

# Chroma Analysis of *Master of Puppets*

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# Hypothesis and Project Objectives:

- Considered a classic of the genre, the majority of tracks on Metallica's *Master of Puppets* (1986) are centered around either musical notes E or F. Chroma analysis will reveal a clear concentration in these bins across whole audio files.
- Effectively implement a function that runs `chroma_stft` and `chroma_cqt` from Librosa on each track of the record and make separate plots for each.

# Technical parameters

Algorithms - Librosa chroma\_stft, chroma\_cqt (function w/ plotting included)

File format - MP3

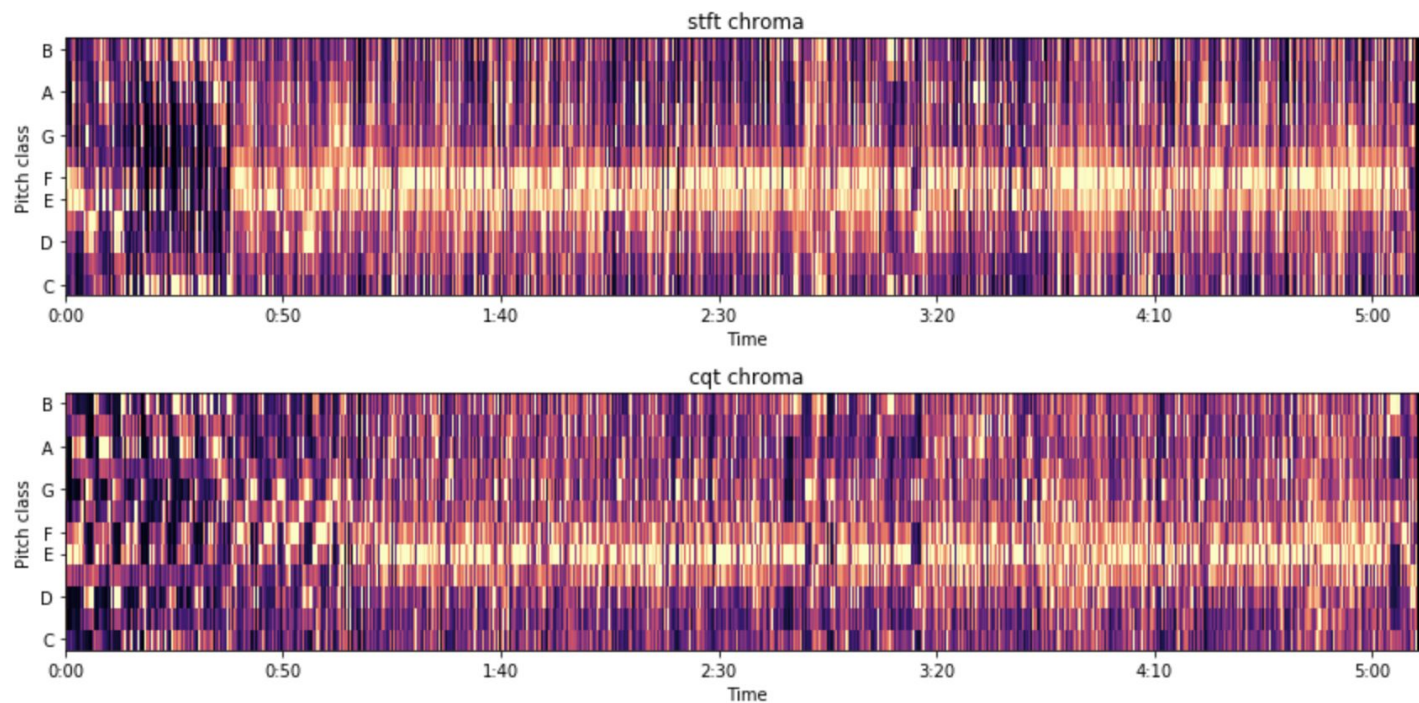
Sample rate - 44100

fft window - 2048 samples

