

# 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 arm trajectory planning, 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 state estimation and sensor fusion, 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 planner 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.

## FEATURED PROJECTS

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

Apr 2024 - Dec 2024

- ▷ Developed control strategies for a bird-like robot using an OptiTrack motion capture system, in ROS2/Python.

**Multi-Agent Reinforcement Learning simulation environment from scratch**

Apr 2024 - June 2024

- ▷ Built an end-to-end physically accurate training pipeline for Multi-Agent Exploration in ROS2.

**Fully Autonomous Search-and-Rescue with a Robot Dog**

Jan 2024 - Mar 2024

- ▷ 3D visual SLAM and outdoor frontier exploration on Unitree Go1 and Zed 2i 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 avatar with haptic feedback.
- ▷ Created custom Python wrappers for the MoveIt2 API, and for position control in Gazebo.

**EKF SLAM pipeline in C++ from scratch**

Jan 2024 - Mar 2024

- ▷ Programmed a complete ROS2 pipeline in C++ for SLAM on a Turtlebot, from scratch.

**Navigation and Kalman Filter Localization of Self Driving Car**

Nov 2023 - Dec 2023

- ▷ Simulated an autonomous car with waypoint navigation, localization, sensor fusion, and A\* path planning.

## TECHNICAL SKILLS

**Programming**

C++, CMake, Python, Git, Linux, Unit Testing, Bash, Docker, Java, Lua, Jekyll

**Computer Vision**

Visual SLAM, Feature Extraction, Object Detection, Segmentation, Deep Learning

**Simulation**

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

**ROS/ROS2 Packages**

Nav2, SLAM\_Toolbox, MoveIt2, TF2, AprilTag, RealSense2, Isaac ROS

**Hardware**

NVIDIA GPUs & Jetson, Unitree, Embedded C, RaspberryPi, Teensy, PIC32, Franka