

Alexander De Costa

ML Engineer — U of T Mathematics & Probability Graduate
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Current modeling work confidential; please contact for details.

Summary

- Machine learning engineer with a rigorous foundation in mathematics and probability, specializing in interpretable ML, scalable AutoML systems, and advanced model search.
- Skilled at designing hybrid model architectures and intelligent, modular pipelines that combine statistical rigor with automated feature engineering and model selection.
- Currently leading development of a production-ready AutoML framework leveraging Bayesian optimization and robust statistical preprocessing to improve rare-event detection in time series and tabular data.
- Passionate about building explainable, reliable AI systems that bridge research innovation and real-world impact.

Technical Skills

Machine Learning: Models from first principles (logistic regression, ensembles); classical and modern time series (ARIMA, Prophet, state-space models).

Deep Learning: LSTMs, Transformers, Graph Neural Networks, Temporal Fusion Transformers, GANs, diffusion models; interpretable and hybrid architectures combining neural and probabilistic components.

AutoML Systems: Custom Bayesian optimization (Optuna), EDA-driven feature transformations, class imbalance detection, multi-stage pipeline search.

Mathematical Research: Functional analysis (Banach & Hilbert spaces), spectral methods, and high-dimensional probability applied to algorithm design in ML.

Tools & Frameworks: Python, PyTorch, Jupyter, RStudio, SQL, scikit-learn.

Infrastructure (in progress): FastAPI, Docker, Kubernetes, MLflow, Airflow, Terraform, Prometheus, AWS, Git.

Education

University of Toronto *Sep 2020 – May 2025*
BSc, Mathematics and Its Applications (Probability/Statistics)

Relevant coursework: Measure Theory (MAT1000), Functional Analysis (MAT1001), Mathematical Statistics (STA452), Stochastic Processes (STA2006), Operator Theory (MAT1011).

Experience

RiskScope

Jun 2025 – Present

Co-founder & Lead ML Consultant

- Led development of a modular AutoML pipeline with Bayesian optimization and intelligent feature transformation, designed to handle high-cardinality, sparse, and imbalanced fraud detection data.
- Integrated advanced modeling components into a modular and interpretable pipeline designed to capture complex data patterns while maintaining robustness and transparency.
- Engineered robust preprocessing modules that extract statistical and temporal structure, support targeted feature transformation, and improve downstream model generalizability.
- Developed adaptive evaluation and tuning strategies to enhance rare-event detection under class imbalance and distributional shift, with emphasis on interpretability and stability.

Manulife

Jan 2023 – May 2023

Actuarial Student – Experience Analytics

- Updated experience monitoring reports via data extraction and validation (R, SAS, SQL); collaborated cross-functionally to improve study programs supporting valuation and pricing models.