

Garvish Bhutani

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EDUCATION

University of Toronto

Engineering Science, CGPA: 3.61 (82.1%)

Robotics major with Minor in Machine Intelligence

Relevant Courses: Neural Networks and Deep Learning (Pytorch, Transformers, Attention), Intro to Robotics, Applied Fundamentals of Deep Learning, Embedded Devices (Microcontrollers, C, Assembly, CAD), Intro to Learning from Data, Control Systems

Toronto, ON

Sep 2022 – May 2027

SKILLS

Languages: Python, System C, C/C++, System Verilog, RISC-V, Assembly, MATLAB

Tools: ArduPilot, ModelSim, Synopsis Verdi, Git, Flight Controller, Nvidia Jetson, FPGA, LiDAR, Stereo Camera, IMU, GPS, ESP-32C

Technologies: Robot Operating System (ROS), Linux, Pytorch, Pandas, Numpy, Scipy, Matplotlib, OpenCV, Open3D

EXPERIENCE

Low Power AI Hardware Architecture Intern – Qualcomm

May 2025 – Present

- System integration for audio, sensor and **AI hardware** on Snapdragon chips for mobile, laptop, wearables and automotive.
- Validation and graphing flow to find defects in **Network on Chip (NoC) bus interface** before silicon design and implementation.
- Testing and profiling **hardware prototypes** to prove feasibility and collect performance data for cutting edge features.

Robotics Researcher – Sidewalk Navigation – Robot Vision and Learning (RVL) Lab

May 2024 – Jan 2025

- Integrated a **Model Predictive Control** local planner (SICNav) with Google Cartographer for localization, an **A*** global planner, and pedestrian detection (PiFeNet) and tracking system using a **pillar aware attention** on **Clearpath Jackal** robot equipped with **Ouster LiDAR** to create a fully autonomous navigation stack that safely interacts with pedestrians on sidewalks.
- Developed a novel implementation of Cartographer using **ROS Python and C++** with a 3D mapping model and 2D motion model getting the localization error down to 14cm allowing for safe maneuverability and obstacle avoidance on narrow sidewalks.
- Improved and iterated over different implementations through rigorous testing indoors and outdoors to get every part of the navigation stack integrated and for our robot to navigate in the face of noisy localization and perception.

Drone Lead – Heavy Duty Drone Survey Mission – Robotics for Space Exploration (RSX)

July 2025 – Present

- Developed a **17-inch quadcopter** capable of carrying a **1.1 kg payload** with up to **20 minutes** of flight time in windy conditions.
- Tuned **PID controls** and validated **ArduPilot**-based position and altitude hold for **stable, reliable flight** performance.
- Led the design and implementation of a **gripper system** capable of picking up objects weighing up to **1 kg**.
- Managed **full-system integration, assembly**, and iterative design improvements to enhance **maintainability**, and ease of repair.

Software and Autonomy Lead – Mars Rover Navigation and Simulation – RSX

Sept 2022 – July 2025

- Developed an autonomous navigation system that achieved top 5 among 35 contestants in a University Rover Challenge mission to reach waypoints on an outdoor featureless Mars-like terrain using **Python and C++ in ROS**, with in-house obstacle avoidance algorithms and off-the-shelf ROS packages.
- Developed and lead workshops teaching more than 100 students git concepts, **dual booting Linux** environment on windows and basic robotics concepts to give them experience with **ROS, sensors**, and navigation stack.

PROJECTS

Alzheimer's Disease Identification using EEG Data

Designed and programmed a **convolutional neural network** model using **PyTorch** to help in early diagnosis of patients with Alzheimer's Disease using electroencephalogram (**EEG**) outperforming almost every other study on the dataset we used in terms of testing accuracy at that time.

MediLens: Customizable Biometric AR Goggles

Developed AR goggles to transcribe and translate conversations and health data into a caption overlaid on the lens in real time for individuals with deafness using **ESP32** with various sensors and a display with information reflected on lenses using optics concepts.

AWARDS

- **Best Abstract Overall** at Uoft's Undergraduate Engineering Research (UnERD) Conference out of **140 candidates**
- **Dean's Undergraduate Student Summer Research Pivot Fellowship:** Recognizes academic merit and is intended to support research projects. Award Valued at **\$8000**