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GenAI Assignment 6
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Discussion Points

Summary of Findings

The highest epochs for each run were 65 and 60 as the model struggled with storage. I noticed that as I increased epochs, the model established better phrasing and more accuracy of the key that it was given. I thought it was interesting that all of the examples had a tempo of 120 which is fast for music even though some of the examples sounded like they would be better suited for a slower tempo. This was surprising as both the Bach and Vivaldi datasets had a mix of tempos. I assumed this was because the model focused on notes and duration. If the model was given more information on tempo, I think it would match the tempo better with the notes generated. The Bach-generated music established thematic development and transformed the groups of eighth notes to vary the sound of the piece.

For the generated Vivaldi violin music, I chose violin works from solo pieces and orchestral scores. I think this varied the style of music, however, it made it challenging to generate varied music. Especially, because some of the dataset examples repeated the same note for many measures (Four Seasons Winter Movement) or included many rests. I used 13 pieces for the Vivaldi dataset and included longer multimovement works. This was still similar to the number of notes of the Bach dataset even though the Bach dataset included 36 pieces. This also made it challenging for the model as the Bach Suites are shorter and have a condensed theme when compared to a multi-page work with many themes.

Reflection on the model's ability to generate music in the style of Bach (subjective evaluation).

This piece's key is E ♭ Major. The generated music creates an accurate representation of the key by not adding too many accidental notes (flats or sharps). Adding the G ♭ in the 5th measure was a good choice as it made the piece sound like it was nearing the end of the phrase.

Some common options for starting notes would be the 1st, 3rd, or 5th interval of the E ♭ Major scale. So for this piece, we most likely expect the song to start on E ♭ . The next two most common notes would be G or B ♭ (all three of these notes make up the E ♭ major chord and are considered the tonic chord of this piece. Starting on a G ♭ note is a possible choice especially because the piece's first note is on an upbeat (usually a note that is the key's first note, E ♭ , would not be used for an upbeat note).

The piece could improve on its ending note. When you listen to the phrase it does not sound complete. This is because it ends on an A ♭ . Ending on the fourth interval is not a common choice as it is not part of the root chord (meaning the 1st, 3rd, or 5th notes of the key discussed earlier). Almost all pieces end with the root note, so, for this piece, it should end on the E ♭ , the tonic of the key to make the phrase sound complete. Also, a staccato note at the end was a surprising choice especially because that's the only articulation in the piece. It doesn't make sense to end a piece with this because a staccato marker is used to create space between the notes. As it's the last note there is no need for this.

Extra Credit Research Problems

Quantitative Metrics? Are there any such metrics to evaluate a model's training performance?

One way to evaluate a model's training performance would be to determine common themes in each piece. From the dataset, I would choose a measure or two of notes that are repeated throughout a piece, and do this for each piece. I would then compare them with the generated lines to see if they match up by interval distance or repeated patterns. For intervals, I would look at the space between notes. Usually with Bach Suites, within each group of notes, 4 eighth notes together start the same and the 4th note is a variation on the theme. This would help determine if the generated piece is creating a similar style.

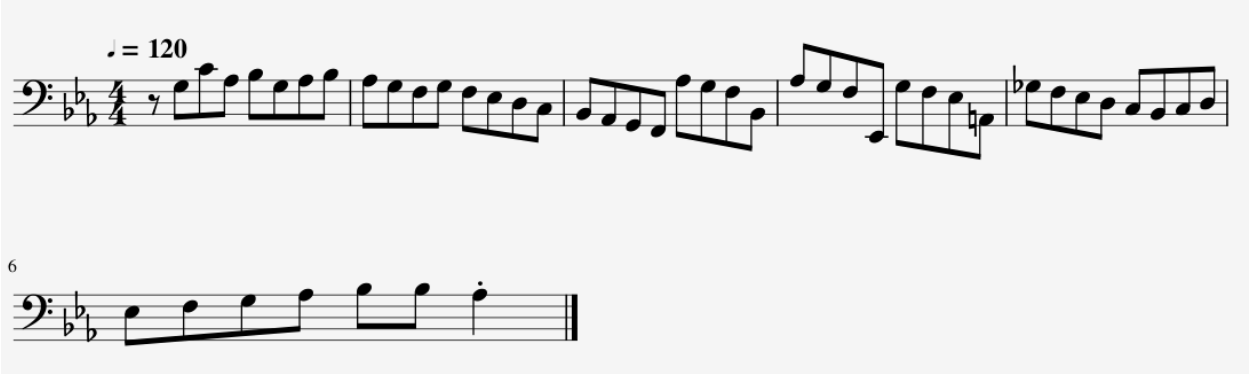
Another option could be to see how many accidental notes are outside of the key. Meaning, that if I were in the key of C Major, all accidental notes (sharps and flats) would be considered outside of the key. I would then determine from a few pieces what percentage of notes are outside of the key and see if the generated music has a similar percentage. This would help determine if the generated music follows Bach's distribution of notes outside of the key.

