Tanish Ambrishkumar Mishra

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GitHub: https://github.com/expert-amateur

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
- **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, 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

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