

Multi instrument music generation using VAE

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Summary

Generating long music sequences from raw audio waveforms can be very compute intensive. MIDI format gives a much more compressed representation of a subset of Music which may give us a tractable way to generate melodies. In this project we generate MIDI audio using Variation Auto Encoders for multiple instruments.

Background Information

Composing music is a skill that is acquired by many years of practice. The music itself is the result of the life experiences of the musician, their state of mind, their unconcious and concious thoughts. Their creative talent is subjective and difficult to generalize. Recent advances in Generative models for Music generation have shown impressive results where the focus has been to replace the creative process. Learning the distribution of music creation may be an intractable problem at the moment. However one approach we can take is to build tools that serve as an aid in the creative process. If a musician already has a few ideas in mind on how a song or melody should start, can the problem be modelled as a conditional generative process where given the start and style of the song, can a model generate multiple possibilities of how the song can proceed? In such a generative system, the inputs to the model would be a short MIDI sequence. The system would generate a bunch of sequences that may serve as suggested next sequences and so on. By conditioning on the input and letting the musician choose the path to take, the model can help in the creative process.

Placeholder
Image

Figure 1:Figure caption

Technical Methods

The following architectures were tried for controllable generation:

- Variation Auto Encoder (VAE) with a single Encoder Decoder
- Beta VAE with $\beta \in [0, 100]$
- DC GAN
- VAE with single Encoder and multiple Decoder sharing Z space

The materials were prepared according to the steps outlined below:

- Curabitur pellentesque dignissim
- Eu facilisis est tempus quis
- Duis porta consequat lorem
- Curabitur pellentesque dignissim

Important Result

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Mathematical Section

Nam quis odio enim, in molestie libero. Vivamus cursus mi at nulla elementum sollicitudin. Nam quis odio enim, in molestie libero. Vivamus cursus mi at nulla elementum sollicitudin.

$$E = mc^2 \quad (1)$$

Nam quis odio enim, in molestie libero. Vivamus cursus mi at nulla elementum sollicitudin. Nam quis odio enim, in molestie libero. Vivamus cursus mi at nulla elementum sollicitudin.

$$\cos^3 \theta = \frac{1}{4} \cos \theta + \frac{3}{4} \cos 3\theta \quad (2)$$

Nam quis odio enim, in molestie libero. Vivamus cursus mi at nulla elementum sollicitudin. Nam quis odio enim, in molestie libero. Vivamus cursus mi at nulla elementum sollicitudin.

Methods

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Results

Placeholder
Image

Figure 2:Figure caption

Nunc tempus venenatis facilisis. Curabitur suscipit consequat eros non porttitor. Sed a massa dolor, id ornare enim:

Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Conclusion

Nunc tempus venenatis facilisis. **Curabitur suscipit** consequat eros non porttitor. Sed a massa dolor, id ornare enim. Fusce quis massa dictum tortor **tincidunt mattis**. Donec quam est, lobortis quis pretium at, laoreet scelerisque lacus. Nam quis odio enim, in molestie libero. Vivamus cursus mi at *nulla elementum sollicitudin*.

Additional Information

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- Curabitur pellentesque dignissim
- Eu facilisis est tempus quis
- Duis porta consequat lorem

References

- J. M. Smith and A. B. Jones. *Book Title*. Publisher, 7th edition, 2012.
- A. B. Jones and J. M. Smith. Article Title. *Journal title*, 13(52):123–456, March 2013.

Acknowledgements

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