Martin Sit

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Education

University of Waterloo — Expected May 2029
Honours Bachelor of Computer Science, Co-op — *Waterloo, ON*

Skills

Languages: Python, C++, JavaScript, TypeScript, HTML5, CSS3, Java, MATLAB
Technologies: React, Vue.js, Node.js, Flask, Django, NumPy, PyTorch, TensorFlow, Keras, Matplotlib, Tailwind CSS

Professional Experience

Machine Learning Research Intern | *Python, MATLAB, TensorFlow, Keras* — Jul 2023 – Aug 2023
Sunnybrook Research Institute — *Toronto, ON*

- Engineered a 3D convolutional neural network (CNN) to drastically accelerate FUS treatment monitoring processes
- Achieved a **46x** speed improvement with **0.99** ICC, enabling ultra-fast image reconstruction approximations
- Generated synthetic radio frequency image datasets for ML training using MATLAB-based ray-acoustic model
- Researched DNN architectures including U-Net, ResNet, and DenseNet

Research Intern | *Python, Flask, PyAutoGUI, Networking, Linux* — Oct 2022 – Jul 2023
University of Waterloo — *Waterloo, ON*

- Architected a GUI automation system to collect TCP/IP packet data from video conferencing calls
- Scraped and processed **100+** hours of video data to curate a robust dataset for ML model training
- Researched papers on traffic fingerprinting and censorship-resistant internet communications

Software Developer | *Vue.js, Nuxt, Tailwind CSS* — May 2022 – Aug 2022
Black York Region Youth — *Markham, ON*

- Designed and developed a responsive, multi-page website for a conference funded by an **$84,300** grant
- Implemented third-party APIs to create a dynamic image gallery, enhancing visual appeal and interactivity

Volunteering

Organizer – Web/Tech Head | *React, Next.js, Tailwind CSS, MongoDB* — Aug 2022 – Aug 2024
JAMHacks — *Waterloo, ON*

- Spearheaded redesign for event website and dashboard used by **700+** newly registered users
- Led storage system rewrite to dynamically aggregate uploaded files, allowing instant batch downloads
- Built QR code-based attendance system for workshops attended by **180+** in-person participants

Projects

LiteNet – Neural Network Framework With 0 Dependencies | *C++*

- Developed a C++ deep learning framework, with a simple and intuitive API based on Keras and PyTorch
- Implemented all algorithms (i.e. backpropagation) as well as the underlying linear algebra operations from scratch
- Used the framework to create an image classifier model for the MNIST dataset with **94%** testing accuracy

Sensai – Computer Vision Workout Coach | *Python, JavaScript, Vue.js, Nuxt, Flask, OpenCV, Mediapipe, SocketIO, JWT*

- Created a full-stack fitness platform with real-time AI feedback and analytics
- Engineered an API using Flask and SocketIO to process Mediapipe pose calculations from live camera input
- Built a responsive frontend web application with Vue.js and Nuxt, providing an engaging user interface
- Implemented secure user authentication using JWT and MongoDB

Kaleidoscope – Emotion/Irony Assistive Tool for Autism | *Python, JavaScript, PyTorch, Flask, WebExtensions*

- Engineered an ML-based application to provide emotion/irony recognition for individuals with ASD
- Trained BERT-based LLMs on **60k** Tweets and Reddit comments via transfer learning
- Achieved **89%** and **86%** accuracy on emotion and irony detection models, respectively
- Built a Flask-based backend API to serve model inference at millisecond latency

Uptone – Social Media Hate Speech Filter | *Python, JavaScript, TensorFlow, Keras, Flask, WebExtensions*

- Developed a browser extension to detect and automatically filter out unwanted content on X (Twitter)
- Designed a convolutional neural network to recognize hate speech and offensive language in social media
- Trained the model on **25k** Tweets, achieving **87%** accuracy in detecting hate speech and offensive language