Nirmal Amirthalingam

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SUMMARY

- Motivated graduate student proficient in predictive modeling, data visualization, and exploratory data analysis
- Competent with data classification, regression tasks; supervised and unsupervised Machine Learning algorithms
- Demonstrated experience in developing Deep Learning models in PyTorch and TensorFlow

EDUCATION

Virginia Tech, Blacksburg, VA — May 2023

Master of Engineering in Computer Engineering — *GPA: 3.96/4*

Coursework: Advanced Machine Learning, Deep Learning, Computer Vision, Data Analytics, Information Visualization

Amrita Vishwa Vidyapeetham, Coimbatore, India — June 2020

Bachelor of Technology in Electronics and Communication Engineering — *GPA: 8.57/10*

Coursework: Pattern Recognition, Optimization Techniques, Image Processing, Probability and Random Processes

TECHNICAL SKILLS

Programming: Python, SQL, C++, JavaScript, HTML, CSS, MATLAB

Frameworks/Tools: PyTorch, TensorFlow, Tableau, D3.js, AWS, Azure ML, Firebase, Flask, Postman, Docker, PostgreSQL, Git, GitLab

Libraries: OpenCV, Numpy, SciPy, Keras, Scikit-learn, Pandas, Matplotlib, Seaborn, NLTK, SpaCy

PROFESSIONAL EXPERIENCE

Data Science Intern — Jun 2022 - Aug 2022

AreaProbe — *Washington, DC*

- Developed Catalyst - an object detection model for pedestrians and vehicles based on **YOLOv5** in PyTorch
- Deployed the model for **35 RTSP camera** feeds installed in parking lots and housing communities of the **Anacostia** neighborhood in Washington, DC
- Implemented an audio detection pipeline based on **YAMNet** (MobileNet architecture) and created a trigger mechanism to detect gunshots in real-time
- Facilitated the storage of object counts along with **color recognition for vehicles** and integrated with **gunshot detection** and deployed the model on AWS EC2 instances using Amazon SageMaker

Graduate Teaching Assistant — Aug 2021 - Present

Virginia Tech — *Blacksburg, VA*

- Assisted students with programming assignments and course projects in ML/CV for 3 courses – **Digital Image Processing**, **Advanced Computer Vision**, and **AI Innovation and Machine Learning**

ACADEMIC PROJECTS

Document Parsing for Electronic Theses & Dissertations (ETDs) — Aug 2022 - Dec 2022

- Developed an end-to-end object detection pipeline for **information extraction** from **Virginia Tech's ETD** repository
- Used **YOLOv7** and **Faster R-CNN (Detectron2)** algorithms to extract text and image objects from ETDs
- Implemented post-processing rules to filter detections and parse information to a structured format and developed read/write APIs to interact with the database in **PostgreSQL**
- Integrated the model with an **information retrieval and search** system that supports up to **50k ETDs** by providing **Dockerized** services with **CI/CD** capabilities

Trending YouTube Video Analytics using Sentiment Analysis — Sep 2022 - Nov 2022

- Scraped data from YouTube's API for trending videos to analyse **key indicators** affecting the popularity of such videos
- Performed **sentiment analysis** using **NLTK** and derived additional attributes to gain more insights
- Built interactive visualizations and dashboards in **D3.js** and **Tableau** that help explain the correlation between raw video statistics, and trend analysis of the general viewer sentiment over time

Hierarchical Multitask Learning in Non-Euclidean Space — Mar 2022 - Apr 2022

- Developed **few-shot** image classification models for **Omniglot** and **mini-ImageNet** datasets using Non-Euclidean manifolds, and evaluated using **Stiefel**, **Hyperbolic** and **Riemannian** optimizers for faster convergence
- Achieved an improvement in test accuracy by **3%** using Hyperbolic models for 5-way 5-shot learning task on Omniglot

PUBLICATIONS

- Evaluating the Scalability of a Multi-Object Detector Trained with Multiple Datasets — **May 2021**
- A Combined Wavelet and Variational Mode Decomposition Approach for Denoising Textured Images — **Dec 2020**
- A Comparative Study between State-of-the-Art Object Detectors for Traffic Light Detection — **Feb 2020**