VIRTUAL MUSEUMS: ENJOY THE MONUMENTAL CEMETERY OF MILANO THROUGH INTERNET

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Abstract

This paper illustrates an Internet hypermedia application for the preservation and enjoyment of cultural resources, in this case sculptured monuments and accessories which have been the object of surveys at the Monumental Cemetery of Milan. The application is part of a project conceived for the use in public institutions in Italy; consequently, this first version is in Italian. Its users are a complex community where people with different functions and specific tasks interact in the management and utilisation of cultural resources. The problem in developing an application of this kind is twofold involving on one side, the definition of community 's problems and the definition of support they can hope to obtain from computer science; and on the other, the implementation of that support in integrated tools that can supply the desired functions.

The paper also discusses the implications of the technological situation today when the rapid transformation of communication in the management of cultural resources calls for careful thinking about the new tools available and their reliability, about training requisites and possibilities, and about the times and resources required to develop and mantain innovative, useful applications.

1. Introduction

The development of new information technologies, with the consequent spread of the use of hypertext and hypermedia systems, networks, and CD-ROM [1,2,3] has had strong repercussions in the field of cultural resources. After the now well-known international directives resolved by the G7 in their last meeting, we can expect a further increment in applications in this sector in the near future.

At the same time, the numerous questions these new instruments imply have embroiled specialists managers of cultural resources in a broad and continuing debate. Roger-Pol Droit [4] has aptly compared the present state of multimedia systems and electronic publishing to the pioneering times of the movies, when an instrument presumably rich in potential, but still rudimentary, inspired bitter polemics between its ardent supporters and equally uncritical detractors.

In Italy, it is primarily around the theme of the museum that the main differences in attitude emerge. We summarize them here, neglecting the more radical positions on both sides.

No one questions the usefulness and effectiveness of the new information resources in all that more directly concerns mass communication. Some strongly favor their employ, especially for the ease with which even complex data, so difficult to assemble without hypertextual systems, can be obtained. And also because once that information has been entered in the network, (Internet, but not only) the access to it is practically unlimited, considerably extending the universe of users in cultural institutions.

Others observe that the conceptual framework imposed by the nature of the means available today is not always functional for communications correctly structured for spreading information. These people find a certain over-standardization in the products currently in circulation. This is probably also due to the fact that the attractions of the new technological system end up by making us forget the need for a well-defined cultural project, with the result that it is often the information tools which model the contents, instead of the contrary.

In any event, as Philippe de Montebello pointed out at the round table organized at Cannes in January, for MILIA, by the Réunion des Musées Nationaux[5], the managers of our cultural patrimony, responsible for communication, as well as for preservation, cannot ignore the new electronic media.

Any activity proposed must, consequently, be viewed in this broader perspective, and even in the autonomy of each individual project, they all shall pursue certain basic objectives:

- investigate the theoretical reflections of the discussion on the real potentials of the new information tools, regarding communication for the sector of cultural resources in both its aspects of didactics and research;
- experiment models of communication that are innovative from both the point of view of computer science, such as, for example, hypertextual and interface architectures, and communication in the more literal sense;
- design a flexible system for the cataloging and rationalization of Internet resources for museums, museum science, and data banks;
- contribute at the didactic level to guide-lines, for people operating in the field, on the use of the

new information media, their implications, and problems.

The project presented here is the result of the combined efforts of different institutions and experts, each contributing according to his/her professional background.

2. Terminology

Examining what is called a museum in Internet [6,7,8] we can define as a *network museum* the constellation, not necessarily generated by an actual institutional museum, of a variable number of components, such as:

- hypermedia, the principal subject of which is the works and objects preserved in a museum;
- hypermedia on specific themes which refer to works and objects preserved in museums and other places;
- hypermedia systems regarding disciplines which can be associated with a particular museum;
- forums, lists of museological and museographic matters or themes connected with the area of interest of a particular museum;
- network editions of journals;
- general information concerning the hours, services, and cultural, exhibiting, and publishing activities of a single museum;
- offers of various services, such as, for example, the sale of catalogues and publications.

