

Abolfazl Eskandarpour

📍 Vancouver, Canada

✉ Abolfazl.Eskandarpour@gmail.com

📞 (778) 325-0776

🔗 [Google Scholar](#)

🌐 [in/Abolfazl-Eskandarpour](https://www.linkedin.com/in/Abolfazl-Eskandarpour)

SUMMARY

Experienced AI Researcher specializing in deep learning and robotics, with a strong focus on analyzing and enhancing algorithmic performance on large-scale datasets. Proficient in dynamic modeling, control, and optimization using data-driven approaches to meet complex ML challenges. Skilled in designing experimental processes to iteratively improve machine learning tasks and in implementing scalable prototypes for AI applications. Eager to advance in AI research, especially in reinforcement learning (RL) and large language models (LLMs), with a commitment to understanding industry trends and sharing insights with team members.

EDUCATION

Simon Fraser University

Ph.D. • Electrical & Computer Engineering • GPA: 4.17/4.33

Thesis Title: "Deep Learning-based Hybrid Dynamic Modeling and Tube-Based MPC Control of Aerial Manipulators"

Burnaby, BC

Expected Graduation Date: Feb. 2025

Tarbiat Modares University

M.Sc. • Electrical & Computer Engineering • GPA: 3.5/4.0.

Thesis Title: "A Cooperative Model Predictive Controller Design for a Group of Quadrotors using Particle Swarm Optimization"

Tehran, Iran

Graduation Date: Feb. 2015

Shiraz University of Technology

B.Sc. • Electrical & Computer Engineering • GPA: 3.5/4.0

Thesis Title: "Review and Simulation of Recent Reliability and Lifetime Improvement Approaches in Wireless Sensor Networks"

Shiraz, Iran

Graduation Date: Aug. 2012

PROFESSIONAL EXPERIENCE

Simon Fraser University (SFU)

Researcher Assistant

Burnaby, BC

2019 - Present

- Developed an unmanned aerial manipulator (UAM) system integrating AI-driven perception and interaction capabilities,
- Successfully deployed the autonomous UAM platform in both real-world applications and simulation environments using ROS1/ROS2, Gazebo, and PX4,
- Created a hybrid dynamic model for the UAM using deep learning architectures (FNN+TCN) for precise system identification, achieving a 30% improvement in model accuracy from 3 hours of input-output flight data.
- Designed advanced AI-based control algorithms, including a deep learning-enhanced tube-based MPC, to improve system stability and adaptiveness, resulting in a 20% improvement in uncertainty management.
- Implemented a deep learning-driven controller for high-precision trajectory tracking (50Hz) with a 45% enhancement in tracking accuracy and a 99% success rate in payload handling, with minimal errors on heavy loads.
- Leveraged offline reinforcement learning (RL) on a large dataset from the UAM platform to enhance state-space dynamic models and update policies in safe batch mode, enabling improved policy robustness prior to deployment.
- Ongoing Project: Develop a framework for seamless interaction between UAMs and human operators, incorporating LLMs to enable natural language commands (e.g., "Retrieve the package" or "Inspect the structure"). This approach enhances UAM usability and autonomy in tasks like payload grasping and retrieval.
- Videos of my results: 1-[Payload Grasping and Retrieval \(Real-Time Experiment\)](#), 2-[Learning-based Dynamic Modeling, Identification, and Robust Control \(Simulation and Real-Time Experiment\)](#), 3-[Payload Grasping and Retrieval \(Simulation\)](#)

Simon Fraser University

Teaching Assistant

Burnaby, BC

2019 - Present

- Served as a Teaching Assistant over 20 times in the Engineering Science (ENSC) and Sustainable Energy Engineering (SEE) departments at SFU.
- Managed tutorial and lab sessions, providing support and answering students' questions for an average of approximately 150 students each semester.
- Designed assignments, lab exercises, quizzes, and midterm/final exam questions, and responsible for grading them.

