

SPECIFICATION OF A HYPERMEDIA SYSTEM FOR THE TOPKAPI PALACE

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Abstract

This paper summaries the doctoral investigation being carried out in the ABACUS group of the University of Strathclyde into the relevance of advanced multi-media technology to the explanation and investigation of the complex development of architecture which has historical and/or cultural significance.

INTRODUCTION

The aim of contemporary architectural reconstruction is to envisage what buildings of the past might have looked like. The presentation of architectural reconstruction is also important to communicate previous architectural values to the current generation of architecture student.

However, traditional teaching media are severally limited in their capacity to present and evaluate historical hypotheses. The difficulty arises due to the variety of sources and for-mats in which textual and visual records exist. Text may be distributed over a wide variety of document types (e.g. travel books, account records, historical theses) and in more than one language; visual records may be in a wide variety of formats (e.g. water colours, engravings, miniatures) and depict the building to difficult scales from dissimilar viewpoints.

Because of this, data sources have to be studied for a long time to *compare* historical records with reconstruction drawings, to identify historical *transition* and to *understand* the relationship between visual and non-visual data.

The research question is therefore focused on the use of hypermedia technology to develop a possible alternative solution to the problem of paper based presentation, and is formulated as :

How should a hypermedia system be constructed to improve the presentation and visual analyses of architectural reconstruction?

RESEARCH CONTEXT

The research project takes as its focus the Topkapi Palace in Istanbul.

Historically, the Palace is a very important building for the Ottoman Empire. After the Sultan Mehmed II took Istanbul from the Byzantine Empire, he established a royal palace. When this was burnt down, it was replaced by the Topkapi Palace. In contrast with the first one, the Topkapi Palace (called the New Palace) was designed not only for 'Imperial Apartments' but was also intended for governmental offices and military services. Over the centuries, the complex was developed and extended to the *Sarayburnu* where the Ancient Istanbul stands and become 'a city in the city' with kiosks, mosques, hospitals, baths and a kitchen complex. Late palaces, the *Ciragan*, *Dolmabahce* and *Yildiz* which were planned in a more western style were completed over a short time span and did not have the same wide range of functions. In this respect, the Topkapi Palace is unique example.

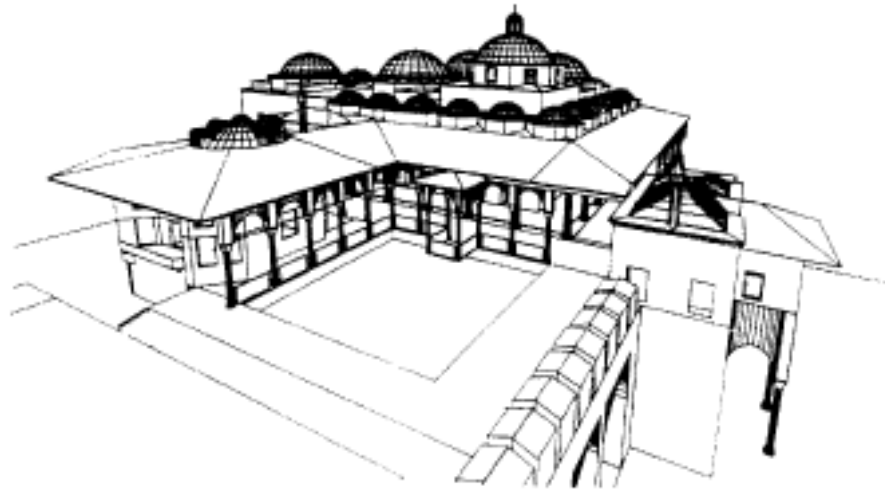
Sociologically, the Topkapi Palace is well-known worldwide. The Harem where Sultans spent their private lives, becomes a subject for novels, films and operas. The social life, relationships, and events have been extensively studied by many researchers. The Governmental and military establishment of the Place which influenced European and Islamic Culture have also been the subject of extensive study. All of these activities ensure the continued popularity of the Topkapi Palace.

