Internet and Cultural Heritage Communication

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K.Cain, Y.Chrysanthou, F.Niccolucci, N.Silberman (Editors)

Virtual Access to Culture: A Cartographic-Archaeological Approach

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Abstract

Cultural assets and cultural information databases become available via the world wide web increasingly. To enable a worldwide management and work with this amount of data, multilingual methods for the access, selection and data extraction have to be found. With the help of cartography, its use of human visual perception and multimodal presentation techniques, a feasible solution for effective information handling may be possible. The implementation of cartographic access and querying methods assume a consistent data-structure. The creation of these structures in form of a gazetteer should be the first conducting step in this cartographic-archaeological approach for a multilingual cultural heritage management tool.

H.5.1 [Multimedia Information Systems]: Hypertext navigation and maps

1. Culture and the web

The peculiarity of the world wide web (WWW) seems to be a growing coalescence of and almost non restricted accessibility to a diversity of data. For the management of cultural heritage data these characteristics may provide a powerful and "multi-located" tool and data container, assuming a possibility of structuring, searching and selecting the content. Thus, in addition to local libraries and archives, the world wide web could enable access to all kinds of cultural elements, if these or their descriptions are available in a digital form.

The importance of an access to worldwide cultural heritage objects lies, among other important things, in creating awareness of one´s own culture and the understanding of others. It is this topic of identity and understanding, which could mainly be supported by the global access via the WWW. Furthermore interdisciplinary work, cooperation and learning of cultural and spatial dependencies are encouraged. In some parts of this issue the spatial relevance of immobile cultural objects play an important role. For instance in planning, archaeological and architectural work the communication process of experts and public needs support, where the role and importance of cultural objects with their spatial dependency help to understand historical and present relations.

Expanding the thoughts to proceedings in archaeology and the problematic of the archival and storage question in libraries due to masses of literature, leads to additional use for the WWW, the database "crawler" and its comprehensive multilingual access possibility.

Generally publications in cultural working fields include an interpretation part, catalogue and list of objects with pictures. The catalogue and the pictures normally take most of the place and costs. This parts could easily be economised by an availability over the WWW. The result would be a publication consisting of the interpretation part and the access codes for the webbased "crawler", a gazetteer combining various historical databases, which are containing the required catalogue, pictures, animations and maps. A multilingual distribution for the small interpretation part could then be done in economical sense. [Harl 03]

Also archival purposes aim for a wide distribution and redundant storage of the content on one hand. Here the main intention ist to avoid destruction of the information or original objects. But on the other hand masses of data avoid to extract the one important dataset, one is looking for. To overcome this problematic of "data jungle" a crawler, gazetteer or meta-database for an effective access would be helpful. In addition to simple text queries, a visual, non-linguistic interface for the gazetteer as portal to multiple databases would provide a multilingual, almost "cultural independent" access and selection possibility in querying and managing cultural assets for a very broad-based user group.

2. The cartographic approach

A map could be a possible visual interface for the management of cultural assets and monuments. It takes into account the spatial origin and relation of the cultural objects to and from a region. This provision of spatial information enables further querying techniques and a multilingual access to the gazetteer. Web-based mapping with multimedial presentation techniques furthermore provides flexible exploration possibilities, comprehensive information symbolisation and

a potentially more efficient information transfer. All of these aspects concern the user –gazetteer interface, thus the human computer interaction, and the users perception, cognition and knowledge building.

The flexible exploration is based upon the users multisense interaction model with the system, where not only text based inputs lead to a result, but also graphical, tactile and linguistic methods are valid and understood, of course depending on the used hardware solution for the user interface. These multimodal techniques include the simultaneous presentation of and interaction with the different sensual modes. The aim of this variety in presentation is to find the best understandable way for the combination in symbolisation of the requested or explored information. Resulting from this combination the information transfer from the expert/system to an user becomes more effective on the basis of enhanced perception and cognition processes. [Jobst 04]

In general the human perception´s balance point lies almost on the visual sensors, which are trained and used from the very beginning in life. Reading, writing and the use of language also employ the visual sensors in further development. This creative evolution forms complex processing sequences in the brain, which filter, aggregate, complete and select the important information. As a result we may assume that the visual coding of information is one of the most effective and even is language independent [MacEach 99]. Anticipatory looking to international and interdisciplinary cooperation and usage in cultural assets management this multilingual approach would be helpful.

