

EVA *Europe* *'99 Berlin*

Co-operation Day Proceedings

Electronic Imaging & the Visual Arts

9th - 12th November 1999



**Gesellschaft zur Förderung
angewandter Informatik e.V.**
Society for the Promotion of Applied Computer Science

VASARI UK

Co-operation Day Proceedings

EVA *Europe* *'99 Berlin*

Electronic Imaging & the Visual Arts

The 6th EVA Berlin is the main European event in 1999
of the worldwide EVA series.

9th – 12th November 1999

at the

$\frac{S}{P} \mid \frac{M}{K}$ State Museums of Berlin –
Prussian Cultural Heritage
at the Berliner Kulturforum

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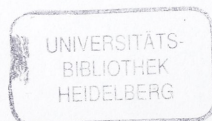
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PROGRAMME

EU PROGRAMMES & PROJECTS

-
- | | |
|--|----------|
| Digital Heritage and Cultural Content. Towards a European Cultural Information Landscape
Claude Poliart (DGXIII, European Commission, Luxembourg) | 1 |
| ACOHIR: Accurate Colour High Resolution Recording and Reproduction of 3D Objects for Electronic Publishing and the Consumer Market
Andreas Kohl (cobax Nuernberg, Germany) | 2 |
| Exotic Europe? Travelogues in Early Cinema
Professor Ruth Keller-Kempas (Fachhochschule für Technik und Wirtschaft Berlin, Germany) | 3 |
-

EU NATIONAL/REGIONAL INITIATIVES

-
- | | |
|--|----------|
| Visual Elements and Structures of Landscapes in Brandenburg (Germany) - Development of an Image Database and Photo Library
Professor Jurgen Peters (FH Eberswalde, Germany),
Philip Paar (Centre for Agricultural Countryside & Land Utilisation Research, Germany) | 4 |
| Museums of the Greater Region of SaarLorLux-Rhineland-Palatinate and Wallonia
Christian Glöckner (Intracommunal Institut for Regional Affairs, Luxembourg) | 5 |
| A Digitised Art, Culture & History Image Database on Thrace
Gerassimos Kekkeris (Democritus University of Thrace, Greece) | 6 |
| 'Sun, Sea & Silicon Chips': Promoting Digital Culture in the South West of England
David Drake (South West Arts, UK) | 7 |
| Heritage on the Web: Building a Gateway to European Cultural Heritage
Michael Hiley (De Montfort University, UK) | 8 |
-

CENTRAL & EAST EUROPEAN REGIONAL/NATIONAL INITIATIVES

-
- | | |
|--|----------|
| Information Systems in the National Museum of Art of Romania – Achievements and Projects
Lucian Vasilica (National Museum of Art of Romania) | 9 |
|--|----------|
-

PANEL DISCUSSION

(without a paper)

-
- | | |
|--|-----------|
| East & Central European Initiatives & Collaboration with Western Europe
Ladislav Kesner of the Czech Republic and others | 10 |
|--|-----------|
-

EUROPEAN STUDENT INITIATIVES

-
- | | |
|--|-----------|
| Some Experiences with Media Concepts in Museums
Professor Peter Hupfer, Kai Fischer (Bauhaus University Weimar, Germany) | 11 |
|--|-----------|
-

INTERNATIONAL

-
- | | |
|---|-----------|
| Virtual Fashion Collections for the New Millenium: Interdisciplinary Approaches to Defining Data Structures
Kathi Martin (Drexel University, USA) | 12 |
| Selecting a Picture Frame with Digital Imaging
Alan Cole (IBM T J Watson Research Center, USA) | 13 |
| emii. European Museums' Information Institute
Christina Brown (emii, cambridge UK) | 14 |
-

DIGITAL HERITAGE AND CULTURAL CONTENT
TOWARDS A EUROPEAN CULTURAL INFORMATION LANDSCAPE

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Introduction to the 5th Framework Programme

The European Commission's 5th Framework Programme for Research and Technological Development, 1998-2002¹ is divided into five thematic and three horizontal programmes. The Information Society Technologies (IST) programme² is the largest of the thematic research and development programmes with a global budget of 3600 million Euro.

The main focus of the IST programme (1999 work programme) is on enhancing the user-friendliness of the information society: improving the accessibility, relevance and quality of public-services especially for the disabled and elderly; empowering citizens as employees, entrepreneurs and customer; facilitating creativity and access to learning; helping to develop a multi-lingual and multi-cultural information society; ensuring universally available access and the intuitiveness of next-generation interfaces; and encouraging design-for-all.

Multimedia content finds a central role in the IST programme. The objective here is to confirm Europe as a leading force in this field and enable it to realise the potential of its creativity and culture.

The Information Society Technologies Programme

The IST Programme brings together and extends the ACTS³, Esprit⁴ and Telematics Applications⁵ programmes to provide a single and integrated programme that reflects the convergence of information processing, communications and media technologies. The 1999 IST work programme is mainly composed of action lines dedicated to four IST Key Actions, complementing each other in their overall objective to enhance the user-friendliness of the Information Society. The four Key Actions and their budgets for the 5-year programme are:

Key Action	Title	Budget (M euro)
I.	Systems and services for the citizen	646
II	New methods of work and electronic commerce	547
III.	Multimedia content and tools	564
IV	Essential technologies and infrastructures	1363

In this context the focus of this paper is on cultural heritage in Key Action III.⁶

¹ Detailed information to be found on:

'Cordis', the Community Research and Development Information Service at <http://www.cordis.lu/>

'Europa', the European Union's server at <http://europa.eu.int/index-en.htm>,

'ISPO', the EC Information Society Promotion Office at <http://www.ispo.cec.be/>

² by Decision No 182/1999/EC of the European Parliament and of the Council of 22 December 1998, a specific programme on a user-friendly information society was adopted by Council Decision No 99/168/EC of 25 January 1999 (Official Journal L 64, 12/03/1999 p. 20 - 39)

³ see <http://www.infowin.org/ACTS/>

⁴ see <http://www.cordis.lu/esprit/home.html>

⁵ see <http://www.cordis.lu/telematics/home.html>

⁶ see <http://www.echo.lu/ist/ka3/>

Key Action III – Multimedia Content and Tools

This Key Action aims to improve the functionality, usability and acceptability of future information products and services, to enable linguistic and cultural diversity and contribute to the valorisation and exploitation of Europe's cultural patrimony, to stimulate creativity, and to enhance education and training systems for lifelong learning. Work covers new models, methods, technologies and systems for creating, processing, managing, networking, accessing and exploiting digital content, including audio-visual content. This Action Line integrates both applications-oriented research, focusing on publishing, audio-visual, culture, education and training and generic research in language and content technologies for all applications areas.

Digital heritage and cultural content is one of the five main areas for research and technological development and the aim is to expand the contribution of libraries, museums and archives to the emerging culture economy, and thus encompasses all aspects of economic, scientific and technological development. It is co-ordinated by the European Commission's Cultural Heritage Applications unit, DG XIII-E2⁷, in Luxembourg.

From 4th to 5th Framework Programme

Building on and bringing together and extending the activities under the former ACTS, ESPRIT and Telematics Applications programmes (all part of the 4th Framework Programme, 1994 -1998), the main objective of Key Action III is to improve information products and services in support of linguistic and cultural diversity and to enhance education and training systems for lifelong learning. Work in the area of cultural heritage will build on achievements under the Fourth Framework Programme addressing libraries, museums and related institutions⁸ and will attempt to encourage convergence in technical approaches and applications for the various cultural institutions and networked services.

A few successful examples of projects funded under the 4th Framework Programme are the AQUARELLE⁹ and CHILLIAS¹⁰ projects (both supported under the Telematics Applications Programme) and DELOS¹¹ (funded under ESPRIT). AQUARELLE, is an application designed to allow users to search a variety of cultural heritage databases on its international network via their own personal computers. CHILLIAS created a multimedia virtual simulation of a children's library on the WWW/Internet. The DELOS Working Group is part of the ERCIM Digital Library Initiative¹². Its objective is to promote research into the further development of digital library technologies, in particular to stimulate research activities in areas which are relevant for the efficient and cost-effective development of digital library systems, encourage collaboration between research teams working in the field of digital libraries, and establish links with on-going projects and activities in the field of digital libraries in industry and other public and private institutions.

A View of the Future

What is emerging as a focus for the future is to help create a European cultural information landscape by encouraging cultural memory organisations to participate in R&D actions providing innovative prototype networked services for both professional users and citizens. This future information landscape should be easy to identify, easy to access, and easy to navigate and should be extended to also encompass Europe's scientific and industrial heritage.

⁷ see <http://www.echo.lu/digicult/home.html>

⁸ see Background and discussion documents for archives, libraries and museums at <http://www.echo.lu/digicult/en/backgr/brainsto.html> and Contribution to discussions on RTD priorities for libraries, archives and museums at <http://www.echo.lu/digicult/en/backgr/libbrain.html>

⁹ see <http://aqua.inria.fr/>

¹⁰ see http://chilias.isegi.unl.pt/chilias_int/descript.htm#project

¹¹ see <http://www.iei.pi.cnr.it/DELOS/>

¹² see <http://www.ercim.org/>

Equally tomorrow's cultural content will be produced by generating new forms of digital media. What this cultural content will be, and how it will be created, managed, distributed and preserved remains uncertain and a fertile ground for future research and experimentation.

The key participants in future cultural heritage projects must be Europe's memory institutions, both public and private, with a particular focus on new alliances with technical and content-related partners.

Research Priorities¹³

In translating this embryonic vision of the future three research priorities have been identified, namely:

- Ensuring integrated access to collections and materials held in libraries, museums and archives
- Improving the operational efficiency of large-scale content holdings by means of powerful interfacing and management techniques
- Preserving and accessing multimedia content of various types, including electronic materials and surrogates of physical objects.

The Annual Work Programmes

The IST programme is a flexible framework where focus is built within distinctive annual work plans. For the 1999 work plan¹⁴, the research priorities are taken up in two main action lines:

Key Action III, Action Line 2.3, Access to scientific and cultural heritage - call for proposals was launched on 19 March 1999, closed on 16 June 1999

Key Action III, Action Line 2.4, Digital preservation of cultural heritage - call for proposals scheduled for 15 September 1999.

Action Line III.2.3 Access to scientific and cultural heritage

Objective: To improve access by citizens and by professionals to Europe's fast-growing science and culture knowledge base, through developing advanced systems and services supporting large-scale distributed, multi-disciplinary collections of cultural and scientific multi-media resources. The technological focus is on rich representations, powerful immersive features such as 3-D visualisation, real-time virtual object manipulation and group interactivity, whether for multimedia retrieval, virtual galleries, mass media events or audio-visual distribution. Work is expected to develop new mixed-economy models for exploitation, repackaging and re-use. Work should also address interoperable access to distributed resources, whether through cross-domain resource discovery, interfaces or new architectures and standards, or whether through digital archives integrating library and museum objects.

The focus of this Action Line concentrates on the development of technologies that will lead to what can be called in the broadest sense 'next generation Digital Libraries applications'. Generic models and techniques that facilitate access to distributed resources utilising standardised and automatically generated indexes, categories, making use of metadata and metadata generators and tools have already been identified as key research topics. On the content side the need for and development of new tools and advanced techniques to build virtual representations of collections found in large numbers of European cultural repositories is clearly emerging as a key issue. The overall trend is towards a wide range of networked services providing a new level of seamless and transparent access capability.

¹³ see background material/publications on metadata, digitalisation and preservation issues at <http://www.echo.lu/digicult/en/study.html>

¹⁴ see <http://www.cordis.lu/ist/wp.htm> (to download 1999 work programme)

Key issues in the projects launched at the first call¹⁵ are:

- interoperability, exchangeability, meta-data and common data models
- common and easy interfacing,
- multimedia data (with special attention to the visual content) search, retrieval and navigation on distributed sources,
- extended use and development of for instance XML/RDF, SGML and Z39.50 protocols and
- domain specific business and exploitation models.

Action Line III.2.4 Digital preservation of cultural heritage

Objective: To address new ways of representing, analysing, manipulating and managing different kinds of digital cultural objects from different media sources, with special attention given to surrogates of fragile physical objects. The work should focus on the sustainable development of valuable digital repositories in Europe's libraries, museums and archives. It should address the technical and organisational problems surrounding the viability of scaleable digital repositories, e.g. through test-bed creation for: long-term preservation and content management in distributed heterogeneous collections (e.g. provenance, authenticity, identification and links). Particular attention should be paid to long-term accessibility, both by citizens and for scientific analysis, and to quality, affordability and acceptability.

The foreseen developments here are expected to follow on the work launched under Action Line III.2.3, and thus contribute to the further development of the digital libraries concept and the virtual representations experiments. The key issues are on:

- strategies for long term development and maintenance of repositories and archives of valuable digital objects,
- preservation of content and context for both digitised collections of physical objects and digitally born ones,
- solutions that are scalable in both technical and organisational terms,
- cost effective quality services for all types of users and
- long term sustainable solutions for managing and preserving distributed digital collections.

For more information and details on contacts, have a look at the DigiCult web site at

<http://www.echo.lu/digicult/home.html>

¹⁵ see <http://www.echo.lu/digicult/en/fp5/mrchcall.html>

EP 23276 ACOHIR

**ACCURATE COLOUR HIGH RESOLUTION RECORDING AND REPRODUCTION
OF 3D OBJECTS FOR ELECTRONIC PUBLISHING AND THE CONSUMER MARKET**

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Project Report and Status

Abstract

The purpose of the project is to construct a modular system for acquiring and presenting 2D images from 3D objects at accurate colour and resolution dependent on the capturing device. The system is designed for acquisition, processing and display of colour corrected images of 3D objects. It comprises of three basic modules: the acquisition module, the editing module and the viewing module.

The ACOHIR system is a modular system allowing capturing, correction, editing, storage and display of colour calibrated images from 3D objects. The system modularity will allow the user to upgrade each module, depending on technology advances. Although each commercial system will require a specific configuration, it is expected that alternative hardware selection will be available for each module.

Working under windows NT, the system will offer an integrated approach to capturing, processing and storing of digital images of 3D objects with full control over lighting and colour. Benefits for the user will be to have control over the whole chain from capturing to display. The system will be also able to provide records of multiple views of 3D objects that will be valid in future systems without the need of further digitisation.

Initially identified target markets are museums, industries, catalogue builders (electronic and paper), education as well as auction houses, insurance companies and photographic studios.

ACOHIR is funded by the European Community under the number EP 23276.

PROJECT: EXOTIC EUROPE? TRAVELOGUES IN EARLY CINEMA

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The project *Exotic Europe? Travelogues in Early Cinema* is sponsored by the European Commission as part of the *Raphael* Program. The project coordinator is the Technical College for Technology and Economics in Berlin (Fachhochschule für Technik und Wirtschaft, Fachbereich 5, Gestaltung/Restaurierung/Grabungstechnik). The partners in the project are three archives in three European countries: the German Bundesarchiv-Filmarchiv in Berlin/Koblenz, the Cinema Museum in London, and the Nederlands Filmmuseum in Amsterdam.

In accordance with the goals of the *Raphael* Program, which supports "transnational cooperation projects between museum institutions for the enhancement of and accessibility to the heritage," films and film devices from each of the three participating archives will be restored. Beginning in Spring 2000, these films and film devices will be presented to the public in various forms:

- A DVD will provide a selection of twenty actuality films from the period between 1905 and 1925. These will be supplemented by five essays on cultural history (film clips with commentary or music), as well as a data bank with filmographic information.
- A video with 20 actuality films. This is intended for persons and/or institutions without DVD capacity.
- A travelling exhibition, which will be shown in Germany and Great Britain beginning in 2001.
- A film program - with live music - which will be shown in Spring 2000, corresponding with the release of the DVD.
- A catalogue, which will be available with the DVD or video, and which will also serve as an exhibition catalogue.

