Towards a conceptual model for Brazilian popular music representation

Marcos Fragomeni Padron[1], **Fernando William Cruz**[1], **Juliana Rocha F. Silva**[1]

[1]Faculdade de Ciência da Informação
Universidade de Brasília (UnB) – Brasília, DF – Brazil

marcos.fragomeni@gmail.com, fwcruz@unb.br, jurfsilva@gmail.com

Abstract. *Popular music is a valued component of Brazilian national heritage because it reflects local traditions and produces records of current social and cultural organization. Despite the importance of popular music to Brazilian heritage, many sources of information regarding this music have interoperability problems and are unable to meet all users' information needs. Most systems for classifying musical information applied to Brazilian popular music are adaptations that hinder the management of this repertoire. In this article it is discussed a specific representation for Brazilian popular music in the form of a conceptual model in order to communicate its nuances and enable the derivation of application models for different areas, such as Museology and Librarianship.*

1. Introduction

The Brazilian popular music is one of the most listened music styles in Brazil due to its strong connection with the local culture. Through this music it is possible to meet the several Brazilian ethnic aspects, either by its lyrics, or by the origins of sounds and rhythms. Regardless of its importance, there are no formal guidelines for Brazilian music heritage preservation. Therefore, several information sources of Brazilian music lack strategies dedicated to serve different information needs and quite often adopt cataloguing standards that prevent these musical objects to be put in a context of digital curation.

Since late 1990's, some multi-entity bibliographic conceptual models emerged. Those models had a strong influence over musical resources organization. The first one received the FRBR acronym [IFLA 2009], which in practice synthesizes a family of conceptual models later consolidated on a single model known as IFLA LRM [IFLA 2017]. The FRBR model inaugurated a new look over the process of intellectual creation, providing an entity-relationship model whose core entities, WEMI (**Work, Expression, Manifestation** and **Item**), separate intellectual from physical aspects of bibliographic resources. Other model that have influenced the musical information organization is the FRBRoo [IFLA 2015], that builds on CIDOC-CRM [CSIG 2011] to offer a common view of library and museum information under a temporal, event-oriented perspective. Those bibliographic models are agnostic about the kind of catalogued resources and generic in relation to subject information and the cultural contextualization of works. The Music Ontology [Raimond et al. 2007], used to publish musical resources in the Semantic Web, represents another conceptualization for organizing musical information, however it does not consider the particularities of different cultures and musical traditions.

This article presents a specific conceptual model for Brazilian popular music representation, which aims to communicate its nuances and enable the derivation of application models for different areas, such as Museology and Librarianship. The proposed

model expresses the nature of musical works in Brazilian popular music tradition and real world situations in which those works are conceived, performed and recorded. The represented conceptualization is built based on the study of the aforementioned conceptual models and on a previous research [Silva 2017], that proposed guidelines for organizing Brazilian popular music information in accordance with the characteristics of this type of music as identified in the literature and in the perceptions of 22 interviewed Brazilian musicians.

For better expressivity, the model is represented in the well-founded OntoUML language [Guizzardi and Wagner 2010] whose metamodel is supported by the Unified Foundational Ontology (UFO) categories. It was used the 2.0 version of OntoUML as introduced in [Guizzardi et al. 2018] which is founded on the UFO's reviewed theory of endurant types and taxonomic structures.

2. The conceptual model

The conceptual model is presented in the form of OntoUML diagrams followed by textual explanations of the represented conceptualization. In order to reduce the number of elements and ease visualization, *mediation* and *formal* relation stereotypes are not shown. Not stereotyped relations linked to *relatorKind* classes and its specializations are *mediations*, while the remaining not stereotyped relations are *formal*.

