

WINSTON DOSS

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EDUCATION

Carnegie Mellon University (CMU) Master of Science in Robotics (MSR)	Ongoing
• Working under Dr. Sebastian Scherer and Dr. Wenshen Wang for the DTC Challenge	
Indian Institute of Technology Madras Exchange Student (Senior Year)	May 2024
• Worked under Dr. Bijo Sebastian and Dr. Lakshmi Narasimhan 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., Joshi, B., & Sebastian, B. "Tracking and estimation approach for human-aware mobile robot navigation" *IEEE Sensor Letters*. Early Access. DOI:10.1109/LSENS.2024.3492373, 2024	June 2023-Aug 2024
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RELEVANT EXPERIENCE

Darpa Triage Challenge, AirLab

Ongoing

Autonomy and Vision Team

- Designed and implemented a ROS2 based real-time tracking system leveraging YOLO Detection.
- Fine-tuned Yolo model to significantly improve detection of camouflaged-clothed casualties, increasing precision from 22% to 85%.
- Implemented 3D localization using both geometry-based method and Deep learning-based depth estimation (UniDepth) for accurate spatial reasoning.

Teaching Assistant

Jul 2024 - Dec 2024

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 by assisting with invigilation and grading to facilitate learning and administration.

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 each's strengths and trade-offs.

Self-Balancing Bike Robot

Aug 2023 - Jan 2024

Competition Project

- Developed a self-balancing robot based on a Furuta pendulum structure, incorporating advanced control mechanisms for stable motion.
- 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 2022 - Feb 2023

Competition Project

- Developed a go-to-goal controller for an omni-wheel robot to follow waypoints for drawing, with control commands communicated via Wi-Fi between the laptop and onboard ESP32.
- Integrated Aruco marker-based localization using a calibrated overhead camera, simulated the system in Gazebo, and successfully assembled and deployed the physical setup.

RELEVANT COURSEWORK

Advanced Computer Vision | Math Fundamentals for Robotics | Introduction to Field and Service Robotics | Introduction to Motion Planning | Marine Autonomous Vehicles | Image Signal Processing | Control Systems | Robotics Laboratory

TECHNICAL SKILLS

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

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