

Tharinda Piyadasa

PhD Candidate · AI & Machine Learning Researcher

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RESEARCH SUMMARY

Doctoral researcher at the University of Sydney specialising in multimodal AI, computer vision, and acoustic/speech analysis. Experienced in applying deep learning, mathematical modelling, and image processing to real-world biomedical and linguistic challenges. Strong publication record across top-tier venues with hands-on expertise in end-to-end research pipelines, from data acquisition and model development to validation and dissemination.

RESEARCH INTERESTS

Computer Vision · Natural Language Processing (NLP) · Speech & Acoustic Analysis · Medical Imaging · Deep Learning · Multimodal Learning ·

EDUCATION

PhD, Electrical and Computer Engineering

Jun 2023 – Present

University of Sydney, Australia

- Research focus: 3D vocal tract modelling using real-time MRI, combining diffeomorphic deformation, deep learning segmentation, and acoustic validation.
- Supervisor group spans speech science, biomedical engineering, and clinical linguistics.

B.Sc. (Hons) in Computer Science — GPA 3.99 / 4.0

2018 – 2022

University of Colombo, Sri Lanka · Prof. Mohan Munasinghe Award: Highest GPA in Computer Science

RESEARCH & PROFESSIONAL EXPERIENCE

Doctoral Researcher / Casual Academic

Jun 2023 – Present

University of Sydney · Sydney, Australia

- Conducting original research on volumetric and real-time MRI-based 3D vocal tract modelling using constrained LDDMM (Large Deformation Diffeomorphic Metric Mapping) for dynamic morphing of speech articulators.
- Developing and evaluating deep learning models (CNNs, Transformers, Generative Models) for automated vocal tract segmentation, speech synthesis, and acoustic feature extraction.
- Designed and validated an acoustic analysis pipeline for vowel production using MRI-derived vocal tract geometry, integrating signal processing and machine learning methods.
- Published 6 papers across speech science, acoustic analysis, and biomedical imaging; collaborating with an interdisciplinary team of 10+ researchers.
- Teaching assistant for DATA2001, COMP9123, INFO1110, INFO5992, and INFO6007 - covering data structures, programming, and applied data science.

AI Research Engineer

May 2022 – May 2023

BooleanLabs · Sri Lanka

- Designed and deployed state-of-the-art AI solutions for client use cases spanning recommender systems, image processing, and computer vision, targeting publication-quality outcomes.
- Built a deep learning-based fabric recommender system combining multi-model fusion and image feature extraction, achieving strong performance on sparse interaction data.
- Developed a real-time suspiciousness detection system integrating YOLOv4-based concealed identity detection, helmet detection, and known-suspect recognition using TensorFlow and Keras.

Software Engineer Intern

Oct 2020 – Apr 2021

WSO2 LLC · Sri Lanka

- Member of the Ballerina Standard Library team; automated the Standard Library CI/CD build pipeline, reducing manual effort and improving release reliability.
- Designed and implemented the Ballerina SerDes package (serializer/deserializer) using Google Protocol Buffers (Proto3), enabling efficient typed data transfer across distributed systems.

PUBLICATIONS

Peer-Reviewed Conference & Journal Papers

- T. Piyadasa, M. Proctor, J. Glaunes et al. **"Morphoacoustic Modeling of a Dynamic 3D Vocal Tract Using MRI-Constrained Deformations and FEM Acoustics."** *Interspeech*, 2026.
- T. Piyadasa, J. Glaunes, M. Proctor, A. Gully et al. **"Constrained LDDMM for Dynamic Vocal Tract Morphing."** *Interspeech*, 2025.
- M. Proctor, T. Szalay, T. Piyadasa, C. Jin et al. **"Rhotic Articulation in Australian English: Insights from MRI."** *Interspeech*, 2025.
- T. Szalay, M. Proctor, A. Gully, T. Piyadasa et al. **"Lateral Channel Formation in Australian English /l/: Insights from MRI."** *Interspeech*, 2025.
- Y. Yue, M. Proctor, L. Zhou, R. Gupta, T. Piyadasa et al. **"Towards Speech Classification from Acoustic and Vocal Tract Data in Real-time MRI."** *Interspeech*, 2024.
- T. Piyadasa, M. Proctor, A. Gully et al. **"Acoustic Analysis of Vowel Production using Magnetic Resonance Imaging."** *SST (Australasian Speech Science & Technology)*, 2024.
- T. Szalay, M. Proctor, A. Gully, T. Piyadasa et al. **"Lateral Articulation across Vowel Contexts: Insights from Magnetic Resonance Imaging."** *SST*, 2024.
- T. Piyadasa, K. Gunawardana **"SOM-XG: Self-Organizing Map Based Resampling with Sample Extraction and Generation."** *ICTer*, 2023.
- T. Piyadasa, K. Gunawardana **"A Review on Oversampling Techniques for Solving the Data Imbalance Problem in Classification."** *ICTer*, 2023.
- T. Piyadasa, R. S. R. Silva, D. Kasthuriratna **"Recent Developments and Limitations in Recommender Systems: A Review."** *NILES*, 2022.

TECHNICAL SKILLS

Languages: Python, MATLAB, Java, Ballerina

ML / DL Frameworks: PyTorch, Keras, TensorFlow, Scikit-learn

Data & Tools: NumPy, Pandas, SQL, Jupyter Notebooks, Git, AWS, OpenCV

AWARDS & ACHIEVEMENTS

- Prof. Mohan Munasinghe Award for Computer Science — Highest GPA, University of Colombo (2022)
- Champion, International Conference in Data Science 2021 Mini Hackathon — University of Colombo / Creative Software
- Winner, Wi-Fi Based Indoor Localisation Competition — ISSAI, Nazarbayev University (2021)
- Director's List, Academic Performance Award — University of Colombo (2018)

SELECTED ACTIVITIES & VOLUNTEER EXPERIENCE

- Mentor, HSC Science Extension Mentoring Program — Faculty of Science, University of Sydney (2023–present)
- Participant, Cornell–Maryland–Max Planck Pre-doctoral Research School (CMMRS 2021), Max Planck Institute for Software Systems, Germany
- Participant, AUA–NU Overseas Study Program, Nazarbayev University, Kazakhstan (2021)
- Mentor, Monitored C++ Training Program — National Olympiad in Informatics (2019)

REFERENCES

Available upon request.