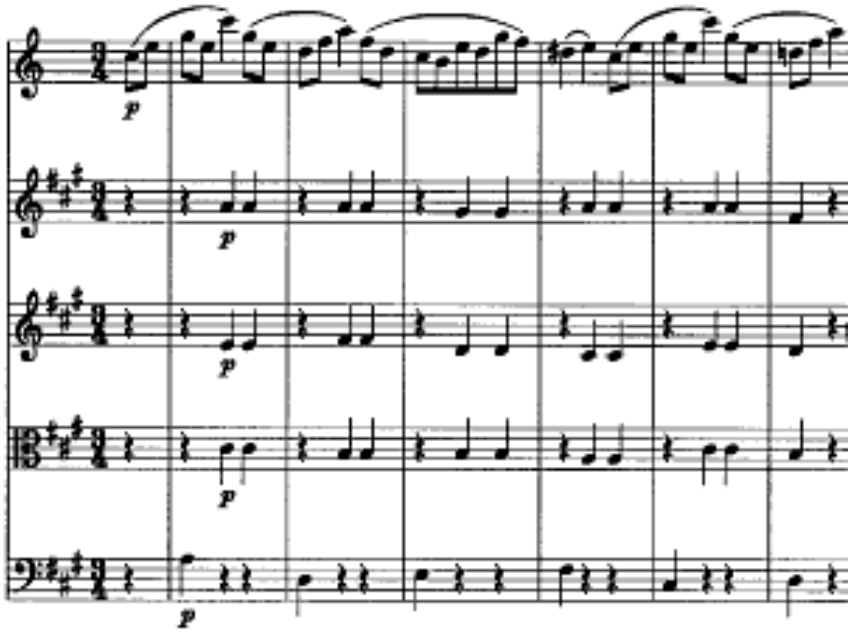
Score semantics: textures, tracks, structural cues

Music 253/CS 275A

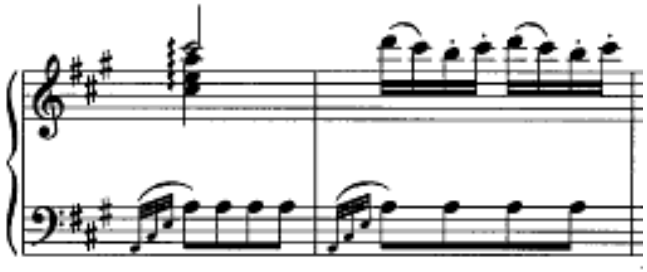
Stanford University

Textural types

- Ensemble texture



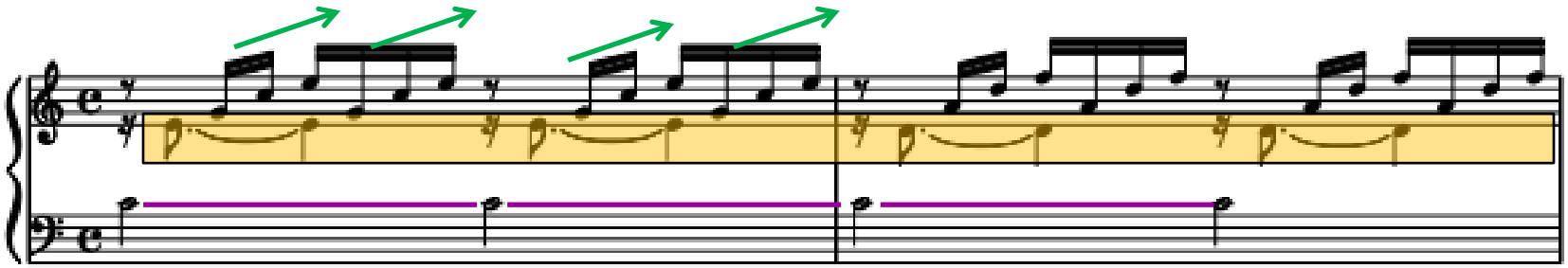
- Keyboard texture



Beyond MIDI core examples

Performance: **Arpeggiation** and tracks in harpsichord, piano, and lute music

- How many voices?
- When?

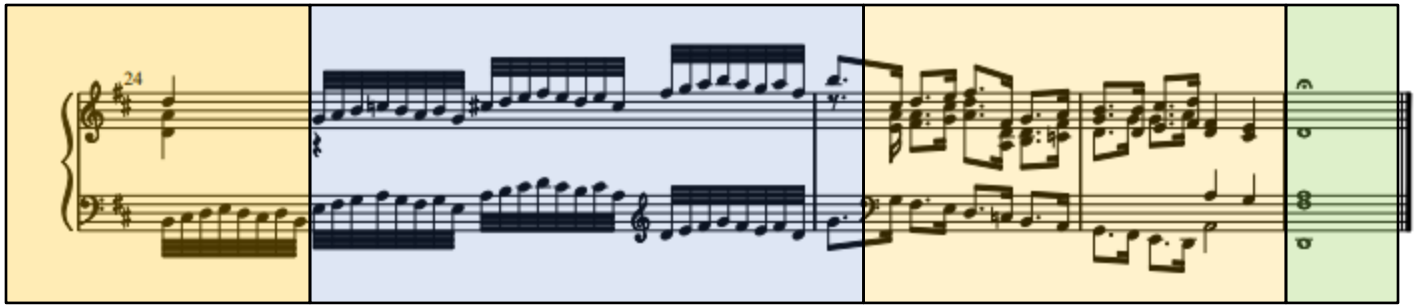


Bach: WTC I, C-Major Prelude: "plucked" arpeggios

One person's cognitive "chord" is
someone else'e running $8^{th}/16^{th}$-note passage,
Or "broken chord" lines

