J Dhana Santhosh Reddy

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Education

University of Maryland, College Park **Aug. 2023 – May 2025**
Master of Engineering Robotics *College Park, MD,USA*
Coursework: Multi-Modal Models, AI and Deep Learning, Perception, Path Planning, Robot Modeling

SRM Institute of Science and Technology **Aug. 2019 – May 2023**
B.Tech. Mechatronics Engineering *Chennai-TN, INDIA*
Coursework: Applied Mechatronics, Fundamentals of Robotics, Automation and Intelligent Systems

Technical Skills

Languages: Python, C++, MATLAB

Libraries and Tools: OpenCV, ROS, TensorFlow, PyTorch, Open3D, Git, Arduino, bash, ABB RobotStudio, CARLA, MoveIt, SolidWorks, Simulink, ControlDesk 2.0

Development Platforms: Linux (Ubuntu), Embedded robotics, Gazebo

Experience

Research assistant **May 2022 – July 2022**
SRM Institute of Science and Technology *Chennai, INDIA*

- Designed and optimized a PID controller for precise DC motor speed control, reducing response time by **14%.** Executed real-time HIL simulations with dSPACE 1104 and MATLAB/Simulink, improving closed-loop performance.
- Implemented Simulink models with RTI libraries to interface BLDC motors and H-bridge drivers, validating performance through oscilloscope analysis.

Projects

Fuzzy Adaptive RRT*N Path Planning and Control on CARLA | *Python, CARLA* **April 2024**

- Implemented and evaluated the Fuzzy Adaptive RRT*N (FA-RRT*N) algorithm for autonomous vehicles in the CARLA simulator, incorporating fuzzy logic to dynamically adjust sampling parameters based on obstacles.
- This adaptation led to an **84%** reduction in computation time and **68%** fewer nodes explored, demonstrating the algorithm's efficiency and potential for complex robotic navigation systems.

Perception-Based Dynamic TurtleBot | *Python, OpenCV, ROS2, Gazebo* **May 2024**

- Built ROS2-based Turtlebot navigation with YOLOv8 stop sign detection, optical flow, and horizon-line calibration for robust obstacle avoidance.
- Achieved 1st place via robust stop-sign detection, error-resilient navigation, leveraging horizon-line calibration for seamless indoor/outdoor operation.

Transformer based 3D Object Detection for Autonomous Vehicle for LIDAR Point Cloud

Python, PyTorch, Open3D, KITTI Dataset **November 2024**

- **Engineered a custom transformer-based framework** for 3D object detection in LiDAR point clouds, leveraging KITTI data to train models optimized for urban autonomous vehicle navigation.
- **Integrated pretrained PointNet++** for feature embedding and developed a novel loss function, achieving enhanced detection accuracy and computational efficiency in cluttered urban environments.

Imitation Learning of Hand Gestures for a Dual-Arm Robot Manipulator | *Python, RobotStudio, RAPID* **May 2023**

- Developed gesture generation system for Yumi robot using pre-trained data to map text/voice to co-speech gestures, integrating NLP, OpenPose, and cross-platform socket communication for real-time synchronization.
- Engineered pipeline converting simulated joint coordinates to Yumi angles, resolving kinematic constraints for human-like gesture replication and achieved **~50 second** end-to-end execution.

Publications

Mapping of Deep Learning based Gesture Generation with Speech and Image Data to a Robotic Manipulator | Published: 2024(Under Review) |*INDERSCIENCE*