Development of Digital Collections of Intangible Cultural Heritage Objects - Base Ontology

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Abstract. The digitization of the intangible cultural heritage covers a much wider range of knowledge, digitization techniques, processing of digital resources, coding and storage. Therefore, it requires extension of the standard ontology for digitalization of cultural heritage and the ways of interaction with the data. An entry for the intangible cultural heritage may be a custom, craft, event, sport or art passed down through the generations. It is complex and combines many elements. The DigiCult project helps us develop an extended model that fits the process of ICH digitalization Europe wide.

Keywords: Digitalization, Intangible Cultural Heritage (ICH), Digital Collection, ICH Ontology.

1 Introduction

Constantly evolving digital technologies provide newer and more sophisticated ways to present, process, store and disseminate cultural and scientific content, as well as opportunities to preserve human values and achievements throughout the history of civilization. Example for this exponential demand for digitalized cultural content is the growth of Europeana, the biggest platform for Europe's digital cultural collection. (European Commission, n.d.) In 2021 it provides access to over 50 million digitised items in dedicated thematic collections on art, fashion, music, photography, literature, artworks and more. (Europeana, n.d.)

One of the largest groups of them is connected with the intangible culture which includes crafts, music, rituals and folklore. All of these represent clusters of connected items that may differ drastically from each other but gain their value only as a part of intangible element.

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2 Intangible Cultural Heritage

The process of digitization of the intangible heritage poses a number of challenges with regard to the standardized documenting of ICH objects with appropriate descriptors and digital formats, management of digitized ICH assets' collections, access and delivery of complex ICH objects.

The provision of a unified methodology for ICH objects digitization is a maintenance act that helps to ensure that the intangible cultural materials will be more long-lasting as they are transferred to an additional format which is easily accessible to the broader audience (people from different generations, cultures, locations). This is one of the main challenges related to the digitization of ICH, which provides a rich field for research and innovation.

One of the most current problems in cross-disciplinary activities in museum work is the digitalization of intangible cultural heritage. In 2019, the presence of the word "digitalization" appeared in the Bulgarian Cultural Heritage Act for the first time and encouraged the more initiatives for digitalization of the museum collections.

Yet another amendment to the law sheds light on a long-neglected issue in the Bulgarian museology - how to register intangible cultural heritage, hence the next topic - how to digitize intangible cultural heritage. According to Art. 42 of the Cultural Heritage Act, which transposes Art. 2 (1) of the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (UNESCO, 2018)

Intangible Cultural Heritage is:

1 Oral traditions and forms of expression, including languages and literature as a bearer of intangible cultural heritage;
2 Fine and performing arts;
3 Community customs, rites and celebrations;
4 Knowledge and customs related to nature and the universe;Knowledge and skills related to traditional crafts.

Art. 43 and 44 of the Cultural Heritage Act describe the process of identification and conservation. Art. 43 is new in the Bulgarian legislation and has not been used as a procedure so far. Regional historical museum Burgas became the first museum in the country to try to identify intangible cultural values under the prescribed procedure in July 2020, and at the same time within the pilot digitalization project was launched as part of the Digital presentation and preservation of intangible cultural heritage project. (DigiCult), funded by the Erasmus + Program of the European Union (DigiCult, n.d.).

Given that the Act specifies the registration of intangible cultural heritage in a manner known to that of movable cultural valuables, it can be concluded that a unified ontology would be applicable to the unification of knowledge in a standard and a digital system.

As already shown in the previous point, using the functionality of MusLib (Stewart, 2018) to add unlimited additional ontologies, it is possible to create a new classification subsystem aimed at intangible cultural heritage. This method allows data storage with great flexibility to add more than one ontology dynamically in the same environment.

3 Complex Semantic Network Modelling

As the digitization of intangible cultural heritage demands a much wider range of knowledge, digitization techniques, digital resource processing, coding and storage, an extension of the ontology described above and ways to interact with the data described above are sought.

An entry for the intangible cultural heritage may be a ritual, custom, craft, event, sport or art passed down through the generations. It is complex and combines many elements. The study of intangible cultural heritage describes its parts - people, personalities - bearers / performers, material objects, records / descriptions from scientific archives, chronicles, and other documents, mentions, verbal art, as well as time chronology.

