Mohammad **Mortazavi**

PhD Researcher at University of Toronto • Applied AI Scientist at Vector Institute

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Education

University of Toronto — *Toronto, CA*

Doctor of Philosophy (PhD) – Electrical and Computer Engineering — *September 2021 – August 2025*

- Conducted research at the intersection of Graph Neural Networks and Wireless Communications, focusing on Autonomous Vehicular Networks.
- Course Assistant for ECE345: Algorithms and Data Structures, ECE1724: Bio-inspired Algorithms for Smart Mobility, and INF2190: Data Analytics.
- **Courses:** Machine Learning Fundamentals, Computer Networking Systems, Artificial Intelligence in Finance, Engineering Economics Analysis.
- **Honors:** Awarded University of Toronto Fellowship, Awarded Edward S. Rogers Sr. Graduate Scholarship.

Sharif University of Technology — *Tehran, IR*

Master of Science (MSc) – Electrical Engineering — *September 2016 – September 2018*

- Conducted research on Cooperative Relaying in Random Access Wireless Ad-Hoc Networks with Energy Harvesting Nodes.
- **Courses:** Coding Theory, Numerical Optimization Methods, Digital Signal Processing, Game Theory, Stochastic Process, Network Coding.
- **Honors:** Ranked top 0.1% in nationwide university entrance exam, Published a peer-reviewed paper in the journal IEEE Transactions on GCN.

University of Science and Technology — *Tehran, IR*

Bachelor of Science (BSc) – Electrical Engineering — *September 2012 – September 2016*

- Conducted research on Localization Techniques in LTE Networks, resulting in a publication at the 17th ISCEE and graduation with distinction.
- **Courses:** Computer Programming (C/C++), Information Theory, Probability and Statistics, Linear Algebra, Computer Organization/Graphics.
- **Honors:** Graduated in the top 5 of the class '16, Granted direct admission to graduate studies with exemption from the entrance exam.

Work Experiences

Vector Institute — *Toronto, CA*

Machine Learning Associate – GenAI and NLP Winter Cohort | Part-time (Hybrid) — *January 2025 – May 2025*

- Developed an **end-to-end ML pipeline** on **AWS** EC2, utilizing S3 for storage, to **automate** SRED tax report generation, reducing turnaround time from a week to under **1 hr** and cutting manual editing from 2 hours to **5 min**, ensuring **90-100%** of writing tasks are performed by AI.
- Fine-tuned and deployed domain-specific **LLM (GPT-4)** using **OpenAI API** to automate and enhance legal/business **document drafting**.
- Implemented **RAG workflows** for context-aware document generation using real-time knowledge retrieval from Jira, GitHub, and QuickBooks.
- Integrated **retrieval**, **generator**, and **evaluator** models, leveraging a looped **agent** and **prompt engineering** to ensure compliance and quality.

Ericsson — *Montreal, CA*

Machine Learning Intern – Global AI Accelerator (GAIA) | Full-time (On-site) — *January 2024 – April 2024*

- Developed **decentralized distributed learning** algorithms with parallel training using **PyTorch**, reducing training time by **23%**.
- Accelerated **distributed parallel training** by simultaneously performing **communication** and **computation**, decreasing GPU idle time by **18%**.
- Designed a communication-efficient **network topology** that balances **convergence** and **latency**, achieving distributed consensus **1.2x** faster.
- Conducted **100+** experiments on the cluster using public datasets to evaluate the performance of distributed learning algorithms that trade-off computation and communication costs both in a **multi-core** as well as **distributed memory** setting, enhancing algorithm efficiency by **15%**.
- Delivered insights to internal **R&D teams** to enhance federated learning infrastructure and enterprise ML model scalability.

University of Toronto — *Toronto, CA*

Doctoral R&D Researcher – Mobile Computing Laboratory (Wireless Lab) | Full-time (On-site) — *September 2022 – January 2024*

- Exploited the **predictive capability** of **Graph Transformers** for V2X modeling, boosting V2I capacity by **32%** and ensuring **>95%** V2V reliability.
- Developed and tested **GNN-powered solutions** for dynamic resource management using **large-scale simulation datasets** and PyTorch.
- Proposed **iterative learning** cycles for **graph-based network optimization** and presented findings in international ML and telecom venues.

Selected Publications

[1] **M. Mortazavi**, E. Sousa (2024) "Intelligent Interference Management in VANETs through Dynamic Resource Allocation based on GNNs" *IEEE Wireless Communications and Networking Conference (WCNC)*, Dubai, United Arab Emirates.

[2] **M. Mortazavi**, E. Sousa (2023) "GNN-based Proportional Fair Dynamic Bandwidth Allocation in Wireless Vehicular Networks" *IEEE Global Communications Conference (GLOBECOM)*, Kuala Lumpur, Malaysia.

[3] **M. Mortazavi**, E. Sousa (2023) "Efficient Mobile Cellular Traffic Forecasting using Spatial-Temporal Graph Attention Networks" *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)*, Toronto, Canada.

Technical Skills

Programming Language	Python (Pandas, NumPy, Scikit-learn, Matplotlib), SQL, R, MATLAB, C/C++
Data Science and Machine Learning	TensorFlow, PyTorch, Spark, Azure, AWS, Databricks, SHAP, XGBoost, GCP Vertex AI, Hugging Face
Microsoft Certified Specialization	Azure AI Fundamentals: ML (Automated ML, ML Pipelines), Computer Vision (Object detection), NLP (Text Analytics, Language Understanding, Document AI, Conversational AI, Bot Service)