SAI ASHISH SOMAYAJULA

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EDUCATION

Doctor of Philosophy, PhD— University of California, San Diego 2020-Current
Electrical and Computer Engineering, Majors - Intelligent Systems and Robotics, GPA : 3.962/4

Bachelor of Technology— Indian Institute of Technology, Hyderabad (IIT-H) 2016-20
Electrical Engineering with Minors in Computer Science and Engineering, CGPA : 9.68/10

PUBLICATIONS

Sai Ashish Somayajula, Onkar Litake, Youwei Liang, Ramtin Hosseini, Shamim Nemati, David O. Wilson, Robert N. Weinreb, Atul Malhotra and Pengtao Xie. "Improving Long COVID-Related Text Classification: A Novel End-to-End Domain-Adaptive Paraphrasing Framework" Scientific Reports. Nature Portfolio (under review).

Sai Ashish Somayajula, Abhishek Singh, Youwei Liang, and Pengtao Xie "A Multi-level Optimization Framework for Data Augmentation in Low-Resource Machine Translation" ACL Rolling Review (under review).

Sai Ashish Somayajula, Youwei Liang, Abhishek Singh, Li Zhang, and Pengtao Xie "Generalizable and Stable Finetuning of Pretrained Language Models on Low-Resource Texts" ACL Rolling Review (under review).

Ruiyi Zhang, Rushi Qiang, **Sai Ashish Somayajula**, Pengtao Xie, "AutoLoRA: Automatically Tuning Matrix Ranks in Low-Rank Adaptation Based on Meta Learning", ACL Rolling Review (under review).

Li Zhang, Basu Jindal, **Sai Ashish Somayajula**, and Pengtao Xie "E2EAug: An End-to-End Data Augmentation Framework for Medical Image Semantic Segmentation" CVPR 2024 (under review).

Sai Ashish Somayajula, Lifeng Jin, Linfeng Song, Haitao Mi and Dong Yu. "Bi-level Finetuning with Task-dependent Similarity Structure for Low-resource Training." Association for Computational Linguistics, 2023, **Paper**.

Sai Ashish Somayajula, Linfeng Song and Pengtao Xie. "A Multi-Level Optimization Framework for End-to-End Text Augmentation." Transactions of the Association for Computational Linguistics, 2022, **Paper**.

Pathapati Aravind Ganesh, Chakradhar Nakka, Havish P.N.V.S.S.K., **Sai Ashish Somayajula** and Amuru Sai Dheeraj, 2020, September. "Supervised Deep Learning for MIMO Precoding." In 2020 IEEE 3rd 5G World Forum (5GWF) (pp. 418-423). IEEE, **Paper**.

Subbareddy, B., **Sai Ashish Somayajula**, and Aditya Siripuram. "Investigating the Relationship between Graph Eigenvector Ordering and the Signal Processing Dual", **Paper**.

Contributed to the teaching material for the Teaching and Learning Centre, Indian Institute of Technology, Hyderabad, **Digital Modulation Techniques**, **Functional Series**, **Continuity**

INTERNSHIPS

Apple, On Device NLP Research Intern 2023
Dr Vivek Kumar Rangarajan Sridhar

· Delved into multi-modal Large Language Models (LLMs) while working with the Input Experience NLP team, exploring innovative ways to enhance user interactions.

Tencent AI Lab, NLP Research Scientist Intern 2022
Dr. Lifeng Jin, Dr. Linfeng Song, Dr. Haitao Mi

· Worked on inducing task-specific similarity knowledge into language models in low resource settings for soft-data augmentation. Learned a task-specific similarity matrix and the model weights end-to-end framed as a Bi-level optimization problem.

Texas A&M University, Halliburton Engineering Global Program Scholar 2019
Dr. Dileep Kalathil and Dr. Srinivas Shakkottai

· Developed a control algorithm for self-driving cars to navigate in a crowded environment using a pedestrian behavior model, which was developed using Inverse Reinforcement Learning.

L.V Prasad Eye Institute - Engineering Center 2018
Dr. Kiran Kumar Vupparaboina

· Segmentation of Optic disc and Hard exudates in Fundus Images, Choroid layer in Optical coherence tomography(OCT) images using Deep Learning Techniques. Developed a web portal for doctors to use the tools.

Pressbury - *Health care Start-up* 2017

· Developed a low power ECG monitoring device namely "CADENCE-ECG" that can interface with smartphones which is launched in the market.

PROJECTS

Attention-Guided Weight Mixup 2023
Dr. Pengtao Xie

Worked on a bi-level optimization framework, where each weight node is a mixup of pretrained and finetuned weights using an attention parameter. This helps mitigate overfitting and catastrophic forgetting issue in large language models and address finetuning instability.

Improving Long COVID-Related Text Classification: A Novel End-to-End Domain-Adaptive Paraphrasing Framework 2023
Dr. Pengtao Xie

Improved long COVID related literature classification by alleviating data scarcity using data generated from an end-to-end domain-adaptive paraphrasing framework. This is particularly aimed for healthcare applications reducing the time and efforts of medical professionals in finding long COVID related data.

A Multi-Level Optimization Framework for End-to-End Text Augmentation 2020
Dr. Pengtao Xie

Worked on an End-to-end Text Augmentation technique framed as a multi-level optimization problem that produces quality text augmentations tailored to the domain of the classification dataset. Working to extend the project to Machine translation datasets.

Graph-to-Graph Generator Model for Automatic Generation of Commonsense Knowledge Graph 2020
Dr. Pengtao Xie

Working on automated generation of Commonsense Knowledge Graph from a seed graph via Graph-to-Graph generation approach.