Consequently, we hold that the term *virtual museum*, as used by the press, and even by specialists, is absolutely misleading as to what can be actually be found in Internet. A network museum is not an imitation, much less a substitute for a real museum. It is a particular information object, with its own identity within the network, to be seen rather as one of the tools through which an institutional museum communicates with its potential public.

3. State of the art in Italy

If we exclude the brief files entered in the civic networks of nodes dedicated to geographic and tourist information, Italy has some ten museums in Internet (the situation as of February-March 1995). In particular, these are: the National Archeological Museum of Cagliari; the Morandi Museum in Bologna; the Museum of the Photographic Image and Visual Arts of the University of Tor Vergata, Rome; the Museum of the Department of Physics of the University of Naples; the Museum of the Specola in Bologna; the Exhibition of the Scientific Imagination of Trieste; the Padua Museum of Wooden Toys. The Uffizi has a reconstruction, at present still in the planning phase, of the 1780 layout, while the Florence Museum and Institute of History of Science is now launching an extensive program.

4. What Internet applications can offer

The search for tools that can be used in Internet to facilitate cultural communication at the international level and the spread of information are leading to the definition and thematic specialization of nodes that can act in a defined geographic region as a reference which is:

- *documental*, the nodes having been conceived as catalysts for the gathering, coordination, and diffusion of tools and information on a specific subject
- *scientific*, in relation to the activities of preservation of the retrieved artifacts, study, and research;
- *didactic/informative* in exercising the function of collector of matters and problems, and in supplying solutions or useful referrals and
- *coordinative* the nodes concerning related subjects or problems.

Consequently, the various applications designed become the building blocks for the construction of an information structure which allows the Internet nodes to perform functions of gathering, preserving, communicating, circulating documents or artifact reproductions and offers the possibility of expanding the information system through network connections with distant systems, through the extension of local archives, and through the development of new thematic applications (exhibitions, publications).

Finally, we believe that the creation and the operational effectiveness of these nodes must be supported by an environment that offers the following functions:

- on-line documentation management of the retrieved material;
- recovery and management of bibliographic archives;
- management of the connections with and access to the resources organized in LAN around the node;
- management of the connections with remote sites (information centers) and access to the resources linked with the node;
- retrieval, production, updating, and management of mailing lists to manage connections and access remote resources, or local applications;
- definition and management of an electronic mail box, a discussion point (Newsgroup) open to the Internet world.

5. Rationale behind the proposal

The complex systems of homogeneous cultural resources (typical, but hardly exclusive examples are the collections of the large historical cemeteries) present problems of care, preservation, and research. The monumental cemeteries of the large cities must also cope with problems of management, for the number of objects they contain and the necessity of dealing with a multitude of heterogeneous data. There often seems to be no solution to these problems, especially when different orders of information pertain to different institutions, such as the State, Regions, and Municipalities, and are intended for widely diversified recipients.

In the case of the large cemeteries, for example, the categories of data include:

- private identification,
- topographical data,
- data regarding burial space,
- historical and artistic data,
- data regarding conservation,
- data of historic interest.

And all this information concerning the indivual person or artifact must be multiplied by hundreds of thousands.

Without a system that can simultaneously handle the mass of data produced, we can expect no examples of efficiency from either those peripheral offices of the State responsible for safeguarding of these places (having territorial jurisdiction), or the municipal offices (for Building and the Registry), responsible for management.

We have, therefore, undertaken the study of an integrated system that, gradually assembling the private data regarding the dead and their families, the documental evidence regarding burials, observations regarding deterioration and acts of preservation and restoration, historical information, and such, could manage this input in a coordinated manner for all the categories of users.

What we propose here is a flexible system that can be updated and tailored to different types of user, from students or tourists to the people responsible for monument preservation and maintenance, as well as technical and administrative personnel (Fig. 1).