Musical Quality? How can you determine if the generated music resembles Bach's Cello Suites, both in structure and stylistic elements?

The generated Bach phrase would be in the style of a Courante, Gavotte, or Gigue, all pieces that have a fast tempo with quick eighth notes. This would not be a common beginning for the suites like the beginning prelude movement of the Bach Suites.

I think the scale between measures 2 and 3 is a good representation of Bach's Cello Suites as it shows a descending scale that I think is common in the Bach Cello Suites. Also similar is the use of eighth notes used throughout the piece. The main and most significant aspect is the measures 3-5 as each set of eighth notes starts with a similar theme but there is a contrasting variation with the jump down to lower notes.

Bach Cello Suite Generated Model

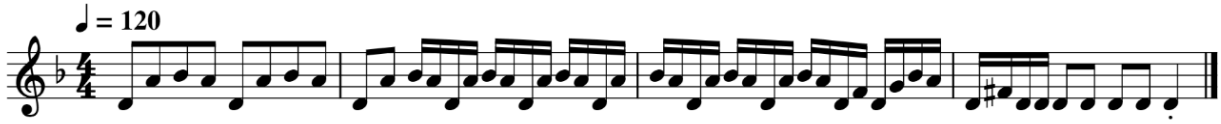


Beyond Bach? Build a similar model on any music/composer of your choice.

Vivaldi Violin Generated Model

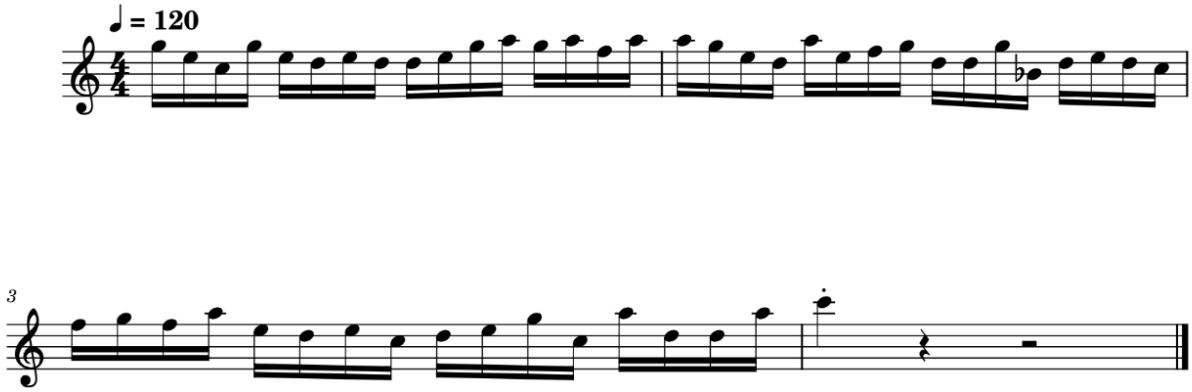
Example 1 did a better job of resembling Vivaldi's works. I like the transition from eighth notes to sixteenth notes to show thematic development. The repeated notes at the end were similar to phrasing from other Vivaldi works. This phrase is in the key D Minor. It represented the key well as it started and ended on D, making the phrase sound complete. It also included an F♯ which would make sense as F is the 3rd interval of the D Minor scale and the raised F to F♯ would make sense as it adds thematic development right before ending the phrase.

Example 1



Example 2's key was a bit ambiguous to me. I assumed it was in C Major but the notes were distributed randomly with no clear melody. Additionally, the B ♭ in measure 2 makes the phrase less clear as there's no purpose to add that note. The piece does end on a C and, in the final measure, sounds like there is some melodic development, but by that point, it's too late to clarify what the main melody is when combined with the rest of the measures. These notes are also very fast, so I had to slow down the tempo to hear if there was any melody. Usually, sixteenth notes for a violin at this tempo would all be repeated or it would be clear that the notes were leading to another theme. Generally, these notes sound very randomly chosen with little purpose.

Example 2


♩ = 120
3