

Alakh Himanshu Desai

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EDUCATION

University of California San Diego Sep 2022-Present
- PhD candidate in Electrical and Computer Engineering
GPA: 4.0/4.0
Advisor: Professor Nuno Vasconcelos
- (Thesis) Master of Science in Electrical and Computer Engineering
GPA: 3.89/4.0
Courses: Deep Learning, Computer Vision, Algorithm Design and Analysis,
Video Compression, Linear Algebra and Application, Parameter Estimation, Computational Photography
International Institute of Information Technology (IIIT) Hyderabad Jul 2015-May 2019
(Honours) Bachelor of Technology in Electronics and Communication Engineering
GPA: 9.15/10.0
Ranked 4th and Dean's merit list holder
Courses: Computer Networks, Data Structures, C Programming, Digital Image Processing, Numerical Analysis

TECHNICAL SKILLS

Programming Language: Python, C, C++, MATLAB
ML frameworks and tools: Tensorflow, Pytorch, Keras, Scikit-learn, OpenCV, Pandas
Familiar with: Git, SQL, HTML, Docker, Kubernetes, AWS Cloud Computing, Video Codec, video compression standards

EXPERIENCE

- Graduate Research Assistant, UCSD** Apr 2020 - Present
Python, PyTorch, OpenCV, Docker, Kubernetes
 - Currently working on improving control over text-to-image generations models like diffusion
 - Worked on scene graph generation and visual relationships recognition.
 - Proposed a lightweight single-stage model for scene graph generation with 20% fewer parameters over SOTA.
 - Developed a dynamic sampling method and knowledge distillation, achieved more than 30% improvement over SOTA.
 - Paper** accepted in **ICCV 2021** [[link](#)], **Neurips 2022** [[link](#)] and **ECCV 2024** [[link](#)].
- Computer Vision Research Intern, Intrinsic (Alphabet)** July 2021-Sept 2021
Multiview Geometry, GPU Programming, TensorRT, Pytorch, Git, Spell Worksapce
 - Worked on improving the efficiency of the existing pose estimation pipeline. This reduced the overall runtime by **6.8x**.
 - Developed and implemented Efficient PnP inspired closed form solution for multiview camera pose estimation to replace the existing iterative algorithm. This could handle the discrete and continuous symmetries of the objects.
- Research Assistant, IIIT Hyderabad** Jun 2017-May 2019
Keras, MATLAB, PyTorch
 - Built translation invariant scattering coefficients helped achieve around 5% improvement over different datasets.
 - Developed Capsule network based deep neural network, which directly operates on 3D OCT volumes for classification.
 - Papers** Published in **ISBI 2020** [[link](#)] and **EMBC 2019** [[link](#)].

RELEVANT PROJECTS

- Enhancing prompt adherence with diffusion-negative prompts** Apr-Jun 2020
PyTorch, Diffusion, Gen-AI
 - Extracting "true" diffusion negatives for a given prompt and seed pair.
 - This negative can be used as a mathematically backed anchor for improving prompt adherence in Stable Diffusion.
 - This work allows users to circumvent the semantic mismatch between their and the model's understanding of negation
- Compressing Deep Neural Networks** Apr-Jun 2020
Python, PyTorch, Image and Video Compression
 - Model compression was implemented with connection pruning, weight-sharing through k-means clustering while training.
 - With post training storage via Huffman coding, we achieved around 70% weight compression.
- Dangerous Selfie Analysis** Aug-Dec 2019
C/C++, Python, Tensorflow-Lite, BeautifulSoup, HTML, Javascript, Pandas, Face++, Android Studio, Model Compression
 - The model was trained on data scraped from Instagram and then compressed using Tensorflow-Lite.
 - An in depth analysis of potentially fatal selfies was performed based on user, location and other features.
 - The model was then deployed into an Android application to alert a user when taking a potential "Kill-fie".

PUBLICATIONS

- A. Desai**, N Vasconcelos, "Improving image synthesis with diffusion-negative sampling," 2024 IEEE European Conference on Computer Vision (ECCV), Milan, Italy, 2024.
- A. Desai**, TY Wu, S Tripathi, N Vasconcelos, "Single-Stage Visual Relationship Learning using Conditional Queries," 36th Conference on Neural Information Processing Systems (NeurIPS 2022), New Orleans, LA, USA, 2022.
- A. Desai**, TY Wu, S Tripathi, N Vasconcelos, "Learning of Visual Relations:The Devil is in the Tails," 2021 IEEE International Conference on Computer Vision (ICCV), Montreal, Canada, 2021.
- A. Desai**, R. Chauhan and J. Sivaswamy, "Image Segmentation Using Hybrid Representations," 2020 IEEE 17th International Symposium on Biomedical Imaging (ISBI), Iowa City, IA, USA, 2020.
- D. J. Gaddipati, **A. Desai**, J. Sivaswamy and K. A. Vermeer, "Glaucoma Assessment from OCT images using Capsule Network," 2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS), Berlin, Germany, 2019.