Rajat Mehta

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Education

Northeastern University, Boston, MA **May 2023**
Master of Science in Robotics, ECE Concentration
Related Coursework: Deep Learning, Machine Learning, Computer Vision, Reinforcement Learning, Robot Sensing and Navigation, Assistive Robotics

Shri G.S. Institute of Technology and Science, Indore, India **June 2021**
Bachelor of Technology, Electronics and Telecommunication Engineering

Experience

Tocaro Blue, LLC **Feb 2024-Present**
Machine Learning and Autonomy Engineer *Birmingham, AL*

- Engineered a robust 3D navigation software for marine vehicles, ensuring compatibility with systems from four leading radar manufacturers.
- Developed and trained a hybrid image-statistics machine learning model to classify marine objects into 8 categories, achieving a 4.2% increase in model accuracy.
- Designed novel segmentation architectures to classify marine objects from radar scanline images, reducing production costs by 13%.
- Integrated Navtech Radar scanline and GPS data into the end-to-end product pipeline, enhancing real-time navigation capabilities.

Skills: *Transformers · Computer Vision · Marine Radar · Semantic Segmentation · Statistical Modelling · Tracking Filters*

Bluefusion Inc. **June 2022-Aug 2022**
Perception Engineering Coop, Autonomous Systems *Boston,MA*

- Developed a completely automated code pipeline for generating **Radar FFT heatmaps**, refining them using image processing and implementing Yolo **object detection** over the heatmaps.
- Collaborated with the senior team to train the **Yolov5** model over FFT Heatmap outputs of the **MATLAB Radar Simulations** and tested them on generated heatmaps over real-world datasets.
- Redesigned **Lidar** based detection algorithms including **PointNet and PointNet++** for Imaging Radar and implemented them over **3D Radar dense point clouds**.
- Conducted extensive simulations in **Unreal Engine** using Matlab to prove the supremacy of **High-end Imaging Radars** over **Stereo Cameras** in different weather conditions.

Skills: *Autonomous Perception · Sensor Fusion · Computer Vision · Radar Systems · Lidar · Stereo Imagery*

Projects

Dense Depth Maps Generation using LiDAR and Stereo Imagery ***Fall 2021***

- Generated 3D Depth maps for **Autonomous Vehicles** using a special CNN arch. with an encoder-decoder network for using point cloud data from LiDAR and the disparity generated from stereo images.
- Trained the **CNN** model on KITTI datasets and achieved an RMSE score of 1548.89 while generating depth maps in 0.4s on an NVIDIA GTX 1060 GPU.

Image Segmentation using U-Net ***Spring 2023***

- Performed Semantic Segmentation on TGS Salt Identification dataset.
- Trained U-Net Architecture from scratch over 4000 images of sedimentary rocks having salt deposits, achieving 96% test accuracy while successfully classifying salt deposits from the sediments.

Point Cloud Mapping for COBRA Bot using Stereo Imagery ***Fall 2022***

- Generated 3D Colorized Depth Frames from grayscale & RGB Images using RealSense Stereo Camera.
- Performed Point Cloud Sampling for surroundings of the COBRA Bot at 10% Density.

Face Monitored WheelChair System ***Spring 2021***

- Developed a Robotic Wheelchair which can be controlled using facial gestures of the user.
- Extracted **facial keypoints** in real time from the **camera** stream to predict the intent of the user.
- Created a WiFi server with **ESP-32 CAM** module which was used to send signals to run the motors.

Technical Skills

Programming Skills: C,C++,Python, MATLAB, HTML, CSS
Libraries and Tools : Tensorflow, Keras, scikit-learn, OpenCV, Numpy, Pandas, ROS, PCL, QT Rviz, Gazebo, Matplotlib, Unreal Engine, ADT MATLAB, Arduino, SHAP library
Data Handling/Storage Tools : Amazon S3, Data Version Control (DVC), Git LFS. JarvisLabs.ai
Hardware: Raspberry Pi, Intel RealSense Stereo Camera, ATMEL MCU, Arduino, ESP Modules, RAMPS Shield