

Software for Music Analysis

An Overview

Agenda

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



1. Introduction

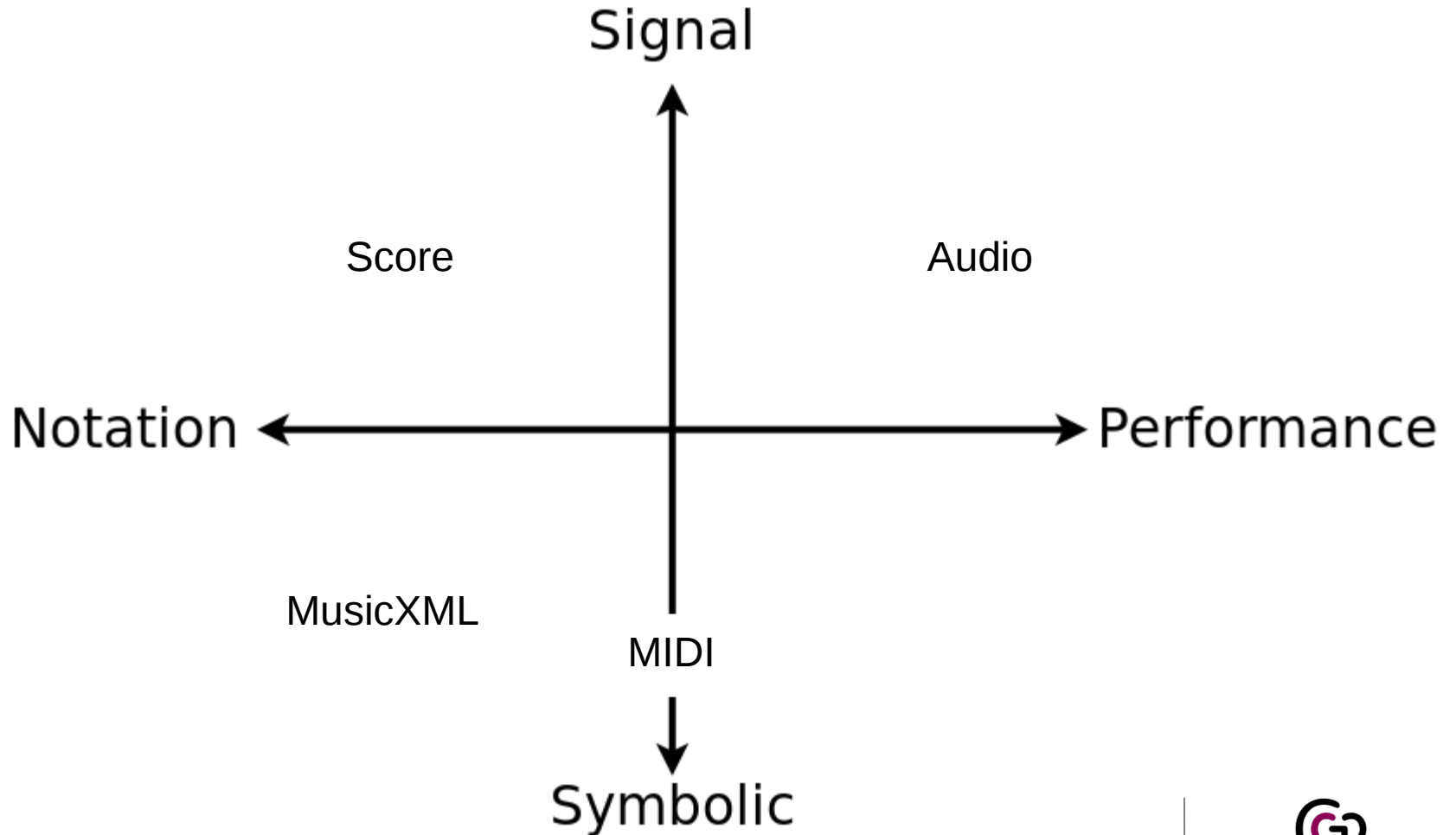
This talk gives an overview of:

- 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
- x Hard to process (OMR)