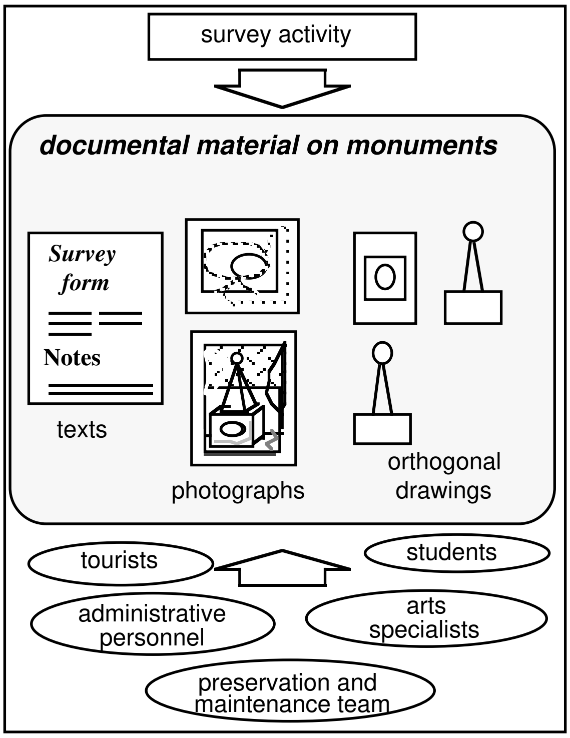

Fig. 2. Potential users of the application

Our case study is the Monumental Cemetery of Milan (Fig. 2), which was designed by Carlo Maciachini in 1863 and is now considered the mirror of a society and the largest open-air museum of sculpture in Italy [9, 10, 11].

Fig.2. The Monumental Cemetery of Milan, Italy: one of the monuments surveyed.

6. Realization of an integrated system

The documental material provided by the surveys on a subset of monuments is heterogeneous. It includes: the Survey Form, containing the coordinates for locating the monument, personal data (name, dates of birth and death, honorifics) of the person concerned, and Notes concerning the state of conservation; photographs representing overall views and details of the monuments; and orthogonal projections. These documents are stored in multimedia archives which comprehend formatted data, free texts, and images in both color and black-and-white.

All this information is organized in *macronodes*, each of which is the hypermedia unit describing a surveyed monument. The user navigates within each macronode to browse among the different aspects of a single monument and among all the macronodes to visit the Cemetery (Fig.3). The different modes of consultation provided are discussed in this section.

The flexibility of the system has been achieved by integrating three specific components (Fig. 4) [12]:

a) a DataBase Management System (DBMS), to organize and manage the formatted data contained in the Survey Form;

