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Linked open data to represent multilingual poetry collections. A proposal to solve interoperability issues between poetic repertoires

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Abstract

This paper describes the creation of a poetic ontology in order to use it as a basis to link different databases and projects working on metrics and poetry. It has been built on the model of the Spanish digital repertoire ReMetCa, but its aim is to be enlarged and improved in order to fit under every poetic system. The conceptual semantic model, written in OWL, includes classes and metadata from standard ontological models related to humanities fields (such as CIDOC or Dublin Core), and adds specific elements and properties to describe poetic phenomena. Its final objective is to interconnect, reuse and locate data disseminated through poetic repertoires, in order to boost interoperability among them.

Keywords: ontology, TEI, verse, metrics, poetry, CIDOC

1. Introduction

Poetic features have been analysed and classified in the different literary traditions since the beginnings of Literary Theory studies. These features have been organized in form of poetic repertoires (first printed in paper and later web-based) that give account of metrical and rhythmical schemes of each poetical tradition or school. They gather long corpora of poems, which are defined by their main characteristics.

Performing comparative analysis of the existing digital poetic repertoires and databases poses important problems, as data sources are a rich and heterogeneous mosaic of virtual poetry collections integrated by multilingual corpora, such as French lyrical collections (Nouveau Naetebus), Italian (BedT), Hungarian (RPHA), Medieval Latin (Corpus Rhythmorum Musicum, Annalecta Hymnica Digitalia, Pedecerto), Gallego-portuguese (Oxford Cantigas de Santa María, MedDB2), Castilian (ReMetCa), Dutch (Dutch Song Database), Occitan (BedT, Poèsie Neotroubadouresque, The last song of the Troubadours), Catalan (Repertori d'obres en vers), Skaldic (Skaldic Project), or German (Lyrik des Minnesänger), among others.

Each repertoire belongs to its own poetical tradition and each tradition has developed its own analytical terminology for years in a different and independent way (González-Blanco & Sélaf, 2014). The result of this uncoordinated evolution is a bunch of varied terminologies to explain analogous metrical phenomena through the different poetic systems whose correspondences have been hardly studied.

From the philological point of view, there is no uniform academic approach to analyse, classify or study the different poetic manifestations, and the divergence of theories is even bigger when comparing poetry schools from different languages and periods. To give an example, the same quatrain of dodecasyllables can be encoded in different ways depending on the philological tradition: 12A12A12A12A, 4x(7pp+7p) or 4aaaa; or even named with different meaning: "alexandrine" means 14-syllable line in Spanish but only 12-syllables in French.

There are also important technical issues, as these repertoires were created in different periods and most of them are driven by stand-alone collected databases. The ER (Entity-Relationship) data model is the most commonly used for this purpose, together with the data model based on records for the logical implementation (Elmasri & Navathe, 2011), which is widely accepted, but the technological implementation varies from one project to another. So, there are repertoires that use SQL databases, others that are based on XML tagging or even new models based on non-structured databases.

Although the current ICT infrastructures are prepared to harvest such collections and provide access to them by a search engine, it is absolutely necessary to standardize metadata and vocabularies at philological level in order to be able to climb up the semantic layer and link data between different traditions. There are a few studies which deal obliquely with some of the above mentioned aspects (Bootz & Szoniecky, 2008; Zöllner-Weber, 2009), but there is not yet a conceptual model of ontology referred to metrics and poetry.

The closest related works to this topic are probably the conceptual model of CIDOC[1], the vocabularies of the Getty Museum[2], as they are designed to express relations and artistic manifestations in the field of humanities, the controlled vocabularies of English Broadside Ballad Project[3] and the linked data relations offered by the Library of Congress[4], which do not offer a deep information on metrics vocabulary.

2. Our Proposal

The aim of this paper is to present a model able to serve as a uniform solution for terminological issues in order to

[1] http://www.cidoc-crm.org
[2] http://www.getty.edu/research/tools/vocabularies
[3] http://ebba.english.ucsb.edu/
[4] http://id.loc.gov/

build a solid semantic structure as a basis to link the different poetic systems. This structure will enable to publish repertoires on the web in a structured format and using open standards in order to build an open-source and collaborative platform based on a poetic ontology which lets interoperability among the different European metrical repertoires. Performing comparative studies would allow researchers to move a step forward beyond the current philological state-of-the art, explaining phenomena like the origins of vernacular poetry or the evolution from accentual to syllabic rhythmical patterns.

