

Background

- Do machine learning procedures which extract audio features actually extract musically meaningful information?
- Audio quality is not often considered and reported in research setups
- Could have an impact on audio feature extraction.
- Essentia is an open-source C++ library for audio analysis and audio-based music information retrieval.
- Impact on rock genre highest.
- BPM not explicitly researched in earlier work.

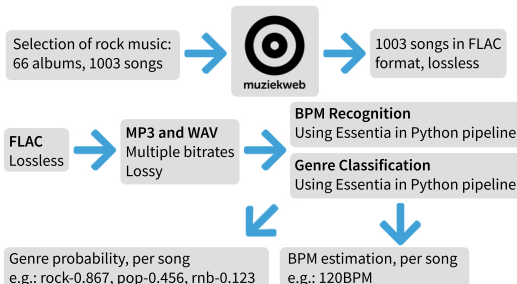
Research questions

How do different audio codecs and audio quality impact genre classification and beats per minute (BPM) recognition in Essentia?

- What is the performance of genre classification with FLAC encoding?
- What is the performance of BPM recognition with FLAC encoding?
- How is genre classification influenced by MP3 quality/bitrates?
- How is BPM recognition influenced by MP3 quality/bitrates?
- How is genre classification influenced by WAV quality/bitrates?
- How is BPM recognition influenced by MP3 quality/bitrates?

Method

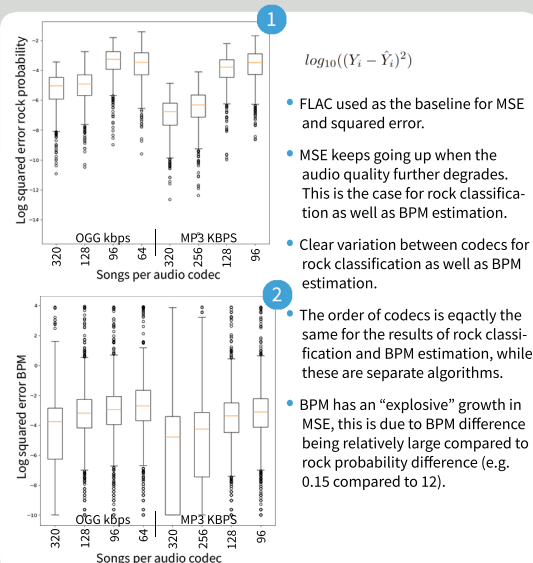
To obtain music files in their original format, we collaborated with Muziekweb. They are run by music professionals, among which musicologists. All their albums are labeled with their genre, this is used to hand-pick 66 albums as a dataset for this research.



Results

Mean squared error used as measure, tables visualized in the boxplots on the right, using the log (base 10) squared error.

Audio codec	MSE rock probability	Audio codec	MSE BPM
FLAC	0	FLAC	0
MP3 320 kbps	0.000001	MP3 320 kbps	18.640363
MP3 256 kbps	0.000002	MP3 256 kbps	27.831408
OGG 320 kbps	0.000024	OGG 320 kbps	29.732891
OGG 128 kbps	0.000054	MP3 128 kbps	37.494367
MP3 128 kbps	0.000449	OGG 128 kbps	66.388747
MP3 96 kbps	0.001160	MP3 96 kbps	68.39757
OGG 96 kbps	0.001369	OGG 96 kbps	75.439119
OGG 64 kbps	0.001511	OGG 64 kbps	112.913352



Conclusions

- Audio codecs and quality have a clear influence on the results in MIR.
- Audio codecs and quality should be more explicitly considered in research setups
- No conclusion on which audio codec is best, more data is needed for this.