

TEJAS M. BHADRE

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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.

Robotics: ROS2, MoveIt2, URDF, Nav2, SLAM, Path planning, ADAS, Gazebo, Foxglove, Kalman Filter, Digital Twin

Computer Vision: OpenCV, 3D Reconstruction, Object Detection, 3D Geometry, Fiducial Estimation

Machine Learning: PyTorch, LLM, Transformers, TensorFlow, CUDA, CNN, OpenAI Gym, Isaac Sim

DevOps: Docker, Linux, Git, AWS

CAD and FEA: PTC Creo, Solidworks, CATIA, AutoCAD, Siemens NX, ANSYS Fluent, Hyperworks, PTC Windchill

Experience

Robotics Researcher, DRONES Lab

May 2025 – Present

- Currently as a part of my Capstone Project, Implementing Reinforcement Learning to perform the trenching motion, achieving autonomy and enhancing the digging done by Excavator
- Contributed to the Localization, Navigation, and Control stack for an autonomous excavator funded by MOOG Inc., including recording ROS bags for the 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.
- Created a digital twin of an excavator using its URDF model in MoveIt-2 to enable realistic simulation and learning, significantly reducing the need for physical resources and prototype testing.
- Incorporated and streamlined a ROS topics data acquisition pipeline to record lossless published topics such as position and velocity from IMU, pressure values, CAN messages, and FLIR camera messages.

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.

Design 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.

Projects

SLAM based mapping and cost-map generation

- 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.

Autonomous Navigation System using RRT Path Planning

- Implemented Rapidly-Exploring Random Trees (RRT) algorithm within ROS and Gazebo, enabling TurtleBot3 navigation through intricate simulated environments and achieving a high rate of collision-free path planning.

Stereo Visual Odometry

- Utilized the KITTI dataset to estimate robot motion by implementing visual odometry techniques and RANSAC algorithm, enabling accurate trajectory reconstruction with OpenCV.