

# Milad Farjad

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## SUMMARY

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- PhD candidate in Electrical and Computer Engineering specializing in multi-agent reinforcement learning, robotics, and embodied AI.
- Four years of experience in developing and optimizing algorithms for motion planning, task planning, perception, and control in autonomous vehicles.
- Highly skilled in Python and PyTorch, with hands-on experience in reinforcement learning, robotics, and real-time control systems.
- Published researcher in control theory and robotics, passionate about advancing embodied AI, autonomous driving, and robotic systems.

## EXPERIENCE

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### 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

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**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

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- 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 (*Submitted to Elsevier Robotics and Autonomous Systems Journal*)

## 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.