Callum Hepworth

403-966-1937 | callumahepworth@gmail.com | github.com/calhep | www.callumhepworth.com

Education

University of British Columbia Vancouver, BC, Canada
BASc in Engineering Physics *09/2018 – Present*

- Cumulative GPA: 4.00/4.33
- Relevant Coursework: Machine Learning & Data Mining, Data Structures & Algorithms, Relational Databases, Signals & Systems

Skills

Languages: Python, JavaScript, Java, C/C++, HTML/CSS, SQL
Frameworks: ReactJS, VueJS, Bootstrap, Flask, ROS
Tools & Libraries: Git, mpi4py, pytest, JUnit, OpenCV

Work Experience

Teaching Assistant **09/2022 – Present**
UBC Department of Computer Science *Vancouver, BC, Canada*

- Supervised twice-weekly lab sessions of **30+ students**, providing guidance on assignments assessing the fundamentals of **data structures and algorithms**
- Hosted a weekly office hour, providing 1:1 support to a class of **200+ students**

Machine Learning Researcher, Intern **07/2022 – 08/2022**
SLAC National Accelerator Laboratory, Stanford University *Menlo Park, CA, USA*

- Empowered research teams by enabling **real-time** data analysis, visualization, and error detection of high-dimensional experimental image data through the development of a framework plugin in **Python**
- Developed an algorithm to perform incremental principal component analysis (iPCA) at scale ($\sim$10^5 images of $\sim$10^5 features each) by leveraging relevant academic findings as identified through a comprehensive literature review
- Achieved a **100x** increase in runtime performance by identifying and parallelizing rate-limiting steps through performance benchmarking using the **MPI Message Passing Interface**

Software Developer, Intern **01/2020 – 12/2020**
Validus Research, Inc., a subsidiary of AIG *Waterloo, ON, Canada*

- Significantly decreased project turnaround times by streamlining user workflows through the development of an internal-facing web application in **Vue.js**
- Facilitated the intuitive comparison of varied client information by retrieving, formatting, and displaying analytical data through an integrated UI and data retrieval pipeline
- Empowered users by enabling the exporting of formatted project data to a customized .xlsx file by developing a **Flask API** in **Python**, retrieving relevant data from **Microsoft SQL Server**
- Returned after initial four month internship (January - April) on a part time basis starting in July 2020

Projects

cryoEM Dataset Generator | *Docker, Python, C* **09/2021 – 05/2022**

- Generated large datasets of simulated cryoEM images by developing a user-facing **Python** wrapper for a **Docker** deployed **C** program
- Eliminated cloud storage costs by uploading simulated datasets to the Open Science Framework, integrating the tagging and uploading of datasets using an **API**
- Ensured that our open-source project was extensible by achieving **90%** code coverage through a rigorous **pytest** test suite and through thorough code documentation using docstrings

Autonomous License Plate Classifier | *Python, ROS, Deep Learning, Computer Vision* **09/2020 – 12/2020**

- Using the **ROS** framework, developed a simulated robot in **Python** and **C++** capable of autonomously navigating a competition surface
- Reliably retrieved raw license plate data from passing vehicles by developing an image capture algorithm with **OpenCV**, filtering selections using a SIFT keypoint match threshold
- Achieved **99%** classification accuracy on test datasets by designing a convolutional neural network using **TensorFlow** and **Keras** to identify alphanumeric license plate characters