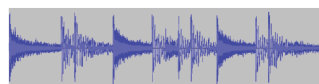


Modelling features of musical audio signals using machine learning algorithms

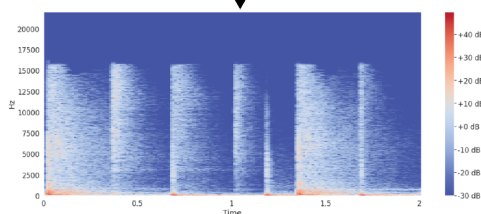
Author: Martin Žák, supervisor: Ing. Lukáš Marták

Motivation

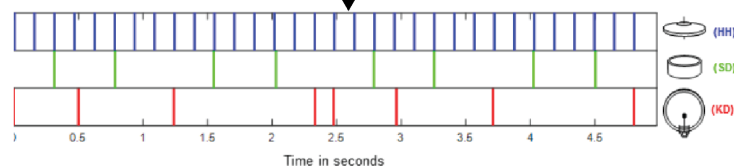
Automatic drum transcription (ADT) could be part of software teaching drums using gamification, that would make practicing more attractive. ADT process involves drum separation that would allow DJs and music producers change separately various properties and characteristics of drum instruments. Music search could be also improved by extracting rhythm and finding songs with similar “groove”.



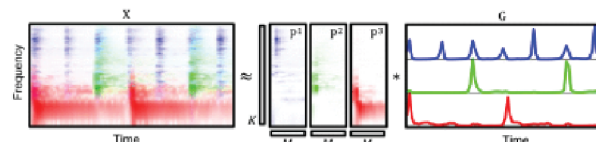
Spectral
analysis



Automatic drum
transcription



Method 1. PFNMFD



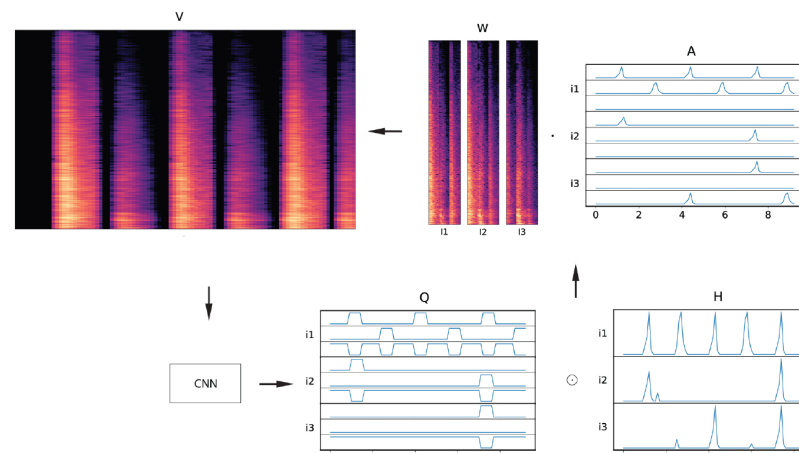
Datasets

- IDMT-SMT-DRUMS
 - 26.5 minutes of music
 - only drums
- ENST-DRUMS
 - 3.5 hours of music
 - drums + other instruments

Results

Algorithm	AVG F1
PFNMFD	0.92
NMFD	0.9
SANMF	0.85
PFNMFD	0.72
AM1	0.72
AM2	0.7

Method 2. NMFDQ



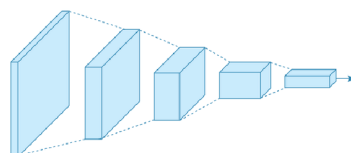
Datasets

- MDB-DRUMS
 - 20 minutes of music
 - only drums with additional drum technique information

Results

- in addition to the transcription of ordinary strikes, our method do transcription of drum techniques unlike state-of-the-art systems usually neglecting it
- confirmed our proposed “fault-tolerance” method property ensuring resistance to CNN misclassifications

Method 3. Prototypical CNN



Datasets

- SLAKH-2100
 - 140 hours of music
 - harmonic instruments with drums and additional drum technique information
- MDB-DRUMS

Results

- improvement of overall performance thanks to using n-ary classification during inference phase
- presence of harmonic instruments in train set doesn't effect discriminative space model in a way to better recognize drum techniques