HW2

For this HW I have experimented with Piano-midi.de and Nottingham mid music files.
I started off by experimenting with 13 Piano-midi.de files. However, due to consistent failure in the training phase, I switched to the Nottingham mid files and persisted with it.
The experiment was conducted for two types of RNN architectures: MelodyRNN and PolyphonyRNN.

Explain dataset characteristics (how many, which genres, why you chose)
The Nottingham dataset consisted of 45 midi files. These were Ashover Simple Chords. This belongs to the Piano Waltz genre. I chose these because this dataset was easy to analyze in terms of chords and notes. Also, visualizing them in GarageBand was easy (with almost 2 tracks playing simultaneously).

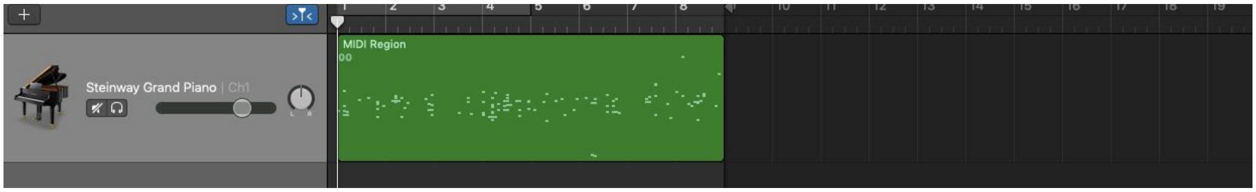
Describe training parameters (epoch, num_outputs, num_steps, primer_melody)
For both the RNN architecture: MelodyRNN and PolyphonyRNN, the parameter used for experimentation were: *batch_size=64, rnn_layer_sizes=[64,64]* and *batch_size=64, rnn_layer_sizes=[128,128].*
I had experimented with several variations of training steps: 1, 10, 100 and 200. As expected, the loss values kept decreasing (as more steps were added) and accuracy kept increasing (although very slowly). The best output was obtained for 200 steps. One of the logs looked like:

```
INFO:tensorflow:global_step/sec: 0.23354
INFO:tensorflow:Saving checkpoints for 104 into ../../../../run/train/model.ckpt.
INFO:tensorflow:Perplexity = 42.249573, Loss = 3.7435942, Global Step = 111, Accuracy = 0.20125633 (43.347 sec)
```

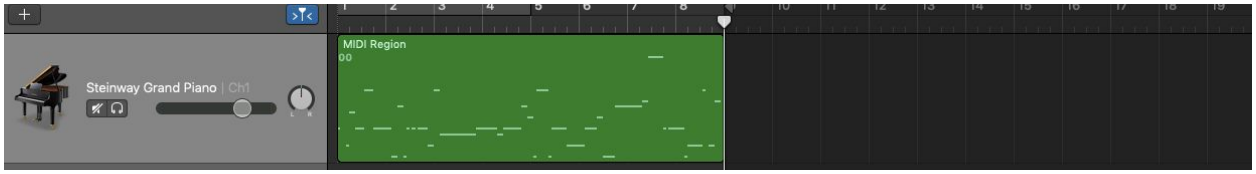
The *primer_melody* was *[60]* in both the cases.

Share your music result! Post your music generation output via SoundCloud or Youtube
Melody-1: https://soundcloud.com/abhilash-srivastava-787829435/m2-1
Melody-2: https://soundcloud.com/abhilash-srivastava-787829435/m2-1
Polyphony-1: https://soundcloud.com/abhilash-srivastava-787829435/polyphony1
Polyphony-2: https://soundcloud.com/abhilash-srivastava-787829435/polyphony2

Briefly describe the difference in results from different NN models and the difference in results from different data size.
There is a clear difference between the music generated using MelodyRNN and PolyphonyRNN. The PolyphonyRNN sounds more random, there are a lot of notes playing at once and it's hard to make sense. The screenshot for the midi is shown below:



MelodyRNN, on the other hand, is more consistent and continuous. This sounds more harmonious and is pleasing. Also, the notes are longer in melody as compared to polyphony. The screenshot for the Melody is shown below:



After experimenting with *rnn_layer_sizes=[64,64]* and *rnn_layer_sizes=[128,128],* I found that with larger rnn_layer_size the music notes became longer. However, the difference between the quality of music generated wasn't significantly different.