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:** Music Recommendation Systems, Speech and Audio Information Retrieval, Natural Language Processing, Representation Learning

Georgia Institute of Technology — Atlanta, GA
B.S. in Computer Science — *Aug 2017 – Aug 2021*
- **Coursework**: Machine Learning, Deep Learning, Algorithms Honors, Robotics and Perception, Computer Graphics, Statistics and Applications, Recording & Mixing

Research Experience

Technische Universität Wien — Jan 2023 - present
Visiting Researcher/Collaborator — *Vienna, Austria (Remote)*
- Researching implicit feedback-informed **sequential music recommendation** using bidirectional transformers (RecSys 2023 submission)
- Advised by Dr. Peter Knees

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 generative models (VAE/VQ-VAE) for robust and scalable **audio fingerprinting**
- Curating open source audio/video dataset for urban pedestrian activity

Georgia Institute of Technology — Jan 2020 - May 2021
Undergraduate Research Assistant — *Atlanta, GA*
- Researched representation learning approaches for automatic **music performance assessment** (MPA), resulting in an ISMIR 2021 conference paper [1]

Publications

1. **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*** *2021*
2. 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". *International Society for Music Information Retrieval Conference Late Breaking Demo ,* ***ISMIR*** *2021*

Work Experience

Amazon — Aug 2021 - May 2022
Machine Learning Engineer — *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
- Proposed and developed a novel evaluation methodology and end-to-end pipeline to automate model deployment

Amazon — May 2020 - Aug 2020
Software Development Engineer Intern — *Seattle, WA (Remote)*
- Designed and built an automatic evaluation feature in a DNN-training pipeline to support product classification
- Feature leverages AWS lambda, EMR, S3, and Spark to reduce model evaluation effort from 45-75 hours to minutes

Selected Projects

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

- Investigated the use of generative models (VAE/VQ-VAE) to learn compact augmentation-invariant representations for audio fingerprinting systems

Leveraging Negative Signals for Sequential Music Recommendation Aug 2022 - Present
Advisor: *Dr. Peter Knees* *Atlanta, GA*

- Using bidirectional transformer-based architectures and contrastive learning objectives to model robust session and track embeddings from positive and negative user feedback for next-song music recommendation

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 [1] 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

Adapting Transformers for Downstream NLP tasks Mar 2021 – May 2021
Deep Learning Course Project *Atlanta, GA*

- Explored methods of model compression to reduce the necessary trained parameters of RoBERTa for downstream classification tasks
- Extended the work of Gururangan et. al, which showed benefits of task-specific pre-training in large language models and Pfeiffer et. al, which proposes AdapterHub, a framework for NLP transfomer model compression

Technical Skills

Interests: Speech and Audio Information Retrieval, Recommendation Systems, Speech/Music Generative Modelling, 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

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