Venkata Nagarjun Pudureddiyur Manivannan

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Education

Carnegie Mellon University — Pittsburgh, PA
Master of Science in Robotics | CGPA: 4.0/4.0 — August, 2025
Coursework: Localization and Mapping (16833), Visual Learning (16824), Computer Vision (16720), Robot Learning (16831)

National Institute of Technology - Tiruchirappalli — Trichy, India
B.Tech in Electrical and Electronics Engineering | CGPA: 8.87/10 — July, 2023
Coursework: Machine Learning, Data Structures and Algorithms, Modern Control System, Artificial Intelligence

Work Experience

AART Laboratory Carnegie Mellon University, Research Assistant — Pittsburgh, PA
Online Behavior and Image Classification — Sept 2023 - Present
- Building online behahvior and image classification networks inspired by human brain sub-architectures for pedestrian intent prediction, social behavior classification, and image classification.
- Image Classification performance improved to **92%** over the 85% demonstrated by LSTM networks on a stream of partial image patches from the MNIST and CIFAR datasets.
- Implemented a memory based classification module on custom-built Environment for various urban fire scenarios.

Projects

Learning Opacity for Gaussian Splatting with Inverse Rendering | Pytorch — Pittsburgh, PA
Carnegie Mellon University — May 2024 - Present
- Developed novel opacity estimation for Gaussian Splatting grounded on material properties and colour
- Integrated the module into Gaussian Splatting Inverse Rendering (GSIR) (Pub) on the MIP360 Dataset
- Improved Novel-view Synthesis metric Peak-Signal-to-Noise-Ratio (PSNR) by **0.55** over the GSIR baseline

Perception Aware Agile Autonomy of UAV | C++, Ray Casting — Pittsburgh, PA
Carnegie Mellon University | Report | Code — February 2024 - May 2024
- Integrated perception-awareness module with the UAV trajectory planner for point clouds inputs.
- Implemented Amanatides and Woo's Ray Casting Algorithm on voxel maps converted from depth data.
- Calculated information gain over the voxel depth map to be used for optimal UAV-heading calculation
- Demonstrated **7.45% increase** in Closest Distance over Loquercio et al. baseline for successful flights

Generative modeling and Transformer Applications | Python, PyTorch — Pittsburgh, PA
Carnegie Mellon University — April 2024 - May 2024
- Evaluated custom LS-GAN, WGAN-GP (CUB 2011) and diffusion models (DDPM, DDIM) on CIFAR 10
- Implemented multi-head attention for image-captioning (COCO); Attained sub-0.05 loss in 100 epochs
- Developed a Vision Transformer (ViT) with custom patching to achieve test accuracy of 72% within 100 epochs

Object Detection and Image Classification | Feature Pyramid Networks, Pytorch — Pittsburgh, PA
Carnegie Mellon University — March 2024 - April 2024
- Utilized a custom Feature Pyramid Network for Object Detection on PASCAL Dataset to achieve mAP of 23%
- Finetuned ResNet-18 on PASCAL by analysing t-SNE plots of image features to achieve 0.76 mAP in 50 epochs

Online Fault Location Detection | LSTM, MATLAB, Simulink — Trichy, India
National Institute of Technology Tiruchirappalli, India — Jan 2023 - May 2023
- Devised a real-time fault location detection system in power systems using LSTM with accuracy of **87.5%**
- Designed an LSTM Forecaster to interpolate missing data gaps in PMU velocity data to feed detection modules.
- Developed a robust LSTM Classifier with accuracy of **90%** and **85%** with and without incomplete data respectively

Skills

- **Languages**: C/C++, Python, SQL
- **Softwares**: MATLAB (Simulink), ROS, LTSpice
- **Tools and Models**: Pytorch, Tensorflow, Gaussian Splatting; CNN; RNN; Generative Models; OpenCV; Git; Linux