Pavan Seshadri

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Education

Georgia Institute of Technology — Atlanta, GA
M.S Music Technology — *Aug 2022 – present*

- **Advisor**: Dr. Alexander Lerch
- **Topics:** Speech and Audio ML, Music Recommender Systems, Urban Soundscape Detection
- **Coursework**: Signal Processing, Audio Content Analysis, Recommendation Systems, Linear Models, Graph ML

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

- **Coursework**: Machine Learning, Deep Learning, Robotics, Computer Graphics, Recording & Mixing

Research Experience

Technische Universität Wien — Jan 2023 - present
Researcher/Collaborator — *Vienna, AT (Remote)*

- Researching implicit feedback-informed **sequential music recommendation** under Dr. Peter Knees [1]
- Proposed a contrastive-learning task to penalize rankings of user-skipped tracks relative to played tracks
- Gave a talk at the 1st Workshop on Music Recommender Systems at RecSys 2023

Georgia Institute of Technology — Aug 2022 - present
Graduate Research Assistant — *Atlanta, GA*

- Investigating neural architectures for NSF-funded project on urban pedestrian **soundscape detection**
- Investigated the use of VAEs for robust and scalable **audio fingerprinting**
- Curated open source audio/video dataset for urban pedestrian activity *(Submission Under Review)* [4]

Georgia Institute of Technology — Jan 2020 - May 2021
Undergraduate Research Assistant — *Atlanta, GA*

- Researched representation learning approaches for automatic **music performance assessment** (MPA) [2]
- Exceeded SoTA performance for MPA regression tasks using an ordered classification contrastive learning task
- Presented work as first-author at ISMIR 2021

Publications

1. **Pavan Seshadri** and Peter Knees. "Leveraging Negative Signals with Self-Attention for Sequential Music Recommendation". In *Proceedings of the 1st Workshop on Music Recommender Systems, 17th ACM Conference on Recommender Systems,* ***MuRS @ RecSys****, Singapore, 2023 (Oral)*

2. **Pavan Seshadri** and Alexander Lerch. "Improving Music Performance Assessment With Contrastive Learning". In *Proceedings of the 22nd International Society for Music Information Retrieval Conference,* ***ISMIR****, Online, 2021*

3. 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 *International Society for Music Information Retrieval Conference Late Breaking Demo ,* ***ISMIR****, Online, 2021*

4. **Pavan Seshadri**, Chaeyeon Han, Bon-Woo Koo, Noah Posner, Subhrajit Guhathakurta, and Alexander Lerch. "ASPED: An Audio Dataset for Detecting Pedestrians". *arXiv preprint arXiv:2309.06531*, 2023

Work Experience

Amazon Aug 2021 - May 2022
Software Development Engineer - AI/NLP *Seattle, WA*

- ML Engineer in Catalog Product Knowledge supporting text-based classification tasks using **LLMs** (BERT, etc.)
- Collaborated with research scientists on model and data evaluation to propose solutions to performance bottlenecks
- Used AWS to design and develop end-to-end pipelines to automate LLM training, evaluation, and deployment.

Amazon May 2020 - Aug 2020
Software Development Engineer Intern *Seattle, WA (Remote)*

- Designed and built an automatic evaluation framework in a DNN-training pipeline to support product classification
- Leveraged AWS lambda, EMR, S3, and Spark to reduce model evaluation effort from 45-75 hours to minutes

Selected Projects

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

- Designed a method using self-supervised transformer-based architectures and contrastive learning objectives to model robust session-level relationships using implicit user feedback for next-song music recommendation
- Demonstrated method increases top-K hit rate 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 promising performance using smaller-dimension embeddings compared to SoTA deep learning audio fingerprinting methods

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

- Leading audio research effort for NSF-funded collaboration between GT School of Music and School of City Planning
- Investigating attention-based architectures for urban pedestrian soundscape detection
- Collaborating with city planning researchers to create an open-source audio/video dataset of pedestrian activity

Contrastive-based Automatic Music Performance Assessment 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

Skills

Interests: Perceptually Motivated Speech and Audio Representation Learning, Recommendation Systems, Natural Language Processing
Languages: Python, Java, C/C++, Bash, MATLAB
Developer Tools: Git, Vim, Docker
Libraries/Frameworks: PyTorch, Amazon Web Services, Pandas, Numpy, Scipy, Matplotlib, librosa, pySpark
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