Encoding: **Tracks** in harpsichord music

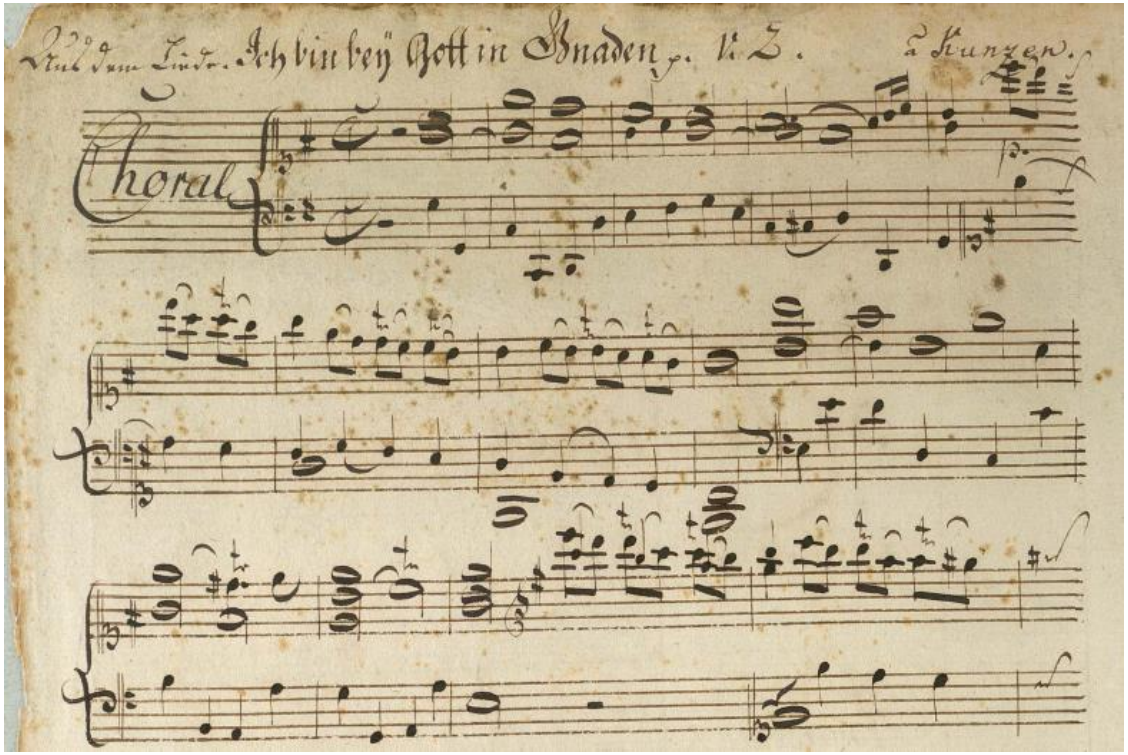
- How many voices?
- Number of voices controls “volume”



3 (4) 2 3 (4) ?

Bach: WTC I, D-Major Fugue

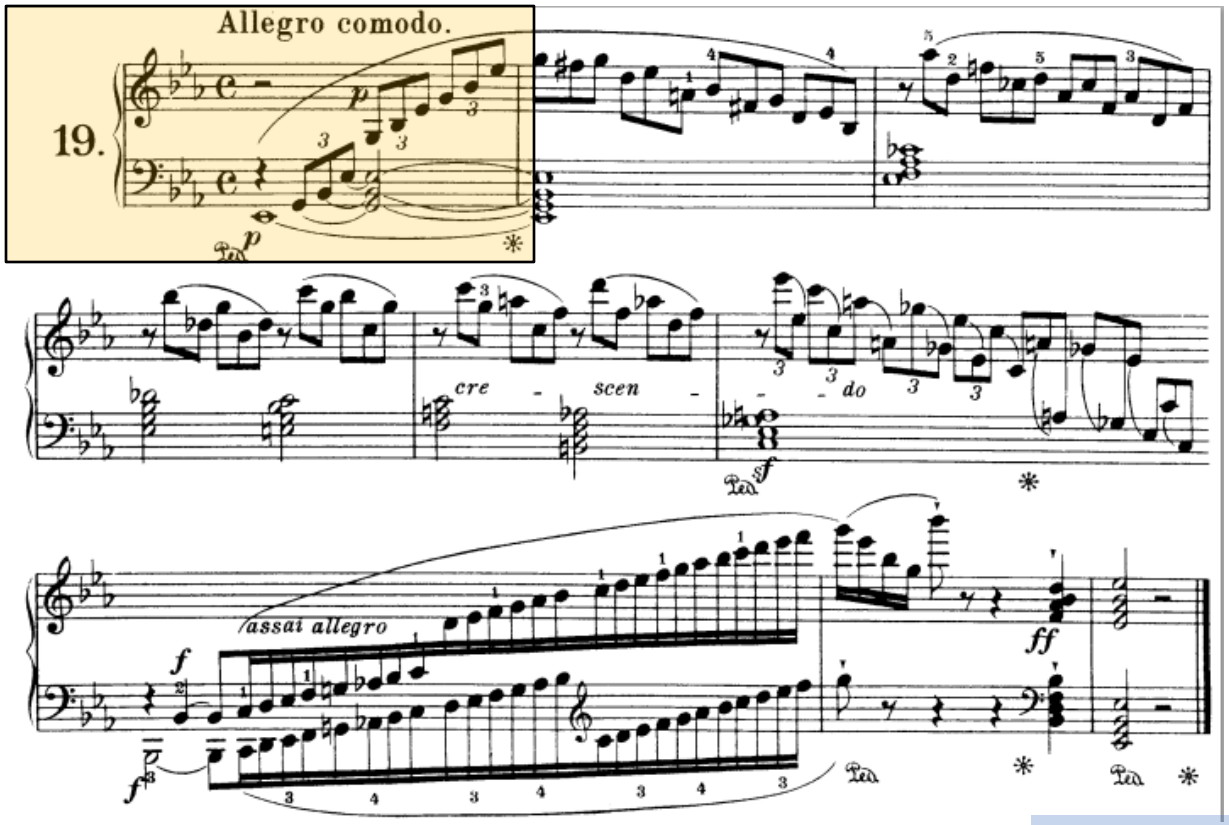
Well-behaved tracks (organ)