Nitrate goes DVD - On Presenting Early Nitrate Films with the New Digital Media

Up until the 1950s, all films were filmed on highly flammable nitrate film stock and thus, due to security reasons, could no longer be projected. As a consequence, these films are practically inaccessible to the present-day audience, with the exception of a few scholars and researchers. These films are carefully stored by film libraries and archives around the world, where their decay is slowed by methods of film preservation.

The actuality films we have chosen for the project are in part only available as single nitrate copies, partially as safety copies.¹ They do not belong to the canon of masterworks from the silent film era, and the names of the people who filmed them are in many cases unknown or forgotten. They are valuable as early historical documents on the everyday life and the longings of the people in the early twentieth century. They take us on idyllic river cruises, open unknown landscapes, show crafts and customs that have long since been forgotten. The aesthetics of these early non-fiction films should be seen in the context of earlier traditions in the visual arts as well as in the context of the technological developments in filming and projection. In the early twentieth century, a time of narrow conceptions of homeland and pronounced national feelings, these films

¹ Besides appropriate storage, preserving this film material includes cleaning, repair, and transfer to safety film stock (polyester film).

make an transnational perspective on Europe visible. A curious gaze falls on foreign countries with other 'exotic' ways of life: visual pleasure formed a central moment in the early cinema.

An imagined journey to a past Europe awaits today's audience. Traditional modes of access to these precious film images will be expanded by the use of new media, and the DVD will be tested as a pilot project for the archives. The cinema experience cannot and should not be replaced. The light and colour intensity of the nitrate originals and the irregular contrasts are already changed in copying the nitrate originals onto security film. In addition, the form of projection from the period, i.e., the soft light of a projector which brought the nitrate film images to light, is no longer available to later audiences.

Before now, the only alternative to cinematic viewing was taping films on video; with the problem of a loss of image quality. Video is already now supplemented by DVD (Digital Versatile Disc), and will eventually be replaced by this new technology. In this process, the film images are first transferred to DigiBeta, and then to a DVD; this allows the transformation of analog images into digital images with a stunningly high quality. Not only the films copied onto security film can be digitized, however. This technological innovation also allows the direct digitization of preserved nitrate copies in relatively good condition. Thus, losses of quality, which necessarily occur with the transfer between multiple film stocks and data carriers, are minimized. With digital editing, which is sometimes falsely termed (digital) restoration, the traces of time can be "erased." Scratches, faded colours or inconsistencies in lighting can be "filled in" and/or standardized through the digital editing process.

For film libraries and archives, digitization offers the possibility of making the films accessible to both researchers and a wider audience, without taxing the carefully preserved film copies. In this project, various possibilities presented by DVD will be explored:

- non-linear, linked informational structures: links between films and filmographic information, imagined trips through Europe (jukebox system), essays on cultural history, which can stimulate visual reception, and playfully and individually utilized;
- multilingual offerings;
- testing the publication of digitized film material.

The following are formulated as open questions:

- Does DVD address a broad younger public which can develop an interest in the materiality of film through the new technologies?
- Does the visual reception of this material simplify the access to an important period of film and cultural history?
- Can an awareness of the value and importance of the preservation of these film documents be mediated and/or improved by presenting appropriate information on the DVD (an introduction to film restoration, the illustration of different image qualities)?
- Does the medium encourage the viewer to become accustomed to polished digital images, or to what extent can it teach the viewer to perceive the difference between analog and electronic images?

If restoration and preservation are not only understood as a process of technological optimization, but rather take place in a reflexive confrontation with the medium itself, then today, approximately 100 years after the invention of film and on the verge of the digital age, we are challenged not only to confront the technological possibilities for innovation and their relevance for restoration and as data carriers for film material, but also with the preservation of the original material itself. In thirty or fifty years, it should still be possible to have access to the visual aesthetic of film which can only be perceived in the original.

VISUAL ELEMENTS AND STRUCTURES OF LANDSCAPES IN BRANDENBURG (GERMANY) – DEVELOPMENT OF AN IMAGE DATABASE AND PHOTO LIBRARY

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1. Introduction and project objectives

Terrestrial landscape and aerial photographs are an important medium for visual documentation or analysis in the context of landscape-related research and instruction.

There are a number of conventional photo archives at the Center for Agricultural Landscape and Land Use Research (ZALF) and at Polytechnic University of Eberswalde (Germany). The number of scientific investigation and research area landscape photos continually increases; recently, digital photos have also been added to these archives – the amount of photographic data is becoming unmanageable.

What kind of solution could be developed for more effective organization of these photo archives?

To address this problem, new methods for improving accessibility of scenic images of the German State of Brandenburg were investigated. It was looked up for new ways, in order to make these pictures from the landscapes of Brandenburg more accessible also for third-parties and the public. The federally supported research project “GRANO” (“Approaches for a sustainable agricultural production: Application for Northeastern Germany”), offered an opportunity to realize an organizational approach. An intensive collaboration of the local and regional participants (farmers, authorities, tourism initiatives etc.) forms the basis for the GRANO project.

The visualization of landscape statuses and scenarios mediates between expert knowledge and everyday life experience (see: Nohl 1996, Paar in: Kretschmer et al. 1999). To guarantee transferability of the experiences from this research project, it should be possible to edit the image data and create a portable, Internet-accessible archive.

This image database can be used - also beyond the concrete research project - for the following purposes:

- For the archiving and documentation of typical scenic elements and structures.
- For visual documentation, landscape monitoring and landscape modeling.
- For analysis and evaluation in landscape planning procedures (Environmental Impact Analysis, Land Use Planning, local “Agenda21” processes etc.).

The landscape image database can be used also as source for the production of image textures for 3D-visualization and could be applied for the storage of 3D-landscape objects or even digitized

landscape drawings.

According to these various intended purposes, the target group includes not only landscape planners, but in addition:

- Specialists in ecological landscape research and instruction, planning offices and other authorities.
- Rural tourism organizations and tourism consulting associations.
- Students.
- The interested public.

2. Systematics of visual landscape elements and structures

There are several systematics available for describing central European landscapes, landscape elements and structures from different scientific areas: ecology, geomorphology and engineering sciences etc. The range and quality of systematics developed for the State of Brandenburg are thereby very different.

A good basis for the systematic classification of landscape elements and structures is the mapping guidance for biotope types (Landesumweltamt Brandenburg 1995). This classification is the result of research and discussions over many years. However, only a few biotope types are yet represented systematically by photographic examples.

The biotope types are important, but not the only components to describe the cultural landscape. A second important group are historical landscape elements and land use forms (KHLE - Hallmann/Peters 1993), such as lanes, stonewalls, field terraces etc.

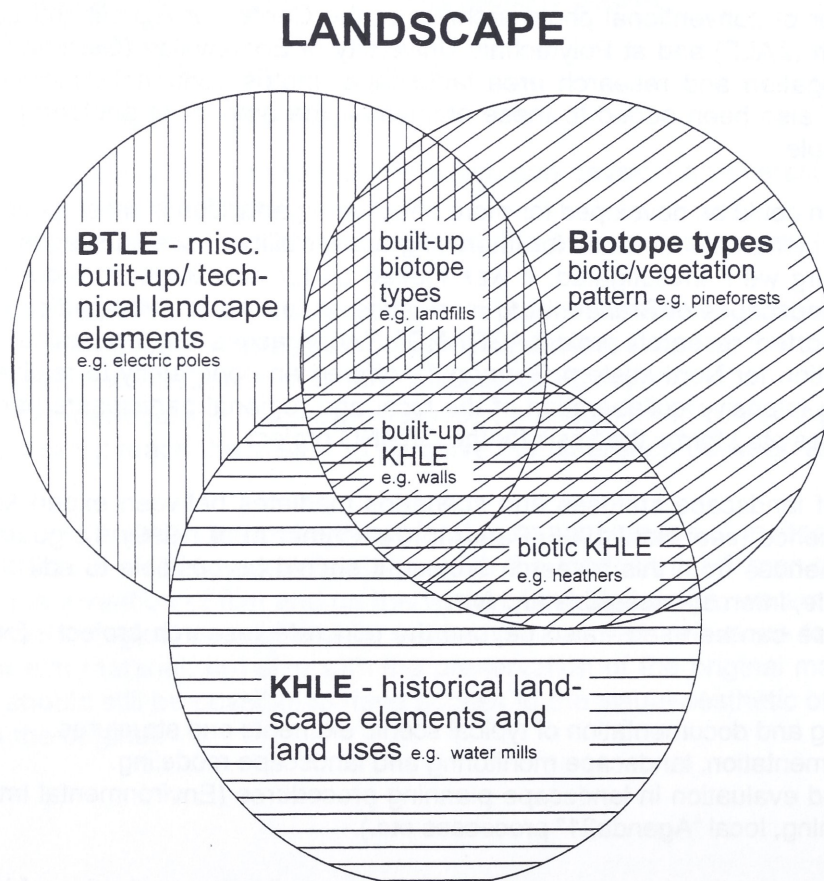


Fig.1: Relations and overlap between the three catalogs of the landscape image database

At the Polytechnic University of Eberswalde, a systematics of the historical landscape elements and land uses with a scope of several hundred "KHLE's" was developed (Peters/ Klinkhammer 1998). This is the second main catalog of the image database beside the biotope type systematics. There are overlaps between both catalogs (Fig. 1): Thus e.g. a Calluna-heather-landscape, created by a specific land use practice, is assigned to both the biotope types and the KHLE – systematics.

In one case the current vegetation and in the other case the historical land use (pastures with sheep), forms the criteria. A window from the union catalog is represented in Fig. 2.

- ▷ ALLGEMEINE BILDDATEN
- ▷ BIOTOPTYPEN BRANDENBURG
- ▷ BTLE - sonstige bauliche/technische Landschaftselemente (Vorentwurf 04/1999)
- KHLE - Kulturhistorische Landschaftselemente und -nutzungen (10/1998)
 - ▷ K0 SIEDLUNG - Kulturhistorische Landschaftselemente in Siedlungs- und Siedlungsrandbereichen, Siedlungsrelikte
 - ▷ K1 HANDWERK UND GEWERBE - Elemente und Relikte des fruehen Handwerks, der Kleinindustrie und des Kleingewerbes
 - ▷ K2 VERKEHR - Elemente des Funktionsbereichs Verkehr
 - ▷ K3 WASSERBAU - Hochwasserschutz, Wasserbau und begleitende Anlagen
 - K4 LANDNUTZUNG - Elemente und Relikte der bauerl. u. tradition. Landwirtschaft, des Gartenbaus, der Fischerei u. Forstwirtschaft
 - K41 Landwirtschaft
 - K411 Acker-, Wiesen-, Weide- und Heidelandschaften
 - K4111 Acker- und Wiesenlandschaften
 - ▷ K41111 historische Flurformen
 - ▷ K41112 Wiesen/ Weidengruenland
 - ▷ K4112 Hutlandschaften/ Hutungen (extensive Weiden)
 - ▷ K4113 Heiden (extensive Schafweiden)
 - ▷ K4114 Terrassenlandschaften (Terrassierte Haenge)
 - ▷ K412 Gehoelzbereiche und Einzelgehoeelze in der offenen agraren Kulturlandschaft
 - ▷ K413 Landwirtschaftliche Gebaeude im Aussenbereich
 - ▷ K414 Kleingewaesser, landwirtschaftlich genutzt
 - ▷ K415 Reliefstrukturen, die durch landwirtschaftliche Bearbeitungsprozesse entstanden sind
 - ▷ K416 Sonstige Elemente in Acker-, Wiesen-, Weide- und Heidelandschaften
 - ▷ K42 Forstwirtschaft
 - ▷ K43 Fisch- und Teichwirtschaft
 - ▷ K5 VERWALTUNG, VERTEIDIGUNG UND RECHTSSPRECHUNG - Grenz-, Verteidigungsrelikte, Rechtssprechung
 - ▷ K6 FREIZEIT, ERHOLUNG UND ERINNERUNG
 - ▷ K7 FEUDALE ANLAGEN - Burganlagen und Schloesser
 - ▷ K8 RELEGION - kulturhistorische Landschaftselemente mit religioeser Bedeutung
 - ▷ K9 BODENDENKMALE
- ▷ SCHLAGWORTVERZEICHNIS

Fig. 2: Window from the catalog-set of the image data base

Further components of the landscape apart from two systematics mentioned:

- Geomorphology,
- Atmospheric appearances (e.g.: clouds, rainbows),
- Contemporary build-up/technical landscape elements,
- Current land use forms,
- Individual plants,
- Humans,
- Animals,
- Means of transportation, and much more.

Key word systematics were developed for these landscape features to allow for reasonable system of archiving. Since a landscape photo frequently shows only one, but in actuality contains various side-by-side or consecutive (front, middle, background) picture constituents, an indexing of a picture under different catalogs or key words is not only permitted, but necessary for purposeful tracking.

3. Methodological and technical concepts of the image database and photo library

The digitalization and categorization of landscape photos from the extensive analog archives of the participating institutions is a time-consuming affair. Frequently, not all of the meta data necessary

for a database system has been documented. For the visual representation of visual landscape features, systematically photographing this data with digital cameras at different seasonal aspects proved a more favorable approach. For demonstration purposes, this methodology has been applied since October 1998 to selected areas of Brandenburg. In this context, photographic resources from other research projects, theses (diploma) and a subproject of a job-creation measure called "Creation of a Photographic Archives of Typical Elements of the Agrarian Landscape" will be extensively utilized. Archived material will be likewise entered when digitization and use of a picture are likely. The continuous supply of new image data is not a direct part of the project, but carried out by co-workers, who were entrusted with the conventional image files. Meta information of the landscape photos is entered into the image database. The original digital pictures remain on CD ROM. Only a preview image is generated and the file path to the original is managed dynamically.

First general image meta data such as picture rights, line of sight or time of day, has to be specified to the entry through predefined descriptors. The geographic reference is specified by means of a standard municipality key and the Transverse Mercator coordinates of the recording standpoints.

Datei **Mac OS**
 CD_D0014: D0001492.TIF

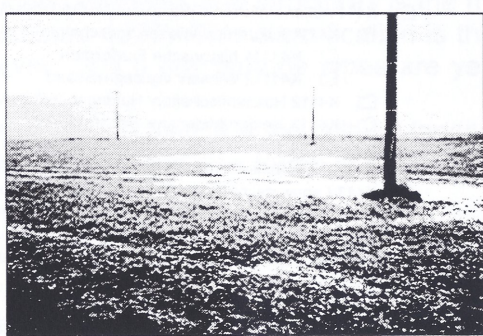
Windows
 CD_D0014 (C:)\D0001492.TIF

Program PictureViewer

Type TIFF	Picture depth Farbbild
File size 26,35 MB	Resolution 2700 dpi
Created 08.12.1998	Height 2495 pix
Modified 08.12.1998	Width 3689 pix

Dataset

Captured 17.03.1999
Modified 05.05.1999



Status
 Pruefen

Caption Writer
 Biebrach, J. & Gelfort, R.