2. Digitale Registratie - 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
- x Little performance information



2. Digitale Registratie - MIDI

MIDI score

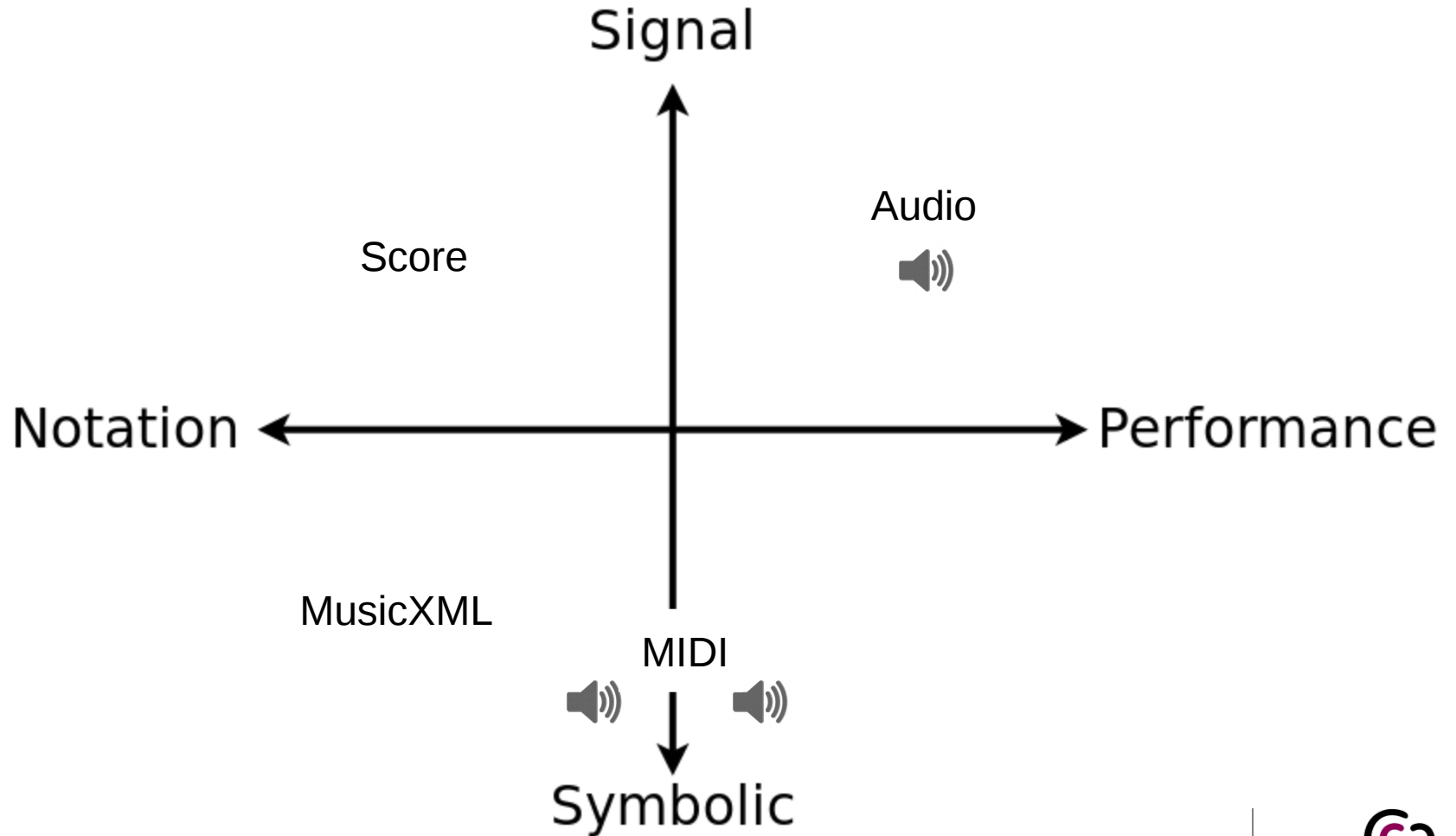
- ✓ Automatically to process
- ✓ Musical contents and lay-out
- x Little performance information

