

Symbolic Music Representation and Synchronized Datasets

Eleanor Selfridge-Field
esfield@stanford.edu

Welcome to CCARH

- <http://www.ccarh.org>

Score, MIDI, analysis resources:

MuseData: <http://www.musedata.org>

KernScores: <http://kern.ccarh.org>

Themefinder: <http://www.themefinder.org>

Tutorials:

Notation and representation: <http://252.ccarh.org>, <http://253.ccarh.org>, etc.

Humdrum Portal: <http://humdrum.ccarh.org>

Publications on applications and their methods

Computing in Musicology

<http://www.ccarh.org/publications/books/cm>

Beyond MIDI: <http://www.ccarh.org/publications/books/beyondmidi/online/>

Score, MIDI, and Analysis Resources

MuseData

- **1100+ complete works** (classical)
- **Genres**
 - Opera, oratorio
 - Symphony, chamber
- **Primary encoding: MuseData**
 - Comprehensive system to support multiple application domains
- **Secondary encodings:**
 - Kern [analysis]
 - MIDI [sound]
 - PDF [performance]

KernScores

- **c. 2000 works** (mainly classical)
- **Genres**
 - Piano
 - Choral
 - Folksong
- **Primary encoding: Humdrum kern**
 - Comprehensive system to support analytical applications
- **Secondary transformations:**
 - Very numerous

What is music representation?

- A method for accommodating musical features required for
 - Printing
 - Sound (playback, generation, et al.)
 - Analysis
 - Visualization (abstraction)
 - Cognitive and intellectual saliency

Synchronized data

Symphony No. 5

- Linked datasets in diverse formats
- All data instantiations treat one **physical source** or underlying edition
- All files point to their origins

I
Allegro con brio. (♩ = 108)

Flauti 1, 2

Oboi 1, 2

Clarineti 1, 2
in B \flat

Fagotti 1, 2

Corni 1, 2
in E \flat

Trombe 1, 2
in C

Timpani
in C, G

Violino I

Violino II

Viola

Violoncello

Contrabasso



MuseData



Symphony No. 5

I
Allegro con brio. (♩ = 108)

Flauti 1, 2
Oboi 1, 2
Clarinetti 1, 2 in B \flat
Fagotti 1, 2
Corni 1, 2 in E \flat
Trombe 1, 2 in C
Timpani in C, G
Violino I
Violino II
Viola
Violoncello
Contrabasso

MuseData to PDF converter

This page can be used to convert MuseData files into PDF files of graphical music notation as well as alternate data translations from MuseData.

Input Data

First, specify a data file either on your local disk or from the web as a URL:

Upload
MuseData
from your
computer:

The uploaded file should contain MuseData (stage 2), or an MPG (Muse PaGe) layout file which can be generated from MuseData files before final PDF production. Multiple Musedata part files can be concatenated together, placing the line "/eos" after each part file contents, and "/" at the end of all input data. Multiple MPG files can be concatenated together by following each page's data by a line containing a single "p" in the first column.

Or, specify
a
MuseData
URL:

Or, paste/ type the data here:

```
#####  
PART = s01  
#####  
(C) 1993, 2002, 2005 Center for Computer Assisted Research in the Humanities.  
ID: {beethoven/bhl/orch/sym5/stage2/01/s01}  
TIMESTAMP: MAY/19/2010 [md5sum:8e9df6848c5271cdc919c569cdb74d81]  
08/19/93 E. Correia  
WK#:67 MV#:1  
Breitkopf & H\va3rtel, Series 1 No. 5, Leipzig  
Beethoven Symphony No. 5 in C Minor, Op. 67  
First Movement  
Flauti 1, 2  
0 0 .  
Group memberships: score  
score: part 1 of 13  
&  
Modified 05/12/08 for SCORE conversion  
&  
$ K:-3 Q:2 T:2/4 C:4 I:2 D:Allegro con brio. (\0& = 108)
```

