Chasing Wild Horses: Evaluating Music Content Analysis with Irrelevant

Konrad Swierczek[1], Michael Schutz[2]
swierckj@mcmaster.ca schutz@mcmaster.ca

[1] Department of Psychology, Neuroscience & Behaviour, McMaster University
[2] School of the Arts, McMaster University

Background

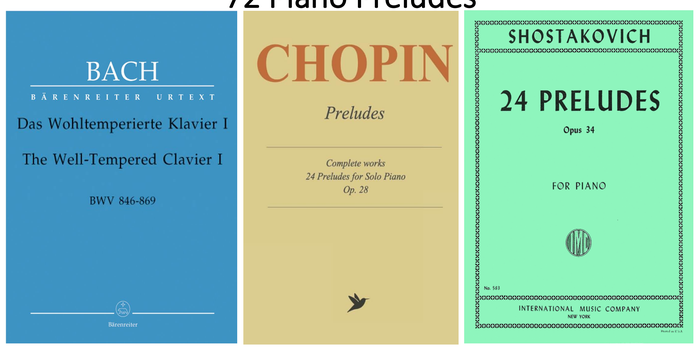
- Evaluation is central to advancing Music Information Retrieval *(Downie, 2004; Sturm 2016)*
- Different versions of the same composition result in inconsistent extractions of structural features like mode and onsets *(Swierczek & Schutz, under review)*

How do specific musical and audio properties influence feature extraction?

- We synthesize audio from MIDI to examine the individual influence of manipulations on a variety of features and analysis tools

Method

72 Piano Preludes



MIRtoolbox 1.8.1

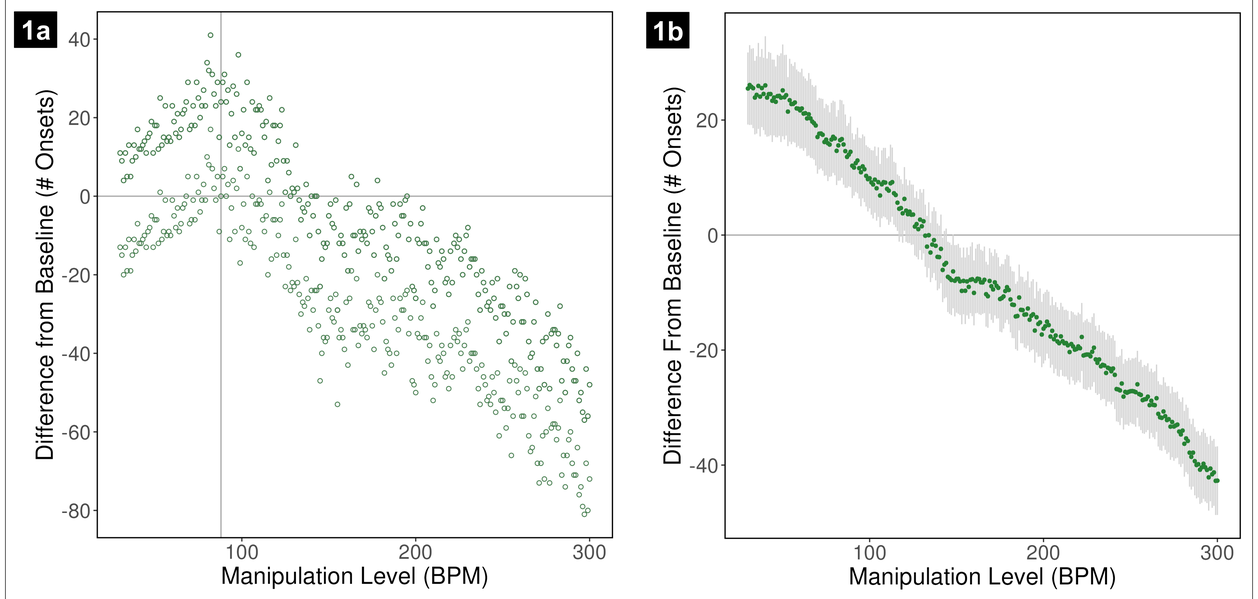
librosa

ESSENTIA

Summary

- We propose a method for evaluating MIR features that does not rely on ground truth
- We examine five manipulations that may influence the extraction of features
- Onset detection is influenced by MIDI manipulations, all features are robust to quality.
- **Applications**: evaluation, algorithm selection, parameter optimization

