Creating Jazz with Deep Learning

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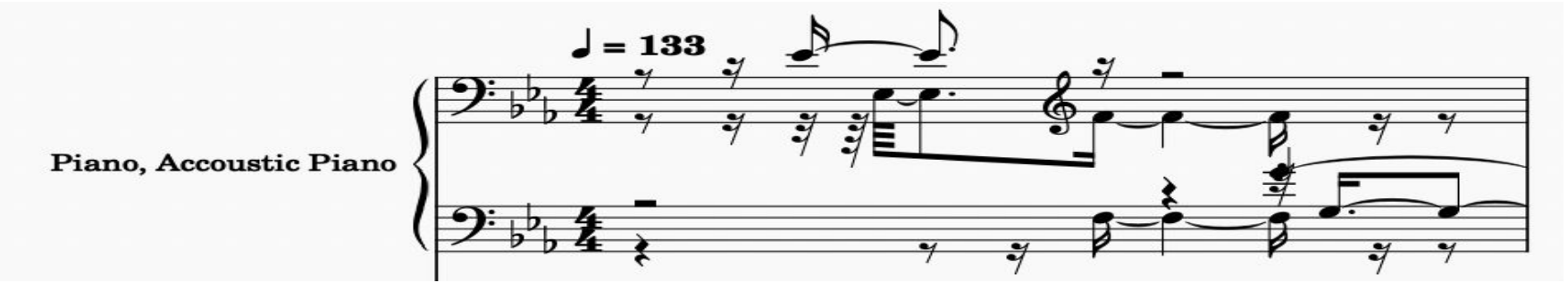
Martin Yong

Let’s start with jazz!

Piano cover of “I’ve grown accustomed to her face” by Doug Mckenzie

But what is music, really? - A series of notes (pitch, octave, offset), chords, pauses



Approach

Dataset: 5 jazz piano covers in midi (.mid) format

Library: music21 from MIT

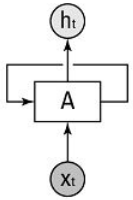
If NLP uses words, music uses notes

1 

Parse notes and chords from midi

2 X Y

Transform into:
- input (100 notes)
- target variables (the 101th note)

3 

Create neural network model and train

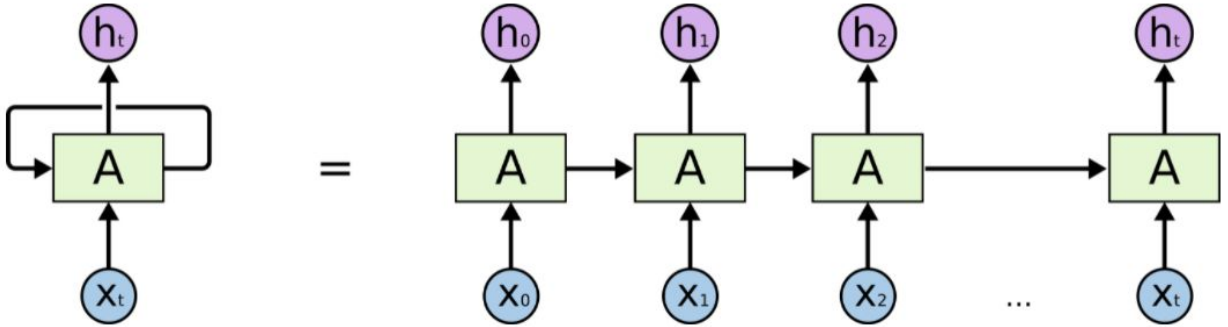
4 Fm

Generate 500 notes using the model

5 

Transform and store them into midi files

Modeling



Unrolled RNN model, credit: Christopher Olah's blog (see Appendix)

- Use RNN (Recurrent Neural Network) model, in particular Stacked LSTM (Long-Short Term Memory model)
- Use of batch normalization between layers to speed up learning
- Minibatch size of 32, running 400 epochs

Result

Epoch 1

Epoch 100

Epoch 382

Lessons Learned

- It takes a lottttt of epochs, a lot, before the result sounds… ok
- # of epochs are more important than the # of songs

Next Steps

- Ingest rest notes as inputs in order for the model to learn pauses in songs
- Create structure of actual songs, i.e. verse-chorus-verse-chorus-bridge
- Add an additional instrument, e.g. bass

Appendix

Appendix A - References

Shubham Gupta - https://www.hackerearth.com/blog/developers/jazz-music-using-deep-learning/

Sigurður Skúli - https://towardsdatascience.com/how-to-generate-music-using-a-lstm-neural-network-in-keras-68786834d4c5

Colah's blog - Understanding LSTM Networks: https://colah.github.io/posts/2015-08-Understanding-LSTMs/