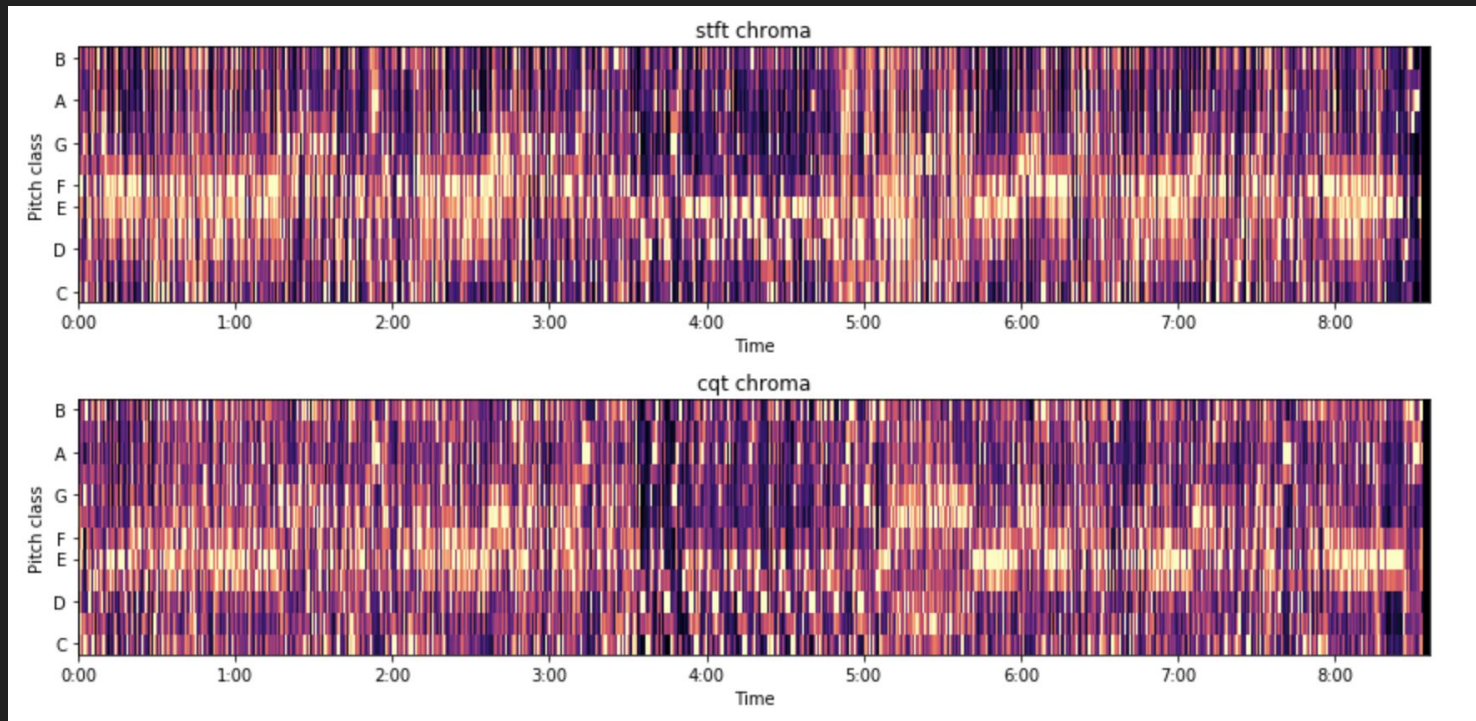
Hop size - 512 samples

Bins - 12

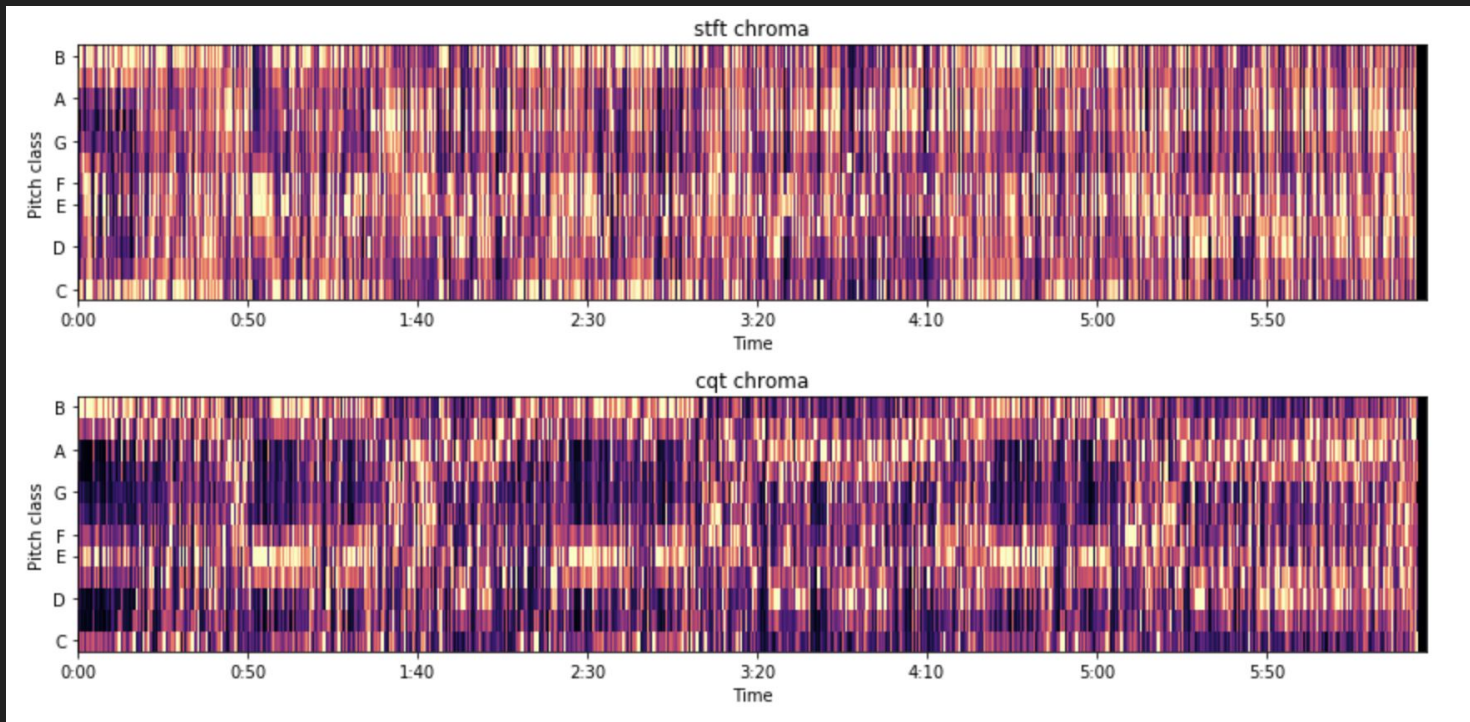
# Results - Battery



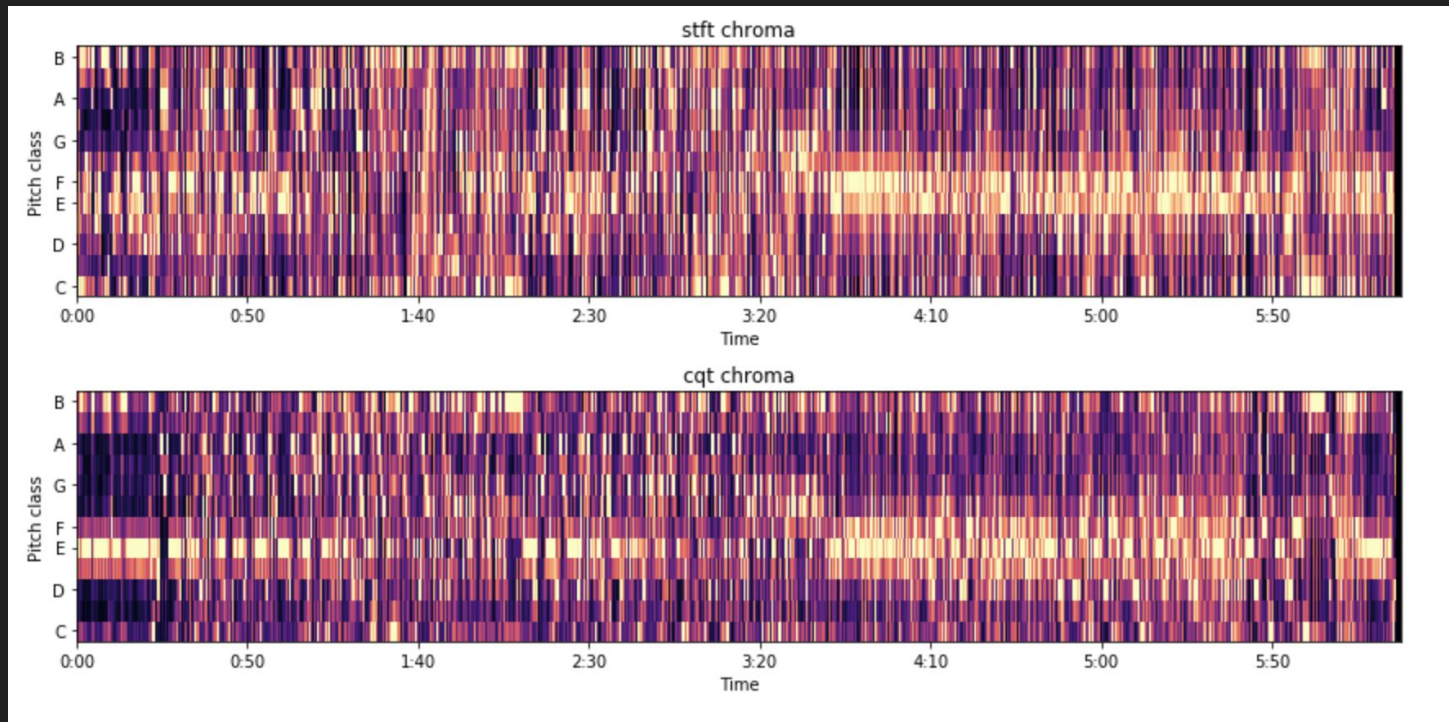
# Master of Puppets



# The Things That Should Not Be

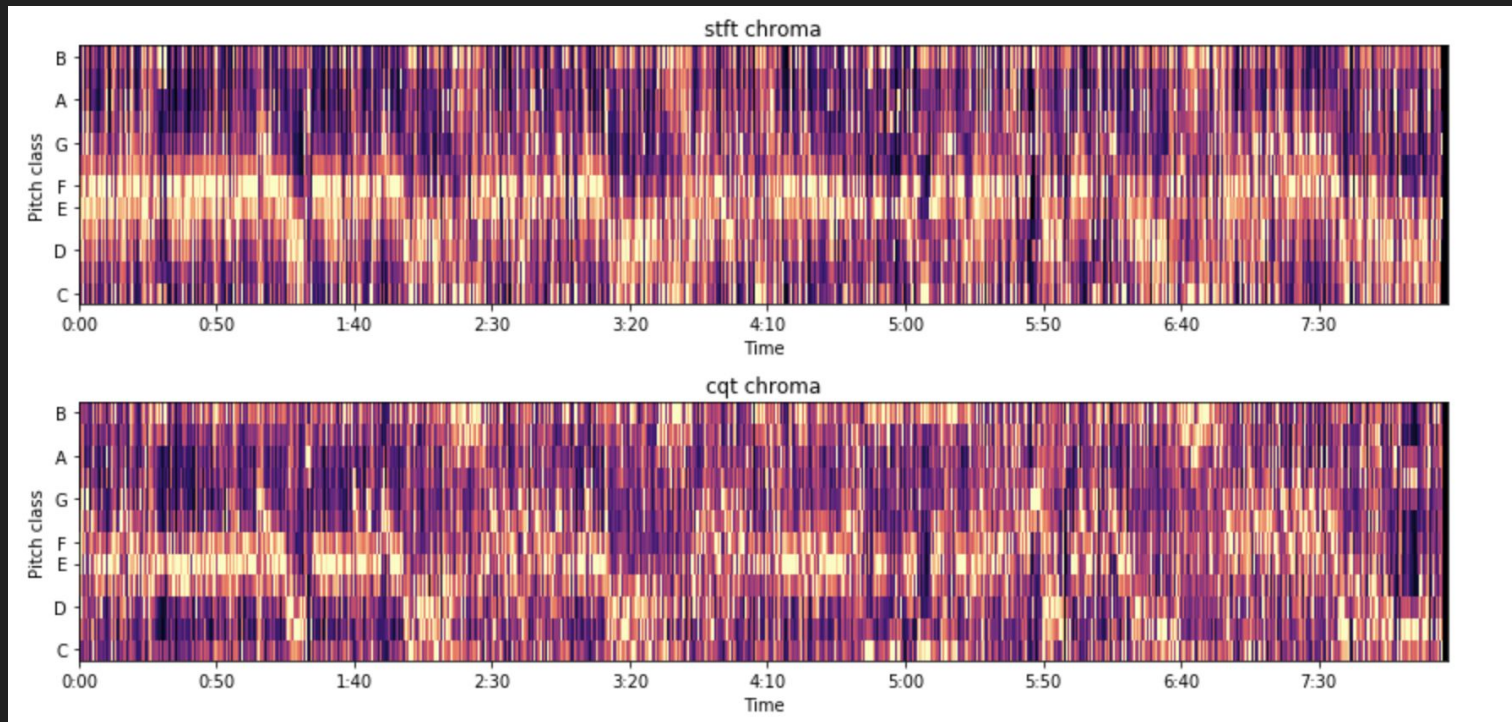


