Mihir Deshmukh

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*Seeking internships for Summer 2024

Education

Worcester Polytechnic Institute **Aug 2023 - May 2025**
Master of Science, Robotics Engineering *Worcester, MA*

College of Engineering, Pune **Aug 2018 - May 2022**
Bachelor of Technology, Electronics and Telecommunication Engineering(8.86/10) *Pune, India*
Minor in Computer Engineering

Technical Skills

Languages: C, C++, Python, MATLAB, C#
Developer Tools: ROS/ROS2, OpenCV, PyTorch, Tensorflow, PCL, GIT, MATLAB, Linux, CI/CD, VS Code, ARM Keil, Cuda, LaTeX, Machine Learning, Altium Designer
Network Architectures: ResNet, VGG, YOLO, DenseNet, RCNN
Hardware: Jetson Nano, RaspberryPi, STM32, Arduino, STM32, KinectV2, Zed camera 2i

Experience

Bajaj Finserv **Jul 2022 - Jul 2023**
Software Engineer *Pune, India*
- Leveraged .Net Core for Web API creation and Ado.Net for database integration as a member of the Collections Portal Team.
- Developed front-end applications in Angular.

McMaster University - Mitacs Globalink Research Internship **May 2021 - Jul 2021**
Research Intern *Online*
- Worked under Dr. Gary Bone on the project "Collaborative Robot Arm Software Development".
- Applied concepts of Ransac segmentation, clustering, and Transforms in Webots and MATLAB. Simulated PR2 for collaboratively picking objects by processing the point cloud.

Binary Robotics **Nov 2020 - Jan 2021**
Project Intern *Pune, India*
- Calibrated cameras using OpenCV to enhance the auto-pick and place mechanism of a gantry system.
- Designed an electronic architecture for a 5 axis Gantry system equipped with hybrid servos.

Robotics and Automation Lab, COEP **Jun 2019 - Jun 2022**
Undergraduate Researcher *Pune, India*
- Handled the programming, circuit & PCB designing, perception, and sensor fusion for Omni-wheeled robots as well as research projects.
- Participated in ABU Robocon 2020 and 2021 and worked from ideation to prototyping the robots.

Academic Projects

Deep Learning based Robotic Grasping of unknown objects. [link] | *PyTorch, OpenCV, MoveIt!*
- Developed a pipeline to optimally Grasp objects of variable shape, size, and orientation using vision capabilities.
- Applied VGG16 and ResNet50 architectures through Transfer Learning in PyTorch. Adapted this to a custom 3D-printed 5-DoF robotic arm with MoveIt and the KinectV2 depth camera.

Visual Slam and Object Recognition using Kinect v2 & ROS | *Python, ROS, Gazebo, YOLO*
- Implemented RTAB map in gazebo simulator and tested the same using Kinect V2.
- Employed the YOLO v3 framework for real-time object detection in tandem with map generation.

Metalimbs | *ROS, Rviz, MoveIt*
- Simulated an anthropomorphic robotic arm with six DOF using human foot movements, integrating leg position tracking via an IMU and flex sensor-actuated gripping.
- Utilized MoveIt for inverse kinematics and trajectory planning.

Rubik's Cube Solver. | *Embedded C, OpenCV, Python*
- Designed an automated system to solve a Rubik's Cube, utilizing a camera for input and six stepper motors to actuate each face, powered by an STM32 microcontroller.
- Developed and optimized a color detection and cube-solving algorithm using OpenCV, with a focus on contour analysis.

Papers & Publications

- P. Junare, **M. Deshmukh**, M. Kulkarni and P. Bartakke, "Deep Learning based end-to-end Grasping Pipeline on a lowcost 5-DOF Robotic arm," 2022 IEEE 19th India Council International Conference (INDICON), Kochi, India, 2022, pp. 1-6, doi: 10.1109/INDICON56171.2022.10040180. [paper]
- M. Kulkarni, P. Junare, **M. Deshmukh** and P. P. Rege, "Visual SLAM Combined with Object Detection for Autonomous Indoor Navigation Using Kinect V2 and ROS," 2021 IEEE 6th International Conference on Computing, Communication and Automation (ICCCA), Arad, Romania, 2021, pp. 478-482, doi: 10.1109/ICCCA52192.2021.9666426. [paper]
- Rushikesh Pachghare, **Mihir Deshmukh** and S. S. Ohol, "Design and Performance analysis of robotic jellyfish for underwater surveillance manufactured as a soft robot", Conference: ARMS 2021, Paper Id: ARMS21138.