Name
 d0001492 bestellter Acker

Categories
 Photographer: Biebrach, J. & Gelfort, R.
 Copyright: ABM Fotoarchiv
 Copyright_notice: bei Angabe der Bildrechte
 Year_month_created: 1998/10
 Daytime: nachmittags
 Line_of_sight: Nordost
 Clouds: starke
 Municipal_id: 12064316 Muencheberg
 B09130 Intensivaecker (LI)
 B10124 Energieleitungstrassen (PRE)

Notes
 Photographed_d: 29.10.1998
 Photographed_h:
 Digital_source: SprintScan 35
 Camera: Olympus OM-4
 Film: Agfa 200
 Focal_length : 28mm
 misc.: Winterraps_Brassica napus,
 Wasserstauflaeche auf Schlag 17

Fig. 3: Example dataset from the image database

Hierarchically structured systematics for the entry of landscapes and landscape elements are entered into the database as categories. Each photo is classified by categories based on its components (Fig. 3). Besides an ID, each image data record receives a generally comprehensible caption name derived from a key word directory for landscape elements.

The software system used is the Media Asset Management System "Cumulus", from Canto Soft-

ware San Francisco, CA and Berlin, Germany. The network version runs on a SUN Solaris Enterprise server at ZALF and offers TC/IP access of Windows or MacOS Clients in the Intranet. Cumulus 5 (announced) will run on our Linux Web-server. Thereby, the photo library and database contents are accessible to external entities, such as universities, nature protection authorities etc., as well as the interested public and stake holders. Cumulus 5 supports ODBC, which enables connections to 3rd party databases.

The Cumulus client provides the practical opportunity to list and maintain the digital landscape images and to manage database queries.

Parallel to Cumulus, a Geographical Information System (GIS) serves for geographic-referenced and map-based database queries. The recording standpoints of the photographs are mapped in an "ArcView GIS" theme.

The landscape images can be assigned and analyzed with e.g. different landscape units or geomorphologic units through operations with other GIS themes. This service could also be offered through the free ESRI ArcExplorer in the Internet.

4. Outlook

Apart from the above-mentioned application purposes, there are also impulses at the European level for establishing digital landscape image databases.

There is a trend of diminishing the diversity of scenic characteristics to one "European Union standardized" landscape. In the draft of an European landscape convention, the member states are requested to identify their own landscapes and its features and to analyze the forces and pressures, which are changing them" in order to preserve the variety and unique characteristics of European landscapes (Council of Europe 1997). We would therefore recommend the use of digital image processing with respect to database and GIS technologies, because landscapes are suited to informative handling due to their relationship with the human imaginative power, cultural identity and aesthetics. Scenery is vital to ensure rural recreation and to deploy the potential of rural tourism in selected areas.

Internet-compatible image databases offer the ideal prerequisites to analyze similarities and differences between regional landscapes in comparative studies. The information exchange enabled through comparative landscape research could significantly support the preservation and sustainable land use of historical cultural landscapes. The results should be applied to the pending fundamental structural re-organization of the rural development policies (e.g. AGENDA 2000, environmental conditionality programs on agriculture).

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MUSEUMS OF THE GREATER REGION OF SAARLORLUXRHINELAND-PALATINATE AND WALLONIA

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A networked Association

The Greater Region comprising Saarland, Lorraine, Luxembourg, Rhineland-Palatinate and Wallonia is an unwieldy name for an area which has been trying to cooperate in a way which is unique throughout Europe.

By the end of the sixties, four different nations - Belgium, Germany, France, and Luxembourg - and five different regions - Belgian Luxembourg, Grand-Duchy of Luxembourg, Lorraine, Rhineland-Palatinate, Saarland - agreed to intensify their cooperation and to form an integral whole by holding summit meetings, by organising a closer cooperation between parliamentarians, chambers of industry and commerce, chambers of handicrafts, universities, and small and medium-sized enterprises. All of this is being manifested by 85,000 commuters in the region every day. As a result, southwestern Germany, northeastern France, southeastern Belgium and the Grand-Duchy of Luxembourg in the middle have grown together into an area with a population of 11.2 million and a per capita gross domestic product which is above the EU average, an area which is now trying to seize its opportunity at the centre of the European Union, in the middle of Euroland.

The concept of the so-called "Blue Banana" devised by Prognos-Institute in Basel at the end of the eighties, serves to describe the zones which experience the strongest growth in the European Union. The zone ranging from Mid-England to Tuscany just outside Rome and branching off to Paris and to Eastern and Central Europe and extending as far as the Mediterranean Coast includes those areas which are bound to experience the strongest growth in the near future.

Illustration "Blue Banana" to be shown on overhead projector

A look at this strange fruit shows that the Greater Region as it is interpreted by IRI, occupies a remarkable central position.

This has been reaffirmed in the North-South and East-West links referred to in a documentation of the third Summit Meeting.

Follows presentation of North-South axis and East-West link

From what has been said, we must conclude that the Greater Region will be well advised to intensify its cross-border cooperation for economic reasons and to take all economic, social and political measures necessary to turn the region into a competitive place in the heart of Euroland.

Yet, there is still another reason:

Presentation of the Carolingian Empire after its partition into three kingdoms in 843.

A look at the map of Europe after the partition of the Carolingian Empire into three kingdoms in 843 reveals the following:

The Lotharingian Middle Realm covered a zone which at the time was considered to be the prosperity axis of the empire. The Middle Realm extended from the North Sea harbours via Metz and Strasbourg to what is today Switzerland and went on to Lombardy, Piedmont and Tuscany. Contrary to the expectations of the contracting parties the Middle Realm did not turn out to be the peace-keeping link between the eastern and western empires but gave rise to many controversies, the bloodiest and most devastating of which ended on 8 May 1945.

When laying the transparency I showed earlier on top of this transparency it becomes evident that the prosperity axis of the 9th century noticeably overlaps with the zones which are expected to experience an intensive growth in the 20th century.

So, when we are talking about cross-border cooperation along this axis which we refer to with this unwieldy name "Greater Region of SaarLorLux-Rhineland-Palatinate and Wallonia", there are not only economic but also historical reasons which come into play.

What is being tried here and elsewhere in terms of cross-border cooperation, for example between Baden-Wurtemberg and Alsace or in the Aachen, Maastricht and Liège region, is nothing else but an attempt to correct a fundamental error committed in the past with disastrous consequences and to achieve integration in a peaceful Europe.

The Association established by IRI on 7 December 1998 in Trier is meant to be a cross-border cultural network comprising four nations. Its work will be primarily based on the Internet.

Museum networks which have already been in existence in the Greater Region will now cooperate across the borders. Small and medium-sized cultural institutions which have not yet been (sufficiently) networked in the region and beyond will be registered. The Association of Museums will then invite them to become part of a cross-border network.

By 14 June 1999, 151 out of 900 museums had joined the Association of "Museums located in the Greater Region of SaarLorLux-Rhineland-Palatinate and Wallonia".

A model project of cross-border cultural cooperation is being developed. The term "museum" will obviously not be defined in its narrow meaning to enable other cultural institutions such as memorial places and cultural foundations to participate.

The Association of Museums promotes the interests of museums in the Greater Region by

- establishing regional and supra-regional contacts between museums with similar or different orientations, in particular between small and medium-sized museums and cultural institutions,
- developing a cooperation forum by organising conferences, expert committees, fairs, touring exhibitions, etc.
- eliminating linguistic barriers and comprehension problems in the Greater Region by providing written and spoken information in several languages (publications, assistance in providing guided tours for visitors in several languages, press conferences, information, Internet)
- addressing specific groups of persons, such as senior citizens, pupils and young adults (activities and media used will be geared to different target groups)
- increasing the number of visitors in the different museums by improving public-relations work, increasing the number of tourists in the Greater Region (culture trails),
- mobilising hotels and restaurants which are located near museums and mobilising other members of the Association.

Culture and Museums create and safeguard jobs

- The Association wants to contribute to a better development of the tourist potential in the Greater Region, thus helping to create and preserve jobs. The aim is to interest an increasing number of people in visiting museums. This applies to all museums irrespective of their size, orientation, and geographic location in the Greater Region.
- Visitors to museums will be informed about similar or other exhibitions in other museums in the region with special emphasis being placed on the members of the Association.
- The Association aims to increase the tourists' length of stay in the Greater Region from 1 ½ or 1 ¾ days at present to 2-3 days. Its public-relations work will therefore also include service sectors which are important to tourists, such as hotels and restaurants located near museums.

The network will be based on the information and data system of the Association which will provide information about affiliated museums over the Internet.

At a price of 50 Euro the data of the museums can be entered on the IRI website.

IRI will be in charge of the management and administration of the Association and, in doing so, will ensure the permanent operation of the Association. The advisory board will decide about the programme and work of the administrative office.

Other museums are invited to join the Association.

Programme of the Association

The Association of "Museums of the Greater Region of SaarLorLux-Rhineland-Palatinate and Wallonia" elected from among its members an advisory board which is to develop the aims and the future programme in cooperation with IRI, which is in charge of the management and administration.

The rules of procedure lay down the aims, the working methods, the modalities of membership, the general assembly, and the work of the advisory board, the functions of the office, which is in charge of management and administration, and finances.

- Based on the specification sheets which the Association will receive from the museums, a data pool containing the most important information about the relevant museums, such as key data (name, address, telephone and fax number, E-mail, and Internet address, logo), programmes and services will be developed.
- The advisory board and IRI will establish contacts with the different ministries, the regional administrations and the EU Commission with the aim of lobbying for a broader political support at the regional, national and European level.

The First Conference of the Museums was held in Luxembourg on 8 October 1999.

The Association plans to organise a presentation in Nancy in April 2000 (and a "museum fair" in Ottweiler, Saarland in 2001).

IRI, in association with the advisory board, will set up and facilitate various workshops consisting of representatives of different museums with the aim of preparing the different activities planned (topics, basis of discussions, speakers, etc.)

These activities will be made public in a journal to be published regularly. In addition, there will be press conferences and press releases. To achieve the widest circulation possible, the different publications will be issued in the different languages of the Greater Region.

Members of the Association's Advisory Board:

Bernd Blumenthal, Volkskunde- und Freilichtmuseum Roscheider Hof, Konz (Germany)

Mireille-Bénédicte Bouvet, Service régional de l'inventaire de Lorraine, Nancy (France)

Constantin Chariot, Musées Gaumais, Virton (Belgium)

Magdeleine Clermont-Joly, Musée de l'histoire du fer, Jarville-La-Malgrange (France)

Hans-Peter Kuhnen, Dr., Rheinisches Landesmuseum, Trier (Germany)

Rainer Raber, Saarländischer Museumsverband, Ottweiler (Germany)

Helge Rieder, Prof., Fachhochschule Trier, Trier (Germany)

Werner Steinmetz, Saarländisches Uhrenmuseum, Püttlingen/Köllerbach (Germany)

Danièle Wagener, Musée d'histoire de la Ville de Luxembourg, Luxembourg (Luxembourg)

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Abstract

The aim of the computer program so called ArtShow, is to develop an easily distributed programming tool providing storage, communication and presentation services required by art community.

ArtShow has a lot of sophisticated features for making interactive presentations to audience such as search and retrieve via keywords, zooming of paintings, an outliner to help in organizing the presentation and the data entry of a usual database. For presenting the program, we prepared an example image database based on the art collection of the National Bank of Greece.

1. Introduction-description of the package

Although enthusiastically welcomed by the film and broadcasting industries, computers have not been readily accepted by most of the art community. Although having enormous potential as visualizing tools, part of the art community is somewhat perplexing. It is certainly true that the liaison between art and technology has not been an easy one. Furthermore, due to strict business programs only a few art historians and art educators can follow and update their knowledge regarding available programs and techniques.

Today, the wide availability and portability of personal computers and very sophisticated programs invite art historians to work directly on their own computers, so that intermediaries are no longer required. Furthermore, there is still a need for art historians and teachers to work beside programmers, in order to improve the familiarity and the simplicity of the user interface of art software.

The reasons for this are:

- New and unfamiliar users often feel uncomfortable and daunted by new technologies.
- Up until now, art historians and computers have made up a rather unfamiliar field.
- Most visitors of museums do not read the instructions and information cards for handling the computer systems.

ArtShow, is a digital art-image database for archiving, presentation and retrieval of art-works. The platform of the system is Microsoft Access¹, a commercially available general purpose, object oriented relational database working under the operating system Windows². The user interface, which drives the two-way communication with the database, has been developed by Macromedia Authorware Pro³ (ver. 5) which is a platform for multimedia applications developing. In cases

¹ Microsoft Access is a trademark of Microsoft Corporation.

² Windows and Windows Multimedia extensions are trademarks of Microsoft Corporation.

³ Authorware Pro is a registered trademark of Macromedia Inc.

where the tools provided by Authorware were not adequate for the specific application, we added function libraries (DLLs) written by Borland Delphi 4.0⁴. Some special features of the system are:

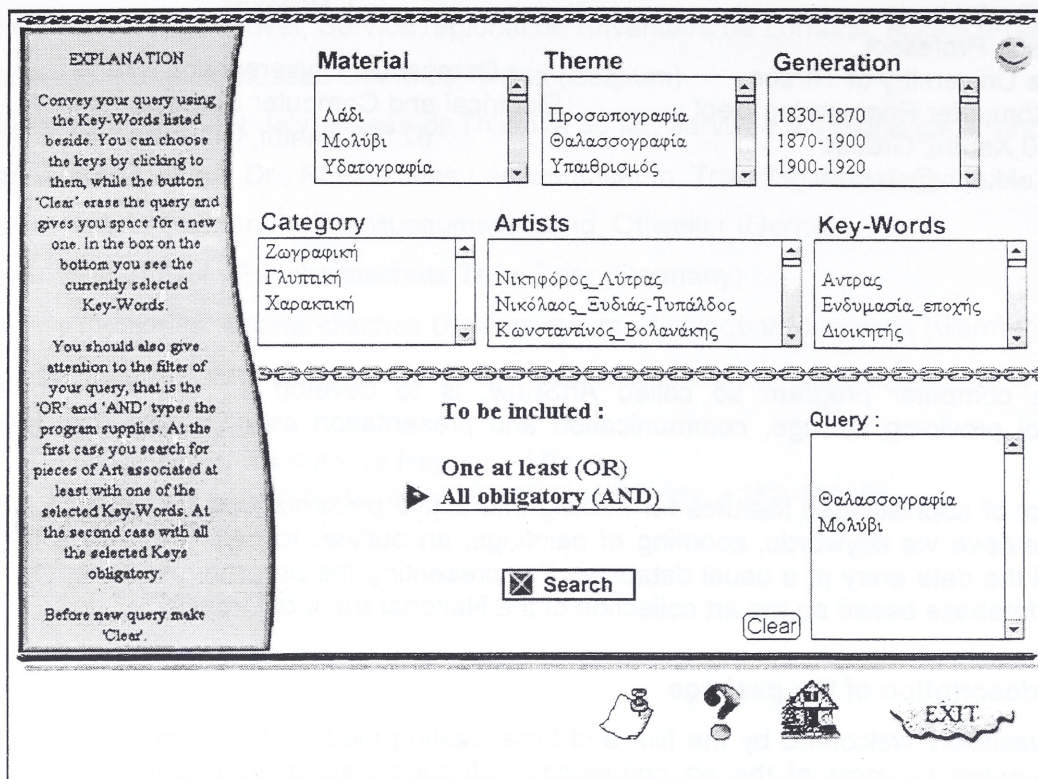


Figure1: The main window (queries)

1. Handling of multimedia information in a uniform way.
2. Data security
3. Multiple image display.
4. Automatic database installation.
5. Selection of the user language (Greek and English).