2.1 The Basis for our Proposal

The data model proposed in this paper is based on the conceptual model designed for the Spanish Digital Repertoire of Medieval Poetry, ReMetCa[5]. ReMetCa has tested different systems (commercial, free, open-source, and proprietary). The final decision, after experimenting with Oracle Express Edition (González-Blanco & Rodríguez, 2013), has been using a relational database MySQL combined with a XML tagging using the TEI-verse module. The advantage of this hybrid model is that its relational structure provides both a uniform description of the formal characteristics of each poem, and flexibility and richness to show the complex metrics features of our texts thanks to TEI tagging.

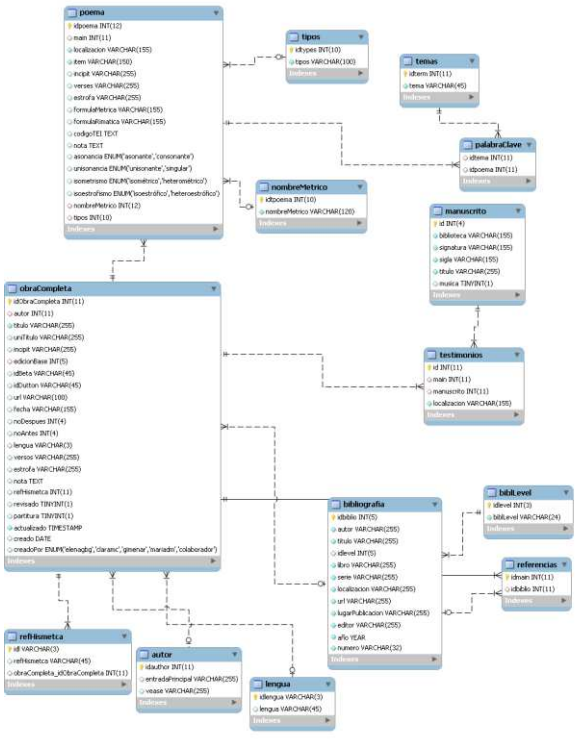


Figure 1: ReMetCa data model

2.2 The Data Model

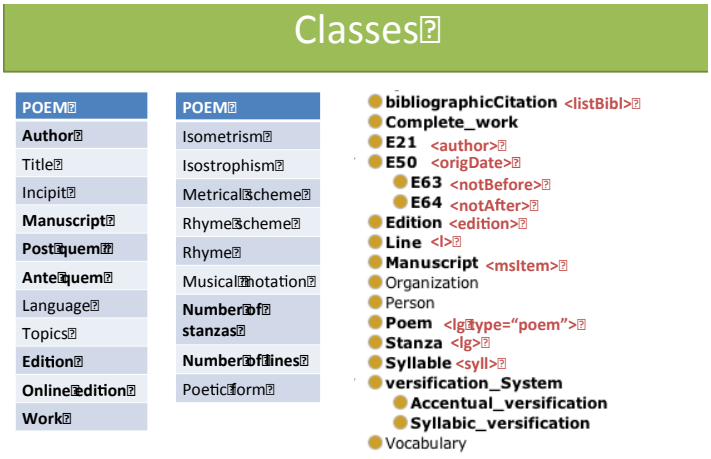
The conceptual model, designed on the basis of ReMetCa, has been transferred to the Semantic Web as Linked Open Data. The abstraction of this initial model is prepared to be amplified with the necessary fields and terms to define metrical phenomena which are not shown in the Spanish poetic system or in the other repertoires which have been taken into account to design this first version of the semantic prototype. In order to enlarge its horizons, structure, description and contents, datasets of various corpora have also been taken into account.

The implementation of the model makes use of one of the most recognized standards for the Semantic Web description: the Ontology Web Language (OWL), developed by W3C as an extension of RDFS[6]. The ontology integrates sets of predefined metadata using namespaces and it has been built using WebProtégé (Tudorache et al. 2011).

The ontology has been built based on the common categories or metadata of the existing repertoires. Some of them have been modeled as classes (poems, stanzas or lines), as they may contain individuals. Other fields reflect, however, the relationships that can be established between individuals, such as "composed by" which link poem and author. Others have been modeled as data properties, since they link entities to literals and values, line number, musical notation, or metrical scheme. Therefore, the current ontology does not collect all the fields of our database and tags we use but just the ones that it shares with other databases in order to provide interoperability between them.

The resulting first version of this ontology is hosted at various places[7].

Figure 2 below shows a sample of the classes, properties and data properties of the poetry ontology related to the previous ReMetCa data model (Figure 1):



[5] www.remetca.uned.es

[6] https://www.w3.org/TR/owl-features/

[7] www.purl.org/net/ReMetCa;
http://datahub.io/dataset/ReMetCa-ontology;
http://lov.okfn.org/dataset/lov/vocabs/ReMetCa.

