A DIGITAL EXHIBITION OF THE HISTORY OF THE OLYMPIC GAMES IN ANTIQUITY.

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ABSTRACT:

The Digital Exhibition of the History of the Olympic Games in Antiquity is a project for the Hellenic Ministry of Culture funded by the 3rd European Framework. We can define this Digital Exhibition as a complete set of digital applications or a “digital bunch”. This digital bunch acts rather complementary to the exhibits of the Ancient Museum of Olympia and presents a complete picture of the Ancient Olympics for the visitor. The Digital Exhibition uses 14 different information systems varying from classical info kiosks and PDAs to Haptic Systems, Synchronized Video Sequences, and Virtual Reality Theater. Although the project makes an extensive use of digital technology, all the applications are separated from the original exhibits of the Museum, in order to respect the classical form of an Archaeological Museum. The production of the content, the digital applications and the system integration took more than 15 months before being presented to the public.

1. Introduction & General Considerations

The basic idea of this project was to make more attractive a classical archaeological museum with the appropriate digital technology applications. The Museum in the city of Olympia is a neoclassical style building, and was designed and constructed in 1885 by the German architects F. Adler and W. Dorpfeld. The whole construction was funded by the famous Greek philanthropist Andreas Sygros, and for that reason the building was named Sygrotion. Until 1970 all the famous statues and artifacts of the Olympia excavations were hosted in this building. When the new museum of Olympia opened in 1980 the old one closed and after extensive reconstruction works he opened again in 2004, as the Museum of History of the Olympic Games in Antiquity. During the reconstruction phase of 2002-2004, a lower level was created in order to host future thematic applications. The basement was finally used to host the Digital Exhibition of the History of the Olympic Games in Antiquity. The production of the content, the digital applications as well as architectural works and the system integration took more than 15 months to be presented to the public. The project started in January, 2007, and from last April, 2008 until August, 2008 the museum operates in a pilot process. For the design of the digital exhibition a number of general rules were taken under consideration for the whole design process. The collection of the exhibits is the most valuable asset of the museum, not only because of its high archaeological value, but also because of the combining force of the assorted messages and information. The entire content of the exhibit illustrates the amazing achievements of the ancient Greek world, which by rituals such as festivities and games, developed social responsibility and the spirit of community.

• The constant bonding between these rituals and the city-state as a way of social and political forming in the ancient world has been greatly illuminated by recent archaeological studies. Based on the plethora of information, the diversity of the visitors, and the functional capabilities of the museum, the digital exhibition will discretely serve the existing ancient exhibits of the ground floor, but also will act as a complementary repository of information in the lower level.
• While the visitors of the museum have to follow a predefined path in the main rooms of the ground floor of the museum, they are free to select any digital system they wish, when they are on the lower level.
• The content of the digital exhibition will be presented in 4 languages, i.e. Greek, English, French and German.
• For the personal information systems (PDAs), the exhibit descriptions will be presented in two versions. The first “compact” version will be offered to visitors with a limited time for the visit of the museum. This version will focus on the major exhibits of the museum only. The second one will cover all the exhibits of the ground floor of the museum.

2. The Information Systems

The Digital Exhibition of the History of the Olympic Games in Antiquity uses 14 different information systems varying from classical info kiosks and PDAs to Haptic Systems, Interactive Walls, Synchronized Video Sequences, and Virtual Reality Theater. We will focus on some of the most attractive systems of the exhibition, i.e. the Haptic System, the Synchronized Video Displays System, and the Virtual Reality System.

2.1. Haptic System

The Haptic System is a virtual reality system where the user can interact, through the senses of touch and sight, with digital models of 3D art forms and sculptures [1]. The system (Figure 1) main components are: Host PC, Control Unit and the two Robotic Devices.
- **The Host PC.** The Host PC is the high level application computer responsible for force rendering and graphics management procedures. Also the Host PC communicates the data for controlling the robotic devices to Control Unit through UDP protocol.

- **The Control Unit.** The Control Unit runs Low level control software. The main functionalities of the Control Unit are: To acquire the HI sensor signal, to generate the correct HI control motors signal for moving two arms and for providing an open loop (pre-compensated) control for exerting forces on the end-effector (force feedback functionality). Other functionalities of the Control Unit are the implementation of the control algorithms of the force to be exerted and position/speed of the end-effector, and the management of the UDP communication with Host PC.

- **Robotic Devices:** The robotic device is made of two identical mechanical arms each having a serial kinematics with a total of 6 degree of freedom. Robotic devices provides the force feedback to the user by means of two suitable thimbles.

