Aaron Sarkar

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**Skills Profile**

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| **CAD:** SolidWorks, AutoCAD, OrCAD, GD&T  **Electrical tools:** Soldering, Oscilloscope, DMM, Function Generator  **Hardware:** STM32, Arduino | **Programming**: C/C++, Python, MATLAB, Arduino  **Mechanical tools:** 3D Printer, Laser Cutter, Hand tools  **Project Management:** Git, Monday.com, MS Excel |

**Work Experience**

**Mechatronics Engineering Intern** **Feb 2024 – May 2024, Sep 2024 – Dec 2024**

*Sartrex Power Control Systems Inc.*

* Used Python and Selenium to extract the title, price, ratings, and description of 89 3D printing products using their XPath, and then used OpenAI API to find the type, print speed, and print bed size from each title and description
* Spearheaded a redesign of the company’s website, integrating JSON-LD, and optimizing meta data for enhanced SEO
* Operated electrical measuring equipment to gather data on over 200 electronic components, evaluating the success yield of supplier products.

**R&D Engineering Intern** **Oct 2022 – Dec 2022**

*Cambridge Elevating Inc.*

* Compiled data on beam shapes and respective strength, and created an ultimate tensile strength calculator in excel
* Applied failure mode analysis of deformable solids to facilitate the redesign of support columns for a primary line of elevators, improving the cost-to-weight ratio by 15% while maintaining existing safety requirements

**Engineering Intern** **Jan 2022 – May 2022**

*SB Tool and Machine Co.*

* Compiled a dataset of dimensions for 300+ aerospace parts in excel and performed quality analysis based on the required tolerances

**Operational Excellence Intern** **Jul 2021 – Sep 2021**

*Toronto Research Chemical*

* Used MS Excel to collect data on chemical transportation and formulated dedicated routes to minimize safety breaches
* Designed surveys to monitor departmental progress and streamline the identification of issues

**Projects**

**Single Layer Convolutional Neural Network** *| Python, FER-2013 Dataset, TensorFlow, Keras*

* Developed a single-layer CNN that labels 48x48 pixel images of facial expressions, organized into 7 categories of emotions, and correctly labels them with a 25% accuracy
* Devised functions for the convolution layer, max pool layer, dense layer, and activation layers, as well as the backpropagation functions for each layer, and trained the overall model over 28700 images

**Multilayer Perceptron Neural Network** *| Python, MNIST Dataset, TensorFlow, Keras*

* Programmed a 3-layer neural network that labels 28x28 pixel images of digits with a 96% accuracy
* Created and implemented functions for forward propagation and backward propagation, creating the 3 dense layers and then applying gradient descent over 50000 training images

**2-Axis CNC Machine** *| MATLAB*

* Used an STM32 to take analog input from two potentiometers to control the 2D position of a 2-axis machine
* Utilized interrupts to continuously change motor speed based on the angular position of the potentiometers, and used tight polling on the ADC to track the wiper voltage from the potentiometers

**Education**

**Mechatronics Engineering (BASc)** *|*University of Waterloo **Sep 2021 – Apr 2026**

* Computer Structures, Microprocessors, DS & A, Sensors and Instrumentation, Advanced Calculus