

# Zareef Raiyan Safdar

Master of Visual Computing Student at Simon Fraser University

E-mail: [zrs4@sfu.ca](mailto:zrs4@sfu.ca), Phone: 604-396-7175, LinkedIn: <https://www.linkedin.com/in/szareef/>,

GitHub Portfolio: <https://safdarzareef.github.io/>, Location: Coquitlam, BC, Canada

## Technical Skills

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**Programming Languages:**

Python, C, C++, C#

**Libraries and Frameworks:**

PyTorch, OpenCV, TensorFlow, NumPy, Pillow, Matplotlib, ROS

**Other Technologies:**

Unreal Engine, Unity3D, Linux, Bash, Version Control, Docker

## Work Experience

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**Computer Vision Research Internship (Remote)**

January 2023 - Present

*MI+x Group, University of Birmingham*

Birmingham, West Midlands, United Kingdom

- Researched Synthetic Dataset Generation using **Unreal Engine 5** through the development of lifelike human kitchen action simulation through procedural animation techniques and interactive object-grabbing systems,
- Enabled frame-by-frame video capturing from the GPU through the development of **C++ plugins**.

**Software Engineer Intern - Autonomous Vehicle Simulation**

May 2022 - August 2022

*Ford Motor Company*

Ann Arbor, MI, United States

- Researched various lens distortion models from relevant literature to implement realistic lens distortion.
- Implemented lens distortion models using **Unreal Engine 4** and **C++** within the existing codebase to increase the realism of the simulation digital twin for training and testing perception models.
- Designed validation strategies using **Python** for the lens distortion feature to be ready to use in production.

**Undergraduate Research Assistant**

May 2021 – May 2022

*Computational Autonomy and Robotics Laboratory, University of Michigan*

Ann Arbor, MI, United States

- Implemented a Deep Inverse Reinforcement Learning algorithm for traversability estimation using **PyTorch**.
- Created a method to convert 3D meshes into interactible actors on Embodied AI Simulators using **C++**.

**Software Engineer Intern**

January 2021 – December 2021

*Deepen AI*

Ann Arbor, MI, United States

- Completed a survey on current self-driving car simulators and stacks to find a viable choice for testing.
- Recreated self-driving scenarios from Scenario Description Language to LGVSL and CARLA Simulators.

**Software Engineer Intern**

October 2020 – December 2020

*Sheba Technologies Ltd.*

Dhaka, Bangladesh

- Researched and implemented models for Facial Recognition Systems using **TensorFlow** for banking clients.
- Developed methods for anti-spoofing using object detection for Facial Recognition Systems using **OpenCV**.
- Built methods for preprocessing image data to machine-readable formats using **OpenCV** for KYC verification.

## Selected Projects

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**Depth Prediction from RGB Images**

Computer Vision Course Project

- Re-implemented the DenseDepth model in **PyTorch** to estimate a Depth Map from an RGB image.
- Implemented various loss functions in **PyTorch** and optimized training for low-performance GPUs.

**Multi-Modal LLM Finetuning for Natural Disaster Image Change Detection**

Lab Project (In Progress)

- Built dataloaders for finetuning the LLaVA Reasoning Segmentation model, including auto-generating prompts.
- Adapting and finetuning the LLaVA model to be able to accept contrastive input for change detection tasks.

## Education

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**Simon Fraser University**, Burnaby, BC, Canada

August 2023 – December 2024 (*Expected*)

*Master of Visual Computing*

GPA: 4.33 out of 4.33

- **Courses:** Distributed and Cloud Systems (In Progress), Rendering and Visual Computing for AI (In Progress), Visual Computing Lab, Machine Learning

**University of Michigan**, Ann Arbor, MI, United States

August 2019 – December 2022

*Bachelors in Science and Engineering in Computer Science*

GPA: 3.565 out of 4

- **Notable Courses:** Software Engineering, Game Development, Self-Driving Cars, Operating Systems, Extended Reality (XR/AR/VR), Computer Vision, Machine Learning
- **Awards:** University Honors, Dean's List (December 2019, December 2021, April 2022, December 2022)