SAI PRAHLADH PADMANABHAN

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA — May 2021
Master of Science in Electrical and Computer Engineering — GPA: 3.77/4.00

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

GRADUATE COURSEWORK

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, AWS, Jupyter Notebooks
Machine Learning Libraries & Frameworks: PyTorch, Tensorflow, Scikit-learn, Numpy, Pandas, OpenCV, Matplotlib

PROFESSIONAL EXPERIENCE

Engineer – *Samsung Semiconductor, San Jose, CA* — September 2021 - present

- Developed a Verilog code generation assistant using LLMs, incorporating conversational AI for a chat-based interface that improved code suggestions and completion. Achieved 85% pass@5 success, leveraging fine-tuning on domain-specific datasets and a custom benchmark to optimize performance and efficiency.
- Developed a movie recommendation system using DLRM with Memory Semantic SSD for personalized recommendations. Demonstrated it at the "Open Compute Project" conference, highlighting AI-based decision-making and system performance.
- Established a Jenkins pipeline to automate performance testing and built a Grafana dashboard for data visualization, accelerating the testing process by 10% and enhancing monitoring efficiency.

RESEARCH EXPERIENCE

Graduate Research Project — February 2021 - May 2021

- 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.

ADDITIONAL EXPERIENCE

Graduate Teaching Assistant, Introduction to Deep Learning - *CMU, Pittsburgh, PA* — December 2020 - May 2021

ACADEMIC PROJECTS

Attention Based End to End Speech to Text Deep Neural Network

- 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-LSTMs and an attention mechanism.
- Achieved an average Levenshtein score of 24.3 on Librispeech dataset using teacher forcing and weight tying techniques.

Pupil Tracking for Early Detection of Huntington's Disease Progression

- Developed a real-time eye tracking system using OpenCV and dlib to detect pupil coordinates for tracking eye movements.
- Quantified the degeneration in eye movement range of Huntington's disease patients by logging horizontal and vertical motion.
- Implemented tracking from webcam video, with optional data storage in an MQTT database for medical history monitoring.

Defense against Adversarial Attacks

- 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

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