

## **Practice Makes Perfect: Enhancing Neural Networks for Music Generation**

682 Neural Networks Project Proposal

Two - Person Group Proposal

The problem we will be investigating is: Can decent sounding and catchy music be generated fully from a neural network? We think this is an interesting problem because music is a highly subjective and completely human construct, so if a model can produce pleasant melodies, it means something as complex as music generation can be quantified. This is also an interesting problem from a data perspective because there are hundreds of thousands of MIDI files publicly available on the internet and several different approaches to training on these files. We will use existing MIDI Databases to collect our data for this project (some links to existing DBs are provided below). We may have to write scripts to scrub these sites for files.

There are some existing approaches to music generation from MIDI files, one of which is converting the MIDI files to images and learning via RGB pixel input. Another approach is to vertically align the music file and sequence the data in a different axis other than by timestamp. A third approach is to use transfer learning on a trained ImageNet classifier which has found image features, and add layers at the end to convert the image features into sound features. We have found that the results of these NNs are clearly not generated by a human. In our approach, we will combine and modify these existing approaches with even more data to produce more satisfactory results.

This project will not be shared with another class. It will be solely produced for 682 Neural Networks.

Meghana:

I will be responsible for researching different music generation through neural networks that have been attempted previously, and cataloging the results of those techniques to help us solidify an experiment to move forward with. Once an experiment has been isolated, the plan is to train a neural net for basic generation with small dataset for testing. I will contribute to the model validation through hyperparameter-optimization, the testing procedure, and results evaluation. I will also contribute to the final paper which will explain our project.

Jagath:

I will be responsible for the collection and organization of the data required for this project. The files that we will be working with require several stages of manipulation and wrangling to be suitable for machine learning. I will gather, sort, and manipulate the data as necessary for the project. After the basic neural network models are developed, I will assist in

hyperparameter optimization and testing of the output. Finally I will help with writing the final paper.

To evaluate our results, we plan to take a sample of 30 people, and have them each perform two tests. The first is to have them rate the quality of several samples of music generated by the neural nets on a scale. The second is to have a blind test of determining if a music clip is generated by the neural network or by a human. This second test is necessary as a baseline for us to know how realistic the music generated by our model is. Because music is subjective, for quantifying results these tests will help us determine if the neural net is producing sounds that are more realistic to what a human would generate, and could tell us how intelligent our model is.

## READINGS AND RESULTS SECTION

### MIDI Databases

<https://www.vgmusic.com/>

<http://www.mirsoft.info/gamemids.php>

<https://bitmidi.com/>

### Research Paper Ideas

<https://www.justinsvegliato.com/pdf/deep-jammer-report.pdf>

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