Neural Style Transfer in Audio

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This project will be an exploration into music making using machine learning, more specifically sequencing neural networks. This problem is a branching off from Dr. Hawley’s current research in the field of machine learning and audio. The project will attempt to create new original music using a synthesis of two existing pieces of music. We will do this through neural style transfer. Neural style transfer has been extremely successful in the realm of transfer the style of images. We would like to find out if this success can be replicated with audio. In an article published through the International conference on learning representations, by and anonymous author, the author explains that they “take a language-modeling approach to training generative models for symbolic music”[1]. We would like to take this approach to style transfer. In this approach we would encoder each midi value or set of of midi values(if velocity is involved) as a ‘word’ the network will then learn to piece together these words into coherent musical sentences. The natural place to start on this project is language translation, a topic which has been explored extensively. In the pytorch tutorial referenced the author explains code for a sequence to sequence model with attention. This is the type of model is interesting to us because music requires repetition of sections this means that the network needs a way to retain past information a model with attention would be a good choice for this.[3] Not only does the network need a way to look in the past but also a way to look into the future. A network can use a bidirectional LSTM (Long Short-term Memory Network) which will allow the network to read into the past and also “look-ahead” like a musician reading sheet music.[2]

[1]Anonymous (2018, September 27). Music Transformer.

Retrieved from <https://openreview.net/forum?id=rJe4ShAcF7>

[2] Malik, I., & Henrik, C. (2017, August 11). Neural Translation of Musical Style.

Retrieved October 21, 2018.

[3] Translation with a Sequence to Sequence Network and Attention¶. (n.d.).

Retrieved from https://pytorch.org/tutorials/intermediate/seq2seq\_translation\_tutorial.html