

# LIAM FRIJA-ALTARAC

Montreal, QC

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## EDUCATION

**Master of Computer Science**, École de technologie supérieure (ÉTS) 2022 - 2025  
Machine Learning and Computer Vision

- Analyzing the propagation dynamics of convolutional filters through symmetry and spectral decomposition.
- Investigating geometric and spectral patterns that emerge in CNN kernels trained on large-scale datasets.
- Developing a mechanistic interpretability framework to better understand how information propagates through CNN layers (in pixel space).

**Bachelor of Electrical Engineering**, École de technologie supérieure (ÉTS) 2016 - 2020  
Concentration in Computer Science

**DEC in Computerized Systems Technology**, Vanier College 2013 - 2016

## SKILLS

**Technical** Machine Learning, Computer Vision, Image Processing  
**Software** Python, NumPy, PyTorch, TensorFlow, Keras, Qt, Matlab, C

## EXPERIENCE

**Machine Learning / Computer Vision Developer** May 2025  
Little Angel Medical *Montreal, QC*

- Assisted the Research and Development team in building machine-learning solutions for pediatric monitoring tools.
- Designed and implemented models using modern learning-based techniques (VLMs, contrastive learning approaches)

**Lab Assistant (SYS818, SYS809)** Sep 2024 - Dec 2025  
École de technologie supérieure (ÉTS) *Montreal, QC*

- Assisted students in graduate-level courses in Computer Vision, Machine Learning and medical imaging.
- Helped students understand key concepts, debug implementations, and apply theoretical knowledge to practical projects.

**Software Developer** Feb 2021 - Jan 2022  
Belden Inc. *Montreal, QC*

- Programmed various tools (using Python, NumPy, Qt) to assist with the Research and Development team.
- Wrote software to analyse copper as well as fiber optic components.
- Developed a reference/dependency tool with text analysis for internal file management.

**Firmware Development Intern** May 2019 - Aug 2019  
CAE Healthcare *Montreal, QC*

- Developed firmware in C for STM32F4 microcontrollers.
- Worked with communication protocols such as SPI, I<sup>2</sup>C, and DMA.
- Programmed real-time systems.

**Automated Test System Development Intern** Sept 2017 - June 2018  
Belden Inc. *Montreal, QC*

- Programmed software to analyse S-Parameters.
- Wrote software to establish communication with a Vectorial Network Analyzer to acquire data remotely.
- Developed a graphical interface in Python to display acquired and calculated data.

- Developed circuits and software to facilitate testing and automate report generation.

## PROJECTS

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**Semi-Autonomous Car.** Programmed an STM32F0 (ARM Cortex-M0) for a semi-autonomous car that could be controlled by remote control, as well as avoid obstacles. Implemented USART and I<sup>2</sup>C from scratch, I/O control (motors, sensors, etc.), and collision avoidance logic.

**Neural Network with Backpropagation.** Wrote a Neural Network (MLP) library from scratch using Python and NumPy, to obtain a deeper understanding of Backpropagation. Developed a web interface in Bootstrap and Flask to interface with the library to easily train and configure a custom MLP.

**Race Horse Biometric System.** Built a real-time biometric system that would be used for race horses to monitor their vital signs while racing. Programmed an Atmel microcontroller to interface with the various sensors. Developed a web interface (Bootstrap) to monitor the horse's condition.