

Nicholas Fung

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Experience

Riskfuel Analytics, ML Engineer ✉

Sep 2021 – Dec 2023 | Toronto, Canada

Primary Technologies: PyTorch, Docker, Kubernetes, Pulsar, SQL

- Developed ML models to speedup structured product pricing. Tailored model complexity to suit client performance requirements. On GPU, the models ran 1,000,000x faster compared to traditional Monte-Carlo pricers, while maintaining sub-0.1% errors, transforming nightly pricing processes into real-time processes.
- Designed schemas for financial data, and orchestrated custom transformations using DAG workflows. Used Pulsar to aggregate streaming data from over 200 on-prem and cloud nodes to produce millions of data points for training.
- Implemented systematic outlier detection methods, using Python's scientific computing libraries. This reduced data anomalies, leading to higher model performance.
- Led pilot projects with global investment banks, defining project scope, coordinating engineering efforts, and delivering models. This led to full product licenses in significant reductions in compute costs for clients.

Riskfuel Analytics, Research Associate ✉

Apr 2020 – Aug 2020 | Toronto, Canada

Primary Technologies: PyTorch, Docker, Kubernetes, Git, GitHub Actions

- Created scalable workflows by containerizing runtime environments using Docker, and orchestrating workloads using Kubernetes on an on-prem cluster with 50+ nodes. This reduced downtime and maximized cluster utilization.
- Accelerated Scotiabank's exotic option pricing by implementing innovative data generation strategies and training deep learning models to reach 800,000x in pricing throughput compared to previous methods.
- Implemented a CI/CD pipeline that automated unit testing and image building using GitHub Actions. This reduced build times by 40%, standardized code development processes, and improved observability and error handling.

Non-Invasive Surgical Innovations, Software Engineer

Apr 2018 – Aug 2018 | Hong Kong

Primary Technologies: Computer Vision, Object Detection, YOLOv3, Image Processing, CUDA

- Deployed a model for real-time colorectal tumor detection with sub-50 ms latency by aggregating a dataset of over 3,000 scraped and annotated images, and training a Convolutional Neural Network using the YOLOv3 architecture.
- Implemented noise reduction and edge enhancement techniques to improve image clarity for better diagnostic accuracy, using CUDA in C++ for the Jetson TX2 embedded computing module.

Projects

Open Democracy

Primary Technologies: Django, Postgres, ChromaDB, LLMs, LangChain, RAG

- Developed a system using retrieval-augmented-generation (RAG) with GPT-4 to summarize bills and debates in the Canadian House of Commons in order to promote greater transparency in political activity to the public

Education

University of Toronto, MSc, Computer Engineering

Toronto, Canada

Specialization in Machine Learning with Financial Applications

Primary Technologies: Pytorch, BERT LM, HuggingFace, spaCy, NLTK, VAE, Generative Modelling

- Variational autoencoders for option pricing. Applications in risk management and derivative pricing. *Publication* ✉
- Fine-tuned a pretrained BERT LM on earnings calls to predict investor sentiment and future returns.

Select Awards

- Bell Scholarship: Awarded to 3 graduate students in ECE.
- Mitacs Accelerate Fellowship: Awarded to graduate students for research collaborations with an industry partner.

University of British Columbia, BSc, Computer Engineering

Vancouver, Canada

Graduated with Distinction

Select Awards

- Dean's Honour List: Maintained an average of 80% or above.
- Awarded the Trek Scholarship: Awarded to the top 5% of undergraduate students in their year and department.

Certificates

Certified Kubernetes Administrator (CKA) ✉

Certification ID: LF-hkyfxltp2j