

Symbolic Musical Analysis

CS 275B/Music 254

Practicalities

Course context

- ▶ Music 253 Symbolic Musical Data
 - ▶ How to **encode** musical data sets (scores)
- ▶ Music 254 Symbolic Music Analysis (Music Query, Analysis, and Style Simulation)
 - ▶ How to **decode** musical data sets
 - ▶ **Query** = data **extraction**
 - ▶ **Analysis** = data **evaluation**
 - ▶ **Style simulation** = data **assessment and manipulation**

Elements of the course

▶ Samples:

- ▶ **Query:** *Themefinder* (melody)
- ▶ **Analysis:** *Humdrum* (harmony, rhythm, melody)
- ▶ **Style simulation:**

Humdrum (involves integration of other operations)

Project part:

(a) literature survey



(b) tool development

(3) presentation and write-up

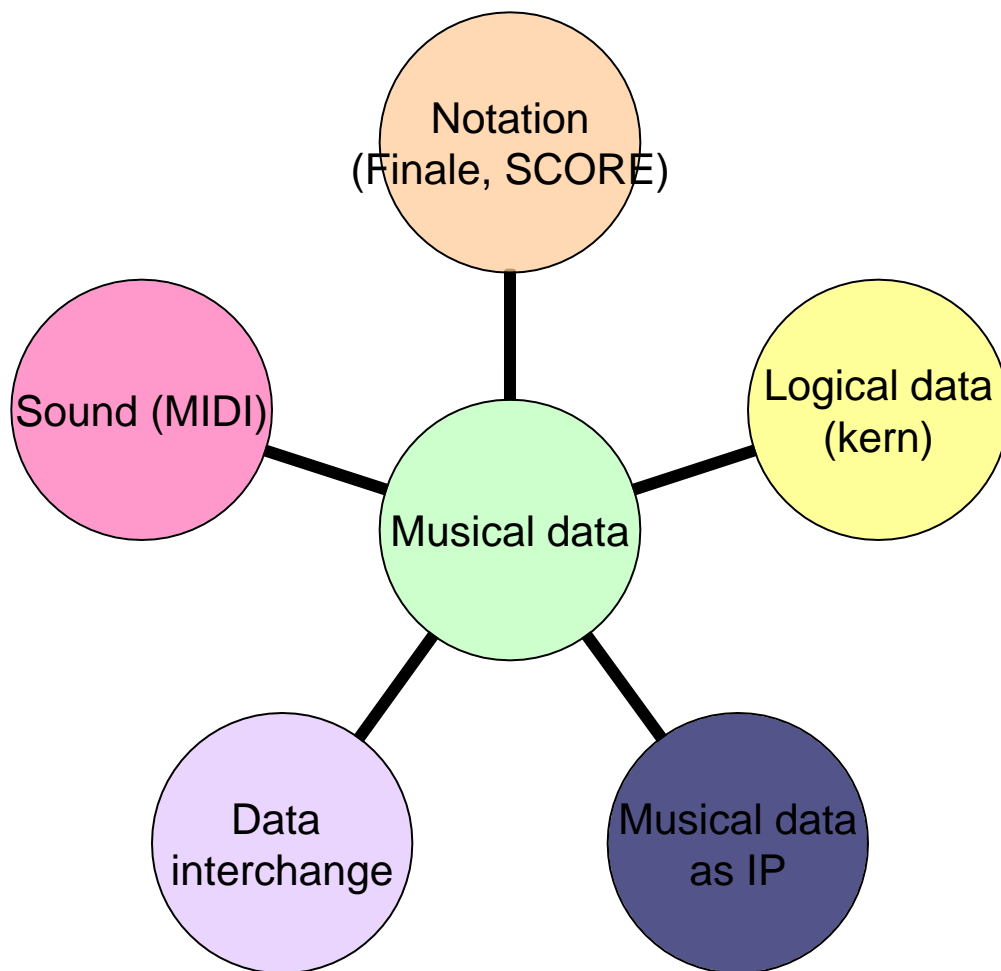
Topic schedule

- ▶ Musical topics:
 - ▶ Week 2 Melody; data sources; similarity
 - ▶ Week 3 Harmony; current work
 - ▶ Week 4 Rhythm; current work

