

YukTungSamuel Fang

Also published as: **Yudong Fang**

Nanjing University (Suzhou Campus) — Hong Kong SAR

B.Sc. Intelligent Science and Technology

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Research Interests

Embodied AI and robotics, with a focus on perception, spatial memory, and decision-making that let robots act reliably in unstructured real-world environments. Hands-on experience spanning navigation, semantic mapping, and real-robot deployment. Seeking opportunities for overseas graduate studies (Fall 2027 entry).

Education

Junior Undergraduate Student, Nanjing University (Suzhou Campus)

Suzhou, China

B.Sc. Intelligent Science and Technology

Expected 2027

- **GPA:** 4.48 / 5.00

- **Selected coursework (scores):** Data Mining (95), Database Systems (96), Operating Systems (95), Data Structures & Algorithms (95), Machine Learning (94), Deep Learning (94), Programming Practicum (94.9)

Publications & Preprints

- **Y.T.S. Fang**, Z. Shi, J. Qiu, Z. Chen, J. Shi, H. Xu, J. Huo, Y. Gao

INHerit-SG: Incremental Hierarchical Semantic Scene Graphs with RAG-Style Retrieval.

ICRA 2026 Workshop on Robots Meet Prior Maps; Selected for Oral Presentation, Best Presentation Finalist.
[arXiv:2602.12971](#) — [Project Page](#)

Contribution: Independent first author; led the end-to-end pipeline, manuscript writing, figures/tables, experiment design, visualization, supplement, hardware/communication bring-up, and real-robot data collection.

- H. Ding, Z. Xu, **Y.T.S. Fang**, Y. Wu, Z. Chen, J. Shi, J. Huo, Y. Zhang, Y. Gao

LaViRA: Language-Vision-Robot Actions Translation for Zero-Shot Vision Language Navigation in Continuous Environments. *ICRA 2026.* [arXiv:2510.19655](#) — [Project Page](#)

Contribution: Led real-robot deployment (on Unitree Go1) and system integration.

Research Experience

Incoming Research Intern, National University of Singapore (NUS)

Summer 2026 (incoming)

Advisor: Prof. Lin Shao — summer research in embodied AI.

Inference & Learning Research Group (led by Prof. Yang Gao), Nanjing University

State Key Laboratory for Novel Software Technology

Undergraduate Researcher, 2025–present

Zero-Shot Vision-and-Language Navigation (LaViRA)

2025.05–2025.09

Advisors: Prof. Jieqi Shi, Prof. Jing Huo

- Addressed trade-offs in existing zero-shot VLN-CE methods between scene generalization and MLLM reasoning utilization.
- Developed a coarse-to-fine hierarchical framework that decomposes actions into language planning for high-level decisions, vision grounding for perceptual integration, and robot control for precise movements.
- Leveraged varying scales of Multimodal Large Language Models (MLLMs) to enhance reasoning, grounding, and navigation efficiency in unseen environments.
- Implemented modular decomposition to maintain transparency and support real-world deployment without prior training.
- Achieved state-of-the-art performance on the VLN-CE benchmark with Success Rate (SR) of 38.3% and Success weighted by Path Length (SPL) of 28.3% using Gemini-2.5-Pro, demonstrating superior generalization with +16.1% SR and +17.7% SPL over InstructNav; deployed on Unitree Go1 and Agilex Cobot Magic robots. Accepted at ICRA 2026.

Active Exploration with Semantic Map Prediction (SEA)

2025.09–2025.10

Advisors: Prof. Jieqi Shi, Prof. Jing Huo

- Tackled limitations in learning-based exploration methods, including the lack of long-term environmental understanding and efficiency in global awareness.
- Designed an iterative prediction-exploration framework using semantic map prediction to forecast missing areas based on current observations.
- Incorporated an ASC-based local mapper for predictions and confidence estimation, alongside RL-based hierarchical policies for two-stage navigation.

- Developed a confidence-aware full mapper to accumulate and adjust local maps, guiding exploration via differences between predicted and actual maps.
- Deployed and debugged the full pipeline on Habitat datasets, with real-robot integration on Unitree Go1 and Agilex Cobot Magic platforms.

Incremental Hierarchical Semantic Scene Graphs (INHerit-SG)

2025.10–2026.02

Advisors: Prof. Jieqi Shi, Prof. Hao Xu, Prof. Jing Huo

- Resolved misalignments in existing semantic scene graphs, including offline processing, lack of interpretability, and flat structures unsuitable for embodied tasks.
- Constructed a semantic graph evaluation dataset, HM3DSem-SQR, focusing on complex natural language command queries and a human study dataset focusing on semantic accuracy.
- Introduced an online system with a Floor-Room-Area-Object hierarchy and RAG-style retrieval, using natural-language descriptions as semantic anchors for human-intent alignment.
- Employed an asynchronous dual-process architecture to decouple geometric segmentation from semantic reasoning, with event-triggered updates for long-term consistency and low overhead.
- Deployed multi-role Large Language Models (LLMs) to decompose queries into atomic constraints, handle logical negations, and apply hard-to-soft filtering for robust reasoning.
- Achieved state-of-the-art results on the HM3DSem-SQR dataset with geometric accuracy of 37.7% (within 1m, +15% over DualMap) and semantic accuracy of 70.6%, real-world trajectory evaluations with 60.0% success rate (+70% over baselines). The system also demonstrates scalability for downstream navigation tasks.

Research in Progress

Lifelong Mobile-Manipulation Memory Benchmark

2026.03–present

- Designing a benchmark that evaluates world-model maintenance under continuous household perturbations, organized around a three-level capability framework (build/organize world model, update/maintain under conflicts, memory-guided action). Simulation environment implemented; preliminary method under active development.

Uncertainty-Aware Interactive Object-Goal Navigation

2026.06–present

- Developing a decision framework for when an embodied agent should act, explore, or ask the user, based on two-layer uncertainty modeling and information-gain-driven question generation. Research proposal completed; feasibility validated via baseline (SG-Nav, CoIN-Bench) reproduction.

Honors & Awards

- NJU Scholarship for HK/Macao & Overseas Chinese Students — **First Prize** (Sophomore year; university-wide; 5 awardees (Top 2%); defense required)
- NJU Scholarship for HK/Macao & Overseas Chinese Students — **Third Prize** (Freshman year; university-wide)

Academic Service

- Reviewer (by invitation), *IEEE Robotics and Automation Letters* (RA-L), 2026

Skills

- **Programming:** Python (for ML pipelines and ROS integration), C++
- **Robotics:** ROS (for data collection across diverse sensors, inter-device communication in complex setups, downstream control via SDKs for dynamic motion planning and execution), real-robot deployment and debugging
- **Tools:** Linux, Git; agentic coding workflows (Claude Code/Codex) in remote development for rapid prototyping and project automation
- **Hardware:** 3D modeling & printing (custom fixtures for sensor integration); sensor/compute configurations (possess hands-on experience with various commonly used robot cameras)