

MAHAN POUROMIDI

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HIGHLIGHTS OF QUALIFICATION

- Master's graduate in Biomedical Engineering (GPA: 3.97/4.0) with research in computer vision and deep learning.
- First-author publication accepted at SPIE Medical Imaging 2025; experience developing multimodal vision-language models.
- Strong theoretical and programming background in mathematics, optimization, Python, and C++.

EDUCATION

McMaster University

Hamilton, Ontario

Master of Applied Sciences in Biomedical Engineering (GPA: 3.97/4.0)

Sep 2022 – Sep 2024

- Master's Thesis: An Investigation of Advanced Deep Learning-Based Automated Models for Tumor Segmentation in Whole-Body PET/CT Images (Supervisor: Dr. Ashirbani Saha)
- Selected Coursework: Information theoretic methods in trustworthy machine learning applications: **A**, Research methodologies in basic health sciences: **A⁺**, Biomedical Engineering 2: **A⁺**

Amirkabir University of Technology

Tehran, Tehran

Bachelor of Science in Electrical Engineering (GPA: 3.6/4.0)

Sep 2017 – Mar 2022

- Bachelor's Thesis: Fire Detection Using Neural Networks and Thermal (Supervisor: Dr. Amir Jahanshahi)
- Selected Coursework: Machine learning: **A**, Computational, intelligence: **A**, Numerical analysis: **A⁺**, Engineering Mathematics: **A⁺**, Calculus: **A⁺**

HONORS

- Ranked within the top 0.5% in the university entrance exam among around 150,000 participants. [Summer 2017]
- Granted admission to study a second major (offered to students with a high GPA, selected by Exceptional Talents Office) [Spring 2018]

PUBLICATIONS

- **Pouromidi, M.**, et al. Is segmentation performance of deep-learning models affected by cancer type? A performance analysis on PET/CT. *SPIE Medical Imaging* 2025. (Link)
- **Pouromidi, M.**, Bayasi, N., Yousefirizi, F., Rahmim, A. *Report-Guided Vision-Language Segmentation for PSMA PET/CT*. Manuscript in preparation for submission to *Journal of Nuclear Medicine* or *European Journal of Nuclear Medicine and Molecular Imaging* (EJNMMI), 2025.

ONLINE COURSES & CERTIFICATIONS

Deep Learning Specialization

Issued: January 2022

DeepLearning.AI (Coursera)

- Neural networks, regularization/optimization, CNNs, sequence models.

Linear Algebra

Issued: Dec 2021

Imperial College London (Coursera)

- Matrix algebra for ML; vector spaces, eigenvalues/eigenvectors.

Fundamentals of Digital Image and Video Processing

Issued: May 2021

Northwestern University (Coursera)

- Sampling, filtering, transforms; core computer vision and medical imaging basics.

MIT 6.006: Data Structures & Algorithms

Audited

MIT OpenCourseWare

- Asymptotic analysis, hashing, heaps/graphs, dynamic programming, dynamic programming.

