Music Genre Classification

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Contents:

Problem Statement:

The intersection of Music and Machine learning has many applications including audio tagging, music generation, and music classification.

Using the GTZAN dataset, the objective of this project is to classify 1000 songs from 10 different musical genres.

The Dataset:

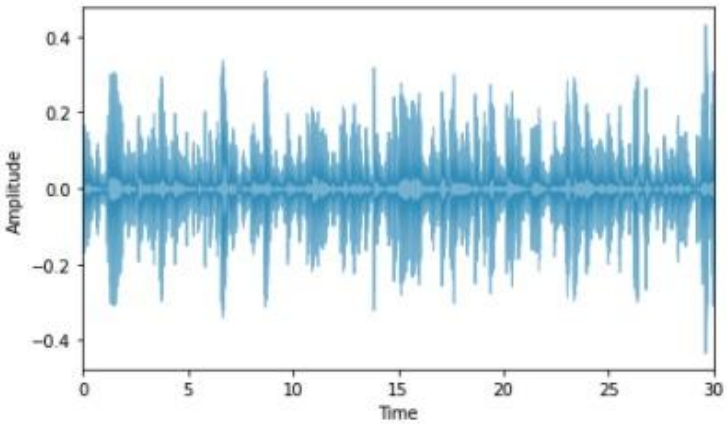
The GTZAN Genre Collection is composed of 1000 30-second segments of audio from 10 genres of music:

- Blues
- Classical
- Country
- Disco
- Hiphop
- Jazz
- Metal
- Pop
- Reggae
- Rock

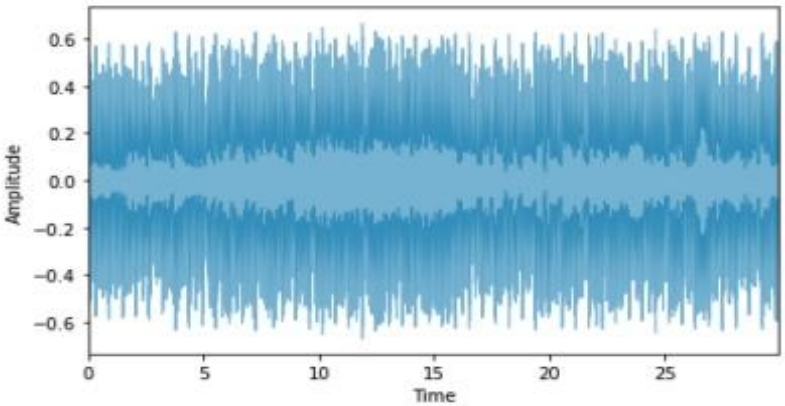
http://marsyas.info/downloads/datasets.html

Working with Audio:

