

Yuvraj Borade

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EDUCATION

Visvesvaraya National Institute of Technology (VNIT), Nagpur, India Jul 2020 – May 2024
B.Tech. in Electronics and Communication Engineering CGPA: 7.81 / 10

Relevant Coursework: Linear Algebra, Probability and Statistics, Control Engineering, Signals and Systems, Digital Image Processing, Artificial Intelligence, Embedded Systems, Object-Oriented Programming, Operating Systems

PUBLICATIONS

G. Pandey, **Y. Borade**, H. Sharma, S. Kannaiyan, “Agricultural Assessment using Aerial-Imagery Data with Deep Convolution Network and Prescription Map Algorithm for Optimized Spraying Path,” International Journal of Applied Mathematics, Vol. 38, No. 7s, 2025. [[paper](#)]

INDUSTRY EXPERIENCE

Awiros Jun 2024 – Present
Computer Vision Engineer Bangalore, India

- Designed and deployed real-time perception pipelines for ANPR/OCR, aircraft part inspection, and industrial process monitoring under challenging real-world conditions.
- Led onsite evaluations and field deployments, translating open-ended operational requirements into reliable perception systems.
- Integrated **robotic arm** with aircraft inspection pipeline for automated door scanning, coupling real-time defect detection with programmed actuation paths via **ROS2**.
- Adapted camera-centric perception platform to ingest **3D LiDAR** data over ROS for a parking management system deployed across 20+ facilities, bridging sensor modalities across different deployment architectures.

RESEARCH EXPERIENCE

VNIT Nagpur Aug 2023 – May 2024
Bachelor's Thesis, Prof. K. Surender: Agricultural Crop Assessment using Aerial Imagery Nagpur, India

- Designed an end-to-end UAV perception-to-action pipeline for precision agriculture using RGB aerial imagery.
- Collected field data across multiple crop types under varying illumination, weather, and time-of-day conditions at the Regional Agricultural Research Station, Raigad, Maharashtra.
- Trained DeepLabV3+ for weed and disease segmentation with class-imbalance-aware learning, achieving **95.04% accuracy**.
- Generated geo-referenced prescription maps for variable-rate pesticide application based on patch-wise weed density estimation.
- Implemented and compared three coverage path planning strategies namely lawnmower, priority-based, and TSP-based, to study trade-offs in field coverage and resource efficiency.

Robotics Research Center, IIIT Hyderabad Apr 2023 – Dec 2023
Research Intern, Prof. K. Harikumar: UAV based Infrastructure Assessment Hyderabad, India

- Worked on drone-based infrastructure assessment using stereo vision, LiDAR, RTK-GPS, and IMU data within **ROS**-based pipelines.
- Estimated building tilt from 3D point clouds using clustering-based plane segmentation and geometric reasoning over segmented plane normals.
- Trained **PointNet**-based semantic segmentation models on BuildingNet for wall and ground classification in reconstruction-based analysis.
- Implemented incremental unsupervised crack segmentation with **domain adaptation** across visually diverse building surfaces.
- Integrated onboard sensing components including stereo camera, LiDAR, and flight controller on Jetson Xavier NX, and worked with VINS-Fusion for visual-inertial odometry in GPS-denied settings.
- Validated geometric estimates against manual ground-truth measurements, achieving mean tilt error within 0.6 degrees on test structures.

- Developed obstacle avoidance pipeline for Sahayak autonomous medical robot using A*, RRT, and B-spline trajectory optimization in **ROS**.
- Worked on loop closure optimization for SLAM, simulating custom environments in **ROS** and evaluating place recognition networks.

SELECTED PROJECTS

ANPR OCR System

Nov 2024 – Jan 2025

- Replaced a brittle preprocessing-heavy pipeline with an **end-to-end OCR architecture** under severe data constraints (**6K samples** vs. 85K legacy dataset).
- Built a **data flywheel** combining synthetic data generation, consensus labeling, deployment data reuse, and distribution-aware curation for rare license plate formats.
- Implemented a feedback-driven annotation loop targeting deployment failure modes, improving robustness under real-world domain shift.
- Released **Awiros-ANPR-OCR** on Hugging Face, achieving **98.42% accuracy** at ~5 ms latency on RTX 3090.

Aircraft Part Inspection

Feb 2025 – Present

- Developed a real-time streaming perception pipeline for aircraft component inspection with zone-level coverage tracking and rescan guidance.
- Integrated **robotic arm actuation** for automated door scanning, coordinating programmed scanning paths with real-time defect detection.
- Designed an architecture that shares per-frame features across inspection zones to reduce redundant computation and support real-time result delivery.
- Implemented per-part attribute verification using learned visual representations and lightweight classifiers.

Process Monitoring in Automobile Manufacturing using VLMs

Apr 2025 – Jun 2025

- Automated multi-step industrial process inspection using **Vision-Language Models (VLMs)** with in-context learning.
- Designed a two-stage pipeline combining vision encoders for coarse action recognition and VLMs for fine-grained step verification.
- Studied trade-offs between latency, reliability, generalization, and modularity in multimodal systems deployed in factory environments.

TECHNICAL SKILLS

Programming	C, C++, Python
Robotics	ROS, ROS2, Gazebo, Sensor Fusion, Trajectory Planning
Perception	Detection, Segmentation, Tracking, Point Cloud Processing, Representation Learning, OCR
ML Frameworks	PyTorch, OpenCV, Hugging Face
Deployment	ONNX, TensorRT, NVIDIA DeepStream
Languages	English (TOEFL iBT: 104/120), Japanese (JLPT N3)

EXTRACURRICULARS & SERVICE

Chairman, IEEE Student Chapter, VNIT Nagpur

2022 – 2024

Organized technical seminars, workshops, and academic events focused on robotics, computer vision, and emerging technologies.

Member, IvLabs (Institute Robotics Community)

2021 – 2024

Mentored junior students in robotics, ROS, and computer vision through project-based guidance and peer learning.