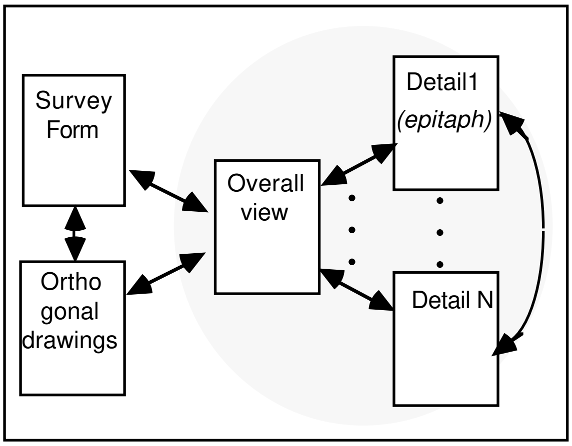

Fig. 3. A macronode

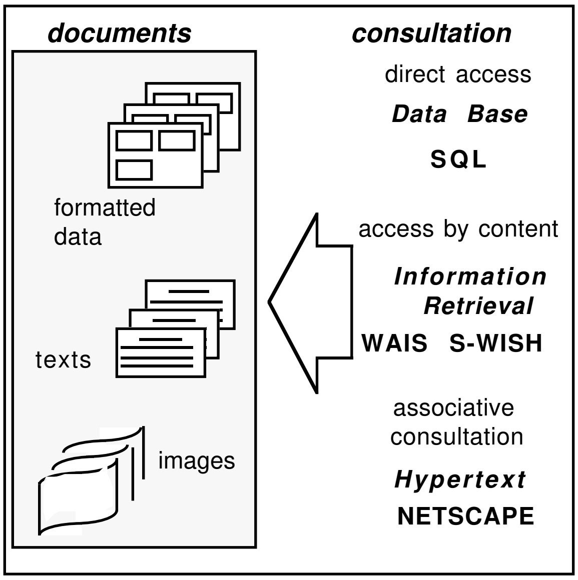

Fig. 4. Multiple access to multimedia archives

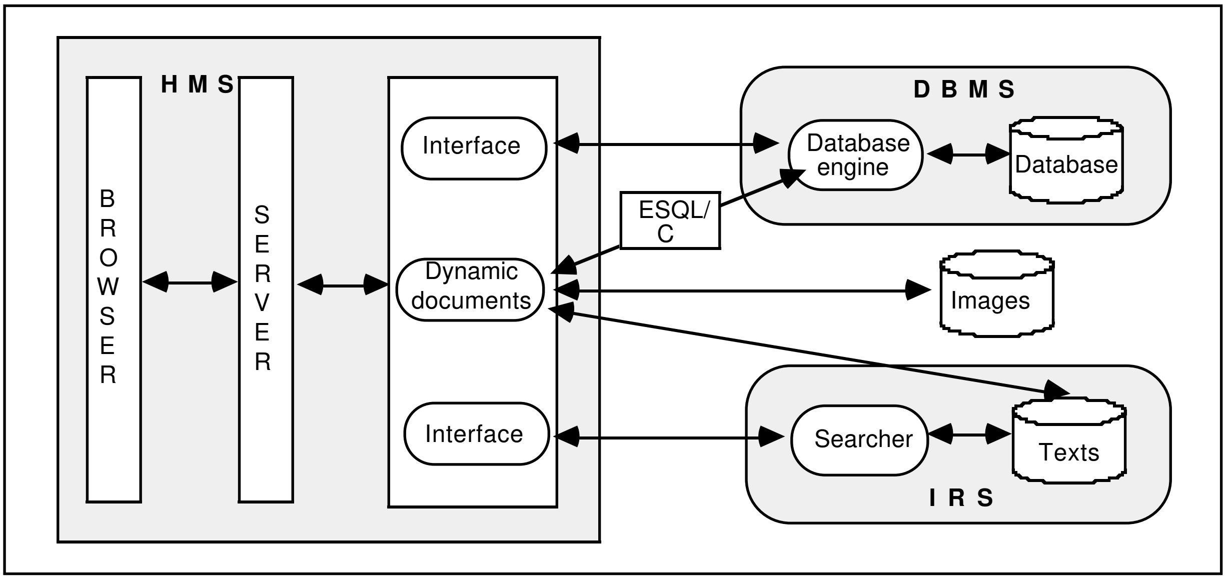

Fig. 5. System architecture providing for software integration

b) an Information Retrieval System (IRS), to access documents, indexed by the iconographic subjects represented in the images (photographs of the monuments) and by the content of the inscriptions (epitaphs) and Notes;
c) a HyperMedia System (HMS), to navigate the document archives.

The first release of the system has been developed on a UNIX Workstation with a 1152x900 color monitor, integrating public domain software with commercial packages and in-house developed programs (Fig. 5). The server is NCSA (National Center for Supercomputing Applications) HTTPD (HTTP-Deamon) [13]. The browser is Netscape (by Netscape Communications Corporation) [14] to provide for hypertextual navigation; the documents have consequently been written in HTML (HyperText Markup Language) [15]. Direct access to data has been provided by integrating Informix SQL DB engine [16] to manage the Survey Forms, and S-Wish (Simple Web Indexing System for Humans [17]) to handle monument inscriptions and surveyor Notes, which are both indexed by content. User interaction is based on GSQL (Gateway-SQL) [18], which allows the adoption of Query By Example (QBE) techniques simulating a Survey Form, and on WWWWAIS [19].

