MUSIC GENERATION

TEAM ALCOVE (9)

MOTIVATIONS AND KEY AIMS

- Original goal: Generate 30-second pop songs using Long-Short-Term-Memory (LSTM) and compare the results of our network against other music generating networks from Universities, researchers, google etc to see if our network was the preferred musician.
- Altered Goal: Generate piano songs using a Recurrent Neural Network (RNN) and Generative Adversarial (GAN) neural networks we made and compare the results to determine which network makes better music.

- Comparison Metrics –
  - training time
  - Accuracy
  - Loss
  - Number of parameters
  - Song Quality
  - Find the best network architecture that makes coherent and enjoyable music!

STRATEGY

RNN

Adapt a sample architecture and processing methodology from a Keras music generation tutorial to mesh with the model architecture for RNNs from class.

Adjust hyperparameters for performance

- Number of epochs
- Batch size
- Learning rate
- Optimizers
- Positive pressure

GAN

Adapt the GAN model from class and apply image-focused GAN to MIDI files. Convert midi files to piano roll images, get Generator to make piano rolls, discriminator to detect fake rolls.

Adjust hyperparameters for performance

- Number of Epochs
- Batch Size
- Learning Rate
- Dropout
- Optimizer
- Activation Functions
- Alpha (leaky RELU)

NETWORK OUTPUT

RNN

- training time - Averages 6.3 minutes
- Loss- .1668
- Number of parameters - `Total params: 824,962`
- Song Quality -

GAN

- training time – 6-11 minutes, averaging 8 minutes
- Accuracy - 50% - can vary heavily with hyperparameter tuning
- Loss- Both discriminator and generator hover around .64-.74 loss. Hyperparameter tuning can drastically drive values up.
- Number of parameters - Total - `35,106,698`
  - `Nontrainable Parameters – 14,529`
- Song Quality -



THE TEAM & TEAM CONTRIBUTIONS

Emily Musselman – Milestone lead, GAN network lead, demo

Evan Kubick - Music "Expert", Gan network tester, Demo

Jason Miller – GAN network tester

Joseph **May** - Creating your own MIDI dataset, presentation, Gan network tester

Louis **Lizzadro** - Network Pioneer (GAN & RNN), RNN lead, demo

DEMO

QUESTIONS?

- Team Alcove – Music Generation
- Emily Musselman
- Evan Kubrick
- Jason Miller
- Joseph May
- Louis Lizzadro