There is a rich source of material in different form relating to the Palace. There are several visual collections such as, engravings, paintings, miniatures, maps, photographs which recount the development of the palace over the centuries, The written records such as *seyyahatname* (traveller books), *masraf defteri* (account books), *ferman* (sultan's law) describe kiosks and gives detailed information about the materials which were used for the construction. But for interested members of the general publics and even for committed architecture historians, these sources are characterised by their diversity. Although, Historians and architects have been written reference books which explain the historical, architectural and sociological importance of the Palace, the learner has still found difficulties to understand The Topkapi Palace fully. (ELDEM& AKOZAN 1973, NECIPOGLU 1992)

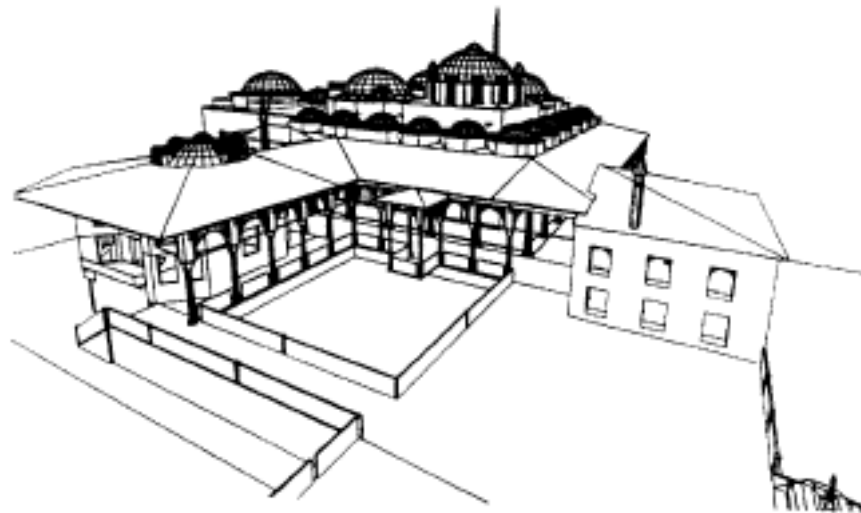
RESEARCH STRUCTURE

The research investigation was structured as follows:

1. In order to become familiar with the geometry and rendering of the Topkapi Palace, a small part, the fourth courtyard which is the best part for experimentation of the visualisation problem and historical transition, was analysed as a pilot project (figure 1).



the 16th century



the 20th century

FIGURE 1- The Topkapi Palace, the Fourth Courtyard

Reconstruction: Sedat Hakki Eldem, Modelling software: Architrion II 5.5.1,
Hardware: Macintosh IIcx 8/160, Silicon Graphic IRIS.

2. An investigation was then made into how conventional representation techniques could be improved through advanced computer technology and what kind of further advances might be possible in the near future.

3. A theoretical argument for the best relationship between the user and the interface was developed with a view to the definition of a better hypermedia application.

4. Representational possibilities of architectural reconstruction were listed, and the system theories were developed in consideration of the role of computer graphics.

5. The graphical interface of a hypermedia application was specified in detail. In this way, the system scenario was revised by testing some parts by HyperTalk.

At the end of this research, a multimedia presentation was created to demonstrate how the hypermedia system would work in practice. The main outcome, then is a detailed specification and maquette of a proposal hypermedia system suitable for general application in the reconstruction of historical architecture.

SYSTEM SCENARIO

The ideas of hypermedia for visual analyses of architectural reconstruction which have been developed in the PhD thesis are applied in a scenario which defines the specification of a hypermedia system. The Topkapi Palace is used as an example in the scenario to explain explicitly how the system could be applied to a specific historical complex.

This hypermedia system will mostly be utilised in a public space such as historical building which is specified in this system (in this case, the Topkapi Palace), in a museum, in a library or in a research room.

When the user sits in front of the computer to work with the hypermedia system, he/she encounters an 'Introduction' on the screen. When clicking at any point on the screen, the user accesses a 'system finder' which will direct him/her to one of the two principal modules; the multimedia presentations and the media editing, system. (figure 2)

To send the user to the desired module, the system asks the user this question: "WOULD YOU LIKE TO HAVE A SHORT TRIP AROUND THE TOPKAPI PALACE BEFORE GOING TO THE MEDIA EDITING ENVIRONMENT?".