MIDI performance

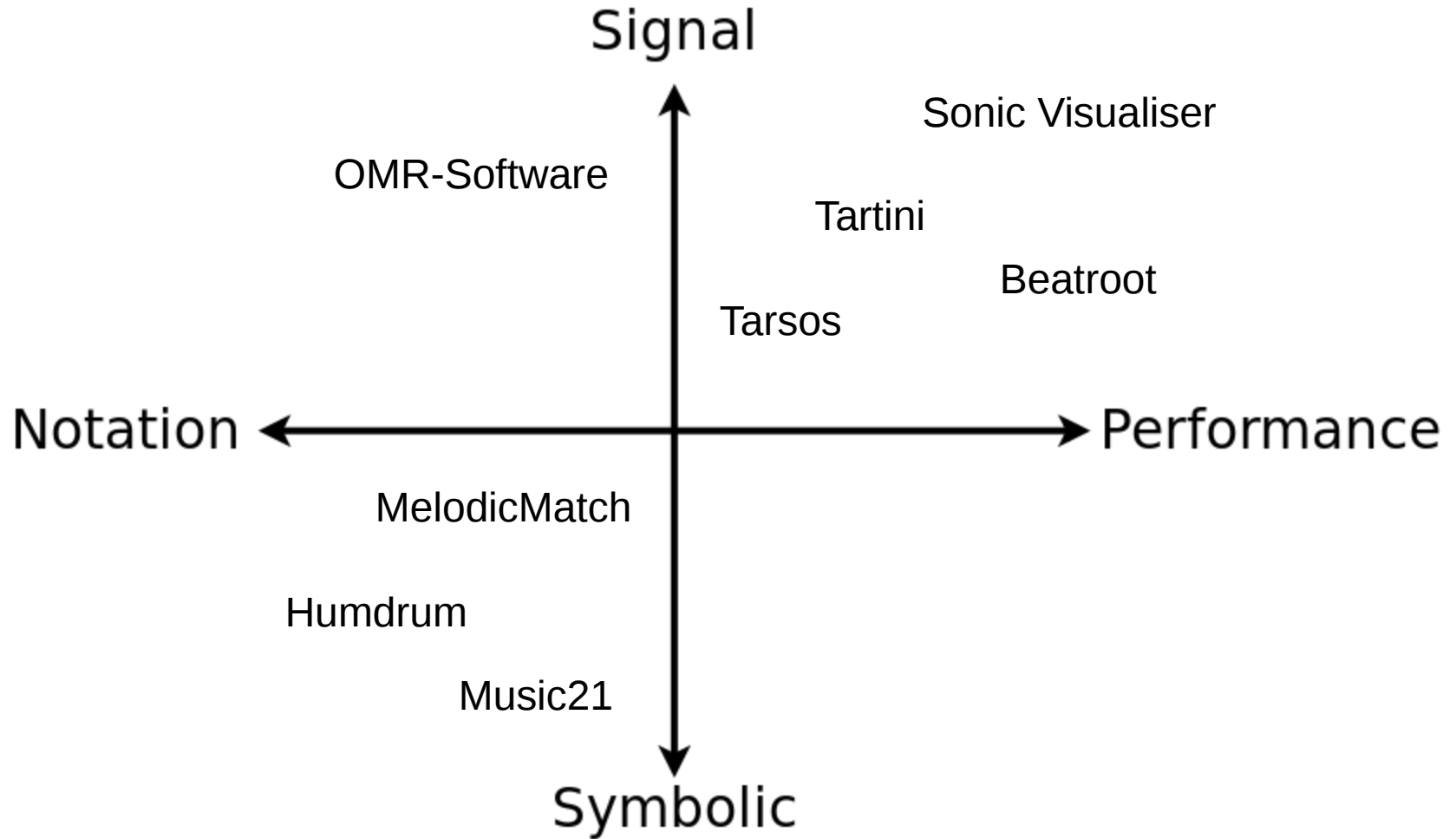
- ✓ Automatically to process
- ✓ 'All' information about performance, musical contents
- x No lay-out info



