Siwen (Sivan) Ding

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Brooklyn, NY - 11238, USA

RESEARCH INTERESTS

- Machine Perception: Multi-modal Deep Learning, Spatial Audio, Music Informatics
- Audio Representation Learning: Compositionality, Disentanglement, and Generalizability

EDUCATION

New York University

Sep 2023 – Jun 2028 (Expected)

2nd year Ph.D. in Computer Science at Music and Audio Research Lab, GPA: 4.0/4.0

New York, NY

Computer Vision, 3D Audio, Music Information Retrieval, Digital Signal Processing, Machine Learning

Columbia University

Sep 2021 - Dec 2022

Master of Science in Data Science, GPA: 3.4/4.0

New York, NY

· Algorithm, Statistical Inference, Computer System, Deep Learning, Reinforcement Learning, Music Signal Processing

• Wuhan University

Sep 2017 - Jun 2021

Bachelor of Engineering in Energy and Power Engineering (Track: Thermal Engineering), GPA: 3.8/4.0

Wuhan, CN

 $\circ \ Advanced \ Mathematics, \ Mechanics, \ Electronics, \ Dynamics, \ Automatic \ Control, \ Computational \ Fluid \ Dynamics$

EXPERIENCE

• Dolby Laboratories [Uldeo to Spatial Audio Generation

May 2024 - Aug 2024

Research Intern with Mark Thomas and Lie Lu

San Francisco, CA

- Engineered a 360° video to spatial audio generation paradigm using diffusion, spatial audio codecs, and contrastive learning
- Proposed a novel weighted group residual vector quantization cross-entropy loss with ablation analysis
- Dolby Laboratories [| Robust User Localization in Dolby Atmos FlexConnect

 Acoustic Mapping Intern with Avery Bruni and Mark Thomas

Jan 2023 – May 2023

San Francisco, CA

- Repurposed speech enhancement model to improve DOA prediction robustness in user localization in reverberant rooms
- Designed and implemented novel PCM covariance matrix mask, leading to a 62% improvement in localization accuracy

PROJECTS

Self-Supervised Multi-View Learning for Disentangled Music Representations (ISMIR LBD 2024)

Aug 2024- Oct 2024

Music and Audio Research Lab, NYU (with Julia Wilkins, Juan Bello, and Magdalena Fuentes)

• Architected a self-supervised multi-view learning framework to disentangle audio features, focusing on timbre and frequency

- Demonstrated improved classification of music attributes and separation of subspaces through controlled experiments
- Soundscape Simulation, Augmentation and Visualization (ICASSP 2024)

Jul 2023 - Dec 2023

Music and Audio Research Lab, NYU (with Iran Roman, Chris Ick, Brian McFee, and Juan Bello)

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- · Developed a Python library for data simulation, augmentation, spatialization, and visualization of spatial audio
- Conducted ablation studies with DCASE SELD challenge to manifest 37% improvement of augmentation over baseline
- Voice Anti-Spoofing and Audio Deepfake Detection (ICASSP 2023)

May 2022 - Nov 2022

Audio Information Research Lab, University of Rochester (with You Zhang and Zhiyao Duan)

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- Innovated a novel loss function for speaker attractor multi-center one-class supervised learning with 120K voice data
- Refined generalizability of audio spoofing detection to achieve SOTA EER by 38% relative improvement

PUBLICATIONS

C=CONFERENCE, S=IN SUBMISSION

- [C.1] Ding, Siwen, You Zhang, and Zhiyao Duan. SAMO: Speaker Attractor Multi-Center One-Class Learning for Voice Anti-Spoofing. In IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 1-5. IEEE, 2023.
- [C.2] Roman, Iran R., Christopher Ick, **Sivan Ding**, Adrian S. Roman, Brian McFee, and Juan P. Bello. **Spatial scaper: a library to simulate and augment soundscapes for sound event localization and detection in realistic rooms**. In *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 1221-1225. IEEE, 2024.

SKILLS

- Programming: Python, R, SQL, Shell (Linux), Slurm, Docker, C, C++, PySpark, Singularity
- Python Tools: PyTorch, NumPy, Pandas, Librosa, Scikit-Learn, Scipy, Plotly, Transformers, Gym, Habitat, TensorFlow
- Media: Logic Pro, Final Cut Pro, After Effects, Max/MSP, Processing, Sonic Pi, Ableton Live, PureData
- Interests: Electric Guitar, Guzheng, Music Production, Song Writing, Video Production