

## EDUCATION

**Northeastern University**, Boston, MA

**09/2021 - 08/2023**

*Master of Science in Robotics*

**Relevant Coursework:** Wearable Robotics, Advanced Machine Learning, Pattern Recognition and Computer Vision, Robot Sensing and Navigation, Robot Mechanics and Control, Mobile Robotics, Robotics Science and Systems.

**Sardar Vallabhbhai National Institute of Technology (SVNIT)**, Surat, India

**07/2017 – 05/2021**

*Bachelor of Technology, Electronics and Communication Engineering*

**Relevant Courses:** Engineering Mathematics, Fundamentals of Computers and Programming, Microprocessor Peripheral and Interfacing, Embedded Systems, Advanced Processor Architecture, Digital Signal Processing.

## SKILLS

**Languages and Frameworks:** Python, MATLAB, C++, Java, HTML, CSS, Tensorflow, Keras, ROS, Gazebo, Rviz, Embedded C  
**Tools and Technologies:** Git, Linux, SQL, REST API, Machine Learning, Deep Learning, Computer Vision, NLP, Jira, Trello, SLAM, Control and Motion Planning, Localization, Reinforcement Learning, Raspberry Pi, Arduino, MAVLink, Ardupilot, Q Ground Control, LoRa, UWB, Sensor Fusion, OpenSim  
**Soft Skills:** Leadership, Management, Communication, Public Speaking, Content Writing

## EXPERIENCE

**Robotics Engineering Coop**, GreenSight Agronomics

**05/2022 – 12/2022**

- Leveraged U-Net for semantic segmentation employing Cross-Entropy Loss producing an IoU > 0.5.
- Conducted comprehensive research and evaluation of sensor technologies suitable for integration with a drone prototype, including Lidar, Radar, Sonar, UWB and Long-Range Radios considering various design and technical constraints such as power consumption, weight, and cost, to ensure optimal performance and scalability.
- Designed an algorithm to display lidar data in 3D space with a resolution of 8x8 per the sensor design specifications and developed a standalone script for integration with ROS in real-time to achieve robust and efficient navigation in uncertain environments.
- Spearheaded the entire process from data exploration to evaluating the dataset against multiple machine learning models to achieve an accuracy of up to 96.47%.
- Demonstrated indoor localization accurate to 1% with the help of data obtained from UWB ranging.
- Achieved a significant research milestone by implementing transmission of MAVLink telemetry over LoRa for the first time ever.

**Co-Founder and Product Manager**, Plutus Security Solutions

**01/2021 – 07/2021**

- Designed a product prototype and coordinated with the core team in pitching it to DRDO who offered funding worth USD 121,000.
- Enabled efficient interfacing of multiple cameras to Raspberry Pi eventually adding features for live streaming and taking snapshots.
- Integrated the Raspberry Pi to the piezo electric pads system to capture a photo when pressure is sensed.
- Increased efficiency of OCR technology as an application of Deep Learning to identify characters on a number plate (99.81%).

**Associate Product Manager**, ABC Power Systems

**11/2019 – 12/2020**

- Received training on product management, business strategy and how to generate market research insights for sustenance and growth.
- Assisted upper management in establishing Vision, Core Purpose, Core Values and B.H.A.G. to be followed for the next decade.

**Research Intern**, SFR Medical

**06/2020 – 09/2020**

- Improved state-of-the-art OCR technology with CNN for handwriting recognition.
- Inspired Wound Classification Project using CNN to identify the nature and seriousness of a wound from a low-resolution image.

## PROJECTS

**Image Super Resolution**

**01/2022 – 04/2022**

- Achieved Super Resolution on images using architectures SRCNN (2x), FSRCNN (3x), EDSR (4x), ESPCN (4x), LapSRN (8x).

**Augmented Reality**

**01/2022 – 04/2022**

- Wrote code from scratch in C++ for processing the .obj files to build complex virtual objects such as a teddy bear using only the face, edge and vertex information and projecting it onto a plane with reference to checkerboard corners.

**Real-time 2D Object Detection**

**01/2022 – 04/2022**

- Built product around real-time object detection with features including functionality to add more classes and multi-object detection.

**Sensing and Navigation**

**01/2022 – 04/2022**

- Collaborated to demonstrate Visual, Visual-Inertial and Multi-Map SLAM with monocular, stereo and RGB-D cameras, using pinhole and fisheye lens models using ORB-SLAM3 with ROS on data collected in the real world using Northeastern's autonomous car NUANCE as well as on EuRoC, TUM-VI and Kitty Datasets.
- Evaluated its performance against other state-of-the-art algorithms such as LeGO-LOAM and RTAB-Map in different scenarios.
- Performed Dead Reckoning and Velocity Estimation using only the IMU data and used GPS as the ground truth.

**Reconnaissance using Turtlebot3**

**10/2021 – 12/2021**

- Designed an autonomous system to perform reconnaissance in a close and initially unknown simulated disaster environments.
- Detected 12/15 Apriltags and broadcasted their exact locations while generating a complete occupancy grid map using SLAM.

**2D Mapping and Localization**

**05/2020**

- Created 2-D Mapping through Simultaneous Location and Mapping Algorithm from data gathered with a laser sensor and used Adaptive Monte Carlo Localization (AMCL) algorithm to pin-point robot's location on an established maps.

**Path-Planning for Robotic Manipulator**

**04/2020**

- Implemented Rapidly exploring Random Tree (RRT) path-planning algorithm on Kuka arm robot to efficiently avoid obstacles.

**Self-Driving Car Model Implementation**

**01/2020 – 03/2020**

- Employed Q-learning intuition, reward and punishment strategy to develop an AI brain for a car to avoid sand particles (obstacles).