

## METHODOLOGICAL APPROACH TO THE CONSTRUCTION OF CULTURAL HERITAGE ONTOLOGY

*Baeva Desislava, Rashkova Victoria, Ivanov Ivan*

Angel Kanchev University of Ruse

### Аннотация

*Использование онтологий для моделирования исторических знаний является ключевым аспектом интеграции информационных технологий для многих исторических институтов. Авторы статьи подытоживают вывод о том, что для создания онтологии с основами культурно-исторического знания методология METHONTOLOGY является наиболее подходящим методом. Также рассматриваются различные этапы этой методологии.*

### Abstract

*The use of ontologies to model historical knowledge is a key aspect of the integration of the information technologies for many historical institutions. The authors of the article summarize the conclusion that for the creation of ontology with culturally-historical knowledge bases the methodology METHONTOLOGY is the most appropriate method. The different stages of the methodology are also considered.*

*Keywords: ontology, cultural-historical heritage, methodologies, information system, knowledge*

### Introduction

Nowadays, it is clear that the use of computer technologies to preserve and promote the cultural and historical heritage for future generations becomes a major goal for many cultural institutions.

Increasing globalization requires the perception of historical memory as a powerful and valuable resource for spiritual survival and sustainable development of our society. In the era of the creation of large multinational organizations such as the European Union, societies are faced with various problems the most disturbing among which are the mixing of cultures and domination of the strongest of them, which often leads to depersonalization / zoning out smaller ethnicities; an increasingly global introduction of English-language words into local languages; loss of national identity at the expense of the modern world trend - a citizen of the world; loss / neglect of ethnic identity at the expense of the national one. In this respect, the preservation of cultural heritage is a sign of a strategically built policy of unification of the nation. The following basic national targets are outlined - identification of cultural values, physical preservation of heritage, use of national wealth.[4][5]

The need to change the ways of integrating and expanding the possibilities of including folklore by practical implementation for the purposes of education in patriotism.

According to eCultValue, a project funded jointly by FP7 [2] of the European Commission, the current areas of development that focus on work with cultural and historical heritage based on ICT are:

- scientific, educational and entertainment applications related to archaeological monuments and objects; interactive games based on collections; Big Data solutions customized for the growing amount of data related to the presentation of cultural and historical heritage; 3D technologies and virtual reality; methodologies to assist in the search and presentation of content; standards for metadata, related data and semantic technologies; language technologies, automated translation and localization - to facilitate the exploitation and valorisation of digital assets of cultural exhibitions online in a global context; creating links to education - learning outside museums, electronic workbooks; interactive online knowledge tests; computer creativity (for example, digital storytelling) and interdisciplinary research.

It is of great importance that technological solutions are compatible with specific scientific profiles and needs. In many cases, decisions are made for other sectors that switch to adapted products for museums and historical research - this trend must be changed and the software product should be set up for the relevant scientific or applied purpose[3].

As a result of the intensive development of ICT, the opportunities for access to publications in the electronic environment have grown rapidly. Global access to information requires the idea of "no walls" libraries. It is now quite possible to navigate not only in the electronic resources of a library, but in all virtual libraries of computer networks. The global users with unlimited access rights, needs a more flexible and open search system. They should not be bound by the strict rules of cataloging and bibliographic standards.

### **Conceptual software approach to presenting semantic information**

Semantic web technologies extend existing data services by enabling data warehouse deployments, creating glossaries of concepts, and setting up data processing rules.[1]

The use of ontologies to model knowledge from specific areas is a key aspect of integrating information from different sources to support collaborative work within virtual communities. Ontologies serve to improve the process of retrieving information and are important for making automated logical conclusions from the knowledge provided. Their popularity is increasing as they offer elegant IT opportunities such as interoperability, information sharing, repeat data usage, etc [7].

Ontologies have a potential for applications that provide a vocabulary for a subject area designed for users and programming systems. They allow the creation of intelligent interfaces. These systems, based on set rules, customize the dialogue with the user on the basis of simple conclusions from the available restrictions on certain properties.

The digitalization of Bulgaria's rich cultural and historical heritage has been the subject of many projects, resulting in the accumulation of a large amount of digital material, the access of which is hampered by the lack of good presentation and structure of the available data.

Sharing common understanding of the structure of information among people and software agents is one of the goals in developing ontologies.

