**HARMINDER SAINI**

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*Data science enthusiast with expertise in Python, PyTorch, and financial analysis, looking to apply analytical skills to solve complex financial challenges and deliver actionable insights*

**EDUCATION**

***Bachelor of Applied Science: Computer Engineering***

*Queen’s University, Smith Engineering, Kingston, Ontario*

***Bachelor of Arts and Science: Economics***

*Queen’s University, Kingston, Ontario*

**SKILLS**

Python **|** C Programming **|** PyTorch **|**Neural Networks **|** Java (Object Oriented) **|** JavaScript **|** SQL **|** Assembly Language (Nios II) **|** Verilog **|** Data Structures **|** SolidWorks **|** Android Studio **|** Econometrics **|** Financial Analysis **|** Statistical Analysis **|** Data Analysis **|** Economic Theory

**WORK EXPERIENCE/ PROJECTS**

[***Capstone Project: Machine Learning System for Emotion Recognition and Adaptive Tracking***](https://github.com/Harminder13/Capstone-Project) ***Kingston, Ontario***

*Team Member September 2024 –**April 2025*

* Developed a real-time detection algorithm using **Python**, **PyTorch**, and **OpenCV**, integrating a **YOLOv11-**based emotion recognition system with adaptive camera tracking.
* Engineered a servo-controlled camera mount with a **1-meter vertical range**, ensuring **precise facial alignment** and improved **detection accuracy**.
* **Developed and trained a model** on a diverse **15,000-image dataset** with augmented preprocessing, achieving **over 90% classification accuracy**.
* **Achieved sub-1-second response times** for emotion detection and camera adjustments, improving system responsiveness and user experience.
* Developed an adaptive feedback system to improve camera alignment using facial orientation and tracking data.

[***Financial Analysis of The Coca-Cola Company***](https://github.com/Harminder13/Financial-Analysis-of-The-Coca-Cola-Company-/blob/08f726bf93bba08bd47d4e9662fe78a3c634513e/Financial%20Analysis%20Report.pdf) **Kingston, Ontario** *Project June 2024 – August 2024*

* Conducted a **three-year financial analysis** of **Coca-Cola**, examining **profitability**, **liquidity**, and **solvency** using key financial ratios (ROE, ROA, current ratio, debt-to-equity).
* Identified a **12.3% increase** in **net income** and improved **debt-to-equity** from **1.41 to 1.29**, reflecting **stronger capital management**.
* Analyzed **segment performance** across **North America**, recommending **strategic adjustments** to improve **market positioning**.
* Delivered a detailed report summarizing **financial trends** and **strategic insights**, demonstrating **analytical** and **communication skills**.

[***Machine Learning System for Automated Detection of Surgical Instruments***](https://github.com/Harminder13/Automated-Detection-of-Surgical-Instruments/blob/7e439e4795db671b65410521ee3917c4eea85057/Classification%20of%20Surgical%20Instruments.pdf) ***Kingston, Ontario*** *Team Leader September 2024 – December 2024*

* Developed an **object detection system** to identify and classify **surgical instruments** in real-time using **Python**, **PyTorch**, and the **YOLO framework**.
* Achieved mean average precision (mAP) scores of **0.991 (validation)** and **0.988 (testing)** by training on a dataset of over **3,000 images**.
* Enhanced the dataset with **data augmentations** to address class imbalance and improve detection in challenging conditions, reducing overfitting.
* Improved detection precision by **2%** and computational efficiency by **15%** through advanced attention and feature extraction modules.
* Optimized detection under **occlusion**, achieving a **94% true positive rate** for distinguishing visually similar tools.

[***Design and Implementation of a Reduced Instruction Set Computer (RISC)***](https://github.com/Harminder13/RISC-Computer-Design) ***Kingston, Ontario***

*Team Leader January 2024 – April 2024*

* **Led a team project** focused on **designing, simulating, implementing,** and verifying a **RISC Computer** (Mini SRC).
* Developed a **32-bit machine** with a **32-bit datapath**, **16 registers**, and dedicated registers for multiplication and division.
* Defined instruction formats and categorized instructions into **load/store**, **arithmetic/logical**, **branch/jump**, and **input/output**.
* Designed and implemented a RISC computer with **95% simulation accuracy** and **100% hardware functionality** on the Cyclone V chip.
* Reduced development time by **20%** through efficient use of Quartus Prime and ModelSim

**EXTRA-CURRICULAR EXPERIENCE**

[***Queens’s Space Engineering Team***](https://qset.ca/satellite/) ***Kingston, Ontario***

*Onboard Computer Systems Team Member September 2023 – December 2023*

* Implemented **microprocessors, memory banks, and interfacing chips** to establish connections between components in a mini satellite.
* Coordinated tasks among satellite components, achieving a **95% efficiency in system integration**.

[***Queens’s Robotics Team***](https://www.qkrt.ca/) ***Kingston, Ontario***

*3D Modeling Lead January 2021 – April 2022*

* Designed, modeled, and created a robot for the VEX U Robotics Competition using SolidWorks.
* Built and **programmed a robot** with precise **object manipulation**, **autonomous motion**, human driver support.