The idea about the program was to create an easy search interface on a database, containing art information, which visitors or art historians could handle easily. The Access database is very common in computer systems working under Windows and is used in many museums for various projects. The indexing of the images became by keywords but we continue experimenting using different methods as content based retrieval. Using just the Access the available data (images, text, keywords) can be stored in shells and forms of the database but the problem is that all these can be reached only by programmers. Authorware is a platform for hypermedia applications and can be connected with Access. A user interface is designed with it so that users of the database can find all the information about the available data using just buttons and scroll-bar menu(fig. 1). Since Authorware is not designed for the particular needs of art community some additional essential features have been added using the Delphi language, such as zooming and SQL type screens to help them in detailed examination and advance searching the database. The degree of zooming is depend on the resolution of scanning the images. The SQL type query is depends on the particular collection.

⁴ Borland Delphi is a trademark of Inprise Inc.

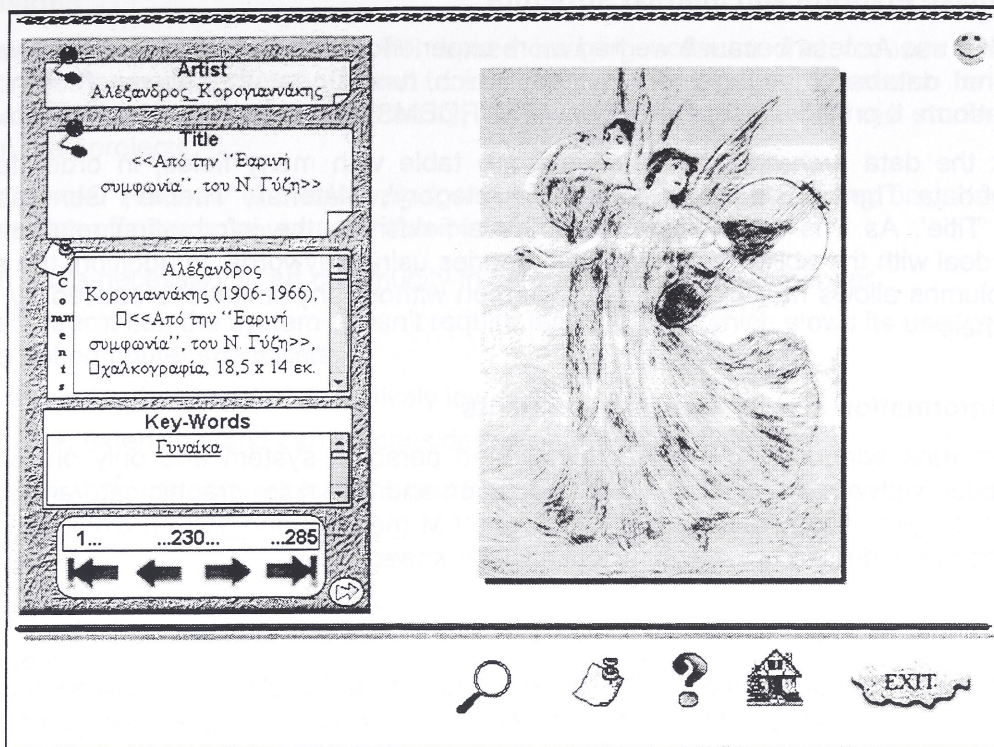


Figure 2. A capture of the displaying window

All these features are common in similar museum application. A common disadvantage of them is that if someone wants to set up a particular presentation the series of appearance of the data can't be changed since it depends on the indexing of the database. To solve this problem, additional features have been added to ArtShow so that it can be used in similar way as the very known program PowerPoint. The difference with it is that instead of introducing the data of the particular presentation one each time, users of ArtShow can use the search interface of the program to locate part of the collection of the museum and after that can manipulate the series of appearance in the same way PowerPoint does (i.e. dragging slide icons from Slide View). The final presentation in this way is interactive since all special features of the ArtShow can be used.

It is of particular importance that ArtShow can be considered as an 'open' system, in the sense that it can be used as a software tool for archiving medium image-databases. It allows the user to easily add new material and to manipulate the old one as well. It can also delete its contents and be host to a completely new job. From the user point of view, this operation has nothing to do with programming language. In addition, a system of labels, hints, messages, text entries and buttons offer him an easy and secure way of managing data and utilizing his thoughts.

Information in ArtShow is organized as a knowledge base according to a specifically developed quite simple user interface. ArtShow's windows (like figure 1 and 2), includes buttons and scrolling menus for the management of the input data, as well as user programmable buttons for the presentation of related information.

ArtShow can be used by the visitors of a museum to find information on the collection (or part of it) if the program is housed in a position somewhere in it. The art historians of a museum can use the program

- to examine in-depth information of the any object (or group of them) using the search tools
- to make presentations on part of the collection in similar way as the PowerPoint program
- to prepare multimedia titles like the Authorware program.

2. The Database Platform and internal Structure

We decided to use Access because we had more experience with it. Access is such a widely used truly relational database management system which runs under the Microsoft Windows user interface platform. It provides users with a powerful RDBMS able to handle relational tables.

As we look the data archiving, there is only one table with many fields, in order to help the managing of data. The fields are: 'Code', 'Text', 'Category', 'Material', 'Theme', 'Generation', 'Key', 'Artist' and 'Title'. As it is easily understood these fields are the information related with each picture and deal with the ability of making SQL queries using keywords. In addition, the simple text format of columns allows multiple language insertion without any limitations caused by the Greek or English shell.

3. General Information and System Requirements

The program runs adequately on a Pentium based personal system and only on Windows 95 platform or later, with at least an 800 x 600 resolution and true color graphic card and monitor. As a multimedia project, it requires at least 32MB of RAM memory and 166Mh clocking in order for database's cache buffers to provide sufficient transfer speed.

4. Features

The program user interface is very intuitive, with most operations being available through push buttons and menu commands. The piece's image can be seen in a variety window size ranging from 100% to the biggest size you find suitable (in such a case, vertical and horizontal rolling bars are activated) and automatically adaptive resolution. On the other hand, you can reduce the window size from 100% to a canvas size of few pixels.

The system provides various operating modes. It can be used for administrative purposes or presentation (in part or as a whole) of the collection of a museum or by individual collectors. It can also be used for publishing titles for CD-ROM's.

From a general scope, this program has many similarities with other databases and presentation developing programs, as Microsoft Access and Power Point. Thus is why a comparison between them can be useful. Generally speaking the program is suitable for image archiving and creating simple multimedia titles. The main advantage of it is that it allows development of interactive presentation based on image databases providing data searching, zooming. It requires short learning time and low disk space.

On the other hand the program is not allowing variations in the presentation because of the standard layout appearance and it can't offer the flexibility of a usual database except through the programming mode.

By understanding the advantages and disadvantages of the program (table 1), the user can find the cases where he can use it instead of the above mentioned programs.

5. Future Developments

Future work will concern, among others, the following topics :

- The capability of the input and output of images from devices commercially available (CCD cameras, scanners).
- The capability of network publishing.
- The use of video and sound along with images and text.
- The design of an "Insert" command so that outlines from other application program such as Microsoft Word or PaintBrush can be inserted during the preparation of presentation.

6. Conclusions

The present system offers a simple PC based imaging software that focuses on museums, galleries and other organizations of small to medium size. This software can also be used as an educational and teaching tool in Art History, or as a distributed tool to help students and art-workers on their projects.

Seen as a whole, ArtShow is a relatively low cost simple prototype running on today's average personal system offering however a number of capabilities including :

- Perform tasks necessary to art community in an effective and rapid manner.
- It is easily learnt i.e., the system doesn't require learning time which slows its use by people who are not computer specialists.
- Can be easily implemented at a relatively low cost.
- It is portable, extensible and can be considered as an "open" system.

Furthermore, it supports communications and file interchanges and tools for use in education.

	ArtShow	Access	PowerPoint	Authorware
Retrieval speed	***	****	**	***
Zoom	****	-	-	*
Easy to learn	***	**	****	*
Easy to set up (or change) a presentation	****	**	***	*
Multimedia capabilities	*	***	**	****
Data security	***	****	-	-
Database flexibility	***	****	-	*
Preparation of multimedia titles	**	*	-	****
Presentation flexibility	***	*	**	*

Table 1: The advantages and the disadvantages of the ArtShow in comparison with related programs.

References

1. Microsoft Access 97, "Step by step", Catapult, Inc., 1997.
2. "Mastering Delphi 4" SYBEX Inc., 1998.
3. Microsoft PowerPoint Handbook, Macromedia Inc., 1995.

PROFILE

Dr. Gerassimos Kekkeris received the B.Sc. degree in Physics from the Aristotelian University of Thessaloniki and a Ph.D. degree in Control Engineering from D.U.TH. in 1977 and 1990 respectively. He is currently Asst. Professor at the Image Analysis and Multimedia Group. His research interests include Control Engineering, Signal Processing and Multimedia.

Ioannis Paliokas received the B.Sc degree in Electrical Engineering and Computer Science from D.U.TH in 1999. His interests include Multimedia, Databases and Computer Programming.

We feel the need to give special thanks to Vasiliki Damianidou of Aristotelian University of Thessaloniki, Faculty of Arts-School of Fine and Applied Arts for her suggestions.

„SUN, SEA AND SILICON CHIPS“
PROMOTING DIGITAL CULTURE IN THE SOUTH WEST OF ENGLAND

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Porthcurno, Western Cornwall.

A remote coastal village in the 1870s, surrounded by spectacular cliffs. Operators wait in their stations to receive and send messages by cable around the world. Transatlantic communication made possible by advances in telegraphic networks, each message dutifully translated to and from morse code, read by a galvanometer. The Victorian Internet.

Fast forward to the summer of 1997, when the American artist Paul Ramirez Jonas is invited to create a new artwork at Porthcurno as part of the major visual arts event *A Quality of Light*. He creates an installation that links historical devices with contemporary technology. A *camera obscura* captures an inverted image of the landscape and projects it on to a screen. A digital camera captures the same aspect and translates the image data into morse code. The code is 'relayed' over the Internet, where viewers around the world are able to see both the code and the image it represents. At Porthcurno, the code can also be read by an early galvanometer. The artist calls the work *PK*, the letters of the international telegraph code for Porthcurno.

This story reveals some of the many contradictions of my region, the South West of England. At first glance life here may appear remote and backward, lacking the sophistication and complexity of metropolitan life. For the many tourists who come here each year, it's a place of sun, sea and rural tranquillity. Yet look closer and you'll see that the region has always looked outwards not inwards, and provided a link between Old and New Worlds. In addition to its rich maritime heritage, technology has enabled the South West to build relationships with far-flung places around the globe. So perhaps it's not surprising that we now see the beginnings of a digital culture developing in the South West.

In my seven years as Director of Media and Published Arts at South West Arts, I've witnessed the birth and rapid growth of this digital culture. At times I've played a proactive role in facilitating developments in this area. During this time, I've worked closely with my colleague Simon Poulter, who as well as being a prominent artist in the UK and internationally, is also an experienced trainer and advocate for digital development. But I'm not here to tell you what my organisation has achieved. I'm here to describe a number of parallel developments in the region that are gradually converging to form a single vision. These developments bring together cultural, educational and economic concerns.

Before I discuss them, let me give you a brief geography lesson. The South West region covers 7,800 square miles – over 15% of the land area of England, with 635 miles of coastline. It's an area almost as large as Wales. There are important cities such as Bristol, Plymouth, Bath and Exeter, although many people live in smaller market towns or villages. The population overall is around 4 million people. 47% live in rural areas as compared to the national average of 18%. Population density ranges from 4000 people per square km in Bristol, to less than 50 per square km in rural Devon and Somerset. The South West is one of the fastest growing regions in the United Kingdom,

with population projected to grow 11% between now and 2016. However, it's also an ageing region with 49% of the region's population expected to be 45 or over in 2016.

The South West is an area of economic disparity. The north of the region has a large number of high tech and service industry companies, reflecting the importance of the defence, communications and media industries to the prosperity of the region. Bristol has the highest concentration of UK film and media interests outside London. This 'celluloid city', having established its international reputation in that field, is fast becoming a silicon city. Cornwall, by way of contrast, has few large companies and its traditional industries of mining, fishing and agriculture have been in decline for most of this century. Unemployment has reached as high as 12% in many towns and Cornwall's Gross Domestic Product is only 71% of the EU average. It has just been granted Objective 1 Status by the European Union.

First signs

„the information revolution is here. It's the Big Bang of our time –we might even call it the Bit Bang“
Steven Levy, 1995

When looking at the growth of digital culture in the South West over the last decade, it is difficult to pin-point where the initial impetus came from. The earliest developments were certainly sector-specific. By the beginning of the 1990s, Bristol was emerging as a high tech city with a specialism digital media and broadcasting. The BBC's national centres of excellence for Natural History and Television Features, based in Bristol, had developed a reputation for technical and creative innovation that is still the envy of the world. A cluster of specialist producers and technical support companies developed around the BBC's production base, providing a critical mass of creative talent and expertise. Companies such as Division, which specialised previously in virtual reality applications for the defence industry, now turned their hand to the entertainment and public broadcast sector.

The University of the West of England was one of the first higher education establishments in the region to seize the opportunities afforded by the new digital future. A partnership with Hewlett-Packard enabled a research faculty to be set up with artists investigating the creative applications of new software products. A project called *MEDIAworks* was also established by the University's Faculty of Art, Media and Design. The focus of this project is on media training and specialist consultancy for companies wanting to use the Internet for business. State-of-the-art animation and multimedia workstations, television and sound facilities make *MEDIAworks* the largest media training organisation in the South West region.

The ICT explosion

„the information superhighway is now so vast that it has its own horizon“
Bill Viola, artist, EVA California, Los Angeles 1998

The South West, like other regions, has been swept up in the race to become a lead player in the information revolution created by the increased accessibility of personal computers and global communication systems. The slogan 'information is power' is the rallying cry of those who want to 'wire up' all schools and businesses to improve the region's competitiveness in world markets by dint of raising the level of computer literacy among the domestic labour force.

In the South West, this led initially to a wave of capital investment, much of it matching European funding. It resulted in over forty small, locally based ICT centres across the region. Various described as ICT resource banks, business and technology units and telematics delivery centres, these centres tend to offer community and business access to computer hardware and technical assistance with web-site development, on-line marketing and other aspects of corporate communications.

It is fair to comment that the availability of these resource centres in the South West is helping to change people's ideas about the workplace, and the skills required there. But has it fundamentally

changed transformed the way we work? I would say not. The paperless office remains a future prospect, and only a few regional companies have restructured their business activities to operate effectively in a global marketplace.

Defending the Imagination

„The apparatus, the hardware, is of no importance in this story; the machines will certainly not survive. At least the images will survive in many minds, and will be passed down “

Rudy Luijters

In my opinion, the first wave of ICT development in the South West was too hardware-driven. It failed to recognise that development is as much about creating a vibrant and diverse digital culture as it is about giving people the pre-requisite tools and technical training.

It was this concern that led me to form a regional Artists and Technology group in 1995. This included fifteen artists, film-makers, designers, musicians and performers who shared an interest in the creative application of new technology. As a group, we sought to redress what we perceived to be a huge imbalance in the region between finance and resources committed for ICT and hardware development, and the resources needed for a broader electronic education and more creative use of technology in the cultural sector.

In my experience, artists are among society's most skilled and intuitive problem-solvers. The regional Artists and Technology group proved no exception to this rule. Within 18 months, under the project name *Imag@nation*, the group had organised a series of events and projects that radically altered the profile of digital media, and perceptions about the relationship between arts and technology, within the region's cultural sector. This included two Showcase events in Bristol, offering audiences an opportunity to view the latest web art and multimedia work. A Digital Roadshow, sponsored by AppleMac Western, introduced people in six isolated rural communities to digital creativity using Director, Photoshop and Avid software. An eight day *Imag@nation* residential event at Dartington College, Devon, in November 1997, allowed 15 artists from various disciplines to explore the creative use of technology without the pressure of producing a finished piece of work.

