Salar Hosseini

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Education

M.Sc. in Computer Science, University of Toronto *Sept. 2021 – Jan. 2023 (Exp.)*
Research Areas: Deep Learning and Computer Vision, Advised by Prof. Florian Shkurti *CGPA: 4.00/4.00*
- Coursework: Neural Network Training Dynamics, Probabilistic Learning, ML for Mathematical Optimization

B.A.Sc. in Engineering Science (Robotics), University of Toronto *Sept. 2016 – May 2021*
Graduation with High Honours, Artificial Intelligence Minor *CGPA: 3.96/4.00*
- Coursework: Deep Learning, Machine Learning, Robot Perception & Planning, Algorithms & Data Structures

Professional Experience

Machine Learning Researcher | University of Toronto *May 2020 – Present*
Robot Vision & Learning (RVL) Lab
- Proposed and implemented a state-of-the-art method for **self-supervised** video representation learning using **PyTorch** by iteratively clustering and contrasting embeddings from a 3D CNN; published in CVPR 2022 [paper].
- Generated **adversarial driving scenarios** by adding perturbations using differentiable rendering simulators; paper submission forthcoming at *Computer Vision and Pattern Recognition Conference (CVPR) 2023*.

Software Engineering Intern | Intel Corporation *May 2019 – May 2020*
High Level Design Compiler Team
- Researched and implemented a latency-optimized **sorting algorithm** in C++ for processing large data sets.
- Increased average throughput of HLS algorithms by 10% by optimizing latency parameterization using **C++**.
- Developed a GUI with Qt to showcase live FPGA acceleration of a flagship design; presented to ≈40 engineers.

Research Assistant | University of Toronto *Jan. 2019 – Apr. 2019*
Virtual Reality Robotics Lab, Mapping and Localization for a Quadrotor Drone
- Integrated the ORB-SLAM2 API to generate **point clouds** from a quadrotor drone's monocular image data.
- Performed **unsupervised clustering** on point cloud data to distinguish objects in the mapped scene.

Undergraduate Researcher | University of Toronto *May 2018 – Aug. 2018*
Modelics Lab, Accelerated Modeling of 3D Integrated Circuits, in Collaboration with AMD
- Accelerated an electromagnetic solver by 3x by researching and adapting a 2D surface **partitioning algorithm** in C++ to 3D mesh models of integrated circuits.
- Reduced pre-meshing processing time by 10x by optimizing **C++** functions using the Gmsh API.

Extracurricular and Personal Projects

Neurotech - University of Toronto | Quadrotor Drone Vision Team *Oct. 2019 – April 2020*
- Developed a projectile tracker by using **Python (OpenCV)** for colour thresholding and depth estimation.
- Simulated the dynamics of a quadcopter by evolving the system state equations using MATLAB.

aUToronto Self-Driving Car | Object Detection Team *Aug. 2018 – April 2019*
- Created a ROS framework to interface visual inputs, CNN inference, and bounding box visualization.
- Implemented FPGA **inference acceleration** for the SSD300 neural network using the OpenVINO API in **C++**.

Technical Skills

Programming Languages: Python, C++, C, Java, MATLAB, Bash, Latex, Verilog
Libraries & Tools: PyTorch, NumPy, JAX, OpenCV, scikit-learn, SciPy, Pandas, Jupyter, Linux, ROS, Git, Docker, Slurm

Awards

Ontario Graduate Scholarship – Merit-based award supporting master's degree *July 2021*
Vector Scholarship in A.I. – Awarded to ≈80 students in Ontario for master's studies in A.I. *May 2021*
Eng. Sci. Award of Excellence – Awarded to ≈25 students in Eng. Sci. for academic achievement *Mar. 2021*
NSERC Undergraduate Research Award – Computer Science research grant for project at RVL Lab *May 2020*