SAI PRAHLADH PADMANABHAN

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA — May 2021
Master of Science in Electrical and Computer Engineering — GPA: 3.67/4.00

Vivekanand Education Society's Institute of Technology, Mumbai, India — May 2019
Bachelor of Engineering in Electronics — GPA: 9.06/10.00

GRADUATE COURSEWORK

Foundations of Computer Systems (18-613), Introduction to Deep Learning (11-785), Machine Learning with Large Datasets (10-605), Foundations of Privacy (18-734), Computer Vision (16-720), Estimation Detection and Learning (18-752), Rapid Prototyping (18-745)

SKILLS

Programming languages: Python (Proficient), C++ (Beginner)
Application Software: MATLAB, Databricks PySpark, AWS, Jupyter Notebooks
Machine Learning Libraries & Frameworks: PyTorch, Tensorflow, Scikit-learn, Numpy, Pandas, OpenCV, Matplotlib

PROFESSIONAL EXPERIENCE

Deep Learning Intern - *Cere Labs, Mumbai, India* — June 2019 - August 2019

- Trained Feature Pyramid Networks for text localization in documents.
- Enhanced text localization accuracy by 2% after adopting Progressive Scale Expansion Network architecture.
- Resolved issue of omission of isolated characters by tuning hyperparameters for ResNet-50 backbone.

RESEARCH EXPERIENCE

Graduate Research Project — February 2021 - Present

- Designed a dense neural network to classify reaction time of drivers with a test accuracy of 83%.
- Applied transfer learning and boosted network performance from 46% to 78% on unseen driver data.

Graduate Research Assistant - *CyLab, CMU, Pittsburgh, PA* — September 2020 - December 2020

- Performed K-means clustering on driver reaction time classification output of a neural network to verify robustness of classification and ensure safety of shared control in autonomous driving.
- Improved the clustering methodology through mean centroid initialization and elbow method to observe a maximum of 20% increase in cluster radii across 5 clustered regions.

ACADEMIC PROJECTS

Homography based Panoramic Stitcher — March 2021 - April 2021

- Devised a multi-image stitcher, based on FAST feature detector and BRIEF descriptors. Employed RANSAC and refined planar homography to warp and stitch images into a single panorama image.

Attention Based End to End Speech to Text Deep Neural Network — November 2020 - December 2020

- Implemented a speech to text transcription network as outlined in the paper Listen Attend and Spell. Network design involved an Encoder and Decoder structure composed of Pyramidal Bi-LSTM and attention mechanism.
- Achieved an average Levenshtein score of 24.3 on Librispeech dataset using teacher forcing and weight tying techniques.

Defense Against Adversarial Attacks — September 2020 - December 2020

- Formulated FGSM and PGD attacks on CIFAR-10 dataset with ResNet-32 backbone, collaborating with a team of 4 members.
- Developed the inpainting algorithm, second stage of a 3-stage defense pipeline involving image cutout, image inpainting and denoising using autoencoders, obtaining a 70.5% classification accuracy for 0.05 epsilon on FGSM attacks.

MyTorch Deep Learning Framework (11-785 coursework) — September 2020 - November 2020

- Built a custom Deep Learning library analogous to PyTorch, having auto differentiation feature, supporting forward and backward propagation operations for Dense layers, 1-D Convolutions, LSTMs and GRUs.

Face Classification and Verification Using CNNs — September 2020 - October 2020

- Trained a ResNet-18 CNN model to acquire face embeddings of images and get Cosine Similarity between two images to verify if it is of the same person.
- Applied data augmentation techniques and achieved an AUC Similarity score of 93.45%.

ADDITIONAL EXPERIENCE

Graduate Teaching Assistant, Introduction to Deep learning - *CMU, Pittsburgh, PA* — December 2020 – Present