Pratik Walunj

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Education

University of Nevada, Reno **2024 - Present**
M.S. in Computer Science and Engineering ***(AI and Robotics)*** *3.3/4.0 GPA*

University of Pune **2018 - 2022**
B.E. in Computer Science & Engineering, ***Honours in Data Science*** *9.1/10 CGPA*

Work Experience

ARA Lab **Nov 2023 – Present**
Research Assistant *On-site*

- Built **AI-driven inspection robots** with **ROS2**, **LiDAR–IMU fusion**.
- Implemented **defect detection** and **SLAM** (DLIO) in Python/C++; wrote reusable CV modules with **OpenCV**/**PyTorch**.
- Prototyped and debugged robotics software (topics, TFs, launch) and conducted experiments; **analyzed metrics** and presented results.
- Deployed models on **Jetson Nano/Orin** (CUDA-enabled builds, optimized data loaders, camera/IMU streams).
- Designed custom PCBs; integrated **cameras, LiDAR, IMU, encoders**; brought up drivers and ROS2 nodes for real robot testing.
- Authored research artifacts (IROS-level) on platform-agnostic inspection and terrain transition behaviors.

SAS Research and Development **June 2022 – Aug 2023**
Associate Software Engineer *On-site*

- Automated secure **CI/CD** with **Shell, Docker, Azure Key Vault**; removed plaintext secrets in pipelines.
- Packaged and deployed **ML services** with containerization and runtime secret injection; improved reliability and auditability.

Parc Robotics **Oct 2019 – Feb 2021**
Student Intern *On-site*

- Built a **6-axis arm** (2 kg) using **ROS1** and **closed-loop stepper** control.
- Programmed **trajectory planning & calibration** in Python/C++; achieved **0.01 mm repeatability**.
- Designed PCB interfaces; integrated **vision feedback** for precise pick-and-place.

Projects

Culbot for Culvert Inspection (IROS 2024): **Link**

- Programmed **ROS2 UGV** with **LiDAR–IMU fusion** and **5-DOF manipulator**; inspection in tunnels.
- Implemented **vision-driven navigation & defect detection**; deployed inference on **Jetson Nano**.
- Ran structured experiments and **reported results** (accuracy, latency, throughput) to stakeholders.

Office Assisting Robot: **Link**

- Built indoor AMR using **Cartographer SLAM** with **2D LiDAR**.
- Developed object detection & obstacle avoidance with **OpenCV**; designed PCB for sensor/actuator IO.

Drone Delivery: **Link**

- Simulated autonomous flight in **ROS + Gazebo**; **vision-based landing**.

Technical Skills

Programming: Python, C/C++, Shell
Vision/ML: PyTorch, TensorFlow, OpenCV, MediaPipe; object detection, pose estimation, tracking, defect detection
Robotics: ROS2 (Nav2, TF, launch), SLAM (Cartographer), sensor fusion (LiDAR–IMU), PID, Kalman Filter, motion planning
Edge/Embedded: NVIDIA Jetson (Nano/Orin), CUDA basics, cameras/sensors, ESP32, Teensy, Raspberry Pi, Arduino
Tools: Gazebo, RViz, Git, Docker, EasyEDA, SolidWorks, Fusion 360, Azure Key Vault