Sarthak Kumar Maharana

skm200005@utdallas.edu
https://sarthaxxxxx.github.io/
sarthak9811
sarthaxxxxx

Education

2023-Present **PhD in Computer Science**, *The University of Texas at Dallas*, Richardson, USA, *4.0/4.0 (core)*
Advisor: Dr. Yunhui Guo
Research Focus: Data-efficient Deep Learning, Computer Vision, Machine Learning.

2021-2023 **Master of Science in Electrical Engineering**, *University of Southern California (USC)*, Los Angeles, USA, *3.85/4.0*
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*

Research Experience

Aug'23- **Data-Efficient Intelligent Learning Lab**, *UTD*, Richardson, USA
Research Assistant — Advisor: Dr. Yunhui Guo
- Designed a computationally inexpensive adaptive learning rate continual test-time adaptation method based on prediction uncertainty and parameter sensitivity to rapid distributional shifts.
- Proposed a submodular optimization framework for active learning in LiDAR-based object detection.

May'22-July'23 **USC's Mark and Mary Stevens Neuroimaging and Informatics Institute**, *Neuro 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-Dec'22 **Signal Analysis and Interpretation Lab (SAIL)**, *USC*, Los Angeles, USA
Student Researcher — Advisor: Dr. Shrikanth (Shri) Narayanan
- Speaker recognition from rt-MRI videos, based on an unsupervised disentanglement representation learning scheme.

July'20-Apr'21 **Medical Mechatronics Lab**, *National University of Singapore (NUS)*
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-Sep'20 **Signal Processing and Interpretation (SPIRE) Lab**, *Indian Institute of Science (IISc)*, Bengaluru, India

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-Jul'19 **Department of Electrical Engineering**, *Indian Institute of Technology, Kharagpur*, 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 **PALM: Pushing Adaptive Learning Rate Mechanisms for Continual Test-Time Adaptation**
Sarthak Kumar Maharana, Baoming Zhang, and Yunhui Guo.
[arXiv]

C.4 **Not Just Change the Labels, Learn the Features: Watermarking Deep Neural Networks with Multi-View Data**
Yuxuan Li, **Sarthak Kumar Maharana**, and Yunhui Guo.
European Conference on Computer Vision 2024 (ECCV)
[Code]

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 - Self-supervision in Audio, Speech and Beyond.
[Poster]

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-Dec'22 **Understanding Multi-Modal Speaker Recognition via Disentangled Representation Learning**, USC

- 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-Dec'22 **Understanding Linguistic Patterns for Text-Based Speaker Classification**, 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-May'22 **The Effect of Conditioning of Trigonometric Transformations of Dates with 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-Mar'19 **Single Image Haze Removal using Dark Channel Prior**, IIIT-Bh

- 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-Dec'23 **Artificial Intelligence, Operating Systems**, *Teaching Assistant*, UTD — Developing course materials, grading assignments, and holding doubt-clearing sessions.

Jan'22-May'22 **A Computational Introduction to Deep Learning**, *Grader and Mentor*, USC — Grading assignments, holding office hours, monitoring online forums, and project grading.

Academic Service

Reviewer

- British Machine Vision Conference (BMVC 2024)
- 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-May'23 **USC IEEE Graduate Society** — Attended group meetings, strengthened academic and social growth of the members, and hosted workshops.

Aug'20-Oct'20 **PyCon India 2020** — Content writer for social media handles, helped the promotions team, and created virtual swags.

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]