

Introduction of Humdrum

Music 253/CS 275A
Stanford University

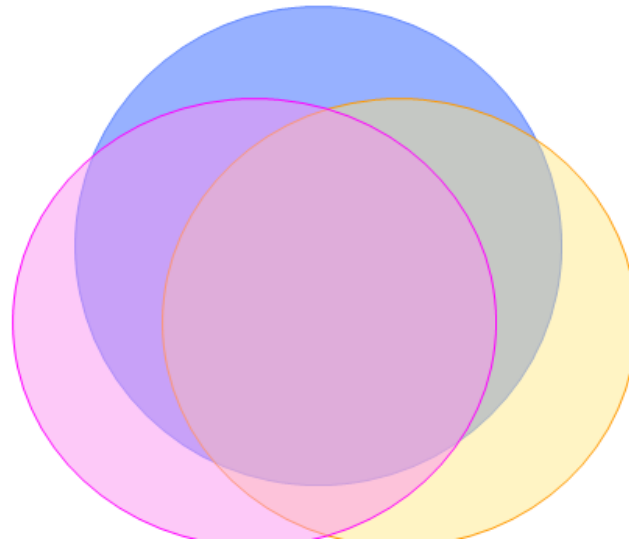
Where we've been

□ Sound apps

- Temporal or
- Sounding pitch

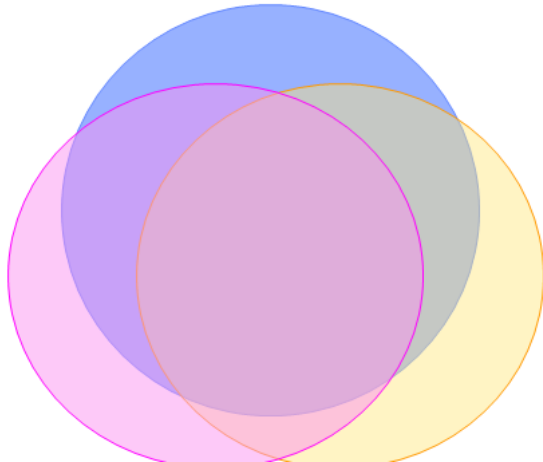
□ Score apps

- Spatial org
- Written pitch



“Logical” information (for analysis)

- No necessary requirements for
 - Sound description
 - Page description



- Possible requirements
 - Gestural information
 - Selective details of notation or sound
 - Cues to formal structure
 - Accentual info

Humdrum Toolkit (1985—)

- *Goat*: encoding for analysis
- *Inventor*: David Huron
- *Orientation*: Context-free grammar
 - Adaptable to many repertoires (incl. non-Western)
 - *Not directly printable* [based on Unix]
 - Offers a wide range of representations
 - Features and representations can be extended
 - Features can be minimized or excluded
- *Availability*:
 - Extensive documentation online
 - Tool set (official version) downloadable



Local resources for Humdrum

- CCARH Humdrum **Portal**: <http://humdrum.ccarh.org/>
- **Downloads** of the Toolkit:
<http://extras.humdrum.org/download/>
- Sapp **extras**: <http://extra.humdrum.org/>
- **Data** in the ****kern** form (CMN format for Humdrum TK):
<http://kern.ccarh.org/>
- Humdrum users group: ****hug**

Overview (comparative)

- | | | |
|--------------------------------|----------------------------|--|
| □ MIDI: Sound | □ Event-based → | ■ Binary; time-ordered; var-length; score Types 0, 1] |
| □ SCORE: Graphics | □ Object-based → | ■ ASCII; score/spatially- ordered; var. no fields |
| □ MuseData: Core rep. | □ Event-based → | ■ ASCII; fixed/expandable; part-ordered [=MIDI Type 1] |
| □ MusicXML: interchange | □ Attribute-based → | ■ ASCII; fixed/expandable; time- or score-ordered |
| □ **kern: Analysis data | □ Event-based → | ■ ASCII; score-ordered but no spatial information [=MIDI Type 0]; selective attribute encoding permitted |

A Humdrum ****kern** file

!!!OTL: Frere Jacques

!!!YEC: ESF 1999

****kern** ****text**

*M4/4

*k[]

!soprano **!lyrics**

!!First phrase

=1

4c

4d

4e

4c

=2

4c

4d

4e

4c

*

=1

Fre-

re

Jac-

ques,

=2

Fre-

re

Jac-

ques,

Spines

!!Fourth phrase

=7

4c

4G

2c

=8

4c

4G

2c

=9

***_**

=7

Din,

don,

din.

=8

Din,

don,

din.

=9

***_**

.....

Decoding a Humdrum file

Comment records:

- !!! Reference records
- !! Global comments
- ! Local comments

Interpretation records:

- ** Exclusive interpretation
- * Tandem interpretation
- *>**x** Form marker
- *- End-of-spine marker

Measure markers:

- = Single bar-line
- == Double bar-line

Tandem interpretations:

- *staff<1> staff no.
- *clef<G2> clef name
- *<G:> key name
- *k[f#c#] key signature
- *M<2/4> meter signature

Semiotic aspects of Humdrum

- A sample problem of nomenclature: pitch
- Humdrum's answers
 - Notated pitch
 - Concert pitch
 - Relative pitch
 - Fundamental frequency
 - Cents
 - Interval
 - Scale degree
 - MIDI note number
 - Visual appearance.....

Humdrum in relation to music

Relies heavily on Unix commands and syntax

- **Unix regular expressions** (`grep`)
- **File-manipulation commands** (`assemble`, `yank`)
- **Sound-management tools** (`record`, `perform`)
- **Pitch translation tools** (`frequency`, `cents`)
- **Duration and accent tools** (`beat`, `accent pos.`)
- **Melody tools** (e.g. `melodic intervals`)
- **Harmony tools** (e.g. `harmonic intervals`)
- **Other music-theory tools** (e.g. `tone-row`, `pitch-class sets`)

Pre-defined representations (49)

- pitch-class
- semitones, cents, MIDI, critical bands, cochlear coordinates
- melodic interval, harmonic interval
- absolute time, relative time, duration, epoch, date
- tablatures: guitar, lute, banjo, sitar ...
- harmony, embellishments

Special qualities of Humdrum

- Very elastic

Base-40 pitch numbers



A musical score in 3/4 time, consisting of four staves. The top two staves are in treble clef, and the bottom two are in bass clef. The score is annotated with base-40 pitch numbers. The first staff has numbers 179, 174, 168, 208, 202, 197, 191. The second staff has numbers 151, 168, 163, 151, 179, 157, 162, 168, 162. The third staff has numbers 139, 145, 151, 139, 157, 151, 146, 134. The fourth staff has numbers 128, 111, 128, 128, 134, 111.

- open, documented
- extensible

