Portfolio

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Self-Introduction

Yao Chenhao（姚晨昊）
Shenzhen Technology University
Automation

About Me:

personal homepage:
https://chenhaoyao.github.io/

skills:

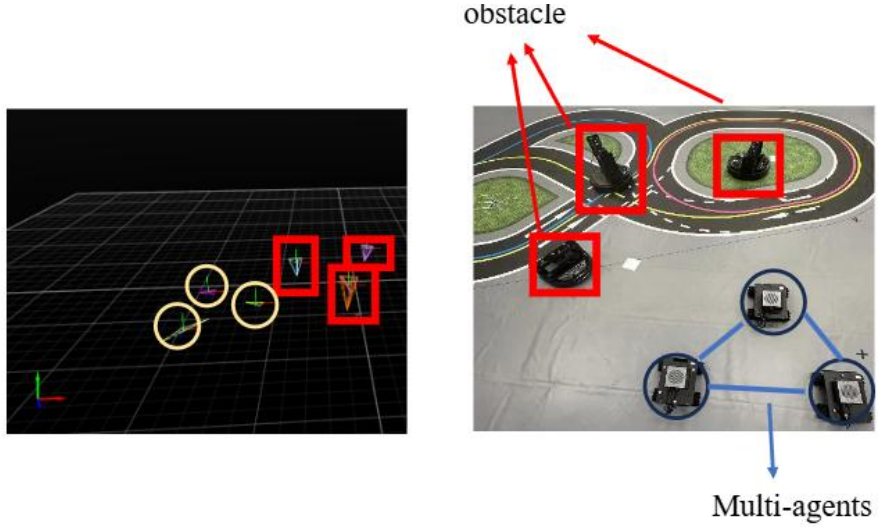
Programming Skills: Proficient in C/C++, Python, and MATLAB/Simulink.
Development Experience: Jetson, STM32, Raspberry Pi, PX4 flight controller;ROS,PyTorch and TensorFlow.
Teamwork Abilities: Extensive experience in team formation and expansion, as well as in project management and coordination.
Language Proficiency: English:IELTS 6.5; German:CGT6; Cantonese.

Key Achievements:

Published in IEEE TII (Q1): Achieved 97% success in multi-agent dynamic obstacle avoidance (PPO/LSTM), surpassing prior SOTA (70%), patent pending.
IROS Paper Accepted: Pioneered LLMs dynamically updating RL rewards, achieving 95% task success in multi-agent scenarios.
Won National Robotics 1st Prize: Developed control/navigation/vision for autonomous quadruped inspection in complex environment.

