Interactive Information System for the Camposanto Monumentale of Pisa.

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Abstract

Multimedia Database gathering the historical-preservative documentation of the monumental complex, including a digital reconstruction achieved through a solid modelling of the building and its fittings.

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1. Introduction

"Proposing a Camposanto devoid of those great wall decoration cycles which, right from its very origin, had conferred it its main meaning and function, deprived of the Roman sarcophagi which had first entered it in the XIV century and had been later on turned into some renowned citizens' sepulchres, or even despoiled of all those sepulchral monuments which had contributed to make a Temple of Fame out of it, a sort of Pantheon for national memories, would be like yielding to expound an incoherent as well as incomplete text: in short, an unintelligible one". [1]

Figure 1: *Rendering with repositioning of the frescoes*

2. The restoration project.

The restoration project of such a complex and historically relevant building as this, which includes so wide a range of different artistic styles, definitely needed a deep and accurate preparatory study. Since the end of the 90s - in accordance with the advisory commission created by the Opera del Duomo and following those experiences and studies on the frescoes which, since the 70s, had been carried on through tests, researches and preliminary studies for the restoration of the Sinopie - the Superintendence of Cultural Heritage started a research project aiming to define the most suitable techniques to restore the entire building.

3. Object-oriented Multimedia Database and interaction with a 3D Model of building.

The studies, projects and then the restoration works themselves produced a multitude of data which could only be interpreted with the help of a computer. This is why an object-oriented Multimedia Database has been designed which can interact with a 3D model of the Camposanto Monumentale, initially conceived to check the repositioning of the frescoes removed from the walls during the war, but able to interact as well with the three-dimensional representation of all the objects in there using the VRML format. The link between the building three-dimensional model - which can be navigated in real time - and the Database is achieved through a server created on purpose; this server, named Sql-WWW multithread [2], queries the DB suitably formatting its data in a HTML format.

Figure 2: *SqlWWW query format its data in HTML.*

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The user can get all information concerning the works of art through both hypertextual links and a dynamic query of the server.
This enables him to go on a three-dimensional tour of the building, stand in front of the frescoes painted on the walls and see the numerous monuments on display in the galleries. Each of the images arranged in this space can be selected to get the relating documentation on it contained in the DB: archivistic sources (about 10.000 documents),

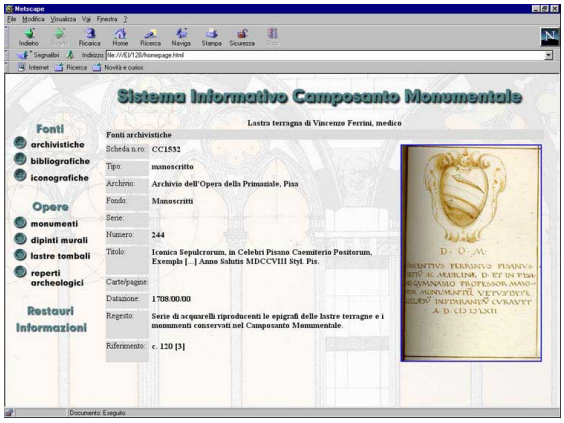

Figure 3: *archivistic source*

bibliographic sources, ichonographic sources, cards of all the works of art which were gathered following type criteria (sepulchral monuments, wall paintings, tombstones and archaeological remains); restoration cards including the results of the diagnostic studies, chemical-physical researches and survey of both the environmental macro and micro parameters, three-dimensional models of the monuments and archaeological remains. It was therefore possible to use the model not only as an interface to get the access to the Database but also as a system to spacially contextualize the numerous monuments and sarcophagi which have been present inside the building in time (all through

1800

Figure 4: *walktrought stillframe of an historical reconstruction*

the Camposanto Monumentale held the function of a true museum, used to display the sacred objects collected from various churches scattered throughout the Pisan area) [3]. In order to achieve this specific aim we developed the system functionalities so as to make the Database-3D model link a dynamic one. As a proof of the many transformations marking the history of this monumental complex, the Information System has been designed to dynamically display - on the user's request - the building settlement in its

Figure 5: *walktrought stillframe of an historical reconstruction*

different historical moments, repositioning each work of art in the exact position it had held through the centuries. The range of research and study possibilities has been therefore remarkably widened, the user being actually able to get the control of the monumental complex as a whole, from the building complex structure to the detail of the objects whose presence enriched it in time.

4. The Interactive Information System.

The new character of our project definitely allows a wider use of the system, which will turn from a

Figure 6: *walktrought stillframe of chiostro*

mere tool designed for professionals of restoration works only to a true ready-to-use Interactive Information System for anyone happening to visit the "Piazza". In order to involve in this project as many laypersons as possible, virtual touristic routes are being carefully studied, paying special attention to their interaction with the system; this with the double aim of simplifying its use and making the multiprojectional navigation possible by using different kinds of control systems. To be able to manage such a remarkable amount of geometric-informative data as well as to allow the greatest freedom in the definition of the user's interface, software libraries have been used which were developed at the PERCRO laboratory of the S.Anna School of Pisa for the part concerning the interactive visualization of Virtual Environments at high complexity degree.

Figure 7: *walktrought stillframe of Nord corridor*

References

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3. C. Baracchini, *I Marmi di Lasinio, la collezione di sculture medievali e moderne nel Camposanto di Pisa*, SPES, Firenze 1993

In fact, due to the richness of architecture styles and frescoes included in it, the Camposanto Monumentale three dimensional model arises technical difficulties linked to the ways of dealing with the information which can only be solved by using specific data management methods. Thanks to the graphic Database advanced management, the software in question is able to make the best out of the calculation resources at the user's disposal, allowing him a visualisation in true time of the monument even in case he's using hardware of a medium-low range.
A series of information areas will, in fact, be set up within the Square main buildings (Museo dell'Opera, Museo delle Sinopie, Camposanto Monumentale, Opera della Primaziale), which will be linked to a network through optical fibre and able to get the access to the above mentioned huge Database. It will be possible, then, to create special guided reading paths linked to different study levels according to the user's needs, as well as to use the three-dimensional graphics as the system for the visualisation and management of the information.

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