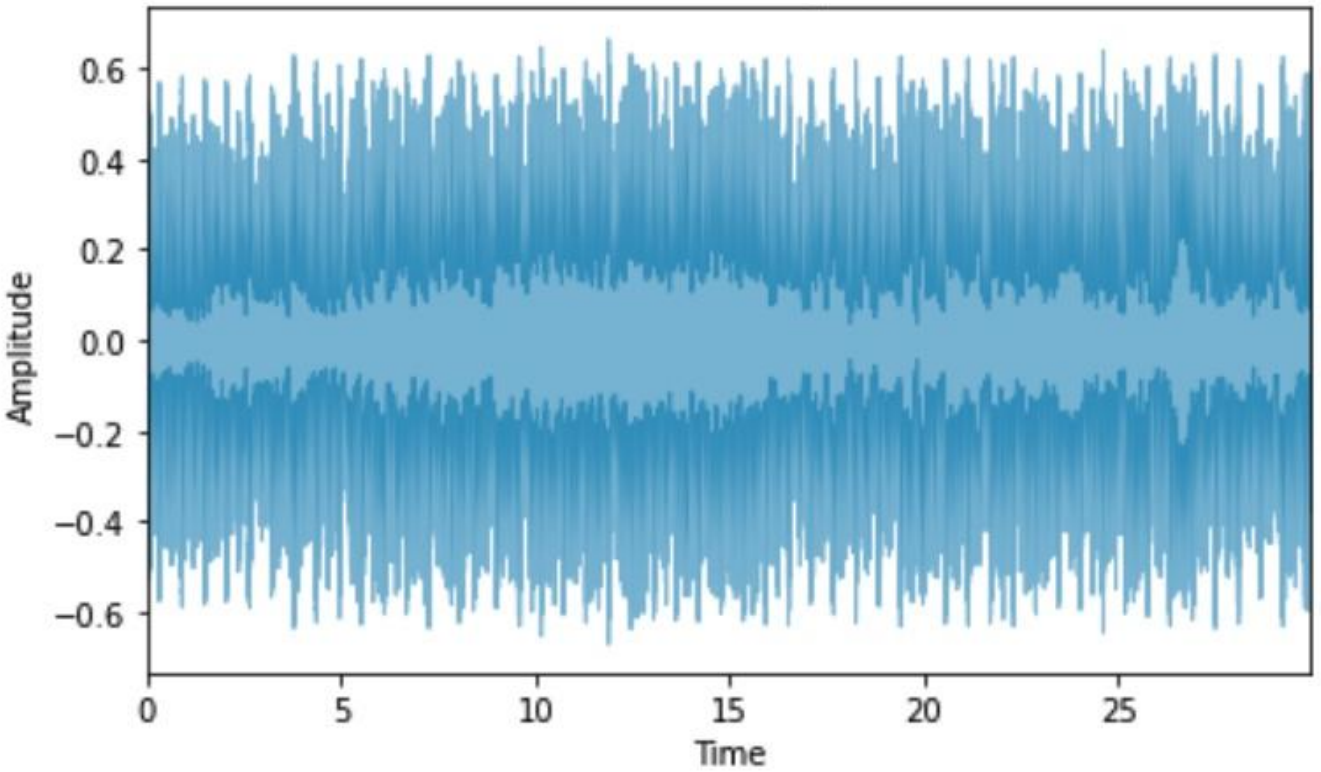
Jazz

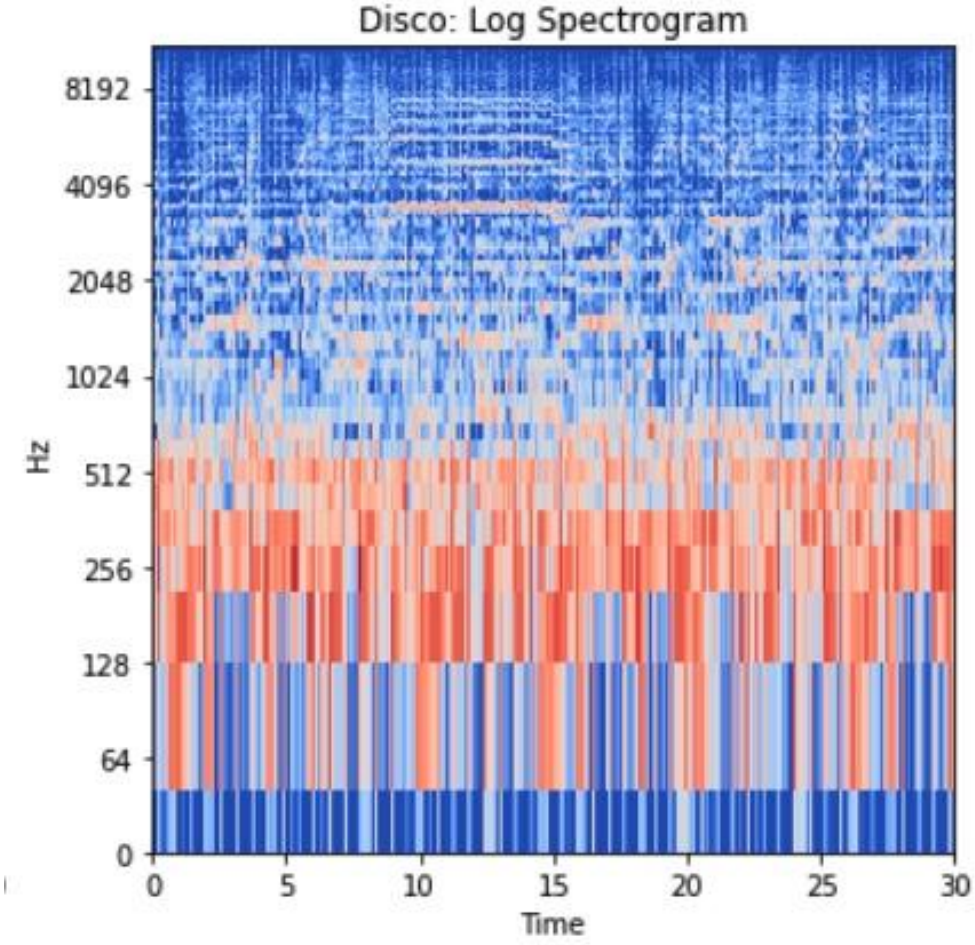


