Mohamed Harmanani

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Education

Queen's University — **Kingston, ON, Canada**
MSc in Artificial Intelligence (cGPA: 4.24/4.30) — 2022 – Present
- Supervisor: Parvin Mousavi

University of Toronto — **Toronto, ON, Canada**
HBSc in Computer Science — 2016 – 2021
Minor: Philosophy

Experience

Machine Learning Student Researcher — **Toronto, ON, Canada**
Vector Institute — Jan 2023 – Present

Graduate Research Assistant — **Kingston, ON, Canada**
Med-i Lab, Queen's University — Sep 2022 – Present
- Implemented **self-supervised learning** methods (SimCLR, BYOL) for prostate cancer detection from ultrasounds on a dataset of 3800+ biopsy cores

Data Scientist — **Montreal, QC, Canada**
Flinks — Sep 2019 – Apr 2020
- Accelerated the development of **MLOps** tools using DVC & Google Dataflow ETL to build data processing pipelines for NLP
- Optimized deep learning models (BERT) for **financial language modelling** using PyTorch and AWS SageMaker, resulting in a 33% increase in performance metrics browsers, increasing volume of collected data by 20%
- Conducted **A/B testing** experiments on 2M+ rows of browser data to improve effectiveness of screen scrapers, increasing volume of collected data by 20%
- Built enterprise level data visualization tools for data exploration by product teams using Streamlit, providing real-time visibility into relevant KPIs
- Utilized explainability frameworks to interpret Machine Learning models, turning predictions into product improvements

Machine Learning Research Intern — **Toronto, ON, Canada**
University of Toronto — Sep 2019 – Apr 2020
- Implemented **NLP and deep learning** techniques (RNN, BERT) for **automated bug detection** in student code using PyTorch
- Improved data processing tools for extracting 15000+ data points from student submissions to serve as training data
- **Trained and fine-tuned** RNN, Transformer, and CodeBERT models, leading to a 55% increase in model performance
- **Deployed over 50** machine learning models to a Flask web server, allowing to run and compare models 5x faster

Bioinformatics Research Intern — **Mississauga, ON, Canada**
University of Toronto — Sep 2019 – Apr 2020
- Led the development of a data pipeline for biological sequence analysis using Slurm, Bash and Python, reducing task turnaround time from 1 week to 2 days
- Developed tools to clean, assemble, and align RNA transcript data, using FastQC, Trinity, Hisat2, and BLAST
- Wrangled over 6TB of data, and extracted insights such as alignment frequency and average transcript length

Software Engineer — **Toronto, ON, Canada**
Venngage — Apr 2019 – Jul 2019
- Implemented probabilistic algorithms for design generation in TypeScript, React & Fabric.js, increasing quality metrics by 13%
- Developed a scalable service for icon searching using React & Algolia, reducing search times on the icon library by 200%

Publications & Preprints

[1] **M. Harmanani** "Modelling the Spread of COVID-19 in Indoor Spaces using Probabilistic Automated Planning" *ICAPS Scheduling and Planning Applications woRKshop (SPARK 2023)*

[2] S. Fujimori, **M. Harmanani**, O. Siddiqui, L. Zhang "Using Deep Learning to Localize Errors in Student Code Submissions" *Proceedings of the 53rd ACM Technical Symposium on Computer Science Education (SIGCSE 2022)*

Teaching

Teaching Assistant — **Queen's University**
Intro to Data Analytics (CISC 151) — Winter 2023

- Conducted review sessions for students to reinforce understanding of programming and data analysis techniques
- Graded assignments and provided timely feedback to students on their code and analyses

Awards

MediCREATE Central Line Challenge, 2nd Place	May 2023
Robert Sutherland Fellowship – Queen's University	Sep 2022
MediCREATE Training Award – Queen's University	Aug 2022
Mathematics & Computer Science Honour Roll – University of Toronto	Jun 2021
Philosophy Excellence 300 Prize – University of Toronto	May 2021
Entrance Award – University of Toronto	Sep 2016

Skills

Programming: Python, SQL, JavaScript, R, Java, C, HTML, CSS, MATLAB
Tools: PyTorch, Keras, BigQuery, Google Dataflow, GCP, AWS (S3, SageMaker), React, Node.js, Pandas, Seaborn
Algorithms: CNN, ResNet, RNN, Transformers, Vision Transformers, BERT, GPT, SimCLR, BYOL, VICReg

Languages

Fluent/Native: English, French, Arabic
Intermediate: Spanish
Beginner: Japanese