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 – September 2025*

- Conducted research at the intersection of Graph Neural Networks, particularly Graph Transformers, and 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%*.

Technical Projects

Generative AI Applications with RAG and LangChain
Toronto, CA

University of Toronto · *August 2025 - September 2025*

- Implemented *document ingestion* pipeline using LangChain and applied recursive *text-splitting* to generate *coherent chunks* for efficient RAG.
- Designed and configured *vector database*, *embedded* documents, and developed *retriever* to fetch semantically relevant document segments.
- Set up *interactive QA interface* using LangChain and LLM for real-time querying over documents with robust retrieval and response evaluation.

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.

Skills

Programming Language	Python (Pandas, NumPy, Scikit-learn), SQL, R, MATLAB, C/C++
Data Science and Machine Learning	PyTorch, TensorFlow, Spark, LangChain, Databricks, SHAP, XGBoost, AWS, Hugging Face
Microsoft-Certified Specialization	Azure AI Fundamentals: Azure ML, Cognitive Services (vision, language), OpenAI Service, Databricks.