A theoretical example for modelling a complex semantic network is presented. RDF-like technology, which is based on triplets, can be used to describe relationships.

subject → predicate → object;

RDF technology is made up of resources, properties and statements. A resource is an object that has a unique Uniform Resource Identifier (URI). Properties are a special type of resource that describes the relationships between other resources, such as "made of", "created on", etc.

The judgments declare the properties of the resource and represent the trio:

resource → attribute → value

4 Circular Reference of the Model

Each record can contain references or links to other class records, in theory creating a circular reference. A rite is performed in a certain place, using certain objects, referring to a specific period of time.

All these classes are interlinked and forwarded between, which creates a circular. In this way the circle of knowledge is closed, using a repeatable model and creates conditions for easy grouping and extraction of knowledge.

A similar attempt to collect and connect knowledge was made in the modelling of the CIDOC standard (CIDOC, n.d.), whose scheme continues to grow and currently has more than 150 elements. However, it is extremely complicated and requires updating.

5 Ontology

An exemplary basic ontology is presented, which was developed in connection with the study of ways to digitize the intangible cultural heritage of the current project DigiCult together with Assoc. Prof. Dr. Yanislav Zhelev and Assoc. Prof. Dr. Maria Zheleva (DigiCult, n.d.).

After considering examples from the work in different European countries and the Bulgarian practice and legislation in this field, an initial version of the ontology was prepared. It will be included in MusLib for digitization of the elements of the intangible cultural heritage studied by the Burgas Museum. (Stewart, R., Simeonov, S., Pavlov, R., 2019)

The DigiCult Data Model (DCDM) consists of three levels (Figure 1 and Figure 2):

- **Base level** - *Cultural heritage object* – collects the basic information about the digitalized "object". Although the model is aimed for intangible heritage the first level still concerns the digitalization of objects because they are the base or the stepping stone. The "object" can be any kind of material evidence connected with cultural heritage - tangible or intangible, for example music instrument, note book, song, photographic image, costume etc.
- **Secondary level** - *Digital presentation of ICH object* – this level concerns the collection of data on the actual digitalization process, digital files and copyrights;
- **Top level** - *Complex object or Collection (intangible object)* – this is the builder level for the complex presenting intangible cultural heritage. Except own descriptive markers it incorporates multiple objects from the base level to create a new type of "object". For example the complex object "Christmas" custom may consist of descriptive fields as well as a collection of base level objects such as certain ritual clothing, recipes, photos, songs etc. All of them together make us understand what is the ritual Christmas and the traditions associated with it.

As mentioned above the model steps on previous experience and survey of good practises. The Dublin Core Metadata Initiative (DCMI, n.d.) and the CIDOC reference model have been used as inspiration whilst creating a solution for formatting and linking objects together and having the ability to output them into a usable metadata format for future proofing.

