DHRUVIL PARIKH

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EXPERIENCE

Robotics Engineer, 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 for extremely low SWAP-C requirements to ensure optimal performance.
- 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 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.
- 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.

Computer Vision 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

Autonomous Driving System **Present**

- Employed ES-EKF for localization and developed vision algorithms for object detection, tracking, and surface estimation.
- Developing motion planning skills for cars using Dijkstra's, A* algorithm, finite state machines, and occupancy grid maps.
- Implementing hierarchical motion planner to navigate scenarios in CARLA with focus on robustness to changes in the environment.

Wearable Exo-Glove **Present**

- Creating a device to assist in tasks that require finger strength while maintaining overall dexterity to improve Hand-Grip Strength.

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.

Path-Planning for Robotic Manipulator **04/2020**

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

SKILLS

Languages and Frameworks:	Python, MATLAB, C++, Tensorflow, Keras, PyTorch, 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, Electronics and Communication Engineering **07/2017 – 05/2021**

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