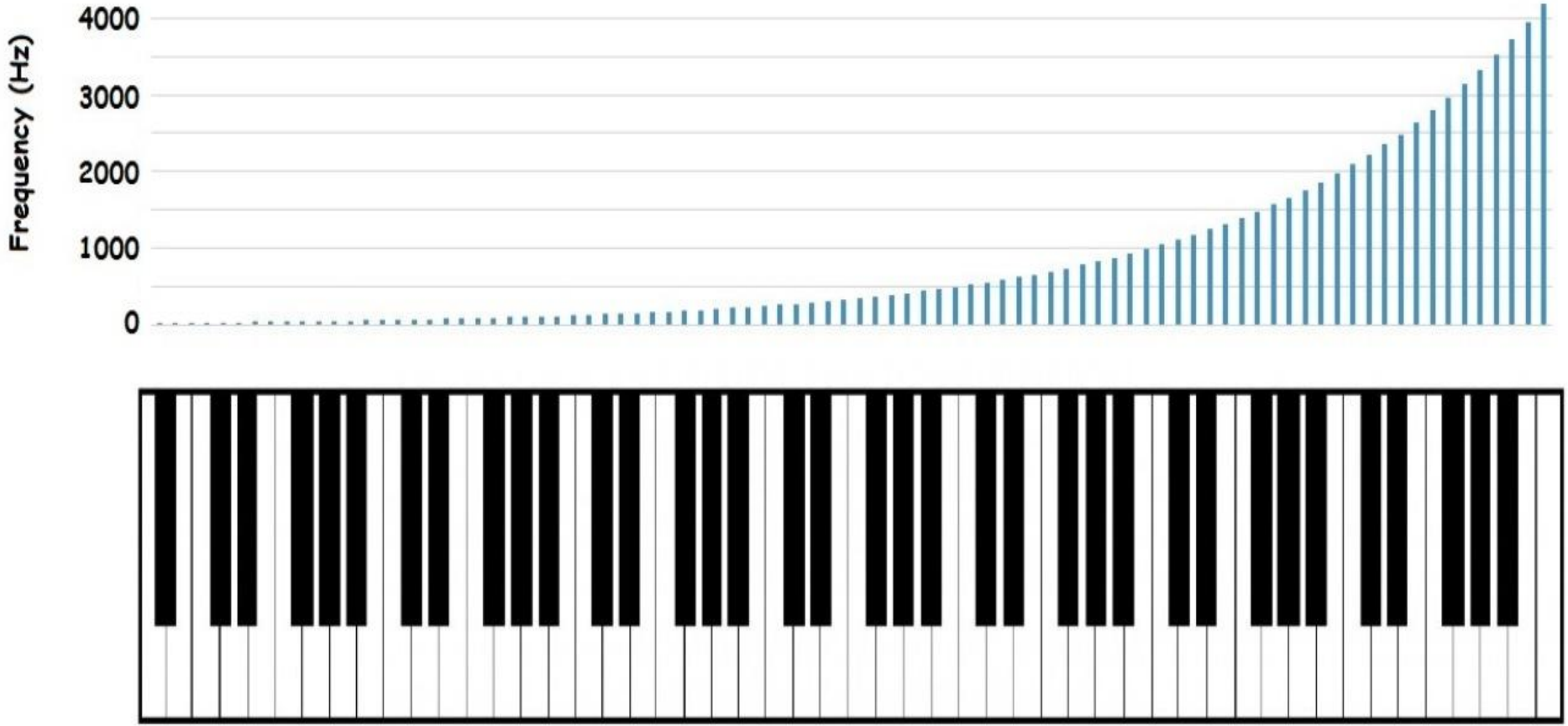
Disco

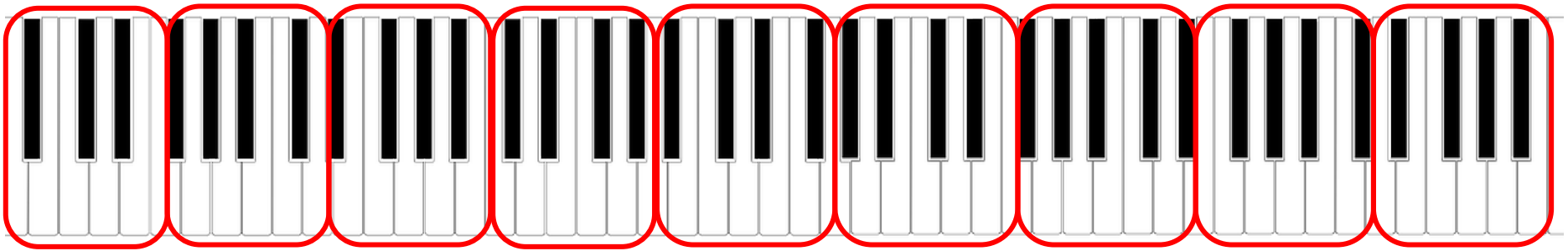


Disco

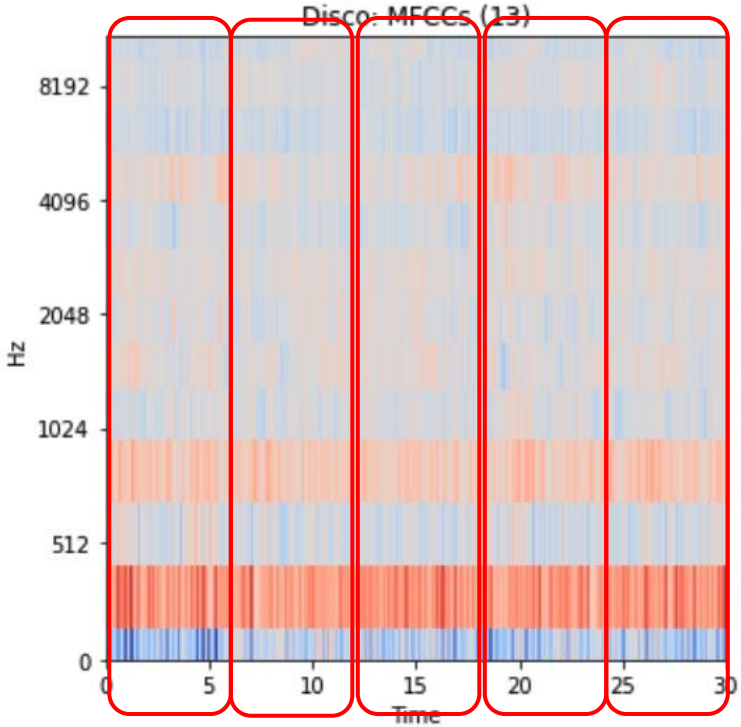



Disco: Log Spectrogram
8192
4096
2048
1024
512
256
128
64
0
Hz
0
5
10
15
20
25
30
Time

