

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

Experience

Robotics Engineer

Oct 2021 – Aug 2022

ALOG Tech

Hyderabad, India

- Developed and refined the control of autonomous multiple trailer systems in warehouse automation, enhancing efficiency by 33% by employing advanced simulation techniques in Gazebo and ROS to ensure safe implementation.
- Designed custom attachments for ALOG® T-1000 AMRs using SolidWorks, enhancing the robot's capability to move 30% more trailers. Integrated trajectory planning algorithms using modified A* and grid-based search for traversing in warehouses.
- Enhanced warehouse robots' navigation and estimation by integrating 2D LiDAR and RealSense cameras, devising a path planning algorithm for improved maneuverability, and significantly improved trailer maneuverability in tight warehouse spaces.

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)

- Designed the dynamic control model and optimized it for thruster-assisted bipedal robot Harpy. Achieved a 95% improvement in gait stability through capture point control 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.
- Implemented diverse walking strategies with a focus on swing offset adjustments to modulate walking speeds and adaptability. Enhanced robotic stability through precise capture point control, optimizing performance across variable terrains.

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

Optimizing Gait Stability Control in a Three-Link Bipedal Robot

Jan 2023 – May 2023

- Achieved a 25% increase in robotic gait stability and efficiency using Lagrangian formalism and feedback control.
- Implemented feedback linearization and PD control to improve robot adaptability and performance across different terrains.

Drone Controller Optimization Performance Comparison

Aug 2023 – Dec 2023

- Optimized drone control algorithms (PID, LQR, MPC) on a dynamic platform, improving response time and stability by 40%.
- Developed and tested a modular drone control system, enabling effective implementation of various control algorithms.

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.

Technical Skills

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

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

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

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](#)