The choice of 'YES' sends the user to the module of the multimedia presentation where he/she gets an overview of the historical building complex; on the other hand, the choice of 'NO' sends the user to the media editing environment where he analyses the building complex using computer images, computer animation, visual, textual and aural records (figure2).

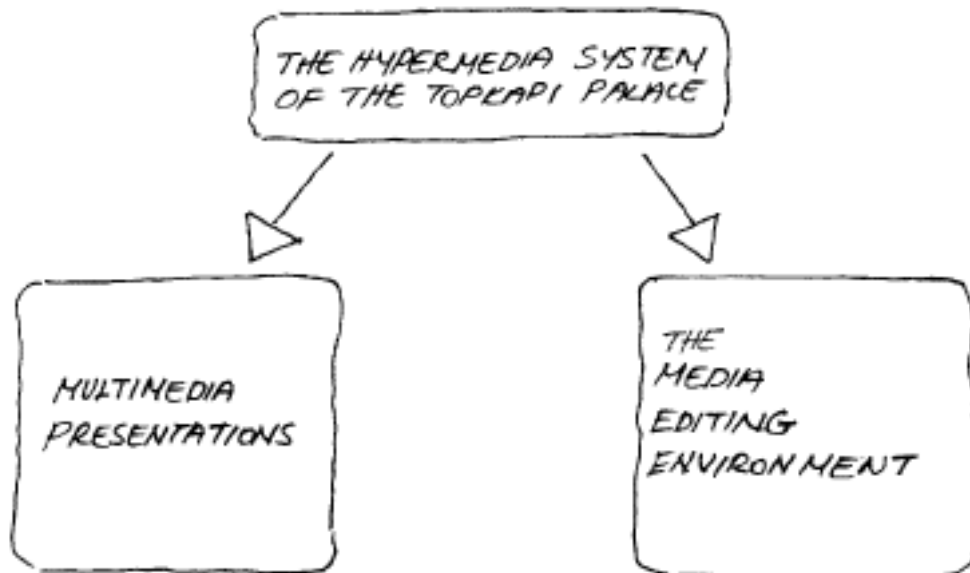


FIGURE 2- THE SYSTEM DIAGRAM

Interface

When the media editing environment is initiated, the interface similar to the diagram below appears:

