Lucas Goncalves

Dallas, TX

goncalves@utdallas.edu

U.S. Permanent Resident

linkedin.com/in/ilucasgoncalves

ilucasgoncalves.github.io

Education

THE UNIVERSITY OF TEXAS AT DALLAS, Richardson, Texas — Expected

Ph.D. in Electrical Engineering, **GPA 4.00/4.00** — Dec 2024

THE UNIVERSITY OF TEXAS AT DALLAS, Richardson, Texas

M.S. in Electrical Engineering – Signals and Systems, **GPA 4.00/4.00**

UNIVERSITY OF WISCONSIN – PLATTEVILLE, Platteville, Wisconsin

B.S. in Electrical Engineering, **GPA 3.67/4.00**

Work Experience

Applied Scientist Intern, Amazon Web Services (AWS) AI Lab, Santa Clara, CA — June 2023 – Sept 2023

-Part of AWS Transcribe Team working on multimodal learning

Research Assistant, Multimodal Signal Processing (MSP) Lab, Richardson, TX — Sept 2020 – Present

-Currently working on developing machine learning algorithms for studying expressive behavior. My research topics include emotion recognition, self-supervised learning, multimodal modelling, handling missing modalities, and audio and video signal processing.

-Collecting the largest spontaneous speech emotion dataset based on real-world podcast audios.

Electrical Design Engineer, Seagrave Fire Apparatus LLC, Clintonville, WI — Jan 2019 – Aug 2020

-Principal electrical engineer on research and development of new generation of Seagrave's fire apparatus. Coordinated with mechanical and hydraulics teams updates needed to implement CAN bus J1939 protocol rate change-over from 250 to 500 kbits/s.

-Developed a database to enable easy access from other teams to electrical parts and reduce time spent consulting with electrical engineers.

Student Researcher, Pioneer Speech Signal Processing Lab, Platteville, WI — Jan 2018 – Dec 2018

-Researched statistical methods used in machine learning clustering algorithms. Studied and implemented different clustering algorithms in MATLAB, such as, k-means and hierarchical clustering.

Publications

Lucas Goncalves, Seong-Gyun Leem, Wei-Cheng Lin, Berrak Sisman, and Carlos Busso, "Versatile audiovisual learning for handling single and multi modalities in emotion regression and classification tasks," ArXiv e-prints (arXiv:2305.07216), pp. 1-14, May 2023.

Wei-Cheng Lin, Lucas Goncalves, and Carlos Busso, "Enhancing Resilience to Missing Data in Audio-Text Emotion Recognition with Multi-Scale Chunk Regularization," ACM International Conference on Multimodal Interaction (ICMI), Paris, France, October 2023.

Shreya G. Upadhyay, Woan-Shiuan Chien, Bo-Hao Su, **Lucas Goncalves**, Ya-Tse Wu, Ali N. Salman, Carlos Busso, and Chi-Chun Lee, "An Intelligent Infrastructure Toward Large Scale Naturalistic Affective Speech Corpora Collection" International Conference on Affective Computing and Intelligent Interaction (ACII 2023), Cambridge, MA, USA, Sept. 2023.

Huang-Cheng Chou, **Lucas Goncalves**, Seong-Gyun Leem, Chi-Chun Lee, and Carlos Busso, "The importance of calibration: Rethinking confidence and performance of speech multi-label emotion classifiers," In Interspeech 2023, Dublin, Ireland, August 2023.

Lucas Goncalves and Carlos Busso, " Learning Cross-modal Audiovisual Representations with Ladder Networks for Emotion Recognition," in IEEE international conference on acoustics, speech and signal processing (ICASSP 2023), Rhodes Island, Greece, June 2023.

Lucas Goncalves and Carlos Busso, " Robust Audiovisual Emotion Recognition: Aligning Modalities, Capturing Temporal Information and Handling Missing Features," IEEE Transactions on Affective Computing, vol. 13(4): 2156-2170, 2022.

Lucas Goncalves and Carlos Busso, " Improving Speech Emotion Recognition Using Self-Supervised Learning with Domain-Specific Audiovisual Tasks" in Interspeech 2022, Incheon, Korea, September 2022.

Lucas Goncalves and Carlos Busso, " AuxFormer: Robust Approach to Audiovisual Emotion Recognition" in IEEE international conference on acoustics, speech and signal processing (ICASSP 2022), Singapore, May 2022.

Relevant Coursework

- Speech & Speaker Recognition
- Probability, Random Variables and Statistics
- Digital Signals Processing

- Machine Learning & Pattern Recognition
- Digital Image Processing
- Applied Digital Signal Processing

Academic Projects

Real-Time Noise Reduction App   **C++**   **Fall 2021**
Implemented an Android smartphone app that implements functions used in hearing aids consisting of wide dynamic range compression (WDRC) and noise reduction (NR). The application was designed to process audio in real-time with a sampling frequency of 48k Hz and where each input frame has 256 samples. Each input audio frame is processed by the voice activity detection (VAD) and sound pressure level (SPL) functions, which measures the probability of speech presence and SPL for each frame.

Pac-Man in VHDL   **VHDL**   **Fall 2018**
Implemented the PACMAN game on a FPGA using VHDL. The game was controlled by push buttons and switches on a DE2board. Incorporated clock dividing, memory initialization file reading, and debugging techniques into the project. Interfaced FPGA with a monitor using a VGA output. Available at: github.com/ilucasgoncalves/PacMan-VHDL

Automatic Audio Signal Denoising   **MATLAB/DSP**   **Spring 2018**
Implemented algorithm in MATLAB to perform spectral subtraction-based noise suppression. Estimated the average amplitude spectrum noise and applied spectral subtraction with full-wave rectification of signals. Performed time-domain signal reconstruction from short-term spectra using the overlap-and-add method.

Power Line IoT Monitoring System   **Analog Design/LabVIEW**   **Spring 2018**
Designed and implemented a power line monitoring system to monitor current, temperature, inclination, and tension on a power line. Responsible for designing and soldering PCB board for the monitoring system. Designed and implemented a testing environment for low power transducers in LabVIEW.

Technical Skills

Languages	:	Python, MATLAB, Verilog, VHDL, C++, HCS12
Operating Systems	:	Linux, Windows, macOS, AS/400
Frameworks & Tools	:	Pytorch, TensorFlow, Kaldi, OpenCV, SolidWorks, AutoCAD, LabVIEW, IQAN

Teaching Experiences & Professional Services

Teaching Assistant, University of Wisconsin – Platteville   Fall 2017 – Fall 2018
  • ELECTENG 3780 - Introduction to Microprocessors
  • ELECTENG 3770 - Logic and Digital Design

Reviewer: IEEE-Transactions for Affective Computing, Interspeech, and ICASSP

Invited Talks:

Lucas Goncalves, Hynek Bořil, "New Methods and Advancements in Deep Learning", invited talk, Center for Robust Speech Systems (CRSS), The University of Texas at Dallas, December 12, 2019.

Lucas Goncalves, Brandon Dane, Henry Breaker, Hynek Bořil, "Classification using Clustering; K-means and Hirearchical Clustering", invited talk, Center for Robust Speech Systems (CRSS), The University of Texas at Dallas, December 6, 2018.

Activities & Awards

Excellence in Education Doctoral Fellowship	May 2022
International Student & Scholar Services, Officer	Aug 2017 – May 2018
International Club Scholarship	Aug 2017; Aug 2018
Phi Theta Kappa International Honor Society, President	Aug 2014 – May 2016
Success Center Student Highlight of the Year	2016
All USA and All Illinois Academic Team	Jan 2016