

# ADITYA NAIR

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**PORTFOLIO:** 🌐 <https://adityanairs.website/>

## EDUCATION

**Northwestern University, Evanston, Illinois**

*Master of Science - Robotics*

Sep 2023 - Aug/Dec 2024

GPA: 3.8

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

*Bachelor of Engineering - Mechanical Engineering*

Aug 2019 - May 2023

GPA: 3.6

## RESEARCH EXPERIENCE

**MARMot Lab, National University of Singapore**

Aug 2022 - Aug 2023

Visiting Researcher | Advisor: Dr. Guillaume Sartoretti

- ▷ Invented a novel optimal torque-control strategy in Python for hexapod robots, accomplishing payload carrying.
- ▷ Devised an optimal admittance control trajectory planner for lifting objects using a hexapod robot's front legs.

Research Intern:

Apr 2022 - Aug 2022

- ▷ Developed a Python Library for  $SE(3)$  body-pose control of legged robots, using PyBullet.

**Robotics Research Centre, IIIT Hyderabad**

May 2022 - Aug 2022

Research Assistant

- ▷ Implemented a Model-Predictive controller in Python for single-agent box pushing manipulation in PyBullet.
- ▷ Designed and tested under-actuated perching mechanisms on drones for power line inspection.

**Inspire Lab, BITS Pilani**

Dec 2021 - May 2022

Undergraduate Researcher

- ▷ Led a team in developing a ROS pipeline in Python for teleoperation of robot swarms (FireBird VI robots).
- ▷ Implemented Iterative Closest Point (ICP) using PCL Library in Python for structural depth estimation.

## PROFESSIONAL EXPERIENCE

**The Port of Singapore Authority - National University of Singapore**

Oct 2022 - Jan 2023

Industrial Research Engineer (Python)

- ▷ Collaborated with multiple teams to engineer pioneering software for robotic manipulation and locomotion.

## FEATURED PROJECTS

**Dexterous Manipulation 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 a custom Python wrapper for the MoveIt2 API.

**Search and Rescue Missing Person with Autonomous Robot Dog (in progress)**

Jan 2024 - Mar 2024

- ▷ 3D visual SLAM and outdoor frontier exploration on Unitree Go1 and Zed2i in ROS2, Python, and C++.

**EKF SLAM pipeline in C++ from scratch (in progress)**

Jan 2024 - Mar 2024

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

**Mobile Manipulation with KUKA youBot**

Nov 2023 - Dec 2023

- ▷ Devised a controller for pick-and-place manipulation on an omnidirectional KUKA youBot, in MATLAB.

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

Oct 2021 - Nov 2021

- ▷ Wrote a Python library to integrate A\* path planning, sensor fusion and steering on a self-driving car in Webots.

## TECHNICAL SKILLS

**Programming**

C, C++, Python, Git, Linux, Testing, MATLAB, Bash, Docker, Java, Lua, Documentation

**Robotics**

Motion Planning, SLAM, Machine Learning, Computer Vision, Nonlinear Optimization

**ROS/ROS2 Packages**

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

**Simulation**

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

**Hardware**

ABB, KUKA, NVIDIA Jetson, Unitree, Arduino, RaspberryPi, Teensy, HEBI, Franka