

## Parvin Malekzadeh

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## EDUCATION

**Ph.D. in Electrical and Computer Engineering**, University of Toronto, Canada (Sep. 2020- Aug. 2024)

GPA: 3.8/4

Thesis: *Advancing Efficiency and Safety in Autonomous Sequential Decision-Making Agents*

Advisor: [Prof. Konstantinos N. Plataniotis](#)

**M.Sc. in Electrical and Computer Engineering**, Concordia University, Canada (2018- 2020)

GPA: 4.1/4.3

Thesis: *Bayesian Estimation for Localization and Decision Support of Autonomous Agents*

Advisor: [Prof. Arash Mohammadi](#)

**B.Sc. in Electrical and Computer Engineering**, Sharif University of Technology, Iran (2013- 2017)

- GPA: 16.04/20
- Thesis: *Person Identification Using EEG Signals*
- Advisor: [Prof. Mohammad B. Shamsollahi](#)
- Ranked 1st (50,000 participants) in the National University Entrance Exam (“Konkour”)

## SELECTED COURSES

**Current Algorithms in Reinforcement Learning**, University of Toronto, A+

**Neural Networks and Deep Learning**, University of Toronto, A+

**Introduction to Machine Learning**, University of Toronto, A+

**Medical Image Processing**, Concordia University, A

**Probability and Stochastic Process**, Concordia University, A+

**Data Mining**, Concordia University, A

## TECHNICAL SKILLS

**Machine Learning:** Reinforcement Learning, Neural Networks, Generative Models, Active Inference, Bayesian Learning

**Programming Languages:** Python (Tensorflow, Pytorch, Keras, Gym, CUDA, Scikit-learn, PySpark), Matlab, SQL

**Tools & Technologies:** Git, Linux, AWS (SageMaker)

## HONORS and AWARDS

**Nominated for the Best Ph.D. Dissertation Awards**, University of Toronto (2024)

**Ontario Graduate Scholarship** (\$10,000), University of Toronto (2021)

**The Best Master’s Thesis Award** (\$10,000), Concordia University (2020)

**Graduate Entrance Awards** (\$5,000), Concordia University (2018)

**National Elites Foundation (INEF)’s Grant**, Iran (2013-2017)

**Ranked 1st (50,000 participants) in the Iranian University Entrance Exam (“Konkour”), Iran (2013)**

**Semi-finalist of the Iran National Mathematics Olympiad**, Iran (2012)

## PROFESSIONAL EXPERIENCE

### **AI Researcher**, Rotman's FinHub, Toronto, Canada (*May 2023-present*)

Modeled financial markets and conducted literature reviews to develop risk-aware reinforcement learning solutions for hedging risk, using Python.

- Created a novel loss function with interpretable parameter adjustments for training risk-aware reinforcement learning algorithms, reducing model tuning time.
- Developed and implemented a distributional reinforcement learning algorithm, increasing resilience to risk compared to existing state-of-the-art risk-aware models.
- Integrated Bayesian GANs into distributional reinforcement learning to enhance market robustness and generate synthetic data for quicker model deployment.
- Published research findings at ICASSP 2024 and have submitted to the International Conference on AI in Finance (ICAIF) 2024 and AAAI 2025.

### **AI Researcher**, Dormakaba, Montreal, Canada (*Jan. 2019- Jan. 2021*)

Conducted literature reviews and developed machine learning models in Python to enhance the security of electronic access systems using mobile Bluetooth signals.

- Develop a real-time machine learning model to localize user relative to the access system with high precision (5 cm error) and make dynamic access decisions, increasing system accuracy.
- Leveraged reinforcement learning models to refine the system access decisions, reducing the error rate.

## RESEARCH EXPERIENCE

### **Graduate Research Assistant**, Bell Multimedia Lab, The Edward S. Rogers Sr. Department of Electrical and Computer Engineering, University of Toronto, Canada (*Sep. 2020-present*)

This research focuses on advancing efficiency and safety of autonomous decision-making agents by developing uncertainty-guided and transfer learning techniques within reinforcement learning and active inference.

- Developed innovative transfer learning algorithms that enable autonomous agents to efficiently transfer prior knowledge from one task to another, significantly enhancing time and memory efficiency.
- Leveraged Bayesian reinforcement learning and active inference approaches to handle uncertainty during decision making, enhancing robustness in changing environments.
- Resulted in peer-reviewed publications in 2 Neurocomputing journals, presentations at 2 ICASSP conferences, and 1 Neural Computation journal.

### **Graduate Research Assistant**, I-SIP Lab, Department of Engineering and Computer Science, Concordia university, Montreal, Canada (*2018-2020*)

This research focused on advancing self-localization and localized decision support systems for autonomous agents.

- Developed machine learning classification techniques on Bluetooth signals for localizing agents in indoor environments, achieving high-precision user localization.
- Created a novel decision-making algorithm by leveraging Bayesian multi-model learning in reinforcement learning, improving sample efficiency.
- Contributed to the field with multiple peer-reviewed publications in IEEE ACCESS journal, ICASSP conference, European Signal Processing Conference, and IEEE Signal Processing Letter.

### **Undergraduate Research Assistant**, Biomedical Signal and Image Processing Laboratory (BiSIPL), Department of Electrical Engineering, Sharif university of Technology, Tehran, Iran (*2013-2018*)

- Planned and set up experiments to gather EEG data using a mobile sensor.
- Employed machine learning and feature selection algorithms for biometric person identification using EEG data.

## REFEREED PUBLICATIONS

### Journals Articles (5 total)

(Accepted) **P. Malekzadeh**, K. N. Plataniotis, "Active Inference and Reinforcement Learning: A unified inference on continuous state and action spaces under partial observability", *Neural Computation* (2024).