Bach: four-vioice chorale

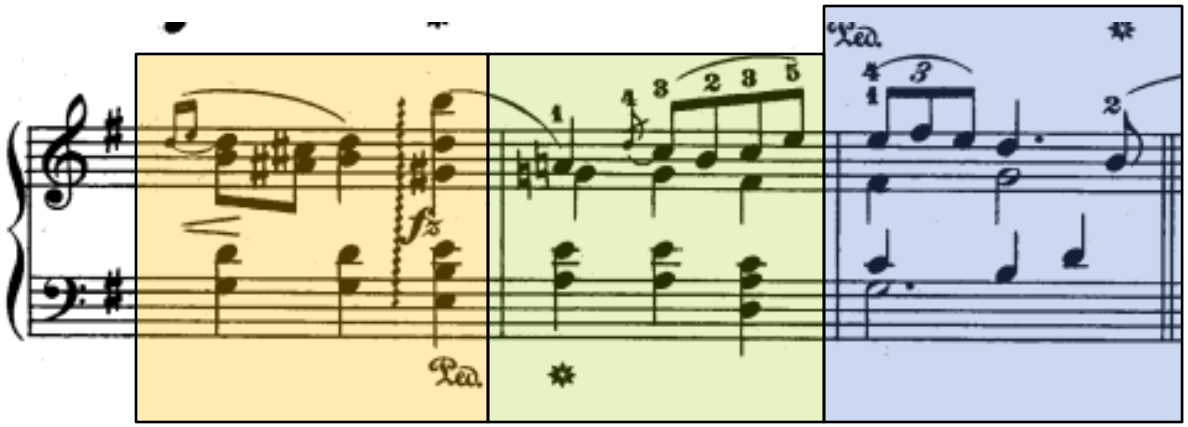
Tracks in piano music

Harp-like passage



Hummel: Prelude No. 19

Tracks in piano music: varying textures

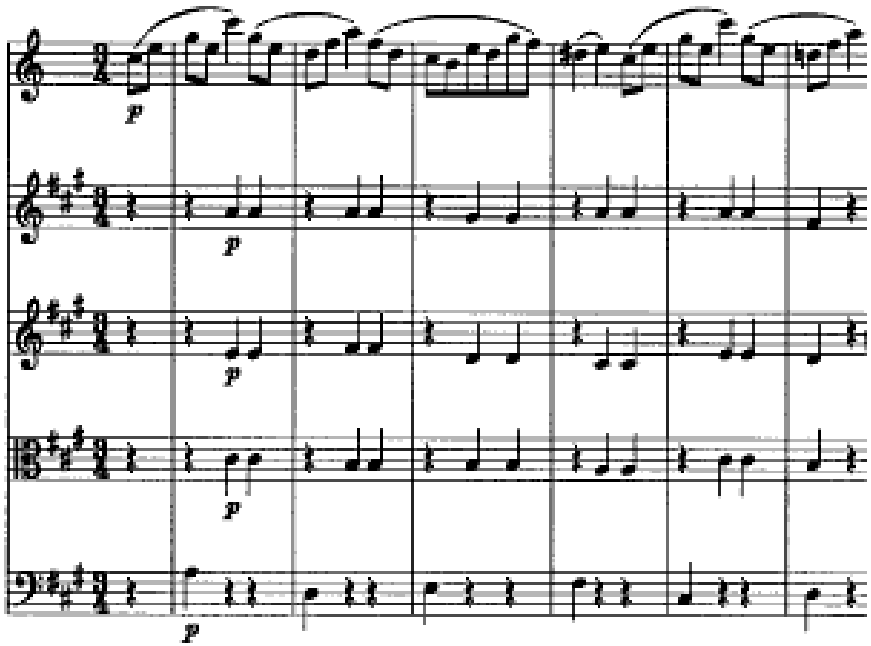


2 3 4

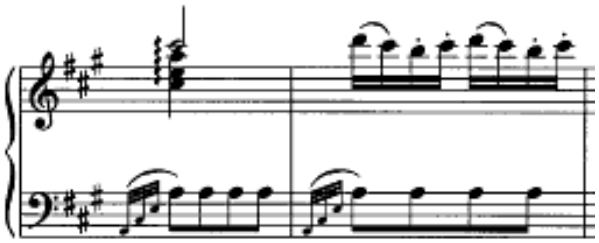
Chopin: Mazurka, Op. 67, No. 1

Braille score typologies

- Ensemble texture = "**open score**"



- Keyboard texture = "**bar over bar**"

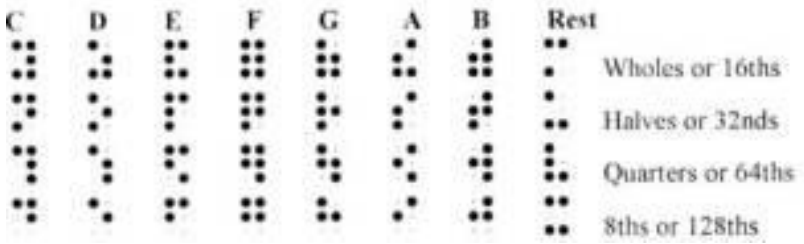


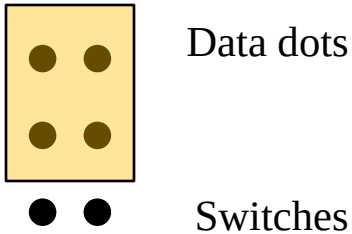
Braille MN: score types

- **Bar-over-bar**: piano music
- **Open-score**: intended for sight-singing
- *Short-score*: choral analogue of bar-over-bar
- *Section-by-section*: piano music or score
- *Single-line*: single instrumental part

