ADITYA NAIR

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Portfolio: adityanairs.website

EDUCATION

★ **Northwestern University, Evanston, Illinois** *Sep 2023 - Aug 2024*
Master of Science - Robotics *GPA: 3.8/4.0*

★ **Birla Institute of Technology and Science, Pilani, India** *Aug 2019 - May 2023*
Bachelor of Engineering - Mechanical Engineering *GPA: 3.6/4.0*

RESEARCH EXPERIENCE

★ **MARMot Lab, National University of Singapore** *Apr 2022 - Present*
Visiting Researcher | Advisor: Dr. Guillaume Sartoretti

- ▷ Developed a hybrid motion-force controller for optimizing joint-torques of a hexapod robot, during load carrying and slope climbing.
- ▷ Implemented admittance control and optimized trajectories for lifting objects using the hexapod's front legs.
- ▷ Currently developing dynamics-informed Central Pattern Generator (CPG) for the hexapod.

★ **Robotics Research Centre, IIIT Hyderabad** *Summer 2022*
Research Assistant | Advisor: Dr. Nagamanikandan Govindan

- ▷ Implemented a Linear Time Variant Model-Predictive Controller for single-agent box pushing manipulation.
- ▷ Designed and tested under-actuated perching mechanisms for drones during power line inspection.

★ **Inspire Lab, BITS Pilani** *Dec 2021 - May 2022*
Undergraduate Researcher | Advisor: Dr. Avinash Gautam

- ▷ Developed a ROS pipeline for teleoperation of robot swarms (Fire Bird VI robots).
- ▷ Implemented Iterative Closest Point (ICP) on point clouds for structural depth estimation of cracks in walls.

WORK EXPERIENCE

★ **The Port of Singapore Authority - National University of Singapore** *Oct 2022 - Jan 2023*
Industrial Research Engineer

- ▷ Engineered pioneering solutions at the intersection of robot design, control and motion planning for problems related to shipping container lashings.

Details sealed due to confidentiality

★ **DomTech Robotics & Automation** *Summer 2021*
3D modelling & Automation Intern

- ▷ Designed a 2-DoF automated welding positioner capable of handling torques up to 6000 Nm.

TECHNICAL SKILLS

Programming	C/C++, Python, Unit Testing, MATLAB, Bash, Java, Lua, SQL
ROS/ROS2 Packages	Nav2, Slam_Toolbox, MoveIt!, TF2, AprilTag, RealSense2, RViz2
Simulation	Gazebo, PyBullet, CoppeliaSim, Webots, Simulink, ANSYS, Fusion360, SolidWorks, Blender
Python Libraries	SciPy, NumPy, SymPy, MatPlotLib, Open3D, OpenCV, MediaPipe, Keras, DOLFIN
Microprocessors	Jetson Nano/Orin, NUC, Arduino, ESP32, RaspberryPi, Teensy

PUBLICATIONS

1. *"Joint-Torque Optimization for Legged Robots during Payload Carrying Operations"*
Nair A, Khurana S, Sartoretti G
To be submitted to the *IEEE Conference on Intelligent Robots and Systems (2024)*.

2. *"Legged Robots for Object Manipulation: A Review"* | **Paper**
Gong Y, Sun G, **Nair A**, Bidwai A, CS R, Grezmak J, Sartoretti G, Daltorio KA
Published in *Frontiers in Mechanical Engineering*.