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 **01/2020 – 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 to 99.81%** as an application of Deep Learning to identify characters on a number plate of a vehicle

Associate Product Manager, ABC Power Systems **11/2018 – 12/2019**

- Received training on **product management**, **business strategy** and generating actionable **market research** insights for 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 **project complex virtual objects** such as a teddy bear using only the face, edge, and vertex data, 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 precise **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