Pavan Seshadri

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EDUCATION

Georgia Institute of Technology   Atlanta, GA
M.S Music Technology   *Aug 2022 – Dec 2024 (expected)*
- **Advisor**: Dr. Alexander Lerch
- **Topics:** Audio/Speech ML, Music Similarity, Music Recommender Systems, Soundscape Detection
- **Coursework**: Recommender Systems, Deep Learning, Audio Content Analysis, NLP, Speech DSP, Linear Models

Georgia Institute of Technology   Atlanta, GA
B.S. in Computer Science   *Aug 2017 – Aug 2021*

RESEARCH EXPERIENCE

Technische Universität Wien   May 2023 - Sept 2023
Researcher/Collaborator   *Vienna, AT (Remote)*
- Under Dr. Peter Knees, used transformers and contrastive learning to incorporate negative feedback for **sequential music recommendation**, increasing top-K hit rate by 3-9% [1]
- Gave an oral presentation at the 1st Workshop on Music Recommender Systems at RecSys 2023

Georgia Institute of Technology   Aug 2022 - Present
Graduate Research Assistant   *Atlanta, GA*
- Researching the use of session-based collaborative filtering as a supervision signal for audio-based **music similarity**
- Investigating audio-visual neural architectures for NSF-funded project on urban pedestrian **soundscape detection**
- Curated open source audio/video dataset for pedestrian detection [2]
- Investigated the use of variational autoencoders for robust and scalable **audio fingerprinting**

Georgia Institute of Technology   Jan 2020 - May 2021
Undergraduate Research Assistant   *Atlanta, GA*
- Developed a contrastive learning sub-task for **music performance assessment**, raising performance by 8-16% [3]

INDUSTRY EXPERIENCE

Amazon   Aug 2021 - May 2022
Software Development Engineer - Machine Learning   *Seattle, WA*
- ML Engineer in **Catalog Product Knowledge** supporting text classification tasks using **LLMs** (BERT, etc.)
- Used AWS to design and develop pipelines to automate LLM training, evaluation, and deployment for Amazon.com

Amazon   May 2020 - Aug 2020
Software Development Engineer Intern   *Seattle, WA (Remote)*
- Used AWS and pySpark to build a large-scale LLM evaluation pipeline to reduce manual engineering hours by 95%

PUBLICATIONS

1. **Pavan Seshadri**, Chaeyeon Han, Bon-Woo Koo, Noah Posner, Subhrajit Guhathakurta, and Alexander Lerch. "ASPED: An Audio Dataset for Detecting Pedestrians". In *ICASSP 2024, Seoul, South Korea*

2. **Pavan Seshadri** and Peter Knees. "Leveraging Negative Signals with Self-Attention for Sequential Music Recommendation". In *1st Workshop on Music Recommender Systems, MuRS @ RecSys 2023, Singapore* *(Oral Presentation)*

3. **Pavan Seshadri** and Alexander Lerch. "Improving Music Performance Assessment With Contrastive Learning". In *ISMIR 2021, Online*

4. Yun-Ning Hung, Karn N. Watcharasupat, Chih-Wei Wu, Iroro Orife, Kelian Li, **Pavan Seshadri**, and Junyoung Lee. "AVASpeech-SMAD: A Strongly Labelled Speech and Music Activity Detection Dataset with Label Co-Occurrence". In *ISMIR Late Breaking Demo 2021, Online*

Selected Projects

Learning Music Similarity from User Listening History   Aug 2023 - Present
Advisor: *Dr. Alexander Lerch*   *Atlanta, GA*

- Developing a method to learn an audio-based music similarity function supervised by session-based listening history (listening session, playlist, etc.) rather than strong labels

- Aim to reduce label reliance and better encode musical elements not exclusive within traditional categories (genre, instrument, etc.)

Leveraging Negative Signals for Sequential Music Recommendation [1]   Jan 2023 - Aug 2023
Advisor: *Dr. Peter Knees*   *Vienna, AT (Remote)*

- Designed a method using contrastive learning to dynamically penalize the rankings of user-skipped tracks relative to played tracks for session-based sequential music recommendation

- Using baseline transformer architectures (causal, BERT-like), demonstrated method consistently increases hit rate @ [1,5,10,20] by 3-9% by learning from implicit feedback

Neural Audio Fingerprinting   Jan 2023 - May 2023
Advisor: *Dr. Alexander Lerch*   *Atlanta, GA*

- Used VAEs to learn compact augmentation-invariant representations for audio fingerprinting systems

- Proposed augmentation de-noising and contrastive learning objectives to build a discriminative representation space

- Preliminary experiments showed comparable performance using 2-4x reduced dimension embeddings compared to SoTA deep-learning based audio fingerprinting methods

Audio-based Urban Pedestrian Detection [2]   Aug 2022 - Present
Advisors: *Dr. Alexander Lerch, Dr. Suhbro Guhathakurta*   *Atlanta, GA*

- Audio Researcher for NSF-funded collaboration between GT School of Music and School of City Planning

- Investigating multimodal learning to distill video infomation into audio networks for urban pedestrian soundscape detection

- Collaborated with city planning researchers to create and evaluate an open-source audio/video dataset of pedestrian activity containing 2600 hrs of recordings

Contrastive-based Automatic Music Performance Assessment [3]   Jan 2021 - May 2021
Advisor: *Dr. Alexander Lerch*   *Atlanta, GA*

- Proposed a novel deep neural model using contrastive learning for regression tasks in music performance assessment

- Exceeded SoTA performance for MPA regression tasks by 8-16% for metrics such as musicality, note accuracy, etc.

- Demonstrated that the proposed method results in better clustering of the model embedding space

Invited Talks

Leveraging Negative Signals for Sequential Music Recommendation   Sep 2023
1st Workshop on Music Recommender Systems, co-located with RecSys 2023 **(MuRS @ Recsys 2023)**   *Singapore*

Skills

Programming Languages: Python, Java, C/C++, SQL, MATLAB, Git, Docker, Linux
ML/Data Science & DSP Libraries: PyTorch/Torchaudio, Pandas, sk-learn, Numpy, Scipy, Matplotlib, librosa
Cloud/Development Tools: Amazon Web Services, Spark, Git, Vim, Docker
Music: Ableton Live, Audacity, Max/MSP, Mixing/Mastering Tools (FabFilter, Izotope Ozone etc.)
Work Authorization: US Citizen, UK Citizen (Dual National)

Awards

3rd place @ Junior Design Expo, *College of Computing, Georgia Institute of Technology*   Dec 2020
President's Undergraduate Research Award, *Georgia Institute of Technology*   Aug 2020