SHREY SHAH

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EDUCATION

University of Michigan, Ann Arbor	Aug 2023 - April 2025 (Expected)
Master of Science, Robotics	GPA - 3.9/4

Courses - Foundations of Computer Vision, 3D Robot Perception, Math for Robotics, Robotics Systems lab

Institute of Technology, Nirma University	July 2019 - June 2023
Bachelor of Technology, Mechanical Engineering	GPA - 3.93/4
Minor Specialization, Computer Science	GPA - 3.9/4

SKILLS

Programming:	Python, C/C++, R, MatLab, SQL plus
Tools:	ROS, Gazebo, CoppeliaSim, LaTex, Creo, SolidWorks, Git, Rviz
Libraries:	OpenCV, numpy, SKlearn, Tensorflow, pandas, Matplotlib, Pytorch

RESEARCH EXPERIENCE

Research Assistant | *Hybrid Dynamics Robotics Lab* | *Prof. Xiaonan Huang*   Dec '23 - Present
- · Developing a 3D pose estimation framework for a soft aerial blimp in aero-distributed environment enabling autonomous maneuvering for the 'Defend the Republic' competition (LTA robotics) in April 2024.

Indian Space Research Organization (ISRO) | *Controls Research Intern*   June '22 - May '23
- · Designed a Dual-motion actuator capable of coarse and fine movement with a fine resolution of 4 nm.
- · Implemented Adaptive-Proportional control system for the operation of a single actuator.
- · Integrated 6 actuators to act as a Hexapod System controlling 6 DOF required for the application.
- · Designed a web GUI for controlling all actuators using CSS.

Reliance Industries Limited | *Vocational trainee*   June '21 - July '21
- · Design and Stress analysis of thermal equipment using Ansys and PVelite.
- · Quality and reliability checking of turbines and centrifugal pumps.

PROJECTS

PointNet classification and 3D reconstruction (Aug - Oct '23)   *3D perception, Pytorch, PointNets, openCV*
- Calculated epipolar correspondences to generate point clouds from different views.
- Implemented ICP for rigid transformation and matching different views of same point clouds.
- Implemented PointNet architecture to classify different 3D representations and identify specific parts of PCs

Robotics systems laboratory project (Aug - Dec '23)   *CV, Manipulation, ROS, SLAM, Path Planning,*
- **Armlab -** Designed a CV pipeline integrating forward kinematics for a robot arm to autonomously pick, sort, and stack colored blocks of various sizes. This project resulted in securing first place in 2 of 4 final lab competitions.
- **Botlab -** Created a mobile robot system with PID control, SLAM, A* planning for exploration, and designed a novel gripper. Achieved first place in one competition and outperformed in path traversal with Pure Pursuit.

Vision Implementation on UR10e (Aug - Dec '22)   *Machine vision, ROS, Gazebo, Matlab*
- Utilized shape analysis with reference markers and stereo vision for detailed object positioning and orientation.
- Implemented kinematic calculations for cobot joint angle determination using the Jacobian matrix.
- Configured extrinsic matrix for accurate world-to-image frame coordinate translation.

Path optimization of a snake Robot (Aug - Dec '22)   *Design, SLAM, Image processing*
- Fixed the design of a used snake robot, improving circuits and employed PWM controller.
- Movement by a sine wave in servomotors instilling phase offsets with set amplitude and frequency.
- Path planning and optimization using SLAM and image processing from an initial viewpoint.

Predicting Abnormalities using biomechanical features (Mar - May '22)   *Machine Learning, R*
- Classified Patient's disease using various models - Random forest, KNN and Support vector machine.
- Extracted key features affecting the patient and achieved an accuracy of 96% by SVM.