Anand Kumar

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EDUCATION & RELEVANT COURSES

University of California, San Diego Sept, 2023 - Mar, 2025
Master of Science, Electrical and Computer Engineering(MLDS) CGPA: 4.00/4
Coursework: Computer Vision, GPU Programming, Statistical Learning, Linear Algebra and Applications

National Institute of Technology, Tiruchirappalli July, 2019- May, 2023
Bachelor of Technology, Electrical and Electronics Engineering CGPA: 9.39/10
Coursework: Machine Learning & Deep Learning, Industrial Automation, Modern Control Systems

PUBLICATIONS

Anand, Nuno, et. al, IntroStyle: Introspective Style Attribution | CVPR 2025 (Review)
Anand et. al, GS-TransUNet: Gaussian splatting skin lesion analysis | SPIE Med Img. 2025

SKILLS

Software & Tools	Python, C++, CUDA, MatLab, SLURM, Kubernetes, JavaScript & SQL
Libraries	PyTorch, TensorFlow, JAX, ROS, FAISS & Pandas

EXPERIENCE & INTERNSHIPS

Training-Free Style Attribution using Diffusion Features Jun, 2024 - Present
Summer Research Internship, Statistical Visual Computing Lab, UCSD
• Devised a training-free introspective technique to perform style attribution using Stable Diffusion features, supervised by Prof. Nuno. Improving Recall and mAP scores by 5% and 30% respectively as compared to the SOTA on WikiArt dataset.
• Crafted a synthetic (`SHacks`) dataset to isolate and evaluate fine-grained style using prompts. Our model outperforms SOTA in our synthetic dataset as well.

Sleep Stage Prediction and Heart Score (Bachelor Thesis) Sept, 2022 - Mar, 2023
ML Industrial Research Intern, Omnyk Inc., USA (Remote)
• Worked under Dr. Yogendra, along with a team of 3, to predict the patient's sleep stages using interbeat intervals (IBIs) from ECG heart data and perform sleep quality and heart health analysis for 10+ patients.
• Implemented Convolutional Squeeze-Excite Blocks in parallel to LSTM layers to improve confidence by 4.5% and inference time of 6.5ms using **PyTorch & Pandas**.

Video Compression using VAE-GAN June, 2022 - Aug, 2022
Computer Vision Intern, Leibniz University Hannover (TNT Lab)|| DAAD-WISE Scholarship - Certificate
• Worked under Dr. Ostermann and Mr. Benjak to implement hyperlatent Variational Auto Encoder GAN (VAE-GAN) for video compression to produce variable bit-rates and perceptibly similar reconstructions.
• Developed a **PyTorch** architecture using Pyramid, Warping & Cost Volume network (PWC Net) to predict motion vectors and achieve better results ($\sim 3\%$) than the baseline on PSNR, MS-SSIM and LPIPS metrics.

PROJECTS

CUDA Optical Flow Sep, 2024 - Dec, 2024
ECE 277 - GPU Programming - Github
• Implemented a CUDA workflow for Lucas-Kanade optical flow algorithm with optimizations based on NSight Compute Profiler.
• Improved frames processed per second (FPS) by 40× compared to naive CPU implementation using Array of Structure (AoS).

Evaluating Effectiveness of Chain-of-thought prompting for small models Sep, 2024 - Dec, 2024
CSE 291 - Advanced Data Mining - Report
• Coordinated with a team of 4 to evaluate small LLMs (Llama 3.2 1B) on benchmark datasets: LogiQA, GSM8k, and QuaRTz.
• Compared keyword and Chain-of-Thought (CoT) prompting techniques to discover keyword prompting is effective with $1-3\%$ drop in accuracy.

Sparse-view 3D Reconstruction using Gaussian Splatting Dec, 2023 - Jun, 2024
Statistical Visual Computing Lab, UCSD
• Collaborated with Prof. Nuno to develop a variance-based view sampler for 3D-consistent view synthesis, using diffusion models to guide NeRF in sparse-view unbounded scenes. Random sampling provided robust results across all metrics.

Zero-GRIC: Graph Retriever for Zero-shot Image Captioning Mar, 2024
ECE 285 - Intro to Visual Learning - Report
• Developed a robust framework for zero-shot image captioning with CLIP, graph convolutional networks(GCN) and BLIP-2.
• Formulated a three-pronged approach: Knowledge Database, Retrieval-based Fusion, and Caption Generation; to enhance performance by ∼25% on MS-COCO subset.