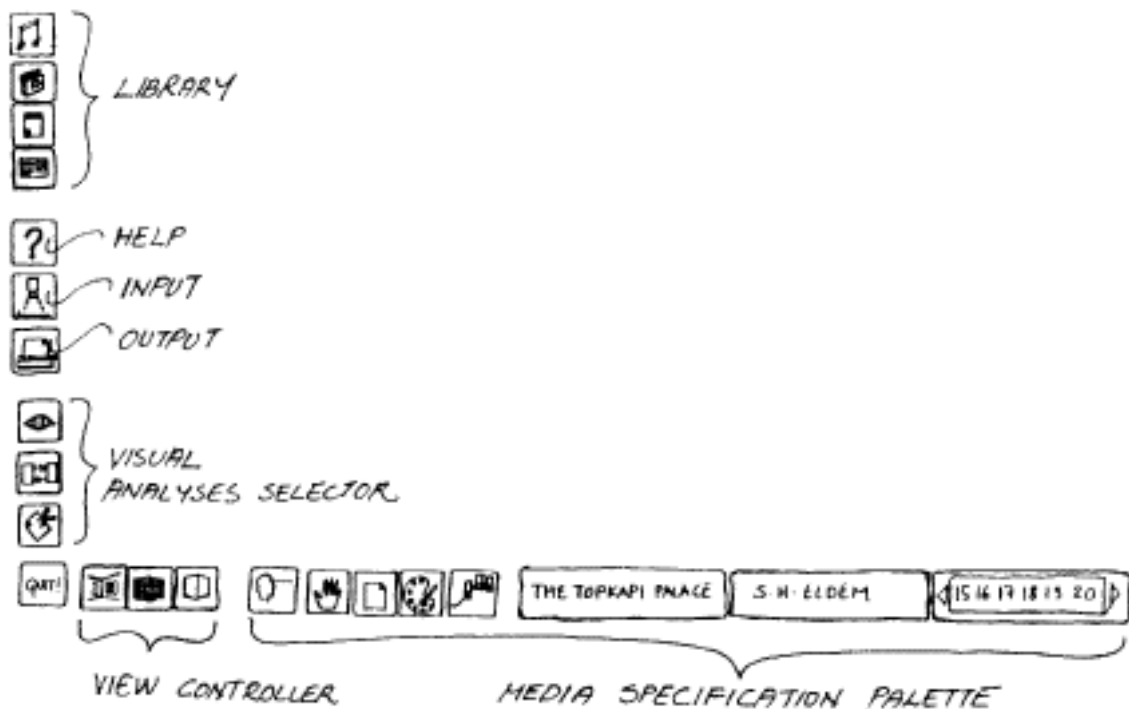


FIGURE-3: THE MEDIA EDITING ENVIRONMENT

On the screen, there is a media specification palette comprising input/output tools, a help tool, a viewer controller, a visual analyses selector and a quit button:

-Media specification palette:

There are six selectors on this palette; each selector has different facilities and specifies the media type as origin, presentation, representation, scale, name of the building, the name of the author and century (figure 4).

