Chenhao Yao

Affiliation: Shenzhen Technology University — Phone: +86 18922909819 — Email: 1752691399@qq.com

Education

Shenzhen Technology University (First-Tier Undergraduate Program)
School of Sino-German Intelligent Manufacturing, B.Eng. in Automation Shenzhen, China
Sep. 2021 – Jun. 2025
GPA: 3.84/4.50 Rank: 5/132

Selected Publications & Major Achievements

- **[TII]** *Multiagent Formation Control and Dynamic Obstacle Avoidance Based on Deep Reinforcement Learning*. Second Author. *IEEE Transactions on Industrial Informatics*, 2024.
- **[IROS]** *Application of LLM Guided Reinforcement Learning in Formation Control with Collision Avoidance*. First Author. Accepted at *IROS 2025*.
- **Patent (Under Review):** A Method for Multi-Agent Formation Obstacle Avoidance Base on Reinforcement Learning. Second Author(Teacher First Author).
- **Competitions:** 1st Prize – National College Robotics Innovation Competition (2024); 3rd Prize – China Robot Competition (2024).

Project Experience

Multi-Agent Formation and Dynamic Obstacle Avoidance via Deep Reinforcement Learning *Core Member*
Mar. 2024 – Jan. 2025
Framed the multi-agent formation and obstacle avoidance problem as an MDP. Applied PPO algorithm with actor-critic architecture, Laplacian matrix for consensus, and LSTM. Deployed on Ackermann robots (Jetson AGX Orin + STM32F103) using ROS and visual-inertial SLAM. Achieved 97% success rate in cluttered environments (vs. 70% in prior SOTA).
Outcome: Published in *IEEE Transactions on Industrial Informatics*; national invention patent under substantive examination.

Applying LLMs in Multi-Agent Reinforcement Learning *Project Lead*
Nov. 2024 – Present
Used LLMs' prior semantic knowledge to guide online adaptation of RL reward functions based on high-level evaluation criteria. Achieved 95% task success across diverse scenarios.
Outcome: Accepted at *International Conference on Intelligent Robots and Systems (IROS).*

Intelligent Quadruped Robot for Autonomous Inspection *Project Lead*
Apr. 2023 – Aug. 2024
Worked on DeepRobotics Jueying Lite2. Configured Jetson Orin NX environment with GPU-enabled OpenCV, VINS, RealSense, YOLO models, and TensorRT optimization. Replaced default PD controller with MPC (from CMU project) and integrated ETH's RL controller for autonomous inspection.
Outcome: Third Prize, 2024 China Robot Competition & RoboCup China; First Prize, 2024 National College Robotics Innovation Competition.

Adaptive MPC Control for Quadrotor UAVs *Project Lead*
Aug. 2024 – Present
Built custom quadrotor (Jetson Orin NX + CUAV V5, PX4). Integrated with QGC via MAVROS. Applied MPC and L1 adaptive control to maintain trajectory tracking under 50% payload and strong wind. Error $< 5\%$.
Outcome: Simulation and hardware setup completed; fine-tuning ongoing.

Controller Design for Quadruped Robots using MPC and RL *Project Lead*
Dec. 2024 – Present
Defined reward function based on gait/velocity accuracy. Trained policy via PPO and actor-critic for 12-joint commands. Used MPC for foot force and joint velocity, and computed torque via inverse dynamics.
Outcome: In progress.

Honors and Awards

- First Prize, 2024 National College Robotics Innovation Competition
- Third Prize, 2024 China Robot Competition & RoboCup China
- Third Prize, 2023 "Bank of Construction Cup" National Energy Conservation Competition
- Second Prize, 2023 "HuaShu Cup" National Mathematical Modeling Contest
- Third Prize, 2023 Guangdong Mathematical Modeling Contest
- Third Prize, 2023 RAICOM Shadow Pursuit Competition (Guangdong)
- Second Prize, 13th National Market Research and Analysis Competition

Technical Skills

Programming: C/C++, Python, MATLAB/Simulink
Platforms: Jetson, STM32, Raspberry Pi, PX4
Frameworks: ROS, PyTorch, TensorFlow
Control: MPC, RL-based control systems
Deployment: Embedded systems, visual perception modules, real-time optimization

Languages

English: IELTS 6.5, fluent in academic writing and oral communication; 2 overseas study programs
German: B1 level (CGT6)
Chinese (Cantonese): Fluent