Zi Huang

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Education

Delft University of Technology (TU Delft) Sep 2024 — Present
Master of Science in Robotics *Delft, NL*

- CGPA: 8.5/10
- Key Coursework: Deep Reinforcement Learning, Robot Dynamics, Planning and Decision Making, Machine Perception, Computer Vision.

Harbin Institute of Technology (HIT) Sep 2020 — Jun 2024
Bachelor of Engineering in Automation *Weihai, CHN*

- CGPA: 91.47/100
- Key Coursework: Modern Control Theory, Intelligent Control System, Embedded Systems, Machine Learning, Calculus & Linear Algebra.

Professional Experience

Software Engineer (AI & Computer Vision) Jul 2025 — Nov 2025
Havatec BV *Nieuw-Vennep, NL*

- Developed an end-to-end computer vision pipeline for instance segmentation.
- Engineered the complete lifecycle: curated custom datasets, trained Deep Learning models in PyTorch, and optimized inference using ONNX for real-time deployment.
- Integrated C# post-processing logic to interface AI predictions with industrial machine control systems.

Mechanical Engineer (Control) Jun 2023 — Sep 2023
Chengdu RIG Science & Technology Co., Ltd *Chengdu, CHN*

- Designed and tuned cascaded PID algorithms for precise motor control (speed, position, and torque).
- Validated control stability and performance through extensive MATLAB/Simulink simulations prior to hardware deployment.

Research & Academic Projects

Master's Thesis: Bio-inspired Control for Soft Snake Robots Oct 2025 — Present

- Supervisor: Dr. Cosimo Della Santina
- Developing a control framework for soft-robot locomotion using Spiking Neural Networks (SNN) and Reservoir Computing.
- Investigating the coupling of Spike-Timing-Dependent Plasticity (STDP) for unsupervised feature learning with PPO for dynamic target reaching.
- Aiming to demonstrate adaptive and energy-efficient locomotion compared to non-spiking Artificial Neural Networks (ANNs).

Hierarchical RL for Quadruped Terrain Adaptation Nov 2025 — Present

- Designing a Hierarchical Reinforcement Learning architecture for robust quadruped locomotion on uneven terrain.
- Decoupling the policy into a high-level velocity command planner and a low-level actuator controller to improve sample efficiency and stability.

Safe Planning & Control for Quadrotors Nov 2024 — Jan 2025

- Advisor: Prof. Dr. Javier Alonso-Mora
- Video: https://youtu.be/btgGNvN8GC0
- Simulation study under Pybullet. Developed a hybrid planning architecture combining sampling-based search with optimization-based control.
- Implemented Informed RRT* for asymptotically optimal global path planning in cluttered environments.
- Designed a linear Model Predictive Controller (MPC) using OSQP to track trajectories while enforcing dynamic constraints and ensuring local collision avoidance.

Multi-Sensor Fusion for 3D Perception Nov 2024 — Jan 2025

- Engineered a cross-modal fusion pipeline combining LiDAR point clouds(bounding box proposals), camera image(pedestrian classification), and Radar velocity data(adaptive confidence scaling).

- Achieved 0.368 mAP on the "View of Delft" dataset (surpassing baselines by 26%) by implementing RANSAC ground plane removal with DBSCAN clustering on Lidar point clouds and apply adaptive confidence scaling for a MobileNet classifier.

Bachelor's Thesis: Visual Navigation for Automated Guided Vehicle Nov 2023 — Jun 2024
- Code: https://github.com/HuangZi-zi/Bachelor_Thesis_MATLAB
- Developed a robust RGB-D perception system using Region Growing algorithms to extract linear feature.
- Integrated an Artificial Potential Field (APF) local planner for real-time obstacle avoidance on a physical Automated Guided Vehicle (AGV) platform.
- Validated the Sim-to-Real transferability of the navigation stack in Matlab and hardware experiments.

Combinatorial Generalization in VAEs Feb 2025 — Apr 2025
- Code: https://github.com/Roodster/dsait4125-cv
- Investigated representation learning by modeling group actions in Variational Autoencoders (VAEs).
- Visualized latent space disentanglement using Uniform Manifold Approximation and Projection(UMAP) to compare transformation-encoding VAEs against standard baselines.

Apple Harvesting Robot Manipulation Apr 2025 — Jun 2025
- Video: https://youtu.be/dJFtMQb1bO0
- Implemented a ROS2/MoveIt motion planning pipeline for a 4-DOF arm to execute inverse kinematics and pick-and-place tasks.

Honors & Awards

Finalist, Interdisciplinary Contest in Modeling (ICM), COMAP Jul 2023
- Top 2% globally.

Outstanding Graduate, Dept. of HR & Social Security of Shandong Province Jan 2024

Academic Excellence Scholarships (First & Second Grade), Harbin Institute of Technology 2021 - 2023
- Awarded 5 times consecutively for maintaining outstanding GPA.
- consistently ranked in the Top 3% (First Grade) and Top 7% (Second Grade) of the cohort.

Second Prize, National Ocean Navigation Device Competition, Chinese Society of Naval Architects and Marine Engineers Aug 2021
- Designed and built an underwater robot capable of autonomous obstacle detection.

Outstanding Student Leader & Social Work Scholarship, Harbin Institute of Technology 2021 - 2022
- Awarded 3 times for exceptional contribution to the University Admission Office and volunteer services.

Teaching & Leadership

Teaching Assistant: Machine Perception Nov 2025 — Present
TU Delft *Delft, NL*
- Assisting in material preparation and practical sessions for graduate-level Machine Perception course.

Volunteer Team Lead Mar 2022 — Aug 2022
Chengdu Weiguang Public Welfare *Panzhihua, CHN*
- Led a team of 9 volunteer teachers to provide education in under-resourced areas.

Skills

- **Programming:** Python, C/C++, C#, Matlab, Simulink.
- **Robotics & AI:** Isaac Lab, ROS2, PyTorch, TensorFlow, MoveIt, OpenCV, Git, Docker.
- **Planning & Logic:** PDDL, Prolog.
- **Languages:** English (C1), Chinese (Native).