Ratio Estimation for Dynamic Range Compressors

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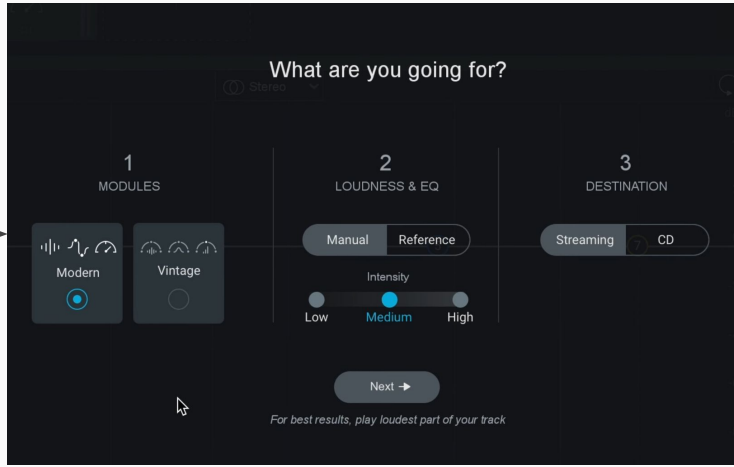
Automatic Control Through The Ages



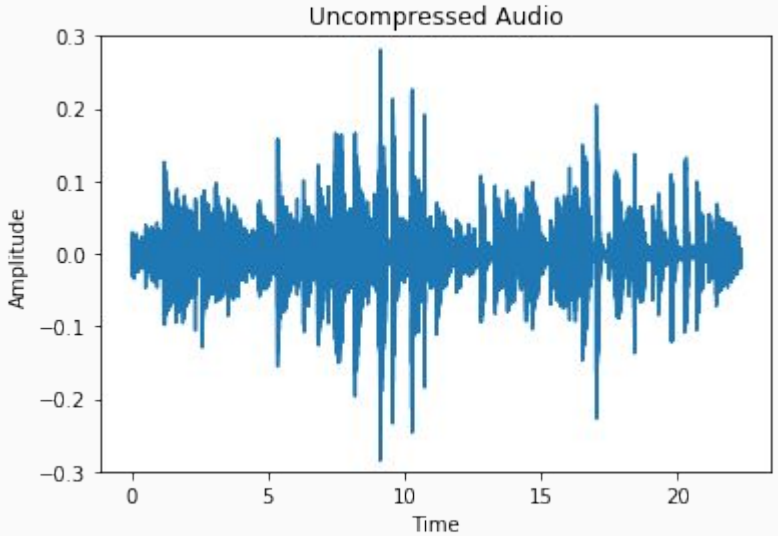
Related Work

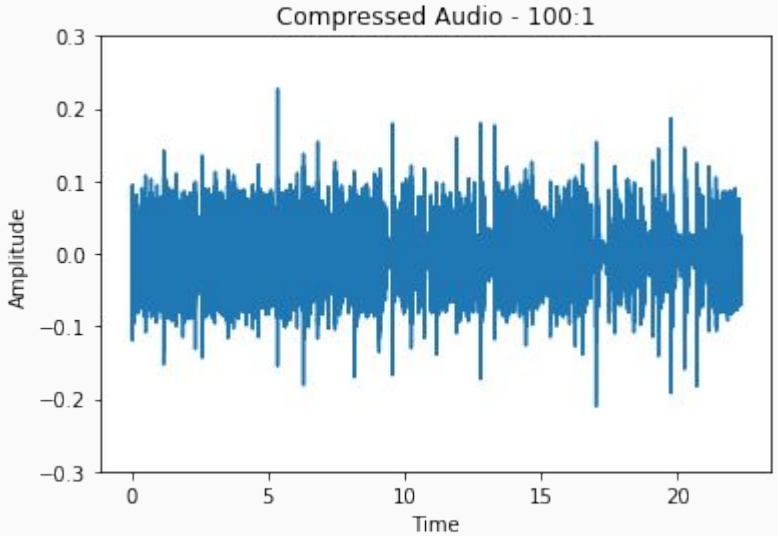
1. Parameter Automation in a Dynamic Range Compressor (2013)
    a. High level user control—adapts to input signal
    b. Real time, time domain features
2. Feature Selection for Dynamic Range Compressor Parameter Estimation (2018)
    a. Using reference audio to set parameters
    b. Variety of time domain and frequency domain features

Dataset

1. GuitarSet
    a. “Mic” subset
    b. 360 examples
        i. Split into 5 second segments
    c. Good mix of transient and tonal information
2. Compression
    a. Segments compressed at random ratios, then features are extracted
    b. Feedforward, Peak detector
    c. Ratios = 1:1, 8:1, 100:1, Threshold = -40 dB, attack = 1.3 ms, release = 300 ms, knee = 0 dB

