Milad Farjad

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Summary

MARL & Robotics Specialist with 5+ years of experience in *Deep Reinforcement Learning* applied to *Heterogeneous Multi-Robot Systems*. Expertise covers the full stack: from designing transformer-based policy networks and hyperparameter fine-tuning to deploying real-time control and motion planning solutions using *Python*, *PyTorch*, *C++*, *ROS*, and *MATLAB*. Published researcher in optimal control and multi-robot coordination.

Experience

Robotics and AI PhD Researcher May 2021 - Present

McMaster University, Hamilton, ON

• Developed a transformer-based multi-agent deep reinforcement learning framework for distributed cooperative mission planning of a heterogeneous team of mobile robots, enabling asynchronous and scalable cooperation among robotic teams.

• Worked on enabling mapless exploration and navigation for cooperative multi-robot systems by grounding pretrained large language models using multi-agent deep reinforcement learning.

• Developed a framework for mapless target-driven navigation of heterogeneous multi-robot systems by integrating continuous-time memory into a transformer-based policy network.

Skills: Python, PyTorch, CUDA, ROS, Linux, Git, Docker, NVIDIA Isaac Sim, Neural Networks, Transformer Models, Deep Reinforcement Learning, Multi-Agent Reinforcement Learning, Large Language Models, Computer Vision, Motion Planning, Robotic Perception, System Design

Teaching Assistant and Mentorship Sep 2021 - Present

McMaster University, Hamilton, ON

Autonomous Electrified Vehicle System Engineering:

• Co-developed the course curriculum, integrating interdisciplinary knowledge from electric machines, drive systems, control systems, programming, signal processing, and optimization towards developing a self-driving vehicle.

• Led lab sessions focusing on the development of sensing, planning, control and SLAM modules for a vehicle platform powered by NVIDIA Jetson Nano, providing practical instructions in Linux OS, ROS, C++, Python, and hardware integration (LIDAR, RGB-D Camera, IMU, wheel encoders, electric motors).

Control Systems Design:

• Instructed and facilitated lab sessions for system identification and controller implementation using the Quanser QUBE™-Servo 2 platform, emphasizing control theory applications with MATLAB and Simulink.

• Addressed students' queries and supported them through both the theoretical concepts and practical challenges encountered in the course projects.

Undergraduate Research Programs:

• Collaborated with four undergraduate students on diverse research projects, providing mentorship, facilitation and technical guidance.

- Integration of LIDAR and RGB-D cameras for effective obstacle detection in dynamic environments.
- Combining multi-robot navigation and collaborative-SLAM with MARL in 3D simulation environments.

Skills: ROS, ROS 2, Python, C++, Gazebo, MATLAB & Simulink, Isaac Sim, SLAM, C-SLAM, Sensor Integration, Control Theory, Electrical Motors, Autonomous Vehicles

Distributed Control Researcher Sep 2018 – Apr 2020

Sharif University of Technology, Tehran, Iran

• Developed a non-iterative method for designing model-free LQR controllers for distributed systems based on convex optimization, improving the convergence time by an order of magnitude over AI-driven iterative methods.

Skills: MATLAB, LaTeX, Convex Optimization, Optimal Control, Reinforcement Learning

Education

PhD in Electrical and Computer Engineering, GPA: 3.97/4.0 May 2021 - Present
McMaster University, Hamilton, ON

- *Awarded* Department Chair's Commendation for Excellent 3-Minute-Thesis Presentation, Jan 2024
- *Relevant Courses*: Machine Learning, Nonlinear Control

Master of Science in Electrical Engineering, Control Major, GPA: 4.0/4.0 Aug 2018 – Apr 2020
Sharif University of Technology, Tehran, Iran

- *Relevant Courses*: Adaptive Control, Introduction to Machine Learning, Multivariable Control Systems, Robust Control

Bachelor of Science in Electrical Engineering, GPA: 3.47/4.0 Aug 2013 – Dec 2017
Sharif University of Technology, Tehran, Iran

- *Finalist* in Sharif's Electrical Engineering Department's Distinguished BSc Thesis Awards, Jan 2018
- *Relevant Courses*: Linear Algebra, Introduction to Robot Control, Nonlinear Systems

Publications

- Farjadnasab, M., & Babazadeh, M. (2022). Model-free LQR design by Q-function learning. Automatica, 137, 110060.
- Farjadnasab, M., & Sirouspour, S. (2025). Cooperative and Asynchronous Transformer-based Mission Planning for Heterogeneous Teams of Mobile Robots. Robotics and Autonomous Systems, 194, 105131.

Languages

- **English**, Full Professional Proficiency
- **Persian**, Native Proficiency
- **French**, Elementary Proficiency

Interests and Extracurricular Activities

- **Translation** - Published translations of books and other media from English to Persian for 10 years.
- **Teaching** - Taught English as a second language to school children.
- **Music** - Plays bass guitar in a rock band.