

# MAYANK DESHPANDE

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## Education

### University of Maryland, College Park

*M.Eng. Robotics, GPA: 3.95/4*

**Aug. 2023 – Present**

*College Park, MD*

### Ramdeobaba College of Engineering and Management

*B.E. Mechanical Engineering, GPA: 9/10*

**Aug. 2019 – May 2023**

*Nagpur, IN*

## Technical Skills

**Languages:** Python, C, C++, MATLAB

**Libraries and Tools:** OpenCV, ROS, MATLAB, TensorFlow, PyTorch, Deep Learning, Git, Arduino, bash, CUDA, gtest, Qt, Fusion 360, Solidworks, Ultimaker Cura, Large Language Models (LLM), Generative AI.

**Development Platforms:** Linux (Ubuntu), Embedded robotics, Gazebo, AirSim, CARLA, CarSim, MoveIt

## Experience

### Intuitive Surgical Inc.

**May 2024 – Aug 2024**

*Software Automation Intern*

*Santa Clara, CA*

- Automated the simulated testing pipeline for the Ion Endoluminal robot, achieving 95 % automation and reducing test time by 20 %, using MATLAB. Implemented time series analysis and machine learning to predict equipment failure.
- Developed a computer vision solution to correct the micro vision probe's video feed orientation, ensuring a straight output using pattern recognition during initialization.

### GAMMA AI Lab, UMD

**Jan 2024 – May 2024**

*Research Assistant*

*College Park, MD*

- Developed a novel deep learning model using Graph Convolutional Networks and bidirectional-GRU to predict pedestrian paths, improving robot navigation in crowded areas.
- Achieved top-tier ADE/FDE metrics with an inference time of less than 2ms, and successfully tested the model on a Husky robot, confirming simulation results with real-world experiments.

### CodelatticeLabs Pvt. Ltd.

**May 2022 – July 2023**

*Robotics Software Engineer*

*Bengaluru, IN*

- Enhanced delivery robot navigation, reducing localization latency with submap fusion, and developed C++ firmware for IoT weight data transmission using Esp32 Node-MCU.
- Simulated and implemented multi-agent coordination algorithms and trajectory tracking methods for constrained robots, leveraging reinforcement learning for intelligent intersection management.

## Projects

### Visual-Encoding-Particle-Filter | C++, Python, ROS2, DL

**May 2024**

- Developed a vision-based localization and visual odometry method for drones using a particle filter with CNN, VecKM, and Histogram of Features encoders, achieving fast convergence and real-time localization in ROS, validated in a Gazebo PX4 SITL environment.

### AutoPano | Python, openCV, git

**April 2024**

- Developed an automatic panorama stitching solution using traditional techniques and deep learning models (HomographyNet), achieving high-quality results with supervised and unsupervised learning, validated on synthetic and real-world image sets.

### 3D Reconstruction using Structure from Motion | Python, openCV, eigen

**March 2024**

- Developed a Structure from Motion (SfM) system using SIFT, matching, and bundle adjustment for 3D reconstruction, achieving accurate results validated with synthetic and real-world datasets.

### MultiRobot Search and Rescue | C++, ROS2, git, gtest

**December 2023**

- Utilized nav2\_utils for collaborative navigation, implemented ACO for dynamic goal assignment (10% faster), and integrated YOLOv5 for real-time human detection (95% accuracy), achieving 90% code coverage through comprehensive unit testing.

### LQR and LQG controller for two pendulum crane | MATLAB

**October 2023**

- Modeled and controlled a two-pendulum crane system using LQR and LQG techniques in MATLAB

### Right Invariant Extended Kalman Filter for object based SLAM | Python

**September 2023**

- Translated the theoretical RIEKF algorithm for object-based SLAM into Python, showcasing in-depth knowledge of RIEKF principles and their advantages over standard EKF in a detailed report on Yang Song et al.'s 2022 paper.

## Publications

### Behavioral Analysis of ROS motion planners integrated with Robotics Middleware Framework (RMF) |

Published: 2022 | IEEE

Evaluated ROS motion planners integrated with Robotics Middleware Framework (RMF) in complex scenarios, providing insights into the performance of various path planning algorithms in real-world tests.