An ontology for ceramics cataloguing

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Abstract

In the last decades, the need of efficiently organize the classification process of archaeological finds – with particular focus on ceramics – has become urgent for scholars and researchers in the field [6]. Currently, in fact, archaeological finds cataloguing and classification are mainly performed by traditional methods like hard-copy archives and standard digital techniques like relational databases. However, such methods have severe drawbacks. They are tools mainly developed and maintained in a local way and they usually store partial data, rarely shared with the whole scientific community, causing an incoherent use of information. Also, they do not support flexible data-management and information retrieval algorithms due to lack of advanced reasoning means.

Semantic web is a vision of the World Wide Web in which information carries an explicit meaning, so it can be automatically processed and integrated by machines, and data can be accessed and modified at a global level thus allowing coherence and dissemination of knowledge. Moreover, by means of automated reasoning procedures, it is possible to extract implicit information present in data, thus permitting to gain a deeper knowledge of the domain. The definition of a specific domain is widely called ontology. In the last years, potentiality of ontologies has been recognized by archaeologists [3, 5]. Some projects have been undertaken concerning either single typologies of archaeological finds or several different materials related to each other.

In this contribution we briefly describe our work on Ontoceramic, a Semantic Web ontology for cataloguing and classifying ceramics.

Ontoceramic is an OWL 2 (Ontology Web Language 2) ontology [11] designed on ICCD (Istituto Centrale per il Catalogo e la Documentazione) data sheets taking into account the most important papers in the field [1]. Ontoceramic consists of 90 classes, 33 object properties, and 20 data properties. It includes a number of SWRL (Semantic Web Rule Language) rules [12] allowing several reasoning tasks on the knowledge domain in a short time.

It has been developed using the *Protégé* [7, 2] editor and classified by the Hermit [8], Pellet [9], and FaCT++ [10] reasoners.

Ontoceramic allows one to carry out many tasks such as associating fragments to a considered specimen according to its provenance, even indicating from which part of the vessel they come from, or by find place (i.e., nation,

region, or province, and so on), or by measurements of their parts, or by their colours, or by other features (i.e., decoration) [4]. In particular, Ontoceramic allows one to specify shape and type of an object removing the redundancy of the nomenclature used, reducing ambiguous classifications of data.

We plan to include in the ontology support for stratigraphic excavations, bibliographic references management including authors and revisors, and identification of the production factory. We also aim at implementing an efficient parallelized decision procedure for the language of Ontoceramic that permits to reason with large data sets.

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