

Education of interactive panorama-design in Architecture

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This paper mainly discusses the importance of interactive panorama in design, and its education in the MDes program, which will run at Yildiz Technical University in the year 2000.

The first part of the paper summarizes the potentials of current interactive panorama technique, which was “A popular form of the public entertainment” in 19th-century. Then, it compares the real-world experiences with observations in an interactive panorama. This comparison is carried out together with technical aspects i.e. limitations, audio-visual effects, composite techniques, live video input, and conceptual aspects i.e. camera actions, natural phenomenon. The technical discussion in the paper is concentrated on the examples from newly developed tools such as Nodemedia, Electrifier, Wasabi Software, and Skypaint as well as Apple QuickTime VR Authoring Tool.

The second part underlines the role of interactive panorama technique in design. In this part, the paper also summarizes how to use the technique at the beginning and, during creation of the design and in its presentation, taking the installation advantages of sound, vision, text and transition effects.

The third part concentrates on the interactive panorama design as an individual project, offered in the MDes program. Then it explains how the preliminary courses were planned for this individual project and summarizes the content of the course formulated through the linear and non-linear structures of the media.

Finally, considering with the future development of interactive panorama technique, the last part of the paper discusses the possible results of this education method.

Keywords: *Interactive media, panoramic image, design education.*

Introduction

The Department of Multimedia Design at Yildiz Technical University, founded in 1998, is working on a MDes program in interactive media, which will run in the year 2000. The students graduated from various undergraduate studies such as, architecture, graphic design, industrial design, will be admitted to this MDes

program. The program is based on design studios; and each design studio has several individual projects such as *interactive page, screen based interactive object, computer games and interactive panoramic image*. In order to realize this aim, students must take a preliminary course, which consists of interactive design theory and teamwork, to compare the interactive media with the conventional ones, before

registering to the individual projects.

Here, in this paper, as a part of our MDes program, we specifically focus on the education of interactive panoramic design, which will be offered as an individual project for the students who have an architectural background. (It will be started after required advanced techniques are commercially available). In this respect, the paper explores the answers of the following questions: (1) *What is the importance of the interactive panoramic image in design?* (2) *Which is the better educational method to apply?*

Importance of the Interactive Panorama Techniques

In the real world, we observe various *happenings* for architectural purposes that take place in the background and the foreground of the space. There are three main happenings:

- Motions on earth
- Objects in motion
- Motions by Artifacts

These could be classified in a number of ways as shown in table 1.

Whatever they are, we feel that all these happenings are **non-repeating** and occur **randomly** in environments, around objects and actions.

Motions on earth	Objects in motion
Fire & Smoke	Motions by Artifacts:
Fog	(Various machines, tools
Moving cloud	and artworks)
Rain & Falling water	
Snow	
Wave	
Wind	

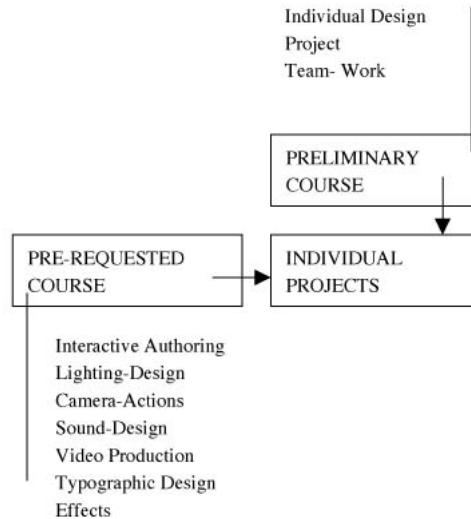


Figure 1 (left). Course Structure in Interactive Media, MDes Program

Table 1 (bottom left). Motions relating to architectural observations

Since the beginning, human kind has been trying to develop representation techniques, which can first 'record' this real-world experience and then 'display' it, as it is in the real world.

Previously, video records allowed the viewers observe the space through various camera actions, i.e. zooming in / out, walking through, flying through / over/ around. Additionally, rewind, forward, pause commands in video tools, gave limited interactions to the viewers as well. Even so, video is a time-limited presentation technique, but the real observation is not.

