Fatemeh Saberi Khomami

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Profile

Computer Science PhD student researching online change-point detection in cooperative multi-agent reinforcement learning. Experienced in building Python ML pipelines with PyTorch and TensorFlow, and designing controlled experiments. Background in data science and statistics, with applied projects in computer vision and sequence modelling. Interested in developing reusable ML software and practical evaluation tools.

Education

PhD in Computer Science *Sep 2023 – Present*
University of Saskatchewan, Saskatoon, SK, Canada
GPA: 88/100 — Supervisor: Prof. Julita Vassileva

MSc in Data Science *Sep 2021 – Sep 2023*
Shahid Beheshti University, Tehran, Iran
GPA: 17.81/20 — Supervisor: Prof. Monireh Abdoos

BSc in Statistics *Sep 2016 – Feb 2021*
Shahid Beheshti University, Tehran, Iran
GPA: 18.01/20

Technical Skills

Programming	Python, R, SQL, C++, Java
ML / Deep Learning	PyTorch, TensorFlow, Keras, scikit-learn, OpenCV, NumPy, Pandas, SciPy, Matplotlib
Tools & Systems	Linux, Bash, SSH, Git, VS Code, virtual environments

Research Experience

Graduate Researcher — MADMUC Lab *Sep 2023 – Present*
Department of Computer Science, University of Saskatchewan

- Designed **Patterns of Past Rewards (PPR)**, an algorithm-agnostic online detector for cooperative MARL, combining smoothed episodic returns, exponential moving variation, and KSWIN without changing the underlying learner.
- Built a PyTorch MADDPG pipeline to evaluate PPR under reward and landmark-colour changes in a custom Speaker–Listener task. PPR reduced excess alarms versus SMA + KSWIN, with slower detection.

Graduate Researcher — Shahid Beheshti University *Sep 2021 – Sep 2023*
Department of Computer Science & Engineering

- Proposed **Deep Nondeterministic Policy Gradient (DNDPG)**, an off-policy actor–critic algorithm extending DDPG with Bayesian teacher-feedback conditioning for continuous-control environments.
- Implemented and evaluated the method in TensorFlow on OpenAI Gym continuous-action benchmarks.

Publications

- **Saberi Khomami, F.**, & Vassileva, J. *Online Change-Point Detection for Cooperative Multi-Agent Reinforcement Learning.* In Advances in Practical Applications of Agentic AI and Multi-Agent Systems, The PAAMS Collection (PAAMS 2026), pp. 290–302. Springer, Cham, 2027. doi:10.1007/978-3-032-41794-7_24
- **Saberi Khomami, F.**, & Abdoos, M. *Policy Improvement in Interactive Reinforcement Learning with Continuous Action Space Using Actor–Critic Methods.* Manuscript in preparation.

Selected Machine Learning Projects

Reinforcement Learning

- **Multi-Agent Q-Learning** — Built a four-agent grid world with food rewards and attack actions; implemented tabular Q-learning and compared learning curves and agent behaviour across hyperparameter settings. [Code]

Computer Vision & Deep Learning

- **Traffic Sign Recognition** — Trained a TensorFlow/Keras CNN to classify 43 traffic-sign categories. Applied histogram equalization to enhance contrast and used image augmentation. Compared colour and grayscale inputs, class weighting, optimizers, and learning rates; saved the best model based on validation accuracy. [Code]
- **Fashion-MNIST Classification** — Compared custom CNN architectures with a ResNet50 trained from scratch; used class-balanced validation sampling, image augmentation, learning curves, and confusion matrices. [Code]
- **Photo-to-Sketch Translation** — Trained a convolutional encoder–decoder on paired face photographs and sketches, using matched image augmentation and visual comparisons of reconstructed sketches. [Code]

Speech, NLP & Sequence Modelling

- **Speech Emotion Recognition** — Extracted MFCC, chroma, and spectral contrast features with librosa; trained TensorFlow/Keras LSTM classifiers for five emotions and compared feature combinations, class weighting, and network architectures. [Code]
- **Persian Tweet Language Modelling** — Prepared word-level token sequences and trained bidirectional LSTM and GRU models with embeddings for next-word prediction and iterative text generation. [Code]

Teaching Experience

Teaching Assistant — University of Saskatchewan *Sep 2023 – Present*
CMPT 360 Algorithm Design, Analysis and Correctness; CMPT 423 Machine Learning; CMPT 317 Introduction to AI; CMPT 412 Social Computing; CMPT 280 Data Structures & Algorithms; CMPT 141/145 Introduction to Computer Science

Teaching Assistant — Shahid Beheshti University *Sep 2018 – Jul 2021*
Fundamentals of Computer and Programming; Statistical Methods

Certifications

Fundamentals of Reinforcement Learning — *University of Alberta (Amii) — Coursera*

Improving Deep Neural Networks — *deeplearning.ai — Coursera*

Structuring Machine Learning Projects — *deeplearning.ai — Coursera*

Awards & Honors

Amii Talent Bursary — Upper Bound AI Conference, Alberta Machine Intelligence Institute *2024, 2025, 2026*
Ranked 2nd Top Student, MSc — Shahid Beheshti University *2023*
Ranked 21st nationally, MSc Entrance Exam, Iran *2021*
Ranked 2nd Top Student, BSc — Shahid Beheshti University *2021*

Leadership & Service

PhD Representative *Sep 2024 – Oct 2025*
Computer Science Graduate Council, University of Saskatchewan

GSA Representative *Sep 2023 – Sep 2024*
Computer Science Graduate Council, University of Saskatchewan

Co-Organizer *2024, 2025*
8th & 9th Symposium on Innovations in Computer Science & Applied Computing, University of Saskatchewan