

# ADITYA NAIR

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**PORTFOLIO:** 🌐 <https://adityanairs.website/> | **YouTube:** 📺 @AdityaNairBuilds

## EDUCATION

**Northwestern University, Evanston, Illinois**

Sep 2023 - Dec 2024

*Master of Science - Robotics*

**Birla Institute of Technology and Science, Pilani, India**

Aug 2019 - May 2023

*Bachelor of Engineering - Mechanical Engineering*

## PROFESSIONAL EXPERIENCE

**HEBI Robotics, Pittsburgh**

June 2024 - Sep 2024

Robotics Software Engineer Intern

- ▷ Standardized the C++, Python, MATLAB, and ROS2 APIs for robot arms, sensor suites (visual and inertial) and IOS devices, using a unified config file format to reduce code and improve cross-language compatibility.
- ▷ Responsible for identifying and resolving critical bugs in C++, Python, MATLAB, ROS2, C, and Java APIs, which significantly improved system stability and functionality.
- ▷ Developed robot arm demos showcasing features like sensor fusion and force control, with video tutorials.

## RESEARCH EXPERIENCE

**MARMot Lab, National University of Singapore**

Aug 2022 - Aug 2023

Lead Researcher - Bachelor's Thesis | Advisor: Dr. Guillaume Sartoretti

- ▷ Invented a novel optimal torque-control strategy in Python for hexapod robots, for payload transport.
- ▷ Developed Python Libraries for 6-DoF body-pose control of legged robots, using PyBullet.

**Robotics Research Center, IIIT Hyderabad**

May 2022 - Aug 2022

Research Assistant

- ▷ Implemented a Model-Predictive Controller for non-prehensile pushing using a Turtlebot in PyBullet.
- ▷ Designed and tested under-actuated perching mechanisms on drones for power line inspection using cameras.

**Inspire Lab, BITS Pilani**

Dec 2021 - May 2022

Undergraduate Researcher

- ▷ Led a team in developing a ROS pipeline in Python for autonomous navigation in robot swarms.
- ▷ Implemented Iterative Closest Point (ICP) on LIDAR scans in Python for structural depth estimation.

## FEATURED PROJECTS

**Data-Driven Control of an Agile Bio-Mimetic Aerial Robot**

Apr 2024 - Dec 2024

- ▷ Calibrated an OptiTrack motion capture system for intelligent control of a bird-like robot, using C++, Python.

**Custom Sensor Simulation Platform for Multi-Agent Reinforcement Learning**

Apr 2024 - June 2024

- ▷ Built an end-to-end physically accurate sensor platform for training Multi-Agent Exploration models in C++.

**Search-and-Rescue with an Autonomous Robot Dog**

Jan 2024 - Mar 2024

- ▷ 3D visual SLAM with a Zed stereo camera and frontier exploration on Unitree Go1 in ROS2, C++, and Python.

**Dexterous Manipulation with Shadow-Hands through Virtual Reality**

Oct 2023 - Nov 2023

- ▷ Developed a ROS2 pipeline in a team of 5 for teleoperation of a humanoid robot with visual and haptic sensing.

**Extended Kalman-Filter SLAM pipeline in C++ from scratch**

Jan 2024 - Mar 2024

- ▷ Programmed a complete ROS2 pipeline in C++ for SLAM using a real and simulated LIDAR, from scratch.

## TECHNICAL SKILLS

**Programming**

C++ (8+ years), CMake, Python, Git, Linux Kernel, Unit Testing, Bash, Docker, Java, Lua

**Computer Vision**

Camera Calibration, Visual SLAM, Feature Extraction, Object Detection, Segmentation

**Hardware**

NVIDIA GPUs & Jetson, LIDAR, RealSense, Embedded C, UDP/TCP, RaspberryPi, Teensy

**Simulation**

Gazebo, MuJoCo, PyBullet, CoppeliaSim, Webots, Simulink, ANSYS, Fusion360, Blender