Hossein Rahmani

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Summary

AI Engineer (M.Sc. Applied Math @ UBC; B.Sc. CS @ Sharif) with 3+ years of ***research*** and ***industry*** experience building scalable ***ML***, ***Causal Inference***, and ***Large Language Models*** systems. Proficient in ***Python***, and ***SQL***; model development with ***PyTorch*** and ***TensorFlow***; cloud deployments on ***AWS*** ; CI/CD and ***Docker***; big-data frameworks ***Spark*** and ***Hadoop***; API development using ***FastAPI***; and experience in ***LangGraph, Langfuse***, ***OpenAI Agent SDK***, ***Streamlit***, ***Weaviate Vector Database***, and ***RAG***.

Education

- **University of British Columbia**
  *Master's in Applied Mathematics, 12 credits (**GPA: 4.0/4.0**)* *September 2023 – October 2025*

  Relevant Courses: Advanced Machine Learning (A^+) - Causal Inference & Graphical models (A^+) - Causal Machine Learning (A) - Computational Optimization (A)

- **Sharif University of Technology**
  *Bachelor's in Computer Science, 141 credits (**GPA: 4.0/4.0**)* *September 2019 – September 2023*

  Relevant Courses: Advanced Programming in Java (OOP) 20/20 - Probability & Applications 19.8/20 - Regression Analysis (Statistical Learning) 20/20 - Algorithms Analysis 19.4/20

Selected Research & Work Experience

- **Semester Research project**
  *at UBC under the supervision of **Prof. Mathias Lécuyer*** *September 2024 - October 2025*
  - Designed an algorithm to measure the **attribution of prompt words** on the **Large Language Model**'s output by conducting a **Randomized Experiment** to estimate the Average Marginal Effect (AME) of adding a word to the prompt.

- **Research Assistant**
  *at UBC under the supervision of **Prof. Elina Robeva*** *September 2023 - October 2025*
  - Designed an iterative algorithm using **Optimal Transport** to jointly estimate the drift, diffusion, and causal graph associated with a Stochastic Differential Equation from temporal marginals for the first time. This work is part of master research, and the preprint is available on Arxiv and submitted to JMLR.

- **Data Scientist**
  *at Shomara under the supervision of **Prof. Mir-Omid Haji-Mirsadeghi*** *December 2021 - October 2022*
  - **Internship**: Predicted the purchase surplus when people got credit using Conditional Average Treatment Effect estimator **GRF** with a novel type of experiment and used the **CUPED** method for lowering the variance of **Heterogeneous Treatment Effect** estimation.
  - **Data Scientist**: Developed a method to decrease variance for estimating the probability of defaulting (in case people don't pay off money) using **XGBoost** leading to a 5% increase in relative AUC.

- **Data Science Internship**
  at Snapp Market *September 2021 - December 2021*
  - Created an innovative algorithm that improved the precision of staff location tracking accuracy by 20% through feature extraction and the **YOLO Algorithm**, and tools in **OpenCV**.
  - Built weekly dashboard for showing marketing statistics from Snapp's database using **SQL**.

Selected Projects

- **Bitcoin Question-Answering RAG**: Engineered an RAG framework for answering questions related to Bitcoin by using Sentence Transformer embeddings in **Chroma** vector Database; integrated **OpenAI's GPT-4** and **Tavily** LLM Search agent for searching tool for enhanced response accuracy.
- **Manifold Sampling & Multi-Manifold Clustering**: Implemented a **multi-manifold clustering** benchmark using **SUGAR** sampling algorithm for OPTIMIZER competition with more than 30 teams at the Sharif University of Technology.
- **HearthStone**: Implemented Graphical Client-Server HearthStone game employing **Solid principles, Factory** and **Visitor** design patterns for handling different actions of a card in the game neatly.

Honours and Awards

- **BPOC Graduate Excellence Award**
  Mathematics Faculty of University of British Columbia *August 2024*
  Awarded for outstanding achievements among master's students of color in the Mathematics Faculty.
- **Silver Medal in National Mathematical Olympiad**
  Young Scholar Club *June 2018*
  Iranian National Mathematical Olympiad is an innovative competitive math contest that covers 4 major fields (Euclidean Geometry, Combinatorics, Number Theory, and Algebra) like IMO but on a national scale.