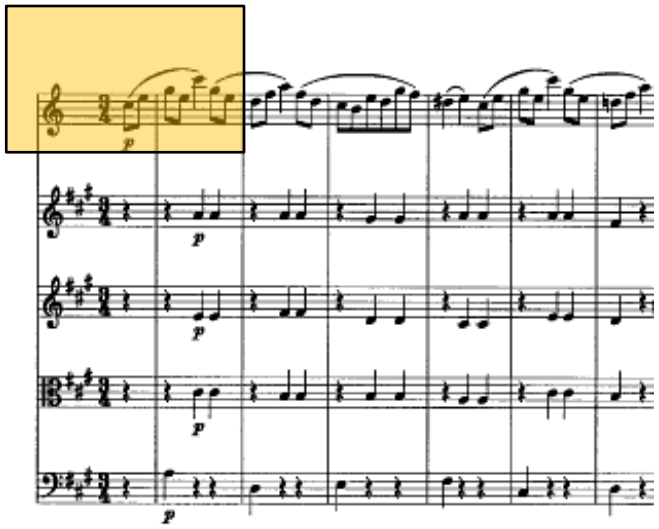
Braille music codes (in general)

- Braille MN developed in *c.* 1850
- **Six-dot cell**
- Many symbols redefined by context
- Has national dialects
- Has international governing body
- Dependent on impact printing

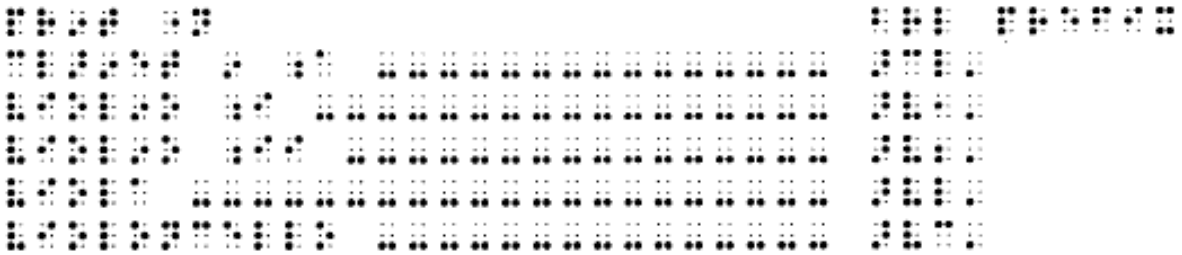




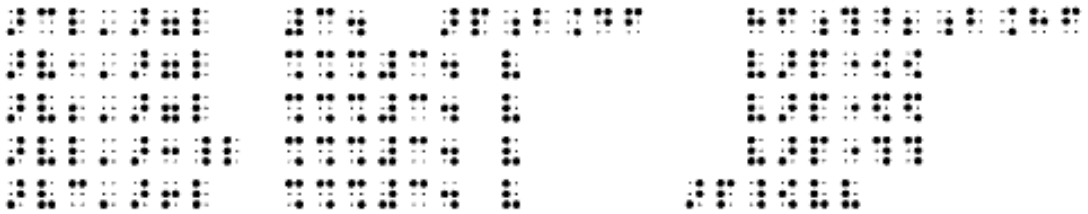
Braille: Mozart trio encoding (clarinet only)



