Milad Farjad

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Summary

PhD candidate in Electrical and Computer Engineering specializing in AI-driven autonomous systems, multi-agent reinforcement learning (MARL), and robotics. Experienced in developing and optimizing algorithms for motion planning, task planning, perception, and control in autonomous vehicles. Proficient in Python and C++, 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 motion planning.

Experience

PhD Researcher May 2021 –
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.

• Proposed novel formulations and strategies for asynchronous learning and macro-action modeling in heterogeneous multi-agent systems, contributing to the advancement of state-of-the-art methodologies.

Publication: Cooperative and Asynchronous Transformer-based Mission Planning for Heterogeneous Teams of Mobile Robots *(Submitted to IEEE Robotics and Automation Letters)*

Skills: Python, PyTorch, CUDA, ROS, Linux, Git, Docker, NVIDIA Isaac, Neural Networks, Transformer Models, Deep RL, Multi-Agent RL, Computer Vision, Motion Planning, Robotic Perception, System Design, Critical Thinking, Outside-the-box Thinking, Adaptability, Problem-Solving, Time-Management

Teaching Assistant and Mentorship Sep 2021 –
McMaster University *Hamilton, ON*

Autonomous Electrified Vehicle System Engineering Course:

• 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 Course:

• 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 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, SLAM, Sensor Integration, Leadership, Communication, Facilitation, Problem-Solving, Teamwork

Research Assistant 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.

Publication: Farjadnasab, M., & Babazadeh, M. (2022). Model-free LQR design by Q-function learning. Automatica, 137, 110060.

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

Education

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

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

Sharif University of Technology Aug 2018 – Apr 2020
M.S. in Electrical Engineering, Control Major, GPA: 4.0/4.0 *Tehran, Iran*

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

Sharif University of Technology Aug 2013 – Dec 2017
B.S. in Electrical Engineering, GPA: 3.47/4.0 *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

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 since high school.
- **Teaching** - Taught English as a second Language to school children.
- **Music** - Plays bass guitar in a rock band, actively performing in the Greater Toronto Area

Skills: Time-management, Communication, Creativity, Teamwork