

Yuxuan Zhang

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Skills

Coding: Python, C/C++, Bash (Shell), SQL, MATLAB, R, Verilog, Java, C#, JavaScript/TypeScript
Tools: Linux, Git, CMake, Docker, CUDA, ROS/ROS2, PyTorch, TensorFlow, OpenCV, PCL, Open3D, Isaac Gym/Sim, MuJoCo
Unity, LabVIEW, Altium Designer, AutoCAD, SolidWorks, Multisim, Keil μ Vision, KiCad
Languages: Chinese (native), English (fluent)

Education

Master in Artificial Intelligence Systems *Aug 2025 – Present*
National University of Singapore Singapore

- Relevant Coursework: Robotic Systems, Natural Language Processing, Pattern Recognition, Machine Reasoning

Graduate Diploma in System Analysis *Jul 2023 – Jan 2025*
National University of Singapore Singapore

- GPA: 4.11/5.00. Focus: Machine Learning Infrastructure and Scalable System Design.

Bachelor in Intelligent Test & Control Engineering *Sep 2020 – Jun 2024*
Harbin Institute of Technology China

- GPA: 4.02/5.00. Thesis Focus: Precision Measurement, Embedded Systems, and Real-time Distributed Control.

Publications

1. Chongkai Gao, Zixuan Liu, Zhenghao Chi, Junshan Huang, Xin Fei, Yiwen Hou, **Yuxuan Zhang**, Yudi Lin, Zhirui Fang, Zeyu Jiang, Lin Shao. “VLA-OS: Structuring and Dissecting Planning Representations and Paradigms in Vision-Language-Action Models.” *NeurIPS 2025* (accepted). [arXiv:2506.17561](https://arxiv.org/abs/2506.17561).
 - Developed **VLA-OS**, a modular framework to evaluate Action-Only, Integrated, and Hierarchical planning paradigms.
 - Investigated **visually-grounded hierarchical planning**, demonstrating its superior zero-shot generalization and long-horizon performance across LIBERO, COLOSSEUM, and DexArt benchmarks.

Preprints

1. **Yuxuan Zhang**. “CCTA: Safety- and Capability-Constrained Tool Arbitration for Long-Horizon Embodied Decision Making.” *Preprint 2026*.
 - Proposed **CCTA**, a hierarchical framework for heterogeneous tool arbitration (VLA, RL, IK) under hard safety and morphology constraints.
 - Formulated arbitration as a **constrained optimization problem**, integrating Control Barrier Functions (CBFs) for safety projection and ROS 2 LifecycleNodes for compute-aware scheduling.
2. Chongkai Gao, Jieao Shi, Xuchuan Huang, Mu Zhaoyu, **Yuxuan Zhang**, et al. “ManiLadder: Benchmarking Manipulation Intelligence Frontier via a Categorized and Multi-Level Task Ladder.” *CoRL 2026* (Under Review).
 - Engineered a **GPU-accelerated simulation environment** for ManiLadder, featuring 112 tasks with four difficulty tiers.
 - Implemented standardized metrics and MILE for rigorous evaluation of manipulation intelligence across diverse robotic embodiments.
3. Haziq Razali, **Yuxuan Zhang**, Qianli Xu, Yiannis Demiris. “Learning to Synthesize Novel Human-Object Interaction in Collaborative Task-Based Settings.” *AAAI 2026 Workshop HCM Submission*.
 - Developed a multi-view perception pipeline using 4D-Humans, HaMeR, and SAM-6D to reconstruct high-fidelity 3D human-object trajectories.

- Investigated **LLM-guided task decomposition** to facilitate multi-agent motion forecasting and synthesis for long-horizon collaborative tasks.

Selected Experience

Research Intern (Hardware / Software / System Design) *Mar 2026 – Aug 2026*
AMD Singapore Singapore

- Incoming research internship focusing on high-performance system architecture for AI workloads (subject to NDA).

AI Research Intern *Oct 2025 – Dec 2025*
Fatfish AI Singapore

- Developed a ROS2-based end-to-end deployment pipeline for humanoids, integrating MiniPC, RealSense, and Jetson Orin Nano.
- Implemented and analyzed **Sim2Real transfer** of VLA policies for locomotion and manipulation, utilizing RL-based controllers and IK solvers.

Research Intern (Assistive Robotics) *Jun 2025 – Sep 2025*
AdaComp Lab, National University of Singapore Singapore

- Engineered a quadrupedal assistant system (RDog-V2) featuring 360° LiDAR and panoramic vision for blind-aid navigation.
- Optimized LiDAR-based **SLAM and dynamic obstacle avoidance** algorithms to enable safe, autonomous guidance in complex urban settings.

Research Intern (Human-Behaviour Understanding) *Mar 2025 – Dec 2025*
*I2R, A*STAR* Singapore

- Formulated a data-generation framework for Human-Object Interaction (HOI) by synthesizing multi-view RGB-D data with LLM-based reasoning.
- Refined 3D reconstruction techniques to model complex collaborative behaviors, supporting research into human-centric robot learning.

R&D Intern (Computer Vision) *Jul 2021 – Aug 2021*
Changjiang Intelligent Control Co., Ltd. China

- Designed a stereo-vision system for real-time 3D surface reconstruction and **6-DoF pose estimation** in automated industrial maintenance.

Tech Art Intern *Jan 2021 – Feb 2021*
Boke City Co., Ltd. (Wuhan Branch) China

- Investigated physics-based character-environment interactions in Unity, focusing on the synthesis of realistic combat visual effects via C# scripts.

Selected Projects

Automated Calibration System for A/D Modules *Oct 2023 – May 2024*
Undergraduate Thesis, Harbin Institute of Technology China

- Developed a multi-channel selection system (PCB + Firmware) and automated PXIe-based calibration protocols for high-precision A/D modules.

Autonomous Drone Docking & Charging Platform *Oct 2021 – Sep 2022*
Innovation Training Program, HIT China

- Engineered a precision landing system (DJI M100 + OpenMV) utilizing **GPS-denied localization** via AprilTag and PID-based control.

Interactive 3D Port Reconstruction *Oct 2020 – Sep 2021*
Annual Research Project, HIT China

- Synthesized large-scale port environments in Unity using high-resolution heightmaps and satellite data.
- Implemented immersive VR interfaces and weather simulation systems to study human-computer interaction in digital twins.