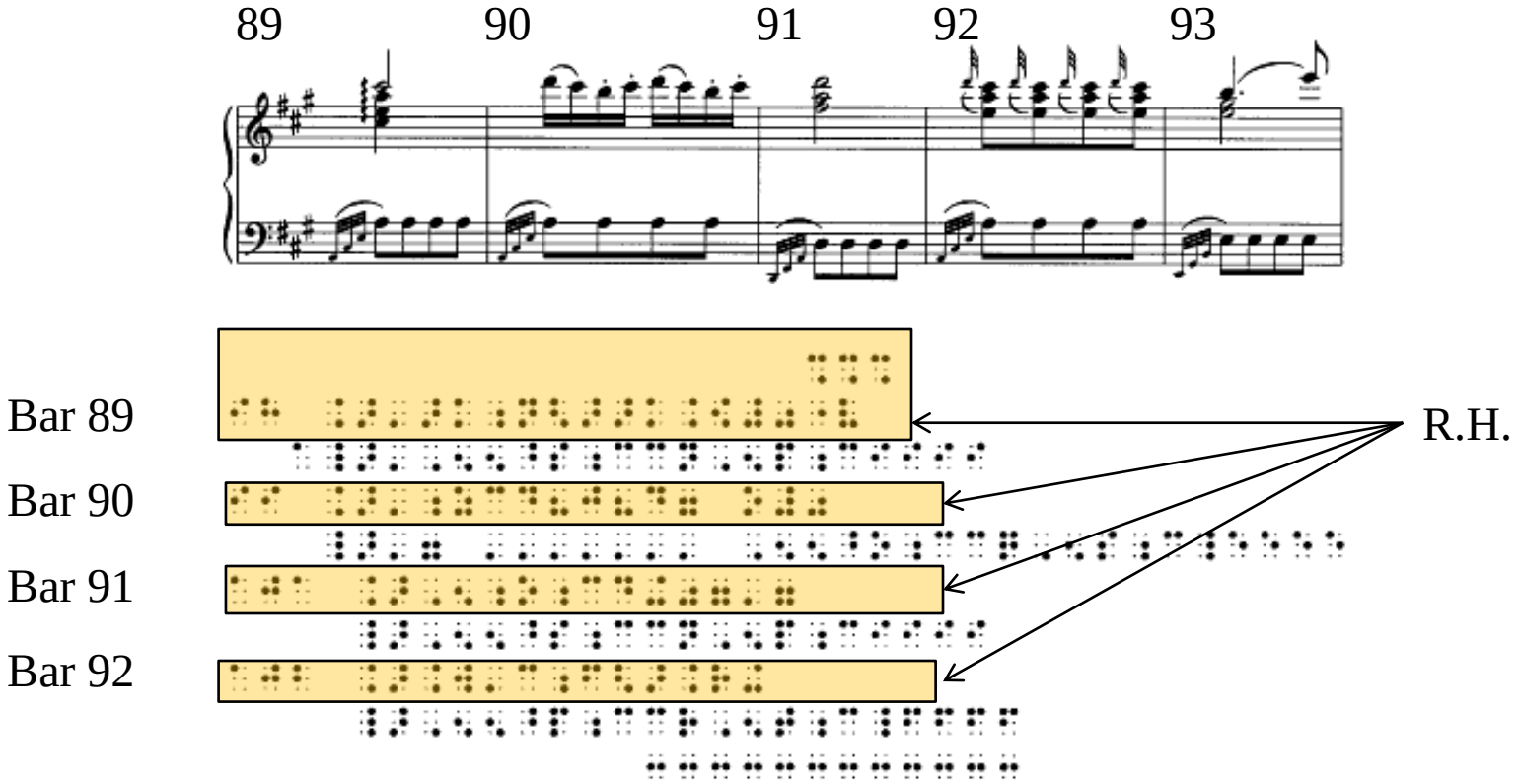
Setup data



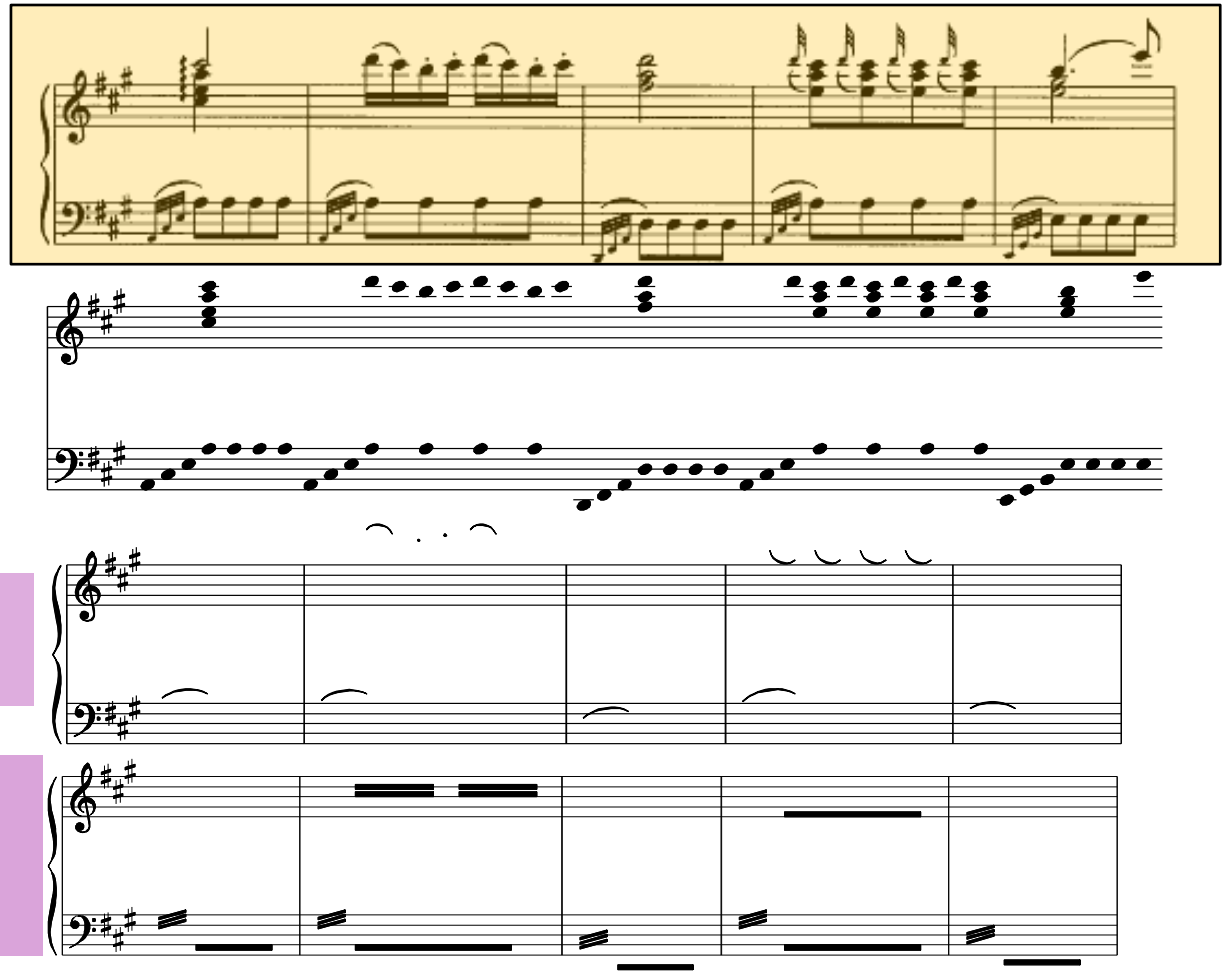
Bars 0, 1



Mozart “Turkish March” in Braille MN



Mozart “Turkish” March: domain dissection



MIDI (pitch) data

Slurs

Slur orientations

Beams

Beam slopes*

Beam lengths*

Musical structure: Notation-sound conflicts

Score structure

- Da capos
- 1st, 2nd endings
- Upbeat complements

Notation>sound translation

Sound specs precise,
Graphics specs free to modify

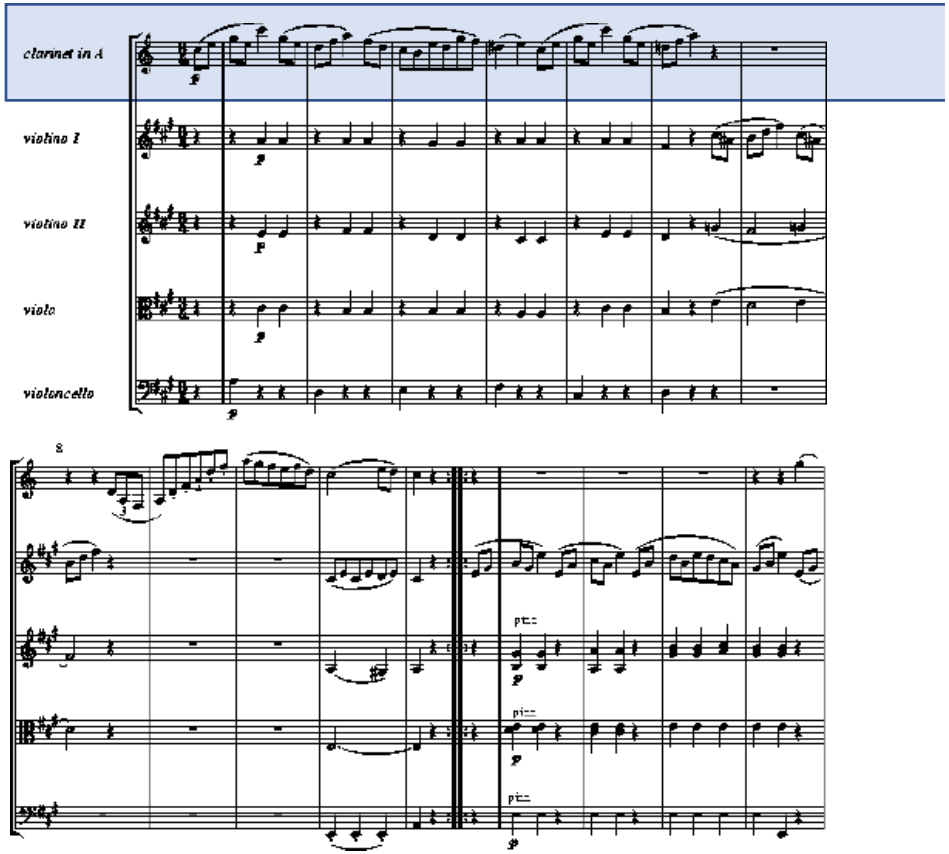
Sound file structure

- Recap point?
- Repeats happen **or not***
- 2nd endings with transitions may not **compute****

* affects total number of bars

** where 1st time has upbeat, repeat point has downbeat

Encoding transposing instruments



- MIDI: sounding pitch
  - Clarinet in A
- Score/part: written pitch
  - Strings in A Major
  - Clarinet in C Major

An application: Textures and tracks in AI-assisted OMR (Alicante group)

- Jorge Calvo-Zaragosa, Jan Hajič, jr., Alexander Pacha
- Reconceptualization
- Introduction of neural nets (NN)
- Goal: end-to-end applications for specific notational types (CMN, monophony, mensural music, keyboard)
  - **Musical semantics**
  - **Musical notation**

