

“YASHISH” MADUWANTHA, H P E R S

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EDUCATION

University of Maryland College Park Maryland, USA
PhD, Electrical Engineering December 2023

Dissertation : Towards Extending Acoustic-to-Articulatory Speech Inversion and Learning
Articulatory Representations

Advisers : Prof. Carol Espy-Wilson and Prof. Shihab Shamma

University of Maryland College Park Maryland, USA
Master of Science, Electrical Engineering December 2022

University of Moratuwa Moratuwa, Sri Lanka
B.Sc. (Hons), Biomedical Engineering April 2017

- GPA 3.73/4.2 (First Class Honors)

FIELDS OF INTEREST

- Articulatory Speech Production
- Speech Enhancement and Audio Noise Suppression
- Speech and Music Synthesis
- Multi-modal Systems
- Speech in Mental Health

PROFESSIONAL EXPERIENCE

OmniSpeech LLC (<https://www.omni-speech.com/>) College park, MD
Digital Signal Processing/Machine Learning Engineer January 2024 - present

- Improving speech intelligibility of hearing aid devices
- Research and development into light-weight speech enhancement and audio noise enhancement systems

University of Maryland College park, MD
Graduate Research Assistant(Speech Communication Lab <https://scl.umd.edu/>) August 2019 –Dec2023

- Working on incorporating nasal and glottal parameters to the existing speech inversion frameworks
- Developed an unsupervised/semi-supervised learning algorithm inspired by the sensorimotor interactions in human brain to learn control parameters to drive an articulatory/audio synthesizer.
- Improved Acoustic-to-Articulatory speech inversion systems with data augmentation and multi-task learning frameworks
- Developed a LSTM based classification model incorporating vocal tract variables predicted by an Acoustic-to-Articulatory Speech inversion system for mispronunciation detection in children’s speech
- Developed and fine tuned an articulatory speech synthesizer to synthesize continuous speech from articulatory trajectories in a speaker-independent fashion.
- Implemented a multimodal CNN with vocal tract variables and Facial Action Units for assessing articulatory coordination in speech to detect positive symptoms in schizophrenia.
- Developed a multimodal speech emotion recognition system with articulatory coordination features and text embedding.

Dolby Laboratories (<https://www.dolby.com/>) San Francisco, CA
Research Intern in Multimodal science team June 2023 - Sep 2023

- Developed a foreign accent conversion system with voice conversion transformers (PyTorch, Hifi-GAN, ESPnet, HuBERT, AWS Sagemaker)
- Patent filed for the proposed accent conversion system which outperformed the state-of-the-art system

Skylyte (<https://www.skylyte.com/>)

New York city, NY

ML Engineer Intern

May 2022- Aug 2022

- Conducted a detailed analysis on vocal biomarkers to identify the best predictors of burnout and resilience
- Developed ML models to classify different levels of burnout, resilience, valence and arousal of speech collected from people working in teams at corporate settings
- Designed and started a speech data collection to capture burnout symptoms at work place

Synergen Technology Labs (<https://www.synergentl.com/>)

Nugegoda, Sri Lanka

Research Engineer

May 2017- July 2018

- Developed (and delivered) the communication interface for a wearable ring for capturing PPG and motion signals for a cardiac arrest monitoring system by Rodin Scientific (<https://www.rodinscientific.com/>)
- Programmed and developed an android mobile app to communicate with a wearable baby monitor device via BLE and to calculate parameters like heart rate, respiratory rate and SpO2 level from the PPG signal.

Research Intern

Oct 2015- April 2016

- Worked on establishing the data communication protocol between a custom developed mobile app and an Insole with pressure sensors to detect pressure variation in the foot for diabetic foot ulcer detection.

University of Moratuwa

Katubedda, Sri Lanka

Undergraduate Research project

June 2016- April 2017

- Developed a hardware and a software platform to acquire and process “Peripheral Arterial Tonometry” and “Digital thermal monitoring” signals to non-invasively predict the cardiovascular health.
- Extracted the Auditory Brainstem Response (ABR) from ongoing EEG signals to measure the magnitude and latency of significant wave peaks to determine the hearing loss in infants.

PUBLICATIONS

-**Yashish M. Sirwardena**, Carol Espy-Wilson, Shihab Shamma. “Learning to Compute the Articulatory Representations of Speech with the MirrorNet”, in proceedings of Interspeech 2023.

-**Yashish M. Sirwardena**, Carol Espy-Wilson, Suzanne Boyce, Mark K. Tiede, Liran Oren. “Speaker-independent Speech Inversion for Estimation of Nasalance”, in proceedings of Interspeech 2023.

-**Yashish M. Sirwardena***, Nina R Benway*, Jonathan L Preston, Elaine Hitchcock, Tara McAllister, Carol Espy-Wilson. “Acoustic-to-Articulatory Speech Inversion Features for Mispronunciation Detection of /ɪ/ in Child Speech Sound Disorders”, in proceedings of Interspeech 2023.

