

Matthew Perez

TECHNICAL PROFILE

Expert in leveraging advanced machine learning models for practical speech and language applications. Specific applications include automatic speech recognition, speech synthesis, quantitative speech analysis, and emotion recognition. Skilled in data-driven analysis for health, behavior, and mood insights, with a solid background in multimodal systems, transformer-based models, and end-to-end machine learning pipeline development.

EDUCATION

Ph.D. in Computer Science and Engineering, University of Michigan, 2024 (*expected*)

M.S. in Computer Science and Engineering, University of Michigan, 2019

B.S. in Computer Science, University of Notre Dame, 2017, *Cum Laude*

RESEARCH EXPERIENCE

Computational Human Artificial Intelligence Lab (*University of Michigan*) Present

Engineered robust speech-based machine learning systems for ASR and error-characterization in low-resource and challenging acoustic environments. Conducted research on error analysis and anomaly detection in speech patterns, leading to enhanced model interpretability and reliability. Experienced with interdisciplinary collaboration efforts between ML and healthcare professionals.

PROFESSIONAL EXPERIENCE

Google (*Speech Synthesis Team*) 2022

Developed and trained a seq2seq model for grapheme-to-phoneme conversion, integrating language identification to leverage multilingual datasets. This led to performance improvements in all tested languages and up to 30% improvement in low-resource settings. This work led to a publication at Interspeech 2023.

Cogito Corporation (*Speech/Signals Team*) 2021

Developed a novel approach for multimodal speech emotion recognition utilizing AWS cloud infrastructure. Demonstrated that incorporating paralinguistic events, such as silence, within a BERT language model, resulted in a 14.6% improvement in emotion recognition performance. This work led to a publication at Interspeech 2022.

MIT Lincoln Laboratory (*Bioengineering Tech Systems Group*) 2019

Applied machine learning to develop speech-based biomarkers for neurological conditions such as depression. Led a project to identify and quantify articulatory features that correlate with mental health states, contributing to a predictive analytics platform used for early detection and intervention strategies.

Garmin (*iOS team*) 2016

Implemented and deployed *Today Extensions* for the Garmin Connect Mobile app, which syncs and displays wearable health information like steps, activities, goals etc.

PUBLICATIONS

- **Matthew Perez**, Duc Le, Amrit Romana, Keli Licata, Elise Jones, Emily Mower Provost. "Seq2seq models for automatic paraphasia detection". Transactions on Audio, Speech, and Language 2023
- Yang Yu, **Matthew Perez**, Ankur Bapna, Fadi Haik, Siamak Tazari, Yu Zhang. "PronScribe: Highly accurate multimodal phonemic transcription from speech and text". Interspeech 2023
- **Matthew Perez**, Mimansa Jaiswal, Minxue Niu, Cristina Gorrostieta, Reza Lotfian, John Kane, Emily Mower Provost. "Mind the gap: On the value of silence representations to lexical-based speech emotion recognition". Interspeech 2022.
- **Matthew Perez**, Amrit Romana, Noelle Carozzi, Praveen Dayalu, Jennifer Ann Miner, Angela Roberts, and Emily Mower Provost. "Articulatory Coordination for Speech Motor Tracking in Huntington Disease" Interspeech 2021.
- Zakaria Aldeneh, **Matthew Perez**, and Emily Mower Provost. "Learning Paralinguistic Features from Audiobooks through Style Voice Conversion" NAACL 2021.
- **Matthew Perez**, Zakaria Aldeneh, and Emily Mower Provost. "Aphasic Speech Recognition using a Mixture of Speech Intelligibility Experts" Interspeech 2020.
- **Matthew Perez**, Wenyu Jin, Duc Le, Noelle Carozzi, Praveen Dayalu, Angela Roberts, and Emily Mower Provost. "Classification of Huntington's Disease Using Acoustic and Lexical Features." Interspeech 2018.
- Louis Daudet, Nikhil Yadav, **Matthew Perez**, Christian Poellabauer, Sandra Schneider, Alan Huebner. "Portable mTBI Assessment Using Temporal and Frequency Analysis of Speech." IEEE Journal of Biomedical and Health Informatics 2017.