RYAN DULLAERT

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SKILLS

- Languages: C++, Python, SQL
- Technologies: Direct3D 12 (D3D12), DirectX 12 (DX12), SQLite, Eigen, OpenCV
- Tools: Git, QNX RTOS, Google Test

EXPERIENCE

NVIDIA Development Inc. – C++ Jan. 2022 – Apr. 2022

Software Intern, Video – Santa Clara, CA

- Developed consumer-producer multithreading in **D3D12** encode app to improve hardware utilization by 500%
- Implemented queue-based inter-thread control to support synchronization with GPU work submission fences
- Enhanced **DX12** video driver interface by storing **ID3D12** resource flags on video command list creation
- Refactored video driver GPU capability query to improve readability of the encode/decode interfaces

Ford Motor Company of Canada – C++, SQL May 2020 – Aug. 2020 | Jan. 2021 – Apr. 2021

Software Developer Co-op – Waterloo, ON

- Developed synonym support for radio stations to allow tuning by name from synonym database with **SQLite**
- Implemented automatic update of radio stations' synonyms with **SQLite** when station availability list changes
- Enhanced logging events to allow developers to debug software running on **QNX RTOS** in existing vehicles
- Automated upload of incomplete event metadata from **SQLite** to improve error handling of interrupted events

Christie Digital Systems – C++ Sept. 2019 – Dec. 2019

Software Engineering Co-op – Kitchener, ON

- Developed an automatic correction algorithm to normalize colour of projected content on rough surfaces
- Gathered accurate colour data from non-uniform screens by identifying relevant projector pixels with **OpenCV**
- Implemented a matrix solver with the **Eigen** library to generate independent RGB corrections for every pixel
- Created additional unit tests for new and existing code with **Google Test** to prevent regressions

PROJECTS

Real-Time Executive – C

ECE 350 Real-Time Operating Systems – Waterloo, ON

- Implemented buddy-system dynamic memory allocation and deallocation algorithm
- Created a pre-emptive real-time priority scheduler for multitasking on ARM Cortex-M3 processor
- Developed real-time message queueing for inter-task communication and console I/O

Waterloo Aerial Robotics Group – Python

Computer Vision Subteam – Waterloo, ON

- Developed producer-consumer module with **Numpy** to map identified image pixels to geographical coordinates
- Implemented multiprocessing support to increase module performance at a 1:1 ratio with processor cores
- Generated projective perspective transformation matrices from drone telemetry for pixel-to-coordinate map

EDUCATION

University of Waterloo Sept. 2018 – Apr. 2023 (expected)

Candidate for B.A.Sc. in Computer Engineering