ADITYA NAIR

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PORTFOLIO: https://adityanairs.website/

EDUCATION

Northwestern University, Evanston, Illinois Sep 2023 - Dec 2024
Master of Science - Robotics *GPA: 3.9*

Birla Institute of Technology and Science, Pilani, India Aug 2019 - May 2023
Bachelor of Engineering - Mechanical Engineering *GPA: 3.6*

PROFESSIONAL EXPERIENCE

HEBI Robotics, Pittsburgh June 2024 - Sep 2024
Robotics Software Engineering Intern

- ▷ Integrating and standardizing features across the C++, Python, and Java APIs, for commercial robots.
- ▷ Creating comprehensive, high-quality examples for clients that highlight the capabilities of force control, sensor fusion, and machine learning, on our robot arms, mobile bases and climbers, with C++, Python and ROS2.

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.

FEATURED PROJECTS

Learning bio-mimetic flight for Bird Robots with Koopman Operators Apr 2024 - Dec 2024

- ▷ Developing active learning ROS2 packages for a bio-mimetic flying robot (MetaFly) using an OptiTrack system.

Multi-Agent Reinforcement Learning Sim environnment from scratch Apr 2024 - June 2024

- ▷ Built an end-to-end physically accurate pipeline for Multi-Agent Exploration training in C++, from scratch.

Search and Rescue Missing Person with Autonomous 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 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.

Mobile Manipulation with KUKA youBot Nov 2023 - Dec 2023

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

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	ABB, KUKA, NVIDIA Jetson, Unitree, Embedded C, RaspberryPi, Teensy, PIC32, Franka