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

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 – Feb 2025**
Machine Learning and Autonomy Engineer   *Birmingham, AL*

- Engineered **Marine-Perception end-to-end pipeline** by developing S**emantic segmentation** models for radar scanline images cutting the production costs by 13%.
- Designed **Vision Transformer (ViT) architectures** to enhance object **detection and classification** in marine environments.
- 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.
- Optimized **Multi-Sensor Fusion** (Radar + GPS) for autonomous marine navigation, enhancing object recognition and tracking.

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

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

- Engineered an **end-to-end Radar perception pipeline**, refining **FFT heatmaps** via **image processing** and integrating **YOLO-based object detection** for improved perception.
- Redesigned **Lidar-based detection models (PointNet & PointNet++)** to work with **3D Radar dense point clouds**, boosting perception accuracy in autonomous systems.
- Performed **simulations in Unreal Engine and MATLAB** to compare **radar-based perception** against **stereo vision-based approaches**, proving radar's superiority in adverse weather conditions..

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

Projects

Dense Depth Maps Generation using LiDAR and Stereo Imagery (*code*, *report*)

- 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.

Skin Cancer Detection Using Transformer-Based Vision Models (*code*, *report*)

- Developed a Deep Learning pipeline for skin lesion Classification using ConvNeXt and ViT architectures, integrating custom data augmentation and preprocessing techniques.
- Achieved 92.1% accuracy on a balanced 2000-image test set using optimized vision models.

Monocular 6-DOF Camera Tracking via Essential Matrix & Feature Matching (*code*)

- Developed a pose estimation pipeline to recover 6-DOF camera trajectories from monocular videos using Essential Matrix decomposition and feature matching achieving **90% alignment accuracy.**
- Engineered robust SIFT-based tracking and optimized trajectory correction through cheirality filtering and projection error minimization.

Technical Skills

Programming Skills: C, C++, Python, MATLAB, HTML, CSS, SQL, JavaScript
Libraries and Tools: TensorFlow, PyTorch, Keras, ONNX, scikit-learn, OpenCV, numpy, Pandas, ROS, PCL, QT Rviz, Gazebo, Matplotlib, Unreal Engine, ADT MATLAB, Arduino, SHAP library
Hardware: Raspberry Pi, Intel RealSense Stereo Camera, ATMEL MCU, Arduino, ESP Modules, RAMPS Shield
DevOps & Cloud Technologies: Docker, Kubernetes (**Containerization**), Jenkins, GitHub Actions, GitLab (**CI/CD**), AWS (EKS, ECS, Lambda), JarvisLabs.ai, FastAPI(**Microservices**)
Data Handling & Storage: Amazon S3, Data Version Control (DVC), Git LFS
Version Control & Agile Tools: Git, GitHub, GitLab, Bitbucket, JIRA, Trello, Confluence