Reaping the Rewards of Success

Imag@nation secured a £375,000 government award in late 1997, enabling a new company called DA2 – the Digital Arts Development Agency – to be set up. DA2 has a regional remit to commission and present new artworks involving digital technology, and to develop wider audience engagement with new technology-based arts practice.

On a sub-regional level, other independent projects have since been established to develop the creative use of technology and carry forward the objectives identified by the *Imag@nation* project. I would particularly like to highlight *PVA/New Networks* in Dorset, an artist-led, not for profit organisation. *PVA/New Networks* delivers a comprehensive range of creative workshops from web and multimedia design to digital video and music production. *PVA/New Networks* is also concerned with aesthetic and social issues, and runs critical seminars tackling such subjects as digital curation and the political context of artists' work on the Net. The organisation also held a highly successful artists' residential event in the summer of 1999 called *LabCulture*, with an open-ended agenda and emphasis on creative collaboration and interdisciplinary work.

Where to Now?

Some people have compared the application of ICT in society to the introduction of electricity to industry, pointing out that electricity was not used effectively until 20 years after the first power station came on stream.

I feel we must establish a digital culture in our region much quicker than that, as the pace of technological advancement is so fast that it's outstripping our ability to devise new applications and

to create worthwhile content for this protean environment. The Internet is being viewed as the 'cutting edge' of cyberculture. With the progressive convergence of television, radio, information and entertainment services through the Internet, Nicholas Negroponte's vision of a 'single media machine, with no geopolitical boundaries' no longer seems such a distant dream. On-demand media will increasingly replace real-time broadcasting. In the case of the cultural sector, production processes and distribution strategies will need to be carefully formulated to meet audience needs.

What is encouraging is that the agenda in the South West is finally moving away from its earlier preoccupation with hardware and purely technical training. The South West Regional Development Agency identified in its 1999 prospectus that 'innovation, creativity and technology lie at the heart of the region's future'. Several public sector organisations are responding to this challenge. The University of Plymouth and Falmouth College of Arts both plan to establish major new centres for digital arts and technology. These will focus on CD and DVD-Rom authoring, interactive media publishing, audio-visual design and content creation for the Net. They will also act as 'hot-houses' for the development of creative businesses.

New regional networks such as *The Learning Connection* and *Peninsula Interactive Media* emphasise life-long learning for individuals and businesses in the area of information and communications technology. Their web-sites and bulletin boards give people direct access to specialist learning providers and on-line learning materials, expert information and advice, useful web addresses and other relevant contacts.

Towards a Single Vision

„The role of art has always been to demonstrate and celebrate interconnectedness“

Gary Snyder

Much of this digital development has been fragmented and sporadic, lacking effective co-ordination. How the region's economic, cultural and educational agendas will come together remains unresolved. With the digital arm of the 'creative industries' embracing such diverse interests as software design, computer games and entertainment arts, broadcast media and publishing, it's perhaps unsurprising that no one body is seen as having a comprehensive overview of digital developments in the South West.

This means that networks and federal structures have an essential role both in maintaining dialogue across sectoral boundaries and supporting the exchange of good practice. Artists and designers need to talk to programmers and engineers, those in the education and training fields need to work together to foster a life-long learning culture around these emergent technologies. As somebody working in the arts, I see my role as promoting the concept of interconnectedness rather than divergence. We must try and weave the many discrete strands of activity into a coherent whole.

And just as the Victorian telegraph operators in Porthcurno kept alive the region's links with the rest of the world, we must see the promotion of digital culture in the South West as an international concern. For that reason, I am keen to develop links between the South West and other regions worldwide that are undergoing a similar transition. The notion of interconnectedness within the arts and media, and interdisciplinary practice, will be explored in a major international conference that South West Arts is promoting in Autumn 2000, as a contribution to the national Year of the Artist.

We have much to learn from each other, through the sharing of respective experiences in this complex and fast-moving arena. By working together, we – artists, cultural planners, educationalists and citizens - can shape the digital future for the good of society as a whole, and ensure that cultural concerns direct rather than serve commercial agendas. As the futurologist Robert Anton Wilson has remarked, „ *The future exists first in **Imagination**, then in **Will**, then in **Reality***“. And for the immediate future, at least, the only limits appear to be the extent of our imagination and the strength of our will to make things happen.

October 1999

David Drake is a writer on a range of arts and cultural issues. He is also Director of Media and Published Arts for South West Arts, the regional arts board for the south west region of England.

Since graduating twenty years ago from the School of African and Asian Studies, University of Sussex, he has worked extensively in the arts and media sector. As well as direct experience of video production and editing, he was Director of Pimlico Arts and Media from 1983-1992. This was a major centre for video and television, photography and graphic design, supported by the European Social Fund and central and local government funding. He joined South West Arts in 1992. Recently, he has turned his attention to studying the impact of digital technologies on arts and media practice. Having successfully co-ordinated an artists and technology network, he led the development of a project called Imag@nation focusing on artists' use of the Internet, multimedia and interactive technology.

In 1998, he was awarded a Winston Churchill Travelling Fellowship to research artists' use of technology in Canada and the United States.

HERITAGE ON THE WEB:
BUILDING A GATEWAY TO EUROPEAN CULTURAL HERITAGE

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Over two hundred years ago the Scottish lawyer and famous biographer of the English writer Dr Samuel Johnson set out by coach to visit Germany. In his journal for Monday 23 July 1764 he wrote:

'I have been at Berlin some weeks. It is the finest city I have ever seen. It is situated on a beautiful plain, and like London has its river. The streets are spacious and the houses well built. I have been presented to the Queen and all the princes and princesses, but have not yet had an opportunity of being presented to the King ... I am determined to see him before I leave'

In fact despite trying very hard to arrange a presentation to Frederick the Great, Boswell never managed to meet the King.

In his journal for Thursday 11 October 1764 he records that he is in Dresden:

'I went and saw the Elector's Library. It is put up in four different rooms, part of a superb building called the Zwinger. It is numerous, and has a good many manuscripts. But what can a man see of a library from being one day in it? ... I must remark that at Dresden strangers pay monstrously dear for seeing the fine things, which is shameful when they are the property of a prince.' (1)

I am quoting from Boswell's journal partly because he is a hero of mine and partly because it points to some of the problems which travellers have had to face over the years in gaining first-hand experience of European culture. James Boswell travelled hundreds of miles over bad roads across Europe on what was then called The Grand Tour. Luckily for him, his family was wealthy enough to allow him a great deal of time and money to carry this out. Even then, as you have heard, he complains about the high charges he has had to pay in order to visit the Elector's Library at Dresden. And he hasn't the time to see anything more than a fraction of the riches which the library contains.

For those of us without large amounts of time and money to travel and to study the World Wide Web offers the possibility of overcoming some of the problems which Boswell faced.

We don't have to spend weeks on dusty roads travelling across Europe – we can simply click onto the Web.

However, the task which faces cultural historians and web designers is a large one and it's not easy. We are at the very beginning of a process which we need to get right if we are going to achieve our goal of providing access to Europe's cultural heritage to a wide public. What should our ideal be?

We need information on-line which is:

- trustworthy
- well-written
- available in several languages
- regularly checked and updated where necessary
- presented in a lively and attractive manner
- giving information for the non-specialist with tourist and travel details
- giving information for the specialist, with additional depth and details as required
- cross-linked with search facilities across many European sites
- free of charges
- free of advertising (though not necessarily sponsorship)
- accessible through a gateway which groups information and sites together

At Heritage on the Web we have made a start in trying to solve these problems and to provide examples for others to follow. We have built a web gateway which provides access to historic houses in the United Kingdom. With the support of the British Government and of the private owners of great houses we are building web sites and on-line cultural resources which provide both tourist information and scholarly details.

Our modern Boswell, travelling at the millennium, will not only be able to fly to his destination, he will be able to follow links to book his hotel on-line, send an e-mail to Dr Johnson and check the public appointments of Frederick the Great. Well not quite. But we can use the new communications and information technology to provide a quality and extent of access to European culture which has never before been possible.

Footnotes

- 1 Quoted from *Boswell on the Grand Tour; Germany and Switzerland, 1764*, edited by Frederick A. Pottle, William Heinemann, London, 1953.

INFORMATION SYSTEM IN THE NATIONAL MUSEUM OF ART OF ROMANIA -
ACHIEVEMENTS AND PROJECTS

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Since April 1997 the National Museum of Art of Romania became the first museum in Romania presenting a home page on the Internet on his own computer server with a whole class of Internet users.

The difficult economical period wich Romania as an eastern country is going through makes it almost impossible for the cultural institutions to maintain an adequate level of high technology. Under the circumstances our solution was to create a general program in order to ensure a possibility to upgrade the configuration, from the level of the LAN up to the external communications and Internet connection. Together with our colleagues from IT institutes in Bucharest, we started different programs designed to be followed step by step.

The general aspect for our information system has 3 main categories:

- A – internal administration for the museum's collections, including archives, research, conservation and restoration, environments parameters' control, multimedia kiosk
- B – internal administration for human and financial resources, protection and security in redundant structure
- C – administration of communications and the exchange of information with others, including protocols, techniques, copyrights and benefits

Steps and results

- LAN divided in four subnetworks following the topology of the building and also for the other branches of the museum (at this moment 35 workstations and a dedicated data line for one branch at Zambaccian Museum);
- installation of Linux operation system on the web, ftp and mail server - cooperation with the Institute for Research in Informatics
- dial-up clients for e-mail accounts on the museum's server
- a team from museum's employees trained to develop technical support for usual technical assistance hard and soft
- implementing first necessary knowledge in data base configuration at the level of curators and restorers
- Configuration for a model of RDBS for museums under Oracle 2000 – cooperation with Institute for Research in Informatics. The general structure of the data base system consists in:
 1. a class of entities concerning process-states, operations, actors, files and associated multimedia objects
 2. classified lists concerning on one hand term lists in a kind of dictionary and on the other hand categories lists for art object's category, materials, school, period, storage methods, department specificity, techniques a.s.o.
- developing the museum home page initially started in cooperation with the Institute for Computers – our web site is <http://art.museum.ro>
- high quality printing line consisting in: digital professional camera with SCSI interface, graphic workstation, slides scanner, print server and network color printer

Problems

- because of the little money involved in the cultural activities is very hard to maintain a high standard concerning hard (our dedicated lines' speed at 512 baudes) and soft configuration (that's why our option for free Lynux system)
- very weak financial possibilities to advertise about what the museum can do, show and teach for the public (the main achievement is our web page)
- difficult connection with similar institution in Western Europe concerning the possibilities to cooperate in European programs, which is a general problem for East European countries.

Projects

- in cooperation with the specialists from IT institutes we will develop next steps concerning:
 - multimedia kiosk for the European collection of the museum which is going to reopen after 10 years (the museum was seriously damaged in the events of 1989)
 - CD ROMs by themes and/or artists
 - improving the image presentation on the museum home page, in order to obtain a good rate quality, communication speed, price
- Local video and multimedia interactive presentation for children, students and general public.
- Drawing classes and art thematic games on computers for children.
- Starting a project of cultural tourism in cooperation with 3 other museums in Romania concerning a virtual tour on our home pages

We must underline that in the course of time Romanian IT specialists have presented at EVA meetings the idea of cooperation in the field of multimedia access to the European heritage between West and East European countries.

Our museum was a signatory member of MoU and after this of MEDICI program and unfortunately for us it was a transfer from Working Groups in MoU to Action Lines and Special Interest Group in Medici. We hope that now, due to the general policy of the Medici's board that Internet can be a solution for everybody to cooperate and to be informed about state of the art in this field.

We intend to focus on the idea that East European countries have a very rich cultural message, their heritage being part of the European heritage and also a bridge for the European integration.

In a few words we see a possible European cooperation for multimedia access to the heritage as follows:

- Defining at the level of the EU (through EVA, Medici, public institutions and/or private companies) a portfolio of projects on different themes without restrictions for participants.
- For each project there will be nominated museums and IT companies teams from each country
- Using the previous experience from MoU – the former group Priorities in Culture Economy in order to develop the idea to “foster the International Virtual Bridges Initiative based on public – private partnerships between national/regional governments and industry”

Proposals

- An important support for cooperation must be the free access to information in the field of multimedia access to heritage especially for museums, which will give the real quality of each project in this field by involving curators and artists.
- At the level of European organizations it will be useful to have links to all the sites of the museums participating to the European projects with specialists and/or ideas
- Defining an European touristic tour presenting the cultural sites of each country or following a certain theme in two versions:
 - 1 a virtual tour presented on the web site of each country from the defined touristic path
 - 2 the second step by creating a CD-ROM with detailed presentation on the same theme

The main advantage will be that people surfing the net will know more about museums.

Concerning the eventuality of CD ROM production our proposal for the revenue is that it be shared between museums and the IT companies involved, with a 70% quota for the museums.

SOME EXPERIENCES WITH MEDIA CONCEPTS IN MUSEUMS

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1. Introduction

The use of computers for the museum management¹ and for archives² is effective and undisputed. So are the CD-ROM's which complement the traditional catalogues³ and the web sites allowing the internet user to inform himself about the collection and the conditions of use⁴. Computer kiosks for individual information retrieval influence already the museum space, requiring a special room, ordinarily outside the collection. Totally new forms are museums with virtual, computer generated objects⁵ and purely virtual museums, existing only in the web⁶.

With these last forms the real, the physical object, the trusted witness of the past, disappears, making the museum one more place in the more or less arbitrary world of new media. Some museum experts are therefor rightfully cautious in the integration of computer and new media in their collections, while other are making heavily use of them⁷.

A good compromise, which doesn't interfere with the traditional museum presentation, are surely portable CD-recorders explaining the objects, characterised by sticked on numbers, in use already in great museums, for instance in the Vatican in Rome and the Rijksmuseum in Amsterdam.

From an historical point of view, museums have been changing their form of presentation. The collections of gifts in the Greek temples showed only the names of the donor. The Roman collections of Greek works of art were not labelled at all, taking their familiarity for granted. The dukes in the renaissance and baroque explained their chambers of rarities and art collections personally to their high ranking visitors. The very short labels on the art works of the museums of the 19th century had the high educational standard of the upper class visitors as a prerequisite⁸.

The present paper deals with the problems of smaller, local museums which don't have so many and precious objects as to attract visitors unconditionally, especially from the younger generation.

Main problems in these museums seem to be: too few exhibits or not enough room to show them in the museum, a dry traditional presentation with showcases and explanatory inscriptions and a certain lack of historical or cultural background on the side of the visitors.

The question therefor is: how can new media and computer techniques be used to make museums more attractive on the one hand and not dominate the real exhibits on the other? How can those new techniques be implemented in such a way as to form an integral and natural part of the museum?

The ideas outlined below stem from work with museums in Thuringia, Germany, realised as students and research projects at the faculty of media of the Bauhaus University at Weimar.

2. Principles of the media concepts

In the development of the various concepts described in section 3 we have tried to follow some general principles.

a) Implementation strategy

Media concepts can only be implemented successfully if the impulse comes from within the museum and the museum people determines aims and contents.

The best way to assure this "content driven development" is for the media designers to closely cooperate from the very beginning with the responsible from the museum.

b) Goals for the visitors

Emotionality

The installation should not only convey information to the visitor but arouse his interest, make him feel the importance of the presented objects or story for his own life and give him an emotional impulse. Other museums projects have stressed this point also⁹.

