

The Visual Matrix: The case of Mimar Sinan Project Site

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Abstract. This paper introduces a web-based 'visual reference system' model for architectural education and research. The system utilizes visualization to aid in spatial comprehension and comparative analysis of abstract architectural concepts. The system establishes a resource for architectural heritage and differs from such other sources by its matrix-based visualization format.

Keywords. visual reference system; architectural education; multimedia resources; e-learning.

Introduction and background

The introduced model forms an online 'visual reference system' of visual and textual information for architectural heritage. The system collects and orders data. The acquired data from the system is displayed on a 'visual matrix', capable of handling simple sorting operations, such as chronological sorting, or sorting by size. The acquired data can also be organized to form and store individual files (called as the profiles) according to different users or different purposes.

The matrix-based structure of the system allows for adding new information at any time. As such, the system has a dynamic and expanding character. This architectural reference tool for research and education may serve scholars, researchers, architects, designers, and historians from all over the world. The introduced model can be applied to diverse topics and periods of architectural heritage.

There are similar efforts utilizing the Internet, databases, and multi/hyper-media systems in order to store, organize and display architectural information. Such efforts span from electronic libraries of significant buildings representing selected architectural periods (Chan et.al. 1999)

to virtual museums on specific architects such as Tsai's Palladio Web Museum (1997) or Allegra et.al.'s prototype work for comparing the works of two specific architects I.L.Kahn and F.L.Wright (1995). There are systems that establish tools for accessing architectural information such as DOORS (Sklar, 1995) or ArchiWAIS (Choi, 1994) and virtual reconstruction techniques are widely used to model existing or non-existing important buildings, cities and/or sites (Lewin and Gross, 1996) of architectural history. To sum up, use of the Internet and databases are not new in architecture; yet, the proposed system introduces an integrated way of employing both techniques for establishing an original reference system, based on the interrelated multi-layered matrices. In order to display the operation of the introduced model, a demonstrational project is developed.

The project is developed in two phases. During the first phase, general framework of the system was laid out. This initial phase was carried out at the Digital Design Lab of Columbia University Graduate School of Architecture, Planning and Preservation. In the consecutive phase, the system was filled in with visual and textual data. This second phase was carried out with the support from the Media Center for Art

History of Columbia University and Turkish Academy of Sciences (www.learn.columbia.edu/msps.html: Aug 2002).

Mimar Sinan Project Site

The demonstrational project is called the Mimar Sinan Project Site (MSPS) and focuses on Classical Ottoman and its contemporary Western cultural heritage of the 16th century. The system consists of multi-layered web pages containing visual and textual data about the art and architecture of the period.

Classical Ottoman architecture is an important and rich part of architectural heritage. This era is almost synonymous with the great architect Sinan's (Mimar Sinan) works. MSPS combines the extensive, yet dispersed information about this era in one major source, accessible simultaneously by numerous users for diverse purposes such as specific (one item-one criterion), complex (more than one item and criteria) or comparative (more than one item – one criterion) researches.

MSPS is based on visual resources. 'Mosques', comprises architect Sinan's selected mosques both in list and matrix format. The plans, elevations, sections, and site plans are organized in inter-related matrices. Each cell of the matrices and the items on the mosque list are linked to the individual mosque pages for acquiring detailed information on the specific mosques.

'Design Principles', displays the common properties of mosque architecture. These properties are linked to multi-level matrices to observe how unique designs are derived from common principles. For instance, the textual information about "site-building relationship" is linked to the site plans matrix.

'Structure', contains an overview of the structural elements and structural principles utilized in Islamic architecture. There are matrices of the roof structures and the domed interiors of the

mosques. Also each structural element can be analyzed on an interactive table. On this table the user clicks on the name of the element on the left hand side, and the element is displayed with a view on the right hand side of the table.

'Comparisons', introduces matrices for comparing Sinan's architecture to the contemporary Western styles (especially to Renaissance), and to the Early Islamic architecture. The matrices contain plans, sections, elevations and site plans of the Early Islamic and Renaissance buildings. All the views in the matrices can be opened up in an adjustable separate window. Hence, an instructor may easily have the plans of Hagia Sophia and Suleymaniye Mosques side by side on the screen for comparative purposes. Finally, the 'Glossary' introduces visually supported definitions of features, concepts and elements of Islamic and Ottoman architecture.

