ADITYA NAIR

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PORTFOLIO: ⊕ **https://adityanairs.website/**

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