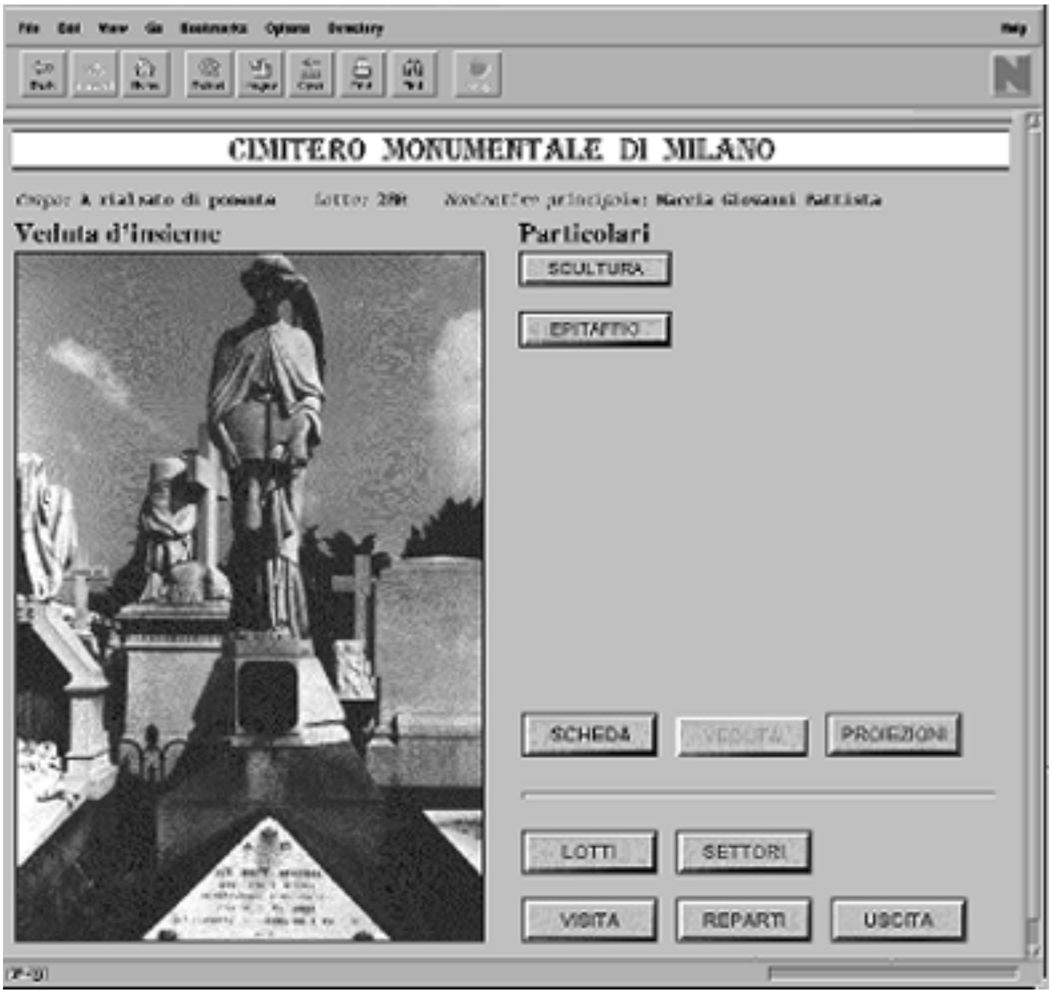

Fig. 6. Interface layout for the Overall view of one of the monuments

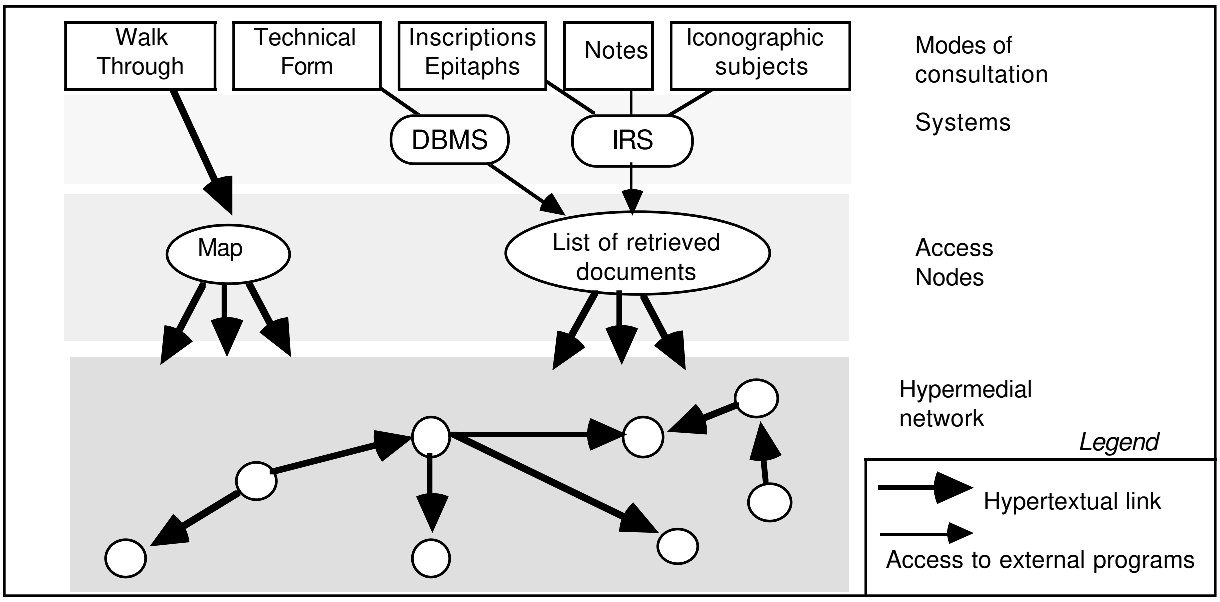

Fig. 7. User navigation within the documental archives

When formulating a query by content, different users may express the same concept in different words. With this consideration in mind, we have built a (first level of complexity) thesaurus for searching Notes by attributing to the survey language classes of synonyms: when interpreting the user query, the system substitutes for each word the disjunction of its synonyms.

While the standardization of the Survey Form simplified information organization, tedious HTML file editing was still required. We have solved this problem by implementing programs which manage documents dynamically by encoding in the listing their invariant parts, and retrieving and organizing the variable parts when the user selects the document he/she wants to visualize. Invariant parts are document layout components and attributes including titles, buttons and icons, position of images and texts. These in-house developed programs communicate the HTML structure of the document to the server through the standard output.

7. User interaction

For general navigation facilities (backward, forward, reload, homepage...) Netscape defaults are used, while a specialized set of bottons and clickable maps has been implemented to access macronode components and to navigate among macronodes. To prevent user disorientation, displayed data include title of the application and of the component of the macronode (see Overall view, Epitaph, Orthogonal drawings, Survey Form); the interface layout is organized so that portions of the screen with the same functional meaning preserve their position and appearance (Fig. 6).

The application has been designed to lead the user through a virtual visit to the Monumental Cemetery of Milan. At the moment it offers five modes of consultation (Fig. 7) :

1) A *Walk Through* the Cemetery, simulating the movements of the visitor, browsing here and there, then stopping to admire the sculpture.