Interactivity

If possible the visitor should be active in the museum, have the possibility of choosing among several variants, giving his museum visit an individual aspect. These choices could be, besides the choice of the language, the objects or themes for which he would like to have an explanation and the level of information, from short comment to full expert information

The installation should avoid the impression of a simple automaton. The system reactions should vary if the visitor repeats an action. The techniques to assure this are well known, they rank from random selection to techniques of artificial intelligence.

c) Design principles

Binding to the location

The installation should make maximal use of the specific architecture and structure of the museum in order to make it unique and typical. Physical movement, walking through various rooms, climbing staircases, touching something are important. A CD-ROM can be played everywhere, a good installation has a fixed place.

Dominance of the physical objects

The physical objects in the museums collection should dominate in the presentation, the museum should not degenerate into an auditorium for a slide show or a video presentation.

Hiding of the technique

Computer screens, keyboards or mouse pads have long since lost their attraction and should be hidden. For interactions more natural techniques like stepping mats, touch or infra red sensors should be used.

In the future the most flexible means seems to be the computer analysis of video recording of the visitors face, gestures, positions and movements¹⁰.

3. Concepts for museums in Thuringia

All concepts were realised by contract and in close co-operation with the museum, the results were presented as prototypes using the technique of the Bauhaus University.

3. 1. The house of the Romantic at Jena ("Romantikerhaus")

The museum uses the former residence of the philosopher J.G. Fichte with three floors.

It shows objects from the early romantic period in literature and the corresponding development of the natural sciences.

The media concept concentrates on three rooms, where the technique is integrated in a traditional setting.

a) Philosophers room

On a lectern in a miniature lecture room lies an open Book with the titles of short audio sequences on philosophical themes, mainly by Fichte. The visitor can choose a sequence by pressing a button at the side of the title and the sequence will be read.

The buttons are extensions of an Audio-CD player; by pressing one button the corresponding track is played.

b) Saloon conversations

In a saloon with historical furniture several objects are sensitive to approximation: portraits of poets and their wives, a book, a piano etc.

On entering the room the visitor hears a mixed up conversation at a relatively low acoustic level where the contents are barely discernible.

If the visitor approaches one object the part of the corresponding person becomes clearly audible, his or her opinion can be heard. After a defined period of time this persons sequence again becomes part of the background noise if it is not sustained by a new activation.

Each sensitive object has a infrared sensor an endless playing CD-recorder and a special wiring which on an impulse from the sensor amplifies the output of the recorder for a defined time.

c) Virtual theatre

A small real scene is equipped with a back projection screen (frosted glass) as background and two loudspeakers; behind the scene a variety of devices can be used: a computer, videobeamer, slide projector, overhead and video projectors. The stage can be used for several purposes.

Real theatre presentations can use the screen as a static or moving background. The computer can play animated sequences. For instance a sequence with background music was realised about romantic painting. Ordinary slide shows, lectures with overhead projections or the showing of video films are possible also. In a further step an interactive information system or even computer games with the participation of (young) visitors can be realised.

The concept was implemented in September 1999 and is now part of the museum presentation.

3.2. Town museum in Jena ("Goehre")

The museum presents objects from the history of the town, products of handicraft, objects of art and documents. The concept of the common museum presentation is not yet defined and the media part had to be designed as a separate installation.

In a mediaeval vault a "time machine" is installed which allows the visitor to travel through the centuries in the town. The machine reminds with its brass tubes a command post from 19th century science fiction vehicle and has the following devices.

The "time lever" allows the visitor to move backwards and forwards in time or come to an standstill in a chosen or period. On a screen on the wall an initial picture in 3D of the town in the corresponding time is displayed.

The two "movements levers" allow the visitor to move forward or stand still and rotate in the environment at a fixed velocity.

With this equipment the history and the architectural environment of the town can be explored.

Especially for children a game has been conceived to explore the middle ages as a virtual travelling journeyman who has to find the seven landmarks of Jena as a proof of his having been there.

In the town he encounters different people which can help him in the search. An encountered person in the town speaks, like in real life, if the visitor confronts him a certain time at speaking distance.

The concept will hopefully be implemented, beginning in 2000.

3.3. The Art Collections at Weimar

The collections in the castle are about to open two new departments: history of the castle and the chamber of rarities, for both media concepts have been developed .

a) Chamber of stories

In a separate part of the history exhibition, in an mediaeval vault, stands a back projection screen in a baroque framing. Columns are distributed in the room which have small objects on top, representing parts of the history of the castle, for instance a melted glass reminds of the great fire.

If the visitor touches one of the objects, it is illuminated by a spotlight and on the screen appears a person telling the story and showing corresponding pictures. To one objects several stories can exist which are told on sequential activation's.

The objects have electric touch sensors which give input to a computer activating the corresponding video sequence.

b) Sphere of imagination

An oval screen as part of the chamber of rarities shows a slowly moving introductory sequence when no action is performed by the visitor. The interactive device is a rotating globe with inlaid sensitive objects on its surface. The actual position of the globe is continually projected on the screen as part of the video.

In rotation the globe and touching an object a video sequence is activated which gives an explanation to a specific part of the collection (ivory carving, clocks, ...).

The loudspeaker is installed in the focus of a spherical vault above the globe so the sequences can only be heard under the vault, the rest of the room is almost quiet.

c) Orbis Pictus, the great book of the collection

As in the real chambers of rarities a great table with an armchair is provided for deeper studies. A computer projection from below on the table's surface simulates a great book in which the visitor can read sequentially or seek certain themes or objects in an index by touching the corresponding parts.

On the table are further duplicate objects from the collection in a shelf. By taking an object out of the shelf a robot servant in the style of the 17th century, standing at the table, explains it.

3.4. Theatre Museum at Meiningen

The museum has original stage settings from the 19th century for which a special building without natural light has been prepared which allows to show one complete stage setting with real stage lighting. This installation takes some time to be hanged, it will be changed about twice a year.

Two great screens about 6 x 4.5 sq. m at the sides of the room and one movable screen in front of the stage allow projections from three video beamers.

In projecting on the three screens the room is changed into a virtual space which can be used for different purposes.

In addition to the real stage setting other stage settings, drafts and photos of costumes, texts or scenes from different performances of the same piece can be projected.

A history of the theatre at Meiningen and its influence on the theatre art in the 19th century could be shown.

In workshops the stage designs of the participants, realised as computer simulations, could be projected in almost full size for evaluation.

At last the room can be used for social or artistic events as an attractive and unusual environment. The concept will be implemented in the year 2000.

3.5 Albert Schweitzer Museum Weimar

The work in progress for this museum shall create an interactive environment, reflecting the live, the works and ideas of Albert Schweitzer.

The museum has the problem that only very few original objects are available and that the house itself is relatively small and has no direct association with Schweitzer (he never visited Weimar).

In the rooms a decent acoustical atmosphere will be created, some objects will be sensitive. A great back projection screen integrated into one room will show sequences from his live and works or from the works of other Schweitzer organisations.

A special internet server will connect dozens of Schweitzer school's world wide and allow the exchange of articles, project descriptions, or at the highest level the real-time broadcasting of events.

The concept will be implemented, beginning in the year 2000.

3. Concluding remarks

For smaller museums the new digital media and computer techniques can significantly raise the attraction, especially for the younger generation, without destroying the character of the museum as a place of authentic objects.

The emotional impression of a museum can be significantly strengthened by the parallel use of several media, by providing a rich historical or environmental background and the possibility to interact with the exposition and to shape an individual museums visit, reflecting specific interests and inclinations.

New findings, related to the museums contents, can easily be integrated, provided the media presentation has a modular character. Dynamic processes, like town development, can be better presented, complex facts, like the dynastic structures of historical Germany, can be shown more clearly.

4. Literature

ICHIM 1991

Interactive and Hypermedia in Museums, First International Conference on Hypermedia & Interactivity in Museums Ed. by David Bearman. Pittsburgh 1991.

ICHIM 1993, Cambridge

ICHIM 1995, San Diego California

ICHIM 1997, Paris

ICHIM 1999, Washington, DC

(editor for all editions: D.Bearman, Archives and Museums informatics Pittsburgh)

Museums and the Web 1997, Los Angeles

Museums and the Web 1998, Toronto

Museums and the Web 1999, New Orleans

(editors for all editions: David Bearman and Jennifer Trant. Pittsburgh)

Electronic Imaging and the Visual Arts (EVA) 1998, Moscow

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²ICHIM 1993, 1995.

³E. g. Dominique Brisson, Natalie Coural; Le Louvre, CD-ROM, Paris 1995 and Reunion des musees nationaux; L'art du Moyen Age, Paris 1997.

⁴See also the last conferences „Museums and the Web“ 1998 and 1999 above all the chapter Best of the Web.

⁵E. g. The Computer Museum, Boston.

⁶The Virtual Museum of New France, Canada. Museu da Pessoa, Brazil.

⁷Kunst- und Ausstellungshalle der Bundesrepublik Deutschland, Bonn.

⁸Nikolaus Pevsner, A History of Building Types, Washington 1976, German edition Hamburg 1998, 111. A.S. Wittlin; The Museum, its history and its tasks in education, London 1974.

⁹In 1999 Turpin Rosenthal opened an exhibition in Weimar, that aims very much to the emotions of the visitors and so it connect education and entertainment in an own way.

¹⁰ICHIM 1995, 217-234.

VIRTUAL FASHION COLLECTIONS FOR THE NEW MILENEUM:
INTERDISCIPLINARY APPROACHES TO DEFINING DATA STRUCTURES.

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ABSTRACT

The work of fashion designers and fashion scholars in the digital age includes the production of visual images, the creation and management of databases and the ability to use advanced network and information technologies to improve access to digital images and information. The College of Design Arts and the College of Information Science and Technology are partners in creating a program designed to provide electronic access to a Historic Costume Collection and to train students to work in an interdisciplinary team to create virtual museum collections for the 21st century.

This paper reports on the first phase of this collaborative work to identify user-based heuristics for classifying objects in the historical fashion collection. Working in consultation with systems, museum, library science, and fashion professionals, and following the guidelines of the Museum Educational Site Licensing Project (MESL), data descriptions were developed to allow flexible searching of the collection across domains. The lack of standardized classification structures or universally accepted vocabulary for fashion collections has led to the adoption of a hybridized collection of terms from Fairchild's Dictionary of Fashion, VRA Core Categories, LC Descriptive Terms for Graphic Materials, The Encyclopedia of Textiles, Fabric Glossary by Mary Humphries, Vocabulary of Basic Terms for Cataloguing Costume, and the Longhouse Reserve Classification of Textiles.

The focus of this paper is a presentation of the data description template, and reporting of preliminary results from a study conducted to evaluate the template's use by indexers from two domains: fashion design, and library science.

INTRODUCTION

The Drexel Historic Costume Collection had its beginning in the 1890s when members of the Drexel family began assembling a collection of notable garments, accessories and textiles. The collection represents 200 years of historic costume and fabric design. Among the items are eight gowns by Charles Worth. One gown, complete with kneeling pillow, was created for Minnie Drexel Fell Cassatt's* presentation to the Austrian Court. The extensive lace collection has been featured in an outstanding resource book on this textile (Veksler, Bella, Lace: The Poetry of Fashion, 1998.) Shoes, millinery, parasols, gloves and other accessories in the collection present an opportunity to study an entire period ensemble. The collection is estimated to contain approximately 7000 items, although that number may prove to be much greater after a complete inventory of accessories and textiles is completed.

While some documentation of the collection exists on a few 3 x 5 cards, the bulk of the collection is undocumented. The basic need is to bring the Historic Costume Collection out of the closet so that it can be accessed by a variety of users. Creating a searchable database of digitized images and supporting documentation for each piece offers a means by which the collection may be accessed by students, scholars, designers and other interested individuals around the world.

From the earliest stages of the joint initiative to create a digital archive and website for Drexel's Historic Costume and Textiles Collection, it was apparent that there would be a need to define data structures in a manner that would support both data entry and data retrieval. Moreover, data definitions would have to support the diverse backgrounds and skills sets of designers, technologists, and scholars. Determining a shared vocabulary from this varied user group and developing a comprehensive, understandable hierarchy to categorize the items from the collection became our first priority.

REQUIREMENTS ANALYSIS

To begin to address this situation we undertook an analysis of potential users and resources. The purpose of the analysis was to provide a user-centered framework for designing the database and to identify low cost methods for delivering the database. A grant of \$4200 was secured from the College of Design Arts to create a working prototype for the web site. The prototype requirements are a web enabled archival form, design of the database, digital images of 15 items from the collection in 3d panorama and design of the interface. The analysis involved nine steps:

1. Define our mission and responsibilities.
2. Identify population to be served (users).
3. Identify users' needs.
4. Define access points based on needs of users.
5. Identify internal as well as external sources of database creation and support.
6. Identify internal (free) resources for data input (catalogers).
7. Evaluate consistency of catalogers/identify training needs.
8. Develop the database using a small sub-set of items from the collection.
9. Evaluate pilot-test database.

Interviews with students and faculty at the College of Design Arts as well as feedback from fellow fashion design educators at the ITAA (International Textile and Apparel Association) conference held in Dallas in October, 1998, and the CSA (Costume Society of America) Symposium in Santa Fe in May, 1999, identified three primary user groups. For all groups of the user population defined, a questionnaire was used to identify areas of interest, needs and uses. Additionally, we sought to identify frequency of Web site use for these interests. The following is a brief summary of these user groups and their information needs as identified in the questionnaire.

Designers (Fashion) and Designers (Textile/Fabric).

These two groups' conceptual models are formed by their design school training and/or by their work experiences. Their search for information on the history of costume is accomplished primarily via books, articles and museum visits. Exposure to visual representations (plates, slides and actual garments) is very important. They cite their own hands-on work with fabric and clothing as being very important to them. Similarly, work done in tailoring, draping, pattern making and construction skills was considered more important than information gleaned from books or museums. Detailed depiction of sundries, finishes, linings and construction of historic costume of all eras is a valuable point of inspiration for the designer of contemporary garments and absolutely necessary for the authentic replication of historic costume. While some members of these groups are using CAD and the WWW for information gathering and work-related activities, the majority are not.

Students

Our mission as a University-based collection is primarily to educate. Responses from students in our own program were therefore extremely important. Our design students shared many of the same information needs and attitudes as the designers groups. They are more comfortable using the Web for research and in using CAD for the mechanical aspects of design and pattern making. In addition to the questionnaire, we interviewed and observed a fashion design graduate student conducting research on a Charles Worth gown in the collection. This student exhibited a greater need for supporting documentation and published materials. A number of questions were raised for which there were no ready answers. Why is the kind of information from one garment to the next so inconsistent? How do I find out more about the Drexel family and where the owner of the gown fits into the family hierarchy? What other gowns do we have that were designed by Worth, and for whom were they designed? What other types of garments were being designed at this time?

Scholars (Historians, Archivists and Design Faculty)

Scholarly research in historic costume extends the need to examine the actual objects both visually and physically. Photographic surrogates are seen as less useful than the objects themselves. The lack of adequate depiction of minute detail and textures and the inability to see all sides of an object, including the inside, were reasons cited for needing access to physical objects. Scholars required greater need for supporting documentation including journal articles, books, historical information, provenance and exhibition catalogs. These groups used the Web for research less often than libraries and museums, citing a lack of full-text historical manuscripts and exhibition records available.

DATA DEFINITIONS

In examining the needs of our user populations, several themes emerged. First, all users require access to some form of visual surrogate of the object. While this surrogate is not considered an adequate substitute for visual inspection of the actual object, many see it as an important mechanism for determining if an object is worth the time and effort required to inspect it personally. Second, users require access to multiple views of a garment, including inside seams and details of construction, closures, embellishments, weave, etc. Third, many users require additional supporting documentation and would welcome access to provenance and bibliographies of published sources of information on a garment.

