RONAK NARKHEDE

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EDUCATION

University of Minnesota | Master of Science in Robotics — St Paul, MN
GPA: 3.3/4.0; Relevant Coursework: Robotics, Robot Vision, Machine Learning — Sept 2025 – May 2026

SRM University | Bachelor of Technology in Mechatronics — Chennai, India
GPA: 8.32/10.0 — Sept 2020 – May 2024

TECHNICAL SKILLS

Programming Languages: Python, C++, MATLAB
3D Simulation & Modeling: RoboDK, Gazebo, MuJoCo, RViz, URDF
Robot Programming: URScript, ABB RAPID, ROS 1, MoveIt
Libraries & Frameworks: OpenCV, PCL, PyTorch, Eigen, NumPy, SciPy
Tools & Platforms: Docker, Git

PROFESSIONAL EXPERIENCE

Medical Robotics and Devices Lab | Graduate Research Assistant — Minneapolis, MN | Sept 2025 – Present

- Built a real time motion tracking system using Electromagnetic sensor for 6 DOF pose estimation in surgical navigation application.
- Integrated the motion tracking system with a tendon driven soft robot, forming a closed loop feedback mechanism for model free control of the robot.
- Developed a near real time hardware-in-the-loop teleoperation platform for a surgical robot using Python webserver and WebRTC, using OpenCV and ArUco markers for visual monitoring and enforcing active constraints for a safety feature.

Choice Robotics Lab | Research Volunteer — Minneapolis, MN | Jan 2025 – April 2025

- Engineered a learning framework for the ALOHA bimanual robot using MuJoCo and Gymnasium, focusing on contact rich tasks like Cube Transfer and precision Peg-in-Hole Insertion.
- Developed a hybrid Behavioral Cloning + Soft Actor-Critic pipeline, pre-training the policy on 50 expert demonstrations to control exploration bottlenecks before fine-tuning via reinforcement learning.
- Optimized sample efficiency by 23% and achieved a 78% success rate on transfer cube task.

PROJECTS

UR5 Manipulation & Force Control | *UR5, URScript, Python, RoboDK* — Fall 2025

- Programmed a UR5 robot for autonomous flashlight assembly using Python (RoboDK) and URScript, with pneumatic grippers via digital I/O and force controlled threading.
- Iterated on assembly logic in RoboDK simulation, tested them in simulation then ran on an actual UR5.

Vision Based Robot Control | *Stereo Camera, ArUco, ROS, C++* — Fall 2024

- Built wireless vision based teach pendant for 3-DOF manipulator using stereo camera and ArUco markers for intuitive 3D point selection
- Created complete RViz simulation environment from scratch including URDF modeling of custom 3-DOF manipulator to preview programmed trajectories before real-world execution.
- Developed ROS control pipeline transforming tracked 3D waypoints into executable joint trajectories using numerical inverse kinematics.

PUBLICATIONS

Towards Remote Thrombectomy with Telerobotically-Driven Guidewires *Accepted*
R. Narkhede, et al. | *Design of Medical Devices Conference (DMD)* April 2026

Estimating the Non-parametric Jacobian of a Tendon-driven Soft Robot *Accepted*
R. Narkhede, et al. | *Design of Medical Devices Conference (DMD)* April 2026

LEADERSHIP EXPERIENCE

Next Tech Lab | Board Member, Robotics and Embedded Systems Chennai, India | Apr 2022 – June 2024

- Organized over 20+ talks, 5 hackathons, and 3 research seminars.
- Recruited & led a team of over 30 undergraduate researchers over 2 years, supervising 20+ projects.