The idea of a cartographic based access to cultural information implies an appropriate data structure, description of data and metadata topology for all used databases and data sources.

3. A data gazetteer

The main challenge in geographic data politics is to create a consistent data structure to enable data combination and usage of this data basis in a cartographic production flow. The demands on quality description and legally issues are very high in order to create consistent map products and a working interface for data extraction. [Gissing 03, FGDC 04]

Beside the geographic basis data, which is responsible for an overall background information and the spatial context, cultural facts and archaeological data have to be merged and put on the planets surface with their geographical reference.

Due to the variety of the disciplines concerned with cultural heritage issues there is an increasing number of highly spezialized and individually structured data ressources. According to the demand for decentralized cultural heritage information systems, the integration of existing systems is planed and requirements are prepared by this working group [Ann 01]. A potential solution would be the creation of a gazetteer or meta database, whose internal structure may be used within the cartographic information interface. Via the aspect of localizability – a characteristic feature common to all objects from the field of material culture – the relations between the results of neighbouring or complimentary disciplines can be made clear. The gazetteer forms the core of an application for the exploration of highly heterogeneous material objects in their relevance to space and time (For the advantages of dynamic maps with timelines see http: //www.ecai.org). Thus a form of 'interdisciplinarity on the fly' can be created with all the additional benefits provided by advanced cartographic visualization tools.

4. CultMap – an initiative to find effective cartographic solutions for practical problems in association with cultural heritage (CH) data

CultMap is a joint project of partners with different interests and backgrounds [Ann 01]. The requirements are formulated on the basis of the Ubi Erat Lupa project, where a number of different academic data sources are made available via the internet (http://www.ubi-erat-lupa.org). Additionally the needs of web based administration have to be considered.

The aspired result is a flexible and robust application that can be adapted for all kinds of scenarios concerned with CH data. The modular structure of data organization and processing will be designed to allow the implementation of variable user environments: for specialists the cartographic interface can be configured as a tool for accurate studies, for laymen as an easy to use information system, based on reliable and adequate data. It may as well be part of e-learning environments as it may serve as an interface for commercial services in the field of tourism.

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MEDINA
MEDiterranean by INternet Access: a Project in Progress

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Abstract

The EC funded project MEDINA aims at promoting the cultural tourism in the Mediterranean basin, by building a transnational multimedia web portal concerning the Mediterranean culture as a whole, integrated with a federation of national web sites dealing with the local heritage of eleven Mediterranean countries. The challenge of the project is cultural, technical, and socio-organizational. The contents of the MEDINA portal allow travellers to discover an armonized transnational view of the culture in the Mediterranean basin and its links to the local cultural heritage of each individual country. The development of the portal and the national web sites is based on a portal generator and on an online editorial tool that both exploit a common application framework. Intense training and a clear workflow of editorial activities supports a cost-effective development process and promotes a strong cooperation among partners, in spite of their religious, geographic, historical, linguistic differences. This paper will present an overview of MEDINA and the lessons learnt after the first phase of the project.

