

Hayden Gunraj

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Skills

- **Languages** – Python, C++, C, Matlab
- **Libraries** – OpenCV, Keras, Scikit-learn, Scikit-image, Flask
- **Concepts** – Computer Vision, Image Analysis, Machine Learning, Deep Learning, OOP, RTOS

Experience

Research Assistant [Vision & Image Processing Research Group, UWaterloo](#) Jan. 2019 – April 2019

- Leveraged Scikit-learn to train traditional learning algorithms for prostate cancer detection in MR images
- Implemented image feature extraction and data augmentation pipelines based on state-of-the-art methods
- Built and trained convolutional neural networks for segmentation using Keras, achieving a Dice score of 0.90

Industrial Imaging Software Developer [P&P Optica](#) Sept. 2018 – Dec. 2018

- Created Python tools for calibration and operation of a hyperspectral imaging system
- Trained and tested support vector machines for material classification and composition analysis
- Developed image analysis algorithms to automate data post-processing and quantify classifier performance
- Designed user interfaces and asynchronous real-time displays to show material classification results

Medical Software Developer [Sunnybrook Research Institute](#) Jan. 2018 – April 2018

- Developed novel segmentation and analysis algorithms for cardiovascular MR images using Matlab
- Implemented state-of-the-art image registration methods to correlate data between images
- Integrated new algorithms into a fully automated analysis pipeline which reduces manual work for clinicians
- Achieved a correlation coefficient of 0.85 when automatic results were compared to expert results

Technical Systems Analyst [CIBC Enterprise Architecture](#) May 2017 – Aug. 2017

- Aided in design of wire transfer system upgrades to align with SWIFT GPI and ISO20022 standards
- Added task automation in VBA to remove manual processes, re-wrote formulas to improve speed by 50%

Projects

Optical Tomography Dec. 2018

- Experimented with tomographic image reconstruction using Python, an iPhone, and a lamp
- Acquired images via light transmitted through a translucent subject and reconstructed them into a 3D volume
- Reconstructed colour channels separately such that they may be recombined to create an RGB volume

Simple 3D Graphics Oct. 2018

- Created a minimal 3D graphics engine using Pygame which can animate simple scenes
- Implemented linear algebra functions to perform manipulations and conversions of object coordinate systems

Education

University of Waterloo [BASc Candidate, Mechatronics Engineering](#) Sept. 2016 – Present

- **Relevant Courses** – Algorithms and Data Structures (C++), Computer Structures and Real-time Systems (C), Digital Computation (C++), Linear Algebra, Numerical Methods