It is widely recognized that building ontologies is an important step in the development of knowledge-based systems. However, there is no clear understanding of the processes of building them. Nowadays, building ontologies is considered rather art, than science. Research in the field is still formal and relies heavily on the expertise gained by the specialists rather than the generalized scientific model.

Procedures for building ontologies include actions that relate to knowledge acquisition, assessment, integration, documentation, and configuration management [6]. They are described in a number of ontology-based methodologies. In our opinion, the methodology describes in the most appropriate way the necessary activities[5]:

**(1) Specification:** identifying the purpose and scope of an ontology, determining the intended target group of users, scenarios for its use, the degree of formalities required, the scope of the ontology, including a set of terms which are characteristics of the objects.

**(2) Acquisition of knowledge:** represents the accumulation of knowledge from a given subject area. It runs largely parallel to stage (1).

**(3) Conceptualization:** Conceptualization reflects human interests and goals, a particular domain can be described and classified differently according to different purposes.

**(4) Integration:** obtain some homogeneity in ontologies, the definitions of other ontologies.

**(5) Performance:** it is formally presented in a language.

**(6) Evolution:** the construction of technical solutions for the assessment of the ontology.

**(7) Documentation:** documentation that provides detailed and comprehensive information for each phase and the product as a whole. The process also involves adding documents that come from other activities.

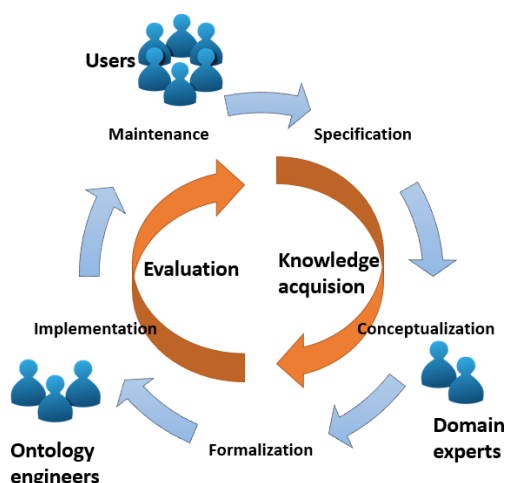


Figure 1. Phases and activities of Methontology and their relation to the actors [8]

## Conclusion

The creation of an ontological model with a folklore knowledge base would contribute to preserving and promoting the cultural heritage of each nation.

Each created model is specific, depending on the area of information it represents. This requires different procedures to be used in order to describe it.

It is clear that building ontologies is still a matter of skill and not of the engineering process of their creation. If ontologies need to realize their potential, it is important to take into account the variety of experience available and an appropriate methodology with a clearly defined scope of application.

## Acknowledgments

This research was supported by the Bulgarian Science Fund, with the grant for financial support for projects of junior researchers and postdocs, agreement M12.1/2018 „Develop and explore a modern approach to conceptual software presentation of the semantic information stored in the Bulgarian national embroidery“

## References

1. Борисова Н., Семантичен уеб- модели и приложения, Югодападен университет „Неофит Рилски“, 2015.
2. Европейска Комисия Изследване на общността, 7РП Утрешните отговори започват от днес (7Рамкова програма) [https://ec.europa.eu/research/fp7/pdf/fp7-factsheets\\_bg.pdf](https://ec.europa.eu/research/fp7/pdf/fp7-factsheets_bg.pdf).
3. Златева Р., Религиозно-провиденциалните възгледи в живота на българина езичник (VII-ср. IX в.) Научни трудове на Русенския университет 48 (сер. 6.2), 242-247
4. Стоянов, Св. Бележки върху осигуреността на културното наследство, Известия на съюза на учените – Варна, 2013
5. Cristani, Matteo; CUEL, Roberta. A survey on ontology creation methodologies. International Journal on Semantic Web and Information Systems (IJSWIS), 2005, 1.2: 49-69.
6. Jones Dean, Bench-Capon Trevor, Visser Pepijn, Methodologies for ontology development, 1998, 2014, <https://cgi.csc.liv.ac.uk/~tbc/publications/itknows.pdf>
7. Navigli R., Paola V., Automatic acquisition of a thesaurus of interoperability terms, Università di Roma “La Sapienza”, 2005.
8. Scherer, Franca, et al. "Similarity as a quality indicator in ontology engineering." Formal Ontology in Information Systems. 2008.