H.5 [Information Interfaces and Presentation]: Hypertext/Hypermedia

1.1. MEDINA in a nutshell

MEDINA (MEDiterranean INternet Access) is a EC funded project that started in 2002 and will run for four years, grouping *17 partners in 14 countries in the Mediterranean area* (tourism institutes, ministries of culture and tourism, universities and private corporations). The main purpose of MEDINA is to promote *cultural tourism* in Mediterranean basin. It addresses travelers who look for original, engaging and customised travelling proposals and live vacation as an *holistic personalized learning experience* - an opportunity to discover an area not only thorough its material heritage but thorough all aspects of a local culture. For this purpose, MEDINA is developing a *transnational web portal* that present topics of interest for cultural tourisms *along multiple dimensions* (from material heritage to folk traditions, myths and religion, handicraft, gastronomy) and *from a Mediterranean, transnational perspective*. The portal offers a number of multimedia "cultural tourism thematic pathways" (e.g., the Silk Route) across several Mediterranean countries, highlighting their common cultural roots, and linking the different topics to the most relevant heritage of each specific country. The country-specific contents are available in the *national web sites,* where each partner country presents its own heritage, highlighting both its Mediterranean value and its national peculiarity, and provides practical information needed to tourists. Working as a bridge towards the federation of national web sites, the portal acts as a *promoter* both of the Mediterranean culture as a whole, and of the local cultures. But MEDINA is relevant not only from a cultural perspective. It is challenging also from a technological and a socio-organizational perspective. The technical approach exploits the concept of *application framework –an application skeleton* that captures the essential features common to all national web sites and to the portal. The skeleton is based on a *design schema* defined using the W2000 model [UWA01], and comprises a set of interrelated linked *classes of topics* (material heritage, food&gastronomy, handicrafts, myths&religion, tourism-info), a set of *navigation patterns*, and a set of *page layout templates* (see a template instantiation for Morocco web site in figure 1). The application framework is the basis for both the MEDINA *editorial tool* and the *"portal generator"* (see figure 2). The purpose of the editorial tool is to support a systematic, coordinated, standardized editorial process, enforcing an agreed set of editorial guidelines and formatting guidelines. It is an online data entry application that allow content authors from the different countries to store their contents in the MEDINA centralized data base, to classify them according to the design schema, to create links among them, and to group them in hierarchical collections and national or transnational cultural pathways. The "portal generator" is a data-based driven web application generator, optimized for the MEDINA purposes. It dynamically retrieves contents and links from the MEDINA data base, selects the proper lay-out templates, and instantiates them to publish the corresponding web pages. The MEDINA technical approach supports a coordinated, consistent development of contents by all involved teams, helps developers to maximise design reuse, and ensures a coherent interface in the portal and in the national sites without sacrificing flexibility (the design schema and tools can be

easily specialized and adapted to the local requirements of each individual country).

From an organizational perspective, MEDINA exploits a *cooperation structure* that allows all national teams to effectively work together. It relies upon an intense training, an effective sharing of know-how, an agreed set of editorial guidelines, a multi-national team of cultural experts (identified by each country), a common set of authoring and development tools, and a clear workflow of editorial and technical activities. A strong organizational, methodological, and technological infrastructure supports efficient cooperation and productive development processes during the project life time (as we discuss in the next section) and hopefully will pave the ground for the *sustainability* of the MEDINA portal and web sites after the end of the project.

2. Lessons learnt

The project has just ended its first phase, mainly devoted: i) to set up the organizational and managerial structure; ii) to identify technical requirements and "stakeholders" needs (of cultural tourists, cultural institutions, tourism agencies, tourism operators); iii) to define the editorial guidelines and to collect a preliminary set of contents; iv) to design, develop, and test the application framework and the development tools prototypes (data entry tool and portal generator). The work carried out so far content has highlighted that the complexity of the project is mainly "cultural" and socio-organizational. MEDINA represents a unique attempt to build, and to deliver through the web, a wide, armonized body of knowledge that is at the same time scientifically rigorous and enjoyable for cultural tourists; that is, based on a transnational view of the culture in the Mediterranean basin; that is, able both to pinpoint the transnational dimension of the different Mediterranean civilizations, their commonalities, their cross influences, and to promote the local identity of each individual country. From a socio-organizational perspective, the resources invested to management so far have been much higher than originally planned. Finding content experts with a Mediterranean view of their specialist domain was not an easy task. It was extremely difficult for partners to identify the local operative members of their team (content authors and technical personnel) and to start working (remotely and not) together with other teams. Indeed, most MEDINA countries have a socio-economic structure strongly different from the nations currently in EU, and even tasks that we consider as "elementary" - such as "attending a meeting in Italy" - may become problematic (for the team from the Palestinian Authority, for example, it meant going through several checkpoints and get a huge set of formal permissions and visas…). In addition, not all partners had a clear "tourism strategy", defined at institutional level by the tourism governmental agencies. This implies that initially these partners had no idea of what they wanted to promote, and how.

