

PRADNYA SUSHIL SHINDE

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Education

Worcester Polytechnic Institute

Aug 2023 - May 2025

Master of Science in Robotics Engineering (GPA: 4.0/4.0)

Worcester, MA

Relevant Coursework: Computer Vision, Vision-based Robotic Manipulation, Motion Planning, Advanced Robot

Navigation

Symbiosis Skills and Professional University

Aug 2019 - May 2023

Bachelor of Technology in Mechatronics Engineering (GPA: 9.128/10.0)

Pune, India

Skills

Languages: Python, C++, C

Libraries, Tools, and Software: Linux OS, ROS (Noetic), ROS 2 (Humble), Nav2, Gazebo, RViz, Blender, OpenCV, PCL, SLAM Toolbox, NumPy, Matplotlib, Sklearn, PyTorch, Eigen, CUDA, Git, Docker, CMake, Arduino, MATLAB, Fusion 360, Solidworks, Ultimaker Cura, Jira, Confluence.

Hardware: Arduino, ESP32, ESP8266, Raspberry Pi, LiDAR

Experience

Graduate Student Researcher

August 2024 - Present

Worcester Polytechnic Institute

Worcester, MA

- Research Topic: Distributed **SLAM** for Collaborative Multi-Robot Mapping in Dynamic Outdoor Environments.

Robotics Software Engineer Intern

May 2024 - August 2024

National Robotics Engineering Center

Pittsburgh, PA

- Contributed to developing localization and mapping packages for a warehouse Mobile Manipulator, integrating **perception** and **navigation** capabilities.
- Conducted **unit tests**, and **hardware-in-the-loop** tests on robotic hardware to validate the performance of the robotic subcomponents.

Robotics Software Engineer Intern

June 2022 - Nov 2022

Technodune Pvt. Ltd.

Pune, IN

- Led software testing and embedded systems integration for the "Wirelessly Controlled Bionic Arm" and "Real-Time Robot Localization using Vision" projects using Python and C/C++.
- Contributed to developing: A 7DOF robotic arm with wireless gesture control and web interface; A real-time robot localization platform with Fiducial markers and Yolo V5, achieving 85% accuracy in a multi-robot platform.

Projects

Einstein Vision: A Perception Pipeline for Autonomous Vehicles [GitHub](#) | [Python](#)

April 2024

- Integrated **lane detection**, **pedestrian pose estimation**, **road sign recognition**, **object detection**, and **scene classification** models to seamlessly visualize the environment around an Autonomous Vehicle as it perceives the world.

Motion and Trajectory Tracking of Aerial Vehicle | [Python](#)

March 2024

- Integrated state estimation and global positioning algorithms such as EKF, UKF, Particle Filter and GNSS/INS to effectively track the motion of an aerial vehicle.
- Trained Convolutional Neural Network (CNN) with Supervised and Unsupervised Learning to predict homography and achieved RMSE of 3.5 - 5.0 %, leveraging **TensorDLT** and Spatial Transformer Network (STN).

SfM: Structure from Motion [GitHub](#) | [Python](#)

March 2024

- Engineered a robust Structure from Motion (SfM) pipeline for 3D scene reconstruction, employing feature matching, Fundamental Matrix estimation, and camera pose estimation, followed by triangulation, Perspective-n-Point (PnP) and Bundle Adjustment techniques,

Homography Estimation: Classical and Deep Learning Methods [GitHub](#) | [Python](#)

Jan 2024

- Developed a panorama stitching algorithm with corner detection, ANMS, feature matching, and RANSAC; trained CNN with TensorDLT and STN to predict homography, achieving 3.5-5.0 % RMSE.

Probability-based Edge Detection: A Classical Approach to Boundary Detection [GitHub](#) | [Python](#)

Jan 2024

- Developed a probability-based edge detection algorithm using filter banks, half-disc masks, k-means clustering for texture, brightness, and color features, and integrated with Sobel and Canny baselines for enhanced boundary detection.

Language Embodied Indoor Navigation [GitHub](#) | [Python](#)

Dec 2023

- Developed an Object Navigation system enabling robots to interpret spoken language for goal identification and navigate using RRT* and A* algorithms in the Habitat Simulation Environment, retrieving RGB, depth, and semantic data for sensory feedback.

Vision-based Object Grasping for Robotic Manipulation assuming Symmetry [GitHub](#) | [C++](#)

Oct 2023

- Developed a vision-based grasp pose analysis algorithm for robotic manipulation by processing depth point clouds, estimating symmetry for grasp point computation, using Gazebo and ROS 2 for simulation.