Liang-Yuan "Leo" Wu

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Overview

Working at the intersection of HCI and AI, where I apply human-centered principles to advance audio AI—particularly in automatic speech recognition, environmental sound understanding, and natural language processing—with an emphasis on accessibility for deaf and hard of hearing (DHH) individuals.

Education

University of Michigan Sep 2022 - May 2024
Master of Science in Computer Science & Engineering *Michigan, USA*

National Taiwan University Sep 2017 - Aug 2021
Bachelor of Science in Electrical Engineering *Taipei, Taiwan*

Research Experience

Soundability Lab May 2023 – Present
Research Assistant, advised by Prof. Dhruv Jain *Michigan, USA*

- Led **4** projects integrating machine learning, HCI, and medical school collaboration to design **accessible AI systems**; first author on **1 filed patent, 4 published paper, and 2 under-submission papers**; co-authored 2 additional papers.
- Developed a real-time speech-to-text captioning system for lab meetings and clinical scenarios, improving accessibility and communication for DHH researchers and patients.

Computational Human Artificial Intellgience Lab Aug 2022 – Apr 2023
Student Researcher, advised by Prof. Emily Mower Provost *Michigan, USA*

- Developed speech emotion recognition models using multimodal approaches, incorporating silence tokens and audio energy features to improve activation state prediction and emotion classification.
- Applied domain adversarial loss to enable personalized emotion recognition by mitigating speaker-dependent biases across diverse user data.

Speech Processing and Machine Learning Laboratory Aug 2019 – Aug 2021
Student Researcher, advised by Prof. Lin-Shan Lee and Prof. Hung-Yi Lee *Taipei, Taiwan*

- Developed a Mandarin **ASR** training pipeline and investigated code-switching speech patterns, presenting findings at Machine Learning Summer School 2021.
- Implemented and demonstrated explainable AI algorithms in natural language processing and computer vision, delivering these as interactive homework examples in a machine learning course with **1,000+** students.

Publications

* indicates Equal Contribution [C#] = Conference Paper [P#] = Short Paper [U#] = Under Review / Preprint

[C4] ***Liang-Yuan Wu*** and Dhruv Jain, **"SoundNarratives: Rich Auditory Scene Descriptions to Support Deaf and Hard of Hearing People"**, *to appear in Proceedings of the 27th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '25).*

[C3] ***Liang-Yuan Wu***, Andrea Kleiver, Dhruv Jain, **"CARTGPT: Real-Time Correction of CART Captions Using Large Language Models"**, *to appear in Proceedings of the 27th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '25).* **Best Paper Honorable Mention**

[C2] Jeremy Zhengqi Huang, Caluã de Lacerda Pataca, **Liang-Yuan Wu**, Dhruv Jain, **"CapTune: Adapting Non-Speech Captions With Anchored Generative Models"**, *to appear in Proceedings of the 27th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '25).*

[C1] Jeremy Zhengqi Huang, Jaylin Herskovitz, ***Liang-Yuan Wu***, Cecily Morrison, Dhruv Jain, **"Weaving Sound Information to Support Real-time Sensemaking of Auditory Environments: Co-designing with a DHH User"**, *in Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25).*

[P3] ***Liang-Yuan Wu*** and Dhruv Jain, **"EvolveCaptions: Real-Time Collaborative ASR Adaptation for DHH Speakers"**, *to appear in Proceedings of the 27th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '25).*

[P2] Jeremy Zhengqi Huang, Caluã de Lacerda Pataca, **Liang-Yuan Wu**, Dhruv Jain, **"Demo of CapTune: Adapting Non-Speech Captions With Anchored Generative Models"**, *to appear in Proceedings of the 27th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '25).*

[P1] ***Liang-Yuan Wu***, Andrea Kleiver, Dhruv Jain, **"CARTGPT: Improving CART Captioning using Large Language Models"**, *in Proceedings of the 26th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '24)* . **Best Poster Award**

[U2] ***Liang-Yuan Wu*** and Dhruv Jain, **"EvolveCaptions: Empowering DHH Users Through Real-Time Collaborative Captioning"**, *under review in CHI '26*.

[U1] Sarah E Hughes*, ***Liang-Yuan Wu****, Lindsay J Ma, Dhruv Jain, Michael M McKee, **"Assessing the Role of Medical Caption Technology to Support Physician-Patient Communication for Patients with Hearing Loss: A Pilot Study"**, *under review in JMIR Rehabilitation and Assistive Technologies*.