Fig. 8. Visiting the Cemetery through its maps

The virtual tourist can examine a monument located at a chosen point on the map of the Cemetery (Fig. 8), starting from the overall view and then satisfying his/her curiosity with information about the decorations and details (photographs, orthogonal drawings (Fig. 9), inscriptions and epitaph (photographs, texts). He/she can then go on to another monument in the neighborhood - the one seen in the background of the photograph, for example - by simply clicking on it, or to another sector of the cemetery, by clicking on the map (hypertextual activity performed by visual browsing).

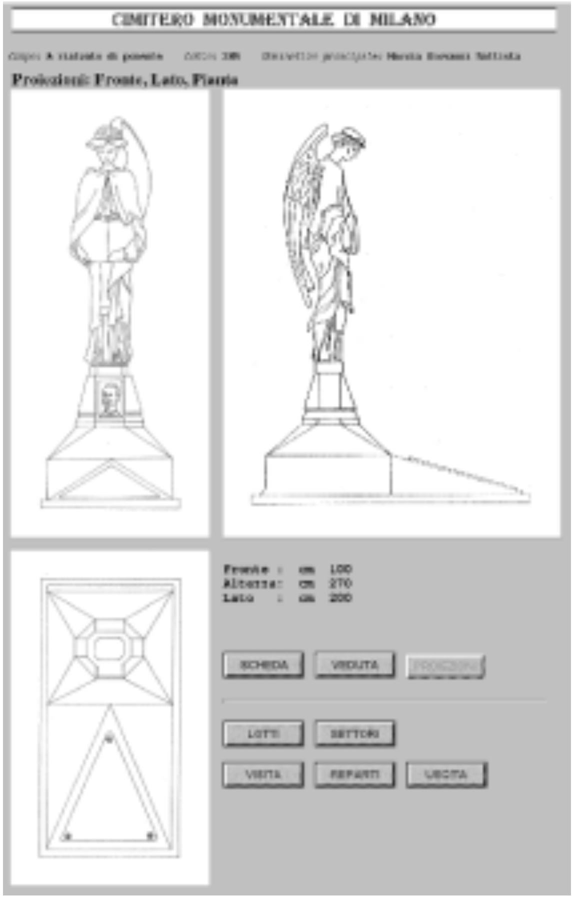

Fig. 9. Orthogonal drawings of the sculpture in the plot 28R

2) *Inscriptions and Epitaphs*, to provide for the interests of the student in the culture of an age, the mentality of a society as expressed in the events and persons celebrated in the epitaphs.

The archives are accessed by keywords of the content of the epitaphs, stored in both pictorial and in textual form (Information Retrieval activity) (Fig. 10).

3) *Iconographic subjects*, for a study on styles, exploring, for example, those monuments with female figures, floral decorations, or even representations of trades and professions (Information Retrieval activity). The subjects are classified and indexed by their attributes, represented by textual strings.

Fig. 10. Textual indexing of the epitaph (*GIOV.BATT.MACCIA / NEGOZIANTE ATTIVO / INTEGERRIMO CARITATEVOLE / TOLTO A 56 ANNI / ALL'AFFETTO DEI CONGIUNTI ED ____ / ____)* allows document retrieval by content

4) *Notes* on the degree of conservation, monitored by searching for those monuments which are "damaged", or "missing parts": the contents of Notes on the degree of conservation can be examined, together with pertinent photographs (Information Retrieval activity and hypertextual browsing) (Fig.11a, 11b).

