Salar Hosseini

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Education

M.Sc. in Computer Science, University of Toronto *Sept. 2021 – Dec. 2022 (Exp.)*
Machine Learning and Computer Vision, Supervised by Prof. Florian Shkurti *CGPA: 4.00/4.00*

- Thesis: Adversarial self-driving scenario generation using differentiable radiance fields
- Coursework: neural net training dynamics, probabilistic learning, ML for mathematical optimization

B.A.Sc. in Engineering Science, University of Toronto *Sept. 2016 – May 2021*
Robotics Major, Artificial Intelligence Minor, Supervised by Prof. Florian Shkurti *CGPA: 3.96/4.00*

- Thesis: Self-supervised learning with iterative clustering for human action videos [CVPR 2022 Paper]
- Coursework: deep learning, computer vision, mathematics for robotics, algorithms & data structures

Professional Experience

Machine Learning Researcher | University of Toronto *May 2020 – Present*
Robot Vision & Learning Lab

- Proposed and developed a state-of-the-art method for **self-supervised** pretraining of video representations which alternates between clustering and contrastive learning on embeddings from a 3D CNN (using **PyTorch**).
- Generated **adversarial attacks** on a self-driving policy that was trained on images rendered from a differentiable radiance field model; trained the scene model using a dataset of CARLA simulator images.

Software Engineering Intern | Intel Corporation *May 2019 – May 2020*
High Level Design Compiler Team

- Researched and implemented a FPGA-optimized **sorting algorithm** in C++ for processing large data sets.
- Increased average throughput of HLS designs by 10% by optimizing latency parameterization using **C++**.
- Developed and presented (to ≈40 engineers) a GUI showcasing live FPGA acceleration of a flagship design.

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.
- Implemented a **graphical user interface** for visualizing 3D mesh models and electromagnetic fields.

Extracurricular Projects

ML Software Developer | aUToronto Self-Driving Car *Aug. 2018 – Apr. 2019*
Deep Learning Acceleration & Object Detection Team

- Created a **ROS** framework for the CNN detection and visualization of objects in self-driving images.
- Accelerated FPGA-inference for the SSD300 **object detection network** using the OpenVINO API (in **C++**).

Skills

Languages: Python, C++, C, Java, MATLAB, Bash, Latex, Verilog
Libraries & Tools: PyTorch, NumPy, 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 – Awarded for research aptitude in computer science *May 2020*