Selected Projects

SoundNarratives | *Python, Huggingface, React.js, Flask, Google Cloud Platform* [GitHub]
- Optimized an audio-language model for auditory scene descriptions through **prompt engineering** based on DHH user needs.
- Conducted qualitative and quantitative evaluations with DHH participants, showing strong preference for the system.

CARTGPT | *PyTorch* [Poster, GitHub]
- Developed a real-time caption correction system powered by **LLM**s, improving human captioners (CART) and ASR models.
- Achieved a **17.3%** (ASR) and **5.6%** (CART) WER reduction in noisy conditions, enhancing accuracy in challenging environments.

AdaptiveSound | *TensorFlow, Kotlin, Android Studio* [Paper, GitHub]
- Developed a mobile app for Android, with on-device **TensorFlow Lite** model and a reinforcement-learning feedback loop.
- Released open-source and used by DHH participants in user study, improving model accuracy by **14%**.

Personalizable Speech-Centered Emotion Classifiers | *PyTorch*
- Built multimodal speech emotion recognition models, integrating speech, text, and silence.
- Utilized audio energy analysis and domain adversarial loss to improve speaker adaptation for personalized emotion classification.

Code-Switching Text Data Augmentation | *PyTorch, Transformers* [Poster]
- Designed a synthetic code-switching text generation pipeline for Mandarin-English.
- Leveraged multilingual models (MT5, MBERT), achieving a **2.8%** reduction in perplexity compared to baseline methods.

Work Experience

Ucarer Inc. May 2021 – Aug 2021
AI Platform Engineer Intern *Taipei Taiwan*
- Developed a backend system using **JavaScript** and **PHP** for an e-commerce platform to assist Sarcopenia patients in scheduling physical therapy sessions and purchasing health-supportive foods.
- Built a customer relationship management system using **PyTorch** to analyze time-series data, enabling dynamic evaluation and ranking of customer needs based on health engagement patterns.

Dragon Cloud AI May 2020 – May 2021
Machine Learning Engineer Intern (remote) *California, USA*
- Developed an **AWS**-based speech processing software to transcribe classroom recordings, detecting English portions in Mandarin-English bilingual classrooms to analyze teaching effectiveness.
- Implemented an English accent scoring system using **PyTorch**, providing automated numerical feedback to assist non-native speakers in evaluating their pronunciation.

Talk

Automatic Speech Recognition in Clinical Care Oct 2024
Presented in Disability Research Symposium, hosted by the CDHW, Michigan Medicine.

Improving User Experience in Speech Recognition with Large Language Model Oct 2023
Presented in 2023 AI Symposium, hosted by the AI Lab, University of Michigan.

Code-Switching Text Data Augmentation Aug 2021
Presented in Machine Learning Summer School 2021.

Honors

Best Paper Honorable Mention (10/83), ASSETS '25 Aug 2025

Best Poster Award (1/44), ASSETS '24 Oct 2024

Dean's List, NTU Dec 2021

Y.L. Lin Scholarship ($15,000), NTU Jul 2021

Outgoing Exchange Student Scholarship ($2,500), NTU Dec 2020

Social Devotion Special Award, NTU Nov 2020

2nd Prize, Undergraduate Innovation Award, NTUEE Jun 2020

Teaching Experience

EECS 592 Foundations of AI (Fall 2023) Aug 2023 – Dec 2023
Graduate Student Instructor *University of Michigan*

EE 5184 Machine Learning (Spring 2021) Feb 2021 – Jun 2021
Teaching Assistant *National Taiwan University*

EE 1006 Cornerstone EECS Design and Implementation (Spring 2020) Feb 2020 – Jun 2020
Teaching Assistant *National Taiwan University*

Services

ICWSM Reviewer Jun 2024

Discover Engineering Workshop Volunteer Aug 2023

Xplore Engineering Workshop Lecturer Jul 2023

Technical Skills

Programming Languages: Python, C++, Javascript, HTML/CSS, Kotlin
Machine Learning: PyTorch, TensorFlow, Huggingface, Transformers
Fullstack Development: React.js, Node.js, Flask, FastAPI
Tools & Platforms: GCP, AWS, SQL, Git, Docker