PRANAV RAJESH

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SUMMARY

Robotics Engineer with hands-on experience in perception system development, sensor fusion, and real-time software using C++, Python, and ROS2 in Linux. Proficient in object detection, 3D sensor integration, and computer vision pipelines. Seeking robotics perception roles focused on developing intelligent autonomy for real-world deployment.

EDUCATION

Master of Science in Robotics and Autonomous Systems December 2024
Arizona State University, Tempe, AZ CGPA: 3.3/4.0
Coursework**:** Modelling and Control of Robotic Arms, Connected & Automated Vehicles, Aerial Robotics, Machine Learning
B. Tech in Mechanical Engineering May 2022
Vellore Institute of Technology, Chennai, India CGPA: 3.6/4.0

TECHNICAL SKILLS

Robotics/Autonomous Systems: ROS/ROS2, SLAM, Motion Planning
Programming: Python, C/C++, MATLAB, Git
Computer Vision/Machine Learning: Object Detection, Object Tracking, YOLO, OpenCV, PyTorch, Numpy, Pandas
Robotics/Autonomous Vehicle Simulators: Gazebo, RVIZ, Carla, MoveIt, Simulink, Carsim

PROFESSIONAL EXPERIENCE

Research Assistant, Battery Electric and Intelligent Vehicle Lab (BELIV), ASU, AZ January 2023 - May 2024

- Developed real-time C++ and Python software for vehicle simulation and perception in a Linux environment, improving system responsiveness by 30%
- Integrated multi-modal sensors (Camera, LiDAR) with real-time data fusion for enhanced vehicle perception and sensor calibration, improving object detection accuracy in dynamic environments
- Applied CAN and Ethernet communication protocols for sensor data streaming and vehicle control
- Leveraged Git for version control and collaborated in Agile/Scrum sprints; participated in peer code reviews and testing workflows

ACADEMIC PROJECTS & THESIS

Intelligent Parking Guidance System using Computer Vision, IoT and Edge Computing– MASTERS THESIS October 2024

- Developed real-time object detection in Python using OpenCV, YOLOv5, and PyTorch, achieving 92% accuracy in dynamic conditions
- Integrated multi-camera sensor data and implemented sensor fusion, improving detection under occlusion
- Deployed system on edge devices running Linux, reducing latency by 40% and enabling real-time updates via IoT
- Established a web-based interface with React, Flask, and MongoDB, enabling drivers to monitor parking availability remotely

Autonomous Mobile Robot (AMR) for Warehouse Automation May 2024

- Programmed AMR using ROS2, implementing LiDAR-based SLAM (gmapping), *trajectory planning (A**, RRT), and real-time navigation
- Integrated and calibrated RGB-D camera, LiDAR sensor, IMU achieving 97% object detection and tracking accuracy using OpenCV
- Conducted hardware testing and debugging in real environments to evaluate autonomy performance and sensor alignment accuracy

Unmanned Aerial Vehicle – Line Follower Drone May 2023

- Created a vision-based navigation system using image processing in python for line-path detection and following in quadcopter
- Implemented *PID control* algorithm in *Simulink* to enhance flight stability, improving trajectory accuracy by 30%

6-DOF Robotic Arm Manipulator for Pick and Place Material Handling Tasks December 2022

- Simulated a 6-DOF robotic manipulator using ROS, MoveIt, implementing inverse kinematics and PID-based motion control
- Integrated a YOLO-based vision system for real-time object recognition and actuation, achieving a 3.5s pick-and-place cycle
- Debugged software-hardware integration issues, conducted system validation, and improved trajectory tracking accuracy by 30%

PUBLICATIONS

Design and Vibrational Analysis of Ceramic-Based Nose Cone December 2022

- Designed a zirconia-based nose cone in SolidWorks for hypersonic flow conditions, reducing heat flux and drag by 75%, and performed vibrational analysis in Ansys, improving aircraft efficiency by 80% (DOI: https://doi.org/10.1007/978-981-19-7709-1_28)

Generative Design Optimization and Analysis of Connecting Rods December 2022

- Modelled a 4-stroke engine connecting rod in *SolidWorks* with topology optimization, reduced weight by 20%, and conducted FEA in *Ansys* to evaluate stress distribution for additive manufacturing (DOI: 10.1088/1742-6596/1969/1/012022)