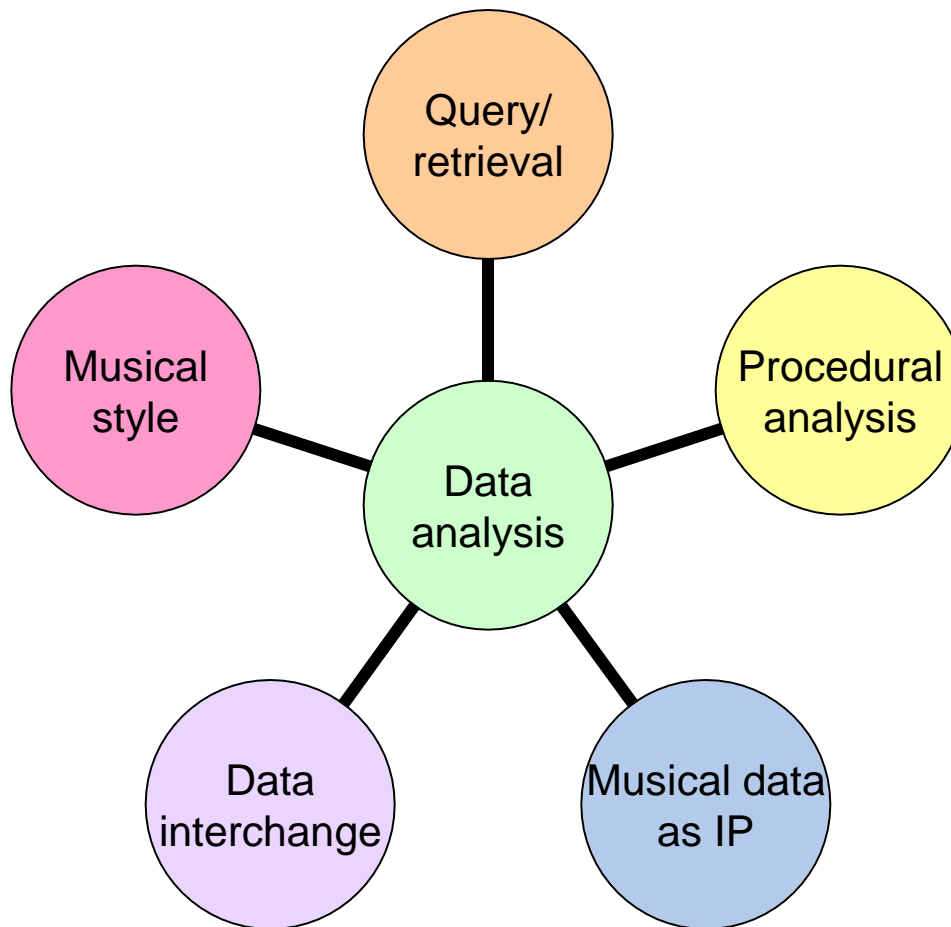
- ▶ Methodological topics (vary from year to year):
 - ▶ Week 5
 - ▶ Week 6
 - ▶ Week 7
 - ▶ Week 8

Contexts and resources

CS 275A: Symbolic Musical Information



CS 275B: Symbolic Musical Analysis



Data resources

▶ Monophonic only

- ▶ Essen database (folk music)
- ▶ *Themefinder* repertories

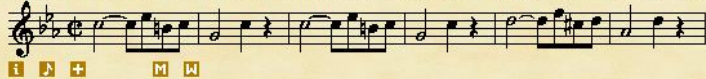
▶ Polyphonic

- ▶ *KernScores*
- ▶ *MuseData*

1. Beethoven, Ludwig Van (1770-1827), Trio in B Flat, Op. 97, Vn., Cello & Pft. "Archduke", 1st Movement, 1st Theme



2. Schubert, Franz (1797-1828), Symphony No. 4 in C Minor, "Tragic", 4th Movement, 1st Theme



3. Weber, Carl Maria Von (1786-1826), Peter Schmolz und Seine Nachbarn, Overture, 1st Theme



Kern Scores

A library of virtual musical scores in the Humdrum ****kern** data format.
Total holdings: 7,866,496 notes in 108,703 files.