Matrix-based structure

Current education and research techniques convey data in a linear sequence. Recollection of this data for later use relies upon one's memory and its organization is a tedious task that may not even lead to satisfactory results.

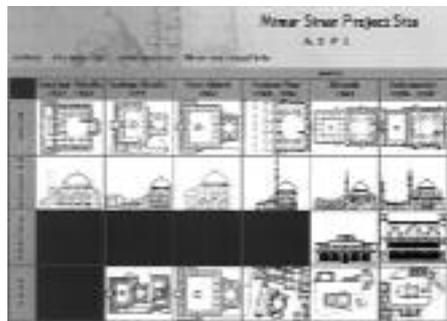
Moreover, notion of space is best perceived in three dimensions. For instance, the characteristics of Classical Ottoman architecture, such as the play of the masses, transformation from human to monumental scale, centrality of form, symbolism of form and delicacy of the structure can be better studied with cross-references from plan to elevation, from site to section. MSPS introduces the possibility of cross-referencing in between the multi-layered data and also integrates QTVR movies of the interior spaces for a better understanding of spatial characteristics. MSPS incorporates means of analyzing the design features specifically and comparatively by its matrix-based structure.

Figure 3. MSPS plans visual matrix organized to display 4-pier typology group.

The main idea behind organizing the visual materials in a matrix format is two fold. First, the matrix structure gives the possibility of displaying all the visual data together for comparative purposes (Figure 1).

If the user wants to have a look at all the plan views, the plan views are arranged on a matrix

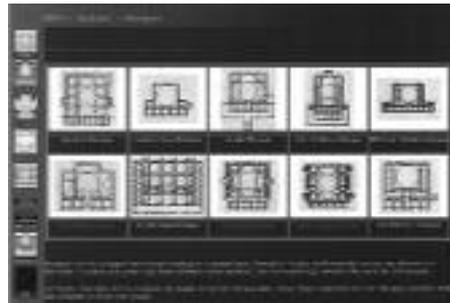
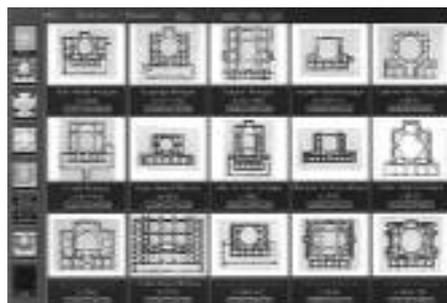
Figure 1. MSPS main visual matrix displaying the drawings of the selected mosques (some views are temporarily inactive).



side by side. As such, the user can have a notion about the amount of data included in the system and also she may compare different plan schemes (Figure 2).

Secondly, the matrix format enables sorting operations to be handled on the data. For instance, the user may have the plans sorted chronologically or may re-sort them according to the different plan typologies (Figure 3).

Figure 2. MSPS plans visual matrix displaying the plans of the selected mosques.



Conclusion: Uses and Users

MSPS contains textual and visual data about the Classical Ottoman mosques, Early Islamic mosques, Renaissance architecture, principles of Islamic architecture, structural elements of Islamic architecture and architectural elements of Classical Ottoman period. By a standard library research, the amount of visual and textual data contained in the system can be accessed at numerous and separate sources.

When inquired by a design student, an instructor, a scholar or an architect the system introduces:

- i. historical, social, political documentation of the 16th Century
- ii. Classical Ottoman Mosques, enabling the user to move back and forth among the buildings for comparisons,
- iii. major examples of the Early Islamic Architecture that helped shape Classical Ottoman architecture
- iv. major examples of the contemporary 16th Century Western styles for comparative purposes
- v. concepts related and unique to Sinan's architecture that can be comprehended better in 3D (such as; the play of masses, the organic relationship between the building and the site, structural solutions, inside-outside relationship), supported by written definitions, drawings and pho-

tos,

vi. definitions and visual documentations of the structural and architectural elements

vii. the possibility of forming and storing different profiles (that accumulate order and organize data in a certain manner of presentation) according to different users or different purposes.

However, MSPS is a demonstrational case for the introduced matrix-based visual reference system model. The model can be applied to other architectural styles or periods, enabling similar kinds of use and aiming at a similar group of users.

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