Calvo-Zaragosa, Hajič, Pacha, et al.: Inputs/output clarified in papers

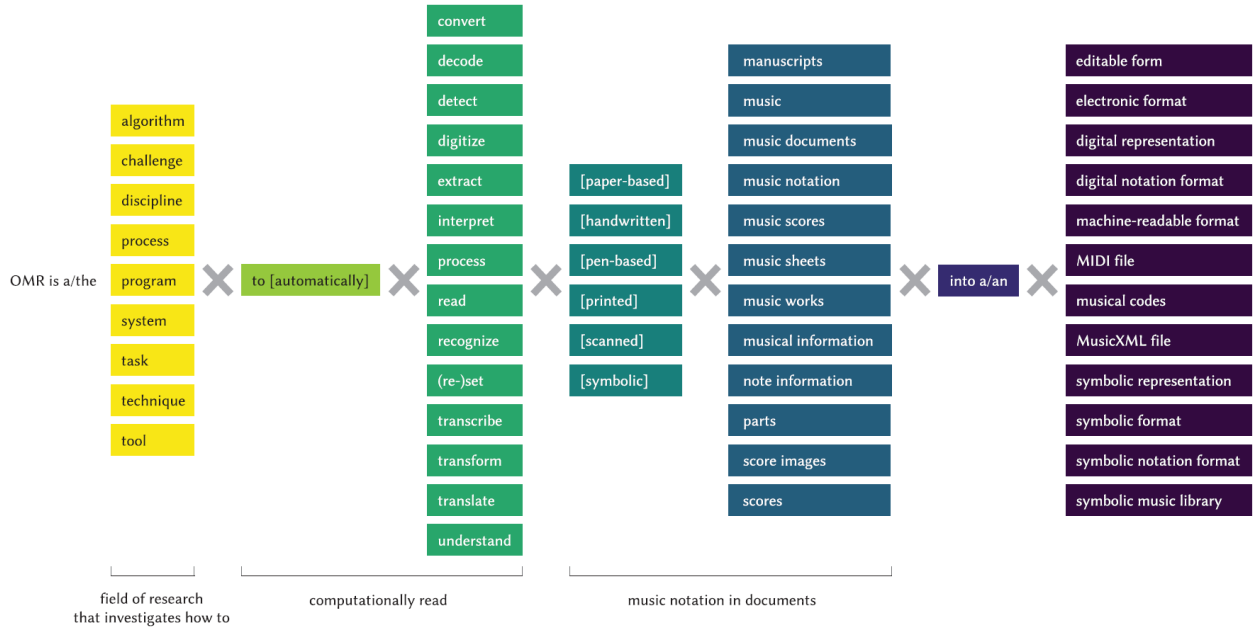


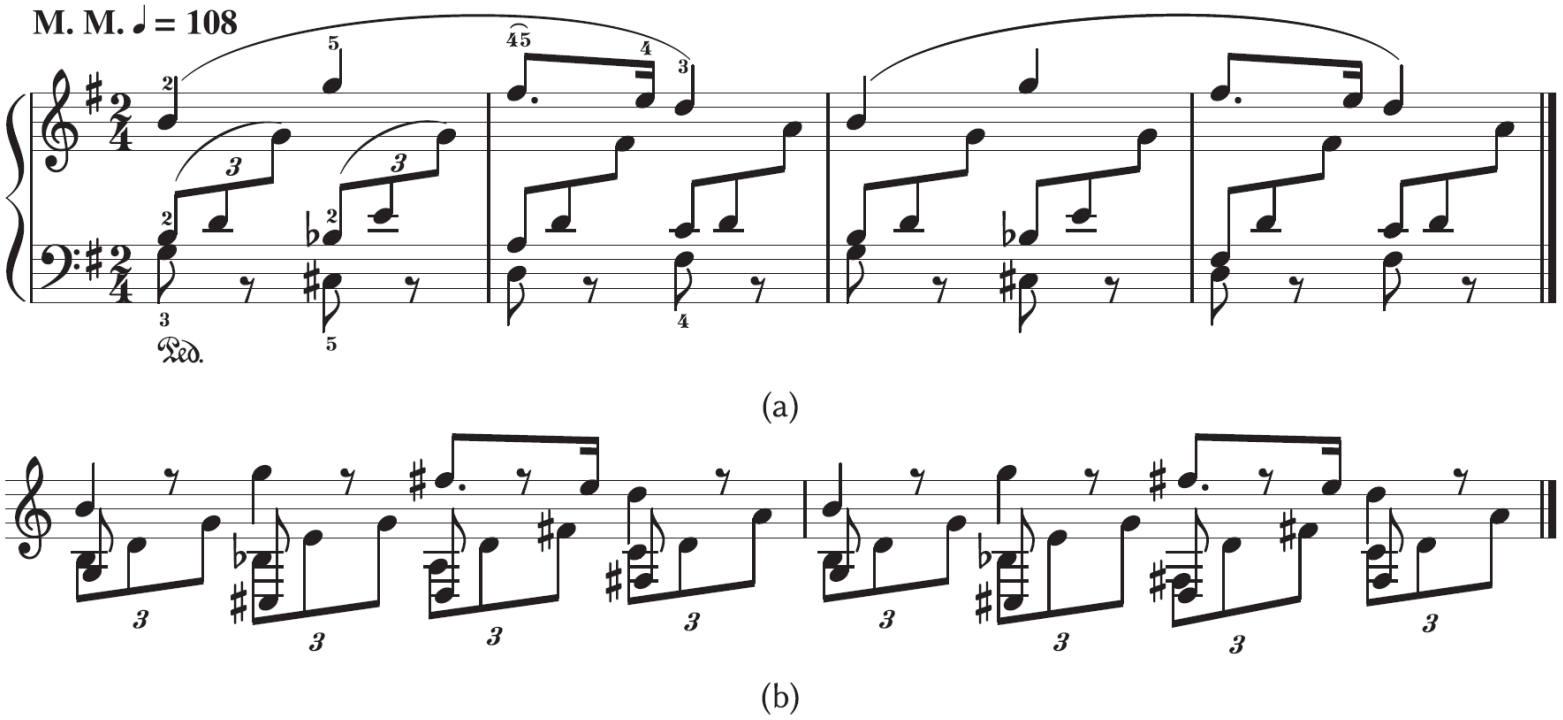
Fig. 1. How OMR tends to be defined or described and how our proposed definition relates to it. For example: "OMR is the challenge of (automatically) converting (handwritten) scores into a digital representation."

ACM Reference format:

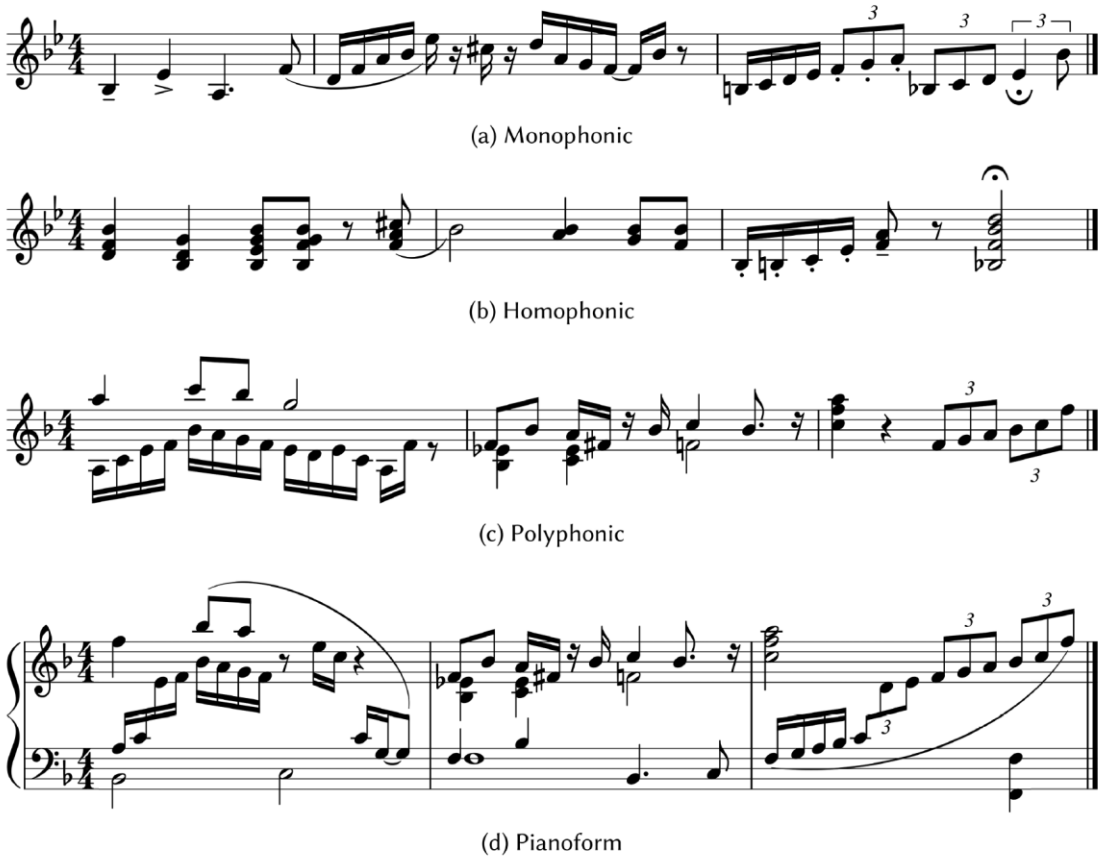
Jorge Calvo-Zaragoza, Jan Hajič Jr., and Alexander Pacha. 2020. Understanding Optical Music Recognition. *ACM Comput. Surv.* 53, 4, Article 77 (July 2020), 35 pages.
https://doi.org/10.1145/3397499

Same notes, different levels of legibility/semantics/comprehension

How does th4e eye find the melody?