-**Yashish M. Sirwardena**, Carol Espy-Wilson. “The Secret Source : Incorporating Source Features to Improve Acoustic-to-Articulatory Speech Inversion”, in proceedings of International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2023.

-**Yashish M. Sirwardena**, Ahmed Adel Attia, Ganesh Sivaraman, Carol Espy-Wilson. “Audio Data Augmentation for Acoustic-to-Articulatory Speech Inversion”, in proceedings at European Signal Processing Conference (EUSIPCO) 2023.

-**Yashish M. Siriwardena**, Ganesh Sivaraman, Carol Espy-Wilson. “Acoustic-to-articulatory Speech Inversion with Multi-task Learning”, in proceedings of Interspeech 2022.

-**Yashish M. Sirwardena**, Guilhem Marion, Shihab Shamma. “The MirrorNet: Learning Audio Synthesizer Controls Inspired by Sensorimotor Interactions”, in proceedings of International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2022.

-**Yashish M. Siriwardena**, Nadee Seneviratne, Carol Espy-Wilson. “Emotion Recognition with Articulatory Coordination Features”, at 181st meeting of Acoustical Society of America 2021.

-**Yashish M. Siriwardena**, Carol Espy-Wilson, Deanna L. Kelly, Chris Kitchen. “Multimodal Approach for Assessing Neuromotor Coordination in Schizophrenia using Convolutional Neural Networks”, in Proceedings of the ACM International Conference on Multimodal Interaction (ACM ICMI 2021).

-**Yashish M. Siriwardena**, Carol Espy-Wilson, Deanna L. Kelly, Chris Kitchen. “Inverted Vocal Tract Variables and Facial Action Units to Quantify Neuromotor Coordination in Schizophrenia”, in 12th International Seminar on Speech Production (ISSP 2020)

- **H.P.E.R.S.Y Maduwantha**, I.M.D Karunathilake, S. Jayasinghe, A.C. De Silva (MIEEE). “Analysis of Parameters derived from Peripheral Arterial Tonometry and Digital Thermal Monitoring Signals for Assessing Endothelial Dysfunction”, in 4th IEEE Healthcare Innovations and Point-Of-Care Technologies conference 2017.

-**H.P.E.R.S.Y Maduwantha**, I.M.D Karunathilake, S. Jayasinghe, A.C. De Silva (MIEEE). “A System to Assess Endothelial Dysfunction by Combining Peripheral Arterial Tonometry with Digital Thermal Monitoring” in 12th IEEE International Conference on Industrial and Information Systems 2017

TEACHING EXPERIENCE

University of Maryland

College park, MD

Graduate Teaching Assistant

August 2018 – May 2020

• ENEE 645: Compilers and Optimization

2020 Spring

• ENEE 322: Signals and Systems

2019 Fall, 2019 Spring

• ENEE 222: Elements of Discrete Signal Analysis

2018 Fall

TECHNICAL SKILLS

• Programming Languages

Coding experience: Python, C, C++, Java, Matlab, Arduino

• Software and Systems

- PyTorch, TensorFlow/keras deep learning frameworks

- Praat and wavesurfer audio processing tools

- Librosa, pyAudio Analysis, Scipy, Scikit-learn, Pandas python packages

- Android mobile app development

- Google Speech-to-text API

- AWS sagemaker

INVITED TALKS

- Gave a talk on “The MirrorNet: Learning Speech Production and Perception through Sensorimotor Interactions” at the Center for Hearing Research journal club in University of California, Irvine.

HONORS AND AWARDS

-Accepted to IEEE ICASSP Rising stars in Signal Processing program for outstanding PhD thesis work

-Awarded with Jacob K. Goldhaber Travel Award to attend Interspeech 2022.

-Awarded Acoustical Society of America (ASA) travel grant and Jacob K. Goldhaber Travel Award to attend 181st meeting of Acoustical Society of America 2021.

-Awarded with the “Mahapola Higher Education (Merit) Scholarship” for being in the top 100 in the country (out of ~40000 candidates) in G.C.E Advance Level Examination 2011 from the Mathematics stream.

-Awarded with the “Sisu Udana Scholarship Award” and “Dialog Merit Scholarship” for being 7th out of ~0.4 million candidates in G.C.E Ordinary Level Examination 2008.

PROFESSIONAL AFFILIATIONS AND ACTIVITIES

- Reviewer, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2024

- Reviewer, 13th International Seminar on Speech Production 2024

- Past chair at the IEEE Robotics and Automation Society University of Moratuwa, Sri Lanka.

- Past field representative in the Biomedical Engineering 12th batch.

- University category organizer of Sri Lanka Robotics Challenge(SLRC) 2014.

- Main organizing committee member of MERCon (2nd Multi-disciplinary Engineering Research Conference) 2015, at University of Moratuwa, Sri Lanka.

- Main organizing committee member in International IEEE Region 10 Congress 2015.

- Student member of Acoustical Society of America and IEEE signal processing society.