Sai Sree Harsha

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Education

University of California, San Diego — San Diego, USA
Master of Science in Computer Science (Artificial Intelligence) — Sep 2022 - May 2024

National Institute of Technology (NIT), Karnataka — Surathkal, India
Bachelor of Technology in Computer Science and Engineering — Aug 2018 - May 2022
GPA: **3.89/4** | Rank: **1/117** | Gold Medalist

Technical Skills

Machine Learning	Deep Learning, Computer Vision, Natural Language Processing
Programming Languages	C++, C, Python, R, JavaScript
Frameworks & Libraries	PyTorch, Keras, TensorFlow, NumPy, Pandas, Matplotlib, OpenCV, HTML
Platforms & Tools	Git, Jupyter, Docker, AWS SageMaker, MTurk, Fn Project, MySQL, Django, Flask

Publications

Product Videography From Stills
2022 European Conference on Computer Vision (**ECCV 2022** CVEU Workshop)

LEAD: Self-Supervised Landmark Estimation by Aligning Distributions of Feature Similarity
2022 IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV 2022**) — Paper | Poster

Experience

Amazon Inc. — Bangalore, India
Applied Scientist Intern at Amazon Media & Ads (Palette AI Research) — Feb 2022 - Aug 2022

- Invented a 3 stage deep learning pipeline comprising of salient object detection, 3D photo inpainting and video representation learning to convert images from an e-commerce product page into a compelling video advertisement.
- Proposed and implemented 6 different self-supervised contrastive learning models using PyTorch to generate high-performance video advertisements that follow cinematic best practices.
- Generated video advertisements for products across 5 distinct categories — enabling thousands of small-scale brands on Amazon to diversify their marketing portfolio at zero cost.
- Presented the project to the Vice President of Amazon Advertising Policy and Creative Studios.
- This work has been accepted at **ECCV 2022** (CVEU Workshop) & **AMLC 2022**. A **U.S. Patent** has been filed.
- Researched, applied, and evaluated Transformer based NLP models for text re-ranking and text paraphrasing.

Mila, Quebec AI Institute — Montreal, Canada
Machine Learning Research Intern at REAL | Advisor: Dr.Liam Paull — Jan 2021 - Dec 2021

- Designed and implemented a framework to demonstrate the occurrence of catastrophic forgetting when a Neural Radiance Field (NeRF) is trained in an online setting.
- Adapted continual learning techniques such as distillation, 5+ variants of experience replay, and A-GEM for online NeRF training to alleviate catastrophic forgetting and enable the use of NeRF as a scene representation for SLAM.
- Attained a positive backward transfer of 2dB PSNR using continual learning and improved novel view synthesis performance by 24%. Code | Slides

Oracle Corporation — Bangalore, India
Data Analytics Intern with the Fusion Analytics Warehouse (FAW) team — May 2021 - Jul 2021

- Developed a framework to extract and analyze data about 20 types of user behavior on the FAW platform.
- Designed a snowflake data warehouse schema with 10+ dimensions that can support efficient data mining, with more that 100k data points and built an ETL pipeline using Pandas and cx_Oracle to populate the data warehouse.
- Minimized resource consumption by deploying the ETL pipeline as a Function that runs once every 7 days in a serverless manner, using Docker and the Oracle Functions platform.
- Identified and visualized more than 25 key performance indicators to provide actionable insights to the product development team. Internship Certificate

Video Analytics Lab, Indian Institute of Science (IISc) — Bangalore, India
Research Intern | Advisors: Dr.Venkatesh Babu, Dr.Varun Jampani (Google) — Apr 2020 - Jun 2021

- Developed a 2 stage self-supervised learning pipeline for detecting image landmarks by utilizing the BYOL framework.
- Generated landmark representations which are 60x smaller in dimensionality, interpretable and exhibit robustness to alignment and scale variations (of up to 2x optical zoom-out) of the object in the image.
- Achieved a 10% improvement in landmark regression performance on the challenging AFLW datasets, with a 45% improvement in the few-shot learning setting. Paper | Poster

Selected Projects

Continual Learning for NeRF | Python, PyTorch | GitHub Apr 2021 - Nov 2021

- Adapted continual learning techniques such as distillation, experience replay and GEM for online NeRF training.
- Achieved a 2dB PSNR positive backward transfer and a 24% improvement in novel view synthesis performance, enabling the use of NeRF as a scene representation for SLAM.

gradSLAM RGB-D Completion | Python, PyTorch, PyTorch3D | GitHub Dec 2020 - Jan 2021

- Leveraged gradients from gradSLAM to recover missing color & depth observations from an RGB-D image sequence.
- Performed extensive experiments using 3 different intialization settings and 2 different loss formulations, illustrating that gradient information from gradSLAM is spatially rich.

Single View 3D Reconstruction | Python, PyTorch | GitHub Apr 2020 - Oct 2020

- Devised a semantic vertex segmentation technique for the task of self-supervised single view 3D reconstruction.
- Formulated a 3D semantic consistency loss to improve mesh reconstruction quality, obtaining a 5% increase in IoU and a 12% increase in PCK as compared to prior works.

PCB Fault Detection | Python, Keras, TensorFlow | GitHub Mar 2020

- Analyzed the performance of 8 different deep convolutional neural networks including Inception, ResNet, and DenseNet for identifying defective printed circuit boards.
- Achieved an accuracy of 73.6%, with a true positive rate of 80% using a ResNet-34 architecture.

Debiasing Word Vectors | Python, TensorFlow | GitHub Jan 2020

- Implemented an algorithm for modifying 50 dimensional GloVe word embeddings to remove gender stereotypes, such as the association between the words 'receptionist' and 'woman'.
- Implemented an equalization algorithm for gender-specific words to ensure that embeddings of a pair of words such as 'actor' and 'actress' differ only through the gender property.

Awards

- National Institute of Technology (NIT), Karnataka Institute Gold Medal, 2022. Graduated Bachelors in Computer Science and Engineering with the highest GPA in the batch.
- Indian Academy of Sciences, Summer Research Fellowship Award (SRFP), 2020. Among the top 1.5% out of 25,000+ applicants.
- The Department of Science and Technology (Govt. of India), KVPY Fellowship Award, 2017. Among the top 0.7% out of 170,000+ applicants.

Volunteering

- Volunteered at the ICML 2021 conference. Tested the conference website, identified issues, and made feature requests to improve user experience.
- Conducted mentorship sessions for 20+ first-year students on introductory topics in machine learning and organized data science contests on Kaggle as a part of the Web Enthusiasts' Club, NIT Karnataka, Surathkal.
- Built a web application using Flask for the SPCOM 2020 conference at the Indian Institute of Science (IISc).