

# WINSTON DOSS

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## EDUCATION

<b>Carnegie Mellon University (CMU)   Master of Science in Robotics (MSR)</b>	Ongoing
• Working under <i>Dr. Sebastian Scherer</i> and <i>Dr. Wenshen Wang</i> for the DTC Challenge	
<b>Indian Institute of Technology Madras   Exchange Student (Senior Year)</b>	May 2024
• Worked under <i>Dr. Bijo Sebastian</i> and <i>Dr. Lakshmi Narasimhan</i> on <i>Perception for Autonomous vehicles</i>	
• CGPA: 8.8/10.0	
<b>National Institute of Technology (NIT), Puducherry</b>	May 2023
<i>Bachelor of Technology in Electronics and Communication Engineering</i>	
• CGPA: 8.68/10.0 ( <i>First class with Distinction</i> )	

## PUBLICATION

<i>Marveldoss, W., Joshika, B., &amp; Sebastian, B. "Tracking and estimation approach for human-aware mobile robot navigation" *IEEE Sensor Letters*. Early Access. DOI:10.1109/LSSENS.2024.3492373, 2024</i>	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,