TEJAS M. BHADE

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Robotics and AI engineer with expertise in developing and deploying AI models, product design, and autonomous systems

Education

Master of Science - Robotics and Computer Science *Expected: Dec 2025*
University at Buffalo, The State University of New York, NY
Coursework: Deep Learning, Reinforcement Learning, Control Systems, Computer Vision, Robotics Algorithms

Bachelor of Engineering – Mechanical Engineering *August 2017 - June 2021*
University of Mumbai, India

Skills

Languages: Python, C++, C#, C, R, MATLAB/Simulink, SQL, JavaScript
Robotics: ROS2, MoveIt, Nav2, SLAM, Path planning, ADAS, Gazebo, Kalman Filter, Sensor Fusion
Computer Vision: OpenCV, NeRF, 3D Reconstruction, Diffusion, Object Detection, 3D Geometry, ONNX, AR
Machine Learning: PyTorch, MLOps, LLM, Transformers, TensorFlow, JAX, CUDA, CNN, OpenAI Gym, Isaac Sim
DevOps: Docker, Kubernetes, Linux, Git, CI/CD, AWS, GCP, Azure, Jenkins, Terraform, KubeFlow

Experience

Robotics Researcher, DRONES Lab May 2025 – Present

- Contributed to the Localization, Navigation, and Control stack for an autonomous excavator funded by MOOG Inc., including recording ROS bags for analysis of Safety Nodes and motion planning algorithms.
- Developed a robust April Tag detection and real-time angle and pose estimation pipeline by leveraging OpenCV and a multi-layer perceptron, efficiently correlating inclinometer readings with ground truth values using deep learning.

Student Researcher, Jun Liu Lab Dec 2024 - May 2025

- Engineered a slip detection and mitigation algorithm using a two-finger gripper setup, enhancing grasp stability and precision in robotic manipulation tasks.
- Integrated NI-DAQ and Arduino with Dynamixel servos and a tactile sensor array to create a robust data acquisition pipeline—enabling high-resolution, real-time sensor feedback for robotic control experiments.
- Assembled and actuated hand from LEAP robotics integrating 16 servo motors. Designed a machine learning workflow to classify tactile sensor data, aiming to predict user-induced actions—advancing robotic perception capabilities.

Research & Development Engineer, Blue Star Ltd. – Mumbai, India June 2022 – Aug 2024

- Revamped Product design of Packaged Air Conditioning System by creating 3D CAD model assembly using CATIA, detailed drawings of parts, subassemblies and unit assembly using GD&T to reduce the overall manufacturing cost by 30%.
- Facilitated cross-functional DFM (Design for Manufacturing) reviews by working with Electrical, Manufacturing, Production, R&D, and Supply Chain teams to improve manufacturability and sustainability of product updates, utilizing SolidWorks,AutoCAD for detailed drawings, ANSYS, and PTC Windchill.
- Integrated automated inspection tools in the manufacturing process, streamlining defect detection and adhering to industry compliance requirements.

Projects

AI-Powered Inverted Pendulum Balancing with Reinforcement Learning on Isaac Sim

- The project involved creating a detailed 3D model of an inverted pendulum system, including the cart, pole, and base, within the Isaac Sim environment.
- Realistic physics and dynamics were implemented for the system, encompassing gravity, friction, and joint constraints, to accurately simulate the behavior of a real-world inverted pendulum.

Adaptive Cruise Control Using CBF-CLF-QP

- Conduct research on simulating control algorithms for adaptive cruise control systems using CBF-CLF based QPs. Developed a new control strategy to prevent infeasible states generated by Control Barrier Functions.

SLAM based mapping and cost-map generation

- Engineered a LiDAR-based SLAM mapping system utilizing FAST-LIO2, achieving real-time point cloud mapping with a 95% accuracy in obstacle detection, and enabling autonomous navigation.
- Designed a cost-mapping algorithm that converted 3D point clouds into 2D occupancy grids using elevation gradient analysis, normalized cost thresholds to enable path planning for autonomous navigation.