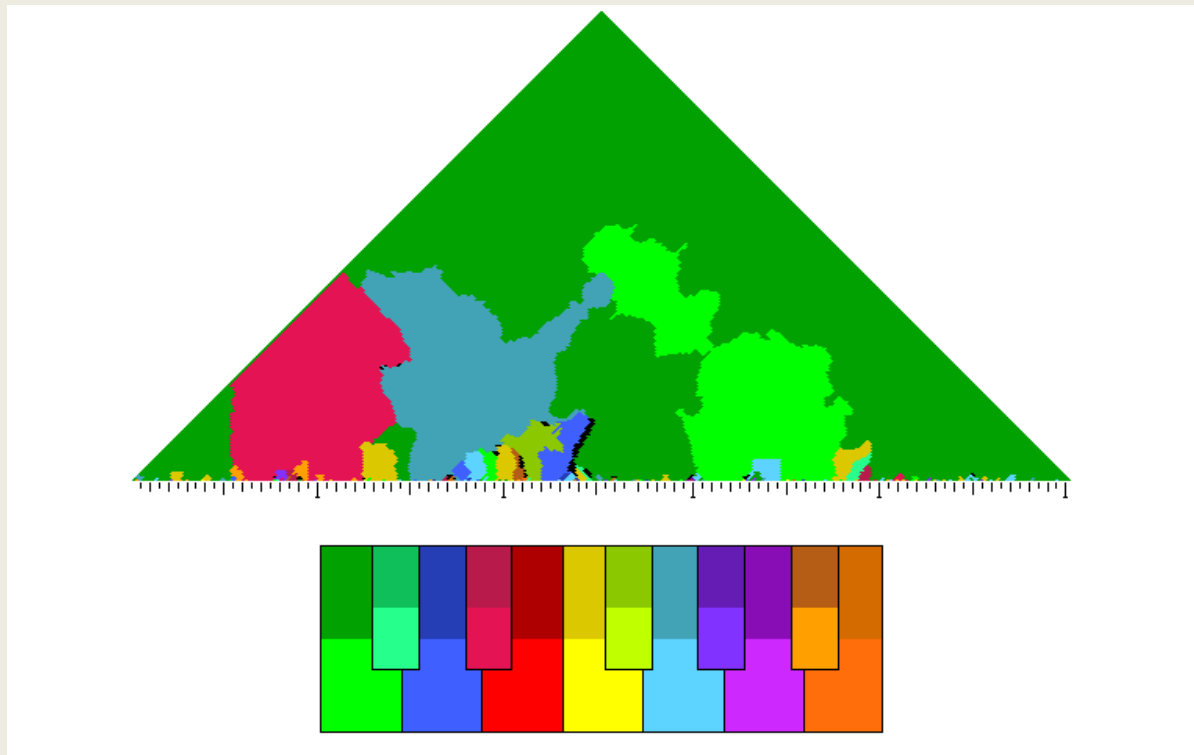
Summary views

- Structural features (piano roll)



Summary views

- Harmonic structure, tonal context (keyscape)



Themefinder (Melodic Search)

- Search engine for symbolic data
- Currently contains 100,000+ themes and incipits
- ISMIR2004 “Very Large Datasets....”
- Current repertories include
 - Classical (instrumental, some vocal)
 - Folk (monophonic)
 - Renaissance (choral)

Themefinder

[[About](#) | [Search options](#) | [Help](#)]
[[New Links](#) | [Composers](#) | [Random](#)]

Take the Quartet Quiz.

Repertory

? type of music to search

Pitch

? A-G, sharp=#, flat=-
e.g. C E- G F#

Interval

? maj=M, min=m, aug=A, dim=a per=P,
fifth=5, up=+, down=-.
e.g. +m9 -P8 +M3 P1

Scale

? do=1, re=2, mi=3, fa=4, so=5, la=6, ti=7
(mode insensitive). e.g. 34554321

Degree

Gross

? up=/, down=\, unison=-.
e.g. //\-/ or uudsu

Contour

Refined

? up step=u, up leap=U,
down step=a, down leap=D, same=s. e.g.
uUDsdu

Contour

Location beginning of theme
only, or
 anywhere in theme

?
?

Key

?
?

Mode:

Meter /

?
?

Submit Search



<http://www.ccarh.org/publications/beethoven-symphonies/>

The Nine Symphonies of Beethoven: A Digital Edition 2009

Center for Computer Assisted Research in the Humanities (CCARH)

A complete-score database of multipurpose digital data of Ludwig van Beethoven's nine symphonies.

Project Team: Craig Stuart Sapp, Don Anthony, Francis Bennion, Edmund Correia, Jr., Walter Hewlett, Eleanor Selfridge-Field, and Andreas Kornstädt.

- Symphony No. 1: [PDF] data: www.musedata.org/beethoven/sym-1
- Symphony No. 2: [PDF] data: www.musedata.org/beethoven/sym-2
- Symphony No. 3: [PDF] data: www.musedata.org/beethoven/sym-3
- Symphony No. 4: [PDF] data: www.musedata.org/beethoven/sym-4
- Symphony No. 5: [PDF] data: www.musedata.org/beethoven/sym-5
- Symphony No. 6: [PDF] data: www.musedata.org/beethoven/sym-6
- Symphony No. 7: [PDF] data: www.musedata.org/beethoven/sym-7
- Symphony No. 8: [PDF] data: www.musedata.org/beethoven/sym-8
- Symphony No. 9: [PDF] data: www.musedata.org/beethoven/sym-9

Click on the "PDF" markers to view PDF versions of the full orchestral scores for each symphony. CCARH supports several core data formats which can be downloaded from the full links listed after the PDF links above.

The primary encoding format for the symphonies was done in the MuseData format (sample). The original MuseData files are converted into several other musical data formats for printing (SCORE), audition (MIDI), and analysis (Humdrum).

Themefinder

Classical

- Scale degree: 3 3 3 1



Themefinder Results (sample)

Classical

- Scale degree: 3 3 3 1

Lalo: Rhapsodie



Schubert: Impromptu



Schubert: Rosamunde Overture



Themefinder

[[About](#) | [Search options](#) | [Help](#)]
[[New Links](#) | [Composers](#) | [Random](#)]

Take the Quartet Quiz

Repertory

? type of music to search

Pitch

? A-G, sharp=#, flat=-
e.g. C E- G F#

Interval

? maj=M, min=m, aug=A, dim=d per=P,
fifth=5, up=+, down=-.
e.g. +m9 -P8 +M3 P1

Scale

? do=1, re=2, mi=3, fa=4, so=5, la=6, ti=7
(mode insensitive). e.g. 34554321

Degree

Gross

? up=/, down=\, unison=-.
e.g. //\-/ or uudsu

Contour

Refined

? up step=u, up leap=U,
down step=d, down leap=D, same=s. e.g.
uUDsdu

Contour

Location beginning of theme
only, or
 anywhere in theme

?
?

Key

?
?

Mode:

Meter /

?
?

Submit Search

Themefinder Results (sample)

- Folk music scale degree: 5 3 5 3