**P. Malekzadeh**, M. Hou, and K. N. Plataniotis, "Uncertainty-aware transfer across tasks using hybrid model-based successor feature reinforcement learning", *Neurocomputing* (2023).

**P. Malekzadeh**, et al., "AKF-SR: Adaptive Kalman Filtering-based Successor Representations", *Neurocomputing* (2022).

**P. Malekzadeh**, et al., "MM-KTD: Multiple Model Kalman Temporal Differences for Reinforcement Learning," *IEEE Access* (2020).

**P. Malekzadeh**, et al., "STUPEFY: Set-Valued Box Particle Filtering for Bluetooth Low Energy-Based Indoor Localization," *IEEE Signal Processing Letters* (2019).

### Conference Articles (13 total)

(In Preparation) **P. Malekzadeh**, et al., "Robust Hedging through GAN-based Distributional Reinforcement Learning," *AAAI* (2025).

(Submitted) **P. Malekzadeh**, et al., "EX-RL: EXtreme Reinforcement Learning for Enhancing Financial Hedging Strategies," *International Conference on AI in Finance* (2024).

**P. Malekzadeh**, et al. "Robust Quantile Huber Loss with Interpretable Parameter Adjustment in Distributional Reinforcement Learning," *IEEE ICASSP* (2024).

**P. Malekzadeh**, M. Hou, and K. N. Plataniotis, "A Unified Uncertainty aware exploration: Combining Epistemic and Aleatory Uncertainty," *IEEE ICASSP* (2023).

M. Salimibeni, **P. Malekzadeh**, et al., "MAKF-SR: Multi-Agent Adaptive Kalman Filtering-based Successor Representations," *IEEE ICASSP* (2021).

M. Atashi, **P. Malekzadeh**, et al., "Orientation-Matched Multiple Modeling for RSSI-based Indoor Localization via BLE Sensors," *European Signal Processing Conference* (2021).

M. Atashi, M. Salimibeni, **P. Malekzadeh**, et al., "IoT-TD: IoT Dataset for Multiple Model BLE-based Indoor Localization/Tracking," *European Signal Processing Conference* (2021).

**P. Malekzadeh**, et al., "Non-Gaussian BLE-Based Indoor Localization Via Gaussian Sum Filtering Coupled with Wasserstein Distance," *IEEE ICASSP* (2020).

M. Salimibeni, **P. Malekzadeh**, K. N. Plataniotis, A. Mohammadi, "Distributed Hybrid Kalman Temporal Differences for Reinforcement Learning," *Asilomar Conference on Signals, Systems and Computers* (2020).

**P. Malekzadeh**, et al., "Gaussian Mixture-based Indoor Localization via Bluetooth Low Energy Sensors," *IEEE SENSORS* (2019).

S. Mehryar, **P. Malekzadeh**, et al., "Belief Condensation Filtering for RSSI-Based State Estimation in Indoor Localization," *IEEE ICASSP* (2019).

M. Salimibeni, **P. Malekzadeh**, et al., "Event-Triggered Monitoring/Communication of Inertial Measurement Unit for IoT Applications," *IEEE SENSORS* (2019).

M. Atashi, M. Salimibeni, **P. Malekzadeh**, et al., "Multiple Model BLE-based Tracking via Validation of RSSI Fluctuations under Different Conditions," *International Conference on Information Fusion* (2019).

## TEACHING EXPERIENCE

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Lab Assistant of **Adaptive control and Reinforcement Learning**, ECE411, University of Toronto (2022-2024)

Lab Assistant of **Linear Algebra**, MAT188, University of Toronto (2022-2024)

Head Teaching Assistant of **Probability and Applications**, ECE302, University of Toronto (2020-2024)

Teaching Assistant of **Algorithms and Data Structure**, ECE345, University of Toronto (2021)

Teaching Assistant of **Numerical Algorithms for Mathematics**, CSCC37, University of Toronto (2021- 2022)

Teaching Assistant of **Introduction to Machine Learning**, ECE421, University of Toronto (2020-2021)

Teaching Assistant of **Calculus II**, MATH 205, Concordia University (2018)

## ACADEMIC and ADMINISTRATIVE SERVICE

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**Reviewer:** ICASSP 2020 and 2022, IEEE signal processing letter, Machine Learning with Applications, Neurocomputing

**Academic advisor** to undergraduate engineering students, University of Toronto (2021-2023)

**Editor of high school mathematics textbooks**, Kheili Sabz Publication Center, Iran (2017-2018)

## PROFESSIONAL DEVELOPMENT

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- CIFAR Deep Learning + Reinforcement Learning (DLRL) Summer School (2024)
- Generative AI with Large Language Models - [Coursera](#) (2024)
- AWS Certified Machine Learning Specialty - [Udemy](#) (2024)
- TEP1203H: Teaching Engineering in Higher Education, University of Toronto (2023)
- SQL Masterclass: SQL for Data Analytics- [Udemy](#) (2020)

## REFERENCES

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**Konstantinos N. Plataniotis** (Ph.D. advisor), Professor @ University of Toronto [kostas@ece.utoronto.ca](mailto:kostas@ece.utoronto.ca)

**Ervin Sejdic**, Professor @ University of Toronto [ervin.sejdic@utoronto.ca](mailto:ervin.sejdic@utoronto.ca)

**Jacky Chen**, Affiliated Faculty @ Rotman FinHub [jackyjc.chen@rotman.utoronto.ca](mailto:jackyjc.chen@rotman.utoronto.ca)

**Parham Aarabi**, Professor @ University of Toronto [p@arh.am](mailto:p@arh.am)

**Arash Mohammadi** (M.Sc. advisor), Professor @ Concordia University [arashmoh@encs.concordia.ca](mailto:arashmoh@encs.concordia.ca)