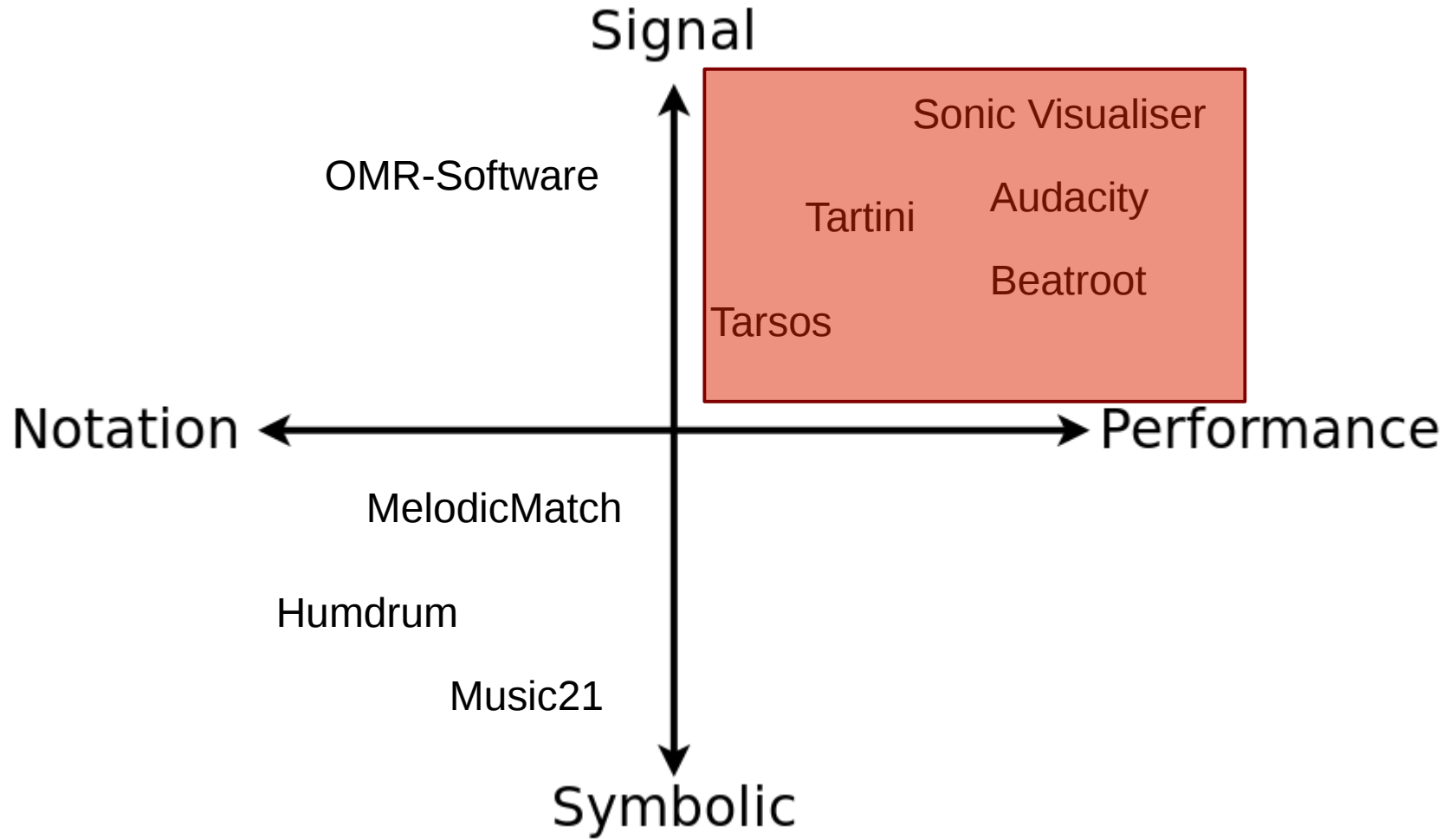
2. Digital Registration



3. Software for Music Analysis

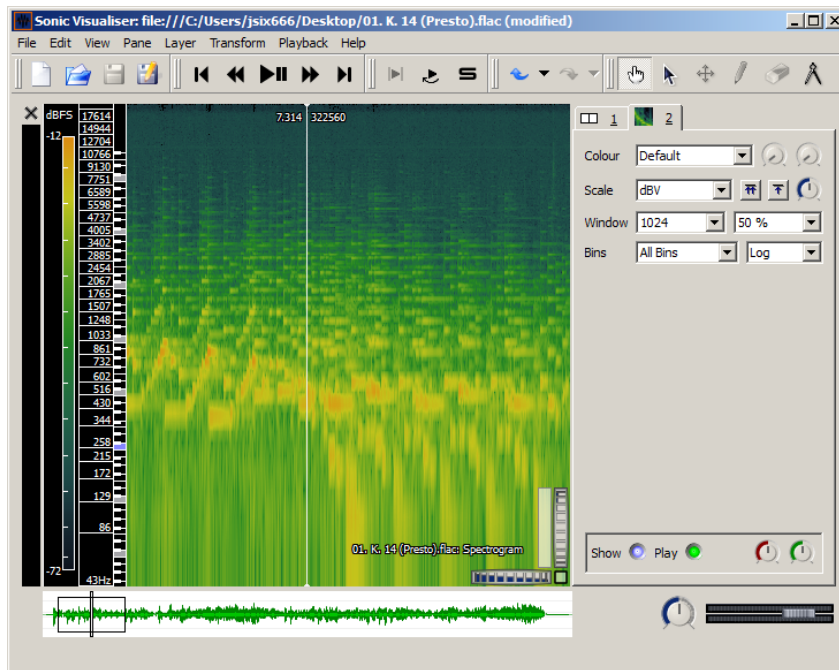


3. Software voor muziekanalyse



3. Software – Sonic Visualiser

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

