Kommineni Aditya

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INTERESTS

Multimodal Signal Processing, Biobehavioural Signal Processing

EDUCATION

Program	Institution	%/CGPA	Duration
PhD: ECE, Advisor: Prof. Shrikanth Narayanan	University of Southern California	3.92/4.0	2022-
IDDD (B.Tech: Electrical Engg, M.Tech: Data Science)	Indian Institute of Technology Madras	9.57/10	2017-2022

SCHOLASTIC ACHIEVEMENTS

- Recipient of **outstanding poster award** at the Ming Hsieh Research Festival 2023
- Recipient of the **Ming Hsieh Department of Electrical and Computer Engineering Fellowship** as an incoming PhD student for Fall 2022 at Viterbi School of Engineering, University of Southern California.
- Awarded the **DAAD WISE** (Working Internships in Science & Engineering) Scholarship in 2021 to pursue a research internship in **Germany**.
- Ranked in the **top one percentile** and was awarded the **K.V.P.Y.** Fellowship in the year 2017.
- Ranked **417** in the JEE Advanced Examination 2017 among **1.4 Million** aspirants.
- Placed **20** among **1500+** teams registered for **Shell.ai Hackathon** for Sustainable and Affordable Energy and was awarded the Bronze Category Prize.

PUBLICATIONS

- Yang, D., **Kommineni, A**., Alshehri, M., Mohanty, N., Modi, V., Gratch, J., & Narayanan, S. (2023). Context Unlocks Emotions: Text-based Emotion Classification Dataset Auditing with Large Language Models. *arXiv preprint arXiv:2311.03551*.
- Mehlman, N., Shi, X., **Kommineni, A.**, & Narayanan, S. Detecting Poisoning Attacks against Speech Datasets using Variational Autoencoders. In *Proc. 3rd Symposium on Security and Privacy in Speech Communication* (pp. 34-40).
- Feng, T., Hebbar, R., Mehlman, N., Shi, X., and **Kommineni, A.**, "A Review of Speech-centric Trustworthy Machine Learning: Privacy, Safety, and Fairness", *arXiv e-prints*, 2022. doi:10.48550/arXiv.2212.09006.

TEACHING EXPERIENCE

Course: Computer Organization, IIT Madras **Fall 2020**
Instructor: Prof. Nitin Chandrachoodan
Role: Teaching Assistant

Course: Data Analytics Laboratory, IIT Madras **Fall 2021**
Instructor: Prof. Gaurav Raina
Role: Teaching Assistant

Course: Digital Systems and Lab **Spring 2022**
Instructor: Prof. Balaji Srinivasan
Role: Teaching Assistant

PROJECTS & INTERNSHIPS

Voice Conversion using GANs **Aug 2021 - Jun 2022**
Speech and Music Technology Lab, IIT Madras Report

IDDD - Interdisciplinary Dual Degree

Advisor: Prof. Hema Murthy

- Analyzed the performance state of the art, end to end voice conversion architectures i.e. **CycleGAN** and **StarGAN** across various speaker demographics to identify areas of improvement.
- Provided baseline performance on a variety of objective measures for GAN based voice conversion models on Indian languages including cross lingual voice conversion cases.
- Proposed some modifications to the current architectures to alleviate the issues in GAN based models.

Lip-Synchronous Dubbing **Jun 2021 - Jan 2022**

Language Technology Group, University of Hamburg

Advisor: Prof. Timo Baumann

- Performed experiments employing **facial landmark features** to demonstrate the **lack of temporal coherence** across frames in current state of the art lip-syncing systems.
- By introducing an additional adversarial loss to account for temporal components of lip movements across time frames, tried to alleviate the lack of temporal coherence.

Low Resource E2E Speech systems for Indian Languages **Jun 2020 - Apr 2021**

Speech Processing Lab, IIT Madras

Advisor: Prof. Umesh Srinivasan

- Analyzed the performance of Transformers and Conformers when employing a **latent set of characters** for multiple India languages under **low resource constraints** (~40 hours per language).
- Trained an End to End **real time** Machine Translation model to translate **english technical lectures** to corresponding hindi text through **back Translation** technique.
- Improved the word error rate of ASR systems for indian languages by **3-5%** by constraining the self attention range in transformers.

Vector Space based Information Retrieval System **Apr 2020 - Jul 2020**

Course Project, IIT Madras Report

Instructor: Prof. Sutanu Chakraborti

- Implemented a vector space based information retrieval model on Cranfield Dataset and measured the efficacy on metrics such as nDCG, Mean Average Precision and F-Score.
- Employed Okapi retrieval function and BM-25 ranking function coupled with Latent Semantic Analysis in order to obtain a **10%** improvement over the baseline model.

Simulation of LTE & NR Layer 1 baseband functional blocks **May 2019 - Jul 2019**

Internship at Tejas Networks, Bengaluru

- Simulated beamforming using MIMO to demonstrate an improvement in throughput by about **40%**.
- Studied the impact on throughput for employing 256,512 and 1024 QAM at various levels of SNR.
- Analyzed the effectiveness of **LDPC codes** for error correction in **low SNR** scenarios.

Shell.ai Hackathon for Sustainable and Affordable Energy **Sep 2020**

Online Hackathon Github Repo

- Problem statement involved designing algorithms to optimize windmill placement in offshore wind farms.
- Implemented **genetic algorithms** by modeling the problem as an optimization problem.

LEADERSHIP & VOLUNTEERING POSITIONS

- **Mentor at Google Explore CSR, 2023**

Mentored undergraduate students as a part of the Explore CSR program in order to foster interest in computer science research among non-stem students.

- **Head, Lectures & Demonstrations Team, Shaastra 2020** (Technical Festival, IITM)

Headed a team of **12** to organize IIT Madras' annual lecture series with **10** lectures involving the likes of **Robin Li**, **Dr. Stephen Wolfram** and **Dr. Haarald Haas**. Effectively managed a budget of over **500,000 INR**.

- **Mentor at Avanti Fellows, 2017**

Volunteered at the **NGO Avanti Fellows** to guide **two** underprivileged **class XII** students through their **preparation for the IIT JEE Examination** by explaining theoretical concepts and analyzing their mistakes thereby enabling their admission to some of the top institutions in the country.