Parham Eftekhar

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Summary

Ph.D. candidate in Computer Science at York University, specializing in graph signal processing, image processing, computer vision, and large language models with a strong track record of publications in top conferences such as NeurIPS and ICIP, along with industry experience as a Machine Learning Engineer and Research Scientist Intern.

Education

York University, Canada 2021 - Present
Doctor of Philosophy in Electrical Engineering and Computer Science GPA: 8.67/9

Sharif University of Technology, Iran 2020
Master of Science in Computer Science GPA: 19.67/20

Sharif University of Technology, Iran 2016
Bachelor of Science in Computer Science GPA: 17.91/20

Experience

Autodesk Company, Canada Sep 2025 - Dec 2025
Physics-Informed Machine Learning Intern

- Developed a novel generative design pipeline using a **supervised fine-tuned Qwen LLM** with **structured reasoning** to automate floorplan synthesis, leveraging a hypergraph-based JSON grammar to serialize complex topology and spatial information into a machine-readable format.
- Integrated **Physics-Informed** Machine Learning (PIML) to evaluate environmental performance metrics—specifically **daylighting and natural ventilation**—ensuring AI-generated layouts met rigorous energy-efficiency and sustainability constraints.
- Collaborated with a multidisciplinary research cohort from **Stanford University** and **UC Berkeley** (Civil & Environmental Engineering and Architecture) to bridge the gap between AI-driven generative design and professional AEC industry standards.
- Established **state-of-the-art** results on the compatibility metric using a real-world residential floorplan dataset spanning Zurich, New York, and Singapore.

York University, Canada Jan 2025 - May 2025
PhD Research

- Contributed to the development of a lightweight **Transformer** for **EEG data** classification using balanced signed graph.
- Evaluated on the Turkish Epilepsy EEG Dataset, the largest public dataset on epileptic seizures with 10,356 recordings from 121 subjects (50 epileptic, 71 healthy).
- Achieved **97.5%** accuracy with only **14,787** parameters, significantly fewer than standard models.

Growers Edge Company, US Oct 2024 - Jan 2025
Research Scientist Intern

- Built a satellite image dataset from Harmonized Landsat Sentinel for corn/soybean classification.
- Developed a crop classification model for satellite images using signed graph spectral classifier learning in **PyTorch**.
- Achieved results comparable to state-of-the-art models while using only **0.06%** of their parameters.

York University, Canada Feb 2024 - May 2024
PhD Research

- Contributed to the development of an interpretable lightweight **Transformer** using unrolled learned graph smoothness priors, implemented in **PyTorch**.
- Achieved performance on par with state-of-the-art models in image demosaicking and interpolation while using only **10%** and **3%** of their parameters, respectively.
- Evaluated model performance on **McM**, **Kodak**, and **Urban100** datasets, ensuring robust testing across diverse image sets.

York University, Canada Sep 2023 - Feb 2024
PhD Research

- Developed a satellite image declouding model via unrolling of the Gradient Graph Laplacian Regularizer in **PyTorch**.
- Achieved significant improvements in quality metrics, including a PSNR of **30.99** dB, SSIM of **0.8519**, and MAE of **0.0216** compared to model-based approaches.

Afarinesh Company, Iran Aug 2020 - Jul 2021
Machine Learning Engineer

- Trained a **BERT** model on 100K+ sentiment samples using **Hugging Face** and **PyTorch**, achieving **86%** test accuracy.
- Collected 200K+ sentiment samples from three book websites (**Taaghche**, **Digikala**, and **Ketabrah**) using **Beautiful Soup**.

Sharif University of Technology, Iran Sep 2017 - Jan 2020

Master's Thesis

- Developed **Visual Odometry** algorithm based on salient feature selection and tracking, achieving 0.97 % translation error.
- Employed **Quaternion** for smoothing ego-motion estimation.
- Employed **Kalman filtering** for improving trajectory estimation.

Divar Company, Iran Jun 2021 - Jul 2021

Business Data Analyst Summer Camp

- Selected as **1 of 18 participants out of 600+ applicants** for a competitive data analysis program.
- Learned and applied **PySpark** to solve real-world business problems using large-scale datasets.

Course Projects

- **Project 2 :** Implemented a **Denoising Diffusion Probabilistic Model (DDPM)** for image generation on CIFAR-10.
- **Project 1 :** Developed French to English machine translation using **LSTM** and **Attention Mechanism** in **PyTorch**.

Selected Publications

1) J. Yao, P. Eftekhar, et al. Lightweight Transformer for EEG Classification via Balanced Signed Graph Algorithm Unrolling. Submitted to *2025 The International Conference on Learning Representations* ***(ICLR)***.
2) P. Eftekhar, G. Cheung, T. Eadie. Crop Classification in Satellite Images via First Eigenvector of Learned Signed Graph Laplacian. *2025 International Conference on Acoustics, Speech, and Signal Processing* ***(ICASSP)***.
3) P. Eftekhar, G. Cheung, T. Eadie. Declouding of satellite images via unrolling of gradient graph laplacian regularizer. *2024 IEEE International Conference on Image Processing* ***(ICIP)***.
3) TT Do, P Eftekhar, SA Hosseini, G Cheung, P Chou. Interpretable Lightweight Transformer via Unrolling of Learned Graph Smoothness Priors. *2024 Conference on Neural Information Processing Systems* ***(NeurIPS)***.

Achievements

Awarded the **VISTA** scholarship for PhD research ($10K per year).	2021
Achieved the **highest GPA** in the history of Sharif University of Technology's Computer Science master's program.	2020
Winner of the Iranian **National Elite Foundation** grant for Master's thesis.	2019
Ranked **7** th among 5,000+ participants in Iran's M.S. entrance exam.	2017
Winner of the national mathematics Olympiad **Silver medal**.	2010

Technical Skills

Programming languages: Python, Java, C#, C++, Matlab, SQL, NoSQL
Libraries: PyTorch, Tensorflow/Keras, PySpark, OpenCV, Scikit-learn, Huggingface, Pandas, Requests, SciPy, NumPy, Flask, Matplotlib
Tools: MySQL/PostgreSQL, Git/Github, Docker, MongoDB, Latex, PowerPoint, Excel, Power BI
Cloud computing: AWS

Relevant Coursework and Certificates

Courses: Deep Learning, Machine Learning, Computer Vision, Image Processing, Statistics, Non-linear Optimization
Certificates: Getting Started with **AWS** Machine Learning, Analyze Datasets and Train ML Models using **AutoML**