Faraz Khadivpour

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Summary

Results-driven **Machine Learning Engineer** and **Data Scientist** with 5+ years of experience in deep learning, explainable AI, and generative AI. Proven ability to design, deploy, and optimize AI solutions for real-world applications. Skilled in AI pipeline development, prompt engineering, and RAG (Retrieval-Augmented Generation) using **LLMs**. Strong background in computer vision and time-series data analysis. Experienced in working in a fast-paced startup environment and agile teams, collaborating with cross-functional groups to develop scalable AI-driven solutions.

Work Experience

- **Machine Learning Engineer** *Jan 2025 - Ongoing*

  Vector Institute Vancouver, BC

  - Collaborate with SISA Energy to design, implement, and integrate Generative AI solutions into their platform, automating data extraction from unstructured data such as images, PDFs, and CSV files.
  - Build advanced language processing pipelines using **LangChain** with LLMs (OpenAI, Anthropic, etc.), leveraging prompt engineering, retrieval workflows, and end-to-end traceability via **LangSmith**.
  - Reduce data collection time from 2–3 days to under 1 hour per building while maintaining over 95% accuracy in information extraction.
  - Use **Git** for version control and collaborate in an agile environment (Jira, Confluence) with cross-functional software engineering teams.
  - Deploy AI services via a Flask API and design custom evaluation metrics to ensure reliability, scalability, and continuous performance monitoring.

- **Machine Learning Researcher** *Jan 2023 - Jan 2025*

  Alberta Machine Intelligence Institute (Amii) Edmonton, AB

  - Applied our proposed explainable AI method to **Large Language Models (GPT-2)** and **Diffusion Models**.
  - Implemented an approach to enhance human understanding of GPT-2 when fine-tuned using the **LoRA** (Low-Rank Adaptation of Large Language Models) method.

- **Data Scientist** *Jan 2022 - Jan 2023*

  Scotiabank Edmonton, AB

  - Developed a neural network incorporating **LSTM** and **attention layers** for 800,000+ loan applications and credit report samples.
  - Collaborated with computer science researchers to apply an **explainable AI** method to a neural network, improving interpretability metrics by 15%.

- **Machine Learning Researcher** *May 2020 - Dec 2021*

  Alberta Machine Intelligence Institute (Amii) Edmonton, AB

  - Proposed a novel explainable AI method that makes neural networks more understandable to human users. (Responsibility)
  - Analyzed the inner workings of neural networks using **Keras** and **TensorFlow** on datasets with over 50,000 images, optimizing model explainability.
  - Worked on state-of-the-art convolutional neural networks such as **ResNet**, **AlexNet**, and **VGG**.
  - Applied the proposed method to image classification tasks, improving interpretability metrics by 5%, and to text classification tasks, improving interpretability by 20%.
  - Conducted a human subject study with 300 participants, analyzed results in **RStudio**, and found a 30% preference for our method over baseline approaches.

- **Machine Learning Researcher** *Jan 2020 - May 2020*

  Neuromuscular Control & Biomechanics Laboratory (NCBLab) Edmonton, AB

  - Collaborated with a team of 5 to complete a project for RWDI consulting firm, achieving project milestones 2 weeks ahead of schedule.
  - Implemented Python scripts to extract spatial data from 3D building models in Rhinoceros software.
  - Preprocessed a large dataset collected from 10,000+ samples and applied dimensionality reduction techniques, such as **PCA** and **autoencoders** (achieved a 90% reduction in data complexity).
  - Designed and trained machine learning models in **PyTorch**, achieving a prediction accuracy of 94% for a key variable in wind tunnel simulations.

Teaching Experience

- **Graduate Teaching Assistant, Game AI** *Jan 2023 - Apr 2023*
  Computing Science Department, University of Alberta. Edmonton, AB
  - Led tutorials and reviewed sessions to reinforce key Game AI concepts and assist students with assignments.
  - Graded quizzes and provided detailed feedback, helping students improve their understanding of **C#** and **Unity**.
  - Supported over 50 students in mastering AI techniques within game development environments.

Education

- **M.Sc. in Computing Science** *Jan 2023 - Dec 2024*
  University of Alberta Edmonton, AB
  GPA: 4.0
- **M.Sc. in Environmental Engineering** , University of Tehran *Sep 2015 - Feb 2018*
- **B.Sc. in Civil Engineering** , K.N.Toosi University of Technology *Sep 2010 - Aug 2015*

Awards

- **Alberta Graduate Excellence Scholarship (AGES)** *Jan 2025*
  University of Alberta
  - Awarded in recognition of outstanding academic achievement in graduate studies.

Certificates

- **Advanced Manufacturing Engineers Upskilling Program** Foresight Canada *Winter 2025*
- **MLOps** Coursera Specialization by deeplearning.ai *Summer 2022*
- **Machine Learning Technician Certification** Amii *Fall 2020*
- **Deep Learning** Coursera Specialization by deeplearning.ai *Summer 2020*

Publications

[1] Khadivpour F, Banerjee A, and Guzdial M. "Responsibility: An example-based explainable AI approach via training process inspection." arXiv preprint arXiv:2209.03433v1 (2022).

[2] Khadivpour F, Guzdial M. Explainability via Responsibility. The 2020 Intelligence and Interactive Digital Entertainment (AIIDE) Workshop on Experimental AI in Games (EXAG). DOI: arXiv:2010.01676.

[3] Shayesteh AA, Koohshekan O, Khadivpour F, Kian M, Ghasemzadeh R, Pazoki M. Industrial waste management using the rapid impact assessment matrix method for an industrial park. Global Journal of Environmental Science and Management. 2020 Apr 1;6(2):261-74. DOI: 10.22034/GJESM.2020.02.10

Skills

- **Programming Languages:** Python, R, SQL, C#
- **Machine Learning Frameworks:** TensorFlow, PyTorch, Keras, Tflearn, scikit-learn, PyCaret
- **Data Manipulation Tools:** Pandas, NumPy
- **LLM Ecosystem:** Prompt Engineering, LangChain, LangSmith, Large Language models (OpenAI, Anthropic, Google), retrieval-augmented generation (RAG), Vector DBs (Chroma, FAISS, etc.), Model Context Protocol
- **Data Visualization Libraries:** Matplotlib, Plotly, Seaborn
- **Deep Learning:** CNN, RNN, LLM, Autoencoders, Diffusion Models, Transformers
- **Cloud Platforms:** AWS, Google Cloud, Amazon SageMaker, Vertex AI
- **Model Deployment:** Docker, Kubernetes
- **Web Technologies:** Flask, Django, HTML, Streamlit
- **IDEs:** Visual Studio, Cursor, PyCharm, RStudio, Jupyter Notebook, Google Colaboratory
- **Control System:** Git
- **Collaboration:** Jira, Confluence, Miro
- **Other:** AutoCAD, Power BI, Rhinoceros 3D, GIS