

Jiahui Zhou

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<https://github.com/IsaacZH>

Education

Shenzhen University	09/2022 – 06/2026
B.Eng. in Automation	Shenzhen, China
National University of Singapore	08/2026 – 06/2027
M.E. in Mechanical Engineering	Singapore

Project Experience

RoboMaster Robotics Competition – RobotPilots Team, Shenzhen University	09/2022 – 08/2025
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- **Project Overview:**

- Participated in the design and development of RoboMaster competition robots, focusing on mechanical structure design, embedded systems development, power modeling, and robotic system integration.

- **Key Contributions:**

- Designed the chassis, gimbal, ammunition feeding, and launching mechanisms of the Hero robot using **SOLIDWORKS**, followed by prototype manufacturing, assembly, and validation testing.
- Developed embedded control software based on **STM32** and **FreeRTOS**, supporting chassis motion control, gimbal stabilization, actuator coordination, and human-machine interaction.
- Built a power consumption model for the robot chassis and performed regression analysis in **MATLAB** to optimize power allocation and control performance.
- Developed a **Python**-based upper-computer tool for dart-launching system parameter tuning, improving debugging and calibration efficiency.
- Participated in the development and debugging of wireless charging and supercapacitor energy management systems to improve subsystem stability and integration.
- Gained hands-on experience in robotic system design, experimental testing, troubleshooting, and cross-functional teamwork through competition projects.

Remote Control System for Quadruped Robot (Final Year Project)	10/2025 – 04/2026
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- **Project Repository:**

- https://github.com/IsaacZH/himloco_lab
- https://github.com/IsaacZH/unitree_deploy

- **Project Overview:**

- Designed and implemented a remote operation system for the **Unitree Go2** quadruped robot, integrating reinforcement learning locomotion control, mapless autonomous navigation, and remote visualization for human-robot collaboration in complex environments.

- **Key Contributions:**

- Built a reinforcement learning training pipeline using **Isaac Lab** and trained locomotion policies with the **HIMLoco** framework under **4096** parallel simulation environments, achieving zero-shot **Sim-to-Real** deployment.
- Deployed and optimized inference on the **Jetson Orin** platform, achieving real-time locomotion control at approximately **50 Hz**.
- Implemented an end-to-end mapless navigation policy based on **SRU (Spatially-Enhanced Recurrent Unit)** with Sim-to-Sim deployment, enabling autonomous obstacle avoidance and target navigation using depth cameras and proprioceptive sensing.
- Designed a **DDS-WebSocket** communication architecture for low-latency data transmission between the robot and operator terminal, supporting seamless switching between teleoperation and autonomous

navigation modes.

- Developed a multi-source visualization interface using **Rerun** for real-time monitoring of depth images, point clouds, robot states, and communication status, achieving end-to-end latency of approximately 30 ms.

Internship Experience

DatenLord – Embedded Engineer Intern

02/2025 – 05/2025

- **Overview:**
 - Participated in the development of smart glasses for industrial defect detection, focusing on hardware design and embedded software development.
- **Key Contributions:**
 - Designed PCB hardware based on **ESP32**, integrating audio codec chips (**AIC3204**), cameras, and gyroscopes.
 - Developed embedded applications using the **ESP-IDF** framework, implementing photo triggering, image acquisition, and UDP image transmission.
 - Developed drivers for **AIC3204** and integrated them with the **ESP-ADF** audio framework for audio capture functionality.
 - Designed an expansion PCB with USB-HUB support based on **Milk-V Duo** for multi-peripheral connectivity.
 - Built Linux systems using **Buildroot**, and developed/debugged USB camera and USB network card drivers for image acquisition and network communication demos.

Sentigent Technology – Reinforcement Learning Locomotion Algorithm Intern

01/2026 – 04/2026

- **Overview:**
 - Participated in the development of a wheeled-legged robot control system, focusing on reinforcement learning simulation environments, **Sim-to-Real** transfer optimization, and classical control deployment.
- **Key Contributions:**
 - Built reinforcement learning training environments using **Isaac Lab**, including simulation configuration, observation/action space design, reward engineering, and training pipeline implementation.
 - Designed and tuned domain randomization strategies for dynamics parameters, mechanical properties, sensor noise, and external disturbances to reduce the sim-to-real gap and improve policy generalization.
 - Developed kinematic and dynamic models for **LQR** control of wheeled-legged robots, and deployed control algorithms on embedded platforms.

Honors and Awards

Champion, RoboMaster Southern Regional Competition	2023
Top 8, RoboMaster National Competition	2023
First Prize, University Innovation and Entrepreneurship Star Team	2023
Third Place, RoboMaster Southern Regional Competition	2024
Top 8, RoboMaster National Competition	2024

Technical Skills

- **Programming:** C/C++, Python, MATLAB, Git, CMake
- **Embedded Systems:** STM32, Nordic NRF Series, ESP32, FreeRTOS, ROS
- **CAD Tools:** SOLIDWORKS, Onshape, Fusion 360
- **Reinforcement Learning:** Isaac Sim, Isaac Lab, MuJoCo