Chapter 10

The SIArch-Univaq: An Architectural Information System for Cultural Heritage

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ABSTRACT

SIArch-Univaq is a knowledge-based instrument for the cataloging of historical architectural heritage, created to provide a powerful cognitive tool to all operators interested in studies and conservation. The principle characteristic of this architectural Information System is its notable capacity of in-depth analysis, going down to the identification of all the constructive components with simplicity of consultation, activated by one or more three-dimensional models deliberately created. Conceived at the University of L’Aquila (Italy) it was developed in the framework of research financed with funds from the Ministry for University and Scientific Research made available for projects of relevant national interest (PRIN). This article describes its structure, characteristics and functionalities.

INTRODUCTION

Digital technology offers extraordinary possibilities for issues such as the protection, the conservation and the valorizing of historical and architectural assets and in particular for the organization of documentation, the physical and material consistency of buildings and for the construction of temporally dynamic tools ideal for the management of information and the structuring of design projects (either ordinary maintenance or restoration) and completed interventions. Architectural Information Systems, in particular, with the challenges in system-design (data collection and entry) and of necessary assiduous maintenance and updating, represent an irreplaceable instrument in this area. Their usefulness becomes clear especially when it is necessary to follow the history of interventions, of the techniques used during restoration and of the pathologies revealed (and resolved) to the asset in question.

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This profound belief was at the basis of the origin of the Architectural Information System called SIArch-Univaq, a 3D database dedicated to historical architecture based on a GIS (Geographical Information System) which allows analysis and enquiries of a database topographically structured with three-dimensional views of a vectored nature.

BACKGROUND

The use of GIS technologies for cultural heritage dates back to the 90s, when the creation of the “Cultural Heritage Chart of Risk” was promoted with the purpose of creating an effective tool for national cultural heritage maintenance and restoration planning.

In time, the Chart was followed by many other similar applications provided by regional governments, ICCD and the CNR. At a later stage the same technology was used to collect information about architectural works’ conservation as for the case of the tower of Pisa GIF (Cordaro 1999, Capponi 2001), the Aosta Roman theater (Salonia 2003) or the “medical record of the Santa Maria di Collemaggio Basilica (Bartolomucci 2004). The SIGEC project (Catalogue General Information System) developed by the Ministry for Cultural Heritage was aimed at standardizing cultural heritage cataloguing procedures.

In historic building restoration sector, several experiments were conducted on the Leaning Tower of Pisa, the SICAR (Restoration Site Documentation Information System) (Baracchini, 2007), or the “Restoration GIS” designed to collect micro-climate data (Cacace, 2006).

The ARCHES (Heritage Inventory and Management Systems), developed by the Getty Conservation Institute (GCI) and the World Monuments Fund (WMF) is considered to be one of the most recent and innovative systems adopted. This system has open source technologies and international cataloguing standards and is aimed at building a global system for cultural heritage documentation.

The adoption of a web-based system allows rapid knowledge dissemination in the scientific community. The system for archaeological protected sites management, so far adopted by the Jordanian Department of Antiquities, is also available for landscape, architecture and artwork documentation. Because of its features, this system has been widely internationally adopted.

Two-dimensional geographic substrates GIS procedures have provided satisfactory results with regard to the management of large amounts of data provided in various supports. Moreover, in order to use these procedures to obtain a more precise description of the architectural work it would be more effective to resort to three-dimensional procedures. In fact, a 3D model allows the user to identify precise spatial references to building elements that are linked with database records.

The SIArchUnivaq procedure illustrated in this chapter can be considered in the light of the previous considerations.

GIS FOR ARCHITECTURE

The idea of building an information system on and for architecture came from the understanding that currently in order to intervene on cultural assets and buildings, and in all operative phases, a considerable quantity of digital elaborations is created. At the end of the works, of these elaborations remains only an archive of paper records; that which is in digital format, saved principally and copied on discs, and therefore consultable only with difficulty, remains unused until the end of the life of the medium upon which it is saved.

If this information were conserved in its original digital format and made accessible, it would be of notable utility for a wide range of uses, not least the programming and execution of successive interventions. The use of digital means stimulates the imagination of the researcher; in fact, if the simple