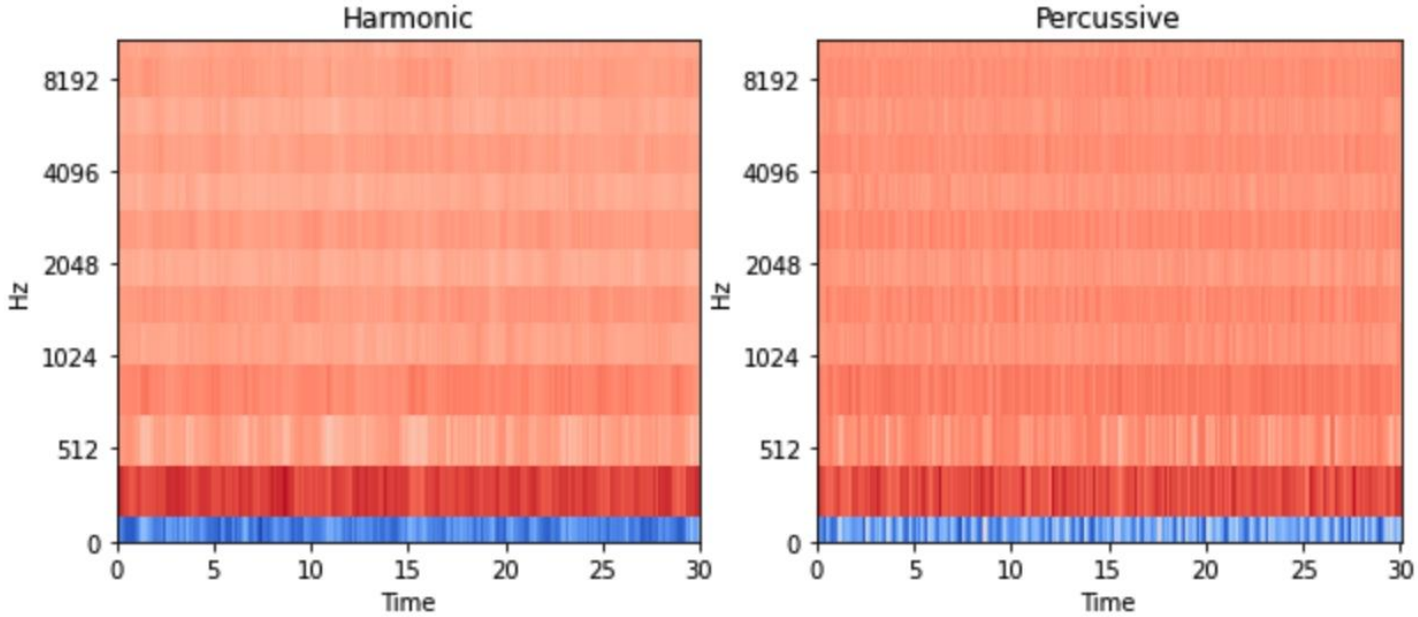

Frequency (Hz)
4000
3000
2000
1000
0



Mel-frequency Cepstral Coefficient (MFCC)



Harmonic-Percussive Source Separation:



Model:

