

Crafting TabMEI, a module for encoding instrumental tablatures

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Abstract

A substantial part of Western art music for plucked, bowed, and keyboard instruments from roughly the early 16th to the late 18th century is notated in *tablature*, a prescriptive notation system that provides the actions a player must take rather than a description of the sounds these actions produce [4]. The mid-20th century saw a revival of tablature for plucked instruments — principally the same as the earlier system, but now for modern (electric) guitar and bass guitar — with the rise of popular music, enabling a large audience to reproduce its favourite music. With the emergence of the personal computer and, especially, the internet in the late 20th century, enormous amounts of user-created tablature — now in various *digital* formats, and increasingly linked to performance material (audio, video) — have become available. Music in tablature, in short, is a force to be reckoned with.

Yet, with the exception of a handful of recent attempts [1, 2, 3, 5, 6, 8, 9], large-scale computational research into music in tablature is lagging behind. We hypothesise that this is to a large extent due to the lack of a suitable digital format capable of encoding not only the explicit, but also the implicit and the contextual information conveyed by a piece in tablature. We think that MEI, which “brings together specialists from various music research communities [...] in a common effort to define best practices for representing a broad range of musical documents and structures” is such a format.¹ In this paper, we describe TabMEI, a module modelling the various tablature variants, to be included into MEI.

At this early stage, TabMEI focuses on tablature for plucked instruments, and includes historical lute tablature in three different types (Italian, French, and German) and tablature for the modern (electric) guitar. We do not yet attempt to model historical guitar or keyboard tablatures, which bring their own challenges. We aim to implement a basic set of elements and attributes — reusing, in the spirit of MEI, existing ones as much as possible — that cover most of the repertoires and their performance techniques to a usable level.

¹ <https://music-encoding.org/>

We encounter several challenges. First, there is the issue of reconciling proposed new MEI elements and attributes with existing ones: are they really needed if MEI already contains mechanisms that model highly similar concepts? Second, modern guitar tablature contains a substantial range of indications of very common performance techniques particular to the instrument (e.g., various legato techniques, string bending techniques, or articulation techniques). Often, these require the introduction of new, idiomatic concepts; an example is a ‘virtual’ note reflecting the current ‘state’ of a note whose pitch is being inflected (itself another concept) while retaining properties of that initial note. Third, modern guitar tablature is often accompanied by a transcription into CMN, which may contain relevant information, added by the transcriber, that is only implicitly or ambiguously present in the tablature (e.g., the exact duration of a note). How should such different levels of objectivity be modelled? Fourth, when dealing with online tablatures in ASCII (plain text) format, one sees a high variance in quality and, since there is no notational standard and anyone can make their own encoding with just a text editor, in representation. Both complicate, among other things, any necessary data preprocessing. Fifth, German lute tablature, which contains no staff but represents each fret-string coordinate by a unique symbol, requires a different rendering paradigm. Although this presents a challenge now, the experience gained modelling this type of tablature will be useful when dealing with keyboard tablatures later.

We adopt the following workflow for implementing a new MEI module:

- Identify notational features specific to tablatures, always taking into account the domain — visual, gestural, or analytical — to which they belong. A feature frequently belongs to more than one domain.
- List requirements based on a set of examples. Complex and rare examples should be considered in order to validate an approach.
- Ensure that the proposed model fits the MEI approach.
- Ensure that existing MEI elements and attributes are reused when appropriate.
- Ensure that the module’s granularity is in line with that of existing MEI modules (i.e., avoid a surplus of new elements and attributes).
- Prepare a customisation and the accompanying documentation, both of which are required to make a proposal (in the form of a pull request) to MEI.
- Incorporate feedback from the larger MEI community.

The TabMEI module has several immediate applications. First, a simple Verovio tablature renderer, taking TabMEI as input, exists.² It is compatible with the Verovio CMN and mensural music renderer — meaning that tablature can be displayed together with music in CMN (e.g., a transcription of the tablature) or mensural music (e.g., a vocal part in a lute song) flexibly. The renderer facilitates basic playback. Second, using a workflow involving the music21 tablature toolbox [1, 2] and a tablature mapping algorithm [9] or a voice separation model [8],³ we can directly compare 16th-century lute intabulations — arrangements of vocal works — with their

² <https://www.github.com/rism-ch/verovio/>

³ <https://www.web.mit.edu/music21/>

vocal models. Third, ‘internet tabs’ (i.e., online tablatures using an ASCII character set) can be ingested through the music21 tablature toolbox, displayed elegantly with Verovio, and analysed on a large scale, or connected to other digital datasets, for example through linked data techniques [6, 7, 10].

In this early stage, there are many lines of future work to be explored. The most obvious — and most demanding — is to be more complete both in the coverage of repertoires (e.g., for the historical guitar, or for the various historical keyboard instruments) and performance techniques. Furthermore, existing Standard Music Font Layout (SMuFL) fonts for displaying historical tablatures are incomplete, and should be extended;⁴ this requires a discussion with SMuFL developers. Useful features, for example in the context of education or the preparation of scholarly or performance editions, would be interactive authoring and editing, and ingestion from a wider range of formats. Finally, the support of playback via soundfonts is envisaged.

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⁴ <https://www.smufl.org/>

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