

# Weiye Hu

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🌐 [hwy0507.github.io](https://hwy0507.github.io) — 🌐 [github.com/hwy0507](https://github.com/hwy0507)

## Education

**Southern University of Science and Technology (SUSTech)** Sep 2023 – Jul 2027 (Expected)  
*B.Eng. in Information Engineering; Overall GPA: 3.89/4.0 (Rank 4/48); Advisor: Prof. Max Q.-H. Meng*  
**Southern University of Science and Technology (SUSTech)** Sep 2027 – Jun 2031 (Expected)  
*Incoming Ph.D. student in Control Science and Engineering; Advisor: Prof. He Kong*

## Research Experience

**Autonomous and Robust Manipulation Group, Shanghai Innovation Institute** Jun 2026 – Present  
*Research Intern with Prof. Hanbo Zhang and Prof. Fan Ye* Shanghai, China

- Developed a whole-body compliance controller that augments nominal WBC with physics-based VMC teachers for safe yielding and smooth trajectory recovery under impacts and sustained external pushes.
- Trained an Echo State Network (ESN) to map proprioceptive histories directly to compliance actions, enabling temporally adaptive control and generalization to unseen contact scenarios.

**Guangdong Provincial Key Lab of Advanced Wireless Communication Technology** Jun 2025 – Jul 2026  
*Undergraduate Research Assistant with Prof. Yi Gong and Prof. Xiaoyang Li* Shenzhen, China

- Developed a Lyapunov-guided hierarchical reinforcement learning framework with residual PPO for joint trajectory, offloading, and resource optimization in UAV-assisted MEC, reducing task delay by up to 67.2% [P.1].
- Proposed a gated residual reinforcement learning framework integrated with FSP–Lyapunov optimization for cache- and control-constrained UAV-assisted IoT, reducing mean end-to-end delay by up to 9.53% over baseline methods.

**Active Intelligent Systems Lab, SUSTech** Sep 2024 – Present  
*Undergraduate Research Assistant with Prof. He Kong and Prof. Guangren Duan* Shenzhen, China

- Developed and deployed a ROS 2/Nav2 perception–planning pipeline for Unitree G1, enabling robust autonomous human following and dynamic obstacle avoidance in real-world experiments. 🌐
- Developed an RL-based hierarchical locomotion framework combining adaptive bipedal walking and quadrupedal crawling for scalable confined-space traversal, with sim-to-real validation on Unitree G1 [P.2].

## Publications

\* denotes equal contribution, † denotes corresponding author.

- [2] S. Xu, Y. Guo, **W. Hu**, Y. Xu, Z. Li, H. Kong†, “REACH: An RL-based Hierarchical Humanoid Crawling Framework for Scalable Confined Space Traversal,” *IEEE-RAS International Conference on Humanoid Robots*, 2026, **Accepted**.
- [1] R. Yao\*, **W. Hu\***, L. Qi, Z. Han, Y. Gong, X. Li†, “Hierarchical Trajectory and Offloading Optimization for Task Delay Minimization in UAV-Assisted MEC,” *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)*, 2026, **Accepted**; Invited **Oral Presentation**.

## Selected Projects

**Intelligent Visual Navigation UAV System for Fire Rescue Scenarios** 🌐 Dec 2025

- Built a closed-loop UAV navigation system by integrating a Raspberry Pi with the flight controller through MAVLink, enabling onboard perception-to-control execution for fire-rescue target following.
- Implemented gesture-triggered target selection, ArUco-based monocular ranging, ROI preprocessing, and robust visual filtering to improve real-time perception stability and reduce embedded inference latency.

**Vision-Guided Autonomous Mobile Manipulation for Multi-Stage Missions** 🌐 Dec 2024

- Engineered an autonomous ROS 2/Nav2 mobile manipulation pipeline, enabling dynamic path planning and precise waypoint docking across multi-stage indoor logistical tasks.
- Orchestrated a distributed finite state machine (Spin, Move, Pickup, Place) to synchronize inter-node communication and ensure fault-tolerant mission execution.
- Coupled 6D visual pose estimation (ArUco/TF) with Inverse Kinematics (IK) for precise grasping, and enabled autonomous proceed/stop decisions by visually recognizing “PARK” markers and traffic-light states.

**Machine Learning and LLM-based Sentiment Analysis** 🌐 Dec 2025

- Built reproducible supervised-learning pipelines for multi-country life-expectancy forecasting, covering data cleaning, KNN imputation, model benchmarking, and randomized hyperparameter search with tree-based and neural models.
- Implemented sentiment analysis using TF-IDF, Word2Vec, BERT representations, and classical baselines, followed by Qwen/GLM prompting and parameter-efficient LLaMA-Factory LoRA fine-tuning for task adaptation and comparative evaluation.

## Honors and Awards

- National Innovation and Entrepreneurship Training Program: Core Team Member; National-Level Project 2026
- SUSTech Outstanding Student Model Award (Top 7/5000+) 2025
- Shokz Cup Global Undergraduate Engineering Practice Competition: Platinum Award (1st Place) 2025
- SUSTech First-Class Scholarship 2024–2026
- Challenge Cup: Guangdong Gold Award, National Bronze Award 2024
- China College Students’ Innovation Competition: Guangdong Gold Award, National Bronze Award 2024