search:

[browse](#) | [shortcuts](#) *anchored*

[A guided tour of the KernScores website](#)
[Recent additions to the KernScores library](#)
[Data Collection Highlights](#)

[Online Humdrum Editor](#)
[CCARH Humdrum Portal](#)
[Contribute kern scores](#)

Query (Retrieval)

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 Degree

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

Gross Contour

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

Refined Contour

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

Location beginning of theme only, or
 anywhere in theme

?

Key

?

Mode:

Meter /

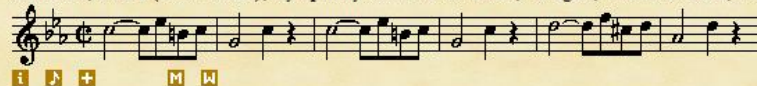
?

Submit Search

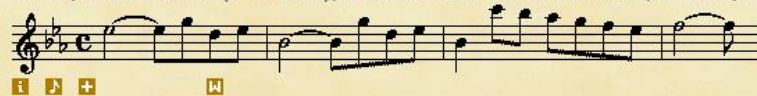
1. Beethoven, Ludwig Van (1770-1827), Trio in B Flat, Op. 97, Vn., Cello & Pft. "Archduke", 1st Movement, 1st Theme



2. Schubert, Franz (1797-1828), Symphony No. 4 in C Minor, "Tragic", 4th Movement, 1st Theme



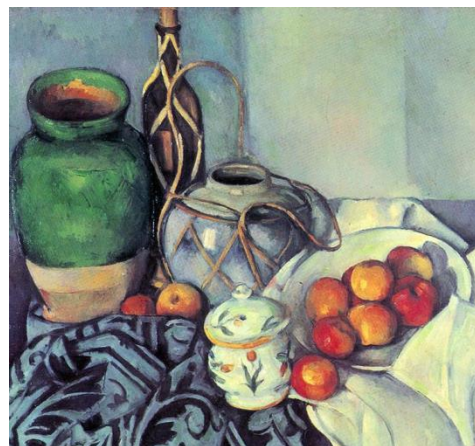
3. Weber, Carl Maria Von (1786-1826), Peter Schmol und Seine Nachbarn, Overture, 1st Theme



