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 strong mathematical and probabilistic expertise, specializing in interpretable models, scalable AutoML frameworks, and efficient model search.
- Designed and deployed modular pipelines integrating rigorous statistical methods, adaptive feature engineering, and automated hyperparameter optimization.
- Leading development of a production-grade AutoML system using Bayesian optimization and robust preprocessing for rare-event and imbalanced data detection.
- Committed to building reliable, explainable AI solutions that translate advanced theory into real-world business impact.

Technical Skills

ML & Time Series: Core models from first principles (logistic regression, ensembles); classical and modern time series (ARIMA, state-space models, Kalman filters, Prophet).
Deep Learning: LSTMs, Transformers, GNNs, Temporal Fusion Transformers, GANs, diffusion models, hybrid neural-probabilistic models.
AutoML: Bayesian optimization (Optuna), adaptive feature transformations, class imbalance detection, modular pipeline design.
Mathematical Tools: Martingales, concentration inequalities, variational principles; fluent in applying advanced theory to practical modeling problems.
Stack: Python, PyTorch, scikit-learn, Jupyter, SQL, RStudio; infra (in progress): FastAPI, Docker, K8s, MLflow, Terraform, 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), Stochastic Processes (STA2006), Mathematical Statistics (STA452), Operator Theory (MAT1011)

Experience

RiskScope *Jun 2025 – Present*
Co-founder & Lead ML Consultant

- Designed a modular AutoML framework integrating Bayesian optimization, adaptive feature transformations, and robust statistical preprocessing for high-cardinality, sparse, and imbalanced fraud detection data.
- Built interpretable pipelines capable of surfacing subtle, non-obvious signals in noisy environments using calibrated models and drift-aware diagnostics.
- Developed temporal feature engineering and redundancy reduction modules to enhance model generalization across heterogeneous datasets.
- Implemented class imbalance-aware tuning and evaluation strategies for rare-event detection under nonstationary distributions.

Manulife *Jan 2023 – May 2023*
Actuarial Student – Experience Analytics

- Updated and validated experience monitoring reports using R, SAS, and SQL.
- Partnered with valuation and pricing teams to modernize internal analytics supporting actuarial assumptions and risk estimates.

Probability & Research Focus

- Continuously deepening expertise in modern probability, focusing on martingales, stochastic processes, and concentration inequalities.
- Working toward theoretical contributions with real-world impact in areas including probabilistic machine learning, reinforcement learning, model maintenance, and quantitative finance.

Professional Skills

- Strong communicator skilled at translating complex mathematical ideas for technical and business teams.
- Collaborative and self-directed; comfortable leading projects and working across roles.
- Experienced in technical writing, mentoring, and presenting models in high-stakes environments.