Music Generation with Deep Learning

- **G**enerative **A**dversarial **N**etwork (GAN)
  - A type of deep learning network where two separate models work against one another to improve and learn
- Implemented [Olof Mogren's C-RNN-GAN](#)
  - Much of the work done was updating the code base to work with more recent versions of Python and TensorFlow
  - Sample output from the paper: [sample11.mp3](#) [sample09.mp3](#)
- My Work
  - Using 3,414 MIDI files of works by classical composers (Tchaikovsky, Debussy, Rachmaninoff, etc.), I trained the model multiple times using different hyperparameters.

Results

- Small model trained on ~1600 classical midi files, one tone per cell, 6 epochs
  - Repeatedly plays the same/similar notes in rapid succession
  - Small model has trouble generalizing
- Large model, 115 epochs, up to 3 tones per cell
  - Outputs seem more 'creative' with a larger octave range, little rhythm to speak of
- Large model, larger discriminator (500 hidden units, 3 LSTM layers), 30 epochs, up to 3 tones per cell
  - Did not have sufficient time to fully train this model--the larger discriminator nearly doubles training time