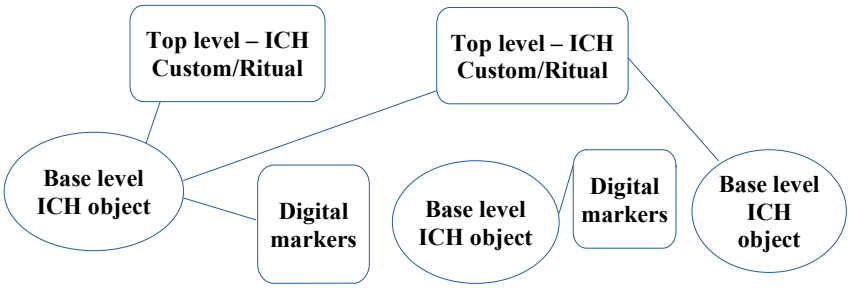

Fig. 1. Ontology Levels

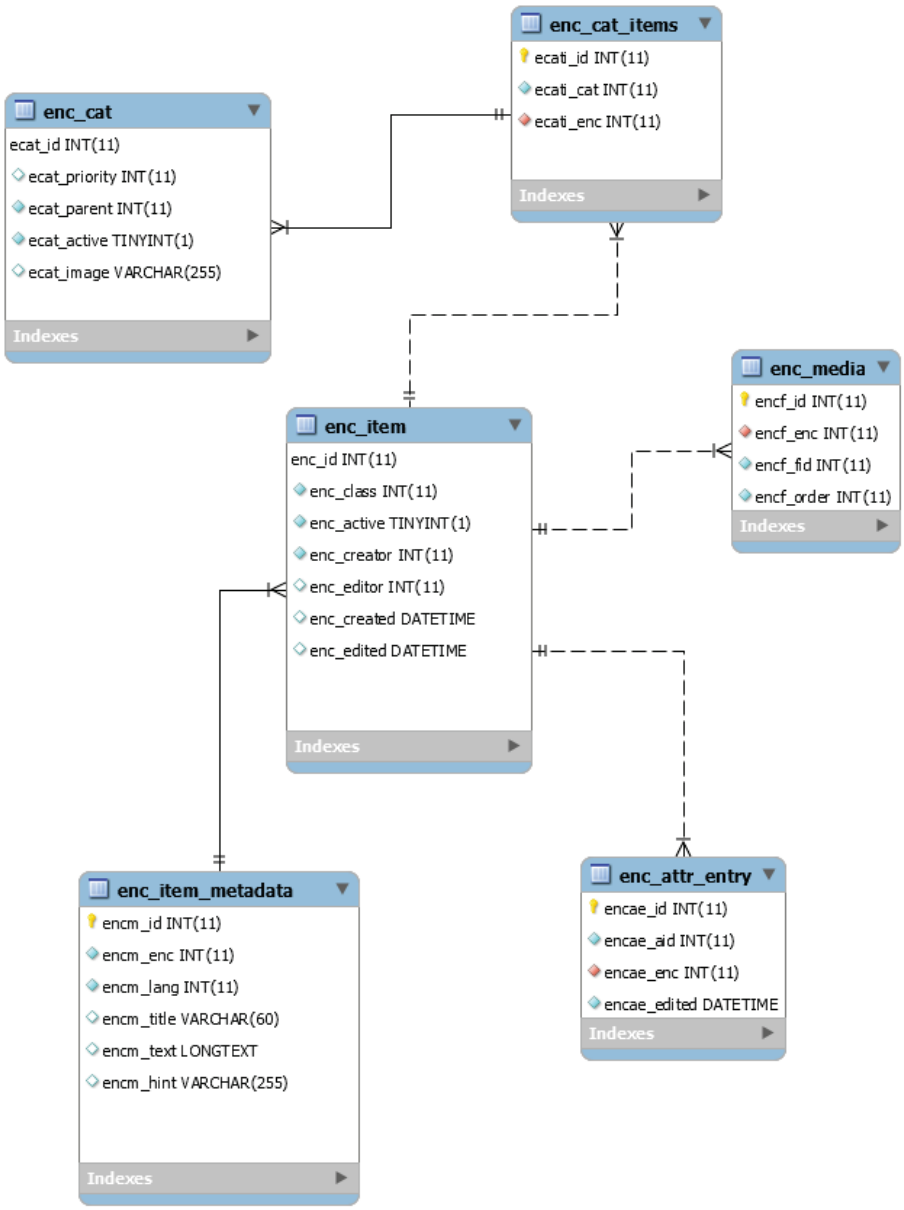

Fig. 2. Database general scheme of MusLib

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References

CIDOC. (n.d.). Retrieved from CIDOC. Conceptual Reference Model: http://old.cidoc-crm.org/docs/cidoc_crm_version_5.0.4.pdf

DCMI. (n.d.). Retrieved from Dublin Core Metadata Initiative: https://dublincore.org

DigiCult. (n.d.). *DigiCult Project*. Retrieved from https://www.digicultproject.eu

European Commission. (n.d.). Retrieved from The Europeana platform: https://digital-strategy.ec.europa.eu/en/policies/europeana

Europeana. (n.d.). Retrieved from Europeana: https://classic.europeana.eu/portal/en

Stewart, R. (2018). Aquae Calidae MusLib - to connect 20 centuries of history. *Digital Presentation and Preservation of Cultural and Scientific Heritage,* 207-211. ISSN: 1314-4006, eISSN 2535-0366.

Stewart, R., Simeonov, S., Pavlov, R. (2019). Development of base ontology for a digital library of the Bulgarian museums' collections. *ACM 9th Balkan Conference in Informatics (BCI2019)*. Sofia. doi:https://doi.org/10.1145/1234567890

UNESCO. (2018). *Basic Texts of the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage, 2018 Edition*. Retrieved from https://ich.unesco.org/doc/src/2003_Convention_Basic_Texts-_2018_version-EN.pdf

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