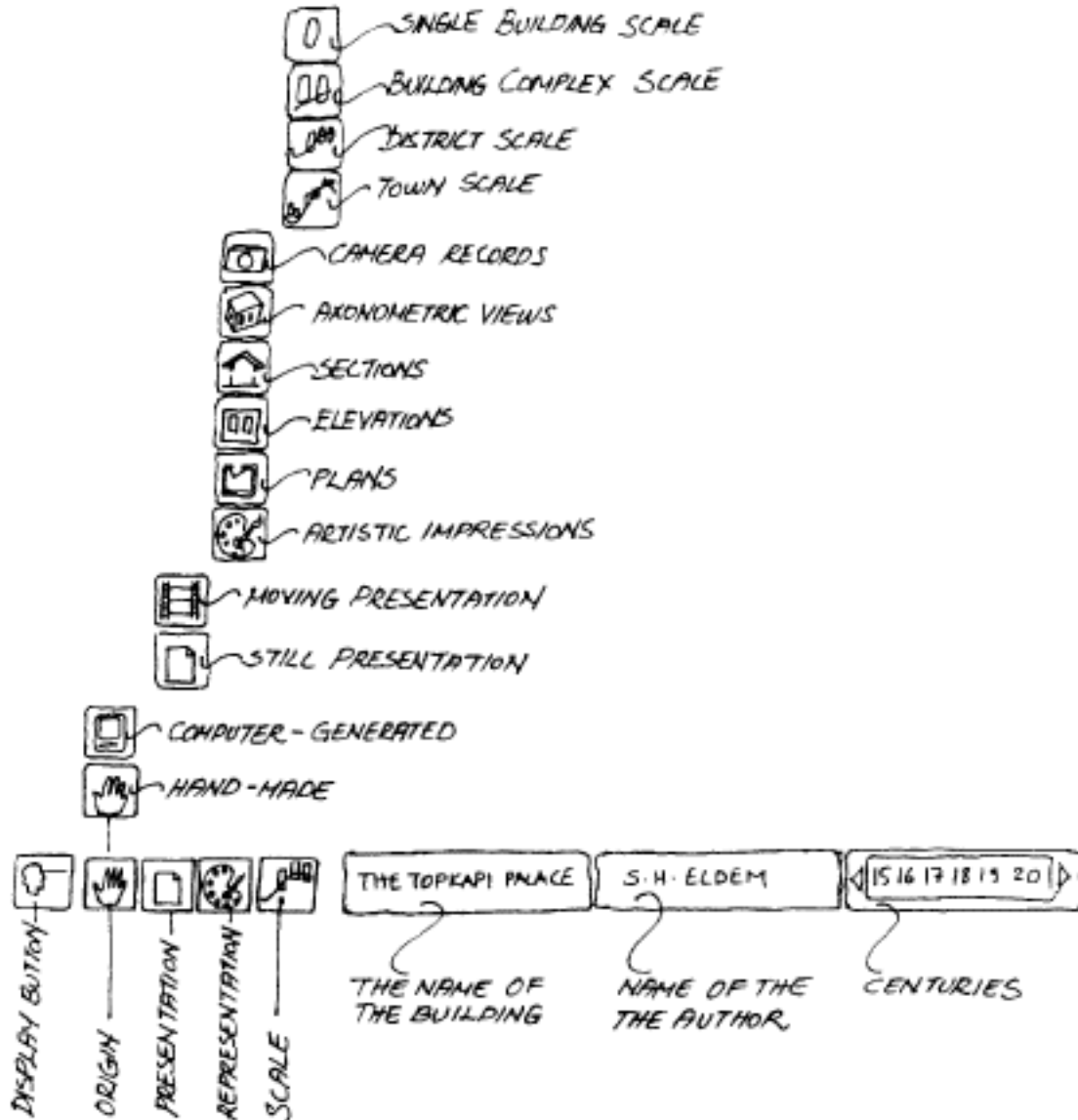


FIGURE-4: TOOLS IN THE MEDIA SPECIFICATION PALETTE

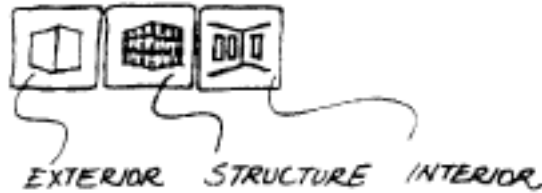
-Help Tool

To learn how to work with palettes, tools and selectors, the user activates the help tools. In this case, the aural helper tells the user what the tool is for when the desired tool is clicked and the mouse is held down.



-View controller:

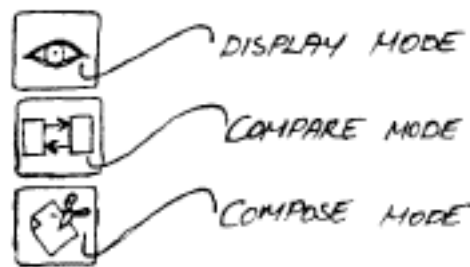
This controller presents the building in three views:



Each view can be changed independently by a controller at the bottom of the screen. When the user selects any of the above views, the current view on the screen is replaced by the selected view by a dissolve effect. Through these operations, the exterior, structural and interior views of the historical building can be changed to provide visual analyses.

-Visual analyses selector:

There are three types of visual analyses provided in the selector:



Each mode of visual analyses works by a different process. In the display mode, the user observes only one visual presentation such as a computer image, an orthographic drawing or an artist impression in full screen size. In this mode, the user can also browse the book and musical pieces related to the building which is currently displayed on the screen. In the *compare* mode, several media can be shown side by side in a window which can be re-sized and freely moved about by the user. In the *compose* mode, presentation can be processed to provide alternative visual analyses of architectural reconstruction

-Quit tool:

The user leaves the media editing environment via the *Quit* tool on the bottom left corner of the screen. After this operation the System returns to the system introduction

Displaying a historical building:

The *display* mode allows the user to browse the architectural and historical documents of a building or a building complex. This mode works like an electronic archive which provides a quick access to desired visual, textual and aural material to find out what kind of information relevant to the historical complex is available.

-Accessing visual material

The user directly accesses desired media by the media specification palette. He/she also selects image of a single building through the general view of the building complex.

-Browsing image collection:

Some historical building may have more than one plan, section, elevation, axonometric view, slide, photograph or artist impression. In this case, these images run in one window and the numbers of available still images are shown on the bottom right corner of the image window. If the user wants to browse all the frames' one by one, he/she must click on the NEXT button on the bottom right corner of the window.



FIGURE-5: THE WINDOW OF IMAGE COLLECTION

-Browsing libraries and I-D card:

The user can also browse books, articles and music pieces related to the image which is currently displayed on the screen. To find basic information about a building or a building complex, the user can also look at an identification card which can be accessed by another button. This card shows the name of the owner, the name of the architects and essential information about the structure, construction and material.

