Aditi Shanmugam

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Technical Skills

Core Competencies:Data Engineering, Deep Learning, Machine Learning, Computer Vision, NLP, MLOps
Programming Languages: C/C++, Python, SQL, LaTeX
Tools and Frameworks: Pytorch, TensorFlow, OpenCV, ONNX Runtime, TensorRT

Experience

Inferigence Quotient **April 2022 – Present**
Machine Learning Engineer (Computer Vision) *Bengaluru, India*

Automatic Number Plate Detection and Recognition - ANPR

- Directed a cross-functional team of 8 data engineers and ML engineers in the deployment of a scalable number plate tracking solution with a custom OCR correction logic tailored for Indian number plates.
- Orchestrated the development of advanced algorithms that boosted detection accuracy to over 95%, ensuring data integrity. This initiative led to a notable decrease in error rates to under 2% and improved service reliability.
- Authored the deployment of software solutions at 10 toll plazas, leading to a 40% reduction in manual tracking errors and enabling law enforcement to respond to violations in real-time.

System for Tracking And Recognition of Targets

- Engineered a high-performance object recognition pipeline on UAVs, resulting in a 30% increase in operational efficiency for surveillance missions and enabling real-time data analysis for on-the-ground decision support.
- Designed and developed a state-of-the-art object tracking pipeline for edge devices, reducing processing time by 50% compared to previous methodologies, thereby enhancing drone navigation and ensuring greater mission success rates.

Real-time Georeferencing of Aerial Infrared (IR) Video

- Spearheaded the design and implementation of a proof of concept that established a pipeline for precise frame registration; improved UAV image alignment with satellite imagery and enhanced geolocation accuracy by 40%.
- Integrated template matching algorithms with sparse and dense optic flow within a vision-based frame registration pipeline; achieved 95% accuracy in aligning UAV-captured images with satellite imagery.

Visual Computing Lab, Indian Institute of Science (IISc) **May 2021 – April 2022**
Research Intern (Deep Learning) *Bengaluru, India*

Source Free Multi-Label Domain Adaptation - SF-MLDA

- Collaborated on the integration of a co-teaching algorithm, Divide-Mix, into the SF-MLDA framework; mitigated data noise, resulting in a measurable 7% increase in accuracy, enhancing overall model reliability.

Superpixel Masking and Image Inpainting - SMAI

- Facilitated the research and development of two advanced neural networks, leveraging Generative Adversarial Networks (GAN) and Autoencoders, leading to a 30% improvement in anomaly detection efficiency compared to previous models.
- Experimented with structural and reconstruction losses to establish correlation on image inpainting and reconstruction along with incorporating multi-exposure fusion techniques for synthetic image regeneration, achieving 80% overall accuracy.

Fellowship.ai **January 2021 – April 2021**
Data Science Fellow *Bengaluru, India (Remote)*

Zero-shot food detection

- Devised a powerful web application that performs zero-shot object detection for food items in an oven setting, allowing culinary staff to identify ingredients quickly; tool is now integral to daily operations in the kitchen.
- Refined the Language-Image Pre-training (CLIP) model, to achieve a Top-1 accuracy of 97.22% and a perfect Top-3 accuracy of 100% using a dataset of 16 images for 100+ classes.

Education

BMS Institute of Technology and Management **August 2018 – July 2022**
Visveswaraya Technological University - B.E Electronics and Telecommunications *Bengaluru, Karnataka*