More recently, time-free interaction on recorded images are developed by computer made interactive 360° panoramic techniques, such as QuickTime VR [QTVR], Surround Video [BDIOMAND], NetVR [NETVR], SmoothMove [INFINITE], Video Brush [VidR]. As we know, the user has a chance to pan the panoramic image 360° freely in the image window to improve his/her observation. Moreover, if the panoramic image has been generated from a 3-D computer model, it would also be possible to pan the image 'panospherically'. [LiveVideo][Wasabi]. Besides all of those, we can add popular transition effects such as fade in/out, wave, clouds etc. [Electrifier].

Figure 2 (right).
Experimenting fire effects in
an interactive panorama,
using Nodemedia, QTVR
Authoring Tool and VR
Script Player.

In fact, representing the real world with the above happenings on interactive panoramic images is not quite easy, especially if random and non-repeating happenings are considered. In this case, the easiest method is to play *live video input* directly on the panoramic image i.e. running traffic, walking pedestrian etc. [PanoVision]. Although observation in this technique is close to the real world, the method is not quite practical at all: First, you must set and switch the video input system, and control camera direction after each starting, which is a really time-consuming process. Secondly, it cannot be presented on any removable storage media (i.e. floppy disc, CD-ROM, external hard disc etc.), and can only be displayed on network environments. Finally, it is not usable the same as any flattened and pre-recorded panoramic image. (Moreover, this application is still under development.)

Hence, how should we present 'the real-world happenings' on a pre-recorded panoramic image for random and non-repeating happenings?

Initially, we can easily say that, action, which occurs in a certain rhythm, can be displayed in a looped movie clip, which provides the continuity in the action. [Nodemedia] Motion nature and climatic motions classified in table 1 can also be processed in this way, except the wind effect: To display the wind effect, we need to deform and activate every cast member in the scene such as trees, grass, and even human being and animals. Therefore the process of adding wind effect is highly impractical in this technique.

A number of specific rhythmic actions of *man* such as gymnastics, dancing, and artifacts such as clock, lighthouse, windmill and even kinetic sculptures, can also provide the continuity in the looped movies.

While considering with random and non-repeating happenings in a pre-recorded interactive panoramic image, one might say that the viewer could not understand the movie loops, if a movie is embedded, which runs longer than the average observation time of the viewer.

To specify this observation time, we made a small



survey on 50 people using our Topkapi Palace VR site. We asked them to look at 5 QTVR movies to determine architectural similarities and differences in the buildings. Our testers viewed the movies in minimum 15 seconds, maximum 180 seconds and average of 52 seconds to be able to answer our questions.

In this case, the average observation time of the viewers, which is specified above is highly controversial. The viewer might look at the movies longer or shorter than expected; depending on the attractions created in the movie i.e. representation technique, vision, sound, text, effects etc. Therefore, estimating such a time limit is quite difficult and may be impossible.

The Role of Interactive Panorama in Design

Parallel with the latest developments, we will install video, sound and 3-D objects in the interactive panoramic image. Therefore, the designer or the artist now composes the media in this environment, and creates an interactive artwork the same as in an interactive web page or a CD-title. In this respect, we might call interactive panorama as a *powerful multimedia technique*.

In an architectural point of view, panoramic images

have been important for many years. In fact, this technique was a popular public entertainment in 19th century. "Traveling artists would set up a tent housing a long canvas strip, or cyclorama, on a track surrounding the viewer. The canvas would be painted with 360-degree views of nature scenes or historical events and paying customers would sit in the middle of the tent and watch as the scene was cranked around them" [Lainhart98].

At the beginning of the design, we often use panoramic image to determine design factors on the building site. More recently, we have also had a chance to easily present our design ideas in the interactive panorama technique, and view it the same as the real world experience, panning the image in any direction. Current and future possible advances in this technique promise not only to record existing environment and convey ideas but also to evolve the design as a composing media on an interactive panorama.

However, when we think about the practicality of this technique, its production process is not yet much useful. Current commercially available authoring tools will ensure the designer to add audio-visual effects on the interactive panorama, but the position of movies or 3-D objects cannot yet be exactly fitted onto the panoramic image cylinder or sphere. Yet, comparing with their current versions, these tools are getting improved and will promise more effective production processes in the near future.

