ABERDEEN ART GALLERY IMAGE DATABASE PROJECT
A PROTOTYPE PROJECT TO CREATE AND MAINTAIN A
LOW-COST ART IMAGE DATABASE

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Abstract: The concern in this study was primarily to identify the way in which visual arts
- paintings, etchings, engravings - could be organised and made accessible using low cost
computer hardware and software. The aim was to take a typically art gallery collection and
investigate fully the type of problems which were involved when considering digitising the
collection.
The paper examines how the project created a sophisticated image database using
minimum financial outlay. Of necessity, the paper is presented as an outline review for
expansion and discussion during the conference.

1. Introduction

The Aberdeen Art Gallery Image Database Project is a pilot project funded by the
Scottish Library and Information Council (SLIC), with the aim of creating a small
image database containing a selection of works held be Aberdeen Art Gallery. The
project was developed using a relatively low hardware specification, using
standard proprietary software, and provides a possible model for others seeking a
low-cost approach to the development of their own image databases.
The project has illustrated many of the issues likely to arise during the
development and construction of an image database, including selecting the
hardware and software; image capture, compression and storage; the indexing and
retrieval of the works; and the design of the user interface¹.

2. Background

The rapid technological developments in the computing field in recent years have
brought image databases within the reach of museums and galleries². Examples
include the MicroGallery at the National Gallery in London (also available on

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* Paper delivered at the workshop of the IFLA Art Libraries Section in Istanbul 1995.
CD-ROM as Microsoft Art Gallery); the Library of Congress Vatican Exhibit (available on the World Wide Web); the National Railway Museum database; and many others. A more comprehensive overview of image databases in museums and galleries is presented in the project report.

3. Existing catalogue

The Gallery’s existing catalogue is kept on a custom-designed database running on their mainframe. The catalogue, which is limited to plain text records, contains a significant quantity of valuable information about each work of art, and it was considered important that this information should be retained in the image database.

For the purposes of the pilot project it was not feasible to extract information from the database catalogue and incorporate it directly into the image database, and consequently the textual data had to be entered manually. However, given the limited nature of the pilot project, this did not present a significant problem, and indeed turned out to be an advantage, as it permitted a consistent level of control to be exercised over data integrity during the creation of the database.

4. Equipment specification

The project was developed on a Western Systems 486DX2 66MHz PC with 16 MB RAM, a VL-bus graphics card with IBM VRAM, a 500MB hard disk, and 17" SVGA monitor, a typical specification for development of a system of this sort. A Fujitsu M2511A 3.5" internal optical disk drive, with a capacity of 128MB per disk, provided archiving facilities.

SPC Superbase 2.0 was chosen as the database system for developing the image database, as it offered both ease of use, and more powerful image handling features than its competition. Micrografx Picture Publisher 4 was chosen to provide image editing, re-touching and manipulation facilities, and image compression was provided by Iterated Systems’ Colorbox SDK and Images Incorporated 3.0.

Images were captured using an Epson GT6500, and A4 flatbed scanner capable of scanning at up to 400 dots per inch and in 24-bit colour or 8-bit grey scale.

The total equipments cost for the project was £3856 (+VAT), although it should be noted that since the equipment was ordered in June 1994, the prices of some of the items of hardware have decreased following the release of new models with higher specifications. In particular, PC prices have dropped substantially, but it should also be possible to obtain the scanner and optical drive at a lower price, or if not,
with an improved specification at the same price. Updated versions of all the software packages are also now available, offering greater functionality at the same price.

5. Digitising the works

5.1 Selecting the source materials

The Gallery keeps photographic records of their collection in the form of monochrome negatives. In addition, they have a limited collection of colour transparencies of their more popular works, in 5"x4" format. Transparencies are not particularly suited to use as a source material for digitisation using conventional scanners, requiring specialist equipment which was outwith the limited budget of the pilot project.

This problem was overcome by making use of the Gallery’s collection of postcards of the more popular works. These scan well, and offered the added advantage of being a standard size. A template was used to ensure that each postcard was centred in the scanning area, irrespective of whether it was in a landscape or a portrait format.

5.2 Image capture

To minimise the loss in quality which would occur during the digitisation process, the image capture parameters were selected to match those of the final screen display. As it was likely that the database would also be viewed on systems other than the development system, an average screen resolution of between 72 and 80 dots per inch was assumed. The works were scanned in 24 bit (True) colour, at a resolution of 75 dots per inch, and yielded images 400x400 pixels in size.

Some problems with moiré patterns arose as a result of interference caused by differences between the dot mask used by the scanner and the dot pattern used in the printing of the postcards. Such effects were minimised by re-scanning the postcard after a slight re-alignment of the postcard on the scanner.

After scanning the individual images were examined using Picture Publisher, and a white mask applied to the edges to remove any artefacts created during scanning. The masked image was then cropped to fit the display frame size, and saved as a Targa (.TGA) format image. After conversion, the resulting images were archived on 128MB removable optical disks.

5.3 Image compression

The digitisation process produced image files of approximately 500KB in size, and while these images could have been incorporated directly into the database,
the large file size resulted in unacceptably slow display times. To overcome this, the images were compressed using Iterated System’s *Images Incorporated* fractal image compression software. The proprietary fractal compression was chosen rather than the standard JPEG because it offered smaller file sizes, and more critically, allowed a higher degree of control to be exercised over the final screen display palette.

