

Aditya Bondada

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Education

Northeastern University, Boston, MA

CGPA: 3.838

Master of Science in Robotics, Electrical and Computer Engineering

Aug 2022 – May 2024

– Coursework: Robot Dynamics, Control Systems, Nonlinear Optimization, Sensing and Navigation

Manipal Institute of Technology, Manipal, India

CGPA: 3.6

Bachelor of Technology in Mechanical Engineering, Minor in Machine Design

July 2017 – Sept 2021

Technical Skills

Languages: Python, Bash, MATLAB, SQL, C++, CUDA

Software: ROS/ROS2, RViz, Gazebo, Git, NumPy, OpenCV, SolidWorks, AutoCAD, CARLA, Tensorflow, Pytorch, SSH, Docker

Operating Systems: Linux (Ubuntu/Debian-based), Windows, MacOS, Kali Linux

Design and Manufacturing: SolidWorks, OnShape, AutoCAD, Ultimaker S3/S5 3D printers, ULTRA R9000 Laser Cutter

Experience

Research Assistant

Sept 2022 – April 2024

Silicon Synapse Robotics Lab, Northeastern University

Boston, MA

In collaboration with NASA Jet Propulsion Laboratory (JPL) and California Institute of Technology (Caltech)

- Spearheaded the development and maintenance of mechatronic design and software stack for Harpy, an innovative thruster-assisted bipedal robot designed for traversing rugged terrains, improving locomotion efficiency by over 40%.
- Designed the dynamic control model through capture point control and optimized performance across variable terrains, achieving a 95% improvement in gait stability and a 50% boost in push recovery using thruster actuation.
- Performed comprehensive simulations of thruster-assisted locomotion, securing a 90% success rate in recovery from unstable states, thereby enhancing walking dynamics using sophisticated control algorithms and innovative push recovery strategies.
- Engineered and tested a lightweight and robust actuator system using 3D-printed components reinforced with carbon fiber and Kevlar to ensure high power density, precise control, and impact resistance for the robot's leg joints.

Robotics Engineer

Oct 2021 – Aug 2022

ALOG Tech

Hyderabad, India

- Led the development of an advanced autonomous navigation framework for a cutting-edge warehouse robot-trolley system, securing seed funding to further advance the technology.
- Developed a simulation environment in ROS and Gazebo to validate and refine path planning algorithms, addressing challenges related to joint behavior, accurate physical representation, and trailer attachment in a virtual environment.
- Implemented and evaluated geometric, hybrid A*, and deterministic grid-based path planning algorithms for non-standard tractor-trailer robot systems, incorporating obstacle avoidance and cost functions based on wheel error to optimize navigation.
- Designed custom attachments for ALOG T-1000 using SolidWorks, enhancing the robot's capability to move 30% more trailers.

Teaching Assistant

Aug 2023 – April 2024

Robot Sensing and Navigation, Northeastern University

Boston, MA

- Designed and implemented an automated grading system on GitHub, slashing grading time by 80% and enhancing efficiency; provided extensive technical support to over 100 students in sensor integration and programming in ROS and Python.
- Leveraged Python to build sensor emulators for GPS and Vectornav IMUs for ROS labs, facilitating interactive learning and developing assignments to improve students' data visualization and sensor understanding.

Projects

Behavior Cloning and Multi-Model Perception in Autonomous Cars

Jan 2023 – May 2023

- Improved steering and trajectory smoothness by 35% and 25%, enhanced object detection by 40% using CNNs in Unity docker.
- Enhanced route efficiency by 30% and reduced jerk using hybrid RRT, A*, and Frenet algorithms in CARLA simulator.

Modular Autonomy using Consumer Technology (i-SLAM)

Aug 2022 – Dec 2022

- Achieved 92% and 90% mapping accuracy and estimation with RTABMap and PySLAM2, with iPhone sensors.
- Developed dead reckoning algorithm with 80% accuracy in GPS-denied areas; designed algorithms for modular autonomy.

Design and Optimization of Drone-Assisted Wildfire Fighting System

Jan 2021 – Aug 2021

- Designed a drone-assisted wildfire fighting system, through advanced UAV control and path planning using ROS nodes.
- Enhanced wildfire detection and area coverage by 30% using multi-UAV systems with ROS, Gazebo, Voronoi Tessellation.

Academic Publications

Dynamics of Multiple Pendulum System Under a Translating and Tilting Pivot

July 2023 | [Springer](#)

Capture Point Control in Thruster-Assisted Bipedal Locomotion

Accepted for IEEE AIM 2024 | [Thesis](#)