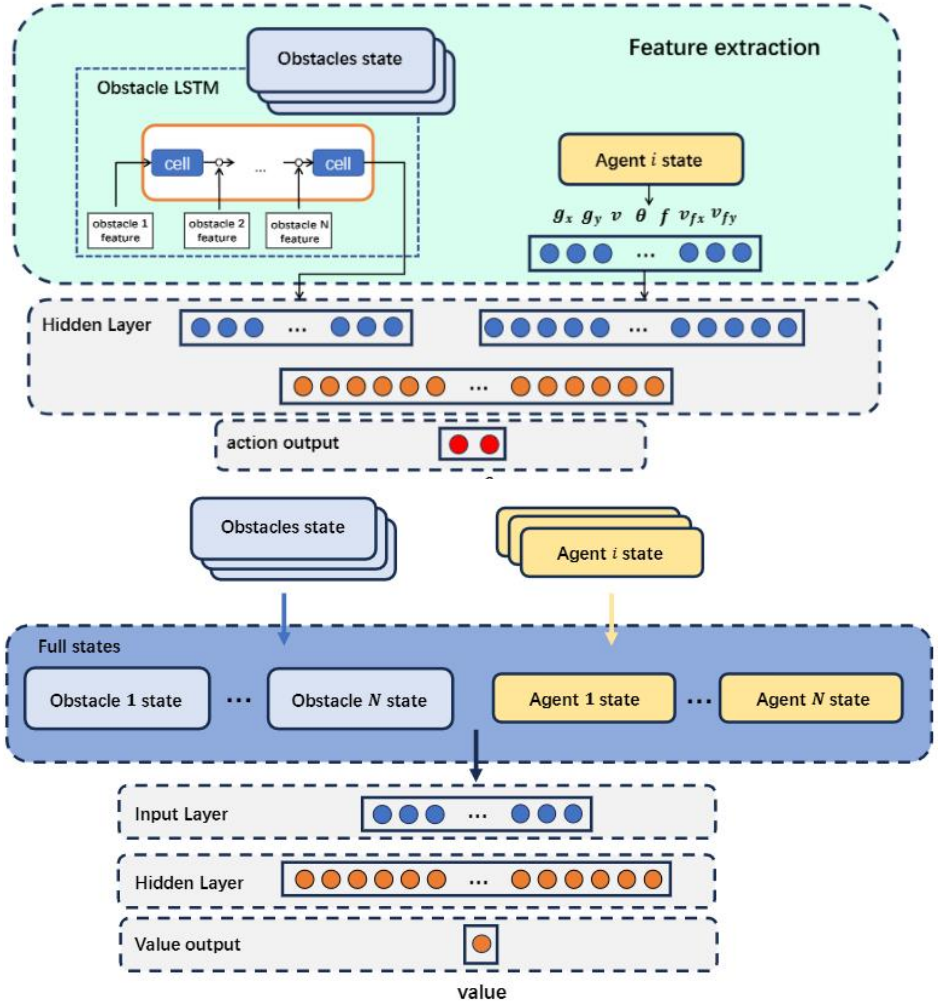
Project Experience

2024.03-2025.01, as core member



Formulated multi-agent formation and obstacle avoidance in dynamic environments as an MDP, and trained using PPO with an actor-critic framework, Laplacian-based consensus, and LSTM networks. Deployed the policy on Ackermann vehicles (Jetson AGX Orin + STM32F103) via ROS and visual-inertial motion capture. Achieved a 97% success rate in dense obstacle scenarios, significantly exceeding the previous SOTA (70%).

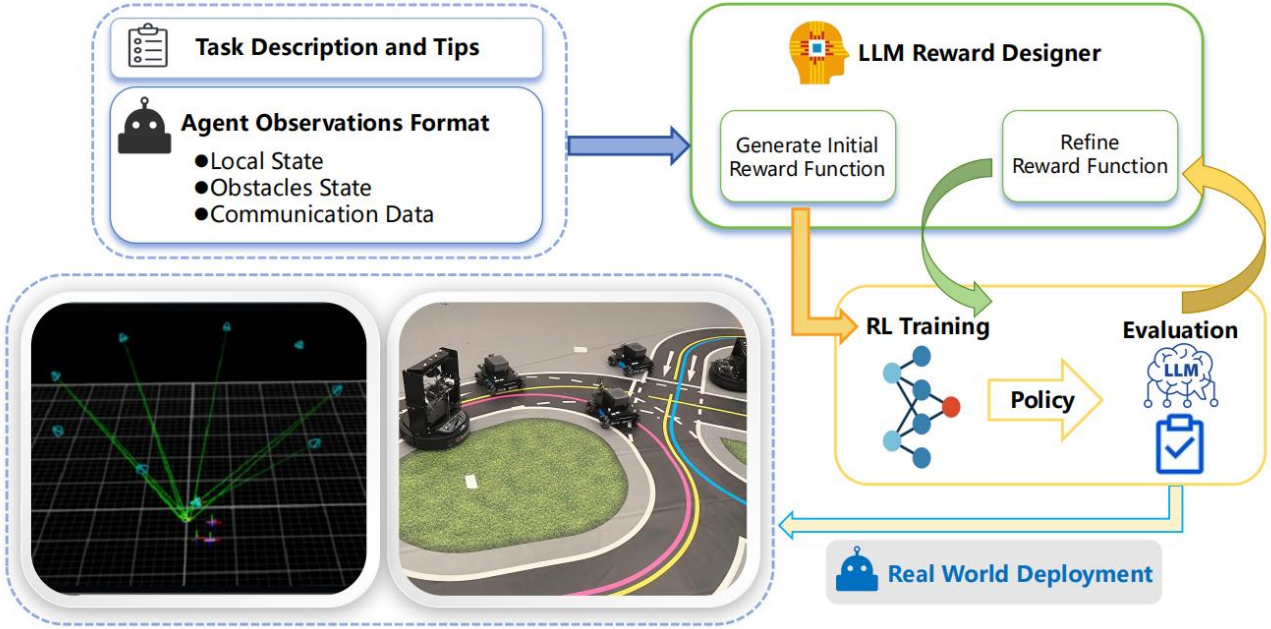
Multi-Agent Formation and Dynamic Obstacle Avoidance Based on Deep Reinforcement Learning



Project Outcome: The paper has been published in a Q1 journal, **IEEE Transactions on Industrial Informatics (TII);** a **national invention patent** has entered the substantive examination stage.

