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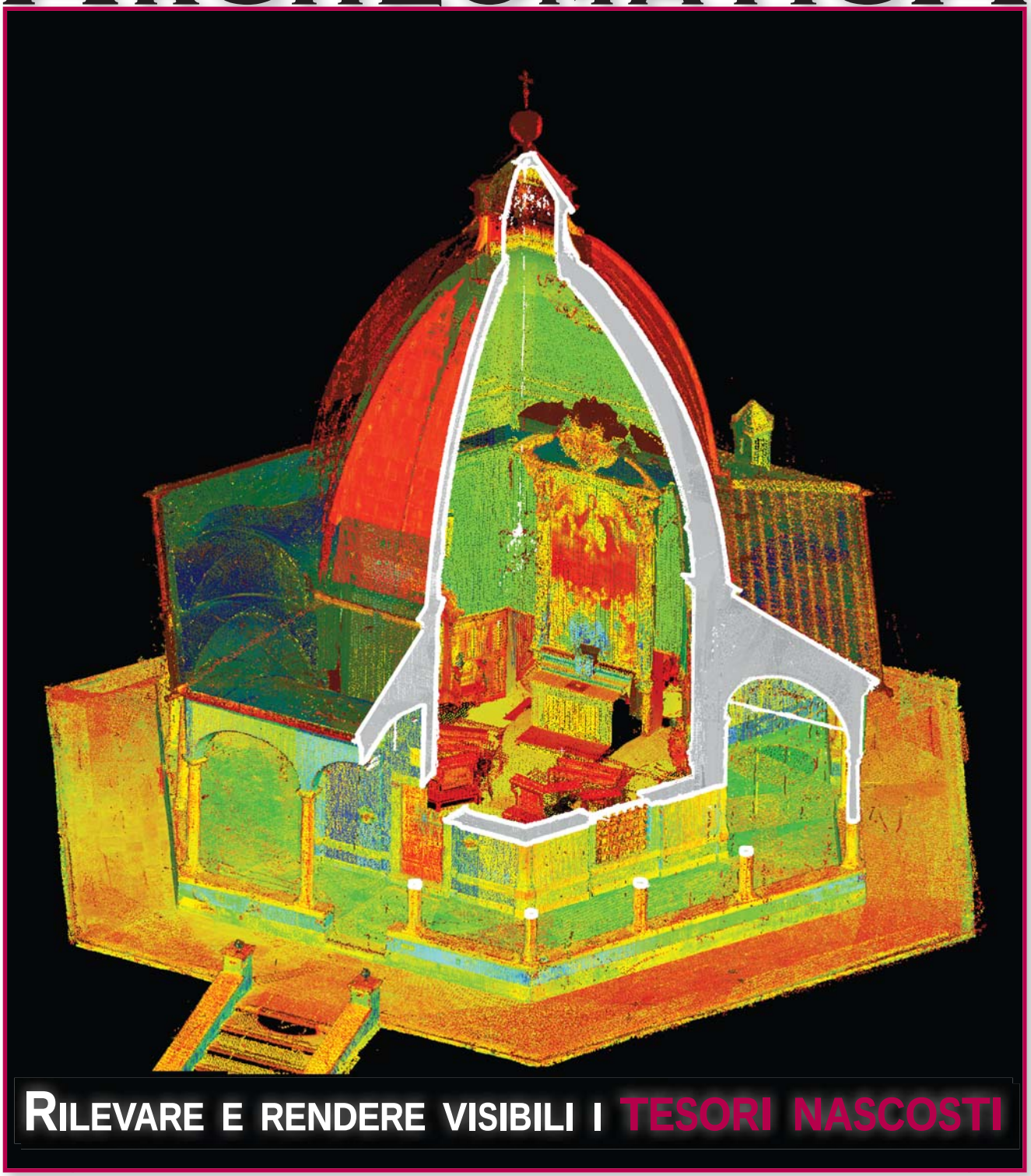
ArcheomatiCA



Rilevare e rendere visibili i tesori nascosti

Un'esperienza sensoriale: i colori dell'Ara Pacis

Risparmio energetico: è la volta dei musei dalla gestione etica

Semantic WIKI per la protezione dei BBCC

L'evoluzione dell'immagine: dalla pittura rupestre all'energia autopoietica

SEMANTIC WIKI FOR THE PROTECTION, EMERGENCY MANAGEMENT AND KNOWLEDGE OF CULTURAL HERITAGE

di Eric Leclercq and Marinette Savonnet

Nowadays, the trend for cultural heritage data management is the generation of numerical corpus that can be viewed and distributed online. To make information available on the web and to provide easy access a web platform application is needed it will be important to make use of a web platform that allows easy creation and editing of web pages as well as a management of their links.

USERS GROUPS AND REQUIREMENTS

Providing access to cultural heritage information beyond books is important. In order to address specific needs an advanced semantic support is required. For domain specialists (like archaeologists, historians) an electronic presentation that can provide a mapping to the printed version is necessary (for citation purposes for example). Additionally, semantic analysis tools should support activities through the formulation and verification of hypotheses. Moreover, for large public, with little knowledge on the domain, advanced browsing interfaces based on semantics can help them to consult corpus. The characteristics that make difficult modelling for cultural heritage applications are: 1) complexity of data (heterogeneous, incomplete, uncertain, spatio-temporal); 2) domain knowledge barrier; 3) evolving knowledge; 4) different skills of actors (from novice to expert).

