

# Milad Farjad

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## SUMMARY

- PhD candidate in Electrical and Computer Engineering specializing in Multi-Agent Reinforcement Learning (MARL) for control of Heterogeneous Multi-Robot Systems, passionate about advancing Embodied AI, Autonomous Transportation, and Human-Robot Interaction.
- Five years of experience in developing architectures and algorithms for optimal control, perception, motion planning, and coordination of multi-robot systems.
- Highly skilled in Python and MATLAB, with experience in designing, implementing, and fine-tuning MARL models for robotics and real-time control systems.
- Published two high-impact papers, advancing the fields of optimal control, reinforcement learning, and multi-robot coordination.

## EXPERIENCE

<b>Robotics and AI PhD Researcher</b> <i>McMaster University, Hamilton, ON</i>	May 2021 - Present
• 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.	
<b>Skills:</b> 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	
<b>Teaching Assistant and Mentorship</b> <i>McMaster University, Hamilton, ON</i>	Sep 2021 - Present
<b>Autonomous Electrified Vehicle System Engineering:</b>	
• 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).	
<b>Control Systems Design:</b>	
• 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.	
<b>Undergraduate Research Programs:</b>	
• 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.	
<b>Skills:</b> ROS, ROS 2, Python, C++, Gazebo, MATLAB & Simulink, Isaac Sim, SLAM, C-SLAM, Sensor Integration, Control Theory, Electrical Motors, Autonomous Vehicles	
<b>Distributed Control Researcher</b> <i>Sharif University of Technology, Tehran, Iran</i>	Sep 2018 – Apr 2020
• 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.	
<b>Skills:</b> MATLAB, LaTeX, Convex Optimization, Optimal Control, Reinforcement Learning	

## EDUCATION

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<b>PhD in Electrical and Computer Engineering, GPA: 3.97/4.0</b> <i>McMaster University, Hamilton, ON</i>	May 2021 - Present
• Awarded Department Chair's Commendation for Excellent 3-Minute-Thesis Presentation, Jan 2024	
• Relevant Courses: Machine Learning, Nonlinear Control	
<b>Master of Science in Electrical Engineering, Control Major, GPA: 4.0/4.0</b> <i>Sharif University of Technology, Tehran, Iran</i>	Aug 2018 – Apr 2020
• Relevant Courses: Adaptive Control, Introduction to Machine Learning, Multivariable Control Systems, Robust Control	
<b>Bachelor of Science in Electrical Engineering, GPA: 3.47/4.0</b> <i>Sharif University of Technology, Tehran, Iran</i>	Aug 2013 – Dec 2017
• 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

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

## LANGUAGES

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

## INTERESTS AND EXTRACURRICULAR ACTIVITIES

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- **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.