In order to support the visual information needs of our users we have decided to have each object digitally photographed in 360 degree multiple views. These still images will be morphed into a 3-dimensional navigable space using QuickTime VR. As a first step in providing a searchable database, we devised a cataloging form to document each garment in the collection and to link to the visual surrogates. The cataloging form was created by adapting existing classification structures for art images, fashion and textiles to the needs of our users. We borrowed extensively from the Core Categories for Visual Resources (VRA Core), the fields used in the Museum Educational Site License Project and the Longhouse Reserve Fabric Classification Guidelines to create an amalgam of existing, specific and non-specific historic costume fields that we as historians, designers, scholars, students and librarians determined to be necessary.

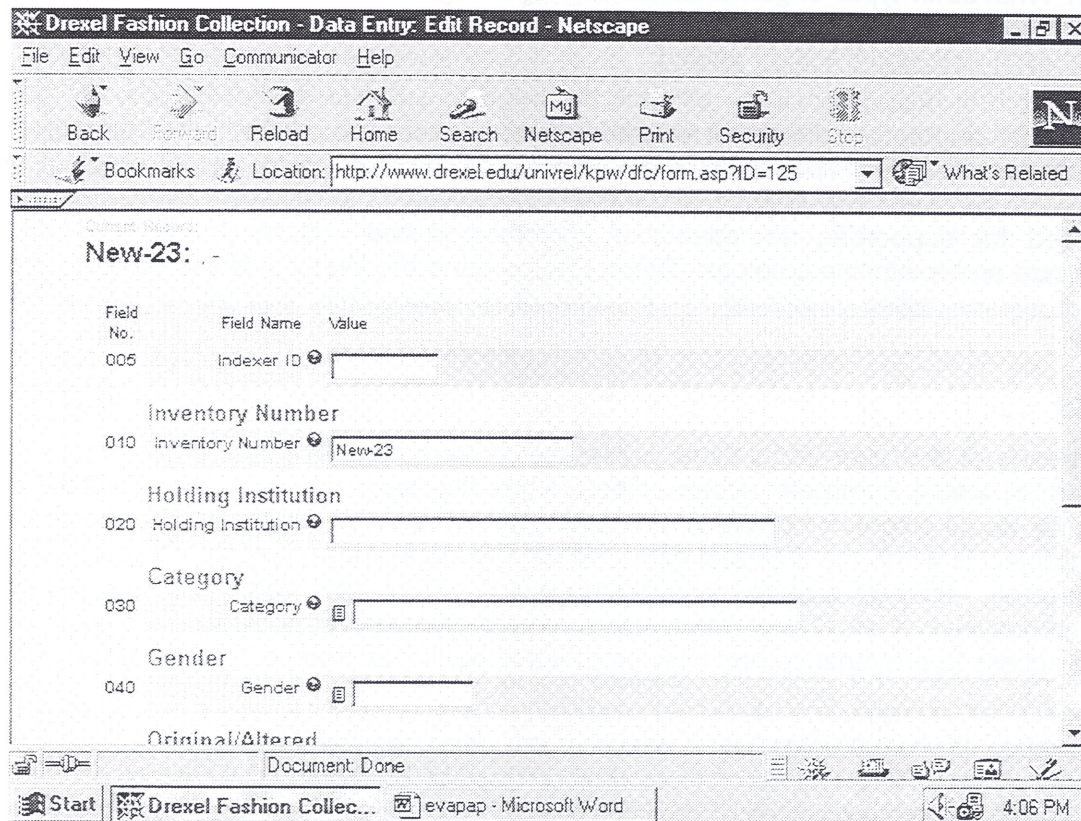
We initially defined over 200 fields and rules for their data entry. These fields cover three general categories:

- Accession Information: type of item, primary and secondary designers,
- storage location, accession number, URL, donor, provenance, etc.
- Descriptive Information: fabrics, style, genre, region or country of origin, accessories, patterns, embellishments, etc.
- Additional Documentation: books, articles, photographs, videos etc.

In order to support data entry by untrained students from a variety of disciplines, a Web-based template was designed as a front end to populate the database. The template is comprised of the following elements:

- Record Creation: simple to use forms-based cataloging that provides pull-down help screens for each field
- Record Edit/View: provides entire record for editing or further processing
- Record Export: provides mechanism to export data in comma delimited format for upload to other database.

A portion of the template is reproduced below:



Although the template itself is simple to use, choosing appropriate terms to describe garments and their construction, fabrics and their construction, and designer or manufacturer names poses numerous challenges. Although sources of controlled vocabulary exist, knowing which source to use and how to use it has been problematic. For example, terms used to describe garments and their construction may be taken from the following sources:

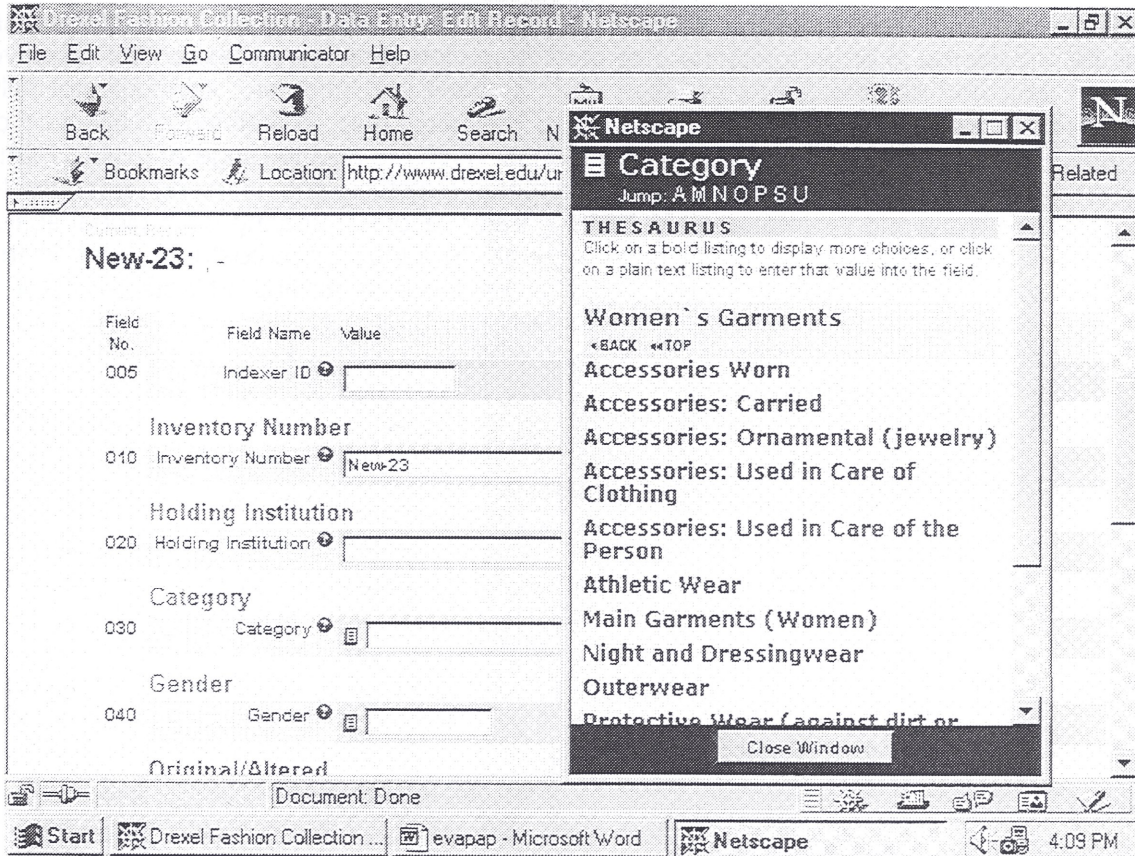
- Art and Architecture Thesaurus
- Dictionary of Costume
- ICOM (International Council of Museum's) Guidelines

While these sources taken together provide excellent coverage of costume, knowing which source to use and knowing how to use it consistently has proven difficult. For example, what is the difference between a corset and a bustier? Between a slip and a camisole? Between tap pants and boxer shorts? Is it enough to catalog all of these as underwear? Are the terms used contemporary enough to access the databas from a non fashion professional's search? Similarly, there exist multiple sources

for controlled vocabulary used to describe textiles, fabrics and their construction. The difficulty here lies in describing multiple ways of creating and embellishing textiles. For example, a fabric may be constructed by weaving together strips of leather and cotton, which may then be dyed and finally embellished with feathers and beads.

In order to facilitate consistent and controlled terminology for both data entry and retrieval, we are developing a hierarchy of categories for garments from the most general classifications, menswear or womenswear, innerwear or outerwear, one piece or ensemble, above, below, or above and below the waist, etc. to the final, definitive, descriptive term. The subcategories are displayed in easy to use drop down menus.

An example from the womenswear pop-up thesaurus menu is presented below.



EVALUATION

In order to evaluate the utility of the template as a mechanism to increase consistency of term use by indexers, tests are being conducted with four groups: (1) students in fashion design, (2) students in library science, (3) professional indexers, (4) professional designers and design scholars. Each group is comprised of five participants who have been instructed to work independently of one another. Each participant in each group has been assigned the task of using the web-based template to "index" or catalog the five objects from the collection. The same five objects have been assigned to each participant, and each has been given color photographs and short textual documentation for each object.

Questions addressed in these tests include:

- How much consistency in term assignment is present among members of each group?
- Which group demonstrates the most consistency among its members?
- How much consistency in term assignment is present between groups?
- Which groups demonstrate the most overlap in term assignment?
- Are there categories for which consistency of term assignment is greater?
- Are there objects for which consistency of term assignment is greater?

Results of these tests will be presented in future papers.

SUMMARY

Controlled vocabulary, shared conceptual models, and an understanding of visual information needs must all be considered in order to standardize the information structure necessary for effective dialogue between user and database, and between one database and another. Although not fully realized, we are nearer to the goal of creating a standard mechanism for describing a collection of historical costume and for retrieving these records in a manner useful to a wide range of tasks. Plans for the future of this project include providing our database structure and indexing template to collections from around the world in an attempt to foster greater resource sharing on a global scale. We also hope to adapt the database and data entry template to support non-costume items in the Drexel collection, and to test the utility of this structure for a wide range of art and artifacts.

SELECTING A PICTURE FRAME WITH DIGITAL IMAGING

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ABSTRACT

We describe an integrated hardware and software solution to provide assistance in selecting an appropriate picture frame for a valuable work of art. A custom hardware setup is used to capture separate high-quality, accurate color, images of frames and works of art. A user then applies the software to search a database of frame images for those of an appropriate size and style for a particular work of art, and to digitally compose separate images of frame and art to achieve a *virtual picture framing*: a realistic image of what the painting would look like in the given frame.

INTRODUCTION

This paper describes a joint project between the Julius Lowy Frame & Restoring Company, located in New York City, and the Image Applications group at the IBM T.J. Watson Research Center. The Julius Lowy Company is an internationally known supplier of antique picture frames for works of fine art. Its clients include art galleries, auction houses, and museums as well as private collectors.

Selecting an appropriate frame for a work of art is a complicated process. Deciding such aesthetic issues as whether a French frame is satisfactory for a Flemish painting is not something for which the imaging technology described here provides answers. There are, however, other more practical problems where the technology does assist.

First, it may not be possible or desirable to bring the work of art to the showroom. In this case, the work may be represented only by a transparency or photograph. Holding a photograph up against the frame gives at best a poor impression of what the final result will be. Second, the picture frames themselves can be large and unwieldy, and are stored in two separate buildings, so that even if the art work is available, a great deal of lifting and carrying is involved in trying out different frames. A further complication is that the picture and the antique frame are likely to be of slightly different sizes. Lowy craftsmen may need to alter a frame to make it fit a particular piece of art, a step they are reluctant to take before the sale! These circumstances conspire to make it difficult to gain an accurate impression of what the final combination of art and frame will look like.

Our project addressed this problem by creating a solution of integrated hardware and application software. In brief, the most significant portion of the inventory of antique frames has been scanned over time to establish a digital library of images. In a typical scenario, a client arrives with a painting (or a photograph of the painting) for which framing advice is sought. While the sales associate discusses options, the scanner technician scans the painting and processes it. The sales associate may now display an image of the painting and search for candidate frames based on

country of origin, size, style, or other attributes. Finally, the software can synthesize a realistic image of the painting in any of the candidate frames, and produce a high-quality print of the image. In following sections, we describe our approach more fully. We first describe the hardware configuration that was developed for the project, and the behind-the-scenes work that goes into capturing and preparing images for the application software.

We then describe the software that is used on the showroom floor to search for and present images to a client. We discuss in some detail the image processing used to compose a "picture-in-frame" image while preserving high-quality and accurate color, both for on-screen and printed images.

BACKROOM OPERATIONS

We describe the hardware designed for the project and the tasks of image capture and preparation. Both are "behind the scenes" and not readily apparent to the customer who is interested in acquiring a picture frame.

Hardware Configuration

Although the IBM side of the project has a long history in high-quality digital image capture, the extreme range in size of the objects to be scanned (from a small transparency up to a 60x75 inch object) precluded use of off-the-shelf hardware. A custom hardware configuration was required.

We did use the existing IBM Pro/3000 Digital Imaging System [Yao91] to capture images. This device (which is a research effort and not a full-fledged IBM product) uses a 3072 by 64-stage TDI CCD to capture images up to 3072 x 4000 pixels in size with a signal to noise ratio of better than 3000:1, and with accurate (colorimetric and calibrated) color. Depending on the size of the object being scanned, either a Rodenstock 105mm or a 150mm lens is used. An image is captured by making three separate scans through colorimetric green, red, and blue filters, designed to mimic human color perception. The camera captures 12 bits per pixel for each color plane, resulting in a 36-bit per pixel TIFF file.

We mounted the camera on a motorized column above a copy stand so that it can swivel through a 90-degree angle. It may be positioned to point down at the top of the stand to scan small objects. When scanning objects larger than 8x10 inches, the camera is swiveled to point at the wall, and the entire stand is rolled to a preset stop (depending on the size of the object) on tracks we embedded in the floor, specially reinforced to reduce vibration. Cables are fed to an overhead track to prevent their trailing across the floor.

To help reduce stray light, we constructed a partition between the camera stand and the wall where the frame (or art) is hung. This partition has a centered opening, into which one of several inserts with successively smaller apertures may be placed, to yield an opening of an appropriate size for the object being scanned.

To achieve uniform illumination of the wall for objects ranging in size from less than 16x20 up to 60x75 inches, we installed a set of eight quartz halogen lights and diffusers between the partition and the wall. The lights, two each at left, right, top, and bottom, are on movable arms that are adjusted to accommodate the size of object being scanned. To image certain types of varnished oil paintings (which cause significant glare), we also found it necessary to include optional polarizing screens for the lights, used in combination with a polarizing filter on the camera lens.

