Pavan **Kavvuri**

Robotics Engineer ·

Sheffield, United Kingdom

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"Systems that think, pipelines that deliver, performance that lasts."

Summary

Robotics Software Engineer with 4+ years of experience developing QA pipelines, performance evaluation tools, and real-time monitoring systems for autonomous platforms. Skilled in C++, Python, ROS2, and CI/CD practices, with a strong focus on testing and validating localisation and perception systems. Currently deepening expertise in state-of-the-art Visual SLAM methods to further strengthen capabilities in autonomy development.

Research Interests

Visual SLAM Focused on learning and applying state-of-the-art Visual SLAM techniques, with interest in modern feature-based, direct, and learning-based approaches for real-world robotics applications.

Skills

Math	3D geometry, Linear algebra
Libraries	OpenCV, Eigen, Pandas
Sensor Integration	HTC Vive Pose Tracker
Programming	C++ and Python
Devops	Git, Docker, ROS2, Jenkins
QA	CI Regression Testing, and Unit Tests
Project Management	Atlassian Suite (Jira, Confluence), Xray

Work Experience

Opteran Technologies

Sheffield, United Kingdom

Robotics Software Engineer

Feb. 2023 - Present

- **Designed and implemented** robust QA pipelines and metric acquisition frameworks in ROS2 - C++ & Python to evaluate the performance and stability of AGVs
- **Led** the development of Spatial and Perception test suites, systematically testing and validating key modules such as Localisation, Optical Flow, Visual Odometry, and Stereo Depth, deepening expertise across multiple domains in robotics QA.
- **Architected and deployed** end-to-end test suites within CI/CD pipelines, enabling automated performance regression tracking and accelerating release cycles.
- **Developed** a custom ROS2 C++ data playback tool to stream rosbags at accelerated rates with reliable and deterministic message delivery, lowering CI runtime, and significantly reducing computational costs.
- **Built** Grafana dashboards for real-time performance monitoring, improving visibility into system behavior and supporting data-driven decision-making.
- **Created and managed** detailed test plans in XRay, overseeing hundreds of test sets and ensuring enhanced traceability and consistency across software releases.

AI Drivers

London, & Singapore

Robotics Autonomy Engineer

Sep. 2020 - Jan. 2023

- **Led** the development of Navigation test suite for autonomous trucks, validating path planning, control algorithms, and their integration with the cognition system.
- **Utilized Digital Twin simulations** to verify path planning and control algorithms, ensuring the system's behavior was consistent with real-world conditions.
- **Leveraged synthetic data** generated from simulations to expand test coverage, improving system validation by simulating a broader range of operational scenarios.
- **Led the Site Acceptance Tests** on the autonomous truck across 10+ seaport terminal deployment sites in Singapore, validating real-world system performance and ensuring seamless data flow between sensors, databases, and decision-making algorithms.
- **Collaborated cross-functionally** with engineering teams and customers to deliver actionable insights using real-time analytics dashboards, strengthening system transparency and operational trust.

Education

University of Bristol
Bristol, United Kingdom

M.S. in Robotics — *Sep. 2019 - Sep. 2020*

- **Dissertation:** Deep Learning-based Yield Estimation and Ripeness Analysis in Mango Orchards.
- **Grade:** 2:1.
- Co-Researcher for Disability Rights & Robotics Group.

Andhra University
India

B.Eng. in Electronics & Communication — *Sep. 2012 - Sep. 2016*

- **Dissertation:** CNN based self driving toy car
- **CGPA:** 8.5

Academic Projects

Fruit Detection & Ripeness Analysis in Mango Orchards
Bristol, UK

Dissertation Project — *Jun. 2020*

- **Developed** a real-time object recognition system for agricultural robotics, enabling autonomous fruit detection and ripeness estimation using the ACFR orchard fruit dataset.
- **Achieved** a mean Average Precision (mAP) of 82.38% and F1-Score of 81.13% using YOLOv4 as the best performing model.
- **Gained** hands-on experience in Darknet, TensorFlow, and PyTorch by implementing, optimizing, and comparing models including YOLOv4, YOLOv4-tiny, and YOLOv5.
- **Designed** a ripeness classification system based on Gaussian Mixture Models (GMM) to estimate maturity probability of detected fruits.

Path Planning & Control for Autonomous Navigation
Bristol, UK

Academic Project — *Jan. 2020*

- **Developed** and implemented real-time trajectory tracking controllers, including Pure Pursuit and Stanley, for autonomous vehicle path following.
- **Researched** and benchmarked global path planning algorithms such as A*, Dijkstra's, and RRT for autonomous robot navigation, evaluating their performance in different scenarios.

Honors & Awards

Awards

2020 **Recipient,** Bristol Plus Award — *Bristol, U.K.*

2020 **Winner – Best Product Pitch (£200 Prize),** Enterprise and Innovation Funding Competition — *Bristol, U.K.*

Honors

2019 **Half-Tuition Scholarship,** University of Bristol Master's Scholarship — *Bristol, U.K.*

2012 **Full-Tuition Scholarship,** Andhra University, Bachelor's Scholarship — *India*