

EDUCATION

Worcester Polytechnic Institute	Worcester, Massachusetts
Master of Science in Robotics Engineering (In progress)	2022-2024
■ GPA: 3.82/4.00	
Sardar Patel College of Engineering (University of Mumbai)	Mumbai, India
Bachelor of Technology in Mechanical Engineering	2018-2022
Capstone Project: Design and Development of an Autonomous Cooking System	
■ CPI: 8.95/10.00 (Class Representative)	

TECHNICAL SKILLS

- **Programming Languages:** Python, C/C++, Java, Arduino, MATLAB, Bash, Embedded C
- **Software:** ROS/ROS2, Gazebo, WeBots, ADAMS, SolidWorks, Creo, AUTOCAD, FluidSim, CURA (3D Printing), Excel
- **Important Libraries and Frameworks:** OpenCV2, Point Cloud Library, TensorFlow, Numpy, PyGame, Git, OOP, Linux/Unix, Windows
- **PLC/HMI Programming** (Siemens, Representation in STL, LAD and FBD),
- **Fast Prototyping, 3D Printing, Control System Design, Pneumatic/Hydraulic System Design, GD&T, Sensor Fusion, Deep Learning, Machine Learning, Reinforcement Learning, Computer Vision**

WORK EXPERIENCE

Void Robotics	September-December 2023
Robotics Software Intern	3 Months
■ Enhanced autonomous delivery robot navigation accuracy by integrating NMEA and F9P GPS systems.	
■ Leveraged Micro ROS for real-time communication, improving control and system reliability.	
■ Collaborated effectively in a cross-functional team, contributing to the overall performance of the project.	
The Innovation Story, Mumbai	October-December 2021
Robotics Teaching Intern	2.5 Months
■ Devised a robotics syllabus for 8th-10th graders in local schools including requisite physics and math along with robotics-specific knowledge.	
■ Designed and fabricated a modular mobile pick and place robot for teaching purposes.	
Bridgestone India Pvt Ltd	June-July 2021
Mechanical Execution System (MES) Intern	1.5 Months
■ Hands-on training experience in MES with emphasis on principles of IOT and Industry 4.0	
■ Prepared an internship report to be utilized for training future interns.	

PROJECTS

Design and development of an autonomous cooking system (Undergraduate Capstone Project)	January-June 2022
■ Collaborated in a team of 3 to build a 5 DOF Robot arm from scratch including CAD Modelling, Electronic circuits, and Control algorithms along with subsidiary systems to enable cooking actions.	
■ Applied different software at various levels of development including SolidWorks, Ansys and WeBots (to simulate the system along with the control algorithm).	
Impact Launching (Kicking) Mechanism for a Mobile Robot	September 2019- June 2020
■ Designed, engineered, simulated, and methodically validated a precision-oriented mechanism for propelling an object (football) over a 15-meter distance	
■ Employed a variety of software applications, including SolidWorks, Ansys, Adams, and Webots, at various stages of the development process	
■ Personally introduced design adjustments, supported by meticulous hand calculations, which played a pivotal role in achieving the designated 15-meter range	
Soft Gripper Fabrication and Testing on a Soft Robot @ WPI Manipulation and Environmental Robotics (MER) Lab	June-August 2023
■ Fabricated a soft finger gripper for a soft robot	
■ Devised a mounting and actuation system for the same with emphasis on modularity and weight using a press fit design via Solidworks	
■ Fabricated the mount and subsidiary parts using 3D printing and tested the same.	
■ Added components to the design to improve grip stability without significant increase in weight	
SCARA Robot Control using ROS2 and Gazebo.	November-December 2022
■ Collaborated in a team of 3 to implement a velocity-based and a position-based controller for a 3DOF SCARA Robot built from scratch.	
■ Used PID control to minimize error in the desired position/velocity.	
■ Used a ROS service to accept position/velocity values from terminal and apply it to the robot, using analytical inverse kinematics for the former and Jacobian for the latter, both evaluated from scratch.	
Pick and place on a UR5e robot using ROS.	October-December 2022
■ Collaborated in a team of 5 to implement pick and place operations on a real UR5e robot.	
■ Used the ur_robot_driver ROS library to interface with the robot through a static network address.	
■ Derived the forward kinematic equations from scratch using PoE notation and used Newton-Raphson method to numerically solve inverse kinematics.	
RRT Based Motion Planner for pick and place on a UR5e robot	March-April 2023
■ Implemented a MATLAB simulation of RRT based motion planning on UR5e in the presence of obstacles	
■ Used the robotics toolbox for importing an accurate robot model	
■ Sampled points in Cartesian space and used inverse kinematics for pose estimation to perform collision detection	

ACHIEVEMENTS

- **Publications:**
 - Mepani, M. M., Gala, K. B., Mishra, T. A., Bhole, K. S., Gholave, J., & Daingade, S. (2022). Design of robot arm for domestic culinary assistance. *Materials Today: Proceedings*, 68, 1930-1945.
 - Bhoir, A. A., Mishra, T. A., Narayan, J., & Dwivedy, S. K. (2023). Machine Learning Algorithms in Human Gait Analysis. In *Encyclopedia of Data Science and Machine Learning* (pp. 922-937). IGI Global.
- **DD-Robocon:** Collaborated in a team of 20 students to earn National Rank 1 in Round 1 in 2019 and 2021. Rank 9 attained in the Final Round in 2019 and 2020, special prize for Best Solution Idea, 2019.
- **FIRST Tech Challenge:** Ranked 3rd nationally and participated in the Asia Pacific Invitational, Sydney in 2015
- **AMCAT:** 99th Percentile in Quantitative Ability (Advanced), 97th Percentile in Logical Ability