Winston Doss Marveldoss

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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
- GPA: 4.16/4.33

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., Joshika, 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*

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,*