New directions in music notation
Initiatives for printed and digital notation

• Extending notational conventions
• Improving digital notation with fonts: SMuFL, Unicode
• Improving digital notation with fonts: Leland (MuseScore)
• Improving existing approaches to notation: Guido MN at GRAME
• Improving optical recognition with AI: Alicante group
Extending conventions for MN

Organizations promoting new notations

- Communal discussions; special interests; tools
  - Finale
  - Sibelius
  - MuseScore
  - Lilypond
  - VexFlow
  - Belle, Bonne, Sage (github)
Fonts *ad infinitim* (SMuFL)

- Unicode: 128 slots for music characters (c1996)
- Unicode aim: *glyph descriptions*, not a specific instance (e.g. eighth notes)
- Not related to *semantic meaning*
SMuFL: A short history

• Original *Sibelius* team released SMuFL (c2014); then Ukraine, then US/UK

• Ex-*Sibelius* team hired by Steinberg (DE): notation product = Dorico

• Team leader: Daniel Spreadbury

• SMuFL font a list of 2,000+ symbols available to anyone

• Uses *private (virtual) space allocation* in Unicode.
SMuFL connections

• Works with proprietary font makers

• Compatible with
  • Finale
  • Sibelius
  • Dorico
  • Verovio
  • MEI

Figure 3. Example of the November 2.0 font.
The “Leland” font for MuseScore

https://www.youtube.com/watch?v=XGo4PJd1lng (20-minute description)

Uses Open Font License (ofl)
Font design close-up

Figure 1: Diagram illustrating how points defined in font-specific metadata can be used by scoring software.
Guido’s new site

Welcome to Guido

Guido Music Notation

The GUIDO Music Notation is a powerful formalism for representing music in a platform-independent way. A musical score should be represented using its graphical features. A musical score should be represented using its graphical features. A musical score should be represented using its graphical features.

The Guido Project

The Guido Project is an open source project hosted on GitHub that encompasses a music notation rendering engine and various music score utilities. The Guido Music Notation Format is a purpose formal language for representing score-level music in a platform-independent plain text format. The format comes with various software components for music score manipulation. The main components of the Guido engine are:

- Different platforms and using different programming languages.

Dominique Fober et al.
Improving durability, robustness

Guido MN—Grame-CNCM

https://guido.grame.fr/

Re-write of Guido original documentation: https://guidodoc.grame.fr/

Tag diagram
Guido example: Mozart Clarinet Quintet
(central example on Beyond Midi; first example in Guido doc.)

User Guide: Tags and nested tags
https://guidodoc.grame.fr/guide/tags/
Interchange codes in the marketplace: MusicXML -- Hal Leonard

The Lark in the Morning

arr Joachim Beyer

Irish Folk Hal Leonard (Publisher)

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Flöte

Gitarre

Violoncello

mp
MuseScore’s sharing site

- Small monthly fee
- User-built repertories (dubious copyright credentials)
Interchange codes in the marketplace: MEI--Bärenreiter GmbH

First “work” produced using MEI data markup (2014)

Salieri, Antonio
Prima la musica e poi le parole
Divertimento teatrale in einem Akt. Operetta für vier Stimmen

Editionsnummer
BA 8811
ISMN
9790006539840

Ausführliche Produktdetails

Band / Reihe

Herausgeber
Betzwieser, Thomas / La Salvia, Adrian

Sprache(n) des Werkes
Italienisch

Sprache(n) des Textteils
Englisch, Deutsch, Italienisch

Produktart
Werkausgabe, Partitur, Kritischer Bericht, Datenträger (USB-Karte), Urtextausgabe

Salieri: Prima la musice poi le parole
MEI-to-user workflow (DE): Critical editions

Encode troublesome passages

EDIROM (MEI)

Encode text

TEI

Score paper

Critical report ROM

Libretto ROM

Markup tool for source material
Improving presentation and documentation

https://wiki.ccarh.org/wiki/Musescore_Supplement

Bartok: The Peacock

Example by Christina Kim
Use of AI in OMR development

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: “Inputs” and “outputs” unclear

OMR is a/the algorithm challenge discipline process program system task technique tool to (automatically) convert decode detect digitize extract interpret process read recognize (re-)set transcribe transform translate understand manuscripts music music documents music notation music scores music sheets music works musical information note information parts score images scores

into a/an editable form electronic format digital representation digital notation format machine-readable format MIDI file musical codes MusicXML file symbolic representation symbolic format symbolic notation format symbolic music library

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:
https://doi.org/10.1145/3397499
Same notes, different levels of legibility/semantics/comprehension
Four categories of “structural complexity”

(a) Monophonic

(b) Homophonic

(c) Polyphonic

(d) Pianoform
“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.
Understanding Optical Music Recognition

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