Nowadays, the trend for cultural heritage data management is the generation of numerical corpus that can be viewed and distributed online. To make information available on the web and to provide easy access a web platform application is needed. Indeed, researches on cultural heritage data require an open environment, which allows to aggregate knowledge produced by different teams involved in research fields. This platform must also provide sharing, exchange, collaboration and evolution capabilities.

Domain specialists working with a scientific point of view often need to comment on primary data. Semantic annotation support adds additional levels of interpretation. Semantic annotations also provide better quality in the query evaluation process than full text search engine, and results can be displayed according to user skills. Moreover, it allows interoperability among corpuses if annotations are defined by using ontologies. In Web platform, these functionalities should be supported within the same interface as the primary data to avoid unnecessary context and application switches for the users. In the meantime, these annotations must be maintained on clearly separated layers to keep integrity and traceability of the primary data.

SEMANTIC WIKI APPROACH

A Wiki is a web platform that allows easy creation and editing of web pages as well as a management of their links. The Wiki concept is suitable for the generation and processing of text documents as well as multimedia documents. Wikis are simple to interconnect with other web applications via RSS protocol, and allow incremental constitution of corpus and knowledge. Articles (wiki pages) in wikis have structured and formatted text management capabilities (intended for humans to read and understand) that use a simple markup language. Relations among articles take the form of hypertext links. Nevertheless wikis only support untyped links dedicated to human navigation through the corpus. Semantic extensions to Wiki engines (Schaffert, Bry, Baumeister, Kiesel 2008) are based on Semantic Web technologies like RDF annotations and OWL ontologies. They supply tools for content structuring beyond the syntactical level. Semantic wikis provide the ability to capture knowledge: the properties and relations between articles can be made explicit, this allows automated processing of wiki content. Reasoning capabilities and query languages such as SPARQL allow to discover links between concepts and to provide dynamic navigation. Ontologies allow structuring a domain of discourse using concepts and relations between them. These ontologies guarantee semantic quality and facilitate communication by providing shared knowledge that can be used to formulate queries about the domain. Cultural heritage domain can benefit from established ontology CIDOC-CRM[1]. CIDOC-CRM deals with high level concepts, for each particular application, CIDOC-CRM can be extended by domain or application ontologies that specify more precisely concepts and relationships. Annotation results are stored as RDF triples and SPARQL can be used as query language. Reasoning tools and query capabilities of SPARQL can also be used with ontologies to produce novel knowledge.

One famous Semantic Wiki implementation is Semantic MediaWiki[2], an extension to MediaWiki on which Wikipedia runs. For example, in life sciences, several projects are based on Semantic MediaWiki engine: BOWiki[3], Brede Wiki[4], LabService Wiki[5].

SEMANTIC WIKIS IN CULTURAL HERITAGE DOMAIN

We have identified four major projects using semantic wikis for cultural heritage knowledge management:

a) After scanning and digitizing a volume (506 pages) of the original *Handbook on Architecture*, the book is converted into wiki pages (Witte, Krestel, Kappler, Lockemann, 2010). Authors have to capture two sub-domains by ontologies: the domain of document management (i.e. sentence, noun, page number, …) and architectural domain (i.e. wall, building material, …). Natural language processing allows connecting architectural concepts with document-specific one, e.g. sentences that mention construction elements of a certain material (figure 1). A public version is available at http://durm.semanticsoftware.info/wiki.

b) *HermesWiki* project (Reutelshoefer, Lemmerich, Baumeister, Wintjes, Haas, 2010) is a plug-in for the semantic wiki KnowWE. The objective is to provide a concise and reliable overview of Ancient Greek History for teaching purpose of students. An ontology, inspired by VICODI project, for the historical domain was developed. A public version is available at http://hermeswiki.informatik.uni-wuerzburg.de.

c) WikiBridge (Chevalier, Leclercq, Millereux, Sapin, Savonnet 2010) is a semantic wiki based on MediaWiki, developed for the project CARE (*Corpus Architecturae Religiosae Europeae – IV-X saec.* – ANR-07-CORP-011). The aim of the project CARE is the constitution of integrated corpus of the European Christian buildings dated from the 4th to the beginning of the 11th century. Semantics is guaranteed by an application ontology based on CIDOC-CRM. Figure 2 presents the entry interface for text input and the annotation interface. A public version is available at http://care.u-bourgogne.fr

d) In the same view, *NavEditOW* is a framework for ontology driven web site. It has been exploited to support a semantic description of two projects: 1) bibliographical entries are integrated in a portal (figure 3) about Prehistory and Protohistory in the Italian area (Bonomi, Mantegari, Vizzari 2006), and 2) SilkRoDE project that aims to collect, structure and diffuse all knowledge about the Cultural Heritage of Central Asia from fields such as archaeology, geography or history. The framework integrates a wiki engine for rendering documents stored in the ontological tier (Bonomi, Mosca, Palmonari, Vizzari 2008).

