

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, Domain Adaptation, Data-efficient Deep Learning,
Computer Vision, Machine Learning.
- 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

- Aug'23- **Data-Efficient Intelligent Learning Lab**, *UTD*, Richardson, USA
Graduate Research Assistant — Advisor: Dr. Yunhui Guo
○ Currently working on problems related to efficient model fine-tuning and continual test-time domain adaptation.
- May'22- **USC's Mark and Mary Stevens Neuroimaging and Informatics Institute**, *Neuro Imaging Computing Research*, Los Angeles, USA
July'23 *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*, Los Angeles, USA
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.2 **PALM: Pushing Adaptive Learning Rate Mechanisms for Continual Test-Time Adaptation**
Sarthak Kumar Maharana, Baoming Zhang, and Yunhui Guo.
arXiv preprint
- P.1 **Not Just Change the Labels, Learn the Features: Watermarking Deep Neural Networks with Multi-View Data**
Yuxuan Li, Sarthak Kumar Maharana, and Yunhui Guo.
arXiv preprint
- C.3 **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.
ICASSP Workshops 2024
- 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, USC**
Dec'22
○ 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**
May'22 **Meteorological Data in Forest Fires Prediction: An Experimental Study** ,
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, L^AT_EX; 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, Operating Systems**, *Teaching Assistant*, UTD — Develop-
Dec'23 ing course materials, 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.

Academic Service

Reviewer

- Computer Vision and Pattern Recognition Conference Workshop on Test-Time Adaptation (CVPR-W 2024)
- European Conference on Computer Vision (ECCV 2024)

Sub-reviewer

- AAAI Conference on Artificial Intelligence (AAAI 2024)

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 team, and created virtual swags.
- Oct'20
- Jul'18- **International Association of Engineers (IAENG)** — Student member.

Awards

- 2024 **Oxford Summer School in Machine Learning 2024**, Accepted to the MLx Representation Learning and Generative AI track
- 2023 **Computer Science PhD Fellowship**, The University of Texas at Dallas
- 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]