

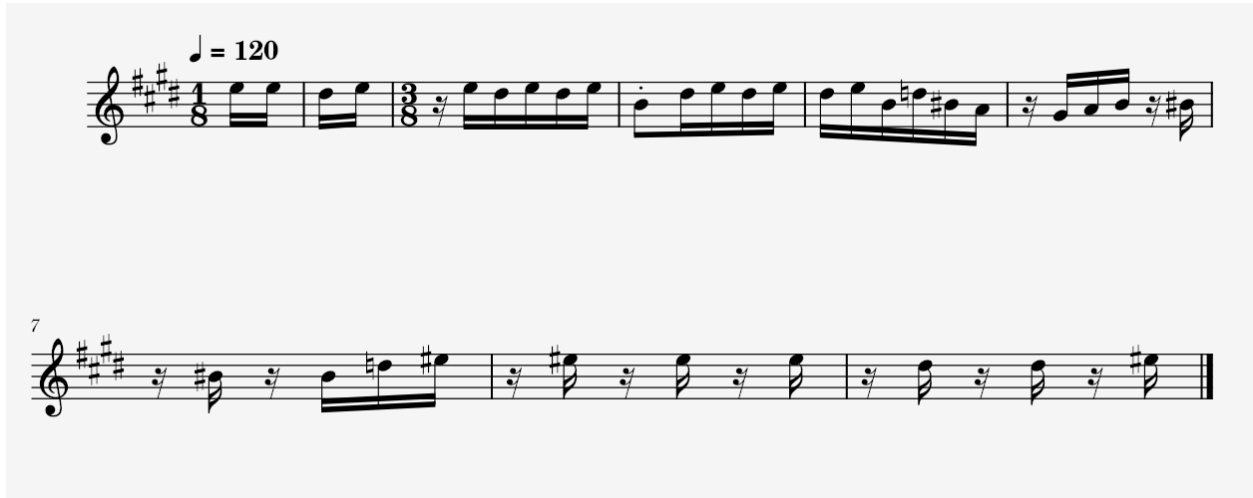
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Generative AI

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1. I installed and imported various packages and modules. Next I mounted the google drive. I then loaded the midi files from google drive and displayed an example in text form. I used 20 midi files with piano music from Beethoven. Next I parsed the midi files and displayed an example of the notes. I then put them in a dataset to be used to train the model.
2. Next, I tokenized the data and displayed some of the tokens. I then displayed some of the vocab (notes). I then set up the training data.
3. Next I set up classes to create a transformer block and embeddings respectively. I then displayed the embeddings. I then created and displayed the model. The model has 2 input layers for the notes and durations, two layers of embeddings for the notes and the durations, a concatenate layer, a layer for the transformer block, and two output layers for the notes and durations.
4. Next, I trained the model for 50 epochs. After each epoch I had the model generate music and store it in the outputs folder. These are the model statistics after 50 epochs:
duration_outputs_loss: 0.7710 - loss: 2.6437 - note_outputs_loss: 1.8726. I also have the music generated from epoch 50 below.



- Finally, I used the model to generate 3 sets of music. I had it generate music with a temperature of 0.1, 0.5, and 1. I then saved the model, the training data, the training outputs, and the 3 generated sets of music.

Generated Music 1 (Temperature of 0.1):



Generated Music 2 (Temperature of 0.5):



Generated Music 3 (Temperature of 1):



Discussion Points:

Looking at the generated music, it has a lot of the same issues that the previous model had. The music jumps around a lot with its notes and most of the generated music consists of 16th notes with not that much variation, especially in the latter half of the generated music. Looking at temperature, I noticed that with the generated music with temperature of 0.1, there are a lot more jumps between notes with the jumps being bigger than with the music with a higher temperature.

The generated music doesn't resemble Beethoven's music that much. His music has less jumps than the generated music and has more variation in the length of notes used instead of mainly using 16th notes.