# Aditya Bondada

857-376-7792 | bondada.a@northeastern.edu | linkedin.com/in/adityabondada | bondada-a.github.io

## 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
– Coursework: Thermodynamics, Machine Design, Mechanical Vibrations, CAD/CAM

## 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 perception by integrating 2D Lidar and RealSense cameras, devising a path planning algorithm for improved maneuverability, and maintaining the software stack to optimize human-robot interactions.

**Research Assistant** **May 2023 – April 2024**
**Silicon Synapse Lab, Northeastern University** Boston, MA
– Designed a dynamic model and optimized a control system 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.
– 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 using LiDAR and visual SLAM 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 (Robot Operating System), RViz, Gazebo, Git, NumPy, OpenCV, SolidWorks, AutoCAD, CARLA
**Operating Systems**: Ubuntu, 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