ADITYA NAIR

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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

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

Multi-Agent Reinforcement Learning simulation environnment 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