PRANAVA SWAROOPA

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SUMMARY

Robotics Engineer with experience designing, building, and hardening autonomous mobile robot systems for real-world use. Specialized in navigation, localization, and perception integration within ROS-based stacks, with a strong emphasis on reliability, observability, and long-term maintainability.

EDUCATION

Clemson University — Clemson, USA
M.S, Automotive Engineering specializing in Robotics — *2023*

Manipal Institute of Technology — Manipal, India
B.Tech, Mechanical Engineering — *2017*

TECHNICAL SKILLS

Robotics Platforms: ROS1&2, Gazebo | **Programming:** Python, C++, Bash

Systems: Linux (Ubuntu), Docker, systemd, MQTT | **Tools:** Git, Azure DevOps

WORK EXPERIENCE

Robotics Software Engineer — Jan 2025 – Present
Technosoft Engineering

- Designed and stabilized an industrial AMR autonomy stack using ROS, integrating planning, localization, and differential-drive control with a focus on deployment readiness and long-term maintainability.
- Diagnosed and resolved autonomy, localization, and system-level issues observed during extended runs and deployment testing, improving reliability in real-world environments.
- Architected production-grade startup, recovery, logging, build, and CI workflows using systemd, automation scripts, and Azure DevOps pipelines, enforcing code quality checks and artifact generation via on-premise agents.
- Co-designed the robot management and fleet dashboard with product and frontend teams, defining telemetry, control, and data usage patterns; implemented ROS and backend integrations, including a resilient MQTT layer for unreliable local networks.
- Owned the design and debugging of an STM32-based peripheral control subsystem, writing custom drivers, ROS interfaces, and test infrastructure.

Robotics Field Engineer — Apr 2024 – Sep 2024
Relay Robotics

- Deployed and configured ROS-based service robots across multiple customer sites, adapting behavior to diverse real-world environments.
- Investigated autonomy, system, and network issues encountered during on-site deployments and coordinated fixes with engineering teams.
- Provided hands-on training and technical support to customer operators, ensuring reliable day-to-day robot operation.

Research Intern — Jan 2023 – Sep 2024
Clemson University

- Contributed to the development of an off-road traversability dataset for autonomous vehicles, supporting perception research in unstructured environments.
- Built a ROS-based data capture pipeline using a mobile robot platform and rosbags to generate high-resolution video datasets.
- Developed a custom C++/OpenCV annotation tool that reduced manual labeling time by 97%.
- Applied optical-flow-based interpolation to further accelerate semantic annotation workflows.

SELECTED ACADEMIC PROJECTS

Autonomous Navigation on TurtleBot3

- Developed a ROS-based autonomous navigation pipeline with lane following and obstacle avoidance using OpenCV, PID control, and LiDAR data.
- Automated experiment logging via scheduled jobs, reducing iteration and testing time.

Drivable Area Detection in Severe Weather

- Trained a CNN-based model to identify drivable regions under adverse weather conditions, achieving 44.14% mIOU on curated subsets of the BDD10K dataset.
- Built scalable data preprocessing and training workflows on an HPC cluster.

Radar–Camera Sensor Fusion for Object Detection

- Implemented selective radar–camera fusion using the nuScenes dataset to improve object detection robustness over vision-only baselines.

Active Contour Image Segmentation

- Implemented active contour–based image segmentation in C++, enabling interactive parameter tuning and user-guided refinement.