EXPERIENCES

Machine Learning Scientist <i>BC Cancer</i> <ul style="list-style-type: none">Led the development of a report-guided vision-language pipeline for whole-body PSMA PET/CT: 3D SegResNet with decoder cross-attention fusing clinical-report tokens with PET/CT for lesion segmentation.Implemented multimodal text features and ablations: token loaders for LLM embeddings with sanitization.Engineered CrossAttention3D (InstanceNorm/LayerNorm stabilization, multi-head MHA, residual projections), scaled training/eval: distributed data parallel training + mixed precision.Outcome: statistically significant reductions in false positive lesion predictions and tighter boundaries on a held-out cohort while preserving whole-body biomarkers.	June 2025 – Present <i>Vancouver, BC</i>
Software Developer Intern (Fullstack) <i>Biophotonics Lab</i> <ul style="list-style-type: none">Built a low-latency streaming service for dual camera feeds; added TLS and auth; used efficient buffering and server-push.Designed PostgreSQL schemas and CRUD APIs (JWT) and structured logging.Implemented Next.js server components where useful to shrink TTFB for stream dashboards.	Jul 2024 – Feb 2025 <i>Hamilton, Ontario</i>
Graduate Research Assistant <i>McMaster University</i> <ul style="list-style-type: none">Comprehensive evaluation on convolutional versus transformer-based models for 3D PET/CT tumor segmentation, achieving SOTA F1 = 0.70 on a multi-cancer imbalanced dataset; packaged training/eval in reproducible PyTorch pipelines.Optimized SAM mask-decoder with ONNX → reduced per-case inference latency by 25% and memory by 150 MB.Wrote the first-author paper (accepted SPIE Medical Imaging 2025); owned experiments, ablations, and result visualizations.	Sep 2022 – Sep 2024 <i>Hamilton, Ontario</i>
Teaching Assistant <i>McMaster University</i> <ul style="list-style-type: none">C/C++ programming: Instructed 100+ students in C/C++, developing skills in technical instruction, debugging, and clear communication.Health Solutions Design Projects III: Assisted students with Arduino and Python programming, including signal denoising and data transmission to remote servers.	Jan 2024 – Jul 2024 <i>Hamilton, Ontario</i>
Undergraduate Research Assistant <i>Amirkabir University of Technology</i> <ul style="list-style-type: none">Improved the accuracy of fire detection by 10% over state-of-the-art by developing CNN architectures (VGG, ResNet, GoogLeNet) in TensorFlow.Curated and labeled a dataset of thermal fire images; wrote labeling guidelines, defined a JSON annotation schema, removed duplicates, and corrected noisy labels to improve data quality.	Mar 2021 – Mar 2022 <i>Tehran, Tehran</i>
Researcher & Algorithm Developer <i>NABZ Group</i> <ul style="list-style-type: none">Developed and optimized adaptive filtering and digital signal processing-based algorithms in Java to remove high and low frequency noise from ECG signals, improving denoising accuracy by 15% and runtime efficiency by 40%.Investigated multi-scale and data-driven denoising methods including Empirical Mode Decomposition (EMD), Independent Component Analysis (ICA), and Wavelet Transform for potential integration in real-time cardiac monitoring systems.Contributed to algorithmic validation and quantitative benchmarking using synthetic and real-world datasets; produced reproducible scripts and visualizations in MATLAB.	Apr 2021 – Dec 2021 <i>Tehran, Tehran</i>

PROJECTS

(Genesis AI Hackathon) NeuroLens <ul style="list-style-type: none">Developed an AI-powered assistive system for visually impaired users that combined real-time object detection (YOLOv8) and OCR with voice interaction.Optimized WebSocket backend to support sub-second response times, ensuring smooth audio-visual feedback in live demos.Defined OpenAI agents of triage, vision, text-to-speech, speech-to-text, and environment description.
MedChatBot: A Medical Chatbot Assistant <ul style="list-style-type: none">Built a retrieval-augmented medical chatbot on a dataset of 47K Q&A pairs, enabling context-aware responses with Llama 3.2Designed a FAISS-based vector store for efficient similarity search and context retrieval.Implemented a FastAPI backend and integrated with a Next.js front end for interactive querying.

TECHNICAL SKILLS

- **Machine Learning & Deep Learning:** PyTorch, TensorFlow, MONAI, scikit-learn, PyTorch Lightning, ONNX; experience with multimodal and representation learning, self-supervised learning, and transfer learning.
- **Computer Vision & Biomedical Imaging:** CNNs, Vision Transformers, SAM, U-Net/SegResNet architectures, image segmentation, registration, preprocessing, and 3D volumetric data handling.
- **Natural Language & Multimodal Models:** Transformers, BERT, CLIP, LLaMA, cross-attention fusion, vision–language integration, and report-guided medical image analysis.
- **Programming & Tools:** Python (NumPy, pandas, matplotlib), C/C++, Git, Linux, Docker, and REST APIs for research prototyping.
- **Cloud & Computational Infrastructure:** AWS (EC2, S3, SageMaker), GPU/DP training, mixed precision, reproducible pipelines.