Still, we have organized so far three plenary meetings, a one-week training session (plus a continuous on-line tutoring), many bi-lateral meetings, and … we made it! Now the Medina machinery has started to move, and people from 14 countries have started an effective and productive cooperation. We believe that this is the key result achieved so far in MEDINA: to prove that it is feasible to *overcome the barriers* induced by national borders, languages, religions, economies, histories, and technical backgrounds. Even in the today tragic situation worldwide, MEDINA shows that it is possible to build communities of humans where, in spite of their strong differences, the mutual respect and understanding of individual cultures are the basis for friendly and constructive relationships.

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Figure 1: MEDINA national website of Morocco.

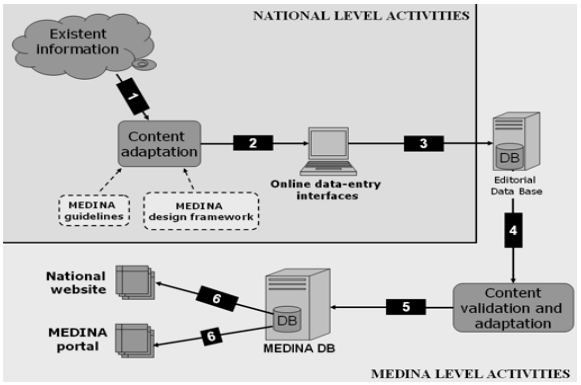

Figure 2: MEDINA workflow and development tools.

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The 3D Website of Piazza dei Miracoli in Pisa – Italy

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Abstract

This paper presents the results of a project aiming to the development of an innovative web site related to the famous monumental complex Piazza dei Miracoli in Pisa. The website includes an innovative section containing an advanced Virtual Reality application, making use of a state-of-the-art 3D web technology. In this application users are able to explore the space and the history of the monumental complex including the famous leaning tower.

Categories and subject descriptors: I.3.8 [Computer Graphics]: Applications

1. Introduction

In June 2001, in concurrence with the reopening of the leaning Tower, the Opera Primaziale Pisana and the Fondazione Cassa di Risparmio di Pisa, in cooperation with the Scuola Superiore di Studi Universitari e di Perfezionamento Sant'Anna and the Scuola Normale Superiore, launched a large-scale multi-media project on the Piazza del Duomo of Pisa: a system to safeguard, enhance the value, manage and provide information on the monumental complex. The system addresses a wide range of audience, at national and international level: experts and researchers in several subjects (art history, architecture, urban planning, history, epigraphy, restoration, conservation of cultural heritage), art amateurs, teachers and students, tourists and visitors, Internet users in general. Everything was structured into different levels of information, each intended for a

Figure 1: The website of Piazza dei Miracoli

precise audience profile. The project was conceived to achieve the following documentary archives and in-depth analysis of various objectives: to foster research and to become a benchmark subjects, and one for non-professional to give an in the field of cultural heritage and restoration, trough a introductive overview of Piazza del Duomo. In particular, medium and long term project, that would permit to carry the latter section contains an advanced Virtual Reality out analyses with more and more innovative methods; to application that enables the space and time exploration of become an environment for discussion and scientific the monumental complex. knowledge dissemination for schools and general public; at the same time, to enhance the city's image, in particular the image of the Opera Primaziale, because of its commitment to enhance the value of the precious historical and artistic heritage of the Piazza del Duomo; To address the goals of the project, an advanced 3D web to find out and test the most appropriate communication application was developed where users at home, using a methods, and especially the innovative application of normal web-browser, can see and explore the information technologies to teaching purposes: in transformation of the square during the centuries. The particular the web and virtual reality, off-line and on-line, application is hosted in the Piazza main server and which consists of 3D navigable models that interact with embedded in a regular webpage, making use of an computer devices, for the understanding of the historical innovative web3D technology called XVR. development of the monumental complex. XVR is a tool realized by PERCRO in co-operation with One of the products of the project was the creation of an the company VRMedia S.r.L, for the development of innovative web site (available online at the address Web-enabled virtual reality applications. Beside web3d www.opapisa.it), subdivided in two sections: one devised content management, XVR supports a wide range of VR for professionals with on-line consultation of devices (such as trackers, 3d mice, motion capture devices, stereo projection systems and HMDs) and uses a state-of-the-art graphics engine for the real-time visualization of complex three-dimensional models that can become very handy even for advanced off-line installations. XVR applications are developed using a dedicated

