SARTHAK VORA

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EDUCATION

University of California, Los Angeles (UCLA) **Expected Date: March 2025**
Master of Science in Electrical and Computer Engineering **GPA 4.0/4.0**

Indian Institute of Technology (IIT) Madras, Chennai, India **June 2023**
Bachelor of Technology in Electrical Engineering **CGPA 8.98/10**

SKILLS

- Programming Languages - Python, C, Linux, MATLAB, Verilog
- Frameworks – PyTorch, TensorFlow, OpenCV, Numpy, Pandas, Scikit-Learn, Matplotlib
- Other skills – Git, Critical-Thinking, Problem-Solving, Collaborative

PROFESSIONAL EXPERIENCE

Resilience Business Grids (RBG.AI), Coimbatore, India **June 2023 – August 2023**
Artificial Intelligence Intern

- Integrated *Segment-Anything (SAM)* with *SegFormer* model for improved Floorplan Image segmentation.
- Utilized OpenCV's contour detection method to transform segments within the semantic map into polygons.
- Crafted a 3D model of the FloorPlan Image in Blender by extruding walls and objects from 2D polygons.

Vision and AI Lab (VAL), Indian Institute of Science (IISc) Bangalore, India **June 2022 – March 2023**
Research Intern – Computational and Data Science (CDS) Department

- Modelled the latent space of *StyleGAN2* with a Denoising Diffusion Model to generate attribute variations.
- Generated a dataset of attribute edit directions by encoding synthetic image pairs into the *W+* latent space.
- Improved FID metric by 3.7 units on average across hairstyle, eyeglass, and smile attributes in *FFHQ* dataset.

SensorDrops Networks, IIT Kharagpur, India **June 2021 – August 2021**
Data Analytics Intern

- Simulated Covid-19 transmission by parameterizing population, contact tracing and random testing data.
- Presented successful simulation results for Lecco province, Italy for end-to-end Covid particle transmission.

PUBLICATIONS

- "Exploring Attribute Variations in Style-based GANs using Diffusion Models", *NeurIPS 2023 Diffusion Workshop Proceedings, **NeurIPS 2023***
- "Attribute Diffusion: Diffusion Driven Diverse Attribute Exploration in GANs", *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition, **CVPR 2024** (under review)*

PROJECTS

Road Scene Completion with Geometry-Aware 3D Vehicle Placement
Vision and AI Lab (VAL), Indian Institute of Science (IISc) Bangalore, India

- Collaborated with two researchers to design a VAE-based placement module for dense 3D bounding boxes.
- Designed an augmentation strategy for localizing plausible locations leveraged as sparse input distribution.
- Achieved road scene completion by rendering copy-paste cars at sampled box locations in the original scene.
- Showcased 22.6% improvement in Average Precision (AP_{40}) metric on *KITTI3D* Object Detection benchmark.

Learning Projections from Single Photon Cameras (SPC) for Stereo Depth Estimation
Undergraduate Thesis, Guided by Prof. Kaushik Mitra (IIT Madras) and Prof. Mohit Gupta (UW Madison)

- Formulated a projection method for estimating depth using deep stereo networks with SPC photon cube.
- Incorporated exposure bracketing into *ACVNet* by selectively using multiple exposures for depth prediction.
- Reduced D1 error by nearly 2% with learned-mask aided video compressive projection over multi-exposure.

3D BlobGAN: Enhancing Generative Models for Controlled 3D Scene Generation

- Enhanced *BlobGAN* framework to support 3D blobs in latent space, enabling controlled 3D scene generation.
- Conducted experiments with the *PatchGAN* Discriminator to ensure consistent generation of multiple views.
- Independently synthesized top and front view for *CleVr* dataset by projecting volumetric blob distributions.

Unsupervised Low-Light Depth Estimation

Guided by Prof Kaushik Mitra, Computational Imaging Lab, IIT Madras

- Reviewed depth estimation on CFNet, GANet and PSMNet SOTA architectures on the KITTI dataset.
- Achieved a 1.5-2x speedup with Mixed Precision, as compared to default single precision, on Resnet50.
- Observed novel occlusion artifacts in the warped views from the disparity map of the input monocular view.
- Trained an unsupervised setting of *CFNet (CVPR 2021)* by using left-right consistency on the predicted depth.

Stereo Color-Monochrome Low-Light Image Enhancement

Computational Photography, Course Project

- Simulated a Low-Light stereo dataset from the Middlebury benchmark and applied random augmentations.
- Altered *Learning to See in The Dark* architecture for single raw image enhancement to accept RGB images.
- Experimented stereo-view image fusion to transfer pixel information between images via a disparity map.

Model Pruning: Lottery Ticket Hypothesis

- Trained a lightweight model and Resnet18 on CIFAR-10 dataset to perform model pruning in PyTorch.
- Observed that iteratively pruned models with 40-80% sparsity were able to re-achieve original performance.
- Concluded that iterative pruning has better model generalizability and better accuracy on the validation set.

RELEVANT COURSEWORK

- Fundamentals Of Deep Learning
- Computational Photography
- Applied Linear Algebra
- Non-Linear Optimization
- Modern Computer Vision
- Computational Imaging
- Applied Programming
- Probability

EXTRACURRICULAR ACTIVITIES

- Acted as the Co-Head of The Fifth Estate 2021-22, Official Student News Body of IIT Madras. Co-led a team of 5 members to conduct surveys and present them as institute newsletters.
- Facilitated a Prototyping session for nearly 30 participants from SQIL NGO (Non-governmental organization).
- Participated in Amazon Machine Learning Challenge Hackathon 2021 in a team of 4 members to solve an NLP-based Extreme Scale Classification Problem. Ranked top 150 out of 700 participating teams.
- Organized events and conducted technical sessions as a member of the Electronics Club, IIT Madras, 2020-22.