Results



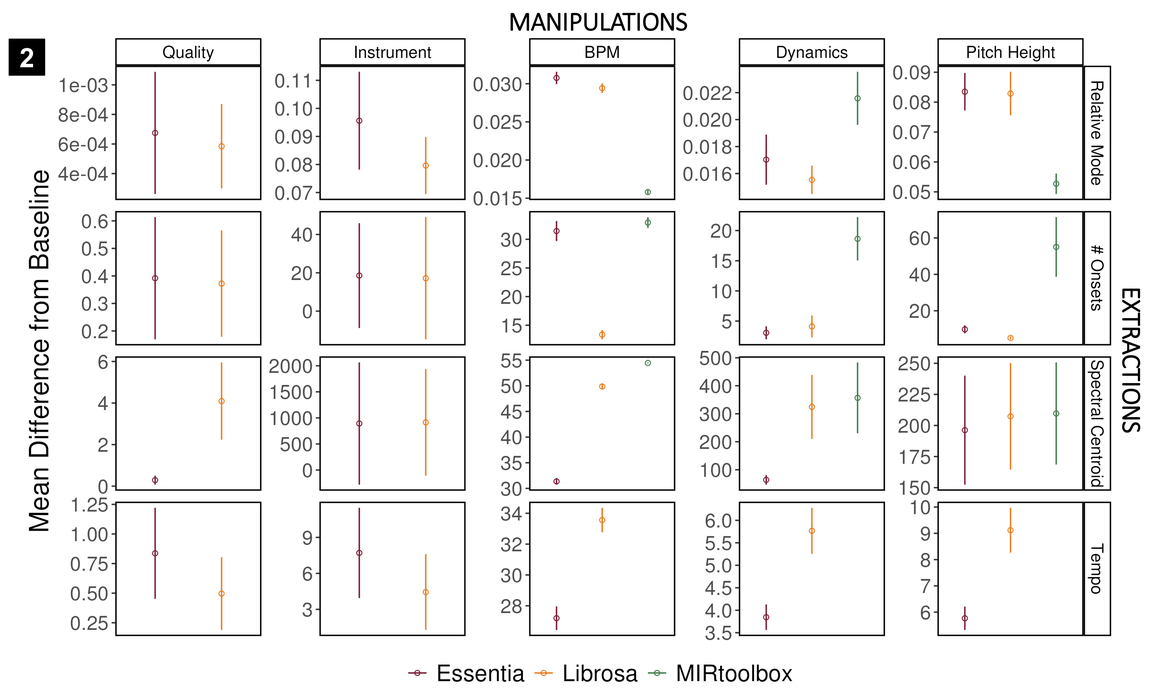


Figure 1a) One example of manipulations across one piece (Bach's WTC Prelude in F# Minor). Shows the difference in onsets as extracted by MIRtoolbox for manipulations of tempo between 30 and 300 BPM. The baseline tempo value for this piece is 88 BPM.
Figure 1b) A summary of manipulations for all 72 pieces in the corpus. Points indicate the mean of 72 pieces for that manipulation level and the gray lines indicate a 95% confidence interval.
Figure 2) Mean and 95% confidence interval for differences from baseline across 3 tools and 4 features for 5 different manipulations

MINISTRY OF Ontario RESEARCH AND INNOVATION
Canada Foundation for Innovation
Fondation canadienne pour l'innovation
NSERC CRSNG
Social Sciences and Humanities Research Council of Canada
Conseil de recherches en sciences humaines du Canada
Canada


McMASTER INSTITUTE FOR
MUSIC &
THE MIND
LIVELab
DIGITAL
MUSIC LAB


MINISTRY OF
Ontario
RESEARCH AND INNOVATION
Canada Foundation
for Innovation
Fondation canadienne
pour l'innovation
NSERC
CRSNG
Social Sciences and
Humanities Research
Council of Canada
Canada
Conseil de recherches
en sciences humaines
du Canada


McMASTER INSTITUTE FOR
MUSIC &
THE MIND
LIVELab
DIGITAL
MUSIC LAB
MINISTRY OF
Ontario
RESEARCH AND INNOVATION
Canada Foundation
for Innovation
Fondation canadienne
pour l'innovation
NSERC
CRSNG
Social Sciences and
Humanities Research
Council of Canada
Canada
Conseil de recherches
en sciences humaines
du Canada

Symbolic Notation

Digital Audio Files