

Akash Patel

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MACHINE LEARNING SCIENTIST

Machine Learning Engineer with 2+ years of experience applying machine learning to real-world business and government problems. Strong foundation in LLM, GenAI, time-series modeling, and model deployment. Proven ability to deliver production-grade ML systems with measurable impact across analytics pipelines, cloud environments, and regulated domains.

TECHNICAL SKILLS

Languages	: Python, R programming, SQL,
Frameworks	: Pytorch, Tensorflow, FastAPI, Streamlit, Hydra
Libraries	: scikit-learn, Hugging Face Transformers, XGBoost, spaCy, NLTK Numpy, Pandas
Databases	: MySQL, SQLite, PostgreSQL
Cloud & DevOps	: Google Cloud Platform (Vertex AI, Cloud build, GKE), AWS, Docker, Kubernetes, Terraform, CI/CD pipelines
Tools & Platforms	: Visual Studio Code, SHAP, Weights & Biases, Tableau, Power BI
Skills	: Machine Learning, Large Language Models (LLMs), NLP, Time-Series Forecasting, Model Evaluation, A/B Testing, Explainability, Fairness Audits, Active Learning, Model Deployment, Data Visualization

EXPERIENCE

Machine Learning Scientist

Defence Research and Development Canada (DRDC)

Jan 2025 – Present

Ottawa, ON, Canada

- Designed and implemented an end-to-end ML pipeline for scrapping, collecting and processing large volumes of open-source intelligence data, incorporating summarization, text classification, and topic modeling.
- Built microservices using **Flask** and containerized the pipeline with **Docker**, deploying on **Google Kubernetes Engine (GKE)** for efficient orchestration and scalability.
- Integrated LLMs into a GenAI-powered web dashboard used for geopolitical risk assessment and automated reporting.
- Enabled analysts to reduce manual effort by **over 90%** in discovering relevant information, generating reports, and extracting insights.

Junior Data Scientist

Canadian Intellectual Property Office (ISED)

May 2024 – Jan 2025

Gatineau, QC, Canada

- Developed production-grade BERT-based classification models to assign NAPCS codes to trademark applications, deployed using AWS microservices.
- Engineered a **few-shot learning pipeline** combining pseudo-labeling, synthetic data generation, and active learning to address low-resource short-text classification, improving accuracy from 30% to over 80%.
- Created explainability and QA dashboards using SHAP and Streamlit to support human-in-the-loop review workflows.

Graduate Teaching Assistant

Carleton University

Sept 2023 – Present

Ottawa, ON, Canada

- Led tutorials and lab sessions for graduate-level courses in **machine learning, optimization algorithms**, and **deep learning**, supporting over 100 students for four consecutive semester
- Delivered guest lectures and assisted in curriculum development, incorporating visual aids, coding demos, and real-world applications to enhance comprehension.
- Provided one-on-one mentoring and academic support, contributing to improved student performance and engagement.

PROJECTS

Enhancing Neural Topic Models with Reinforcement Learning and Count-Based Exploration

Technologies used : PyTorch, SBERT, VAE, REINFORCE algorithm

- * Designed a topic modeling framework using reinforcement learning with count-based intrinsic rewards to improve topic diversity and coherence.
- * Framed topic inference as an MDP and applied REINFORCE with neural density bonuses to avoid mode collapse.
- * Outperformed baselines (ProdLDA, ETM) with **20% higher coherence** and **0.975 diversity**, with minimal compute overhead.

Nowcasting Canadian Labour Market Indicators - Statistics Canada

Technologies used : MySQL, Chronos, SARIMAX, REST APIs ,Seaborn library

- * Led Statistics Canada's initiative to implement statistical models for real-time forecasting of Canadian labor market indicators, reducing their reporting lag by 50% to 21 days.
- * Applied **SARIMAX** and **Chronos models** to optimize accuracy in economic analysis, supporting more informed decision-making processes and strategic planning.
- * Integrated critical external variables such as GDP by industry, stock market indices, and immigration data into project planning, optimizing strategic decision-making and project outcomes.

Trip Destination Prediction by Cross-City Data with Graph neural network

Technologies used : Jupyter Lab, MySQL,Git, Matplotlib library

- * Implemented **optimized Neural Network** architectures for trip type prediction.
- * Applied **Graph Neural Network (GNN)** technique for enhanced destination predictions.

Development of Advanced Fake Statement Detection Model using Truth-Seeker Dataset

Technologies used : Hugging face, Weights and Biases, Trello, Git, NLP models

- * Performed EDA, fine-tuning with **PyTorch**, and leveraged **Weights and Biases** for tracking and optimization.
- * Utilized **BERT, DistilBERT, ConvBERT, and ensemble stacking** with Random Forest Classifier for enhanced performance.
- * Curated fake statement detection model using TruthSeeker dataset, beating state-of-the-art by achieving 96.9% accuracy in two-way and 50.5% in four-way classification.

Few-Shot Learning for Images using Vision Language Models with Angular Margin Techniques

Technologies used : Hydra framework, Pytorch, Git

- * Developed and implemented **CosFace-CLIP**, integrating angular margin with Proto-CLIP for state-of-the-art few-shot learning in vision-language models.
- * Led extensive experiments across diverse datasets, achieving competitive results in 4-shot and 8-shot scenarios, demonstrating adaptability and robust performance.
- * Conducted meticulous error analysis, proposing future research directions to refine and optimize **angular margin-based few-shot learning models**.

EDUCATION

Carleton University

Master of Engineering: Data Science, Analytics, and Artificial Intelligence

Ottawa, ON, Canada

Sept 2023 – April 2025

Georgian College

Artificial Intelligence – Architecture, Design, and Implementation

Barrie, ON, Canada

May 2022 – Dec 2022

The University of Manitoba

Applied Business Management

Winnipeg, MB, Canada

May 2019 – May 2020

Pandit Deendayal Petroleum University

Bachelor of Engineering in Electrical Engineering

Gandhinagar, GJ, India

Aug 2014 – May 2018

CERTIFICATIONS

- AWS Academy Cloud Foundations
- AWS Academy Machine Learning Foundations