

Sarthak Kumar Maharana

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Education

- 2023-Present **PhD in Computer Science**, *The University of Texas at Dallas*, Richardson, USA,
Advisor: Dr. Yunhui Guo
Research Focus: Continual Learning, Data-efficient Deep Learning, Computer Vision.
- 2021-2023 **Master of Science in Electrical Engineering**, *University of Southern California (USC)*, Los Angeles, USA, 3.85/4
Selected Coursework: ML for Medical Data, Theoretical Machine Learning, Deep Learning Systems, Digital Signal Processing, Probability and Statistics, Linear Algebra.
- 2016-2020 **Bachelor of Technology in Electrical and Electronics Engineering**, *International Institute of Information Technology (IIIT)*, Bhubaneswar, India, 8.32/10, Thesis: 9.85/10.0
Thesis: *Acoustic-to-articulatory inversion of dysarthric speech by using cross-corpus acoustic-articulatory data* [ICASSP'21]

Research Experience

- May'22- **USC's Mark and Mary Stevens Neuroimaging and Informatics Institute**, *Neuro*
July'23 *Imaging Computing Research*, Los Angeles, USA
Student Researcher — Advisor: Dr. Yonggang Shi.
○ Developed a tool to perform automatic tractography of the brainstem using d-MRI images.
○ Leveraged image registration and label fusion methods to automatically generate the anatomical ROIs.
- Dec'21- **Signal Analysis and Interpretation Lab (SAIL)**, *USC*
Dec'22 *Student Researcher* — Advisor: Dr. Shrikanth (Shri) Narayanan
○ Speaker recognition from rt-MRI videos, based on an unsupervised disentanglement representation learning scheme.
- July'20- **Medical Mechatronics Lab**, *National University of Singapore (NUS)*
Apr'21 *Part-time RA (remote)* — Advisor: Dr. Hongliang Ren
○ Semantic segmentation to perform pixel-wise prediction of the needle trajectory in ultrasound images - deep learning using autoencoders and spatiotemporal modules.
- Dec'19- **Signal Processing and Interpretation (SPIRE) Lab**, *Indian Institute of Science (IISc)*, Bengaluru, India
Sep'20 *Student Researcher* — Advisor: Dr. Prasanta Kumar Ghosh
○ Studied acoustic-to-articulatory inversion (AAI) for dysarthric speech at low-resource data conditions involving Indian languages, using joint learning and multi-task training. [ICASSP'21]
○ Conditioned the jointly-trained AAI model with x-vectors to study its benefits on the AAI performance of dysarthric subjects.

May'19- **Department of Electrical Engineering, Indian Institute of Technology, Kharagpur,**
Jul'19 **West Bengal, India**
Summer Intern — Advisor: Dr. Aurobinda Routray
○ Developed an in-house template-matching algorithm to detect breaths in speech recordings.

Publications

C = Conference, P = Preprint/Submitted

- P.1 **Acoustic-to-articulatory inversion for dysarthric speech: Are pre-trained self-supervised representations favorable?**
Sarthak Kumar Maharana, Krishna Kamal Adidam, Shoumik Nandi, and Ajitesh Srivastava.
- C.2 **Acoustic-to-articulatory inversion for dysarthric speech by using cross-corpus acoustic-articulatory data**
Sarthak Kumar Maharana, Aravind Illa, Renuka Mannem, Yamini Belur, Preetie Shetty, Veeramani Preethish Kumar, Seena Vengalil, Kiran Polavarapu, Nalini Atchayaram, and Prasanta Kumar Ghosh.
ICASSP 2021 [Poster] [Talk]
- C.1 **Harmonics analysis of a PV integrated hysteresis current control inverter connected with grid and without grid**
Jayanta Kumar Sahu, Sudhakar Sahu, JP Patra, **Sarthak Kumar Maharana**, and Bhagabat Panda.
ICSSIT 2019

Selected Projects

- Oct'22- **Understanding Multi-Modal Speaker Recognition via Disentangled Representation Learning**, USC
Dec'22
○ Presented an adversarial invariance approach to address multimodal speaker recognition, robust to various sources of variability present in videos and speech. [[Code], [Report]]
- Nov'22- **Understanding Linguistic Patterns for Text-Based Speaker Classification**,
Dec'22 USC
○ Studied various text feature extraction methodologies using pre-trained models and classification algorithms and compared them to build a computationally efficient system targeted for text-based speaker classification. [[Code], [Report]]
- Apr'22- **The Effect of Conditioning of Trigonometric Transformations of Dates with Meteorological Data in Forest Fires Prediction: An Experimental Study**,
May'22 USC
○ Studied the effects of conditioning a trigonometric transformation of dates with meteorological data, that would aid in predicting the occurrence of forest fires in Algeria. [Code]
- Jan'19- **Single Image Haze Removal using Dark Channel Prior**, IIIT-Bh
Mar'19
○ The dark channel is based on the following observation relating to outdoor images: In most of the non-sky patches, at least a certain color channel has at least one dark channel i.e. it has low intensities tending to zero.
○ Redesigned an algorithm regarding this. [Link].

Skills

Languages *Advanced:* Python, MATLAB; *Familiar:* C++, Java, Bash
ML Libraries *Advanced:* PyTorch, Keras, TensorFlow; *Intermediate:* OpenCV, scikit-learn
Softwares *Intermediate:* RStudio, ITK-SNAP, BrainSuite
Others Git, \LaTeX ; OS: Unix, Windows

Talks

Acoustic-to-articulatory inversion of dysarthric speech by using cross-corpus acoustic-articulatory data
ICASSP'21

Teaching Experience

Aug'23- **Artificial Intelligence**, *Teaching Assistant*, UTD — Developing course materials, Present grading assignments, and holding doubt-clearing sessions.
Jan'22- **A Computational Introduction to Deep Learning**, *Grader and Mentor*, USC — May'22 Grading assignments, holding office hours, monitoring online forums, and project grading.

Volunteer Work

Aug'23- **CORD.ai** — Helping build CORD.ai, an AI research community, as a research advisor and volunteer.
Oct'21- **USC IEEE Graduate Society** — Attended group meetings, strengthened academic May'23 and social growth of the members, and hosted workshops.
Aug'20- **PyCon India 2020** — Content writer for social media handles, helped the promotions Oct'20 team, and created virtual swags.
Jul'18- **International Association of Engineers (IAENG)** — Student member.

Awards

2020 **Governing Body Merit Scholarship**, Award of INR 15k, *Academic year: 2019-2020*, IIIT-Bh
2019 **Dean's List** [Link], IIIT-Bh
2019 **Summer Research Fellowship**, *Indian Academy of Sciences (10% selection rate)* [Link]