Huawei Technologies services

TX Engineer

Tehran, Iran

2016 - 2018

- Executed the deployment and integration of fiber optic networks, involving the configuration of network infrastructure components, for 5 major Iran provinces
- Oversaw on-site installation activities and subcontractor operations, ensuring compliance with engineering specifications and industry standards.
- Coordinated with engineering teams to diagnose and address technical issues, optimizing network performance and reliability.
- Generated comprehensive technical documentation and progress reports detailing installation procedures, configurations, and system performance.

Tarbiat Modares University

Researcher Assistant

Tehran, Iran

2012 - 2016

- Designed and implemented cooperative constrained MPC controller for quadrotors, including algorithms for formation control, trajectory tracking, planning, and obstacle avoidance.
- Applied Particle Swarm Optimization (PSO) and other advanced optimization techniques to enhance control strategies and performance in quadrotor systems.
- Conducted experimental implementation of Constrained MPC for the quadruple tank process, achieving improved trajectory tracking performance compared to traditional PID controllers.
- Developed and tested control algorithms in practical scenarios, demonstrating the effectiveness and reliability of the Constrained MPC approach.

ENGINEERING SKILLS

Technical Skills: C++, Python, Matlab and Simulink, Pandas, PyTorch, Numpy, OpenCV, TensorFlow, Anaconda, Git/Github, Embedded systems

Robotic Software: ROS1/ROS2, Gazebo, Isaac SIM, Unity, PX4 Autopilot, Qgroundcontrol, Ardupilot

Control and Robotic Skills: Controllers (Robust and Adaptive PIDs, LMPC, NMPC, LQR, H-infinity, Backstepping, Sliding mode), Path Planning, SLAM, Kinematics and Dynamics

AI Knowledge: Model free/based RL algorithms, offline RL, Generative AI and LLM, NN algorithms: TCN, CNN, FNN, RNN, LSTM

LLM Knowledge: Transformers, LLM inference optimization, GPT models, LLaMA, Parameter-Efficient Fine-Tuning (PEFT), LoRA, Prompt Tuning/Engineering

Optimization Knowledge: YALMIP, Baron, Gurobi, and MOSEK , Bayesian Optimization, Gradient-Based Optimization, etc.

Others: Persistent problem-solver with strong problem-solving skills, Self-motivated, Innovative Thinker, Good teamwork spirit and adaptability, Fast-learner

PUBLICATIONS

Journals:

- A. Eskandarpour and I. Sharf, "A constrained error-based MPC for path following of quadrotor with stability analysis," Nonlinear Dyn, vol. 99, no. 2, pp. 899–918, Jan. 2020, doi: 10.1007/s11071-019-04859-0.
- A. Eskandarpour, M. Soltanshah, M. Mehrandezh, K. Gupta "Decoupled Dynamic Modeling by Decomposing the Cross-Coupled Dynamics and Tube-Based LPV-MPC Control Scheme for Aerial Manipulation", IEEE Transactions on Aerospace and Electronic Systems, March 2024, Revised
- A. Eskandarpour, M. Mehrandezh, K. Gupta, A. Ramirez-Serrano, M. Soltanshah "A constrained robust switching MPC structure for tilt-rotor UAV trajectory tracking problem" Nonlinear Dyn 111, 17247–17275 (2023). <https://doi.org/10.1007/s11071-023-08787-y>
- A. Eskandarpour, S. M. M. Dehghan, and J. Karimi, "Designing a predictive guidance and control system for maneuverable ground moving target tracking in 3D space using a Hexarotor," Journal of Control, pp. 0–0, //10.
- A. Eskandarpour, M. Soltanshah, M. Mehrandezh, K. Gupta "Data-driven visual servoing and control of aerial manipulators utilizing reinforcement learning (RL) and deep neural networks (DNN) for efficient load grasping, retrieval, and trajectory tracking ", IEEE IEEE Robotics & Automation Magazine, In progress

