HANSON SUN

hansonsun.school@gmail.com | linkedin/hanson-sun | github/Hanson-Sun

TECHNICAL SKILLS

Languages: C/C++, JavaScript, Python, Java, HTML/CSS, R, Unity C#
Frameworks / Libraries: QT, QML, AWS, Jupyter, Django, Node.js, JUnit, Scikit-learn, NumPy, TensorFlow
Developer Tools: Git, Valgrind, MPLAB, GDB, GPROF, WSL, Makefile, Unity

EXPERIENCE

Embedded Software Engineer
Jan. 2024 – Present

NZ Technologies
Vancouver, BC

- Create user-end software, microcontroller firmware, and API middleware for touchless medical devices in C/C++.
- Improve gesture detection algorithm in C++ and increase detection range by 2x with reduced perceived latency.
- Perform data-abstraction using the MVC paradigm in QT, resulting in 30% performance improvements and reduced code redundancy.
- Fix firmware connection issues by changing data-transfer protocol from UDP to TCP, increasing hit rates by 20%.

Data Engineer (Volunteer)
Nov. 2023 – Present

Pacific Laboratory for Artificial Intelligence (PLAI)
Vancouver, BC

- Building a data collection and processing pipeline for over 200TB of Minecraft video-gaming data.
- Leveraged Python and the Whisper ASR model to produce time-stamped transcripts with 4x real-time speed.
- Currently developing an interface to perform data verification algorithms on an AWS S3 database.
- Adhered to Agile development principles and participated in weekly meetings.

Undergraduate Teaching Assistant
Aug 2023 – Dec 2023

University of British Columbia
Vancouver, BC

- Mentored ∼60 students through lab exercises, aiding their completion and understanding.
- Instructed tutorial sessions for ∼40 students, fostering discussions and addressing questions.

PROJECTS

Particle Physics 2D (PPhys2D) | *JavaScript, Webpack, Node.js, JsDoc*

- Designed a web-based particle-physics engine that supports constrained and fluid dynamics.
- Developed an OOP-based behaviour-driven architecture, providing end-user abstraction and extensibility.
- Produced a complete documentation website with JsDoc (90%+ coverage) and published project using Webpack.
- Achieved real-time performance (>60 fps) with 50,000+ particles, and improved simulation stability using spatial partitioning, numerical approximation, and hybrid impulse-position-based algorithms.

C++ Feed-forward Neural Network | *C++, Valgrind, GDB, GPROF*

- Constructed a multi-layer neural network and a matrix library, benchmarked with MNIST classification.
- Accelerated run-time by 8x with thread-pooling, ensuring data integrity with semaphores and mutexes.
- Utilized custom data structures to improve cache locality and enable vectorization, improving performance by 5x.
- Increased convergence with a final accuracy of 89% by implementing cross-entropy cost, hybrid hidden layers, etc.

Drawing With Sound | *Python, NumPy, Scikit-learn, OpenCV*

- Engineered a Python application that converts 2D images/videos to audio that can be drawn on an oscilloscope.
- Enhanced clarity by over 50% with image processing (OpenCV) and KNN-search path tracing (Scikit-learn).
- Generated high-resolution dual-channel .wav audio through NumPy's discrete Fast Fourier Transform.

EDUCATION

University of British Columbia
Vancouver, BC

2nd year, Bachelor of Science in Honours Computer Science, Minor in Data Science
2022 – 2027

- 96.4% Average, Science Scholar, Trek Excellence Scholarship, J Fred Muir Memorial Scholarship