Sarthak Kumar Maharana

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Research Interests

Short summary: Computer Vision and Machine Learning. Core interests: Multimodal Learning, Inference-time/Test-Time Learning, Robustness, Continual Learning, Representation Learning.

Education

2023-Present **PhD in Computer Science**, *The University of Texas at Dallas*, Richardson, USA, *3.85/4.0*
Advisor: Dr. Yunhui Guo; **Expected graduation: 05/27**; Research Focus: Multimodal Learning, Data-Efficient Deep Learning, Computer Vision, Machine Learning.

2021-2023 **MS in Electrical Engineering**, *University of Southern California (USC)*, Los Angeles, USA, *3.85/4.0*
Track: Machine Learning and Data Science.

2016-2020 **BTech 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.*

Experiences

May'25-Aug'25 **Dolby Laboratories**, Sunnyvale, USA
PhD Research Intern — Sight Experiences Lab (Advanced Technology Group)
- Proposed a novel model-agnostic inference-time framework for robust continual audio-visual learning.

Aug'23- **Data-Efficient Intelligent Learning Lab**, *UTD*, Richardson, USA
Research Assistant — Advisor: Dr. Yunhui Guo
- Designed efficient test-time domain adaptation methods to enhance robustness to out-of-distribution data. [NeurIPS'25, ICCV 2025, AAAI'25 Oral]

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.

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.

Publications/Preprints

1 **AVROBUSTBENCH: Benchmarking the Robustness of Audio-Visual Recognition Models at Test-Time**

Sarthak Kumar Maharana, Saksham Singh Kushwaha, Baoming Zhang, Adrian Rodriguez, Songtao Wei, Yapeng Tian, and Yunhui Guo.

NeurIPS Datasets & Benchmarks Track 2025

[Paper][Code][Datasets][Project][Demo]

2 **BATCLIP: Bimodal Online Test-Time Adaptation for CLIP**

Sarthak Kumar Maharana, Baoming Zhang, Leonid Karlinsky, Rogerio Feris, and Yunhui Guo.

ICCV 2025

[Paper][Code][Project][Presentation]

3 **SELECT: A Submodular Approach for Active LiDAR Semantic Segmentation**

Ruiyu Mao, **Sarthak Kumar Maharana**, Xulong Tang, and Yunhui Guo.

[Under Review]

4 **PALM: Pushing Adaptive Learning Rate Mechanisms for Continual Test-Time Adaptation**

Sarthak Kumar Maharana, Baoming Zhang, and Yunhui Guo.

AAAI 2025 (Oral)

[Paper][Code][Project][Presentation]

5 **Variational Diffusion Unlearning: A Variational Inference Framework for Unlearning in Diffusion Models**

Subhodip Panda, MS Varun, Shreyans Jain, **Sarthak Kumar Maharana**, and Prathosh AP.

NeurIPS Safe Generative AI Workshop 2024

[Paper]

6 **STONE: A Submodular Optimization Framework for Active 3D Object Detection**

Ruiyu Mao, **Sarthak Kumar Maharana**, Rishabh K Iyer, and Yunhui Guo.

NeurIPS 2024

[Paper][Code]

7 **Not Just Change the Labels, Learn the Features: Watermarking Deep Neural Networks with Multi-View Data**

Yuxuan Li, **Sarthak Kumar Maharana**, and Yunhui Guo.

ECCV 2024

[Paper] [Code]

8 **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 Self-supervision in Audio, Speech, and Beyond Workshop 2024
[Paper] [Poster]

9 **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
[Paper] [Poster] [Talk]

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

BATCLIP: Bimodal Online Test-Time Adaptation for CLIP
1^{st} Workshop on Multimodal Continual Learning, ICCV 2025

PALM: Pushing Adaptive Learning Rate Mechanisms for Continual Test-Time Adaptation
AAAI'25 (Oral)

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

Workshop Organizer

- 1^{st} Workshop on Multimodal Continual Learning, ICCV'25
- 2^{nd} Workshop on Test-Time Adaptation: Putting Updates to the Test!, ICML'25

Invited Reviewer

- CVPR'25, ICLR'25, NeurIPS-W'24, BMVC'24, CVPR-W'24, ECCV'24, AAAI'24.

Volunteer Work

Nov'25- **Comets AI Research (CAIR)** — Working as a research advisor to BS/MS students.

May'24-Jul'24 **UTD CS K-12 Outreach Program** — Served as a mentor to 5 high school students to conduct research projects.

Aug'23-Aug'24 **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

2025 **Travel grant**, Scholarship offered by the IEEE/CVF society to present at ICCV 2025.

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]