Hayden Goodfellow |

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Languages: C, C++, Python, Rust, Bash, Java, Assembly (ARMv7-A, x86-64)
Technologies: Linux, RTOS, ROS, CUDA, NumPy, PyTorch, PostgreSQL, Jenkins, Git

Education

Bachelors of Applied Science in Computer Engineering | University of Toronto — **3rd Year GPA: 3.89/4**

- Minor in Engineering Business — Graduation Expected May 2023

Work Experience

Software Engineer Intern | Embark Trucks — May 2022 - Aug 2022 | **San Francisco, CA**

- Developed high-performance application capable of receiving, processing, and encoding up to eight 4k MIPI CSI-2 raw video streams from cameras in parallel with dynamic quality scaling based on computing load
- Implemented NVENC hardware-accelerated encoding to maximize quality while fully utilizing computing power
- Designed and developed new frame timestamping method based on start of first exposure for multi-exposure, linear-response, HDR, CMOS sensors, improving safety-critical frame timestamp accuracy by over 50x
- Created interface to control camera settings remotely over I2C including exposure time, gain, brightness, etc.

Display Software Engineer Intern | AMD — May 2021 - May 2022 | **Toronto, ON**

- Found, triaged, and fixed dozens of Linux graphics driver regressions, greatly improving driver stability
- Optimized Linux build & test Jenkins pipelines, improving overall speed by 25% and raising stability to over 99%
- Migrated all CI/CD systems from Gerrit to GitHub utilizing the GitHub API with zero downtime on migration
- Presented overview of Linux CI/CD pipelines to over 4000 Engineers and Corporate managers as a finalist in AMD Markham's Innovation Showcase where we were chosen out of over 100 projects

Software Developer | Amnesia Escape Games — May 2019 - Aug 2019 | **Ottawa, ON**

- Developed software to monitor and control a distributed system containing over 30 devices such as RFID readers, actuators, and sensors which were connected to 11 Arduino Nano controllers
- Created a multithreaded master controller which communicated over an RS-485 bus and TCP sockets
- Utilized a PostgreSQL database to log and analyze sensor data for testing and balance purposes

Projects

High Performance Particle Simulator — **C • Pthreads • OpenMP • MPI**

- Developed a high-performance particle interaction simulator with 3 versions utilizing pthreads, OpenMP, or MPI
- Heavily optimized each version and created the fastest overall implementation out of over 50 groups

Discrete Laplacian Filter Image Processor — **C++ • CUDA**

- Created, using C++ and CUDA, an image processing application which utilized GPU processing to achieve a 37.9x speedup compared to our optimized CPU-only implementation

Beat Saber Map Generator — **Python • PyTorch • NumPy • Pandas**

- Developed, using LSTM and CNN deep learning models trained on over 15000 user-created songs, an app which took in any song and output a complete, high-quality beatmap for the VR rhythm game Beat Saber

Concurrent Database & Database Driver — **Rust • Python**

- Developed, using Rust, an in-memory high-performance concurrent database based off the EasyDB protocol
- Created, in Python, a database driver and ORM framework (similar to Django's) to interface with the database

Geographic Information System — **C++ • LibCurl • GTK • Cairo**

- Developed, using C++, a full-scale, high-performance, multithreaded geographic information system application similar to Google Maps but tailored to users with vision impairments, such as colour blindness