Alikasim Budhwani

alikasim.budhwani@gmail.com | sanger640.github.io | alikasim-budhwani | sanger640

Skills

- **Programming Languages:** Python, C++, MATLAB, R, Bash
- **Toolboxes/Environments:** ROS, Linux, Docker, PyTorch, Git, MuJoCo

Experience

- **BHF Robotics** *Sep 2023 - Dec 2024*
  Robotics Engineer Markham, Canada
  - Led a team of 4 interns in developing ROS-based autonomy stack for Agrobot mobile platform which conducts targeted weed elimination via high-voltage electricity.
  - Optimized weed elimination sequencing using Ant Colony Optimization (ACO), achieving a high-speed cycle time of 300 weeds/min.
  - Developed the perception module for precise weed detection and elimination site selection, minimizing crop damage while achieving 90% accuracy.

- **Ansys** *Jan 2023 - Apr 2023*
  SDE Intern Waterloo, Canada
  - Implemented isoparametric mapping in C++-based finite element solver, reducing computation time by 10% for 10,000+ node models with complex curved geometries.
  - Refactored C++ element classes in coupling framework using templates, eliminating 15+ redundant classes and improving readability.

- **Promation** *Sep 2021 - Dec 2021*
  Perception Intern Oakville, Canada
  - Developed an in-situ defect detection system for 3D metal printing, obtaining 75% detection accuracy.
  - Implemented a custom hand-eye calibration algorithm for 2D laser scanners, reaching 0.5mm accuracy during 3D object reconstruction.
  - Designed a vision-based trajectory adjustment algorithm for automotive robots, achieving 0.2mm recalibration error.
  - Created a semi-supervised data processing pipeline to segment printed samples, filter noise, and annotate point clouds, reducing time by 60%.

Research

- **Manipulation Policies** *Sep 2025 - Present*
  Robot Planning and Control via Imitation Learning.
  - Developed a VR teleoperation system for robot manipulators which increased demo data collection throughput by 3x compared to using Spacemouse teleoperation.
  - Trained and deployed Diffusion Policies for manipulation tasks, including pick-and-place and assembly, achieving an 80% task success rate in non-deterministic environments.

- **WATonomous** *Feb 2022 - April 2023*
  University of Waterloo's Autonomous Vehicle Team.
  - Led the planning and controls team in implementing a real-time MPC module in ROS2.
  - Developed a spatio-temporal action recognition model to predict pedestrian behavior, improving video-level mAP@0.2IOU by 2.2 points over the existing baseline.

Education

- **University of Waterloo** *Jan 2025 - Apr 2027*
  MASc in Mechanical Engineering (GPA: 4.00/4.00) Waterloo, Canada
  - **Research:** Leveraging chaotic dynamics to learn safety filters for contact-rich manipulation policies.
  - **Coursework** including Nonlinear Control, Stochastic Control, and Vehicle Dynamics.

- **University of Waterloo** *Sep 2019 - Aug 2024*
  BASc in Mechanical Engineering (GPA: 3.84/4.00) Waterloo, Canada
  - **Coursework** including Robot Manipulation, Mobile Robotics, and Reinforcement Learning.