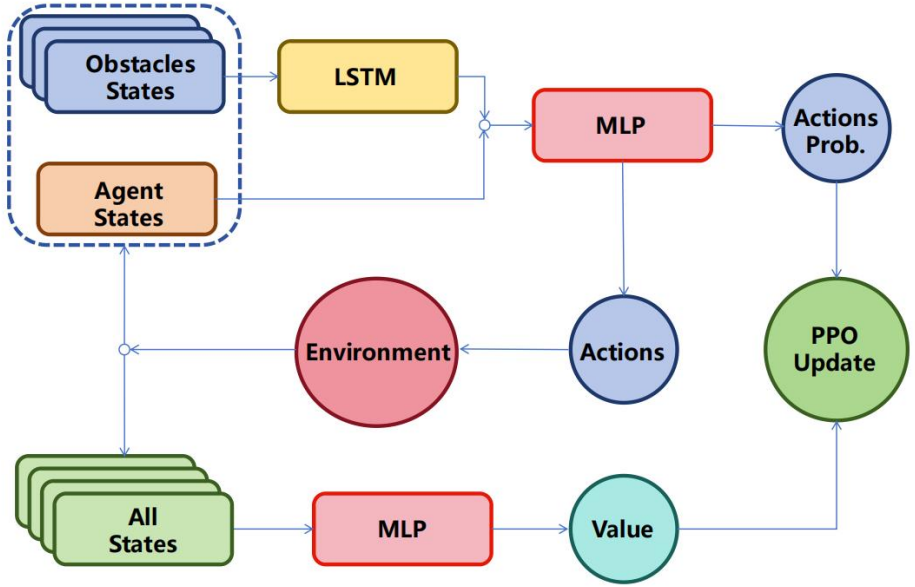
Project Experience

2024.11-2025.03, as project leader



Leveraging the prior semantic knowledge of Large Language Models (LLMs), this work builds upon previous high-level evaluation criteria for reward function design, enabling the LLM to iteratively update the reinforcement learning reward function online. As a result, the reward function converges more rapidly and achieves a 95% task success rate across a wider range of scenarios.

Application of Large Language Models in Multi-Agent Reinforcement Learning



More project details can be found on the project homepage.

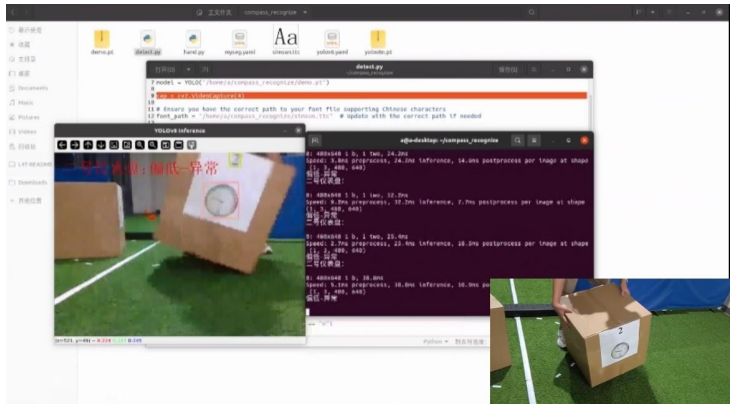
https://macsclab.github.io/LLM_FCCA

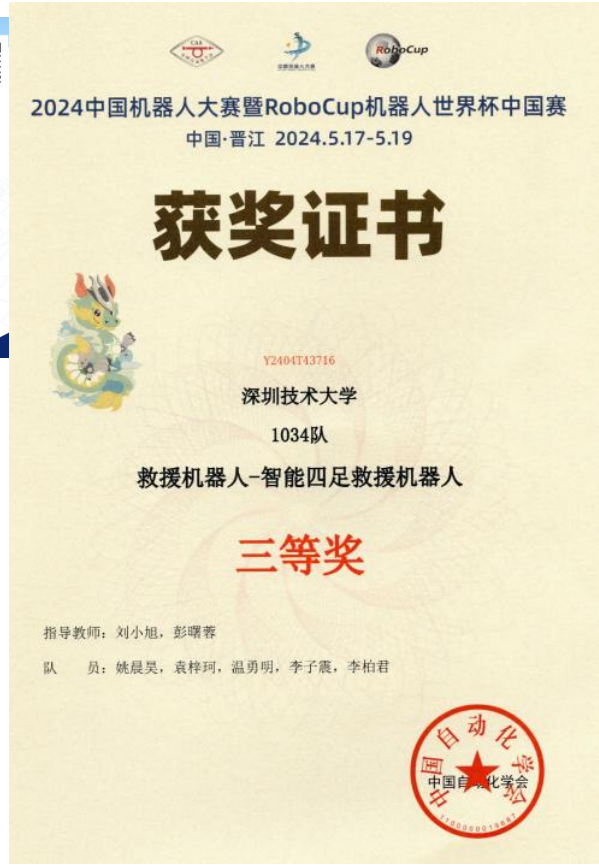
Project Outcome: The paper has been accepted by **International Conference on Intelligent Robots and Systems (IROS)**.

Project Experience

2023.04-2024.08, as project leader

Intelligent Inspection System Development for Quadruped Robots





Developed on the DeepRobotics Jueying Lite2 quadruped robot using an NVIDIA Jetson Orin NX for system flashing, environment setup (GPU-accelerated OpenCV, VINS, RealSense firmware, YOLO models), and runtime optimization via TensorRT. Replaced the default PD controller on the Intel NUC-based low-level board with a Model Predictive Controller (MPC) based on CMU's open-source project, achieving improved locomotion. Deployed ETH's reinforcement learning algorithms to enable autonomous inspection tasks.

Project Outcome: Received two **national-level awards**, one provincial-level award, one **national invention patent** pending.