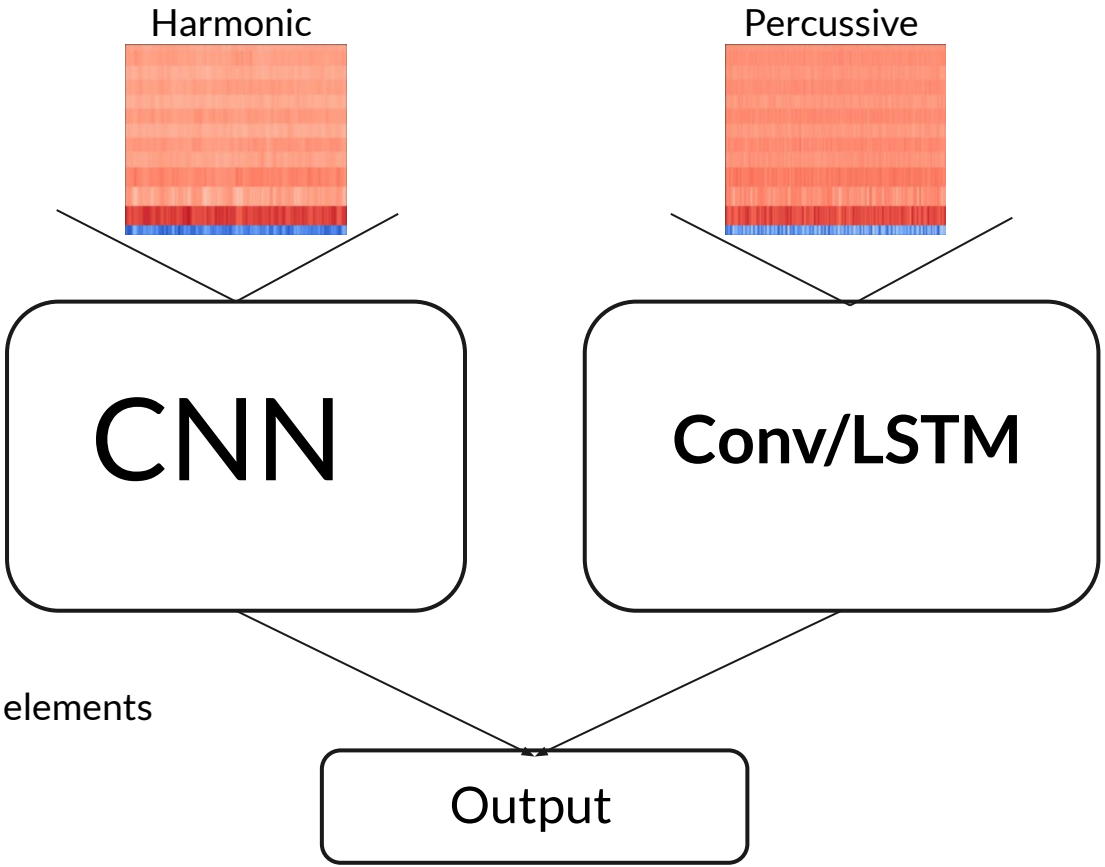
Model created using the Keras Functional API

-More flexible structure
-Allows for multiple inputs

-Convolutional Network for Harmonic elements

-Recurrent Network for Percussive elements

Accuracy: ~70%
Baseline: 10%



App Demo

Data Limitations:

- Can always use more data
- More precise feature extraction
- Genres interconnected/influenced