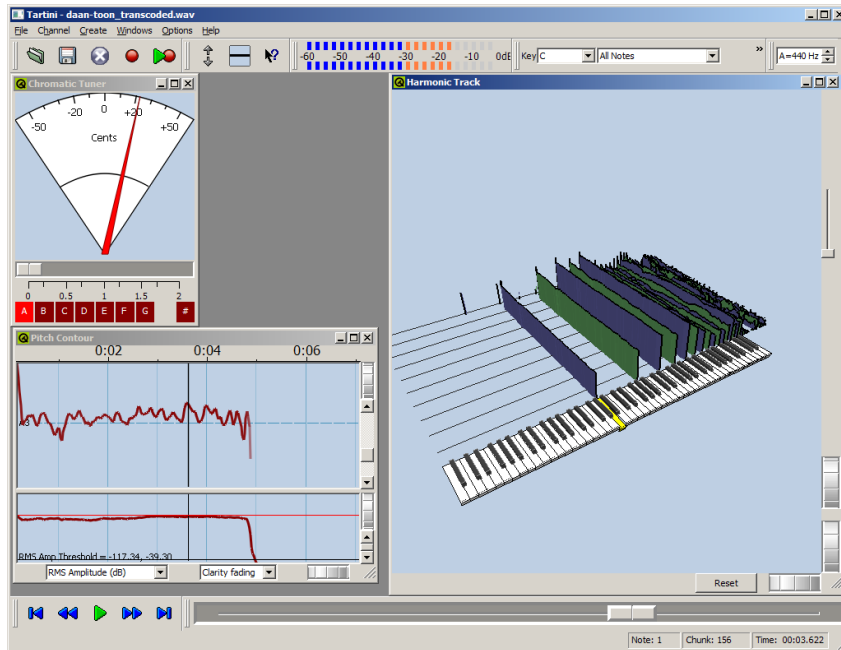


<http://www.sonicvisualiser.org/>



3. Software – Tartini

- Harmonics
- Vibrato analysis
- Pitch

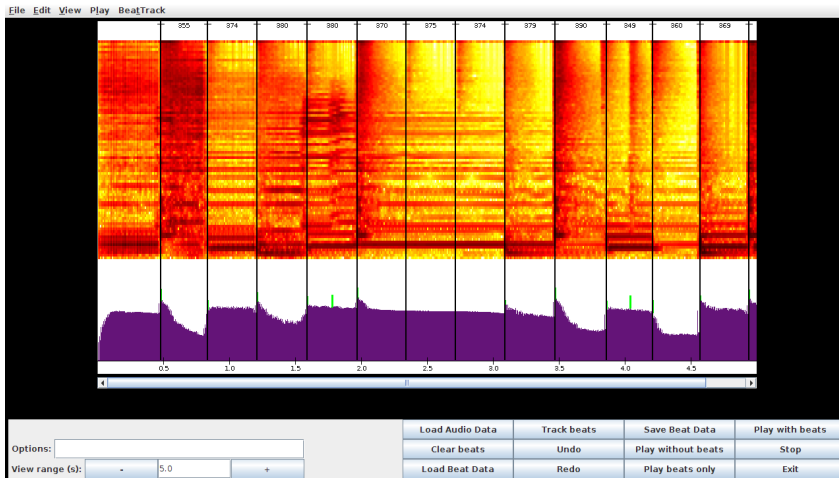


<http://miracle.otago.ac.nz/tartini>