![Figure 1. Haptic System diagram](image)

In our case, the system allows to the visitor to “touch” well-known statues with a thematic relevance to the games of antiquity. It should also be emphasized that since these statues are exposed in different museums around Greece, the Haptic System can be considered as a “digital repository” of statues and sculptures. Currently, two famous statues are presented, the well known Hermes of Praxiteles and Eniochos of Delphi. Both statues were digitized using 3D scanning technology systems and then imported to the graphics engine of the Haptic System (Figure 2). In order to enrich the visual part of the application for the user, a 3D auto-stereoscoping screen is added. The system also allows those individuals with visual disabilities to “touch” digital copies of existing statues, thanks to the extensive use of touch imparted by the system. The Haptic System was developed and installed in the museum by PERCRO research.

![Figure 2. 3D model of the Eniochos of Delphi statue.](image)

2.2. The Virtual Reality System

Although Virtual Archaeology has been accused of being more ‘an artistic task than an inferential process’, this medium still remains the most attractive approach for digital reconstruction [2]. In this application, a virtual walkthrough of the site of Ancient Olympia is presented with the help of dramatized narration. Our heroes, an old athlete and his grandson, walk in the in the site of Ancient Olympia in June 169 B.C. In 22 minutes, the athlete presents detailed information about the various buildings and temples of the site. His grandson is attracted by the story and by the site and he decides to be an athlete for his city-state when he grows up. The scenario is based on the book of Pausanias Guide to Greece [3].

For the construction of the 3D models, our main bibliographical reference was the 5 text volumes and the drawings of the German Archaeological School, Olympia. Die Ergebnisse der von Deutschen Reich veranstalteten Ausgrabung (Adler et all. (1892-1897))[4],[5],[6]. In total, 29 buildings were digitally reconstructed, each in 3 different versions, i.e. High, Medium and Low Quality models, or 40K, 10K, and 1K polygons (Figures 3, 4, 5). By using videogame techniques, each High Quality model was “equipped” with the appropriate textures. Then all the textures were “baked” using the appropriate lighting conditions. Finally, all the baked textures from the High Quality 3D models were ported to the Low Quality ones. The advantage of this approach is the cinematic quality of textures for a Low Polygon Model. In total, 2,848 baked textures were created for the 29 different buildings of the site. The show is
presented to 27 visitors each time, using two video projectors on a screen with dimensions 4m x 2.5m. Each visitor uses his/her own stereo-glasses and headsets. The system supports 4 languages (Greek, English, French, and German) and each visitor can select his/her own language. The system also allows to the viewers to “vote” and select between various paths through the buildings of ancient Olympia.

2.3. The Synchronized Video Displays System

A corridor with 5 successive video displays on each side serves as the entrance to the digital exhibition. On the left, a “walking” video presents the ancient procession from ancient Ilyss to Olympia (Figure 5), while on the right side a group of ancient athletes are practicing in the Gymnasium, while others run from screen to screen. Every element of this 2D sequence is a 3D object placed in a separate layer. A skeletal system is also encapsulated in each element (Figure 6). All the elements of the sequences move independently for 3 minutes, using their own skeletal systems. The main objective of this application is to “drive” the visitor to the central room of the lower level, where a variety of different information systems is installed.

Figure 3. Philippeion 3D Model

Figure 4. Epidamnos Treasure 3D model

Figure 5. Anonymous Treasure 3D model

Figure 5. Synchronized Video Sequence

Figure 6. Skeletal System of the 2D Elements

3. Conclusions/Future Directions

For the first time a large number of information systems has been combined for the presentation of a classical museum exhibition such as the History of the Olympic Games in Antiquity, not only in Greece, but also worldwide. Although a wide number of multimedia applications were used, we believe that a symbiotic relationship has been formed between the classical exhibits and the current digital bunch. A number of difficulties during the content creation process and a questionnaire from the visitors of the museum during the pilot operational period helped us to arrive at the following remarks:

- The Haptic System was evaluated as a difficult multimedia system, since the majority of the visitors could not interact with the virtual statues, without some
kind of training. In addition, since the models were presented in full scale, many visitors requested that some statues be scaled down in a future version.

- The majority of visitors were attracted by the VR Theater. The comments for the visual approach were very positive. Although 3D sound techniques were used, a few problems have arisen from the matching between the sound data and 3D objects in some languages.
- The lack of live elements (human figures) in the show, which were left out due to budget constraints, rendered the presentation less attractive. This was particularly noted by the young visitors, since they are more familiar with digital culture (videogames).

We hope that future versions will address the above issues and will bring the classical type of archaeological museums into the 21st century.

References


