

# DHRUVIL PARIKH

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## EXPERIENCE

### Robotics Engineer, GreenSight Agronomics

05/2022 – 12/2022

- Leveraged U-Net model with Cross-Entropy Loss to perform semantic segmentation, resulting in an IoU score > 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 for extremely low SWAP-C requirements to ensure optimal performance
- Designed an algorithm to visualize lidar data in 3D space with a resolution of 8x8 per the sensor design specifications
- Developed a script for real-time ROS integration, enhancing efficiency by 60% in robustly navigating uncertain environments
- Spearheaded the entire process from data exploration to evaluating for optimal model selection achieving an accuracy of 96.47%
- Demonstrated indoor localization accurate to 3% with the help of ranging data obtained from ESP32 Ultra-Wide Band DW3000
- Decreased latency by 83% as a result of successful implementation of real-time transmission of MAVLink telemetry over LoRa

### Co-Founder and CTO, AISafe Electronics 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 with an accuracy of 100%
- Increased efficiency of OCR as an application of Deep Learning to identify characters on a number plate with an accuracy of 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

### Computer Vision Research Intern, SFR Medical

06/2020 – 09/2020

- Improved state-of-the-art Optical Character Recognition technology with CNN for handwriting recognition by a margin of 10%
- Inspired Wound Classification Project using CNN to identify the nature and seriousness of a wound from a low-resolution image

## PROJECTS

### Autonomous Driving System

01/2023 – 04/2023

- Employed Error State – Extended Kalman Filter incorporating the IMU, GPS and Lidar data achieving localization accurate to 1%
- Developed vision algorithms for object detection, tracking, and surface estimation attaining a combined accuracy of 90%
- Designed a hierarchical motion planner employing A\*, finite state machines, conformal lattice planner, a path planner, a velocity profile generator, and a vehicle controller to navigate scenarios in CARLA with focus on robustness to changes in the environment

### Wearable Exo-Glove

01/2023 – 04/2023

- Engineered a device to assist in tasks requiring finger strength while maintaining dexterity to improve Hand-Grip Strength by 27%

### Image Super Resolution

01/2022 – 04/2022

- Accomplished Super Resolution on image using architectures SRCNN (2x), FSRCNN (3x), EDSR (4x), ESPCN (4x), LapSRN (8x)

### 3D Object Projection

01/2022 – 04/2022

- Wrote code from scratch in C++ for parsing the .obj files to build complex virtual objects such as a teddy bear using only the face, edge, and vertex information, with localized point projection accurate to 1.5% onto a plane with reference to checkerboard corners

### Real-time 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

### Visual-Inertial SLAM with Loop Closure and Bundle Adjustment

01/2022 – 04/2022

- Collaborated to perform 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 the autonomous car NUANCE, 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 predominantly with the help of IMU data, using the 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

### Path-Planning for Robotic Manipulator

04/2020

- Implemented Rapidly exploring Random Tree algorithm on Kuka arm to generate optimal paths and efficiently avoid obstacles

## SKILLS

### Languages and Frameworks:

Python, MATLAB, C++, PyTorch, TensorFlow, Keras, ROS, Gazebo, Carla, Rviz, Embedded C

### Tools and Technologies:

Machine Learning, Deep Learning, Computer Vision, SLAM, OpenCV, OpenCL, Open3D, PCL, ICP, Reinforcement Learning, Raspberry Pi, Arduino, MAVLink, Ardupilot, Q Ground Control, LoRa, UWB, Sensor Fusion, OpenSim, NLP, Git, Linux, Jira, Trello

### Soft Skills:

Leadership, Management, Communication, Public Speaking, Content Writing

## EDUCATION

### Master of Science in Robotics

09/2021 - 08/2023

Northeastern University, Boston, MA

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

### Bachelor of Technology in Electronics and Communication Engineering

07/2017 – 05/2021

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