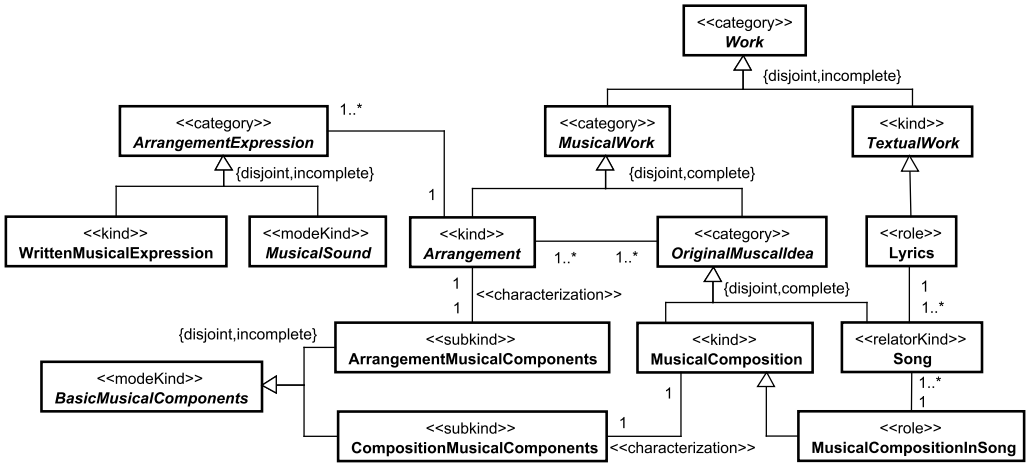

Figure 1. Diagram focusing on musical work.

Figure 1 presents a diagram with the arguably most important concepts in the model, the **Work** and its specializations. To explain the concept of **Work**, we borrow a fragment of **F1 Work** specification of FRBRoo model: "(the work) comprises distinct concepts or combinations of concepts identified in artistic and intellectual expressions, such as poems, stories or musical compositions. Such concepts may appear in the course of the coherent evolution of an original idea into one or more expressions that are dominated by the original idea" [IFLA 2015].

A **MusicalWork** relates to musical expressions, while a **TextualWork** relates to textual expressions. Musical works can be seen as "musical ideas", something like a musical sound not expressed, as if someone could imagine it or play it internally in her mind. **TextualWork** was modeled as a *kind* and not a *category* in order to abstract the taxonomy of textual works, considered not important for this conceptualization.

It is important to draw a distinction between **MusicalComposition**, **Song** and **Arrangement**. A musical composition is a musical work which is considered original, or authorial in users' point of view. It is mainly identified by a melody, that, even with some variations, can be used to identify its expressions (e.g., musical sounds, scores, etc.) as instances of the same "music", even with no lyrics. Musical compositions and songs are considered original musical ideas (**OriginalMusicalIdea)**.

A **Song** is a musical work which links a **MusicalComposition** to a **TextualWork**. A song is a music with lyrics. "A Garota de Ipanema"[1] is a song with music by Antônio Carlos Jobim and Portuguese lyrics by Vinicius de Moraes. The **Lyrics** was modeled as a role of a textual work in a song considering that different sorts of textual works can be used as lyrics. Usually the lyrics is written for the song, but it is not rare for a poem to be used as lyrics. One good example is the song "Canteiros" where Fagner composed a music for a poem by Cecília Meireles. The music in the song was modelled as the *role* **MusicalCompositionInSong**. There is also the case where a song is made by adding a lyrics to an existing musical composition. In this conceptualization the song "A Garota de Ipanema" with Portuguese lyrics and "The Girl of Ipanema" with English lyrics by Norman Gimbel are different songs that share the same music (**MusicalComposition**). It is important to notice that a music to be considered a song must privilege the text. Instrumental music can use the human voice to compose the musical texture on the same level of other musical instruments, even when emitting words or isolated phrases, and still not be considered a song.

An **Arrangement** is a musical work whose author elaborates one (or more) original musical idea, in order to represent it in a given context or in a certain form. That context or form can be as diverse as an album recording of a band, a public performance, a representation in form of a musical notation for a specific orchestration, or a film soundtrack. The class **BasicMusicalComponents** represents the intrinsic musical elements in musical works (e.g., harmony, melody, rhythm, timbre, texture, etc.). Those elements are not modeled separately because they usually overlap. **CompositionMusicalComponents** consist primarily of the composition's melody. They carry the minimum set of elements needed to group all arrangements made for that composition. On the other hand, the **ArrangementMusicalComponents** contain all musical components intended for its execution.

The arrangement is a central piece in the Brazilian popular music scenario. The expression of any musical work requires an arrangement, being this expression in the form of sound or any kind of musical notation. That conceptualization is represented by the *category* **ArrangementExpression** and its specializations **MusicalSound** and **WrittenMusicalExpression**. Musical compositions and songs need an arrangement to be expressed. For example, when someone makes a song and records a video for the Internet singing and playing a guitar, this person is expressing a song with its lyrics and musical composition through an arrangement for voice and guitar.

