

AADESH SURENDRA VARUDE

Robotics Perception Engineer

varudeaadesh@gmail.com | [GitHub](#) | [Portfolio Website](#)

PROFESSIONAL SUMMARY

Perception Engineer with 2+ years of experience building real-time computer vision, SLAM, and sensor fusion systems for autonomous mobile robots, including deep learning-based obstacle detection, LiDAR/camera/GNSS/VIO fusion, and embedded deployment on NVIDIA Jetson. MS in Robotics Engineering, WPI.

TECHNICAL SKILLS

- **Programming Languages:** Python, C, C++
- **Computer Vision & Deep Learning:** OpenCV, PyTorch, TensorFlow, CUDA, tinyCUDA, Nerfacto, Grounding DINO, Segment Anything (SAM)
- **Robotics Frameworks & Simulation:** ROS/ROS2, Gazebo, MATLAB, V-REP
- **Embedded Systems & Sensors:** NVIDIA Jetson AGX Orin, Google Coral, LiDAR, GNSS/IMU, Stereo & Mono Cameras
- **Tools & Platforms:** Git, Docker, Linux/Ubuntu, Qt/QML

PROFESSIONAL EXPERIENCE

Perception Engineer II — MVP Robotics

VT, USA | May 2024 – Present

- Designed and implemented a real-time obstacle detection neural network with a novel image encoding method for autonomous mobile robots operating in multi-terrain, day and night outdoor environments, achieving 92% detection accuracy while reducing training data requirements by 25% versus RGB-based methods.
- Developed SLAM and a hybrid Vector Field Histogram (VFH+) path planner for real-time obstacle avoidance on NVIDIA Jetson AGX Orin.
- Built a human detection and tracking pipeline integrated into the robot's autonomy kit.
- Developed the autonomy perception stack for a modular robot compute platform (SAGE), supporting LiDAR and camera sensor integration.
- Engineering a GNSS and visual-inertial odometry (VIO) sensor fusion stack to improve real-time positioning accuracy in GPS-denied environments.

Research Intern — Computer Vision & Deep Learning — Nokia Bell Labs

NJ, USA | Jun 2023 – Aug 2023

- Automated semantic label generation for NeRF training using Grounding DINO and Segment Anything (SAM), eliminating manual annotation.
- Optimized semantic NeRF training with a Tiny CUDA-based implementation, cutting training time by 50% (36 to 18 hours) with no loss in rendering quality.

Graduate Researcher — Adaptive and Intelligent Robotics Lab (AIR Lab), WPI

MA, USA | Aug 2023 – Dec 2023

- Developed an obstacle avoidance stack for an autonomous underground cable-detection robot.
- Designed a human-robot interaction interface providing real-time camera feedback, map updates, initial navigation, and teleoperation for a cable-following robot.

EDUCATION

Worcester Polytechnic Institute

Worcester, MA

Master of Science in Robotics Engineering | GPA: 4.0/4.0 | Aug 2022 – May 2024

Visvesvaraya National Institute of Technology

Nagpur, India

Bachelor of Technology in Electronics and Communication Engineering | GPA: 8.45/10 | Jul 2018 – May 2022

PROJECTS

- **Semantic Segmentation with Attention U2-Net** — Implemented an attention-embedded U2-Net model for semantic segmentation.
- **Structure from Motion and NeRF (SLAM)** — Reconstructed 3D scenes and estimated monocular camera poses using traditional methods (triangulation, PnP, bundle adjustment) and deep learning (NeRF).
- **Visual-Inertial Odometry (VIO)** — Implemented a Multi-State Constraint Kalman Filter (MSCKF) sensor fusion algorithm combining IMU and stereo camera data for drone odometry.
- **AutoCalib** — Implemented Zhang's method for camera calibration.
- **Reinforcement Learning for Atari** — Trained agents using DQN and PPO variants to play Atari games.

PUBLICATIONS

- H. Zade, A. Varude, K. Pandya, A. Kamat, S. Chiddarwar and R. Thakker, "ReQuBiS - Reconfigurable Quadrupedal-Bipedal Snake Robots," 2021 IEEE 17th International Conference on Automation Science and Engineering (CASE), 2021, pp. 2241-2246, doi: 10.1109/CASE49439.2021.9551526.