



Morteza Aliyari

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Summary

Third-year PhD candidate in Electrical Engineering (Control & Robotics) at National Taiwan University Electrical Engineering department(NTUEE), advised by Prof Li-Chen Fu, developing a safe multi-agent RL framework for quadrotor swarms that integrates formation controllers and safety filters to guarantee shape convergence and collision avoidance.

In addition, to my research I had hands-on experience in **UAV/UGV control, multi-robot systems, and navigation algorithms for self-driving vehicles**. Strong background in C/C++, Python, MATLAB, and ROS1,2 with real deployment on **AGVs, UAVs, and embedded systems(stm32f4)**. Published work in MADDPG , path planning and quadrotor control, and experienced with sensors such as LIDAR, IMU, GPS, and PGV100. Excellent written and oral communication in English; actively learning Chinese.

Technical Skills

Programming	C/C++ , Python, MATLAB,
Robotics & Tools	ROS, Gazebo, RViz, Navigation Stack, OpenCV
Control & Algorithms	MPC, PID, state estimation, navigation (INS/GPS/LPS), filters, obstacle avoidance
AI / ML	Published a paper about safe reinforcement learning for multi agents
Hardware & Sensors	LIDAR, IMU, GPS, PGV100, RLG/FOG/MEMS inertial sensors, STM32 (UART, ADC, DMA, Ethernet)
Languages	English (fluent), Chinese (learning)

Education

Ph.D. in Electrical Engineering (Control & Robotics)

National Taiwan University (NTUEE), End of journey 2027

2023 – Present

Taipei, Taiwan

- Research areas: Multi agent, Deep Deterministic Policy Gradients (Reinforcement learning),formation control, model predictive control, safe multi-robot systems.

M.Sc. in Electrical Engineering, Control Systems

- Thesis: *Design and Implementation of a Quadrotor Flight Control System for a Specific Maneuver Using Model Predictive Control.*

B.Sc. in Electrical Engineering, Control Systems

- Thesis: *Implementation of a Novel Robot Path Planning Algorithm for a Probe Robot.*

Experience

PhD Candidate

NTU,EE

Research and realworld experiment on multi agents reinforcement learning

2023 – Present

Taipei, Taiwan

Localization Engineer

KingwayTek Corporation

2022 – 2024

Taipei, Taiwan

Robotics Research Assistant

National Yunlin University of Science and Technology

Feb. 2021 – Present

Yunlin, Taiwan

- Developed **obstacle-avoidance algorithms** for **multi-agent mobile robots**, focusing on safe navigation in cluttered environments.
- Built and trained an **AI chatbot** with voice recognition and **NLP** (BERT, DIET classifier), integrated with a mobile robot via **ROS/ROS-Bridge** to enable natural-language human–robot interaction.
- Designed and implemented a **navigation algorithm** for a TECO mobile robot using **PGV100** and **LIDAR** with ROS1/C++, including mapping and localization.
- Employed **ROS, C++, Python, Gazebo, RViz, Navigation Stack, MATLAB/Simulink** for simulation and real-robot deployment.
- Developed control algorithms for **quadrotor drones** (PID, MPC) with Python/OpenCV for vision-based tasks.

Robotics & Embedded Systems Engineer

Dec. 2016 – Apr. 2020

Abroad

- Designed and implemented **swarm quadrotor** systems with local navigation and coordination.
- Implemented **INS-based navigation** (with/without GPS/LPS) on **real-time Linux** platforms.
- Modeled, calibrated, and analyzed **RLG/FOG/MEMS gyroscopes** and acceleration sensors for high-precision applications.
- Developed **STM32** firmware (STM32F746) including **interrupts, UART, ADC, DMA, Ethernet** for embedded control and data acquisition.

Selected Publications

- M. Aliyari, Ming-Li Chiang, Li-Chen Fu “Safe TSY Null-Space Deep Reinforcement Learning for Bearing-Rigid Quadrotor Formations,” *IFAC, Preprinted*, 2026.
- M. Aliyari and S. Najafinia, “Real-Time Control of Quadrotor UAVs Based on Online Optimization and Time-Varying Constrained Model Predictive Control,” *IEEE Access*, 2022.
- F. Bayat, S. Najafinia, and M. Aliyari, “Mobile Robots Path Planning: Electrostatic Potential Field Approach,” *Expert Systems with Applications*, vol. 100, pp. 68–78, 2018.
- A. Khooshehmehri and M. Aliyari, “Chaos Synchronization in Josephson Junction Using Nonlinear Robust Adaptive Controller: HIL Implementation,” *International Journal of Dynamics and Control*, 2021.
- A. Khooshehmehri, S. Nasrollahi, and M. Aliyari, “Chaos Synchronization in Josephson Junction Using Nonlinear Robust Adaptive Controller: HIL Implementation,” *International Journal of Industrial Electronics, Control and Optimization*, 2021.

Selected Projects

- **Leader of UAV Group in NTU EE**

Giving a road map. Guiding NTU students. **System design** with ROS, C++ combining with MAD-DGP.

- **Quadrotor MPC Flight Controller**

Designed and implemented an MPC-based controller for a quadrotor performing specific maneuvers; validated performance in real-time experiments as part of M.Sc. thesis.

- **UGV Path Planning with Electrostatic Potential Fields**

Co-developed a path planning method for mobile robots using electrostatic potential fields, evaluated in simulation and published in *Expert Systems with Applications*.

- **Voice-Enabled Mobile Robot Assistant**

Integrated speech recognition, BERT-based NLP, and ROS1/ROS-Bridge to allow users to control a mobile robot through natural language commands.

Teaching & Volunteer Experience

- **Co-founder & Member**, Robotics Association, University of Zanjan
Organized workshops and competitions to promote robotics among undergraduate students.

Honors & Awards

- Third place, FIRA Cup Warehouse League (mobile robots competition).
- Full admission scholarship, National Taiwan University.
- IELTS Academic (score: 7).
- Certificates in C++, Reinforcement Learning and Python.

Online Profiles

Find more about my papers, projects, videos, and source code on my: Google Scholar, GitHub, YouTube, and LinkedIn.