# Welcome Home



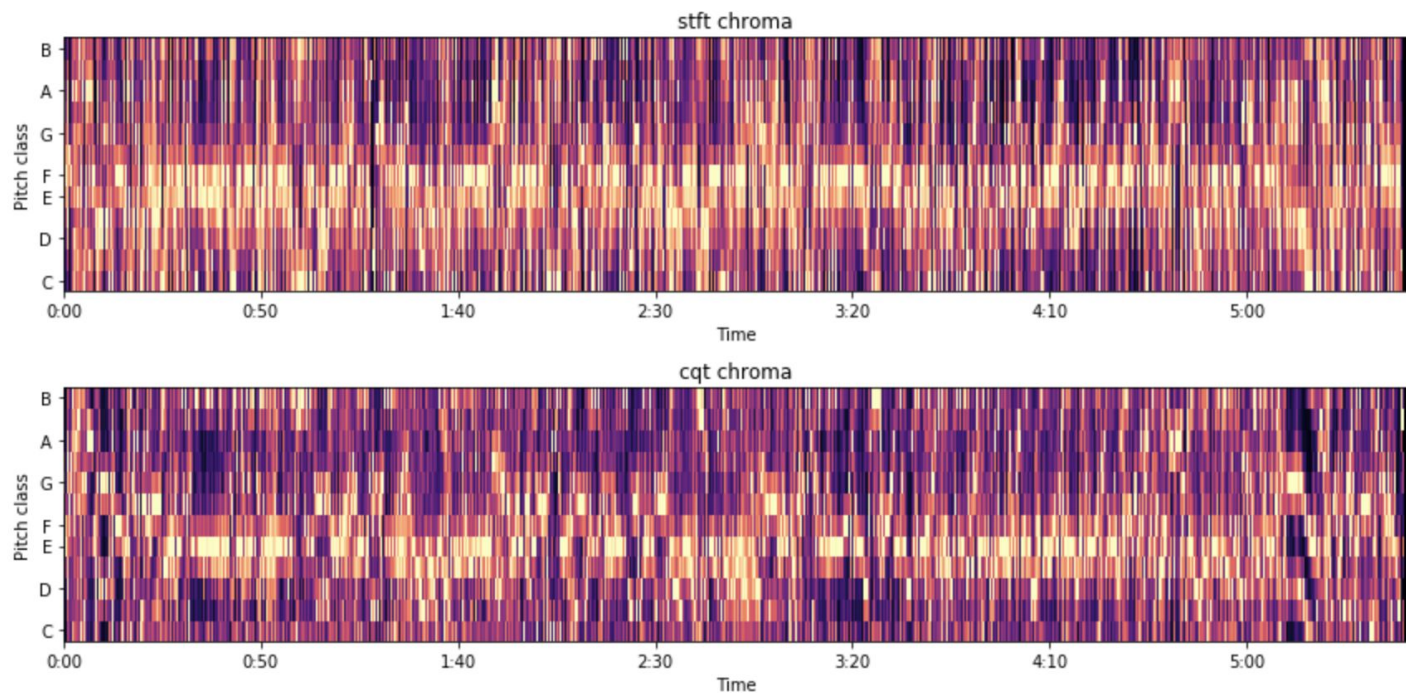


# Disposable Heroes

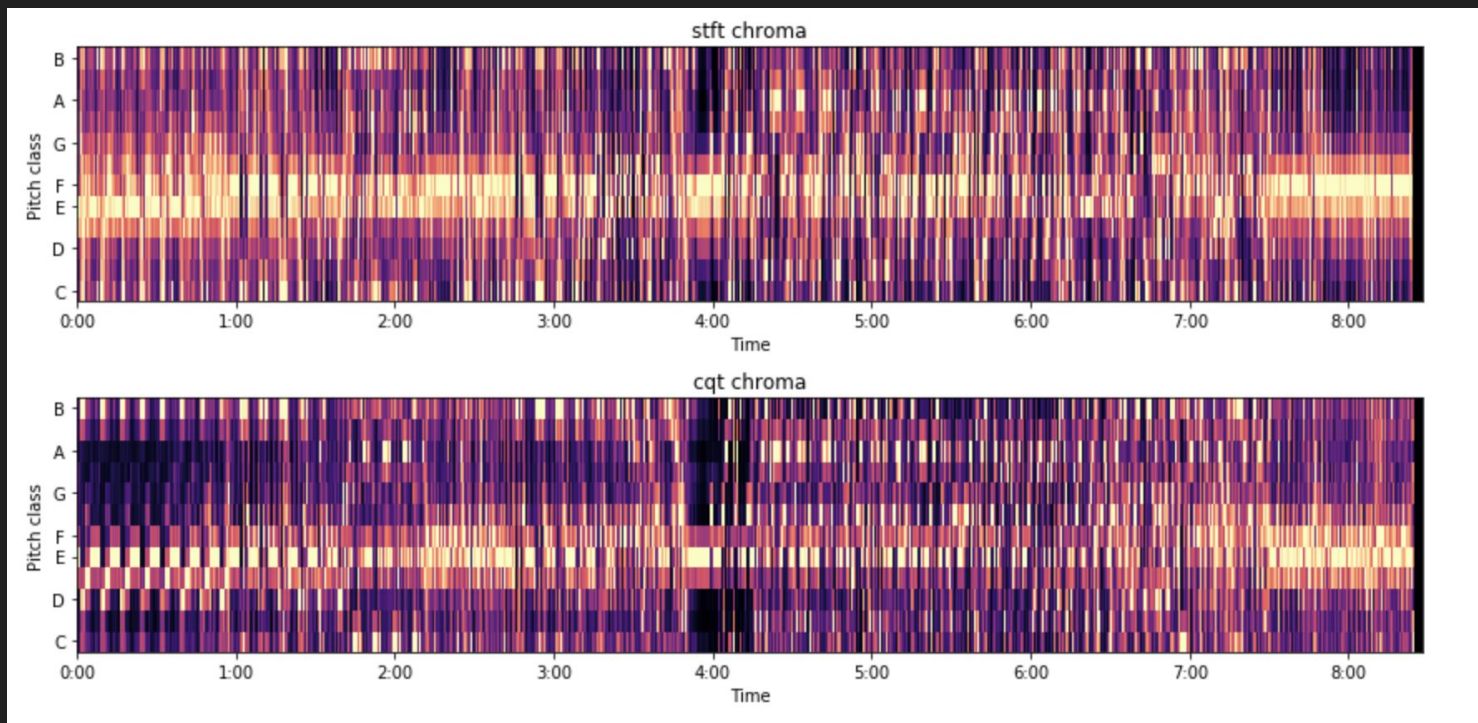




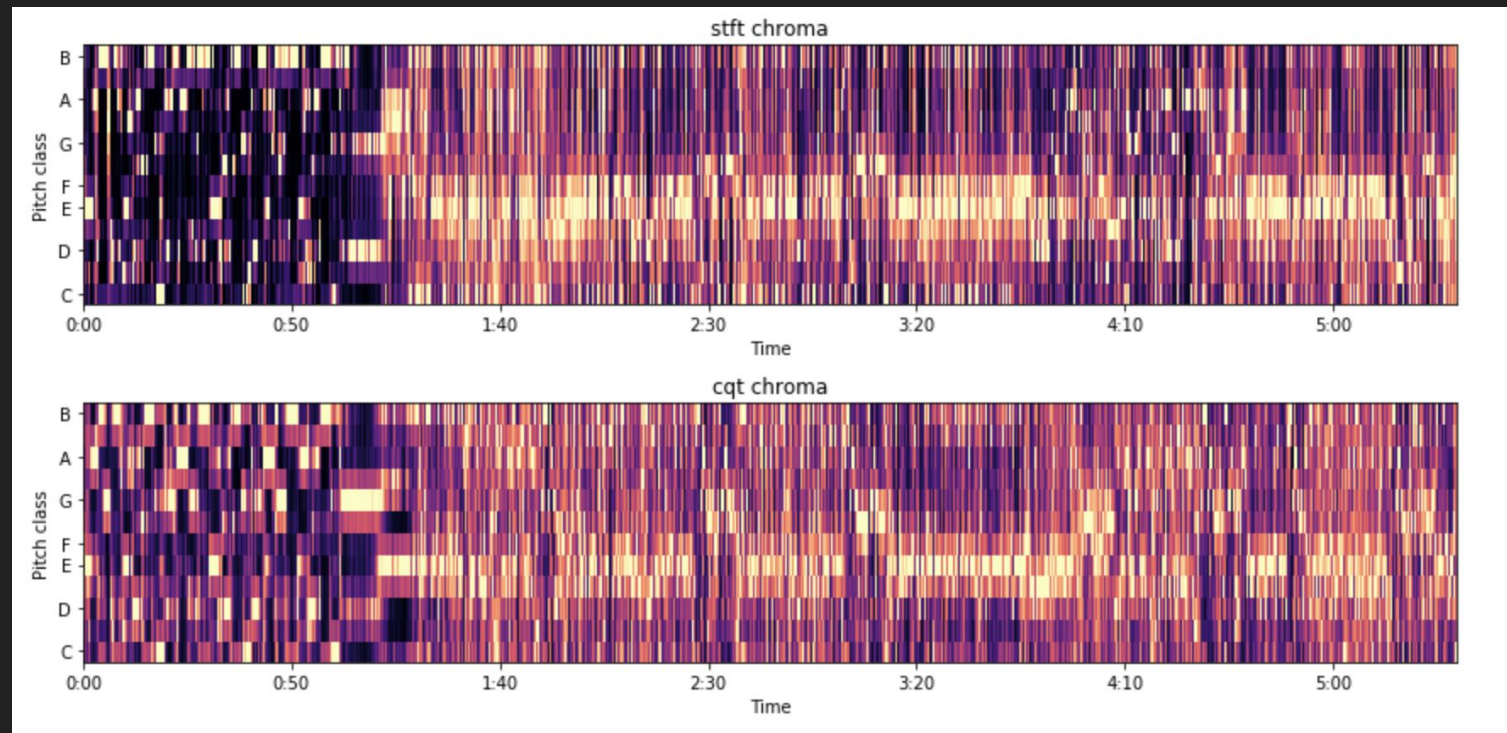
# Leper Messiah



# Orion



# Damage Inc.



# Conclusion:

It appears that on most of the tracks of the record, there is a clear density around the E and F note bins for significant portions of the audio recording. This proves the original hypothesis correct.

Although more research would be required to determine this, one could assume other metal records of the same genre may display similar tendencies to center around E and F centers.

Code available at:

<https://github.com/gbouvier1/Computational-Musicology-Fall-2018-/tree/master/finalProject/code>