2. Web3D technology: XVR

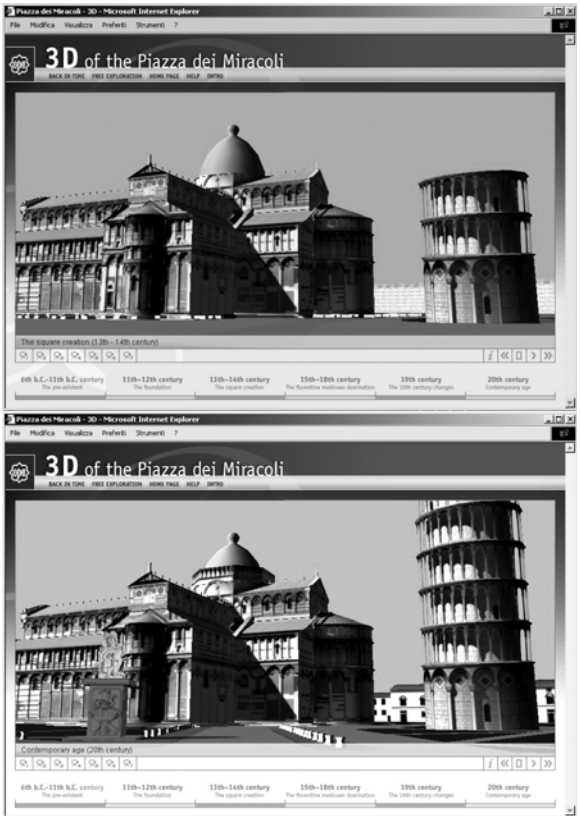

Figure 2: Time evolution of the monuments.

scripting language whose constructs and commands are targeted to VR, and give the possibility to developers to deal with 3D animation, positional sounds effect, audio and video streaming and user interaction.

2. The interactive visit of Piazza dei Miracoli

The 3d section of the website, available both in English and in Italian, allows users both to freely navigate the 3d environment and to watch an interactive movie showing the history of the square, with a narrating voice describing the evolution of the monuments during the centuries. To present the users a familiar interaction paradigm, a set of buttons allow a VCR-like manipulation of the movies. The user can in every moment stop the narration and explore the environment using mouse and keyboard, as the whole application is completely based on real-time 3d graphics. In addition, the user can navigate the environment also trough time (fig. 2): it is, in fact, possible to change the time period and observe how the surrounding environment changes from the particular point of view in which the "time tourist" currently is. Furthermore it is at any time possible to place the camera in some predefined points of view, corresponding to the most significant views of the square, i.e. the gates or the

Figure 3: Selection modality.

main roads surrounding it, plus an aerial view giving the localization of the square in the town of Pisa. Another kind of interaction is the selection modality, (fig.3) in which the user can click on some relevant points of the 3d model and retrieve information about the corresponding monuments by means of a Flash webpage containing all their related documentation, from the historical, artistic and architectural point of view.

All the 3d models are realized using 3dStudioMax and Photoshop, and exported in the AAM format handled by XVR. In order to enhance the perception of the 3d space, the models are shaded in real-time by means of multilayered lighting maps containing information about lighting and shadow casting. The whole application was programmed using the XVR scripting features.

3. Conclusions

The website has been online for more than one year, and it is still daily being visited by hundreds of people with a good success. The 3d section proved to be an effective mean for a wide divulgation of historical and cultural information, having in the interactive modality its best added value in comparison with a normal movie. An additional benefit is related to bandwidth, as the whole size of the transmitted data, for more than 45 minutes of hi-res visualization, is limited to only 8 MB.

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Opera della Primaziale Pisana
Fondazione Cassa di Risparmio di Pisa
Concept and development: *3d section:*
PERCRO – Scuola Superiore S.Anna, VRMedia S.r.l, Andrea Brogi *Website:*
CRIBECU – Scuola Normale Superiore, Liberologico Soprintendenza ai Beni Culturali di Pisa (SBAAS) Delcaldo WebStudio