

NISHIT POPAT

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EDUCATION

Northeastern University, Master of Science in Robotics, Boston, MA 09/2023 - 05/2025
(Control Systems Engineering, Foundations of Artificial intelligence, Mobile Robotics, Robot Sensing and Navigation)
MPSTME, NMIMS University, Bachelor of Technology in Mechanical Engineering, Mumbai, India 07/2019 - 05/2023
(Automation Systems, CAD/CAM, Finite Element Analysis, Industrial Engineering, Programming)

SKILLS

Programming Language: **Python**, **C++**, Bash scripting
Machine Learning & Deep Learning: **CNNs**, **RNNs**, **Transformers**, **Object Detection**, Semantic Segmentation
Libraries and Frameworks: TensorFlow, PyTorch, OpenCV, **CUDA**, Matplotlib, NumPy, Pandas
Computer Vision: **3D Reconstruction**, **Visual-Inertial SLAM**, Neural Rendering, Distributed Sensor Fusion
Robotics Software & Simulators: **ROS2**, MoveIt, Gazebo, RViz, Isaac Sim, PyBullet, OpenAI Gym
Robotics Algorithms: **SLAM**, **Path Planning**, Kalman Filter, AprilTags
Tools & Platforms: Git, **Docker**, **Linux (Ubuntu)**, MATLAB, Simulink, **NVIDIA Nsight**, Jetson

PROFESSIONAL EXPERIENCE

Computer Vision Engineering Intern, Shree Khodiyar Industries Pvt. Ltd., Mumbai 05/2022 - 08/2022

- Optimized **Structure-from-Motion** workflows for **3D modeling** using GPU-accelerated pipelines, improving **defect detection** by **15%**
- Automated **ground-truth dataset labeling**, reducing labeling time by **40%** & improving model training efficiency
- Integrated **monocular depth estimation** into defect pipeline, enabling **20%** faster prototyping and data throughput
- Applied **OpenCV** and **CUDA**-enabled **SIFT/ORB** algorithms to enhance feature detection accuracy in **dynamic environments**

Robotics Engineer, Marlin Racing Team, NMIMS University, Mumbai 01/2021 - 06/2021

- Configured **visual-inertial sensor data** into **ORB-SLAM2** to enhance **vehicle localization accuracy** by **25%** in racing scenes
- Structured and optimized **IMU** and **TF data** using **ROS nodes**, reducing **telemetry lag** by **30%** and improving **analysis efficiency**
- Crafted **custom ROS diagnostics** to monitor **node performance**, enabling **debugging** & improving **system reliability** during tests
- Validated **perception & localization modules** in **Gazebo** scenarios, boosting **iteration speed** by **40%** for path planning tests

ACADEMIC PROJECTS

Vision-Based Object Sorting Using a Robotic Arm [\[GitHub\]](#)

- Led development of **ML-driven perception pipeline** with **grasping**, **motion planning**, and **object sorting** with **RX200 arm**
- Integrated **YOLOv8m object detection** (2 classes, 11 items) with **AprilTag localization** using **ROS 2**, achieving **98% precision**
- Implemented **3D grasp pose estimation** via **OpenCV calibration** & **homogeneous transformations** with **<1cm positioning precision**

Safe Navigation Using Human-Safety-Area (HSA) Algorithm and Multi-Modal Perception [\[GitHub\]](#)

- Built a human-aware navigation system on **Clearpath Jackal** using **YOLO**, **RGB-D**, and **LIDAR** with **HSA** reaching **95% accuracy**
- Developed autonomous navigation pipelines using **SLAM**, **AMCL**, and **A*** for **real-time path planning** and **obstacle detection**
- Engineered **sensor fusion** of **RGB-D** & **LIDAR** data to generate **dynamic safety zones** around **humans** for socially-aware navigation

AI-Based Terrain Segmentation and Autonomous Navigation [\[GitHub\]](#)

- Built an AI navigation system with **YOLOv8** & **3D point cloud fusion** for **adaptive terrain analysis** & efficient **obstacle avoidance**
- Captured and labelled **250+ images** using **CVAT**, created a dataset, and achieved **92.6% precision** in **terrain classification**
- Achieved **12% faster traversal** & **35% lower computing load** in **AI-based navigation** compared to traditional **A* path planning**

Real-Time Lane & Vehicle Detection using UNet and YOLOv8 [\[GitHub\]](#)

- Trained **UNet** on **BDD100K** for **lane segmentation**, achieving **98.19% accuracy** and **0.2767 IoU** across varying conditions
- Curated and processed **5,000+ annotated frames**; deployed a **Streamlit dashboard** with **real-time image** and **video inference** overlay
- Fine-tuned **YOLOv8** for **object detection** and implemented **mask interpolation** and **moving average filters** for output stability

3D Reconstruction from Stereo and Monocular Images [\[GitHub\]](#)

- Constructed a full **3D reconstruction pipeline** using **stereo vision (SIFT + RANSAC)** and **monocular depth estimation (MiDaS)**
- Estimated **camera pose**, **triangulated 3D points**, generated **dense depth maps**, & **point clouds** using **OpenCV**, **PyTorch** & **Open3D**
- Visualized **matched features**, **epipolar lines**, **sparse and dense point clouds**; validated system using **KITTI 2015 Flow stereo dataset**

CUDA-Accelerated LiDAR Point Cloud Clustering for Real-Time Perception [\[GitHub\]](#)

- Implemented **DBSCAN**-based clustering on **LiDAR data** using **CUDA** and **NVIDIA Nsight** to enable **real-time segmentation**
- Deployed on **Jetson Xavier NX** and benchmarked against CPU pipelines, achieving **4x speedup** with identical accuracy
- Integrated with **ROS2** to publish processed clusters for downstream tasks like **tracking** and **scene understanding**

CERTIFICATIONS

• **Deep Learning: Advanced Computer Vision**, **Certified SolidWorks Professional (CSWP)**, **Certified SolidWorks Associate (CSWA)**, **Introduction to Python – Coursera**