WINSTON DOSS

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EDUCATION

Indian Institute of Technology Madras | *Exchange Student (Final Year)* *May 2024*
- Worked under *Dr. Bijo Sebastian* on *Perception for Autonomous vehicles*
- CGPA: 8.8/10.0

National Institute of Technology (NIT), Puducherry *May 2023*
Bachelor of Technology in Electronics and Communication Engineering
- CGPA: 8.68/10.0 *(First class with Distinction)*

PUBLICATION

Marveldoss, W., Joshika, B., & Sebastian, B. ***"Tracking and estimation approach for human-aware mobile robot navigation"*** **IEEE Sensor Letters*. Under Review.* *June 2023-Aug 2024*

RELEVANT EXPERIENCE

Warehouse Drone *Sept 2024-Present*
Competition Project | Team Lead
- Leading a team of four to develop *a quadcopter for autonomous warehouse operations*, addressing the growing need for efficient supply chain solutions.
- Designed and simulated *a PID controller in Gazebo-ROS2* for precise flight stabilization and implemented an *ArUco marker-based vision system* to navigate the complex airspace, avoiding obstacles and locating critical packages.

Teaching Assistant *July 2024-Present*
Introduction to Field and Service Robotics (ED5315), Engineering Design, IIT Madras
- Designed *Python-based assignments* with *CoppeliaSim integration* to enhance student comprehension of the *Extended Kalman Filter*, and automated evaluations via VPL with *custom grading scripts.*
- Led classroom *tutorials* and provided exam support, assisting with *invigilation and grading* to facilitate both learning and administration

Self-Balancing Bike Robot *Aug 2023-Jan 2024*
Competition Project
- Developed a *non-conventional self-balancing robot* with a *front omniwheel* for lateral movement and a rear wheel for propulsion, achieving unique mobility
- Designed and implemented an *LQR-based control system in Octave* for *real-time stabilization*, later fine-tuned through simulation in *CoppeliaSim.*
- Assembled the physical robot and successfully transferred the control algorithm to hardware, ensuring stability in real-world operations

Omni-Wheel Robot with Camera-Based Localization *Sep 2023-Feb 2024*
Competition Project
- Developed a go-to-goal controller for an omni-wheel robot to follow waypoints for drawing, with real-time control via Wi-Fi communication between a laptop and ESP32
- Integrated Aruco marker-based localization using a calibrated overhead camera, simulated the system in Gazebo, and successfully assembled and deployed the physical setup

Multi-Robot Path Planning for Warehouse Logistics *Feb 2024 – Apr 2024*
Course Project
- *Designed and implemented a centralized multi-robot system* for warehouse logistics, optimizing task completion time with static obstacles using three algorithms: Serial A*, CBS A*, and Serial RRT.
- *Simulated the system in CoppeliaSim* and evaluated the algorithms based on planning time, path steps, and execution time, highlighting the strengths and trade-offs of each.

Atum Robotics, Anna University Incubation Cell *Jun 2022 – Aug 2022*
Robotics-Embedded Engineer, Intern
- Developed a cloud-integrated web application using Node-RED to control a droid remotely
- Programmed an ESP32 microcontroller to interface with the Node-RED platform hosted on AWS, enabling real-time command transmission over the Internet.

RELEVANT COURSEWORK

Introduction to Field and Service Robotics | Introduction to Motion Planning | Marine Autonmous Vehicles | Image signal Processing | Control systems | Robotics Labratory **|** Soft Computing | Embedded systems Design

TECHNICAL SKILLS

Languages: *Python, C/C++, Matlab, Octave, Verilog*

Tools/Platforms: *ROS, ROS2, CoppeliaSim, Gazebo, Arduino, UR5 Robotic Arm, Pioneer 3-AT*