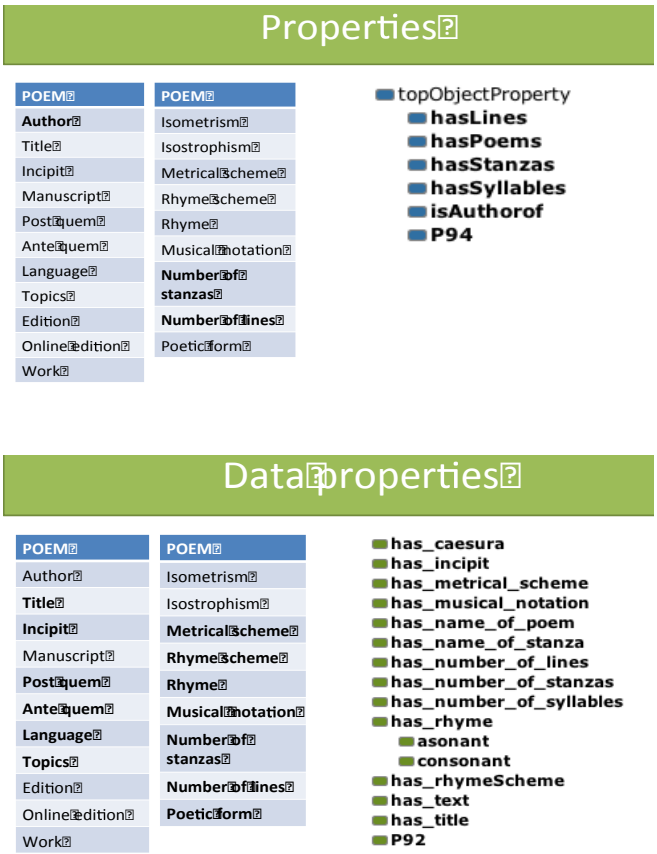


Figure 2: Sample of classes, properties and data properties related to the ReMetCa data model

This model is based on previous works that combine linked data and TEI. There are some preliminary approaches in the field of Philology developed by Christian-Emil Ore and Øyvind Eide (2007). Although the authors focus on the use of Topic Maps, they also point at the creation of a Conceptual Referential Model (CRM) model based on the TEI document and filled with all instances of mapped elements, having in mind that although TEI provides a richer vocabulary than EAD (Encoded Archival Description) or DCMI (Dublin Core Metadata Initiative), it is less abstract than RDF or METS (Metadata Encoding and Transmission Standard). Taking all these reflections into consideration, our ontology includes some elements of CIDOC into its classes and properties. For example, the entity "author" can be linked with DC: creator, FOAF: agent and CIDOC E21, as this is shown among other mappings in Figure 3 below.

As this is a relatively small ontology with interoperability purposes, there are not many elements shared with other ontologies. We have 13 entities, 5 object properties and 14 data properties or attributes. Almost all of them have a TEI equivalent or origin (especially the entities), but only a few are linked with other ontologies or vocabularies, such as CIDOC or DC. Only in these cases, our ReMetCa URIs have been substituted by their existing URIs.

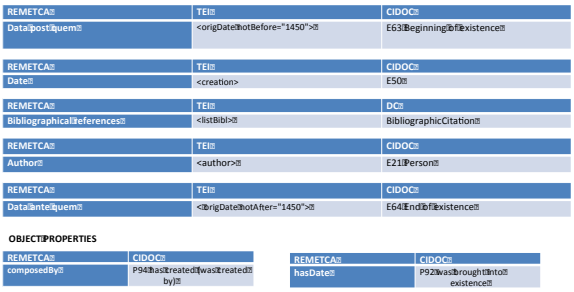


Figure 3: Mapping among ReMetCa, TEI and CIDOC models

Another issue is the number of attributes used for issues like "topics", "names of the poem types" or "functionality". All these categories are defined by the content of attributes like <poem type="">, or @subtype. The solution has been including TemaTres terminological software both to work as a lexical/content provider for TEI tags and to organize metadata. A general controlled vocabulary on Medieval Castilian Poetry at CAICYT-CONICET´s Semantic Server in order to create a more consistent categorial prototype has been set at http://vocabularios.caicyt.gov.ar/pmc/ which is one of the most useful applications of Linked Data in combination with TEI of this proposal, as it complements the XML structure with enriched content semantically organized and structured.

3. Conclusion

To sum up, this project of a poetic and metrical ontology intends to be much more than a repository of datasets, thesauri or controlled vocabularies. It aims to create a semantic standardized structure to describe, analyze and develop logical operations through the different poetic digital repertories and their related resources. Its final objective is to interconnect, reuse and locate the data disseminated through poetic databases in order to get interoperability among projects, to perform complex searches and to make the different resources "talk" to each other following a unique but adaptive model.

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