Software for Music Analysis
An Overview

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Agenda

1. Introduction
2. Digital Music Registration
3. Software for Music Analysis
4. Practical Examples
5. Conclusion
6. Questions, Discussion
1. Introduction

This talk gives an overview of:

- The way music can be represented digitally
- Software for analysis of digital music

The aim is to gain insights, get ideas for your master thesis.
2. Digital Registration
2. Digital Registration - Score

Scanned Score

- Lay-out
- Musical contents
- Hard to process (OMR)
2. Digitale Registration - MusicXML

<note>
  <pitch>
    <step>E</step>
    <alter>-1</alter>
    <octave>3</octave>
  </pitch>
  <duration>24</duration>
  <voice>1</voice>
  <type>quarter</type>
  <stem>up</stem>
  <notations>
    <tied type="start"/>
  </notations>
</note>

MusicXML

- Automatically to process
- Lay-out and contents
- Little performance information
2. Digitale Registration - MIDI

MIDI score
✓ Automatically to process
✓ Musical contents and lay-out
✗ Little performance information

MIDI performance
✓ Automatically to process
✓ 'All' information about performance, musical contents
✗ No lay-out info
2. Digital Registration

![Diagram showing the relationship between Notation, Performance, Signal, and Symbolic with mentions of MIDI, MusicXML, Score, and Audio.]
3. Software for Music Analysis

![Diagram showing the categories of Software for Music Analysis: Signal, Performance, Notation, Symbolic. The software listed includes Tartini, Beatroot, OMR-Software, Sonic Visualiser, MelodicMatch, Tarsos, Humdrum, and Music21.](image-url)
3. Software voor muziekanalyse

<table>
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Signal

Symbolic
3. Software – Sonic Visualiser

- Timbre
- Waveform
- Pitch
- Plug-ins for analysis

http://www.sonicvisualiser.org/
3. Software – Tartini

- Harmonics
- Vibrato analysis
- Pitch

http://miracle.otago.ac.nz/tartini
3. Software – BeatRoot

- Tempo analysis
- Microtiming

http://www.eecs.qmul.ac.uk/~simond/beatroot/
3. Software – Tarsos

- Tone scale analysis
- Microtonees
- Pitch

http://tarsos.0110.be/
3. Software for Music Analysis

- Tartini
- Beatroot
- MelodicMatch
- Humdrum
- Music21
- Sonic Visualiser
- Tarsos
- OMR-Software

Axes:
- Notation - Performance
- Signal - Symbolic
3. Software – MelodicMatch

- Ritmical structures
- Harmonic, melodic structures
- Articulations
- ...

http://www.melodicmatch.com/
4. Practical Examples

The Oboe concerto by Richard Strauss: research around the use of vibrato and dynamics.

Notation or Performance: Performance
Symbolic or signal: Signal
Registration: Audio
Software: Tartini, Sonic Visualizer
4. Practical Examples

Research question about the tempo of different performances of the same piece:

Notation or Performance: Performance
Symbolic or signal: both possible
Registration: Audio or performed MIDI
Software: BeatRoot or music21
4. Practical Examples

Fantasia Contrappuntistica. Ferruccio Busoni, a man with his own style?

Notation or Performance: Notation
Symbolic or signal: Symbolisch
Registration: MusicXML
Software: MelodicMatch, music21
4. Practical Examples

Can you control Stage fright?

Notation or Performance: ???
Symbolic or signal: ???
Registration: ???
Software: ???
4. Practical Examples

Mixed Languages: How to combine aspects of Indian classical music into a live jazz gig?

Notation or Performance: both
Symbolic or signal: both
Registration: Score, Audio or MIDI
Software: Indian tone scales, Tarsos
5. Conclusion

Software can be used as an objective measurement tool to answer research questions related to music.
6. Questions & Discussion

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