Figura 1 - Wiki interface for Handbook of Architecture.

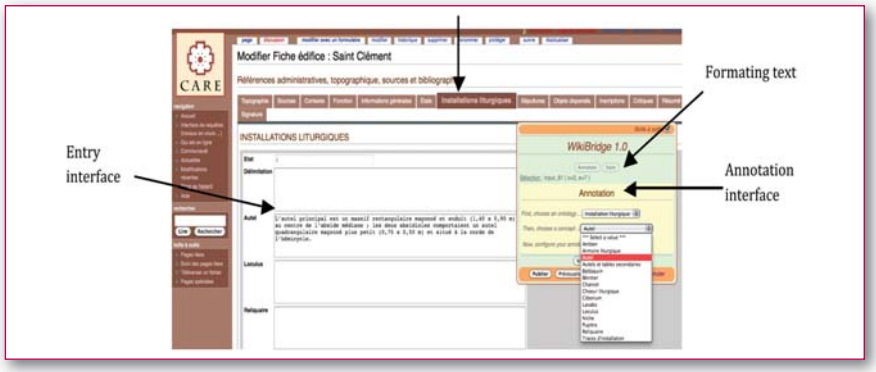


Figura 2 - Adding and annotating a document in WikiBridge.

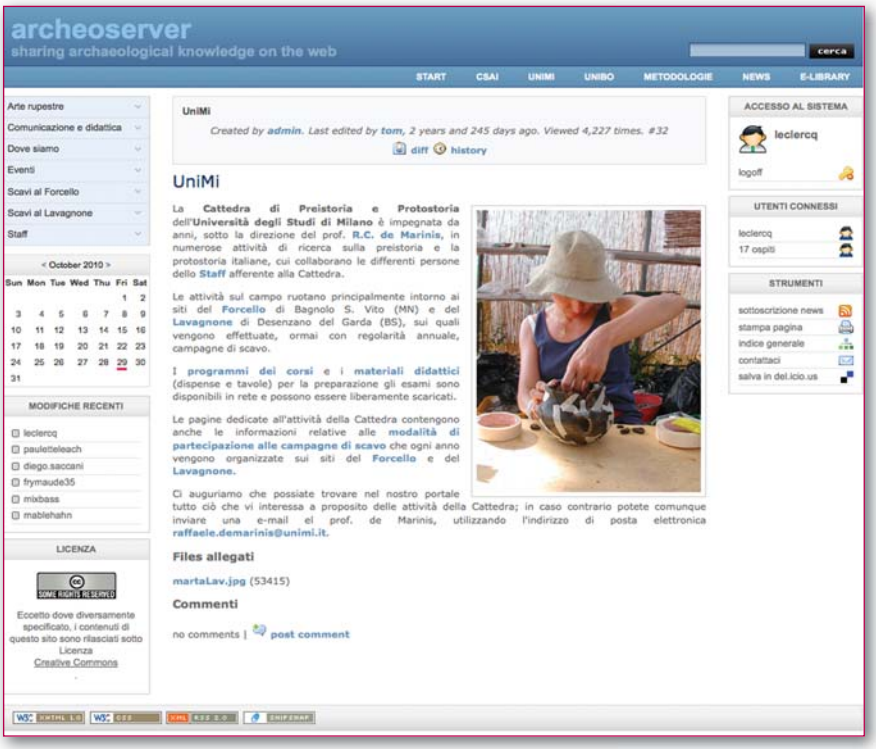


Figura 3 - Archeoserver portal.

CONCLUSION

Recently, semantic wikis are increasingly used to support knowledge management. They show their potential to solve this area without sacrificing flexibility and openness of wikis. Their usability is of prime importance to ensure that non computer scientists can use them in an ad hoc manner. We believe that semantic wikis are adapted to the expectations in the field of digital Cultural Heritage needs. Examples described in section III dated from 2008 show an emerging area of research interest at the intersection of semantic wikis and Digital Cultural Heritage.

Sommario

Wiki semantic per la tutela, la conoscenza e la gestione dell'emergenza

Fornire un accesso alle informazioni relative al patrimonio culturale al di là del supporto che possono fornite i testi, è importante. Per far fronte a specifiche esigenze è richiesto un supporto semantico avanzato. Per gli specialisti (come archeologi, storici) una presentazione elettronica in grado di fornire una mappa per la versione cartacea potrebbe essere uno strumento utile. Wiki è una piattaforma web che permette la creazione, la modifica e la gestione di pagine web.

Metakeys

Semantic wiki, emergency management, cultural heritage conservation.

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Notes

1. CIDOC-CRM http://cidoc.ics.forth.gr/
2. Semantic MediaWiki: http://semantic-mediawiki.org
3. BOWiki: http://bowiki.net/
4. Brede Wiki: http://neuro.imm.dtu.dk/wiki/Brede_Wiki
5. LabService Wiki: http://labservice.biocore.crg.cat/

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