

## Summary

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- Applied Machine Learning Scientist with a PhD in Computer Engineering, specializing in representation learning and graph-based ML for images & time-series, structured data.
- Led development of advanced ML models for multivariate clinical time-series and images, combining attention-based fusion, robust representation learning, and uncertainty quantification for real-world healthcare deployment.
- Architected and deployed GNN-based models for scalable graph inference in production systems.
- Designed LLM systems, including Retrieval-Augmented Generation (RAG) pipelines using OpenAI SDK and LangGraph.

## Employment Experience

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### Data Scientist (Clinical Time-Series ML)

University Health Network (UHN)

Toronto, ON

Dec 2020 – Present

- Led a 5-year oscillometry-PFT ML pipeline for pulmonary patients, unifying SQL/Excel/file-based hospital data with patient matching and reproducible quality control.
- Developed OscilloFusion (multi-channel fusion with attention for oscillometry classification), reaching 80% accuracy and delivering **+5 percentage-point** improvement over conventional deep-learning baselines for oscillometry data.
- Applied robustness strategies: augmentation, synthetic generation (GAN/cGAN), and random feature representations.
- Evaluated model performance under real-world constraints including noisy labels and data drift, and implemented **calibrated uncertainty estimates** to support risk-aware decision-making in clinical workflows.
- Built an **interactive clinician tool** to explore signals, verify predictions, inspect explanations, and swap/compare ML backbones.

### Machine Learning Internship (CAD Automation)

DraftAid

Toronto, ON

Jun 2025 – Sep 2025

- Built an ML pipeline that converts CAD drawings into structured geometric graphs for model processing.
- Designed and trained a graph neural network to recommend annotation links, achieving **94%** recall and reducing reliance on expert manual annotation for CAD drawings.
- Formulated drafting as **conditional autoregressive graph inference** (state-dependent sequential annotation selection).
- Integrated a human-in-the-loop workflow to replace manual entry with efficient model verification.

### Data Scientist

SnappFood

Tehran, Iran

May 2020 – Oct 2020

- Engineered a **hybrid recommendation engine** fusing **latent matrix factorization** with real-time behavioral features to personalize user feeds (PySpark ML).
- devised **spatio-temporal predictive models** for delivery time estimation (ETA) for deliveries, integrating geographic and traffic signals to optimize logistics planning.
- Designed and analyzed **A/B tests**; evaluated CTR, conversion, funnel drop-off, and churn/retention cohorts.
- Developed scalable **Hadoop/Spark** analytics and dashboards (Tableau, Power BI) for city/vendor/item-level insights.

### Software Engineer Team Lead

Atrovan

Tehran, Iran

Nov 2016 – Apr 2020

- Architected a multi-tenant IoT backend for high-throughput ingestion, telemetry analytics, and access control.
- Built event-driven services in Golang with **Kafka** for async processing, fault tolerance, and back-pressure.
- Implemented REST APIs and pipelines using MySQL/MongoDB with Redis caching; led backend + React teams.
- Implemented end-to-end fleet management pipelines: custom GPS telemetry protocols, streaming ingestion, ETA computation, and geospatial indexing for real-time fleet visualization.
- Led and mentored a cross-functional team of backend and frontend engineers; defined technical roadmap and made architectural trade-offs under product constraints.

## Education

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### University of Toronto

*PhD in Electrical and Computer Engineering*

Focus: Healthcare ML, Contrastive learning, Time-series representation learning,

Toronto, ON

2021 – 2026

### Amirkabir University of Technology

*MSc in Electrical and Computer Engineering*

Tehran, Iran

2016 – 2019

### Amirkabir University of Technology

*Bsc in ECE and CS (double major)*

Tehran, Iran

2012 – 2016

## Skills

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- **Programming Languages:** Python, C/C++, Golang
- **ML/DS:** PyTorch, PyTorch Geometric, scikit-learn, sktime, Airflow
- **LLM:** OpenAI SDK, JAX, LangGraph
- **Data/Systems:** Spark/PySpark, SQL, NumPy/Pandas, Docker, Kafka, CI/CD, kubernetes
- **Deployment & Data Tools:** MySQL, MongoDB, Redis, Cassandra, cloud platforms (Azure/AWS)

## Selected Publications

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- HIERVAR: A Hierarchical Feature Selection Method for Time Series Analysis. MLSP 2024.
- Time Series Classification Using Convolutional Kernel and Adaptive Dynamic Thresholding. IEEE ICC 2024.
- Representation Learning of Clinical Multivariate Time Series with Random Filter Banks. ICASSP 2023.
- RASTER: Representation Learning for Time Series Classification using Scatter Score and Randomized Threshold Exceedance Rate. MLSP 2023.
- Modified Deep Residual Network Architecture Deployed on Serverless IoT Platform Based on Human Activity Recognition Application. *Future Generation Computer Systems*.

## Projects

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### PhD Research

- Thesis: Pioneered context-aware **stochastic representation learning** (RASTER), introducing temporal localization to random kernel networks to outperform global pooling in non-stationary, weakly supervised regimes.
- Architected Novel Neural Mechanisms: Engineered segment-wise random convolution networks that capture granular temporal dynamics, effectively scaling foundation-style representations to sparse, high-frequency clinical signals.
- Developed **Self-Supervised Algorithms** (CURVE): Created a contrastive learning framework to optimize high-dimensional random embeddings. Leveraged data augmentation and information-theoretic proofs to strictly guarantee feature utility without labeled data.
- Designed **Attention-Based Fusion Models**: Built "Oscillofusion," a multi-channel architecture utilizing modern attention mechanisms to integrate complex oscillometry data, achieving SOTA discriminability under limited-data constraints.
- Implemented **Trustworthy AI**: Deployed conformal prediction pipelines to quantify uncertainty and model label noise, ensuring robustness against distribution shifts in safety-critical medical datasets.

### LLM Job Application Tracker & Resume Tailoring System

- Designed and deployed a **multi-user job tracker** (Streamlit, SQLite, AWS EC2) with secure authentication and per-user application management.
- Built a **LangGraph LLM pipeline** to extract structured job data from URLs or pasted descriptions with validated JSON outputs.
- Developed a **guardrailed LaTeX resume tailoring engine** enforcing 2-page limits and constrained edits using retrieval over verified resume bullets.
- Integrated **RAG-based customization** to generate role-specific resumes, cover letters, and interview preparation materials.