# Hayden Gunraj

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## Skills

- Languages – Python, Matlab, C++, C
- Libraries – OpenCV, Keras, TensorFlow, scikit-learn, scikit-image
- Concepts – Computer Vision, Image Analysis, Deep Learning, Machine Learning

## Experience

### Deep Learning & Comp. Vision Eng. Intern — Synapse Technology Corp. — May 2019 – Aug. 2019

- Designed an object-level image retrieval pipeline to leverage large sets of unlabelled data
- Developed methods for fast image comparison using latent representations from deep triplet networks
- Used TensorFlow to train convolutional neural networks for automated threat detection in X-ray images
- Deployed the first ever model for automatic cigarette lighter detection at an international airport

### 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
- 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

### Medical Software Developer — Sunnybrook Research Institute — Jan. 2018 – April 2018

- Developed novel segmentation and analysis algorithms for cardiovascular MR images using Matlab
- 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

## 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, Biomedical Ethics
- University of Waterloo Dragon Boat Club (2018)