A New Conceptual Model for Musical Sources and Musicological Studies

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Abstract

We present a new multi-layered, conceptual model for associating musical source materials to musicological arguments. We describe our proposal for operationalizing these concepts through a framework for musical annotation which, in the future, will be implemented using RDF. Briefly stated, this model shows how portions of digitized data in various files and formats can be identified, selected, labelled, and compared.

Introduction

Each layer in our model corresponds to one of the three main categories of objects that represent our data (Figure 1):

- **Evidence Objects** – digitized sources;
- **Musical Objects** – user-selected musical elements and their aggregates in various relevant combinations; and
- **Musicological Objects** – their musicological labelling and scholarly commentary.

Prior to primary scholarly activity (in this case research commentary involving multiple sources) a series of steps must be completed including identification of available resources, selection of items of interest, and addressing locations in these sources. The two lower levels of our model are therefore, generally speaking, concerned with collecting the desired data, while the upper level involves critical judgement. A bottom-up introduction to these structures follows.

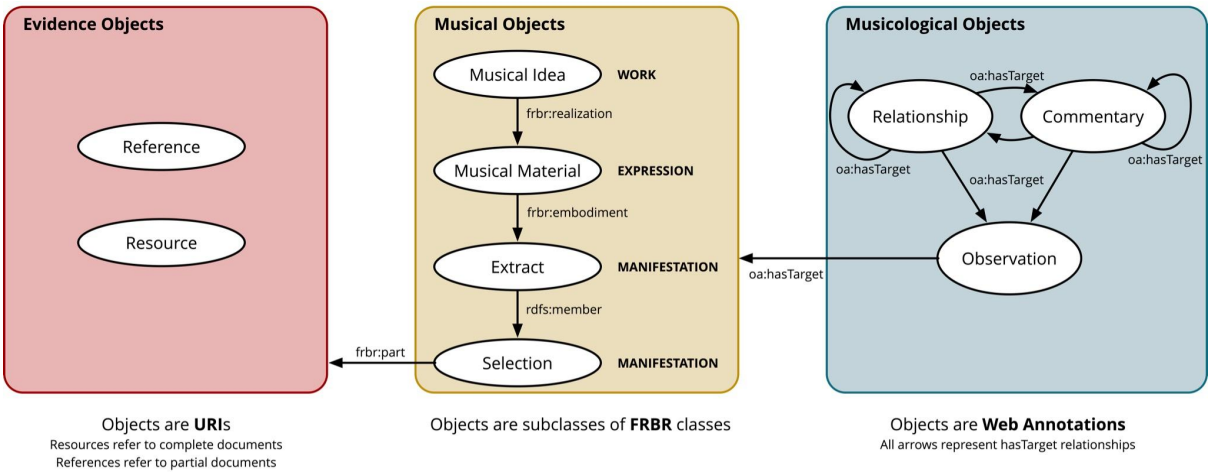

Figure 1: An overview of the 3-layer model.

1 Evidence Objects

These are digitized materials that will be used for the musicological investigation. They include images of musical scores and their MEI encodings (stored in project repositories and digital libraries), music recordings (in the form of audio files and digital video), text documents, and links to secondary source materials, such as books and articles.

Resources refer to complete documents or files which can be unambiguously identified using a Universal Resource Identifier (URI). Typically we would expect to be able to access these. Some examples are: a music encoding file; an image file; a video file; and a document file.

References are places or regions within a resource, and are also identified using URIs.

Examples

- the XML ID of an MEI element: http://example.com/encoding.mei#note-123
- a DOI of a text resource: https://doi.org/10.2307/746230

2 Musical Objects

Musical objects refer to the music that will be investigated, be it in whole or in part, in notated, image, audio or video format. The types of musical objects refer to the various levels of collection and abstraction pertinent to the musical research, closely following FRBR principles. FRBR terminology is used whenever possible, although there are particularities pertaining to the domain of music which we reflect through our use of FRBR subclasses. Any of these musical objects may be the target of an Observation.

A **Selection** is the lowest level of grouping musical references. It contains the complete set of URIs for the individual components of a musical extract, be that a single resource, or multiple resources derived from a single source of material, such as a set of orchestral parts. It is a subclass of frbr:Manifestation because it gathers together digitized embodiments of a single piece. Every Selection must be part of an Extract because it is assumed that every piece potentially has at least two manifestations: one written and one performed.

