

# Chapter 15

## Cultural Heritage Information System (CHIS)

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### ABSTRACT

*The Campania region boasts one of the largest and most priceless cultural heritages in the world: five sites in this region have already been declared a World Heritage Site by UNESCO and many other sites considered “minor” are not adequately promoted in spite of the fact they are of high artistic value. The project “Cultural Heritage Information System,” (referred to from now on as “CHIS”), aims to investigate the possibility of developing a technological infrastructure that can support activities related to the specific context of Cultural Heritage, and the various user involved. CHIS represents the technological leverage with which it will be possible to develop value-added services which can enhance the business environment by means of personalized services. In this paper the authors will describe the proposed framework and its main characteristics.*

### 1. INTRODUCTION

The Campania region boasts one of the largest and most priceless cultural heritages in the world: five sites in this region have already been declared a World Heritage Site by UNESCO and many other sites considered “minor” are not adequately promoted in spite of the fact they are of high artistic value. Unfortunately, these sites do not receive the attention or financial backing they deserve due

partly to constant underfunding and partly due to the uniqueness of the sites themselves. Moreover, there does not seem to be any tried and approved method of sustaining these sites. Cultural Heritage in Campania is an invaluable resource that must be protected, preserved and promoted by “inserting” it in the digital ecosystem of a Smart City, where economic, tourist, recreational and logistic aspects are all considered together.

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As highlighted by recent publications and reiterated by European projects discussing Smart Cities (Caragliu 2009, Schaffers 2011, Jose M. Hernandez-Munoz 2011, Komminos 2011), the adoption of Future Internet technologies, particularly the paradigms of the Internet of Things and Internet of Services, now represents the “de facto standard” in the design and implementation of IT platforms that can provide effective support to the ‘smartness’ of a city. In such a context, it is possible to design context-aware services that take into account both the surrounding environment, whose state is captured by sensors, and the characteristics of the users. These services are all accessible through a Cloud Computing environment (Armbrust, 2010). In the vision of participatory sensing, (Burke 2006) mobile devices of the latest generations (e.g. smart-phones, tablets, etc..) form an interactive network that allows users to access, analyze and share information and knowledge. This vision seems to be perfectly compatible with the peculiarities of smart environments in which users must also have an “active” role.

Following the recommendations of the W3C Semantic Web framework (Berners Lee, 2009, Berners Lee, 2001), in order to allow the enormous amount of data collected (BIG DATA (Lohr, 2012, Bizer, 2012)) in a smart environment to be used by different applications, the data must be properly processed and stored in the form of linked open data, in order to facilitate both access and semantic processing.

Enabling technologies can be considered the basis for the creation of a platform of services supporting integrated knowledge processing, diagnostic monitoring and sustainable use of cultural heritage. They help to provide all the basic functionality required to make “smart” a cultural environment (e.g., museums, archaeological parks, old town centers, etc..), by creating the necessary correlations between different environments.

In particular, we would like to underline that the main research problems related to this scenario will include:

- The adoption of architectural models and standards in the context of Future Internet (Tan Lu 2010, Atzori Luigi 2010);
- The interfacing and communication with the sensors of a site (Zhang Junqi 2010, Rodrigues Joel JPC 2010, Mohamed Nader 2011, Alemdar Hande 2010);
- The access, retrieval, integration and analysis of information from all data sources and the correlation with spatial data (LaValle 2011, Russom 2011);
- The transformation of “captured” data in the form of knowledge and its management (Damova 2011, Ruggles 2012);
- The localization and tracking of users on a site (Khoury 2009, Lionel 2011);
- The access to the knowledge based on the user profile, the context and the use of applications (Kabassey 2013, Ricci 2011, Dourish 2004);
- The analysis of people on social network using the platform (Scott 2012);

A number of proposals which focus on the research of innovative technological solutions to be applied to the cultural system, have been already presented in Italy. For example, in the Technological District for Cultural Heritage and Activities, Lazio - DTC (<http://www.futouring.it/web/filas/distretto-tecnologico>), a platform for the access to cultural heritage has been proposed and is focused on cultural tourists through the realization of digital scenes, virtual reconstructions, augmented reality techniques and mobile applications in order to expand the supply of cultural tourism. The Calabria region, in the context of the MESSIAH project [www.culturaeinnovazione.it](http://www.culturaeinnovazione.it), has proposed methods and enabling multifunctional technologies to support cultural identification, monitoring, restoration, preservation and cataloging and these has been applied to the theme of the underwater archeology.

The problem of evaluation and care of cultural heritage through smart city enabling technologies

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