Maryam AlipourHajiagha

Montreal, Canada | +14385290440 | maryamalipour.io | maryamalipour9877@gmail.com | Google Scholar
linkedin.com/in/maryam-alipourhajiagha | github.com/maryamalipourh | x.com/maryamalipourh

Research Interest

Deep Learning Theory, Probabilistic Learning, Generative Models, Computer Vision

Education

Master of Applied Science in Applied Mathematics 2024 – 2026
Polytechnique Montreal CGPA: 3.9/4.0

Bachelor of Science in Applied Mathematics, minor in Computer Science 2017 – 2022
AmirKabir University of Technology CGPA: 3.5/4.0

Publications

A Probabilistic U-Net Approach to Downscaling Climate Simulations 10/2025
NeurIPS 2025 AI4Science — M Alipourhajiagha, P Lemaire, Y Diouane, J Carreau

Professional Experience

Visiting Researcher 06/2025 – Present
Ouranos

- Conducting applied research as an AI Research Intern at Ouranos, a climate adaptation research hub in Quebec, on probabilistic downscaling models with an emphasis on making models' behavior interpretable.

Graduate Research Assistant 01/2024 – Present
Mila - Quebec Artificial Intelligence Institute

- Developing a multi-variate probabilistic U-Net model for statistical downscaling of climate projections, leveraging deep learning advancements to improve spatial resolution, physical coherence, and inference speed.

Graduate Teaching Assistant 01/2025 – Present
Polytechnique Montreal

- Artificial Intelligence: Probabilistic and Learning Techniques (INF8225) – Prof. Chris Pal
- Fundamentals of Machine Learning (IFT6390) – Prof. Ioannis Mitliagkas & Dhanya Sridhar
- Unsupervised Learning and Time Series (MTH8304) – Prof. Julie Carreau

Undergraduate Teaching Assistant 02/2020 – 01/2022
AmirKabir University of Technology

- Numerical Computations – Prof. Fatemeh Shakeri
- Numerical Analysis – Prof. Mostafa Shamsi
- Fundamentals of Programming in C – Prof. Mohammad Akbari

Teaching Assistant 08/2020 – 04/2022
CS50x Iran

- Contributed to teaching CS50x, Harvard's introductory computer science course, for a Persian-speaking audience. Translated and customized course content, and supported TA sessions in the 2020 and 2021 cohorts.

Technical Skills

- **Programming & Scripting:** Python, C, Java, SQL, Bash, HTML/CSS
- **Libraries & Frameworks:** PyTorch, TensorFlow, Scikit-Learn, NumPy, Pandas, Hugging Face Transformers, Datasets, WandB, TensorBoard, Matplotlib, Seaborn, Plotly
- **Tools:** Git, Docker, MySQL, VSCode, Jupyter, Linux, LaTeX
- **Core AI/ML Knowledge:** Supervised and Unsupervised Learning, Deep Learning (CNNs, RNNs, Transformers), Probabilistic Modeling, Self-Supervised and Contrastive Learning, Transfer Learning and Domain Adaptation, Generative Models (VAEs, GANs, Diffusion Models), Evaluation Metrics and Benchmarking, Experiment Design and Ablation Studies, Model distillation, Interpretability and Explainability, Multi-GPU Training Workflows on Compute Canada (SLURM-Based Job Scheduling)

Honors & Awards

UpperBound 2025 Talent Bursary – Alberta Machine Intelligence Institute (Amii): Spring 2025 Awarded a $1500 (CAD) scholarship by Amii in recognition of research potential and talent in AI/ML, based in Edmonton, Alberta.

Academic Distinction — AmirKabir University of Technology: Spring 2022 Graduated in the top 15% of the cohort; overall CGPA 3.5/4.0; final two-year GPA 3.85/4.0.

Full Scholarship for B.Sc. in Applied Mathematics: Fall 2017 Ranked among the top 0.8% of all Iranian University Entrance Exam participants (150,000 participants) and received a full scholarship for a B.Sc. in Applied Mathematics from the Ministry of Science, Research, and Technology.

Relevant Courses

M.Sc. Courses: Representation Learning (A), Natural Language Processing with Deep Learning (A+), Statistical Machine Learning (B+), Machine Learning Applied to Climate Change (A)

B.Sc. Courses: Advanced Programming in C++ (A+), Data Structures & Algorithms (A+), Database Systems (A+), Probability (A+), Foundation of Matrix and Linear Algebra (A+), Linear & Non-linear Optimization (A+), Data Mining (A), Introduction to Blockchain (B+), Artificial Intelligence (A+), Partial Differential Equations (A+), Dynamical Systems (A+), Computer Networks (A+), Numerical Analysis (A+)

Certifications

Machine Learning Specialization – Coursera (Offered by Stanford University)
Advanced Python Programming and OOP Thinking – Quera College
CS50: Introduction to Computer Science – Harvard University

Projects

Emotion Recognition from Conversational Context

- Developed hybrid models (e.g., SS-BED and CNN–BiGRU) for emotion recognition in text to balance accuracy, speed, and resource efficiency, practical alternatives to transformer models in resource-constrained applications.

litgpt

- Implemented parameter-efficient instruction tuning by applying LoRA to TinyLlama and Pythia on LIMA and benchmarking zero-shot performance on HellaSwag, applied an improved LoRA variant and compared results.

Emotion-Detection

- Finetuning and evaluating transformer-based models like BERT, DistilBERT, GPT-2, RoBERTa, ELECTRA on diverse datasets like ISEAR, Diar AI, and GoEmotions to perform emotion classification on texts.

Sentiment Analysis

- Implementation and report of a sentiment analysis project comparing RNNs and Transformer models on the Yelp Polarity dataset, utilizing a BERT-based tokenizer for pre-processing.

DDPM: PyTorch Implementation

- Implementation of a Denoising Diffusion Probabilistic Models (DDPM) class using PyTorch on the MNIST dataset to minimize the loss function and generate MNIST images.

Human Activity Recognition

- Human Activity Recognition (HAR) using deep learning techniques, specifically MLP and 1D CNN, to classify six activities based on smartphone accelerometer time series data.

Languages

Persian: Native
English: Full Professional Proficiency (TOEFL iBT score: 103)
Turkish: Professional Working Proficiency
French: Elementary Proficiency