

## EDUCATION

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

## TECHNICAL SKILLS

- **Programming Languages:** Python, C/C++, Java, Arduino, MATLAB, Bash
- **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 Programming** (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

<b>Void Robotics</b> <i>Robotics Software Intern</i> ■ 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.	<b>September-December 2023</b> <i>3 Months</i>
<b>The Innovation Story, Mumbai</b> <i>Robotics Teaching Intern</i> ■ 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.	<b>October-December 2021</b> <i>2.5 Months</i>
<b>Bridgestone India Pvt Ltd</b> <i>Mechanical Execution System (MES) Intern</i> ■ 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.	<b>June-July 2021</b> <i>1.5 Months</i>

## PROJECTS

<b>Design and development of an autonomous cooking system (Undergraduate Capstone Project)</b> ■ 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).	<b>January-June 2022</b>
<b>Impact Launching (Kicking) Mechanism for a Mobile Robot</b> ■ 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	<b>September 2019- June 2020</b>
<b>Soft Gripper Fabrication and Testing on a Soft Robot @ WPI Manipulation and Environmental Robotics (MER) Lab</b> ■ 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	<b>June-August 2023</b>
<b>SCARA Robot Control using ROS2 and Gazebo.</b> ■ 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.	<b>November-December 2022</b>
<b>Pick and place on a UR5e robot using ROS.</b> ■ Collaborated in a team of 5 to implement pick and place operations on a real UR5e robot. ■ Used the <code>ur_robot_driver</code> 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.	<b>October-December 2022</b>
<b>RRT Based Motion Planner for pick and place on a UR5e robot</b> ■ 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	<b>March-April 2023</b>

## 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.
- **NPTEL course 'Speaking Effectively':** Top 1% Nationally
- **AMCAT:** 99th Percentile in Quantitative Ability (Advanced), 97th Percentile in Logical Ability