ArtShow: An efficient digital image database

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Abstract. ArtShow is a digital image database, which employs a number of sophisticated features for interactive presentations of the data included. The manipulation of the database is based on Microsoft Access, the user interface is set up on Macromedia Authorware, while additional features are programmed by Borland Delphi.

The look and feel of the entire system is familiar to a typical user of Access and PowerPoint.

For demonstrating the program, an example database was prepared, based on the collection of the National Bank of Greece with names, comments and keywords in the Greek language.

Keywords: Multimedia presentation, interactive presentation, image database, archive, retrieve, zoom, search

1. Introduction

ArtShow is a digital database for archiving, presentation and retrieval of images and related texts. The platform of the system is Microsoft Access\(^1\), a commercially available, general use, relational database, working under the operating system Windows\(^2\) (Windows 95/98,2000, NT). The user interface, which drives the two-way communication with the database, has been developed on Macromedia Authorware Pro\(^3\) (ver. 5). This is a platform for multimedia applications development. In cases where the tools provided by Authorware were not adequate for the specific application, we added function libraries (DLLs) written by Borland Delphi 4.0\(^4\). Some special features of the program are:

1. Handling of multimedia information in a uniform way.
2. Data security.
3. Multiple image display.
5. Selection of the user language (Greek and English)
6. User friendly interface for searching the database
7. Preparation for presentation as in MS PowerPoint.

The main idea of the program was to create an efficient search interface on a database, which users could handle easily. The Access database [2] is very common in computer systems working under Windows. Using just a usual database (in this case the Access) the available data (images, texts, keywords) can be stored in shells and forms of the database, but the problem is that all these can be reached only by programmers. Furthermore, after a usual retrieval, the data is presented in a unique series which is

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\(^1\)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.
\(^4\)Borland Delphi is a trademark of Inprise Inc.
conducted by the indexing of the database. The indexing of the images was done by keywords but we continue experimenting using different methods as content based retrieval.

Authorware [5,6] is a platform for hypermedia applications and can be connected with Access. A user interface is designed with it, so that users of the ArtShow database can find all the information about the available data using just buttons and scroll-bar menus (Fig. 1). Since Authorware is not designed for our particular needs, some additional, essential features have been added to the database using the Delphi language [1,7], such as zooming and SQL type screens for the detailed examination and advanced searching of the database. The degree of zooming depends on the resolution of scanning the images. The SQL type query depends on the particular collection.

Similar features are also common in other applications. For example, Kodak’s Windows-based Portraits & More PC Pro software [9] delivers high speed image processing, template merging, package printing, adding type, etc. The Scala software, infochannel Designer [8] is able to create dynamic multimedia productions with text and graphics and TV-like presentations on the Web. The Image Explorer [11] software produces search, retrieval and animation for digital image libraries and databases. Two other programs are Photo-Eze [10] an Image Management Software for Orthodontists and the Photo-Eze Plus [10], a patient image capture and processing program. These programs can be customized by adding text and images for easy presentation.

SISTER [4] is a system for storing and retrieval of large collections of images on the basis of both textual information and image content. In particular, SISTER allows the user to formulate queries for different image categories on the basis of color information and specific attributes of the image category;
this is possible, because such a system can be easily adapted to support new image categories thus customizing the acquisition and the retrieval subsystems.

A common deficiency of the above programs is that if someone wants to set up a particular presentation, the order of appearance of the data cannot 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 well known program Microsoft PowerPoint [3].

The difference with PowerPoint is that instead of introducing the data of the particular presentation one at a time, users of ArtShow can use the search interface of the program to locate part of the collection and then manipulate the order of appearance in the same way PowerPoint does (i.e., dragging slide icons from Slide View).

In this way the final presentation 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 size image-databases. It allows the user to easily add new material (images, text) as well as manipulate the old one. It can also delete its contents and be host to a completely new job.

From the user’s point of view, this operation involves no programming effort.

In addition, a system of labels, hints, messages, text entries and buttons offers the user an easy and secure way of managing data and utilizing his/her thoughts.

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

![Fig. 2. A capture of the displaying window.](image-url)
ArtShow can be used by users to

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

2. The database platform and internal structure

Access is a relational database management system running under the Microsoft Windows operating system. We decided to use Access because we had more experience with it and also because it is a widely available database engine.

As we look at the data archiving, there are two tables. The first is called “Presentations” and has two fields: the auto numbering and the series of picture codes. The second is the main table and includes many fields for the data management such us “Code”, “Text”, “Category”, “Material”, “Theme”, “Generation”, “Key”, “Artist” and “Title”. The names of these fields depend on the particular collection.

As it is easily understood, these fields represent the information related with each picture and enable the creation of SQL queries using keywords. In addition, the simple text format of the columns allows multiple language insertion without any limitations caused by the English or Greek shell.
3. General view of system structure

The basic idea is to have all information into the database and manipulate it through SQL statements, which are embedded in Authorware, and having some extra displaying capabilities.

Due to this, the program is divided into three parts:

(a) The first part in which the database is declared to the Windows’ ODBC and some variables are initialized.
(b) The query-result part which is responsible for the two-way communication between the program and the database.
(c) The display part which is called every time there is some information to be displayed, including the multiple viewing form for images and the control panel for the presentation flow.

The flowgram of the main program has been designed by giving the graphical objects and setting their properties. We wrote code using functions provided by Authorware and Delphi’s DLLs. The user interface is shown in Fig. 4.

4. General information and system requirements

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

The program runs directly from the CD-ROM or can be installed into the hard disk taking space of 25 Mbytes. In this demo of the program, a supplementary space of 25 Mbytes will be needed for the 286 pictures of the art collection of the National Bank of Greece.

5. Features

The program user interface is very intuitive, with most operations being available through push buttons and menu commands.

The images can be viewed in a variable size window with zooming capability that ranges from as low as 2% to as high as 1000% of the stored image size.
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.

In general, this program has many similarities with other database and presentation developing programs such as Microsoft Access and Power Point. This is why a comparison between them can be useful (Table 1). Generally speaking the Artshow program is suitable for image archiving and creating simple multimedia titles.

Its main advantage is that it allows development of interactive presentations based on image databases providing data searching and zooming. It requires short learning time and small amount of disk space.

On the other hand, the program does not allow variations in the presentation because of the standard layout appearance and it does not offer the flexibility of a usual database except through the programming mode.

By understanding the advantages and disadvantages of the program (Table 1), users can find the cases where they can use it instead of the above mentioned programs.

6. Future developments

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

- The capability of the input and output of images from commercially available devices (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 programs, such as Microsoft Word or PaintBrush, can be inserted during the slides’ preparation for presentation.

7. Conclusions

The present system offers a PC based digital imaging software that focuses on small to medium size image databases. This software can also be used as an educational tool, or as a tool to help students on their projects.

Seen as a whole, ArtShow is a relatively low cost, simple and elegant application offering a number of innovative capabilities including:
– Ability to perform tasks necessary to an art community in an effective and rapid manner.
– Low learning curve i.e., the system does not require learning time which slows its use by people who are not computer specialists.
– Ease of implementation.
– Portability, extensibility and “openesse”.

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

References