SAI SREE HARSHA

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EDUCATION

National Institute of Technology (NIT), Karnataka — Surathkal, India
Bachelor of Technology in Computer Science and Engineering — Aug 2018 - May 2022 (expected)

Cumulative GPA: **9.66/10** | Rank: **1/117** [Link to Rank Certificate]

Relevant Courses: Machine Learning, Linear Algebra & Matrices, Data Structures & Algorithms, Discrete Mathematics, Artificial Intelligence*, Data Warehousing & Mining*, Digital Image Processing* (*taking current semester)

EXPERIENCE

Mila, Quebec AI Institute — Montreal, Canada
Research Intern *at REAL | Advisors: Dr.Liam Paull, Dr.Derek Nowrouzezahrai* — January 2021 - Present

- Developed a pipeline to demonstrate the occurrence of catastrophic forgetting when a neural coordinate map such as a Neural Radiance Field (NeRF) is trained in an online setting.
- Adapted continual learning techniques such as distillation, several variants of experience replay, and GEM for online NeRF training to alleviate catastrophic forgetting.
- Achieved a positive backward transfer of up to 2dB PSNR using continual learning techniques and improved the performance of novel view synthesis by up to 24%. [Link to Code] | [Link to Slides]
- Explored the ability of various voxel-based and surfel-based differentiable renderers to provide accurate gradients with respect to geometry for self-supervised depth estimation leveraging the gradSLAM framework.

Oracle, India — Bangalore, India
Summer Intern *with the Fusion Analytics Warehouse (FAW) team* — May 2021 - July 2021

- Developed a framework to extract and analyze data about customer behavior on the Oracle FAW platform.
- Designed the data warehouse schema to support efficient data mining and implemented an ETL pipeline to populate the data warehouse using operational data.
- Deployed the ETL pipeline using Oracle Functions to run in a serverless manner, minimizing resource consumption.
- Identified key performance indicators and visualized them to provide actionable insights to the product development team and drive informed decisions. [Link to Certificate]

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

- Developed a self-supervised approach for detecting landmarks from category-specific image collections.
- Leveraged the BYOL framework to learn an instance-level representation and used its correspondence-matching property to learn a compact pixel-level representation via a novel dimensionality reduction objective.
- Achieved an improvement of 10% in landmark regression performance over prior works on the challenging AFLW datasets, while attaining improvements of up to 45% in the few-shot learning setting.
- Representations learned are interpretable and exhibit robustness to alignment and scale variations of the object in the image. Our work has been accepted at the **IEEE/CVF WACV 2022**. [Link to Paper] | [Link to Poster]

Indian Academy of Sciences — Bangalore, India
Summer Research Fellow *at IIST Trivandrum | Advisor: Dr.Deepak Mishra* — May 2020 - December 2020

- Performed an extensive comparative study of different pooling techniques for graph neural networks.
- Designed a graph pooling method that collects second-order statistics and leverages neural networks to capture graph topology information and the correlations among features of individual nodes.
- Achieved up to 4% improvement in graph classification accuracy and a significant reduction in standard deviation across multiple cross-validation runs, compared to previous works. [Link to Code]
- Attained consistent enhancement in performance across 9 datasets in the bioinformatics and social network domains.

I3D Lab, Indian Institute of Science (IISc) — Bangalore, India
Winter Intern | *Advisor: Dr.Pradipta Biswas* — December 2019 - January 2020

- Developed a JavaScript web application for the Pointing Task based on Fitts's Law, following the ISO 9241-9 standard.
- Analyzed the cursor movement trajectories, obtained upon completion of the pointing task and visualized metrics as a radially stacked bar chart. [Link to Website] | [Link to Certificate]

PUBLICATIONS

LEAD: Self-Supervised Landmark Estimation by Aligning Distributions of Feature Similarity
Tejan Karmali, Abhinav Atrishi*,* ***Sai Sree Harsha****, Susmit Agrawal, Varun Jampani, Venkatesh Babu R*
2022 IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV 2022**)
[Link to Paper] | [Link to Suppl.] | [Link to Poster] | [Link to Video] | [Link to Slides]

NeuralDoc - Automating Code Documentation using Machine Learning
Sai Sree Harsha*, Aditya Sohoni, K.Chandrasekaran*
10th International Symposium on Embedded Computing and System Design, 2021.
Artificial Intelligence Driven Circuits and Systems. Lecture Notes in Electrical Engineering, vol 811. Springer, Singapore.
[Link to Paper]

TECHNICAL SKILLS

Programming Languages	Python, C++, C, JavaScript
Frameworks & Libraries	PyTorch, Keras, TensorFlow, OpenCV, NumPy, Pandas, Django, Node.js
Platforms & Tools	Git, Jupyter, Docker, Fn Project, Oracle Cloud Infrastructure (OCI)

SELECTED PROJECTS

Continual Learning for NeRF April 2021 - November 2021
- Adapted continual learning techniques such as distillation, experience replay and GEM for online NeRF training.
- Achieved a 2dB PSNR backward transfer with 24% improvement in novel view synthesis performance. [GitHub Link]

gradSLAM RGB-D Completion December 2020 - January 2021
- Leveraged gradients from gradSLAM to recover missing color and depth observations from an RGB-D sequence.
- Performed extensive initialization experiments and gained insights on the potential of the gradSLAM framework for use in self-supervised depth estimation. [GitHub Link]

Single View 3D Reconstruction April 2020 - October 2020
- Developed a semantic vertex part segmentation technique for self-supervised single view 3D-reconstruction.
- Designed a 3D semantic consistency loss and a camera rotation regularizer to improve mesh reconstruction quality and achieved a 5% increase in IoU and a 12% increase in PCK as compared to prior works. [GitHub Link]

PCB Fault Detection March 2020
- Designed deep learning pipelines using architectures such as Inception, ResNet, and DenseNet to identify defective Printed Circuit Boards (PCBs) and achieved an accuracy of 73.6% with a true positive rate of 80%. [GitHub Link]

Debiasing Word Vectors January 2020
- Implemented a debiasing algorithm for removing gender stereotypes in word embeddings used for natural language processing tasks. [GitHub Link]

ACHIEVEMENTS

- Selected for the Indian Academy of Sciences, Summer Research Fellowship Program (SRFP), 2020. Among the top 1.5% out of 25,000+ applicants [Link to Certificate]
- Secured 99.4 percentile score in the JEE Mains examination among 1.5 million candidates, 2018.
- Secured 97.4% in AISSCE conducted by the Central Board of Secondary Education, 2018.
- Secured a rank of 1360 among 1,72,000 candidates in the KVPY examination, 2017.[Link to Certificate]
- Awarded the Certificate of Merit by the Central Board of Secondary Education for being in the top 0.1% of successful candidates in AISSE and AISSCE, 2016 & 2018.[Link to Certificate]
- Awarded the Vasantharathna Foundation's Award for Excellence in Leadership, 2017. [Link to Certificate]

EXTRA-CURRICULAR ACTIVITIES

- **Volunteer** at ICML 2021 [Link to Certificate]
  Tested the conference website, identified issues, and made feature requests to improve user experience.

- **Executive Member** at the Web Enthusiasts' Club, NIT Karnataka, Surathkal
  Conducted mentorship sessions for 20+ first-year students on introductory topics in machine learning & organized data science contests on Kaggle.
  Conducted mock-technical interviews and resume reviews for second-year students.
  Assisted in organizing campus-wide hackathons and organized workshops on version control systems & open source initiatives as a part of Hacktoberfest NITK.

- Built a web application for the SPCOM 2020 conference at the Indian Institute of Science, Bangalore, India.