6. Database structure and content

6.1 Database structure

During the preliminary discussions held with the Gallery, a set of basic criteria for inclusion in the database was outlined. These were used as a starting point for further discussions, during which it was decided to limit the information in the pilot database to the material available in the Gallery’s existing catalogue. A final, revised set of criteria was established, and, after comparison with the Gallery’s catalogue, translated into an appropriate field and file structure for the database itself.

6.2 Content

When the project was still in the planning stage, several alternative approaches for selecting the content of the database were discussed with the Gallery. These included using the work of a single artist for the pilot project (Dyce or Erdley were two of the artists suggested); concentrating on a specific collection within the Gallery’s wider collections (the MacDonald collection was considered for this), or simply digitising the existing collection of colour transparencies.

The final choice of content resulted from the decision to use the Gallery’s postcard stock as the source material for digitisation. The restrictions imposed by the limited size of the postcard collection available for use in the project dictated that the pilot database would be of a general nature.

The selection of material was further complicated by copyright issues, or rather digitisation rights. In order to avoid the complex and time-consuming task of tracing and contacting the copyright holders of the various works, the pilot project only included works where the Gallery holds the copyright. Inevitably, this meant that the works included in the database were limited to older pieces.

In total, fifty-three works were selected for inclusion in the pilot database, with the final set of works covering a range of subject matter, artists, periods, schools and original media.
6.3 User interface

The user interface of the database was designed to present the images and their related information in a clear manner, while still allowing the user to browse or search the database without the need for specialist knowledge of the database system. Most operations are carried out by using the mouse to point and click at the on-screen buttons, or to select categories within the search options. Keyboard entry is only required for the more detailed keyword title search option.

The computer’s video system was configured for a screen display resolution of 800x600 pixels with 16-bit colour, which provided a high quality display on the 17” monitor used by the system, and the user interface was designed for use at this screen display resolution. Subsequent testing of the completed user interface has shown that this screen resolution can also give acceptable results on a system with a 14” monitor, although this is not a recommended configuration for general use.

The user interface was designed using the Superbase Form Designer, and the Superbase programming language, SBL. The final version was converted to a set of programs written in SBL.

The Main screen of the user interface offers the user the choice of either browsing or searching the database, and all screens in the interface contain an option to return to the main screen. A monochrome version of William Dyce’s Pegwell Bay was used as the backdrop for the main and search screens.

The menu bar gives access to the File and Help menus, and is available from all screens. The File Menu gives the user access to the database maintenance functions and the exit option, while the Help Menu allows the user to access the help screens and the general information screen.

The Browse screen is the main information presentation screen, and is used for both general browsing of the database, and for viewing the results of searches carried out by the user. The screen displays details of an individual work, with a button giving the user access to an additional screen of information on that work. Two large VCR-style selection buttons allow the user to move forwards or backwards when browsing through the database collection or search results. The Main Screen button allows the user to return to the Main screen at any time.

The Search screen allows the user to select one of the six different search options, or to return to either the Main or the Browse screen. Searches can be carried out by artist, title, period, school, category, or class. Clicking on one of the search options displays a dialog box which allows the user to either select an item from a
list, or to enter their own search text. The results of the search are viewed using the Browse screen.

The database maintenance functions, entering new records and editing existing records, are carried out using a combination of two record entry screens. The database maintenance functions are only accessible through the appropriate File Menu options, and are password protected to prevent any unauthorised alteration of the database contents.

7. Future considerations

7.1 User evaluation

The system developed during the course of the project is located in the Aberdeen Art Gallery library, and is available for use by the general public.

A detailed programme of user evaluation was outwith the scope of the pilot project, but feedback has been sought from members of the public who have tried the system. The comments received have been very positive, with praise for the system in general,

Full of good information but simple to use too -. great idea!

the quality of the images,

Excellent - amazing graphics/image! I must come back to use it some more

and the ease of use.

Excellent visuals and easy to use for the computer illiterate such as myself.

There were also a number of requests among the comments for more background information on the works and artists.

The reproductions are surprisingly good but it would be better if there could be more information available about the artist and the painting.

Informal feedback from members of staff at the Gallery has also been very positive, and the Gallery is actively seeking funding to develop the pilot into a full system.

Once funding has been obtained, a more detailed programme of user evaluation will be carried out. The results from the user feedback will be considered when deciding on any necessary revisions to the pilot database, and will help provide guidelines for the eventual construction of the full database.
7.2 Further recommendations

If the project is to continue and expand beyond the pilot stage, there are six main areas which require further investigation.

- The possibility and practicalities of directly incorporating data from the main Gallery catalogue to avoid the need for re-typing.

- Enhancing the background information on the works and artists, as requested in the user feedback.

- Alternative methods of capturing and digitising the images. Possible methods may include the Kodak PhotoCD system; digital cameras; or a rostrum camera and video frame-grabber board.5

- The search options need to be developed further, and more advanced search facilities added.

- The copyright issues will have to be investigated fully, and approaches made to the copyright holders of other works to obtain permission to digitise their works.

- Consider the potential for income generation for the Gallery through sales of a limited version of the database on CD-ROM.

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Notes and references


3. op. cit. p. 4-8.


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