Alicante group:
Four categories of “structural complexity”



“Pianoform” semantics

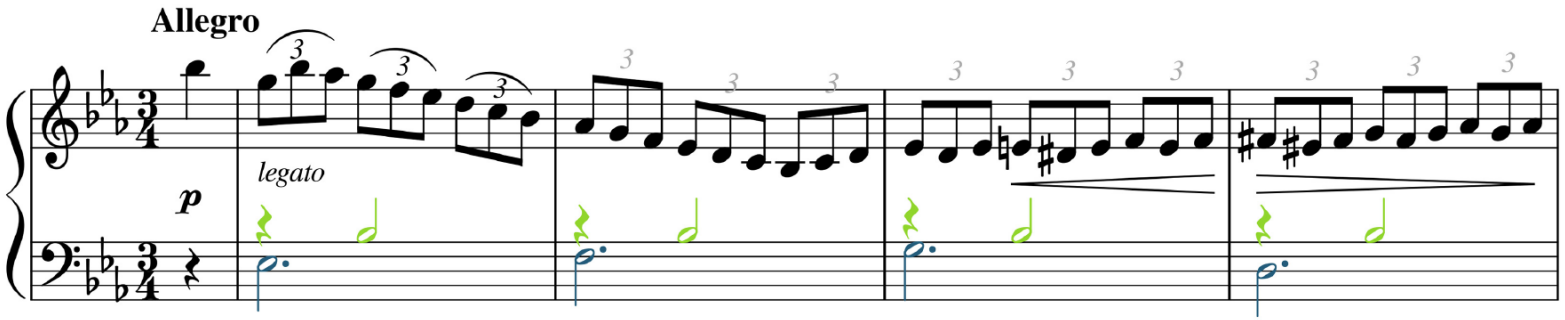
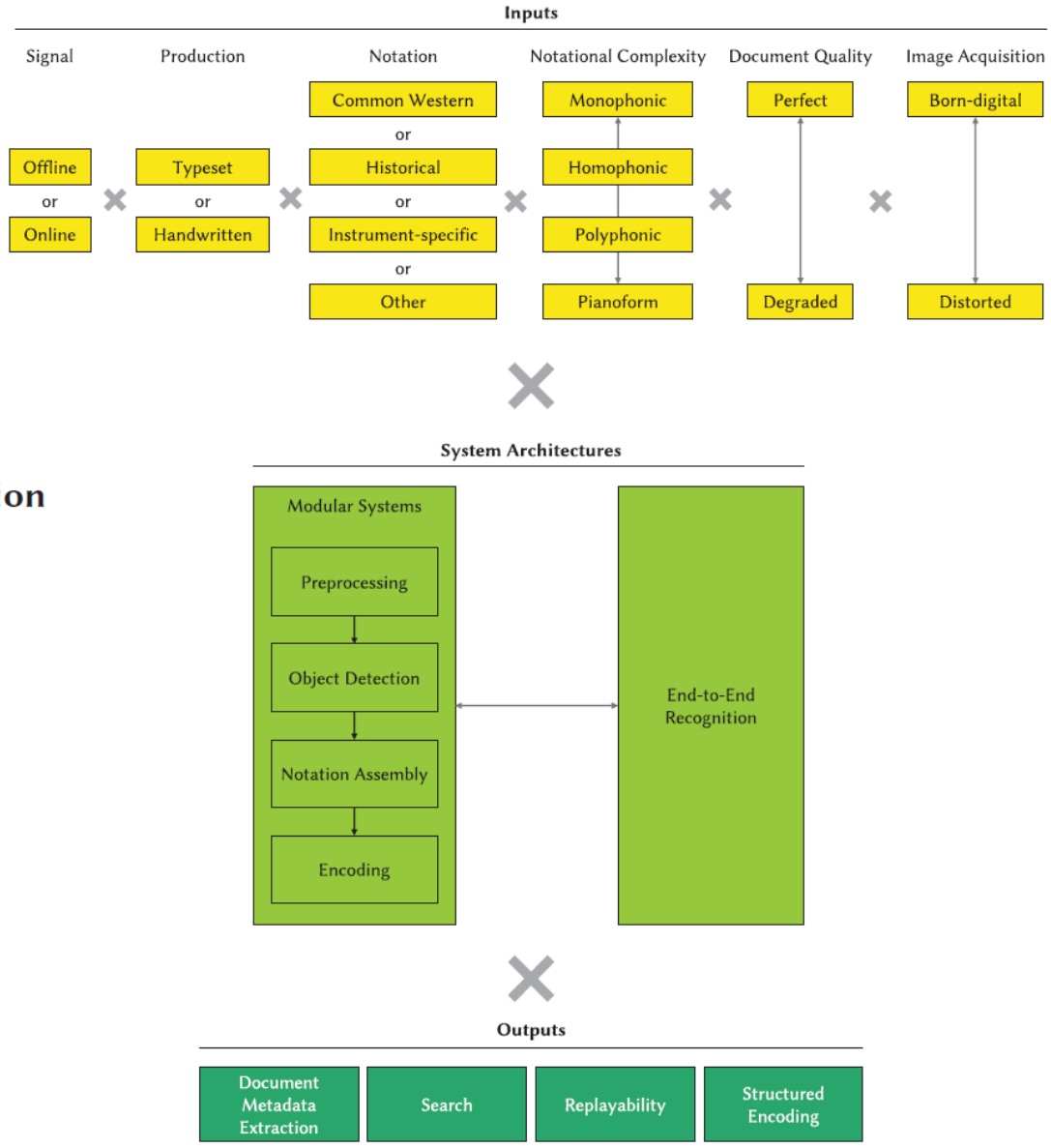


Fig. 14. Beginning of Franz Schubert, Impromptu D. 899, No. 2. The triplet marks starting in the second measure of the top staff are typically omitted in printed editions (here depicted in gray for visualization). The two distinct voices in the bottom staff are color-coded in green and blue.

A clearer model of score semantics



Understanding Optical Music Recognition

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JAN HAJIČ JR., Charles University, Czech Republic
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