Examples

- an area on the surface of the score

- part of a music audio/video file
- a passage in the instrumental or vocal parts of the same musical score

An **Extract** collects various instances of a musical feature or passage. It is comprised of a single or of multiple frbr:Manifestations of a unique musical expression. In other words, it is used to combine Selections of different source materials.

Examples

- a single Selection
- a combination of Selections from different sources, such as the XML IDs of consecutive measures in an MEI file and the timestamps of its corresponding section in an audio file

MusicalMaterial is an abstract entity that refers to the musical concept behind a music extract, such as a passage, phrase or fragment. It is primarily used to group a particular aspect of a musical extract with an analogous – or what we are calling a *parallel* – moment or passage in distinct versions of a musical work. MusicalMaterial represents a single musical thought, independent of its various manifestations in different arrangements or recordings (or, in a variation set, within a single variation).

Since it is an abstraction, MusicalMaterial does not necessarily have a notated expression. It can correspond to just a "core" musical thought or be identical with one of its expressions, according to the scholar's interpretation of the music. Another relevant aspect of MusicalMaterial is that it can refer to any segment of music, independent of formal structures. It is a subclass of frbr:Expression because it represents the realization of a MusicalIdea.

Examples

- the recapitulation section in two arrangements of the same work
- a citation from a piece that is featured in another piece, e.g., the Dies Irae theme in the 4th movement of Berlioz's *Symphonie fantastique*

MusicalIdea is an abstract entity that refers to the musical thought behind a recurring musical structure, such as a theme or a motiv. Although it is similar to MusicalMaterial in the sense that it is an abstraction, MusicalIdea primarily groups elements that can be found not only in parallel passages in different musical pieces but also within a single musical piece, and consequently has greater affinity with established musical structures. As MusicalMaterial, MusicalIdea is abstract and does not require a notated form. It is a subclass of frbr:Work because it is an idealized "seed" of its multiple expressions throughout a musical piece.

MusicalIdeas, as abstractions, must be realised in the form of MusicalMaterial. Even if the MusicalMaterial only occurs in one version, it represents the concept behind a passage, and could recur (i.e. a second expression of the same MusicalIdea always potentially exists).

Examples

- the entries of a subject in a fugue
- a motiv that is repeated and developed in a sonata-form piece

3 Musicological Objects

Whereas the previous layers describe and structure musicological evidence, Musicological Objects enable us to document musicological research. These objects are used to describe, compare and record historical context associated with the collected musical objects, as well as to present hypotheses, link them to non-musical sources, and make scholarly

commentary. This is accomplished using the Web Annotation standard (Sanderson, 2017), capturing annotations, along with their motivation and provenance

Observations usually contain a simple textual remark that targets a musical object. In most cases, it will be used to label such objects or to present one of their relevant features. Observations aim to be objective, non-controversial, or traditional descriptions, so that they can be reused.

Examples

- a label: "This is the theme A of this sonata-form movement."
- something notable: "There is a *fff* (fortississimo) marking here."
- a description: "The development section starts with bassoon and oboe playing the main motiv."

Relationships are used to juxtapose more than one musical object by connecting Observations, Commentaries and other Relationships. They also aim to be a simple text remark, usually noting a commonality, a substitution, an addition or a deletion between Observations. More complex details, such as the reason for a particular change, are recorded in Commentaries.

Examples

- a comparison: "The *fff* (fortississimo) marking in version A was substituted with an *ff* (fortissimo) in version B."
- noting a common pattern: "The *fff* to *ff* substitution occurs in these three passages."
- a deletion: "The introduction was suppressed in version B."

Commentaries are used to make more complex comparisons, bring attention to relevant aspects of the music and to present hypotheses to explain any differences observed. Commentaries can also present historical or analytical reflections informed by academic research, including pointers to external sources and references.

Examples

- a comparison: "The bassoon part in the orchestra version has staccatos that were substituted by a pizzicato in the violoncello in the piano trio version. This represents a deliberate change of articulation since the violoncello is capable of playing it as written in the orchestra version."
- a notable event: "At this time, *fff* markings were absolutely rare. They were probably introduced in the musical vocabulary by Beethoven himself, and even then they figure only in three of his works (see SHEER 1998, 361)."
- a hypothesis: "This substitution of staccatos by pizzicatos may have been done due to the change in instrumentation."

Conclusion

This poster provides an overview of a structural model that aims to support the association of multiple source materials and the development of comparative musicological research, as designed for use in the *Beethoven in the House* research project. Although the model has, thus far, only been used within this project, we anticipate wider applicability encompassing other sources and musicological investigations.

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