Sai Sree Harsha

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Education

National Institute of Technology, Karnataka — Surathkal, India
Bachelor of Technology | *Computer Science & Engineering* — *July 2018 - May 2022 (expected)*
Cumulative GPA: 9.65 /10 (Rank 1/120)

Relevant Coursework: Linear Algebra, Machine Learning, Data Structures and Algorithms, Design and Analysis of Algorithms, Database Systems, Operating Systems, Discrete Mathematical Structures, Theory of Computation, Computer Networks, Computer Organisation and Architecture

National Public School, Rajajinagar — Bangalore, India
Class 11-12 (CBSE) | **Percentage: 97.4%** — *May 2016 - May 2018*

Experience

MILA, Quebec AI Institute — Montreal, Canada
Research Intern, Supervisor: Dr.Liam Paull and Dr.Derek Nowrouzezahrai — *Jan 2021 - Present*

- Working on "closing the loop" between differentiable reconstruction and differentiable rendering for self-supervised learning, leveraging the gradSLAM framework.
- Exploring the ability of various differentiable voxel based and surfel based renderers to provide accurate gradients with respect to geometry.
- Developing techniques for recovering depth maps without 3D supervision.
- Designing mechanisms for performing semantic segmentation of point clouds without 3D supervision.

Video Analytics Lab, CDS, Indian Institute of Science (IISc) — Bangalore, India
Research Intern, Supervisor: Dr.Venkatesh Babu and Dr.Varun Jampani — *April 2020 - Sept 2020*

- Developed the semantic vertex part segmentation technique to improve quality of mesh reconstruction for the self-supervised single view 3D reconstruction task.
- Formulated new loss functions such as a 3D semantic consistency loss and a camera rotation regulariser.
- The proposed approach was also able to reduce dependency on pre-trained networks, ground truth camera and key point supervision as compared to existing methods.
- Gained familiarity with differentiable rendering techniques such as the Neural Mesh Renderer (NMR), the SoftRas (Soft Rasterizer) renderer and PyTorch 3D.
- Code can be found here.

Indian Academy of Sciences, SRFP, 2020 — Bangalore, India
Summer Research Fellow, Supervisor: Dr.Deepak Mishra, IIST, Trivandrum — *April 2020 - July 2020*

- Carried out a detailed comparative study of different pooling techniques in graph neural networks.
- Developed the neural pooling mechanism to improve the effectiveness of second order graph pooling.
- When used for graph classification, the proposed neural pooling technique led to better performance on several bioinformatics and social-network datasets.
- Code can be found here.

I3D Lab, Indian Institute of Science(IISc) — Bangalore, India
Winter Intern, Supervisor: Dr. Pradipta Biswas — *Nov 2019 - Dec 2019*

- Worked on developing software for the Pointing Task which is used as the standard metric to evaluate pointing devices.The implementation follows the ISO standard and is based on Fitts' Law.
- Upon completion of the pointing task, the cursor movement trajectories are analysed and visualised as a Radially Stacked Bar Chart (WheelViz).
- The website for the task can be found here.

Technical Skills

- **Programming Languages:** Python, C++, C, Javascript
- **Frameworks & Libraries:** PyTorch, Keras, TensorFlow, Django, Node.js, SQL
- **Platforms & Tools:** Git, Jupyter, CoLaboratory

Selected Projects

- **Neural Graph Pooling:** Developed the neural pooling mechanism for second order graph pooling improving performance of graph classification task by 2-3% over several benchmark social-network and bioinformatics datasets as compared to existing methods.
- **Pruning Challenge:** Applied weight and neural pruning techniques on neural networks and demonstrated their ability to retain same accuracy with model size on disk reduced to 20% of its initial size.
- **NeuralDoc**: Developed a novel approach by integrating Transformers, the copy attention mechanism and the use of a pre-trained BERT model for automatically generating documentation for Python and Java source code snippets. Achieved higher BLEU, METEOR and ROUGE-L score as compared to 7 other existing methods. Deployed the system as a web application using Streamlit.
- **PCB Fault Detection:** Designed a deep learning model to identify defective Printed Circuit Boards using models such as ResNet, DenseNet, and AlexNet. Achieved an accuracy of 73.6% with just 0.5% false positives.
- **De-biasing Word Vectors:** Implemented the debiasing algorithm from, Bolukbasi et al., 2016 for removing female/male gender stereotypes in word embeddings used in NLP tasks.
- **Night Owl:** Built a web application using Django to ease the process of ordering food from the night canteens in the college campus.

Additional Experience & Achievements

- Received the **Indian Academy of Sciences (2020)** Summer Research Fellowship Award.
- Awarded the **KVPY SX** scholarship with an AIR of 1360 among 1,72,000 candidates.
- Cleared the **JEE Mains** examination with a 99.4 percentile score among 1.5 million candidates.
- Awarded the **Certificate of Merit** by **CBSE, New Delhi** for class 10 and class 12 for being in the top 0.1% of successful candidates.
- Received the Award for Excellence in Leadership given by the Vasantharathna Foundation.
- Member of the **Web Enthusiasts' Club, NITK, Surathkal**. Conducted knowledge sharing sessions on various topics in ML and Kaggle sessions for data science contests as part of the club's activities.