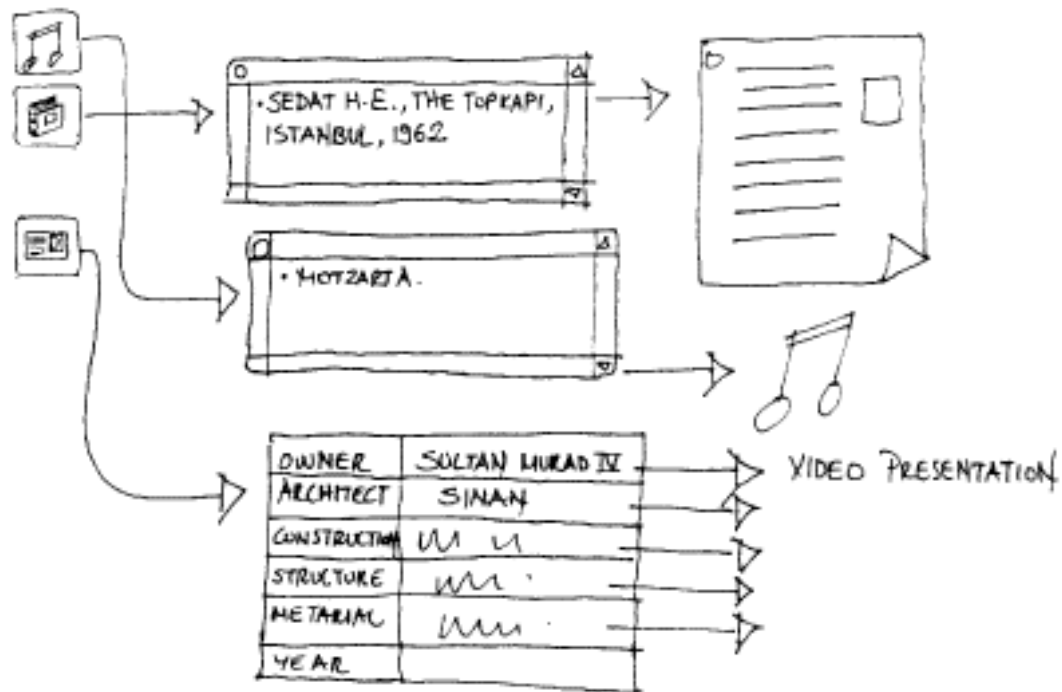


FIGURE- 6: THE PROCESS OF LIBRARIES

Comparing visual materials:

In the **compare** mode, the media which show the appearance of the historical buildings either in the same century or in different century are presented side by side simultaneously to allow the similarities and differences to be noted. For instance, the user might display two different artists impressions which show the building in the same century or display the computer image which depicts the building in different centuries.

Composing visual material :

If the user wants to manipulate visual material for sophisticated processes such as electronic mixing, post processing, texture mapping, etc., he/she activates the **compose** mode on the *visual analyses selector* and uses the **compositor** palette which appears on the bottom left hand side of the screen together with the compose mode. To realise the process easily, an oral super-visor explains what the user should do before each composing process.

