

MIHIR DESHMUKH

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*Seeking internships and Co-ops for Summer and Fall 2024

Education

Worcester Polytechnic Institute

Master of Science, Robotics Engineering (4.0/4.0)

Aug 2023 - May 2025

Worcester, MA

College of Engineering, Pune

Bachelor of Technology, Electronics and Telecommunication Engineering (8.86/10)

Aug 2018 - May 2022

Pune, India

Minor in Computer Engineering

Technical Skills

Languages: C, C++, Python, MATLAB, C#, TypeScript

Developer Tools: ROS/ROS2, OpenCV, PyTorch, Tensorflow, PCL, GIT, MATLAB, Linux, CI/CD, ARM Keil, Cuda, L^AT_EX, Machine Learning, Altium Designer, Angular

Network Architectures: ResNet, VGG, YOLO, RCNN, ViTs

Hardware: Jetson Nano, RaspberryPi, STM32, Arduino, STM32, KinectV2, Zed camera 2i, Franka panda

Experience

Bajaj Finserv

Jul 2022 - Jul 2023

Software Engineer

Pune, India

- Managed the migration of the RBL bank collection web portal, driving the strategic planning and technical execution to enhance operational efficiency and data integrity.
- Created robust Web APIs using .Net Core, ensuring seamless integration with backend databases using Ado.Net, significantly improving the collection process's reliability and speed.

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.

Academic Projects

Dexterous Picking Manipulation - Directed Research, Advisor: Dr. Berk Calli | ROS, MoveIt, PyTorch, OpenCV

- Identified appropriate dexterous skills like sliding, pushing, and flipping for each object in a scene by performing instance segmentation using Mask R-CNN. Located grasp candidates for these object interactions.
- Successfully executed these identified skills on the Franka Panda robot, achieving an accuracy of 92.85%.
- Generated simulation data and subsequently concentrated on training models using this data. Successfully transitioned them into real-world applications.

Structure from motion(SfM) & NeRF | Python, Epipolar Geometry, Volume Rendering

- Utilized chirality for valid 3D point triangulation and improved scene precision by adding more views with Perspective-n-Points (PnP) followed by Bundle Adjustment for optimal alignment and precision of 3D points.
- Implemented Neural Radiance Fields (NeRF) to synthesize novel views of scenes from a sparse set of input images, leveraging differentiable volume rendering for photorealistic image generation.

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.

AutoCalib [link] | Python, Calibration

- Implemented Zhang's camera calibration method, utilizing non-linear optimization for estimating intrinsic & distortion parameters.

Reducing latency for Monocular Depth estimation [link] | PyTorch, Transformers

- Implemented efficient attention within the Skip Attention module to enhance the PixelFormer baseline model, resulting in a 1.24% improvement in RMSE performance.
- Achieved 3.07% decrease in inference time by optimizing FLOPS despite transitioning from 7x7 local attention to global attention.

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]