3. Software – BeatRoot

- Tempo analysis
- Microtiming

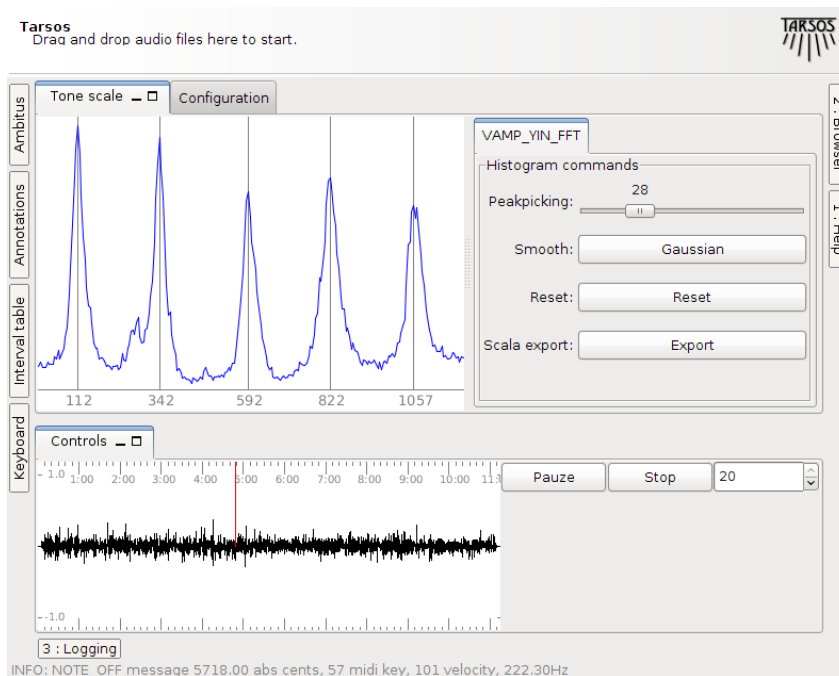


<http://www.eecs.qmul.ac.uk/~simond/beatroot/>



3. Software – Tarsos

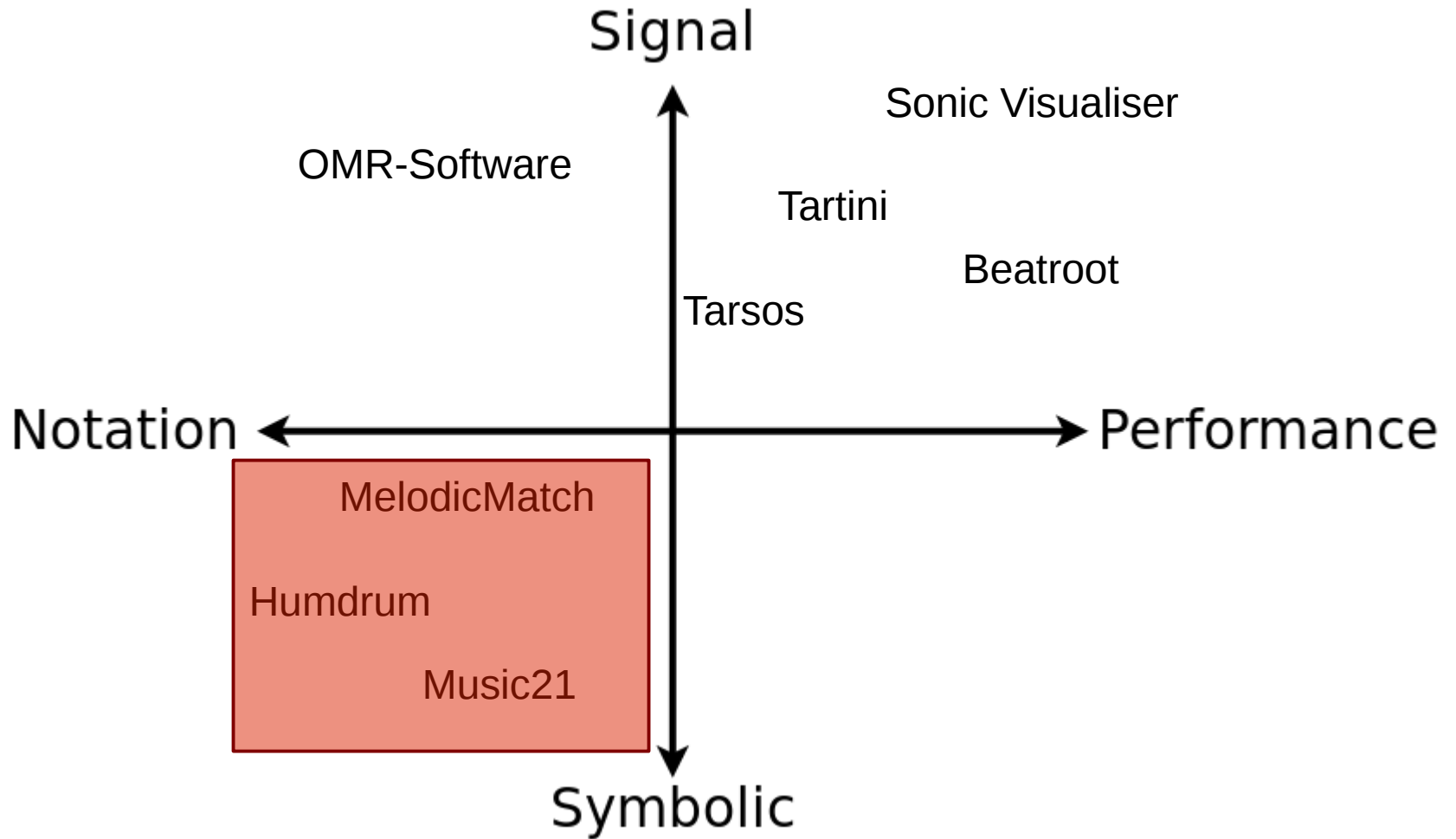
- Tone scale analysis
- Microtonees
- Pitch



