Joseph (Luke) Rivard

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Actuarial Exams

Exam FM	Passed April 2021
Exam P	Passed July 2021
Exam MAS-I	Passed October 2021
Exam IFM	Passed November 2021
Exam MAS-II	Passed May 2022
Online Course 1	Passed May 2022
Online Course 2	Passed July 2022
Exam 5	Passed May 2023

Education

McMaster University, B.Sc. Mathematics & Computer Science — Granted 2024
+ Minors in Economics, Finance, Statistics and CGPA of **3.91/4.00**
+ Near ACAS in **50%** less time than average full-time candidates.
+ Ontario Conference of Casualty Actuaries Scholarship — Granted 2022

University of Waterloo, M.Math. Computer Science — Expected 2026
+ Supervisor | Research Area: Communication between LLM's.

Work Experience

Machine Learning Engineer (June 2024-September 2024) – Kotoba Technologies, Tokyo Japan
- Extended the context window for our speech-to-speech audio foundation model 3x by linear interpolating positional embeddings and fine-tuning on 8x H100.
- Researched state of the art audio tokenizers and proposed better tokenizers that improved model latency and quality significantly. Developed an audio tokenizer comparison pipeline, that enables rapid implementation of new models and audio quality statistics and automatically generates, organizes and plots audio statistics from selected model configurations.

Junior Data Scientist (May 2023-August 2023) – Definity Financial, Ontario Canada
- Helped support and encourage team to migrate our machine learning models to GCP. Demonstrated that is effective to have models in the cloud vs local. Achieved this by creating a decision tree model in the cloud and explaining the results, process and ease of use.
- Discovered large areas of improvement in one of our personal auto insurance double GLM models and completely rewrote the entire model to ensure future maintainability and boosted results significantly in prediction lift charts to help us better segment claims.

Actuarial analyst (Jan 2022-August 2022) – Definity Financial, Ontario Canada
- Controlled project to develop new monthly policy inforces in collaboration with our modeling team in SQL. Reduced our policy inforce run/download time from two days to just twenty minutes.
- Worked on PPV major filing, segmented differentials in our pricing model and identified levels that we should adjust to improve profitability based on theoretical, experience loss ratios, credibility and competitive information. Produced final proposal and presented results to team.

General laborer (2017-2019) Anmar Mechanical & Electrical Contractors Ltd, Hamilton Ontario

Projects

Morse Code Transformer (2024)
I implemented the transformer architecture from scratch. I trained two LLMs, one on english characters and another on morse encoded english characters. I found that increasing ONLY the context length proportionally yielded similar performance between the morse code and english LLM. See GitHub.

Multi inference LLM with implicit chain of reasoning (2023)
See GitHub. Referenced this paper and expanded it to train a new gpt-2 LLM that solves simultaneous 2 digit by 2-digit multiplication using implicit chain of reasoning. Notebook with instructions/visuals is available.

ChatGPT vs Keyword ML (2023)
I trained a few models on keywords to predict binary review sentiment. ChatGPT did better. See GitHub.

Qualitative

Packages: pandas, pytorch, scikit-learn, transformers, xgboost, numpy, matplotlib.
Strong in Python, Microsoft Word, Excel, SQL and PowerPoint. Knowledgeable in R, Java, Git and Google cloud platform. Completed 50 leetcode problems.