Conferences:

- A. Eskandarpour and V. J. Majd, "Cooperative formation control of quadrotors with obstacle avoidance and self collisions based on a hierarchical MPC approach," in 2014 Second RSI/ISM International Conference on Robotics and Mechatronics (ICRoM), Oct. 2014, pp. 351–356, doi: 10.1109/ICRoM.2014.6990926.
- A. Eskandarpour, M. Soltanshah, K. Gupta, M. Mehrandezh "Hybrid Dynamic Modelling using FeedForward and Temporal Convolutional Networks (FNN+TCN) and Robust Control Scheme for Aerial Manipulators", 2024 IEEE 20th International Conference on Automation Science and Engineering
- M. Soltanshah, A. Eskandarpour, M. Mehrandezh, K. Gupta "Robust Partitioned Visual Servoing for Aerial Manipulation Utilizing Controllable-space Image Planning and Adaptive Image Representation", 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- M. Soltanshah, A. Eskandarpour, M. Mehrandezh, K. Gupta " Toward Autonomous Aerial Object Retrieval Utilizing RL-based Eye-to-hand/Eye-in-hand Feature Matching and Controllable-space Image Planning for Partitioned Visual Servoing", 2025 IEEE International Conference on Robotics and Automation (ICRA)-Submitted

AI CERTIFICATIONS

Reinforcement Learning Specialization

Coursera • 2023 • Credential ID: [KSWYXM9YTDY4](#)

Fundamentals of Reinforcement Learning

Coursera • 2023 • Credential ID: [9S76Z5XFH8SJ](#)

A Complete Reinforcement Learning System

Coursera • 2023 • Credential ID: [HYQXJWMF544Q](#)

Neural Networks and Deep Learning

Coursera • 2024 • Credential ID: [QEVUPZR7S7NE](#)

Structuring Machine Learning Projects

Coursera • 2024 • Credential ID: [WRZ70DFN0YDS](#)

Sequence Models

Coursera • 2024 • Credential ID: [ODCDK9V4QZXZ](#)

Sample-based Learning Methods

Coursera • 2023 • Credential ID: [YEC4QD353E49](#)

Prediction and Control with Function Approximation

Coursera • 2023 • Credential ID: [PBMERWUUIXOY](#)

Generative AI with Large Language Models

Coursera • 2024 • Credential ID: [CIK38HLH5X6Q](#)

Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization

Coursera • 2024 • Credential ID: [GRBKWL3OJSOI](#)

Convolutional Neural Networks

Coursera • 2024 • Credential ID: [SRP53ZIG2T9M](#)

Deep Learning Specialization

Coursera • 2024 • Credential ID: [2UU162WT7Y0U](#)

HONORS AND AWARDS

- Winner of the Graduate Fellowship Award six times, awarded by Simon Fraser University for Fall 2020–2024 and Summer 2022
 - Winner of the Faculty of Applied Sciences Graduate Fellowship two times, awarded by ENSC at Simon Fraser University for Spring 2021 and Summer 2024
 - Recipient of MITACS Research Training Award, Awarded by MITACS for Fall 2020
 - Recipient of Helmut and Hugo Eppich Family Endowment Fund four times, awarded by the Senate Graduate Awards Adjudication Committee for Spring 2021-2024
 - Winner of Lang Wong Memorial Endowment Scholarship two times, awarded by Graduate Department at SFU for Spring 2022 and 2024
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RELEVANT COURSEWORK

Machine Learning

SFU University, Computer Science Department • 2020 • Grade: A

Robotic Autonomy

SFU University, Computer Science Department • 2021 • Grade: A

Introduction to Robotics

SFU University, Engineering Science Department • 2020 • Grade: A

Model Predictive Control

Tarbiat Modares University , Electrical & Computer Engineering Department • 2014 • Grade: A