

ASHWIN DISA

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Education

Master of Science, Robotics Engineering (4.0/4.0)

Worcester Polytechnic Institute (WPI)

Aug 2023 - May 2025

Worcester, MA

Bachelor of Technology, Aeronautical Engineering (8.67/10)

Manipal Institute of Technology

Minor in Fundamentals of Computing

Aug 2019 - May 2023

Udupi, India

Technical Skills

Languages	C/C++, Python, MATLAB, Lua
Developer Tools	Linux, Git, ROS/ROS2, MATLAB/Simulink, Gazebo, CoppeliaSim, L ^A T _E X
Libraries	OpenCV, NumPy, SciPy, Matplotlib, pymavlink
Design & Analysis	Fusion 360, SolidWorks, 3DEXperience, ANSYS
UAV Developer Tools	PX4, Ardupilot, QGroundControl, Mission Planner, MAVLink, MAVROS, RaspberryPi, Arduino

Experience

Robotics Research Center, IIIT Hyderabad

Jan 2023 - May 2023

Research Intern | Advisor - Dr. Spandan Roy

Hyderabad, India

- Developed a Path Planning algorithm in velocity space for a UAV interception system. Hardware setup included CubeOrange FCU with ArduPilot firmware and RaspBerryPi as the companion computer. Validated through extensive testing, demonstrating a performance with an interception accuracy exceeding 95% across diverse trajectories. [\[repo\]](#)
- Implemented Reciprocal Velocity Obstacle (RVO) for obstacle avoidance and Depth First Search (DFS) algorithm for coverage path planning of a multi-agent system. Improved performance by using an optimization function to assign optimal paths to each agent.

E-Yantra Summer Internship Program, IIT Bombay

Jun 2022 - Jul 2022

Summer Intern

Online

- Worked on implementation of a research paper based on Proportional-Integral-Derivative (PID) controller to control an over-actuated Omnidirectional Micro-Aerial Vehicle (OMAV) in simulation environment.
- Evaluated the controller by performing 3 Dimensional trajectory tracking, resulting in the position error being consistently below 10% across multiple reference trajectories along with arbitrary orientation of OMAV.

Manipal Institute of Technology

Dec 2021 - Sep 2022

Research Assistant | Advisor - Dr. Vishnu G. Nair

Udupi, India

- Devised a target detection algorithm using OpenCV library and control strategy based on Proportional controller for autonomous landing of UAVs on a custom ground marker using Image-based Visual Servoing (IBVS) technique.
- Tested extensively in PX4 SITL and on hardware. The mean time to land from an altitude of 7 meters was about 26 seconds across 5 test flights. Achieved satisfactory performance with respect to the error in landing position.

Projects

Centralized multi-agent path planning | Python, MuJoCo

- Worked on a system to plan a path for multiple robots simultaneously by treating the robots as a single composite system with many degrees of freedom using dRRT (discrete Rapidly exploring Random Tree). [\[repo\]](#)

Forward, Inverse & Velocity Kinematics of a 4 DOF manipulator | Python, ROS2, MATLAB, OpenManipulatorX

- Derived Forward and Inverse Kinematics of a 4 DOF Robotic Manipulator using it's DH parameters. The work was validated by performing pick and place of an object using a gripper mechanism.
- For Velocity Kinematics, a Jacobian was introduced to control the end-effector velocities. This was verified by giving a constant velocity input of $0.1m/s$ in a particular/arbitrary direction in an incremental manner. [\[repo\]](#)

LQR controller for a self-balancing robot | State-Space modelling, LQR, CoppeliaSim, Lua

- Designed an LQR controller for balancing the robot equipped with a flywheel mechanism. The robot was attached with a 6 DOF manipulator to pick and place objects at designated locations in the arena.
- A geometric equation was derived to steer the robot along curved pathways. The arena was traversed by assuming it as a travelling salesman problem to find the optimal path and cover all delivery locations. Attained a milestone performance score without incurring any penalties. [\[repo\]](#)

Multi-robot coverage path planning | C++, ROS, Gazebo

- Worked on coverage path planning of a multi-robot system in a rectangular grid using voronoi partitioning technique to divide and assign areas. Known static obstacles are placed in the grid and Depth First Search (DFS) is implemented for coverage. [\[repo\]](#)

Publications

- A. Disa and V. G. Nair, "Autonomous Landing of a UAV on a Custom Ground Marker using Image-Based Visual Servoing," 2023 IEEE 4th Annual Flagship India Council International Subsections Conference (INDISCON), Mysore, India, 2023, pp. 1-6, doi: 10.1109/INDISCON58499.2023.10270190. [\[paper\]](#)

Team Achievements

- Winner out of 242 teams, in the E-Yantra Robotics Competition 2021-22, hosted by IIT Bombay. [\[certificate\]](#)
- Ranked 18th overall and **2nd best** in Flight Readiness Review out of 71 teams in the AUVSI SUAS Competition 2022.