Meta-data vs Semantic searching

Generic objects

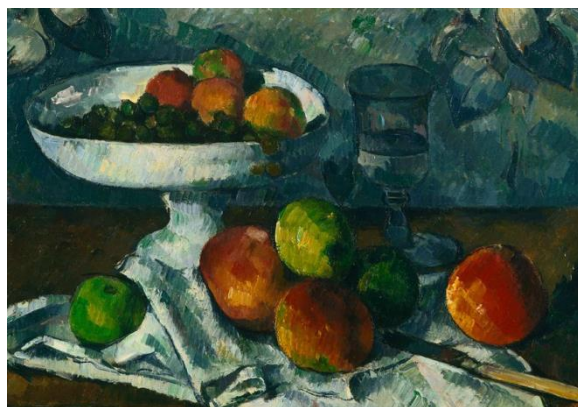
- fruit
- jars
- cloths



Specific objects

- peaches
- vase
- apricot

Ambiguities



Basic colors

- blue
- green
- white

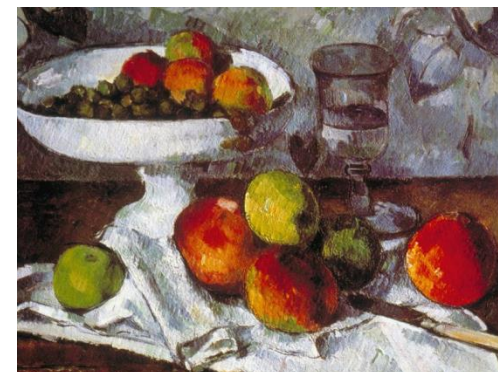
Intermediation

Categories

Gradations

Specific colors

- teal (blue)
- forest (green)
- off-white

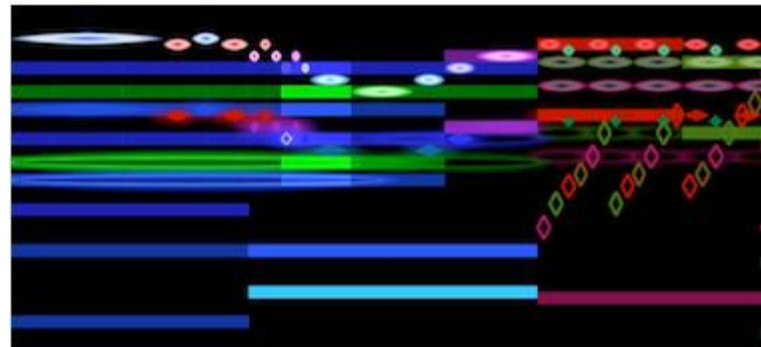