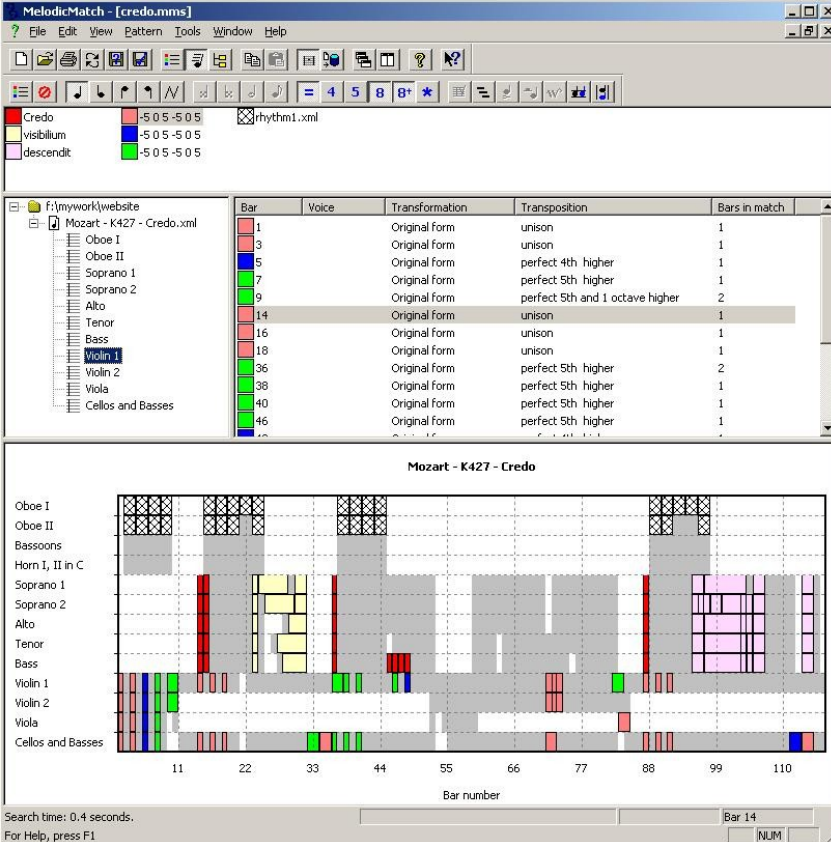
<http://tarsos.0110.be/>



3. Software for Music Analysis



3. Software – MelodicMatch



The screenshot shows the MelodicMatch software interface. The top part displays a file explorer with a tree view of the score structure. Below that is a table with columns: Bar, Voice, Transformation, Transposition, and Bars in match. The bottom part is a graphical score display with a grid of bars and colored blocks representing matches for various instruments.

Bar	Voice	Transformation	Transposition	Bars in match
1		Original form	unison	1
3		Original form	unison	1
5		Original form	perfect 4th higher	1
7		Original form	perfect 5th higher	1
9		Original form	perfect 5th and 1 octave higher	2
14		Original form	unison	1
16		Original form	unison	1
18		Original form	unison	1
36		Original form	perfect 5th higher	2
38		Original form	perfect 5th higher	1
40		Original form	perfect 5th higher	1
46		Original form	perfect 5th higher	1

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

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