Interactive Panorama in Design Education

In general, interactive panorama is a 360° recorded photographic image. In an educational point of view, the student needs to learn the production methods of a 360° image, parallel with the basic photographic principles; but if we mention sound, text, animated images and video installations on interactive panorama; this education should go beyond the photographic education and application skills.

We conclude from the above statement that, the

student should learn main principles of *linear structures* such as animation, video production and *non-linear structures* such as web sites, CD-titles, before designing a sophisticated interactive panorama.

For linear structures, we will offer courses relating to fundamentals of traditional cinematography i.e. lighting- design, action, time-control, sound-design, typographic design and transition effects. Specifically, in the sound-design course, we are planning to give several exercises to the students and force them ...

- to analyze characteristics of sound effects and music in significant examples of movies and plays (theatre, opera, television and radio)
- to select a sound effect and / or a music piece for a movie, a play or a theme
- to select an appropriate video-production for a specific sound effect or music i.e. photographs, video records

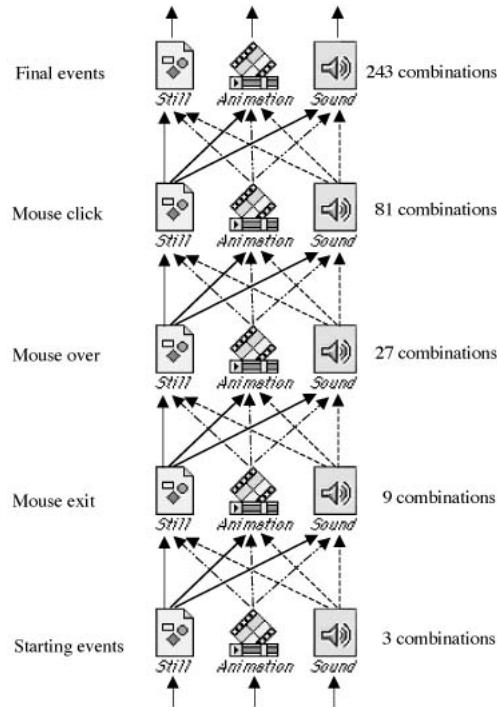
On the other hand, for non-linear structures we offer the *interactive authoring* courses relating to navigation structures, icon-design and mouse events.

We classified 243 basic combinations of interactions created by mouse events (mouse exit; mouse over; mouse click) depending on visual images (still and animated) and sounds (figure 1) [INTERACTION]. Of course, the number of combinations can be increased; using different variations of mouse events, as well as frame events and keyboard events (Callery,1996). (For instance, we can add 'double click', 'mouse up' and 'down event' under mouse click option). We are planning to teach how to realize some of these interactions by authoring tools and then expect them to find the other combinations as much more as they can.

After these studies, students will have a chance to compare main differences between two structures mentioned above and will gain a certain design ability in the interactive media rather than application experience. They will easily adopt their experiences

Figure 3 (right).
Combinations of mouse events in an interactive design [A].

Figure 4 (bottom right).
Thematic analysis onto flattened panoramic image using PhotoShop.



to their artistic design, especially learning various interaction possibilities created by mouse events. Taking advantages of their architectural background, students will compose interactive panorama in many ways to complete their artistic design. To improve their productions, they will be able to use various combinations i.e. integrating time-based and time-free movies, adding transition effects, installing video and computer generated images.

Having had such preliminary courses, the students will, finally, concentrate on individual projects

for producing an interactive panorama such as:

- representing an architectural tour i.e. in a city, in a building complex,
- representing a designed project
- thematic analysis of virtual place.

For the first two subjects, interactive panorama technique is a tool to convey an idea, which is recorded by camera or modeled by computer; but for thematic analyses, it is a design environment.

During the designing of the individual project, the students:

- first plan node structures symbolized on a flow chart i.e. node to node, node to movie to node etc.
- then make artistic decisions on the flattened panoramic scene.
- finally, compose object, text, sound and scene either on a flattened panoramic background or in a spherical view of the interactive panoramic image window depending on which application they use.