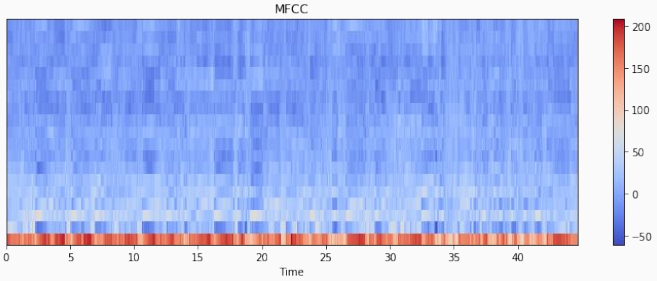
Compression Visualized

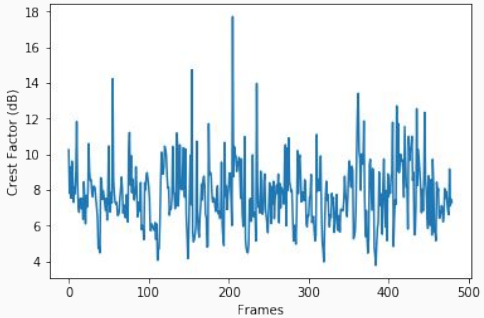




Features

1. MFCC
   a. Timbre
2. Crest Factor
   a. Dynamic Range—ratio of peak level to RMS level
   b. Frame Length = 2048 samples, no overlap
   c. Converted to dB



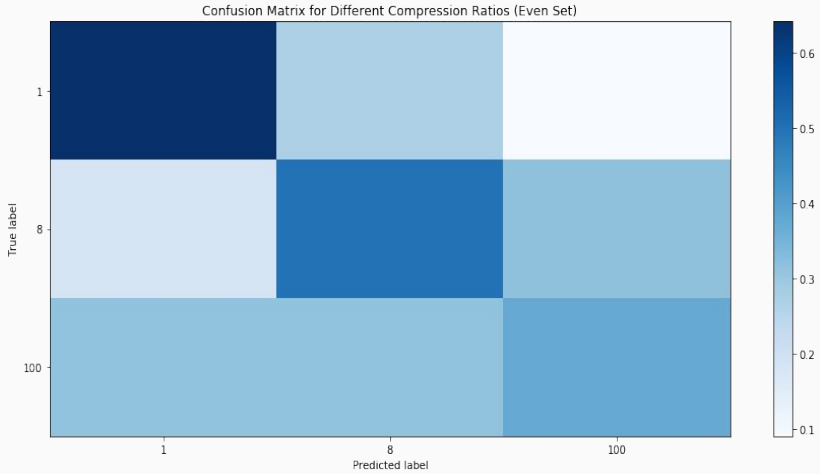


Training and Evaluation

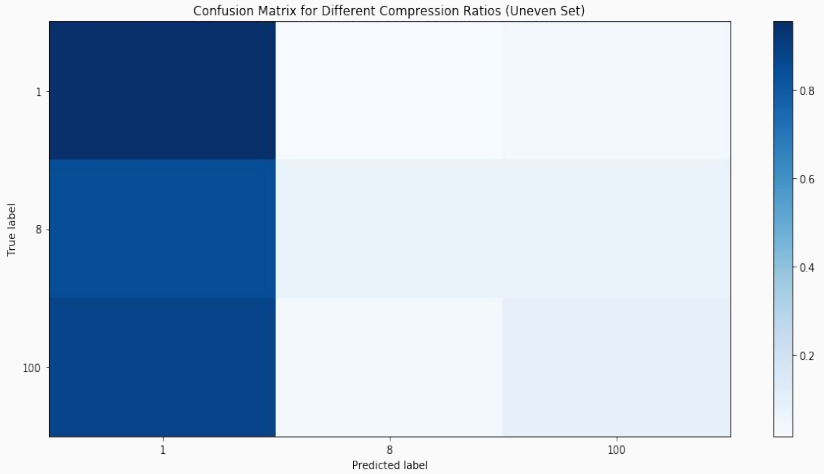
1. 2 datasets
    a. “Even” - 668 1:1, 666 8:1, 666 10:1
        i. training: 1600, validation: 200, training: 200
    b. “Uneven” - 2004 1:1, 666 8:1: 666 10:1
        i. training: 2670, validation: 333, test: 333
        ii. would overlap / more data help?
2. scikit-learn Nearest Neighbors

Results

Accuracy Score = .505
Balanced Accuracy Score = 0.505
f1 = 0.50
k = 50



Accuracy Score = 0.607
Balanced Accuracy Score = 0.373
f1 = 0.508
k = 10



Discussion

1. How did we do?
    a. Compressed / not compressed detector
        i. We need better discrimination
2. Data
    a. More examples - use all capture methods?
    b. Use multiple variations of same example
    c. Split example at note onsets?

Thank You!


Glue Compressor
cytomic
Attack
.3
1
3
.1
10
.01
30
Release
.4
.6
.8
0
5
10
15
20
Clip
Soft
Range