

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, Data Structures and Algorithms, Applied Fundamentals of Deep Learning, Praxis I and II (Engineering Design Practices), Digital and Computing Systems (Verilog, FPGA, RISC-V and Computer Architecture)

Toronto, ON

Sep 2022 – May 2027

SKILLS

Programming: Robot Operating System (ROS), Python (Pytorch, Numpy, Scipy, Matplotlib), C/C++, OOP, ArduPilot, Verilog, ModelSim, RISC-V, MATLAB, Open3D, Gazebo, Dual Boot, GitHub, Ubuntu, OpenCV, Arduino IDE, Google Cloud, OpenAI API

Hardware: Flight Controller, Nvidia Jetson, FPGA, Quartus, LiDAR, Stereo Camera, IMU, GPS, ESP-32C, Arduino

Professional: Engineering Design, Communication, Systems Integration, Leadership, Team Player, Problem Solving

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

- Presented at the 2025 **IEEE ICRA Workshop** on Field Robotics, <https://arxiv.org/pdf/2506.08851>
- Aimed to create a **fully autonomous navigation stack** that safely interacts with **pedestrians** on sidewalks.
- Integrated a model predictive control **local planner** (SICNav) with **Google Cartographer** for localization, an **A* global planner**, and a **pedestrian detection** (PiFeNet) and **tracking** system using Clearpath Jackal **robot** and Ouster **LiDAR**
- Developed a **novel** implementation of Cartographer with a 3D mapping model and 2D motion model giving a localization error of **14cm** from ground truth
- Integration **challenges** included **algorithm compatibility**, and **error propagation** through the navigation stack due to inaccurate localization or suboptimal global planning.

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 **grripper 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 for the University Rover Challenge 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 workshops** for training the recruits in **git concepts**, dual booting **Linux** environment on windows and robotics to give them experience with ROS, sensors, and navigation stack.

PROJECTS

Alzheimer's Disease Identification using EEG Data

- Currently there is **no cure** for Alzheimer's, but **early diagnosis is key** to preserving the quality of life for patients.
- Coded a **convolutional neural network** model using **PyTorch** to **identify** patients with Alzheimer's Disease using electroencephalogram (EEG) data
- Testing on untrained data gave **100% recall, 77% precision and 87% F1 score**

MediLens: Customizable Biometric AR Goggles

- **AR goggles** on top of sunglasses, noise cancelling earbuds and heart rate sensor, which **transcribes and translates conversations** into a caption, which the user can read.
- Designed for individuals with **ASD or deafness** to reduce **sensory overload** while enhancing external communication.

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**