Future Work

Conclusions

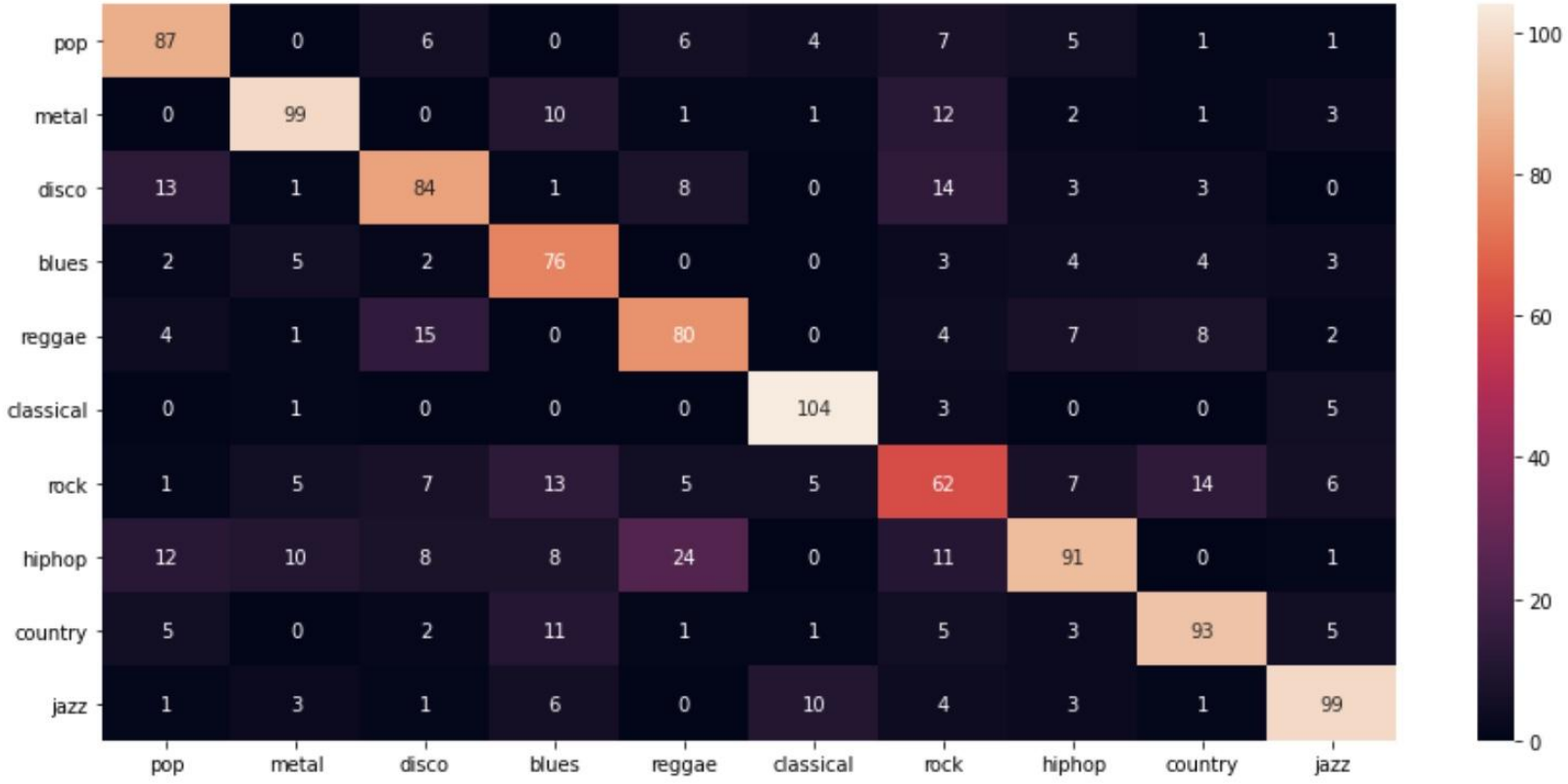
Machine Learning is a viable tool for music genre classification, but not without its shortcomings.

With the right data and a more open-minded application, it could be a more useful and powerful tool.

Questions?

Sources:

https://sound.pressbooks.com/chapter/pitch-and-frequency-in-music/
https://librosa.org/doc/latest/index.html
http://marsyas.info/downloads/datasets.html
https://tanthiamhuat.files.wordpress.com/2018/03/deeplearningwithpython.pdf
https://medium.com/@keur.plkar/audio-data-augmentation-in-python-a916000613e47


pop 87 0 6 0 6 4 7 5 1 1
metal 0 99 0 10 1 1 12 2 1 3
disco 13 1 84 1 8 0 14 3 3 0
blues 2 5 2 76 0 0 3 4 4 3
reggae 4 1 15 0 80 0 4 7 8 2
classical 0 1 0 0 0 104 3 0 0 5
rock 1 5 7 13 5 5 62 7 14 6
hiphop 12 10 8 8 24 0 11 91 0 1
country 5 0 2 11 1 1 5 3 93 5
jazz 1 3 1 6 0 10 4 3 1 99
pop metal disco blues reggae classical rock hiphop country jazz
100 80 60 40 20 0