Corona disease analysis mobile Application 2020
Prof. Kiran Kumar Kuchi

· I was leading the data analysis wing of the Corona App developed by Indian Institute of Technology, Hyderabad which is submitted for further usage by Government of Telangana, India.

Deep Reinforcement Learning for Communication Systems 2019
Dr. Sai Dhiraj Amuru

· Working on an end-to-end model for the MIMO system using Deep Reinforcement Learning techniques in the scenarios of noisy feedback and delayed feedback. Our model does not assume a known channel model.

Duality in Graph Signal Processing 2019
Dr. Aditya Siripuram

· Defined a new metric - Dualness, a measure of closeness between graphs to being (signal processing) duals of each other and developed an algorithm to compute the dualness.

IITH-RU Project Based Learning Program 2019
Dr. Ravikumar Bhimasingu and Dr. S.Suriya Prakash *Ritsumeikan University-Japan*

· Among the ten students from IITH to work in a cross-culture program with Ritsumeikan University. Performed a case study analysis on the concept of AI and Blockchains for the power grid.

Engineering the Eye Hackathon, LV Prasad Eye Institute 2018
- awarded Microsoft Azure Award

· Developed a prototype product to assist visually challenged through unknown indoor environments. Designed a smart cane equipped with a virtual eye to the glasses to guide the user, replicating a dog's behavior.

Soldier Support, Inter IIT Technical meet 2017

· Worked on a problem statement given by Defence Research and Development Organisation, India to upgrade the gear of soldiers. We secured the sixth position in this challenge.

ACCOLADES

- **Second Highest CGPA** in B.Tech Program across all departments (240 students). 2020
- Academic Excellence Award for the Highest CGPA in Electrical Engineering. 2019
- Achieved *Microsoft Azure Award* in "Engineering the Eye-2018 hackathon" 2018
- Represented IIT-Hyderabad in the prestigious Inter-IIT Technical meet and secured 6th position. 2018
- Academic Excellence Award for the Highest CGPA in freshman year. 2017
- Runners-up in PWC challenge with theme as "Smart Cities"- Megathon. 2017
- Class X - Overall Topper Award, Gold medal in Mathematics and Science. 2014
- Bronze medal in National Science olympiad. 2012

TEACHING ASSISTANT

At UCSD:

- ECE 271A - Statistical Learning with Professor Nuno M Vasconcelos.
- ECE ECE 208 - Computational Evolutionary Biology - Professor Siavash Mirarab.
- ECE 285 - Deep Generative models with Professor Pengtao Xie.
- ECE 269 - Linear Algebra with Professor Piya Pal.
- ECE 100 - Linear Electronic Systems with Professor Dan Sievenpiper.

During my Undergraduate: Vector calculus, Linear Algebra, Introduction to AI and ML, Representation Learning, and Probabilistic Graphical Models.

MENTORING AND EXTRA CURRICULAR ACTIVITIES

Supervision at Dr. Pengtao Xie's Lab, UCSD Current
Mentoring masters students on various projects under the framework of Skillearn in the lab.

Mentor at ENLACE program 2021, UCSD 2021
Mentored college and high school students on the research project titled, "Deep Learning Algorithms for the Disease Segmentation of Chest X-rays".

First Year PhD representative at UCSD 2020
Student representative at ECE GSC UCSD.

Head of Elektronica—*Electronics and Signal Processing Club of IIT-H* 2018
A student activity club aimed to foster the culture of critical thinking and innovation in technology among students.

Head of Marketing Team—*Entrepreneurship Cell of IIT-H* 2018
Head of a team that captivates investors to invest in fresh ideas for start-ups from students.

Co-Founder of College Counsel 2017
A start-up that helps a JEE (the exam to be cleared for admission to the IIT) qualified student choose a branch they are suited for according to their rank and interest.

Lead Singer—*Vibes - Music club of IIT-H* 2016
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SKILLS

Languages/Python Libraries	C, C++, Python, SQL, Keras, PyTorch, Tensorflow, Numpy, OpenCV
Softwares/OS	Matlab, Scilab, Octave, LaTeX, Microsoft Office, Windows, Ubuntu

REFERENCES

Dr. Vivek Kumar Rangarajan Sridhar, Engineering Manager, NLP, Apple
vrangarajansridh@apple.com *website*

· Mentor during my internship at Apple.

Dr. Dong Yu, Distinguished Scientist, Tencent AI
dyu@tencent.com *website*

· Advisor during my internship at Tencent.

Dr. Lifeng Jin, Research Scientist, Tencent AI
lifengjin@tencent.com *website*

· Mentor during my internship at Tencent.

Dr. Pengtao Xie, Assistant Professor at Department of ECE, University of California, San Diego
p1xie@ucsd.edu *website*

· Working under his guidance currently at UCSD.

Prof. Mohammed Zafar Ali Khan, Professor, Department of Electrical Engineering IIT Hyderabad
zafar@iith.ac.in *website*

· Teacher and research project guide

Dr. Sumohana Channappayya, Associate Professor and Dean R&D, IIT Hyderabad
sumohana@iith.ac.in *website*

· Teacher and research project guide

Dr. Dileep Kalathil, Assistant Professor at the Department of ECE, Texas A&M University
dileep.kalathil@tamu.edu *website*

· Worked on a project under his and Prof. Srinivas Shakkottai's guidance during my summer internship at Texas A&M University.

Dr. Aditya Siripuram, Assistant Professor at the Department of Electrical Engineering, IIT Hyderabad
staditya@iith.ac.in

· Teacher, research project guide and advisor.