
# GENERATIVE ADVERSARIAL NETWORKS AND SPOTIFY DATA

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# Problem Statement

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- Music production has become democratized
- Artists struggle with infinite optionality
- Rick Rubin: Apply constraints to your music workflow
- People Dislike Constraints
- Artists want a subtle nudge
- Create a tool that provides that subtle nudge

# Spotify API Platform

- Used with SpotiPy wrapper library
- Queried for ~948 house / artists
- Queried for 50 or all song ids from each artist available
- Pulled ~6,000 analysis files from popular songs using primary song keys
- Created a helper API handler due to lack of continuity of data structures received

# Analysis Data

- Time-series and single-value feature set
- Related to rhythm and other independent characteristics

# Feature Set

**Feature set synthesized into the following:**

```
['loudness’,
'beats_start_binary’,
'beats duration binary’,
'tatums start binary’,
'tatums duration binary’,
'bars start binary’,
'bars duration binary’,
'sections start binary’]
```

- **Wanted to Produce this data through a GAN**

# What is a GAN?

# Generators

INPUT:

Noise Vector

Dense Layers (7)

Output:

Data Structure of Same Dimensionality to Training Set (8 x 3000)

# Discriminators or ‘critics’

INPUT:

Output of the generator

Convolutional layers

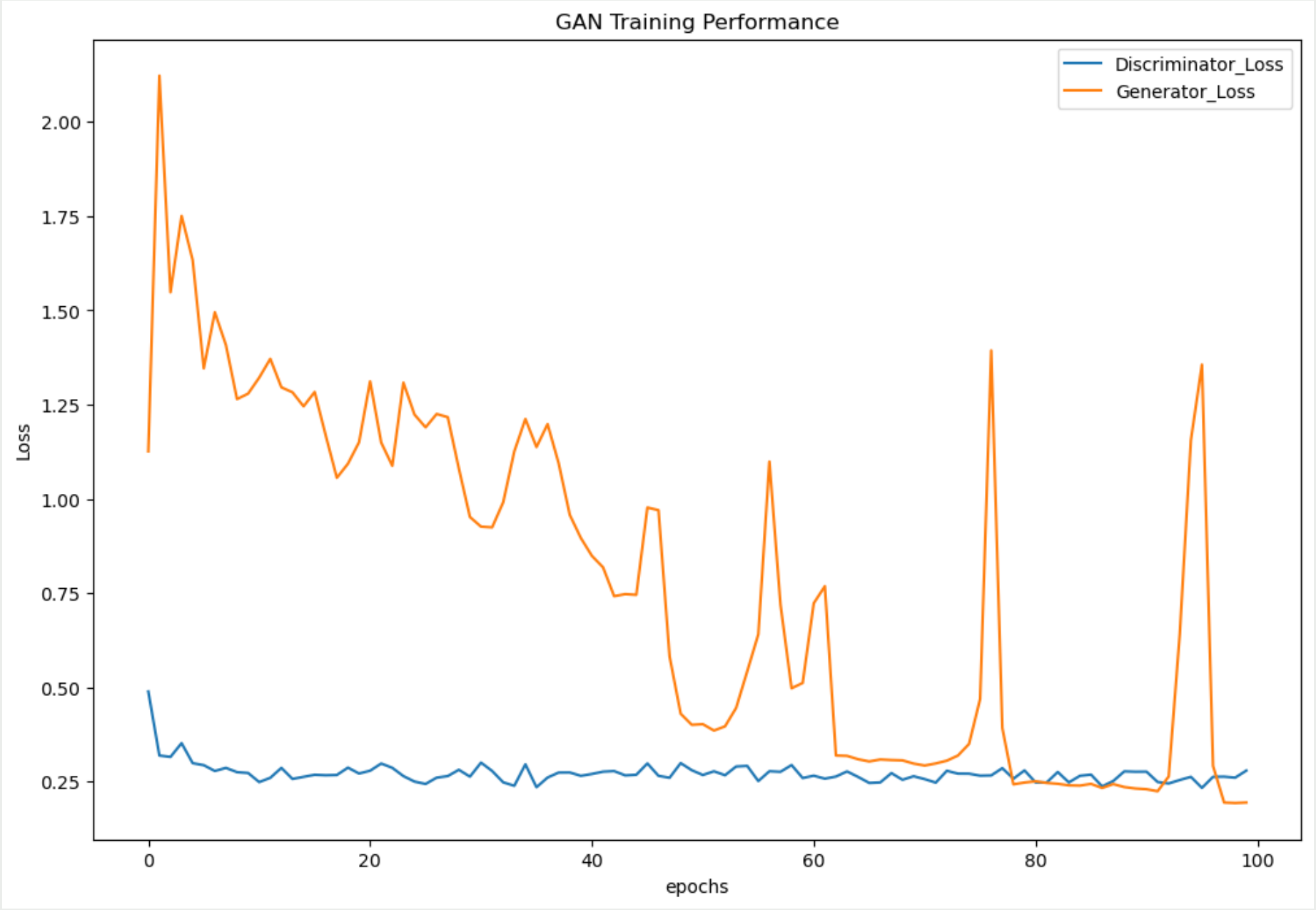
Dense and Max Pooling Layers

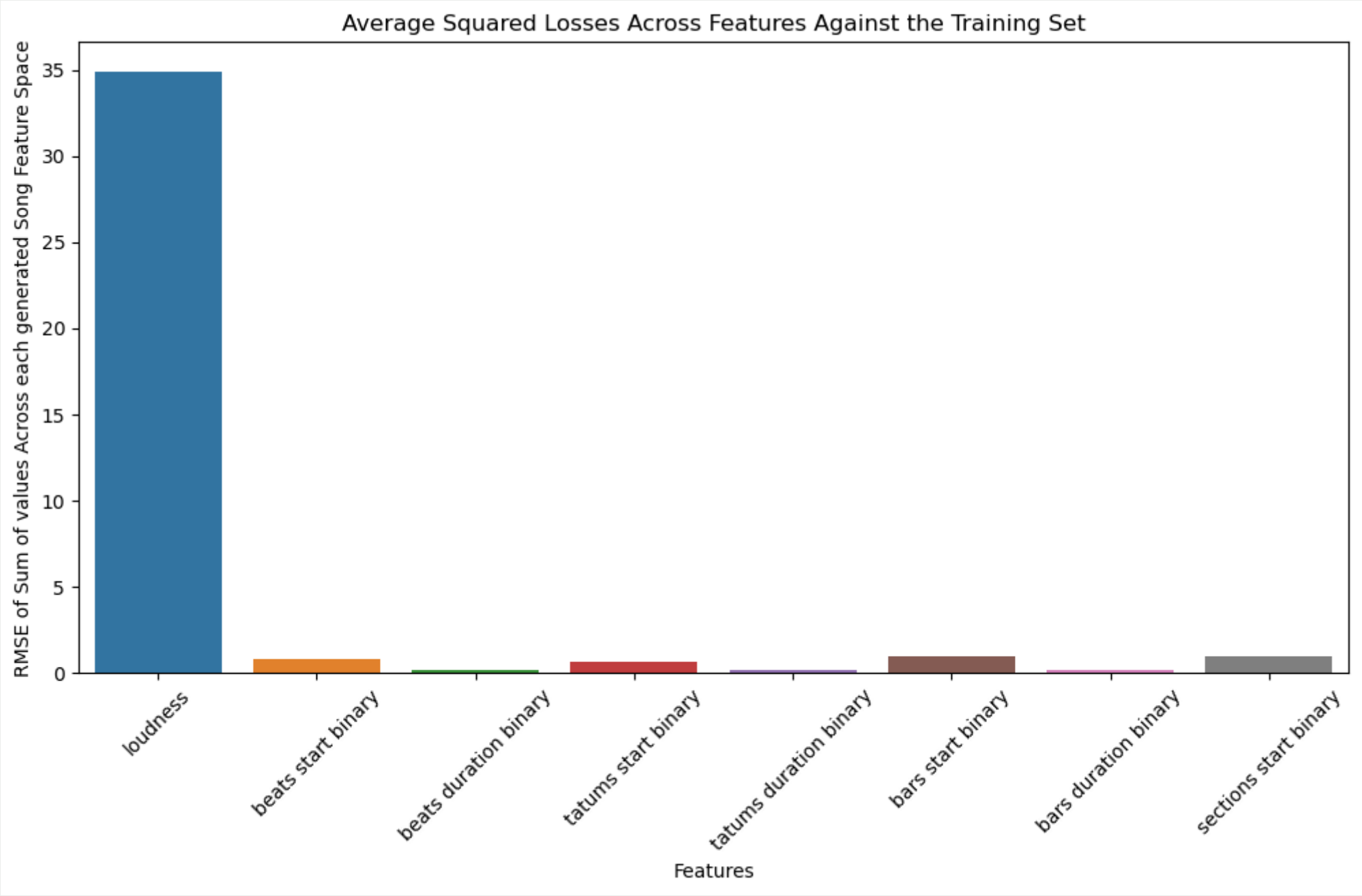
Output:

Binary Prediction –
Was this made by
the Generator or not?

# Loss Functions

- Generator ‘loses’ when Discriminator predicts correctly
- Discriminator ‘loses’ when it guesses wrong
- I used BinaryCrossEntropy() with these underlying factors utilized


GAN Training Performance
Discriminator_Loss
Generator_Loss
Loss
epochs
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0
20
40
60
80
100


Average Squared Losses Across Features Against the Training Set
RMSE of Sum of values Across each generated Song Feature Space
0
5
10
15
20
25
30
35
loudness
beats start binary
beats duration binary
tatums start binary
tatums duration binary
bars start binary
bars duration binary
sections start binary
Features

# MVP

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- Use output of the GAN to create a midi file
- Midi file into a DAW like Ableton live or Logic Pro
- *Jack sends .Wav file in chat*

# Conclusions