

# Zihan Wang

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## Education

<b>The Chinese University of Hong Kong</b>	<i>M.S. in Robotics</i>	<i>Aug. 2025 – Present</i>
<b>Beihang University</b>	<i>B.E. in Automation</i>	<i>Sep. 2021 – Jun. 2025</i>

- GPA: 88.1/100

## Publications and Manuscripts

- PUB: A Plasma-Propelled Ultra-Quiet Blimp with Two-DOF Vector Thrusting.**  
Yixing Zhang, Zihan Wang, Zhijun Li, Xuanlin Fan, Jiawei Zhang, Shaoping Wang  
arXiv, 2025 [\[pdf\]](#)
- Plasma-propelled ultra-quiet flying robot system and power combination control method.**  
China Invention Patent CN118220461A [\[pdf\]](#)

## Research Experience

<b>Unmanned Systems Research Group, CUHK</b>	<i>Nov. 2025 – Present</i>
Graduate Research Assistant	Advisor: <a href="#">Prof. Ben M. Chen</a>
• Topic: BEV-Based Cross-Modal Perception	
<b>Legged Robot Lab, CUHK</b>	<i>Oct. 2025 – Present</i>
Graduate Research Assistant	Advisor: <a href="#">Prof. Yun-hui Liu</a>
• Topic: Vision-based Locomotion for Quadruped Robots	
<b>Tsinghua Laboratory of Brain and Intelligence, THU</b>	<i>Mar. 2025 – Jul. 2025</i>
Undergraduate Research Assistant	Advisor: <a href="#">Prof. Jia Liu</a>
• Topic: 2D&3D SLAM algorithms for <a href="#">Zhixing Autonomous Car II</a>	
<b>Advanced Robotics Centre, NUS</b>	<i>Jul. 2023 – Dec. 2023</i>
Undergraduate Research Assistant (Remote)	Advisor: <a href="#">Dr. Wenshuo Wang</a>
• Topic: 6-DOF Grasp Based on Foundation Models	

## Industry Experience

<b>Beijing Kaiyun Technology Co., Beijing</b>	<i>Jul. 2024 – Sep. 2024</i>
Summer Intern	Advisor: <a href="#">Bin Zhu</a>
• Designed scripted test programs with LUA on the Semi-Physical Simulation Test Software ETEST.	
• Accomplished semi-physical simulation on an embedded system lab box to design a smart clock with temperature and humidity sensing capabilities.	

## Projects

<b>Wheel-Legged Robot</b>	<i>May. 2025 - Jul. 2025</i>
• Developed a wheeled-legged balancing robot, designing a custom STM32F103 microcontroller board and embedded software, with LQR and VMC-based control, capable of balancing, load-carrying and differential-drive locomotion.	
• Implemented cascaded PID control loops to enhance MIT servo motor positioning accuracy to within $\pm 0.5^\circ$ .	
• Integrated the Mahony Filter for accurate state estimation from the Inertial Measurement Unit (IMU).	
<b>Zhi Xing Autonomous Car II</b>	<i>Mar. 2025 - May. 2025</i>
• Developed a ROS2 autonomous mobile car based on NVIDIA Jetson, with sensor fusion implemented from the	

driver level to integrate LiDAR and depth cameras, enabling real-time perception and navigation.

- Modeling & Simulation: Designed the URDF vehicle model and validated motion dynamics through IsaacSim and Gazebo for robust system testing.
- High-Precision Mapping & Navigation: Deployed Cartographer SLAM integrated with Nav2 navigation stack, achieving over 95% map coverage and robust obstacle-aware path planning.
- 3D Mapping: Utilized Intel RealSense cameras with the NVBlox framework to generate real-time ESDF occupancy maps, enabling faster and more accurate navigation in dynamic environments.

#### **High-Fidelity 3D Building Reconstruction from Point Clouds(Bachelor Thesis)**

*Dec. 2024 - Jun. 2025*

- Developed a comprehensive pipeline for high-precision 3D reconstruction of ground buildings from handheld laser scanner data, focusing on refined modeling through advanced segmentation and geometric completion.
- Data Preprocessing: Established a robust preprocessing pipeline for large-scale raw SLAM data. Utilized Statistical Outlier Removal to effectively filter a 74 million point cloud, reducing its size by 8.6% to eliminate noise and outliers while preserving key structural integrity.
- Semantic Segmentation: Implemented and trained a PointNet++ based deep learning model for semantic segmentation of architectural components (e.g., walls, windows, doors). Achieved 83.6% overall accuracy (OA) and 54.0% mIoU on custom-scanned building data, enhancing model robustness in complex scenes with occlusions or irregular structures.
- Refined Modeling via Component Regularization: Designed a novel workflow to address data incompleteness and geometric inconsistencies. Using K-Means clustering to automatically classify and standardize building components based on their geometric properties (height, width).
- Component Reuse and Completion: Employed a two-stage registration process, combining manual point-pair matching for coarse alignment with the Iterative Closest Point (ICP) algorithm for fine-tuning, successfully completing missing or occluded architectural features with high precision.

#### **Zhi Xing Autonomous Car I**

*Sep. 2024 - Nov. 2024*

- Developed an autonomous mobile car using ROS, integrating mapping, navigation, and voice interaction modules for real-world deployment.
- SLAM Mapping: Implemented GMapping to generate 2D occupancy grid maps, achieving over 90% map coverage.
- Path Planning & Obstacle Avoidance: Deployed the ROS Navigation Package for real-time global and local planning, achieving dynamic obstacle avoidance with 97% avoidance accuracy.
- Voice Interface: Integrated the Baidu Speech Recognition SDK for hands-free voice-controlled navigation, with >80% recognition accuracy.

#### **Treasure-Hunting Car**

*Feb. 2023 - May. 2023*

- Developed a mobile robot using Arduino as the main controller and ESP32 for signal processing, integrating map recognition, path planning, and motion control capabilities.
- Developed map-based image processing pipeline using OpenCV, obtain the head-down map by using Perspective Transform on the slant front view and obstacle coordinate extraction through edge detection and contour analysis.
- Integrated PID control with the A\* searching algorithm to achieve high-precision path tracking and dynamic obstacle avoidance. Attained sub-centimeter positional accuracy (<0.5 cm) and rapid attitude control response with minimal overshoot (<1%).

## **Skills**

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**Programing:** C/C++, Python, Pytorch, MATLAB

**Frameworks:** ROS/ROS2, OpenCV, PCL, IsaacSim/Lab, Gazebo, Mujoco

**Hardware:** Solidworks, Fusion360, 3D Printing; Multisim; STM32, ESP32, Arduino, NVIDIA Jetson

**Robot:** Unitree GO1/2

**Language:** TOEFL:101 (W:27), L<sup>A</sup>T<sub>E</sub>X

## Awards

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The Undergraduate Training Program for Innovation and Entrepreneurship Funding (National level)	2024
Academic Excellence Award	2024
Academic Excellence Award	2023