Lennon F. Seiders

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EDUCATION

University of Michigan   **Ann Arbor, MI**

B.S. Computer Science, B.S. Data Science, Minor in Music   *May 2025*

- o Relevant Coursework: Machine Learning, Machine Learning Fairness Theory, Computer Vision, Web Systems, Music Theory, Electronic Music Production, Physics of Music
- o Michigan Community Scholars Program, UofM Faculty Engineering/Arts Student Teams, UofM Mechanical Engineering RISE Program

APPLIED RESEARCH & WORK EXPERIENCE

Bucsek Group   **Ann Arbor, MI**

Undergraduate Researcher   *May 2024 – Sept. 2024*

- o Developed and tested a new algorithm for peak segmentation and removal in X-Ray Diffraction data, improving the sensitivity of peak detection while reducing background noise.
- o Evaluated and enhanced a preprocessing script, achieving a 96.38% estimated success rate in secondary peak removal, with focus on refining background replacement and peak identification methods.
- o Created synthetic datasets and utilized advanced statistical techniques, including gaussian kernel density estimates, to model and analyze diffraction images, aiding in the assessment and improvement of peak filtering algorithms.

Tenor Digital   **Palo Alto, CA**

Software Engineering Intern   *May 2023 – Sept. 2023*

- o Contributed to the development of a private debt management web application, collaborating with a cross-functional team under the Scrum framework.
- o Designed and implemented robust unit testing strategies in C#/.NET, identifying and resolving critical issues in the application's codebase.
- o Strengthened code security by effectively managing numerous API exceptions, mitigating potential security vulnerabilities.

PROJECT EXPERIENCE

Electric Guitar Classification in Polyphonic Music

Designed and implemented a machine learning system to classify electric guitar usage in popular music, demonstrating the potential of deep learning in musicological research.

- o Curated a custom dataset from Billboard Hot 100 year-end charts (1960–1999), using the OpenAI API to create binary classification labels with extracted song metadata.
- o Utilized a two-stage deep learning pipeline combining pre-trained deep learning model YAMNet for feature extraction and a custom neural network for classification, achieving classification accuracy of 74%.

Percussion Instrument Classifier

Developed a machine learning pipeline to classify percussion instruments using waveform analysis and audio features.

- o Analyzed frequency spectrum data and preprocessed audio samples to extract distinguishing features.
- o Engineered features including MFCCs, spectral flatness, and amplitude medians to achieve a 96% accurate classification using a lightweight Random Forest model.

Deep Drawing

Current project team member tasked with the design of a model that predicts visual representations of audio created by the strokes of an artist's pencil for creative intermedia performance.

- o Streamlined the process of interpreting input signals from four contact microphones placed at each corner of the drawing surface, accommodating for the speed of sound travelling through solids versus open air.
- o Utilized individual spectrogram windows and convolutional recurrent neural networks to extract local spatial information and their trajectories from real-time audio features.

TECHNICAL SKILLS

Programming Languages:	Python (*TensorFlow, PyTorch, SciPy, OpenCV, Librosa*), C/C++ (*STL, JUCE*), R (*ggplot2, Tidyverse*), C# (*.NET*)
Tools:	Ableton Live, MaxMSP, Git, Ubuntu, Microsoft Suite