Soroush Omranpour

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Selected Industry & Research Experience

Scientist In Residence - LUCID
Advised by Aaron Labbe

May 2024 – September 2024
Montreal, Canada

- Designed and implemented an open-source generative AI pipeline called **Folly** for producing emotionally resonant, audio-synchronized music videos using a Conformer-based speech recognition model, a CNN-based music analysis toolkit, and stable diffusion. Audio synchronization was done by audio-aware interpolations in the VAE latent space.

Machine Learning Researcher - Mila
Co-advised by Reihaneh Rabbany and Guillaume Rabusseau

September 2022 – Present
Montreal, Canada

- Developed a scalable and efficient tensor-factorized attention mechanism for high-dimensional tensor structured data, with applications in **timeseries forecasting**, **3D image classification**, and **multimodal stock market prediction** improving SOTA performance on the benchmark datasets and significantly reducing training time and memory footprint.
- Conducted research on **static** and **temporal graph learning** methods to analyze mental health patterns of social media users based on their music listening behavior.

Research Intern - Music AI Lab
Advised by Yi-Hsuan Yang

February 2021 – November 2021
Taipei, Taiwan

- Developed two open-source python packages: **DeepMusic** A library for high level musical data manipulation and preprocessing, supporting common encodings used by sequential models, and **Music-Generation** A PyTorch-based framework for training Transformer models on symbolic music data for conditional or unconditional generation.

Deep Learning Engineer - Fanap Inc.
Z-Lab

February 2020 – August 2022
Tehran, Iran

- Developed a full Persian **Speech Recognition** pipeline including wakeword detection, noise reduction, acoustic modeling (pre-trained Wav2Vec2 finetuned on a collection of open and private speech dataets), and language model-based decoding.
- Designed and deployed a **sematic search engine** leveraging ElasticSearch and a sentence embedding Transformer (a pre-trained Bert finetuned on a collection of private datasets) for commercial information retrieval.

Research Intern - IST Austria
Advised by Christoph Lampert.

June 2019 – September 2019
Klosterneuburg, Austria

- Developed a **VAE-based** neuro-symbolic model for solving Raven Progressive Matrices, aiming to investigate abstract visual reasoning and generalization in neural networks.

Research Intern - DML Lab
Advised by Hamid R. Rabiee

January 2019 - June 2019
Tehran, Iran

- Developed an information-theoretic framework called **SocialPhi** to measure the group performance of popular Github repos' contributors and study its correlation with the popularity of the project.
- Developed a SOTA **RNN-based** method for for early detection of fake news on social media reaching the same accuracy as other baselines in up to 20x fewer timesteps.

Education

McGill University
Master of Science in Computer Science, GPA: 3.46/4.00

2022 – 2025
Montreal, Canada

Sharif University of Technology
Bachelor of Science in Computer Engineering, GPA: 3.85/4.00

2016 – 2021
Tehran, Iran

Publications

- **Omranpour, S.**, Rabbusseau, G., Rabbany, R. *Kronecker-Structured Attention For Higher Order Transformers*, Under Review
- **Omranpour, S.**, Rabbusseau, G., Rabbany, R. *Higher Order Transformers: Enhancing Stock Movement Prediction on Multimodal Time-Series Data.* Machine Learning in Finance at **KDD 2024**.
- Ramezani, M., Rafiei, M., **Omranpour, S.**, Rabiee, H. *News Labeling as Early as Possible: Real or Fake?.* **ASONAM 2019**.

Skills

Languages: Python, Bash, SQL, JS   **Databases**: PostgresSQL, MongoDB   **DevOps**: Git/Github, GCP, Docker, SLURM, Unix

ML: PyTorch, HuggingFace Transformers, Pytorch-Lightning, Pytorch-Geometric, Librosa, Nvidia-Nemo, NumPy, Sklearn, PEFT, TRL, Diffusers, Einops, GluonTS, Matplotlib, Pandas

LLM/RAG: Ollama, Llama.cpp, LlamaIndex, LangChain