"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, Prof. Shihab Shamma)

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

University of Moratuwa — Moratuwa, Sri Lanka
Bachelor of Science (Honours), Biomedical Engineering — April 2017

FIELDS OF INTEREST

- Speech enhancement and audio noise suppression
- Audio deepfake detection
- Speech and Music synthesis
- Voice and accent conversion
- Multi-modal systems
- Vocal biomarkers for mental health

PROFESSIONAL EXPERIENCE

OmniSpeech LLC (https://www.omni-speech.com/) — College Park, MD
Senior Research Engineer — January 2024 - present

- Research and development into light-weight speech enhancement and audio noise suppression systems
  1. Delivered a speech enhancement system to suppress background and machine noise of MRI to improve communication between operator and subject inside the MRI
  2. Developed a full band (48kHz) audio noise suppression system to be used in a PC/cloud based video conferencing tool
- Research and development into audio deepfake detection systems
  1. Developed a deep fake detection system which has the best 'single' system performance (EER, min DCF) for the open condition in ASVspoof5 (2024) challenge.
  2. Research and development into interpretable acoustic features for audio deepfake detection
- Developing an API that can be used to extract a key set of vocal biomarkers from speech.

University of Maryland — College Park, MD
Graduate Research Assistant(Speech Communication Lab https://scl.umd.edu/) — May 2020 –Dec2023

- Developed a self-supervised features based (HuBERT) speaker-independent speech inversion system to estimate nasal and glottal activity in speech.
- 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 DNN based classification model incorporating vocal tract variables estimated 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 an speaker-independent fashion.
- Implemented a multimodal pipeline with vocal tract variables and Facial Action Units for assessing articulatory coordination in speech to detect positive symptoms in schizophrenia.

- Developed a mutimodal 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 Audiotory Brainstem Response (ABR) from ongoing EEG signals to measure the magnitude and latency of significant wave peaks to determine the hearing loss in infants.

SELECTED PUBLICATIONS

-**Yashish M. Siriwardena**, Suzanne E. Boyce, Mark K. Tiede, Liran Oren, Brittany Fletcher, Michael Stern, Carol Y. Espy-Wilson, “Speaker-independent speech inversion for recovery of velopharyngeal port constriction degree”. J. Acoust. Soc. Am. 1 August 2024; 156 (2): 1380–1390.
-**Yashish M. Siriwardena**, Nathan Swedlow, Audrey Howard, Evan Gitterman, Dan Darcy, Carol Espy-Wilson, Andrea Fanelli, “Accent Conversion with Articulatory Representations”, in proceedings of INTERSPEECH 2024
-Gowtham Premananth, **Yashish M. Siriwardena**, Phillip Resnik, Sonia Bansal, Deanna L. Kelly, Carol Espy-Wilson, “A Multimodal Framework for Assessment of Schizophrenia Spectrum”, in proceedings of INTERSPEECH 2024
-**Yashish M. Siriwardena***, Ahmed Adel Attia*, Carol Espy-Wilson, “Improving Speech Inversion Through Self-Supervised Embeddings and Enhanced Tract Variables”, in proceedings of European Signal Processing Conference (EUSIPCO) 2024
-Gowtham Premananth, **Yashish M. Siriwardena**, Philip Resnik, Carol Espy-Wilson, “A multi-modal approach for identifying schizophrenia using cross-modal attention”, in proceedings of 46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) 2024
-**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 /ɹ/ 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, 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).

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
  - ONNX runtime, executorch runtime for DSPs
  - Praat and wavesurfer audio processing tools
  - Librosa, pyAudio Analysis, Scipy, Scikit-learn, Pandas python packages
  - AWS sagemaker

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, "Speech Communication" Journal
- Reviewer, International Speech Communication Association's INTERSPEECH 2024.
- Reviewer, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)
- Reviewer, 13th International Seminar on Speech Production 2024.
- Past chair at the IEEE Robotics and Automation Society University of Moratuwa, Sri Lanka.
- University category organizer of Sri Lanka Robotics Challenge(SLRC) 2014.