Connor Usaty

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Education

McMaster University **(Expected) Apr. 2027**
Bachelor of Computer Engineering, Minor in Statistics *Hamilton, Ontario*
- **Golden Key Distinction (Top 15%)** - CGPA: 3.8/4.0
- **Relevant Coursework:** High Performance Computing, Operating Systems, Computer Architecture, Computer Networking, Algorithm Design & Analysis, Data Structures & Algorithms, Advanced Probability & Random Processes

Work Experience

Pure Storage **May 2025 - Aug. 2025**
Software Engineer Intern | C++, Linux *Santa Clara, California*
- Utilized **Linux Perf** to find a bottleneck on the hot path caused by **C++** virtual call overhead. Refactored the code to **C++** templates to shift the overload resolution from run-time to compile time and **increased throughput by 114%**.
- Identified another bottleneck with **Linux Perf** caused by loop overhead. Used **C++** template meta-programming to resolve loop bounds at compile time, enabling **loop unrolling** which **increased throughput by another 51%**.
- Developed a robust unit and performance test generation system with **C++20** template meta-programming and **GoogleTest**, resulting in a **42%** test coverage increase and a **50%** decrease in future test development time.

MHI RJ Aviation **May 2024 - Apr. 2025**
Data Engineer Intern | Python, SQL *Mississauga, Ontario*
- Optimized **4 ETL Pipelines** up to **82%** by refactoring from **Pandas** to **Polars** and optimizing legacy **Python** code to **Python 3.12** ensuring usage of **Python** optimization tools such as list comprehensions, generators, and decorators.
- Developed **3 full-stack web apps** in **Python** using **Dash**, **Plotly**, and **Polars** to dynamically display sales and backlog data from an **SQL** database which provided executives with a detailed oversight of **$10M+** total monthly revenue.

Projects

Market Order Book | *C++, Linux*
- Developed a price-time priority matching engine in **C++** with aggressive order execution and partial fill support while maintaining FIFO semantics and allowing for **O(1)** order cancellations and modifications via std::list iterator caching.
- Implemented a type-safe order memory pool using std::unique_ptr and aligned_storage_t to ensure cache-line alignment.

Redis Server | *C++, Linux, Concurrency, Networking (TCP)*
- Developed a **concurrent lock-free** event-driven server in **C++** using **Linux system calls**, non-blocking I/O, request pipelining, and a custom cache-friendly Buffer struct to achieve **68k+ requests/second** and **43μs latency**.
- Compared **multi-threaded** and **event-driven** server architectures using **Google Benchmark** and std::chrono. This showed that the event-driven design achieved up to **25x lower latency** compared to the multi-threaded model.
- Utilized **Linux TCP** sockets with a custom message serialization protocol for reliable client-server communication.

AI Sudoku Solver | *Python, TensorFlow, Keras, OpenCV, NumPy*
- Fine-tuned a Convolutional Neural Network (CNN) using concepts such as dropout layers, batch normalization, and early stopping to achieve **99.96% validation accuracy** and **0.13% validation loss** on a 213,000 image dataset.
- Developed a synthetic data generation algorithm to efficiently generate a large customized dataset of Sudoku squares.
- Utilized **OpenCV** and **NumPy** to preprocess images, locate the Sudoku grid, and extract the 81 Sudoku squares.

Extracurriculars

McMaster Artificial Intelligence Society **May 2024 - Present**
President | Python *McMaster University*
- Led new educational and project initiatives resulting in a **record-high 1.3k+ member count.**
- Developed NLP, CNN, and neural network demos in **Jupyter Notebook** using **TensorFlow**, **Keras**, and **matplotlib** to further attendees' understanding of concepts such as data preprocessing, model validation, and model fine-tuning.

McMaster Competitive Programming Club **Sep. 2024 - Present**
Member | C++ *McMaster University*
- Placed **second** at the September 2024 **Intel-sponsored** McMaster Competitive Programming contest.
- **1850+** Leetcode contest rating **(Top 5% worldwide)**

Technical Skills

Languages: C++, C, Python, SQL, Bash
Libraries: GoogleTest, Google Benchmark, Boost, STL, PyTest, Polars, Pandas, Dash, Plotly, matplotlib
Other: CMake, GDB, Perf, Linux, Unix, Windows, Git, GitHub, Azure