An arrangement is not always expressed in the form of musical notation (a common situation in this domain), nor its authorship is always registered or recognized. Many arrangements are made in the context of a recording session in a studio where the ar-

[1] Brazilian name for the original song "The Girl From Ipanema".

ranger and the performers interact informally. An arrangement exists even in the context of a group of performers playing together without previous preparation. In that case, the performers themselves are the arrangers.

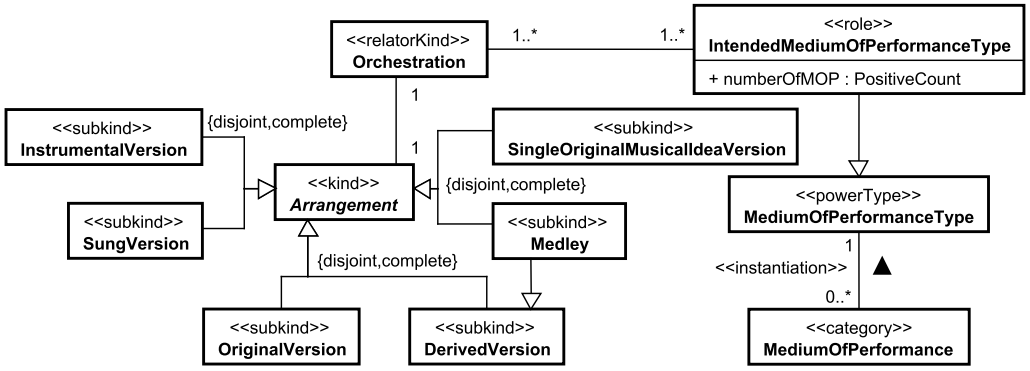

Figure 2. Diagram focusing on arrangement.

Other concepts related to arrangements are shown in Figure 2. The first arrangement by which a song or a musical composition is made known is an original version. Other arrangements of the same original musical idea are considered derived versions. Most arrangements are made for one single original musical idea, however some others concatenate more than one original musical idea in the same arrangement (**Medley**). These medley versions are always derived. If an arrangement is made for at least one song, it is considered to be a sung version, otherwise it is an instrumental version.

The *category* **MediumOfPerformance** (MOP) represents any sort of media used by an individual performer artist to express sound when playing in a performance. Usually it is a musical instrument or the human voice, but it can be anything that can produce sound as when Hermeto Pascoal plays his heartbeat or the whistle of a kettle. An arrangement defines an **Orchestration**, which states the number and types of medium of performances must be used (e.g., one singer and two guitars). The *powerType* **MediumOfPerformanceType** represents all the possible types of MOP, so the orchestration can prescribe kinds of MOP instead of MOP instances. An arrangement is made for any piano, not a specific piano instance. This *powerType* plays the *role* **IntendedMediumOfPerformanceType** in the orchestration. The attribute **numberOfMOP** indicates the number of MOPs of that type should be used. The relation between **MediumOfPerformanceType** and MOP follows the UML notation proposed by [Carvalho et al. 2016] for representing the case of *powerType* partitioning the base type, following their multi-level conceptual modelling theory (MLT).

The musical **Performance** is shown in the diagram on Figure 3. A performance must be an **IndividualPerformance** (performed by only one **IndividualPerformer**) or a **ColectivePerformance** (when there are more than one musician playing). A collective performance is always composed by two or more individual performances. A **Band** is formed by two or more **BandMember** that can change over time. Its principle of identity does not depend on the variation of its members in time. One **Person** plays the role of an **IndivdualPerformer** when playing one or more **MediumOfPerformance** in an **IndividualPerformance**. The *role* **PerformingBandMember** is an individual performer that performs on behalf of a band.

