Reviving Ancient Egyptian Scenes

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Abstract—**Pharaonic inscriptions contain a lot of scenes that illustrate many activities in ancient Egypt, such as daily life activities, religious rituals, festivals, battles, etc. This paper aims to show how the Egyptian Center for Documentation of Cultural and Natural Heritage (CULTNAT) used computer graphics in some projects to visualize the ancient Egyptian scenes in an attractive manner.**

This paper is concerned with four different projects; namely the botanical garden in Karnak temple, the Zodiac of Dendera Temple, the Opet Festival, Kadesh Battle. In each of them, the heritage data visualization was realized with different methodology that suits better the content being presented. The paper describes those different methodologies, why they were used and challenges faced to achieve those projects.

Keywords—visualization; computer graphics; Multimedia; Culturama; Zodiac; Dendera; Karnak; Kadesh; Opet

I. INTRODUCTION

Egypt's heritage is of worldwide interest and importance due to its continuity over a period of more than five thousand years. It encompasses various aspects of human civilization, monitors the development of human heritage, and represents cultural as well as natural heritage of national and international value.
This wealth in archeological sites, architecture, arts, folklore and natural beauty needs to be accurately and purposefully documented. Hence, the establishment of the Center for Documentation of Cultural and Natural Heritage, CULTNAT, one of the research centers of Bibliotheca Alexandrina, supported by the Egyptian Ministry of Communications and Information Technology.

The Center's mandate is to document Egypt's cultural heritage as well as its natural heritage, to increase public awareness of Egypt's heritage using all available modern technology and to build capacities of professionals in the fields of conservation and documentation of cultural and natural heritage.

Ancient Egyptians, the first documenters in history, used different objects such as walls of temples and tombs, stelae, stone plates, papyri and others to depict the daily life, science, art, business, mathematics and major events. Since the ancient Egyptian culture is based on religious beliefs, scenes of the worshipping rituals, judgment day and the afterlife were also represented.

Those documents are the main source of knowledge about ancient Egyptian history and culture. Understanding and illustrating the content of those documents is very essential not only to Egyptologists and historians, but also to the general audience to better apprehend the ancient Egyptian culture which has strong shadows on the contemporary Egyptian life.

Most of the ancient Egyptian documents have iconography as a main component of representation, hence they are called scenes. Hieroglyphic texts are used in some scenes as a secondary element.

This paper describes how computer graphics and multimedia were used to visually clarify and demonstrate the meaning of these scenes not only to be easy to be understood, but also to serve as an attractive and innovative learning method. The paper proceeds by first defining some challenges in explaining ancient Egyptian scenes. Secondly, how computer graphics and multimedia were used to solve those challenges. Practical examples from some projects implemented by the Egyptian Center for Documentation of Cultural and Natural Heritage, CULTNAT, are investigated.

II. CHALLENGES

This section explicates some of the challenges and how they were handled.

A. Think like Egyptians in architectural drawings

In the modern engineering drawing, normally any building is represented by two different separate views: a plan and elevations for different sections of the plan which is quite different from that of the way of the ancient Egyptians. Investigating the ancient Egyptian drawings of buildings whether on the walls of the temples or on papyri, showed that they used to superimpose the elevations on the plan, such that each elevation is placed on the top of the corresponding line in the plan. In this way, one can imagine easily how the building looks like in three dimensions. So simply, having a copy of a

papyrus drawing on a piece of paper, one can cut around the elevations except at its connection with the plan line and raise the elevations up to become perpendicular to the plan thus getting a physical 3D view (model) of the building directly.

B. Scene architecture

Ancient Egyptian documents can either contain one or more scenes. In case of multiple scenes document, each scene is usually framed in a rectangular area called "register". In most cases, registers have a logical order. The problem lies in the documents that does not contain registers, in which multiple scenes are mixed together with no visible or regular separation. This makes it very difficult for non-specialists to identify different scenes. In addition, most of these documents require a long research by Egyptologists to identify the different scenes and their logical order.

Another challenge was that the Hieroglyphic text could be written far from its corresponding iconography. As previously mentioned, the main element of the scenes are the iconography and some Hieroglyphic text.

C. Loss of colors and or details

It is hard to understand the ancient Egyptian scenes as most of them lost their original colors and some parts or details of the scene.

D. Comparison between different elements

Sometimes it is required to make visual comparison between the ancient Egyptian scene and some recent documents so as to better understand the scene. For example comparing between ancient Egyptian representation of the sky map (zodiac) and modern representation, or between some ancient rituals or habits and the same rituals that are still being practiced in a different context nowadays.

E. Scenarios and story telling

Many documents are illustrating events that happened over relatively a long period of time. For example ancient celebrations or festivals that lasted for several days or battles that spent several months. A series of scenes are used by ancient Egyptians in such documents to introduce a sequence of actions forming the storyline of the event. This series of scenes has a similar concept of the modern comic books, but with different distribution and annotation.

F. Representation of songs and poems

Some scenes include poems that are an essential part of the storyline of the document. Maintaining its dramatic and artistic effect to the entire document, is tackled.

III. IMPLEMENTED PROJECTS

In this section we are going to present different projects to present different ancient Egyptian scenes, implemented by Cultnat in which the previously mentioned challenges are handled. As many of those projects are implemented on Culturama system, we will first introduce Culturama.

