

MAT 180 Group Project Proposal: MIDI synthesis

Group Members:

Harkins Loh
Jada Yip
Timothy Ng

Name of Project:

MIDI synthesis

Data Collection:

The primary data and file type required for the project are MIDI sequences with basic instrumentation; baroque, classical, romantic and contemporary soloist piano pieces are the most convenient for the endeavors of this project, since they convey and accomplish many important structures that can be easily studied, such as:

1. Tonality,
2. Harmonic structure based on Western twelve-tone equal temperament,
3. Formularized chordal figures and progression (except Stravinsky),
4. Cadences,
5. Left and right-hand common roles of bass/chord and melody/harmony respectively,
6. Database availability

Files will primarily be collected from [Disklavier World](#), which is a non-profit online repository of at least 10,000 classical pieces in MIDI piano, with MIDI-encoded live performances of piano competitions. These are all unlabelled data (as it is difficult and expensive to find online databases containing labeled data in any respectable significant amount).

If labeled files are found to be necessary, they will be collected from [GiantMIDI-Piano](#), which contains 10,855 piano MIDI files, labeled with composer, genre, duration and other metadata.

Task:

The learning algorithm will generate at least a bar in the “right” tempo, harmony, cadence and distinguishable melody based on the pieces it has learnt. It will be able to emulate at least the genre in its composition, and sound as if it was part of the music. In effect (although not primarily), the algorithm

should be able to “extend” a musical piece or fill in an incomplete part of the music if there were missing data.

Learning Algorithm:

As is usually the case with synthesis machine learning programs, we propose using a feedforward neural network to learn the data given and construct its music. The multitude of variables involved in this project render classical learning algorithms limited, as the latter lacks the flexible capacity of neural networks to keep track of altered data.

Performance Measure:

As with many synthesis machine algorithms, particularly for those that generate music, a difficulty arises in deciding what constitutes quantifiably correct variables to measure for the performance of the algorithm. Even if it was an algorithm made to fill in a missing bar that we manually deleted, human artistry could reject an emulated result.

With these considerations, we will mark its performance by its MSE deviations from harmonic and tonal centers and genre from the labeled dataset, rather than subjective measures of it sounding “good” or “lit”.