

VETRIVEL BALAJI

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EDUCATION

McMaster University, Hamilton, Ontario

September 2021 - April 2025

Bachelor of Engineering - Mechatronics Engineering

HIGHLIGHTS OF QUALIFICATIONS

- Experienced in **Machine Learning** and **Embedded Systems** with previous work experience and projects in **Robotics**, **Computer Vision** and **Image Processing** using **Python libraries**.
- Collaborated and communicated with teammates around the world to independently learn new complex concepts and apply them to real-world issues by developing creative personal projects.
- Experienced with **Java**, **C/C++**, **MATLAB**, and **Python (TensorFlow, Mediapipe, OpenCV, FER, Tkinter)**.
- Developer Tools: **Git**, **VS Code**, **Visual Studio**, **PyCharm**.
- Hardware: **AutoDesk**, **Digital and Analog Circuitry**, **Embedded Systems**, **Raspberry Pi**, **Quanser Robotics**.

EXPERIENCE

Research Student (Machine Learning), Toronto, Ontario

June 2022 – August 2022

Unity Health Toronto

- Developed and implemented an **automated system** which uses **image processing** to analyze and record the poses of patients and medical practitioners in the CT scan room, while preserving privacy, in order to monitor the usage of the room and ultimately increase productivity and improve the process capacity of the CT scan room.
- Designed the back end and **embedded system** for the project using **Python**, **OpenCV**, **Raspberry Pi**, **Google Coral**, and **TensorFlow**.
- Demonstrated exceptional problem-solving abilities and proficiency in learning new technologies by independently mastering computer vision, Linux, and new hardware to successfully create a working prototype of the project within a **three-month time frame**, while staying self-motivated throughout a mostly remote work term.
- Displayed **critical thinking** to work around the chip shortage and utilize different types of hardware in the embedded system in order to successfully build a working prototype.

Submission Officer, Brampton, Ontario

April 2021 – May 2021

BLS International

- **Organized** and assessed Visa applications and documents for Visa processing, while demonstrating **attention to detail** by identifying and comparing information given by applicants.
- Collaborated and communicated with members from other departments to identify missing documents and track them down to ensure the applicants (approximately **80 per day**) have all papers necessary to have their applications approved.

PROJECTS

Level Up | Python, MediaPipe, OpenCV, Pygame, Git

September 2022

- Created a **computer vision and image-processing-based** application during a **three-day Hackathon** (Hack the North) that transforms exercise into a video game by allowing users to select between push ups, sit-ups, and squats, and accurately count reps while ensuring proper form is maintained.
- Incorporated various game modes to track progress and enhance the user experience, making exercise more enjoyable.

Recycling System | Python, Raspberry Pi, Quanser Robotics

March 2022

- Developed an automated process for organizing materials in a recycling facility to improve efficiency and accuracy of the recycling process using **color sensors**, **proximity sensors**, and **infrared LED sensors** to identify, pick up, transfer, and deposit containers into the correct recycling bins using a **Q-arm** and **Q-bot**.

M-U-SIC | FER, OpenCV, Time, Pygame, Tkinter, TensorFlow

January 2022

- Designed an application that uses facial expression recognition to actively detect the user's emotions and play music accordingly, with the ability for users to pause/play, go back, and reanalyze their emotions to play a new track.
- Successfully created the application **under 48 hours** during a Hackathon and continuously worked to make improvements post-event.