 2023 - Present

Peking University

VISITING STUDENT RESEARCHER AT CENTER ON FRONTIERS OF COMPUTING STUDIES

- Advisor: [Prof. He Wang](#)

Beijing, China

Mar. 2022 - Present

Publication

*: equivalent contribution, †: corresponding author(s)

[C3] GAMMAP: Graspability-Aware Mobile MANipulation Policy Learning based on Online Grasping Pose Fusion

Jiazhao Zhang*, Gireesh Nandiraju*, Jaylon Wang, Xiaomeng Fang, Chaoyi Xu, Weiguang Chen, [Liu Dai](#), He Wang†

Submitted to *IEEE Conference on Robotics and Automation (ICRA) 2024*

[C2] 3D-Aware Object Goal Navigation via Simultaneous Exploration and Identification [\[Paper Link\]](#)

Jiazhao Zhang*, [Liu Dai](#)*, Fanpeng Meng, Qingnan Fan, Xuelin Chen, Kai Xu, He Wang†

Accepted to *IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR) 2023*

[C1] Discovering Novel Categories in SAR Images in Open Set Conditions [\[Paper Link\]](#)

[Liu Dai](#), Weiwei Guo†, Zenghui Zhang, Wenxian Yu

Accepted to *IEEE/GRSS International Geoscience and Remote Sensing Symposium (IGARSS) 2022, Oral*

Research Experience

University of California San Diego

RESEARCH INTERN AT SU LAB, ADVISED BY [PROF. HAO SU](#)

California, USA

Mar. 2023 - Present

Project: 3D Scene Generation for Embodied Tasks [On-Going]

- Aiming to generate environments enriched with diverse scene layouts and objects, through extracting knowledge from generative models.

Peking University

RESEARCH INTERN AT EPIC LAB, ADVISED BY [PROF. HE WANG](#)

Beijing, China

Mar. 2022 - Present

Project: Active 3D Scene Understanding & Object Goal Navigation [C2]

- Proposed the first 3D-aware framework for the challenging Object Goal Navigation task, empowered by two simultaneously running sub-policies: corner-guided exploration policy and category-aware identification policy. By this dedicated design, we overcame the challenge of low sample efficiency in RL and high computational cost when leveraging 3D data for training navigation skills.
- I contributed significantly to the method design, coding, and writing, and was primarily responsible for visualization in this project. It ignited my passion for Embodied-AI, further honing my skills in RL, coding, writing, and plotting.

Project: Mobile Manipulation in the Real World [C3]

- Introduced a fusion-driven, graspability-aware mobile manipulation method that ensures consistent temporal grasping pose observations. These observations can be encoded into a reward system, guiding the robot to emphasize detailed observations as it moves towards the best grasping positions. The approach's effectiveness was showcased through extensive real-world tests on a robot dog.

Project: Remote Sensing Image Interpretation in the Open & Challenging World [C1]

- Introduced a multi-stage framework for discovering novel categories in remote sensing images. Initially, a representation extractor is trained using a self-supervised approach, optimizing the use of both labeled and unlabeled data. Subsequently, we estimate the number of new classes and cluster the unidentified data using open-set detection.
- This was my first research project, which ignited my research interest in the Open-World setting. I independently handled the majority of the coding, writing, and plotting.

Teaching

Course 55010501: Opensource Hardware and Programming

Tongji University

TEACHING ASSISTANT FOR **PROF. XIAOHUA SUN** IN COLLEGE OF DESIGN AND INNOVATION

2021 Fall

- Delivered courses on Python & Arduino, guided undergraduate students to design and implement their Art projects through coding.

Honors & Awards

PERSONAL HONORS

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|------|---|--------------------|
| 2023 | Pursuit of Excellence Scholarship with 50000¥ (≈7000\$)
– Highest Honor for All Members of Tongji University (10/43106, among faculty, students & admin staff). | Tongji University |
| 2022 | SenseTime Scholarship with 20000¥ (≈3000\$)
– Nationwide Selected 30 Undergraduates in the Field of AI. | SenseTime Co.,Ltd. |
| 2022 | Tongji Academic Star
– Highest Honor for All Undergrads at Tongji University (15/18536). | Tongji University |

COMPETITION ACHIEVEMENTS

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|------|--|
| 2021 | National First Prize of <i>Challenge Cup</i> Competition: Research Track
Project: We built a pest detection system based on deep learning to help the agricultural workers in the less-developed rural area in China, where there is a great lack of experts on pest detection and the farmhand could only diagnose based on some folk prescription before.
– Most Influential Research Competition among University Students in China.
– Best Record in College History.
– Team Leader. |
| 2023 | National Silver Award of <i>Challenge Cup</i> Competition: Entrepreneurship Track
– Best Record in College History.
– Team Leader. |
| 2022 | Gold Award in Shanghai of <i>Internet+</i> Competition
– Team Leader. |
| 2020 | University Champion of <i>FLTRP Cup</i> National English Public Speaking Contest |

Skills

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|--------------------|--|
| Programming | C/C++, Python, LaTeX, HTML & CSS, SQL, Arduino, Bash |
| Frameworks | Pytorch, NumPy, OpenCV, Open3D, trimesh, Habitat Simulator |
| Others | Public Speaking and Presentation |

Languages

- | | |
|----------------|-------------|
| Chinese | Native |
| English | Fluent |
| French | Preliminary |

Entrepreneurship

I am the co-founder of **LunarAI**, an AI-Empowered Start-Up for Modern Agriculture.