

Aryaman Shardul

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EDUCATION

Northeastern University, Boston, MA

Sept 2024 – Dec 2026

Master's in Robotics

Relevant Courses: Robotics Sensing and Navigation, Robot Mechanics and Control

Veermata Jijabai Technological Institute, Mumbai, India

Aug 2020 – May 2024

Bachelor of Technology in Computer Engineering, GPA 8.14/10.00

Relevant Courses: Machine Learning, Linear Algebra, Data Structures and Algorithms, Internet of Things

TECHNICAL SKILLS

Programming Languages: C, C++, Python, Lua, Octave

Web Developer Tools: HTML, CSS, JavaScript

Software/Frameworks: Linux, GitHub, ROS, ROS 2, Gazebo, CoppeliaSim, MATLAB, CasADi, Arduino IDE, Raspberry Pi, TensorFlow, OpenCV, NumPy

WORK EXPERIENCE

Multi-Robot Autonomy Lab, IISER Bhopal, Remote

Jan 2023 – March 2024

Robotics Research Intern

- Developed a Model Predictive Controller (MPC)-based unmanned aerial vehicle (UAV) path-planning algorithm using MATLAB and CasADi to account for the dynamic wind field present around the UAV
- Created a neural network using Computational Fluid Dynamics and DeepXDE to simulate the rapidly changing wind
- Incorporated obstacle avoidance along with the MPC controller to avoid various obstacles in the UAV's path

Embedded Real-Time Systems Lab, IIT Bombay, Mumbai, India

June 2022 – July 2022

Summer Research Intern

- Developed "Prota: The ROS Bot," an autonomous unmanned ground vehicle with an efficient and modular design to enhance adaptability and scalability for various operational needs
- Calibrated and tested sensors, including Lidar, MPU, time of flight sensors, and the Intel RealSense depth camera, to ensure accurate data for improved navigation and obstacle detection in the hardware assembly
- Implemented Simultaneous Localization and Mapping algorithms using ROS Noetic packages to create the navigation stack for the bot in both simulation and hardware

PROJECTS

OptiDepth

Dec 2023 – May 2024

Project aimed at [accelerating depth estimation](#) on reflective and transparent surfaces by quantization optimization

- Implemented FP-32 to FP-16 quantization on the OAK-D camera for the MirrorNet model and reduced the model's memory size by 49.28%
- Performed post-training quantization for the MirrorNet and GDNet models, achieving a reduction in MirrorNet's memory size by 61.19%, an improvement in inference speed by 50.48%, and GDNet's memory size by 69.39% and an improvement in inference speed by 51.06%
- Submitted a survey paper on "Monocular Depth Estimation for Mirror and Glass Surfaces" to the "Advanced Robotics Journal (Taylor and Francis)," which is currently under review

Dairy Bike

Oct 2021 – April 2022

Designed a [robot](#) that loads and unloads dairy products at delivery points as part of the eYantra robotics competition

- Employed concepts like Euler-Lagrange mechanics and State-Space modelling to create a mathematical model of the bike using GNU Octave
- Engineered a Linear Quadratic Regulator to balance the two-wheeled robot and simulated it in CoppeliaSim
- Designed a 4 DOF custom arm and used Inverse Kinematics to efficiently pick and place the dairy products
- Won the [3rd place](#) in the competition out of a total of 242 participating teams

LEADERSHIP

Software Head, Society of Robotics and Automation

May 2021 – Nov 2022

- Delivered lectures on concepts like PID controllers, image processing, and ROS to 150+ first-year students
- Headed a team of 30 members in organizing various software aspects of robotics workshops
- Mentored a team of second-year students on a robotics project involving SLAM and Computer Vision