

Bahar Emami Afshar

Machine Learning Engineer | MSc AI | 2+ Years of Experience

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TECHNICAL SKILLS

Languages: Python, C/C++, Java, SQL, R.

DevOps: Kubernetes, Docker, MLflow, CI/CD, Azure, Git Actions.

ML Frameworks: Pandas, NumPy, TensorFlow, Transformers, PyTorch, Scikit-Learn, Hugging Face, Langchain.

ML Expertise: Anomaly Detection, Natural Language Processing, Deep Learning, Active Learning, Online Learning, Semi-Supervised Learning, Large Language Models, Feature Engineering, Explainable AI.

APIs & Services: REST APIs, Streamlit, React, Flask.

Databases: MySQL, HibernateORM, Elastic Search, MongoDB, Neo4j.

EXPERIENCE

ML Engineer Researcher (MITACS Internship) | H3M Analytics Inc. | Ottawa, ON

09/2023 – 08/2025

- Supervisor: Dr. Paula Branco (University of Ottawa)
- Developed **X-ITERADE**, an explainable unsupervised anomaly detection framework with a modular backend for fraud detection that identifies high-quality suspicious cases without requiring labeled data, and achieved a **15-times improvement** in the imbalance ratio while maintaining flexibility under labeling budget constraints.
- Created ALISA, an innovative iterative learning pipeline combining active learning, semi-supervised learning, and data augmentation with dynamic weighting and feedback loops, boosting **F1-score by 22%** in highly imbalanced one-class scenarios.
- Developed an explainability module for group behavior analysis in financial datasets, leveraging **GPT** via **RESTful API** calls and local deployment of **LLaMA** and **Mistral** models with in-context learning and prompt tuning, **achieving 90% accuracy** in interpreting fraud patterns.
- Designed and implemented ML models for extreme class imbalance (0.077%) using advanced algorithms including XGBoost, LightGBM, autoencoders, and Transformer-based architectures tailored for anomaly detection and learning from limited labels.
- Built end-to-end deep learning pipelines in Python using Pandas, Scikit-learn, Hugging Face, and PyTorch, ensuring reproducibility and robustness through version-controlled codebases (Git) and thorough documentation.

ML Engineer Intern | Peppy Digger | Tehran, Iran

05/2021 – 09/2021

- Developed a **3-class sentiment analysis** model on Persian Twitter data using FastText embeddings, TF-IDF features, and Bidirectional GRU networks to capture rich language context.
- Applied class imbalance handling techniques, including dynamic class weighting and resampling, boosting **accuracy by 10%** while ensuring balanced performance across classes.
- Built and trained deep learning pipelines in Python with **TensorFlow/Keras**, optimizing with **Adam** and tracking metrics like accuracy and AUC.

PROJECTS

Research Paper Summarizer | Python, Streamlit, LangChain, MLflow, Docker, GitHub Actions, Azure App Service

08/2025

- Developed and deployed an AI-powered tool that ingests academic PDFs and generates concise, structured summaries using LangChain and OpenAI; integrated MLflow for experiment tracking on DagsHub, containerized with Docker, automated builds via GitHub Actions, and deployed on Azure Web App for scalable, cloud-based access.

Semi-Supervised Learning for Bank Marketing | Python, scikit-learn, Numpy, XGBoost, LGBM

03/2024

- Compared and implemented multiple semi-supervised algorithms using models such as GBT, SVC, KNN, and MLP, improving accuracy from 76% to 88% on imbalanced marketing data.

Online Learning for Intrusion Detection | Python, Numpy, Apache Kafka, Stream Processing

11/2023

- Developed a real-time intrusion detection system with Apache Kafka and online learning algorithms using XGBoost, achieving 87% F1-score while adapting to data drift and evolving threats.

COVID Detection from Lung Images | Computer Vision, Python, Numpy, Pytorch, Tensorflow

11/2020

- Built and benchmarked CNNs in NumPy, PyTorch, and TensorFlow for chest X-ray classification, reaching 94% accuracy using data augmentation and tailored loss functions.

IMDB Clone (IEMDB) | Full-Stack Development, Java, Spring Boot, REST APIs, React, Docker, Kubernetes

05/2022

- Built a full-stack movie platform with Spring Boot, RESTful APIs, React, Maven, and JPA featuring OAuth/JWT authentication, user interactions, and a collaborative filtering recommender; tested with JUnit and deployed via Docker in a Kubernetes environment for scalable access.

EDUCATION

University of Ottawa
University of Tehran

M.Sc. in Computer Science - AI Applied Concentration | GPA : A+
B.Sc. in Computer Engineering | GPA: A, Last 2 Years: A+

09/2023 – 08/2025
09/2018 – 07/2023

PUBLICATIONS & IP

UOttawa & H3M Analytics Inc.

2024-2025

- Published 3 peer-reviewed papers on fraud and malware detection using explainable and label-efficient AI systems; submitted one patent on a two-stage anomaly detection and explanation framework. Full list available on Google Scholar.