Major areas of music analysis

Feature extraction and analysis

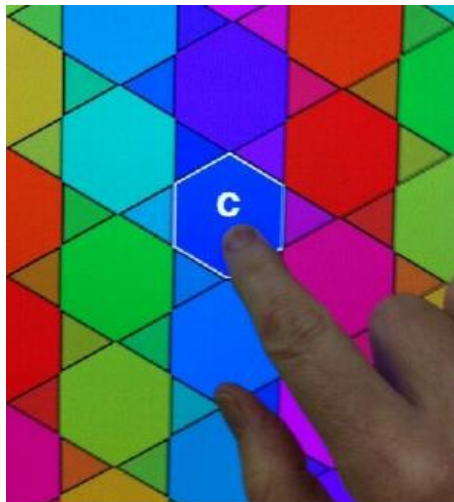


Voices, textures

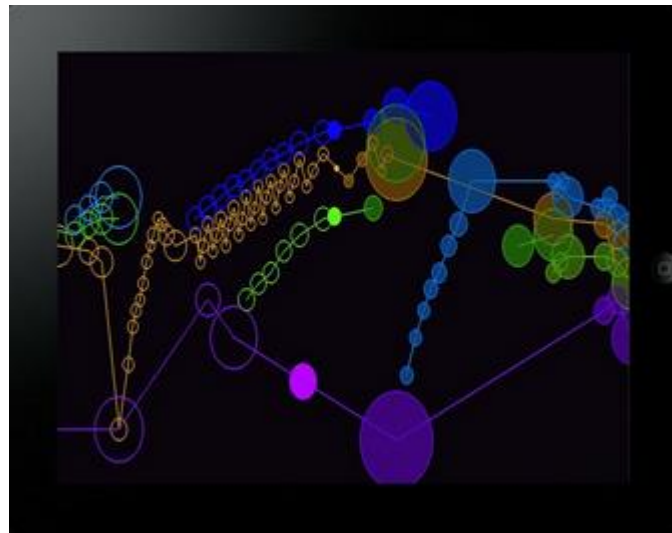


Articulation, dynamics

From the work of
Steven
Malinowski



Tonal relations

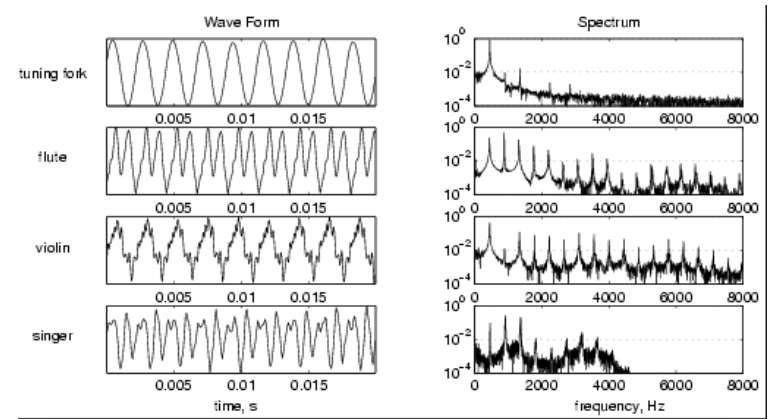


Off the grid

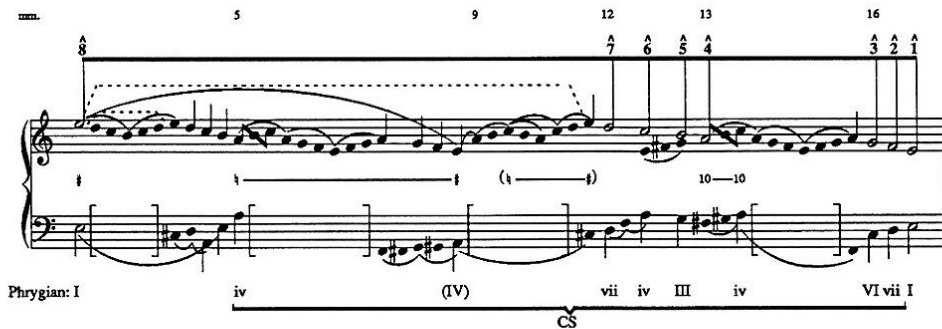
Musical style (analysis)