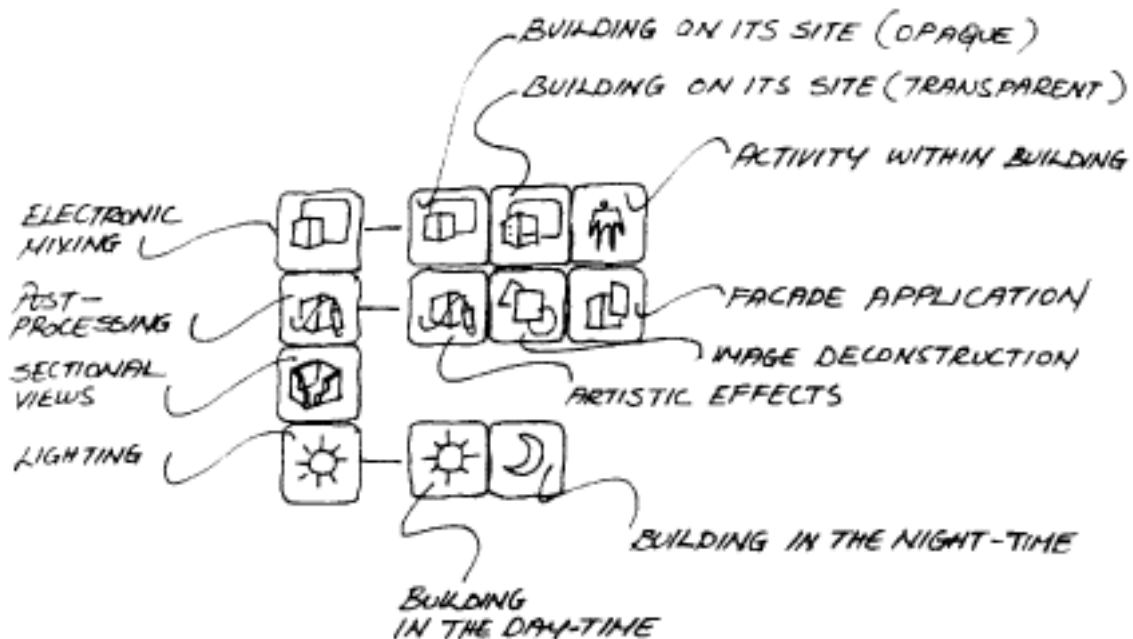


FIGURE-7: TOOLS IN COMPOSITOR PALETTE

There are four sections on the **compositor** palette:

1. Electronic mixing:

Two types of electronic mixing are provided: both of them are accessed from a pop up menu on the **compositor** palette.

- **building on its site**

This facility provides access to composite images which show how any historical building which partly exists or no longer exists would have appeared in its actual site.

- **activity within the building:**

This facility projects a movie presentation onto a single view of a historical building in order to show how previous owners used to live in or around the building.

2. Post-processing:

The user can 'post process' the visual material if desired. To do this, the **post processing tools** opens automatically a data exchange file of the desired computer image, photograph or artist impression into painting software. After this operation, the user manipulates the computer image by means of painting software utilities. When the post-processing is finished, the user can print out a hard copy via the painting software.

Three tools are provided in a pop-up menu for the post processing:

- **artistic effects:** Visual media can be automatically transformed into a classical art style such as water colour, dry brush, etc.
- **image deconstruction:** This tool allows the user to cut a computer image, a photograph or an artistic impression into parts to create a deconstructive composition.
- **facade application:** If the user has developed a hypothesis about the facade of a historical building, he/she can 'paste' a drawing which represents this hypothesis onto an existing facade of the computer image of the historical building.

3. Sectional view:

The facility allows study of the relationship between the plan organisation and the geometry of the historical building all of which are presented in axonometric view.

4. Day and Night Images

This facility allows the user to see the motion of day light around the building during a day and to present the building in the night.

CONCLUSION

From the architectural point of view, this hypermedia system has some advantages over conventional methods of visual analyses of architectural reconstruction:

1. The system is a **collective environment** in which to access and to arrange the information quickly and efficiency .
2. This collective environment also allows the user to compare his hypothesis with other researcher's ideas.
3. The user can understand the transition of a building through the centuries easily because he/she can view the still or moving image sequentially by means of the dissolve effect.
4. The hypermedia system promises a new browsing method with the interactive animation technique to make the analyses more effective.

From an educational point of view, the interface design of the hypermedia system provides four advantages:

1. The user perceives all of the information relating to a specific historical building easily by accessing the desired information quickly and linking one kind of information to another.
2. The first time user can learn easily how to use the facility by oral and visual explanation when the help command is activated.
3. Oral explanations which warn the user of his mistakes, making the hypermedia system more friendly.
4. The system educates the user by means of an interactive animation technique with which the user gains new experience for browsing the visual information of historical architecture.

It seems that hypermedia technology allows us to organise enormous amounts of information concerning a historical building for **better and faster understanding** but future developments offer further promises. Network ready hypermedia Systems, voice recognition possibilities and virtual reality technologies will offer the new perspective to the historical architecture of the Topkapi Palace.

Beside all of these conclusions, the project is still under development. Although the graphical design of a hypermedia interface has been completed, it is planned to observe user reactions to see how the hypermedia system works in practise. For this reason, the project has been awarded by the Turkish Science and Technology Council (TUBITAK) to

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