Conclusion

Educational ideas in this paper might be found a bit inapplicable; because advances in this technique are not fully fixed in the authoring tools yet, are not widely experimented and are still under development. Whatever it is, we can realize once again that

- Interactive panoramic image is becoming one of the most important, is also an alternative



representation technique and design environment depending on advances in this area.

- The students' design skill will get richer, using such a different environment.
- The process of the technique provided by future authoring tools, will be easier and will be more user-friendly. Consequently, the students will be more creative in their works, in the near future.
- Interactive panorama technique may produce new forms, styles and new ways in the representation and enrich design process.

In an educational point of view, we cannot easily say that this is a better method to study, because the

program has not started and been tested yet. However we have the following foresights:

- If the student will not be able to understand the real role of this attractive technique in design and will not use it intelligently and logically; the technique will become a technological play rather than an effective design representation.
- To prevent the above disadvantage and to improve design issue in this type of education,
 - we should underline the concepts, the role of this technique in representation,
 - should teach basic artistic abilities for this representational environment,
 - and finally should not give priority to the

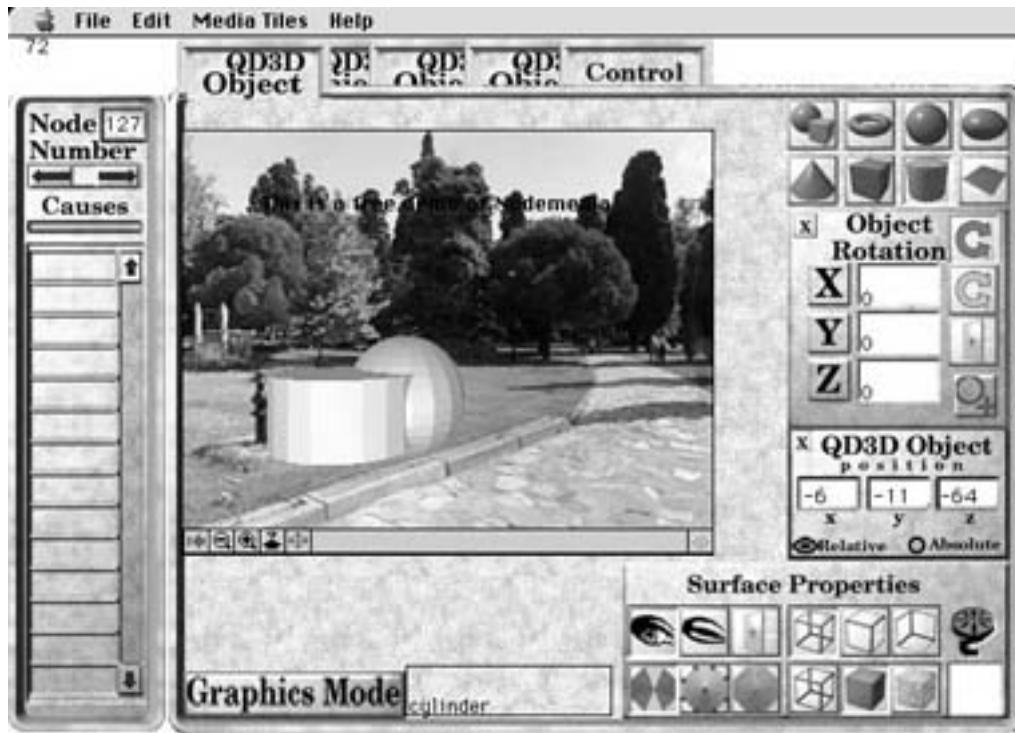


Figure 5 (left). Thematic analysis directly applied into QTVR Scene using Nodemedia.

software education and keep the balance between artistic and technological experience for better results in the design education.

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Notes

- [A] There are 243 combinations of interaction forms from starting events up to final events. Possibilities illustrated between 'starting events' and 'mouse exit' have different meanings. For instance, 'Still to Animation' means Linear Movie Button, 'Animation to Animation' means 'Looped Movie Button'. The same relationships can be devised between 'mouse click' and 'final events' as well.



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