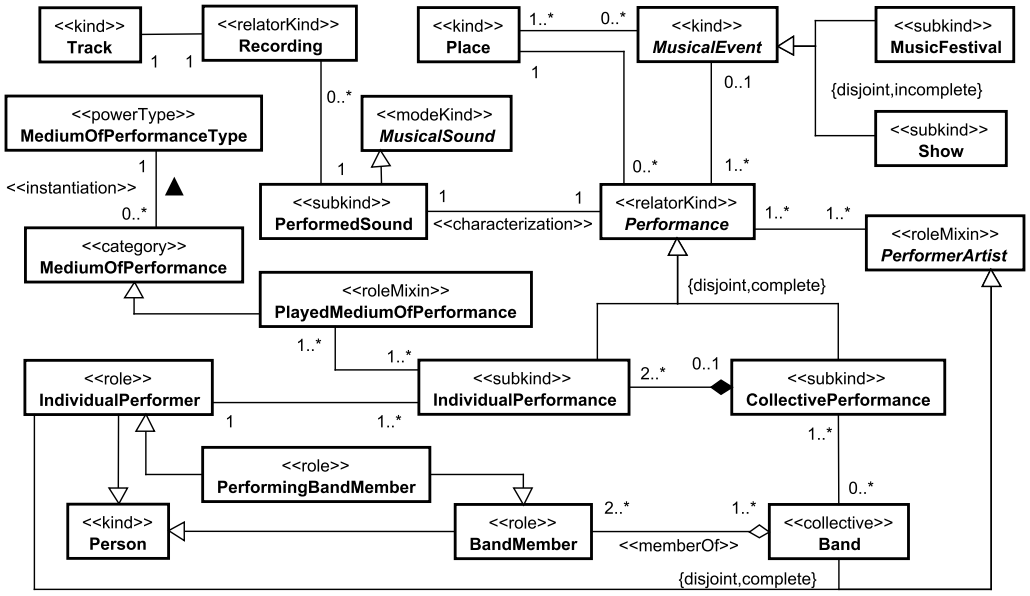

Figure 3. Diagram focusing on musical performance.

The model represents the reality in such a way it can be more expressive and serve to a broader spectrum of applications. One example of that expressivity is the use of Powertypes to differentiate the instances of played instruments from their types. One application can be interested in the actual instance of the guitar played by João Gilberto at the Carnegie Hall in 1962, while, for other application, knowing the kind of the played instrument is enough. Museum studies are interested in object instances, whereas bibliographical applications ignore this information.

A performance is held in one **Place**. It can occur in the context of a **MusicalEvent**. The **PerformedSound** is considered inherent to the performance. That sound can optionally be recorded to produce musical tracks (**Track**). Those tracks can be published in diverse media and formats, however concepts related to these publications are not covered by this model.

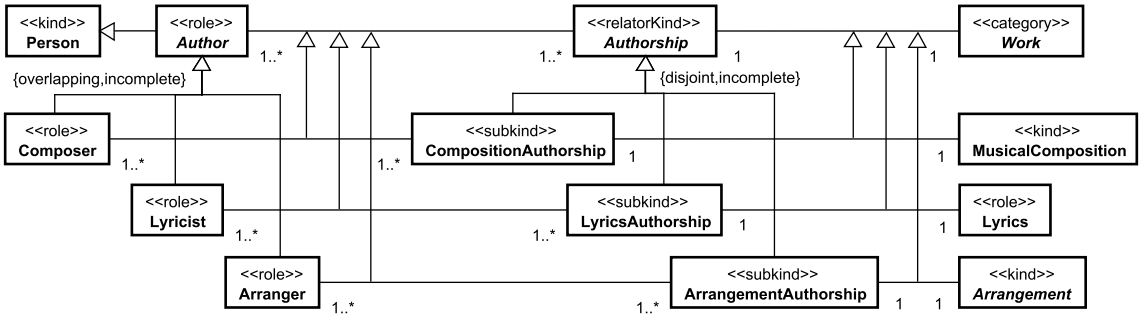

Figure 4. Diagram focusing on authorship relations.

The diagram in Figure 4 depicts all authorship relations. All of those relations specialize the *relatorKind* **Authorship**. There is an authorship relation for each work with one or more authors, and each author can produce several works. The *role* **Author** is specialized according to the conceived work type.

3. Final considerations

The presented model has already shown its value by supporting better communication and analysis of the domain and should evolve to cover concepts such as bibliographical items, cultural context and musical genres. Other usages for this model may include the adequacy evaluation of other music information organization initiatives to this domain, and its use as a common conceptualization for semantic interoperability among heterogeneous data sources.

This research focus on Brazilian popular music, although several of its concepts seem to be common to other musical traditions. The adequacy of this model to other musical contexts will be object of future studies.

It is expected that this work might serve as a first formal description about Brazilian popular music and support the development of software applications, such as music digital libraries, in consonance with Brazilian culture and traditions.

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