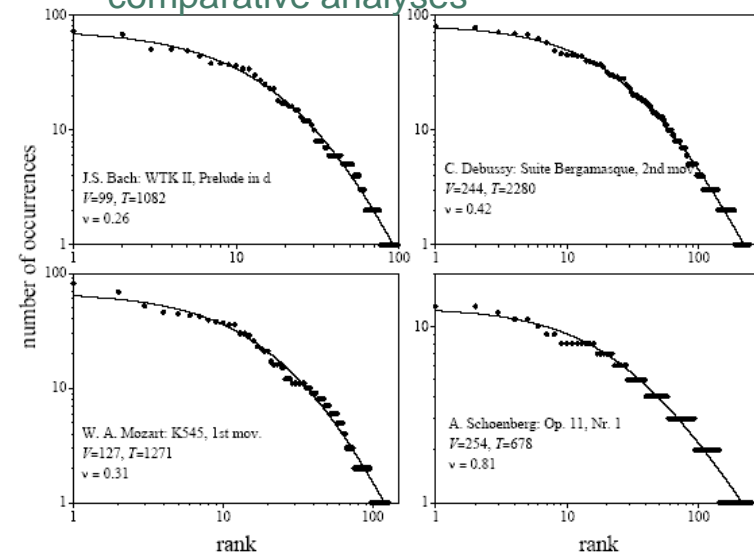
Score-based:
conventional



Performance-based: event-based,
comparative analyses

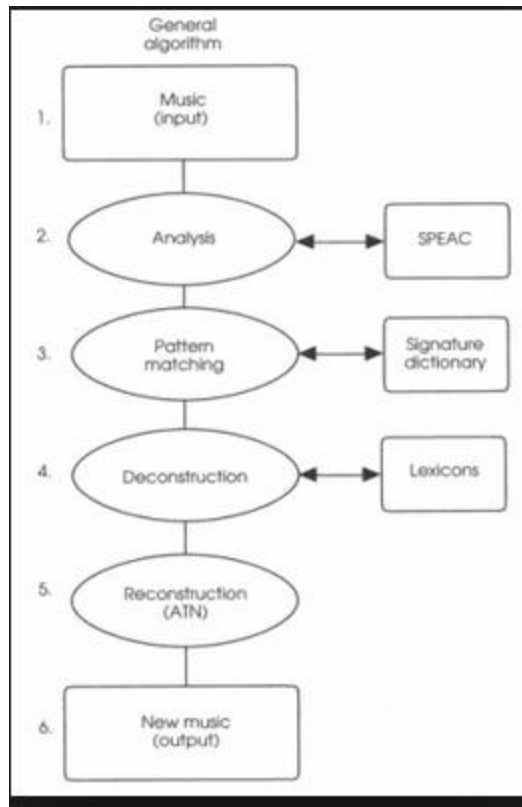


Score-based: Schenkerian (graphical)



Musical style (simulation)

Work of David Cope (UCSC)



Virtual Rachmaninoff

Music by David Cope

with Experiments in Musical Intelligence



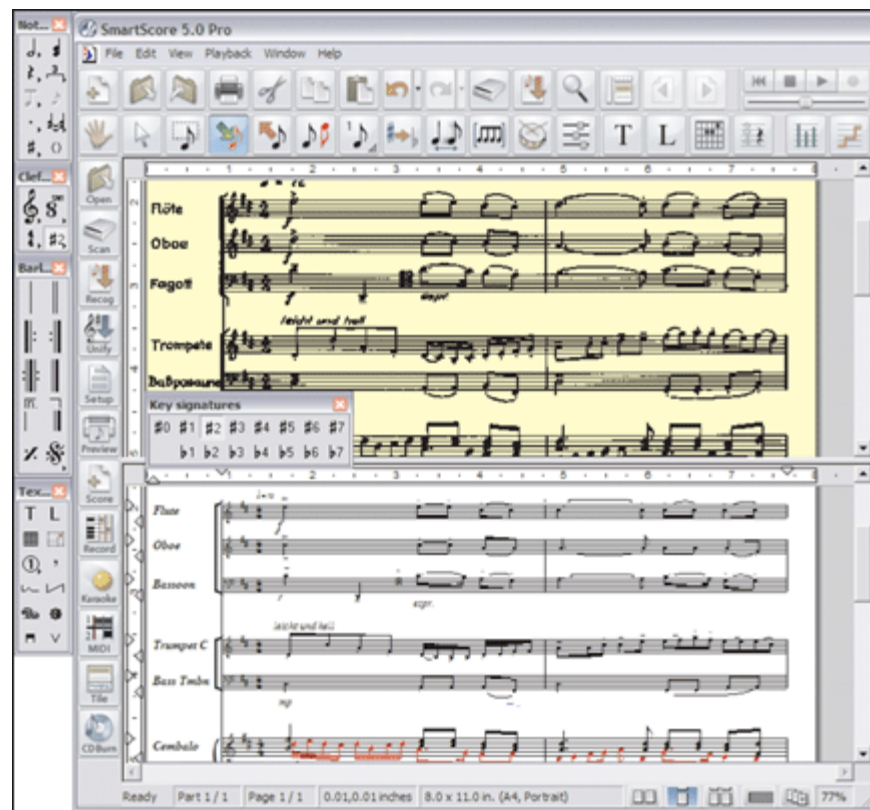
Data interchange

▶ CS 275A

- ▶ MusicXML
- ▶ MEI (in progress)
- ▶ MIDI (common default)

(Data supply)

▶ CS 275B (if relevant)



Other possible areas of study

- ▶ Procedural analysis
- ▶ Structural analysis
- ▶ Style/feature clusters
- ▶ Methods from other disciplines
 - ▶ Linguistics
 - ▶ Mathematics
 - ▶ Psychology/cognition
 - ▶ Information theory
- ▶ New representations
 - ▶ Non-Western music
 - ▶ Pre-tonal music
 - ▶ Post-tonal music
- ▶ Audio/symbolic linking