Because the space between the lights and the wall is limited, and because the larger frames can be quite heavy, an X-Y stage was mounted to the wall with a large moveable panel which can be

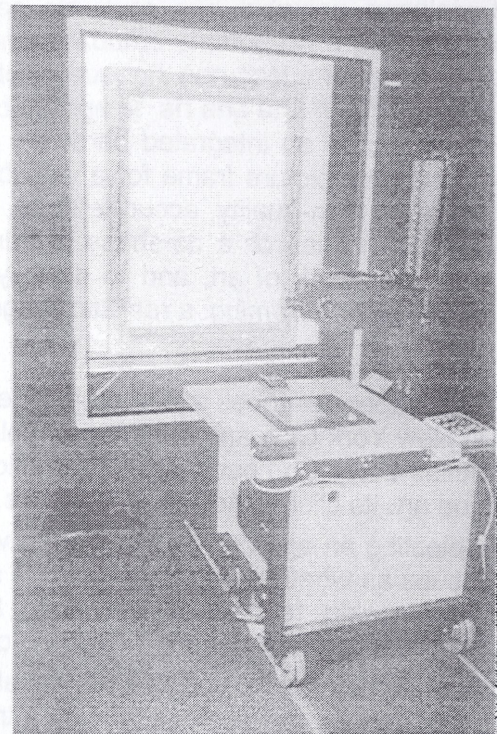


Figure 1: Hardware installation

driven left or right as well as up or down by an electric motor. To hang a large frame, the panel is moved out from behind the lights. The frame is hung on the panel, which is then driven back into place, positioned so that the frame is centered with respect to the aperture in the partition (and hence, with respect to the camera). The panel, which provides the background for scanned objects, is, as nearly as possible, a uniform white, while the room itself as well as the partition are painted a flat black. Figure 1 shows the installation. Further details on the background and development of this equipment are found in [Gio99].

Several different formats have been defined (from 16x20 to 60x75 inches for objects hung on the wall, and 4x5 or 8x10 inches for objects photographed on the copy stand). Each has a standard setup in terms of distance of the camera from the wall, position of the camera on the motorized column, and so forth. In practice, throughput is improved by scanning a number of items of approximately the same size with a single setup, eliminating unnecessary switching among configurations.

Each format is color calibrated. A Macbeth ColorChecker color calibration chart is scanned with the given setup. Since the colors on the chart are known precisely, the colors actually captured by the scanner can be compared with the true values, and used to compute a color characterization of the scanning system. This, in combination with the color characterization of each output device, provides the basis for end-to-end color management [Gio97] and accurate color, one of the key features of the overall system.

Image Capture and Preparation

Images of frames and works of art are captured with the same physical setup, but fit into the overall workflow in different ways. Frames are digitized in batches ahead of time, while paintings are typically scanned one at a time as each is brought in by a client for framing.

To scan an object, the camera setup is established. A quick initial black and white prescan is performed to check for focus, lighting, and to mark the area to be scanned in detail, and then the three-pass color scan is performed. Each image is inspected for quality and annotated with an inventory reference (for frames) or with an identifying title (if a work of art).

In the case of frame images, the application software must be able to distinguish between the frame and its background, or, in other words, know where the "hole" in the frame is, so that the image of a painting may be inserted. The goal is to produce a mask that differentiates the frame from the frame background.

This is done with the aid of a semiautomatic software tool. There are several modes of operation, but one example may help to illustrate it. Frames are scanned on a background of (more or less) uniform white. In one mode of operation, the operator clicks a mouse in the "hole" of the frame, and all contiguous areas of the same color, or within a specified threshold of the same color, are assumed to be part of the background and temporarily changed to a distinctive color (bright blue, say). This makes it visually apparent which part of the image is considered to be background, and which not. If an area of background is left out because its color is too different, a second mouse click in the omitted area will also mark it as part of the background. In other cases, a portion of the frame (perhaps a bright highlight) may be erroneously included because it is too close to the background in color. The tool is then switched to a subtractive mode, and that portion of the frame marked as not belonging to the background. After a few iterations by the operator, the result is a mask (a 1-bit per pixel version of the image, saved with the image) that defines the frame background. A set of four lines defining the quadrilateral which best defines the interior of the frame is also optionally stored with the image (optional, because a quadrilateral is not always a good description of a frame's interior).

For a work of art, no masking is performed. Instead, the image is cropped to size. If the image is scanned from a photographic transparency or print, the actual size cannot be deduced, and so the operator is prompted to enter the dimensions of the original work.

At this stage, the images, whether frame or art, are submitted to a batch process which reads the image files, converts from the original 36-bit color to a 24-bit color format, and produces three derivative images for each original. The first derivative is a relatively high-resolution image, which,

in the case of a frame, includes the background mask, and is up to 2000 x 2500 pixels in size. This will be used for printing, and also for later production of detail views and picture-in-frame images. The second and third derivative images are designed for viewing on screen; they are about 1100 x 940 (for a high resolution screen) and 830 x 680 pixels (for a laptop with lower resolution screen), and, in the case of frames, have their backgrounds set to black. All derivative images are saved in a device-independent format, and carry with them the color characterization of the scanner, so that they may later be displayed with accurate color.

Producing the derivative images can take a minute or two each, so typically a batch will be processed without operator intervention. After the job is complete, each image may be viewed as a quality assurance check and, if satisfactory, placed on a file server for application use.

THE SHOWROOM APPLICATION SOFTWARE

Overall Goals

The application software is intended to allow a sales associate to search the database of frames; to view high-quality, accurate color, images of frames and art; to create and view "picture-in-frame" images; to save selected collections of images in named folders; and to provide high-quality prints of any desired images. It is further designed to allow remote use (on a disconnected laptop, for example) as well as in the LAN environment in the store.

Architecture of the Application

The application exploits a client/server architecture. The three derivative versions of each image are stored, in device-independent format, on the server's file system; the frame database and application data files are also stored on the server. The application software runs on client computers, which are all connected to the server via a LAN (in the Lowy environment, the server also acts as a client). A laptop computer may be configured as both a server and client, permitting use at remote locations, disconnected from the LAN. We use a variety of Intel-based personal computer models, but timing information mentioned here is measured on a 200 MHz Intel Pentium Pro computer with 96MB of memory.

The application program itself is written in a combination of Java (for the program logic and graphical user interface) and native C++ code (for the image processing algorithms). It allows the user to navigate through a series of screens offering different functions either by touching "buttons" on a touch sensitive screen, or by clicking on the buttons with a mouse.

Search Capabilities

The program makes use of a preexisting database listing both the frames currently in inventory and those that have been sold. It characterizes each frame by a number of attributes, including such information as an inventory number, period, country of origin, style, and sight size (inner dimensions of the frame).

To make the program accessible to a wide spectrum of users, it was especially desirable to have a simple and intuitive search mechanism that did not require learning a specialized query language.

To achieve this, the user interface represents each possible value of an attribute by a checkbox on the screen. One or more boxes may be checked (by touch or mouse); this represents the logical OR in a search. If multiple attributes are selected, this represents a logical AND in the search. For example, if the "English" and "Spanish" boxes are checked on the country of origin screen, and the "17th century" and "18th century" boxes are checked on the period screen, this represents a query to find all frames that satisfy:

(English or Spanish) and (17th or 18th century)

As the checkboxes are selected or cleared, a field on the computer screen is immediately updated to show how many frames satisfy the current query. The entire database is held in memory, so that result sets from these simple queries can be computed by bit operations on in-memory bit vectors, giving very fast response times.

Frame size is handled in a different manner. Entry fields allow one to specify the width and height desired for the frame sight size, as well as the allowable variation. These fields are pre-filled with values derived from the size of the most recently examined work of art, so that to find a frame of an appropriate size for a particular painting may require no typing at all. Again, the number of frames within the given size range is shown on the screen, allowing one to widen or narrow the search as appropriate.

This approach to searching, while not providing for arbitrary queries, is straightforward, easy to understand, and fast.

Viewing Frame and Art Images

The software shows images of the frames resulting from a query. This requires that the device-independent image formats be converted to a device-dependent format, involving two aspects of image processing: color management and image enhancement.

Color Management

We considered accurate color to be an essential component of the application. Accordingly, each client computer is separately color calibrated. By displaying a series of colors of known values and measuring what is actually displayed, it is possible to compute the transformation produced by each display card/monitor combination [Min92].

Given this information, it is now possible to convert the device-independent image files stored on the server so that the image color is correctly compensated for the monitor on which it is displayed.

Image Enhancement

The standard operations of brightening, contrast enhancement, and unsharp masking are applied to each image. Several sets of enhancement parameters are used, depending on such factors as whether the scanning was done through polarizing filters, or whether the image is being displayed on a CRT or an LCD screen. In addition, individual images may be “stamped” with unique parameters if the defaults do not seem satisfactory to the scanner operator.

Image Display

In browsing through the inventory of frame or art images, or the results of a query, the application displays thumbnail images, 12 per screen. It is desirable to be able to do this at speed, so the device-dependent thumbnail version of each image is computed once on each client and saved permanently on a local disk.

To display a full-sized image, the correctly sized TIFF file is read from the server and converted into a device-dependent image for display on a particular monitor, a process that typically requires about six seconds. Display-ready images are cached on a local disk, reducing display time to about a second when an image is found in the cache.

Creating Portfolios

The software allows the definition of named “portfolios,” or folders of images. This is a convenience, which allows a sales associate to collect selected images in a convenient place. For example, the image of a painting and images of several candidate frames, perhaps including some corner detail images, could all be placed into such a group for later viewing by a client.

One of the benefits of using a portfolio is that images that take a relatively long time to produce, such as picture-in-frame images, are saved. Future display of these images can be done immediately, without having to compute them first, and so is considerably faster.

The “Picture-in-frame” Capability

To find out what a painting would look like in a particular frame, one of the key motivations for our work, the user initiates the process by selecting which frame and which work of art are to be combined. This results in a dialog providing three options.

One option is whether the frame should be rotated or not. By default, the frame will be rotated so that its orientation (landscape or portrait) matches that of the art, but sometimes there are reasons to override this (when the frame has a distinctive top edge, for example).

A second choice is whether to digitally produce a simulated shadow along the edge of the frame. This is the default, as it makes the resulting image look somewhat more realistic.

A third option deals with any possible mismatch between the sizes of frame and picture. In practice, Lowy artisans will modify a frame to fit a desired painting. To simulate this, the software is capable of digitally cutting down or extending the frame. It modifies each side of the frame image in one, two, or four places. By default, this depends on the style of the frame, as indicated in the database, so that a frame with decorative scrollwork in the center of each side would be modified in two places per side, at one-third and two-thirds of the distance along the frame, leaving the scrollwork intact. A frame with demi-centers would be modified in four places, while a frame with plain edges would be modified in the center of each edge.

Another possibility is not to simulate the frame modification at all, but instead to digitally shrink or expand (scale) the whole frame to fit the desired artwork. This is not normally desirable, since the frame will now be displayed at a different scale than the art, providing a physically unrealistic view.

Picture-in-Frame Processing

Once the options have been selected, image processing begins. First, the high-resolution version of the frame image is read into memory together with its mask. Brightening and contrast enhancement operations are applied, and the frame mask is used to set the background color to uniform black (for on-screen viewing). An exponentially weighted smoothing function is applied to the edge of the frame to eliminate aliasing effects at the boundary between frame and background. The frame image is now rotated if necessary.

In the next step, the art image is examined to compute a target scaling factor that will generate the same resolution as the frame image; this determines the resulting size of the art image, and hence the required size of the frame's interior, in pixels.

At this point, the frame image is modified to make its interior the required size. If the frame is too large, the requisite number of pixels is cut out, evenly divided over the one, two, or four cut locations. If the frame is too small, it is made larger by replicating small bands of pixels one or more times, at the one, two, or four cut locations.

Next, the art image is read into memory and brightening and contrast operations applied. The image is scaled and (if necessary) rotated. The output from this sequence of operations is directed to the interior of the frame, using the frame mask to determine whether each pixel is taken from the frame image or art image.

Now the simulated shadow is generated if requested, and if the optional quadrilateral characterizing the frame's interior is available. An exponentially weighted function is used to darken the four outer edges of the art, using the four mask lines as guides.

Finally, the composite image is scaled to an appropriate size for on-screen display and unsharp masking is applied. The result is written to a device-independent TIFF file (this means that the results of the process may also be used on other client computers without loss of color accuracy).

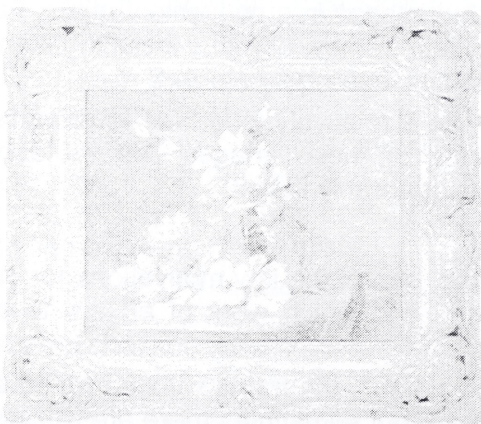


Figure 2: "Picture-in-Frame" image

To actually display the image, the TIFF file is converted to a device-dependent format as described previously; color management is performed, though further image enhancement is bypassed.

This entire process is the most memory- and CPU-intensive part of the application and, even though the image processing algorithms have been carefully optimized in C++ code, computing a picture-in-frame image can take a minute or two. If the image is placed in a portfolio, as described above, then a permanent copy of the image is made and future display of the image on this or any other client will, as with frame and art images, require at worst six seconds or, if the display-ready form is cached, about one second.

Printing

The software also provides the capability of printing any of the images. As it is currently configured at Julius Lowy, both a high quality dye-sublimation printer and a lower quality ink jet printer are connected to the server, and either one may be selected.

For printing, the largest (highest resolution) version of the image is used. The image is scaled as necessary, frame backgrounds are set to white (rather than black), color correction is performed, and the usual image enhancement operations (brightness, contrast, and unsharp masking) are performed with settings optimized for printing. The result is a TIFF format image file; the software then converts this to Postscript for actual printing.

For this application, we considered color accuracy of the printed output to be extremely important. Although the printer was calibrated (by printing a set of patches of desired colors, then measuring the actual printed colors with a spectrophotometer and computing the inverse transformation), our initial results were occasionally disappointing. Investigation showed that the main problem was with colors that were out of the printer gamut; that is, colors that were captured by the camera but that could not be produced by the printer. When such a color is to be printed, it must be mapped by the color management software to a color that is realizable. The method in which this is done can make a significant difference. We formulated a new method of handling out-of-gamut colors that now gives consistently improved results.

CONCLUSION

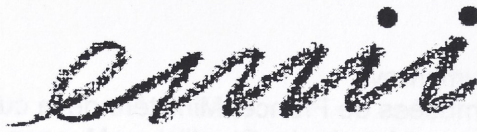
We have described a project to build a fully integrated hardware and software solution for an antique frame dealer. We have highlighted two significant aspects of the project: first, the custom hardware configuration we designed to capture high-quality digital images of the frames and, second, the techniques we developed to synthesize a highly realistic picture-in-frame image from separate images of the frame and art.

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Launched at the **mda/cidoc 99** conference (London 6 – 10 September) the European Museums' Information Institute, or EMII, is a pan-European network encompassing 16 member states.

Project aims

- To facilitate on-line access to the cultural heritage of Europe's museums
- To create long term partnerships between museums throughout Europe
- To promote a European focus for international initiatives

Methodology

The effective implementation of information standards across museums is fundamental to realising the project aims. Some of these standards already exist in one or other of the European states. Others need to be developed or refined. Each country needs to know what exists (so they can implement it) and what does not exist so that they can play their part in creating it. EMII is the focal point in this process.

EMII is not a new structure but a network of existing organisations, i.e. active and supporting partners, that already play a co-ordinating role for museums in their respective countries. EMII staff are liaising with these representatives gathering details of information standards and examples of best practice.

As information is gathered it will be made available via the EMII website as a country-by-country 'Standards Map'. Although currently under construction, this site will become EMII's primary mode of dissemination and will also include up to date information on EU funding programmes, a project partner finding facility and comprehensive links to related sites throughout the world.

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Italy	Ministero per i Beni e le Attività Culturali
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Ireland	Department of Arts, Heritage, Gaeltacht and the Islands
Luxembourg	Musée National d'Histoire et d'Art

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