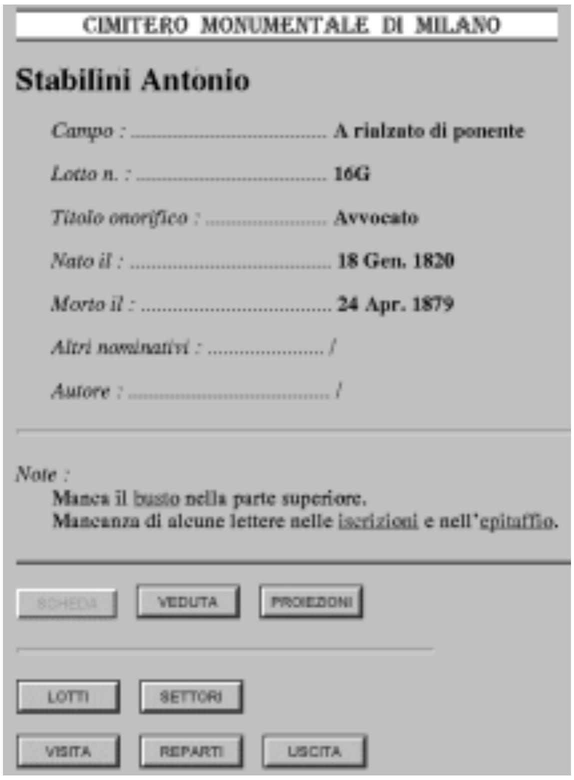

Fig. 11a). Survey Form testifying to the missing bust of a monument (*Manca il busto*....).

Fig. 11b). Clicking on the hot word in the Notes displays the photograph of the detail (the missing bust found behind its pedestal).

5) *Technical Forms*, where specific monuments can be retrieved on the basis of their coordinates on the Cemetery map (plot number), or personal data, providing direct access to the related documents in the archives (Data Base operations).

This program is currently being extended to include a *Guided Tour of Masterpieces*, an additional panorama of monuments by important sculptors and artists and two tutorials *Origin of Urban Cemeteries* and *History of the Monumental Cemetery*, designed to complete the visit to the Monumental Cemetery with indications of its historical background.

8. A summing-up of roles and ideas

Communicating the museum [20,21,22] involves decisions about "what has to be shown, why, and to whom" [23]. In the realization of the *virtual museum*, it must be these decisions which determine the organization of the documents and the definition and implementation of the visual interface and navigational structure [Fig. 12].

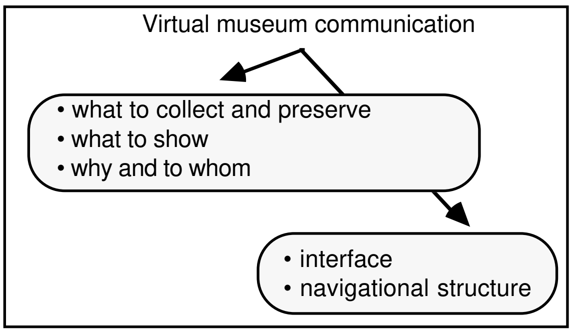

Fig. 12. The concerns of communication on traditional and on the virtual museums

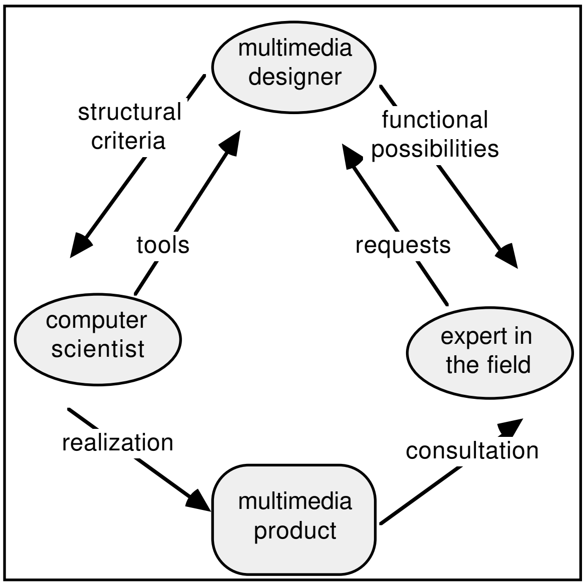

Fig. 13. The different professional skills involved in the application development; their relationships

The design task requires the integration of expertise in specific domains of interest, history of art, visual communication, the preservation of cultural resources, on one hand, with expertise in information technologies on the other.

The profitable use of the system can be guaranteed only by the cooperation [24,25] of people of different skills, with each contributing to both the design and implementation of the system according to his/her professional experience and cultural background (Fig.13).

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