Sunil Kumar

Computer Vision Researcher

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Education

Master of Science | ***Computer Science Specializing in Machine Learning*** Aug. 2023 – Dec 2024
Georgia Institute of Technology Atlanta, Georgia

Bachelor of Technology | ***Software Engineering*** Aug. 2017 – May 2021
SRM Institute of Science and Technology Chennai, India

Work Experience

Research Intern AI June 2024 – Aug 2024
Shein Palo Alto, California

- Worked on 3D Virtual Try-on for the Shein Studio platform.
- Designed and deployed an intelligent image filtering system that integrated **pose estimation**, **multi-person detection**, and **motion blur analysis** to identify and remove low-quality images, enhancing low-quality image detection accuracy by **25%** and reducing manual review overhead. Curated dedicated datasets for each use case to ensure model robustness and improved accuracy.
- Implemented and deployed an Image Photoshop detection system to flag all photoshopped images in the Shein Platform (Waiting for Patent approval)

Graduate Student Researcher August 2023 – Present
Georgia Institute of Technology Atlanta, Georgia

- Proposed a novel Hyper-spectral 3D Reconstruction method leveraging Neural Radiance Fields (NeRFs) with wavelength-conditioned rendering, achieving **500% higher spectral accuracy** for non-RGB novel view synthesis tasks. Enabled novel use cases in biology and recycling with enhanced wavelength-specific visualization.
- Engineered a Gaussian Splatting-based wavelength-conditioned 3D reconstruction pipeline that improved robustness to noise in hyperspectral novel view synthesis, achieving a **20 dB** gain in PSNR and a **200% increase in rendering speed**. (Submitted to TMLR)
- Developed synthetic data generation pipelines using **Diffusion models** and neural feature-map conditioned **ControlNets** to create diverse training datasets for robust perception models in autonomous driving scenarios.

Senior Research Scientist Aug. 2022 – Feb. 2023
Fastcode AI Bengaluru, India

- Designed and deployed object detection and tracking models optimized for UAV-based autonomous drones, achieving **25% faster inference** and **20% higher detection accuracy**.
- Improved detection robustness under low-visibility and adverse environmental conditions, enabling reliable deployment in real-world missions.

Computer Vision Engineer Sep. 2021 – Aug. 2022
VisionBox.ai Remote

- Developed deep learning models for disease and insect detection in agricultural drone imagery, improving field-level diagnostics.
- Built analytics tools from sports video footage to extract game-specific features and player metrics.
- Implemented image stitching and retrieval pipelines to extract spatial insights from high-resolution aerial datasets.

Computer Vision Intern Jul. 2021 – Dec. 2021
Sony Research India Bengaluru, India

- Researched multimodal fusion techniques for emotion recognition from audio-visual inputs, surpassing state-of-the-art benchmarks.
- Improved representations of temporal and cross-modal dependencies in video and audio streams using transformer-based models.

Competitions

SIIC Melanoma Detection 2020
Bronze Medal Kaggle

- Participated in the Kaggle Competition hosted by SIIC to detect the presence of Melanoma, a common type of Skin Cancer. My proposed method achieved an F1 score of 0.938, winning a bronze medal for performance.