

RONAK HARISH BHANUSHALI

Boston, MA

bhanushali.r@northeastern.edu | 857-370-8656 | [linkedin.com/in/ronakbhanushali](https://www.linkedin.com/in/ronakbhanushali)

EDUCATION

Northeastern University, Boston, MA

December 2024

Candidate for Master of Science, Robotics, GPA 3.947

Coursework: Deep Learning, Mobile Robotics, Robot Sensing and Navigation, Reinforcement Learning, Computer vision

K.J. Somaiya College of Engineering, Mumbai, India

June 2021

Bachelor of Technology, Mechanical Engineering, CGPA 8.84/10

Coursework: Artificial Intelligence, Advanced Machine Learning, Industrial Robotics, IOT, Automation and Control

TECHNICAL SKILLS

Programming: C, C++, Python, Linux, Matlab, ROS, ROS2, OpenCV, NumPy, Pytorch, TensorRT, Github, PCL, CMake, Mujoco

Software: Solidworks (CSWA, CSWP certified), Ansys, Fusion 360, TM Flow, Studio5000, Kepware

PROFESSIONAL EXPERIENCE

Piaggio Fast Forward, Boston, MA

July 2023- April 2024

Robotics Intern

- Implemented Iterative Closest Point to enhance localization resulting in a 35% improvement in the position estimate
- Developed a dataset creation tool in python for leader identification using the data collected on a person following robot
- Trained a Siamese Neural Network for leader re-identification in a one-shot learning framework using PyTorch, achieving 90% accuracy, and efficiently deployed it on Jetson TX2 using the TensorRT C++ API for real-time inference
- Designed and implemented a data collection tool in C++ to capture LIDAR readings and ground truth data from a laser range finder, enabling the creation of a robust sensor model
- Engineered a LIDAR sensor model using linear regression on surface data, significantly improving accuracy for precision docking across varying surface types and optimizing real-world performance
- Developed precision docking feature for an autonomous mobile robot with onboard RP LIDAR and RealSense depth camera

IITD-AIA Foundation for Smart Manufacturing, IIT Delhi, India

August 2021- July 2022

Robotics Engineer

- Integrated an AMR with an onboard TM5M700 cobot for autonomous material handling in a Cyber-Physical factory using ROS
- Developed an optimised pick and place sequence for workpiece handling with cobot using the Moveit! ROS package
- Optimized workpiece detection by creating an object detection pipeline using transfer learning
- Deployed the workpiece detection pipeline on NVIDIA Jetson Xavier & merged it with the pick-and-place pipeline
- Defined waypoints for AMR to automate the AMR dispatch process for seamless operation using ROS and REST API

ACADEMIC PROJECTS

PARIS - Precise Air sealing Robot for Inaccessible Spaces, Northeastern University

September 2024 - Present

- Developing navigation and mapping systems for a Unitree Go2 quadruped to operate effectively in constricted spaces
- Creating a simulation environment in IsaacSim for the robot, enabling effective testing and future data collection opportunities

Attention Guided Off-Road Semantic Segmentation, Northeastern University

February – April 2022

- Trained U-Net and U-Net with attention module to perform semantic segmentation for off road semantic segmentation
- Achieved pixel accuracy of 83% by training the model from scratch on RELLIS and RUGD datasets
- Evaluated U-Net, Attention U-Net, and Segformer models to determine the best approach for this problem

Comparative Study of SLAM Algorithms, Northeastern University, Boston, MA

November – December 2022

- Conducted a comparative analysis of Cartographer, R-TAB Map, Open VSLAM, and SPTAM algorithms on ROS and Python
- Implemented and benchmarked the outdoor performance of all algorithms on KITTI dataset, while collaborating with a team

Dead Reckoning using IMU, Northeastern University, Boston, MA

October 2022

- Developed ROS drivers in Python for outdoor data collection using IMU and GPS sensors mounted on a car
- Rectified heading data by IMU calibration and refining signal by removing noise using complementary filters
- Implemented dead reckoning using IMU and verified the same by comparing velocity and position data from GPS

Eyantra Robotics Competition, IIT Bombay, Mumbai, India

June 2019 – March 2021

Team Lead

- Implemented the ROS navigation stack on an AMR in Gazebo and simulated UR5 manipulation for autonomous sorting
- Collaborated to fuse object detection with the pick & place pipeline via the find_object_3d package
- Designed and built a robot with a hitting mechanism and a navigation algorithm using OpenCV and an overhead video feed

Team KJSCE Robocon, K. J. Somaiya COE, Mumbai, India

June 2018 – November 2020

Mechanical Team Lead

- Spearheaded a team of 10 to design and build two-wheeled robots, winning the Best Design Award at ABU Robocon 2020.
- Coordinated with the team to optimize, and finalize the designs by regular brainstorming and providing effective feedback
- Designed & manufactured a quadruped robot & a wheeled robot with swerve drive to maneuver around an obstacle course
- Developed pneumatic and linkage-based mechanisms for various tasks of the ABU Robocon 2019 theme