Culturama is a fully interactive multimedia program on semicircular nine screens panoramic display for cultural and natural heritage. The resolution of the display area is 7200 x 600 pixels. This area is used to deliver wide range of information such as historical timelines, panoramas, scenes and sites, visual comparison between many items and high quality display of large objects. These kind of illustrations cannot be provided using standard computer display. The Culturama, winner of many awards received Patent Right No. 23651 from Egypt -Ministry of State for Scientific Research, with the inventors Prof. Fathi Saleh and Eng. Mohamed Farouk. [1]

Fig. 1

As to the hardware and software involved; the familiar regular workstations, regular video projectors and flat screens projection provided the semicircular projection and the latter facilitated image stitching with no need for special hardware. A new concept of multimedia development is introduced to operate this huge display area. Flexible and powerful software manipulates the whole system. Last but not least. The use of those familiar equipment made Culturama cost effective and easy to maintain. Fig. 2
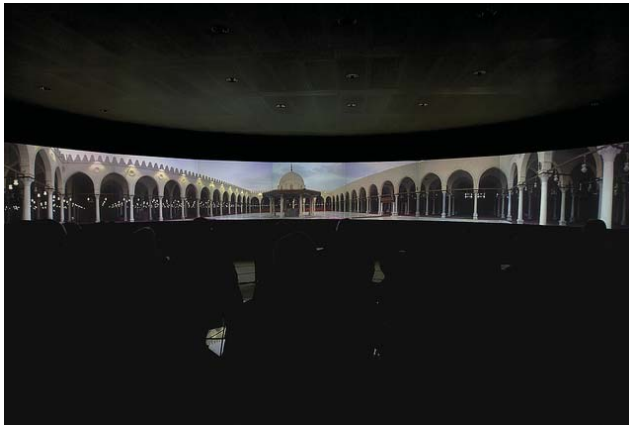
Fig. 2

A. The Botanical Garden

A part of Culturama main show is the Botanical Garden which shows an important part of King Tuhutmosis III contribution to the Karnak Temple, Tuhutmosis III chapel. The Botanical Garden is a unique small room in which the different wild plants, animals and birds that existed during the king's reign are engraved thus documented. It's also called the Botanical Chamber of king Tuhutmosis III. Fig. 3

Fig. 3

Since the colors on the walls were erased, the natural heritage team in CULTNAT recognized the different species, given what we have today. Based on the findings, these drawings were repainted in their same places respectively to facilitate morphing between the inscriptions and the painted image, in the light of recent photos of the recognized species.

One can see the walls outspread on the panoramic screen. The walls seem to revolve around the spectators of the Culturama with their fascinating drawing of plants and birds inspiring the feelings of being inside a real garden. Selecting any bird or plant figure, the painted image is displayed overlapping its same position and information about it is displayed. Fig. 4
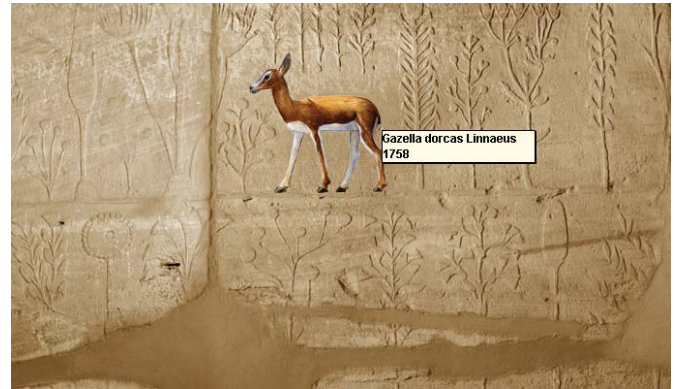

Fig. 4

B. The Opet Festival

The Opet Festival had been celebrated annually since the reign of Queen Hatshepsut (18th dynasty). It was held in Thebes during the second month of the season of inundation and lasted for about 22 days. The festival was linked to the flood of the Nile and its symbolic fertility. The content of the religious rites of the Opet Festival is not perfectly understood but, this Festival is one of the most important festivals in ancient Egypt. [2]

Much of our information about the Opet Festival, comes from the reliefs engraved on the walls of the great colonnade of king Amenhotep III at Luxor Temple. The western wall shows the southward procession and the ceremonies from Karnak to Luxor, and the eastern wall shows the return journey.

Although this ritual took place 3000 years ago, it is reflected in the rituals which still exists till now namely the *Moulid* (religious celebration) of the Muslim sheikh Abu El Haggag. He was a venerated Muslim sheikh who settled in Luxor around 1245 AD and whose mosque and tomb lie within the temple premises. The modern *Moulid* is celebrated each year in the Islamic Higri month of Sha'ban and it has kept, in modified form, many of the ancient festival traditions. Luxor is then transformed to a carnival for three days.

The three screens movie with 4:1 aspect ratio was produced in order to visualize the festival scenes. The main challenges of this movie are to show the very wide scenes for the audience, presenting the chronological order of building the Karnak and Luxor temples, and to make a visual comparison between the ancient rituals and some rituals in the *Moulid* of Abu El Haggag.

As we see in Fig. 5 the aspect ratio helped to visualize some very wide scenes. As it was very difficult to show these scenes in one shot for the audience, especially that the related text which has very small details is highlighted.
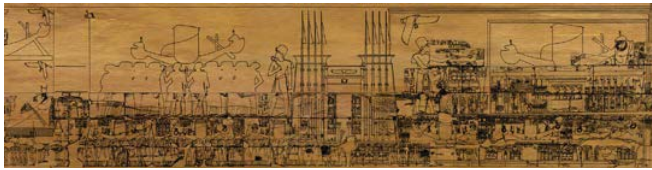
Fig. 5

As we see in Fig. 6 to present the chronological order of the temples and to show the journey in the same screen.

Fig. 6

We shot some videos from the *Moulid* of Abu El Haggag in order to make a clear visual comparison between the modern rituals and the ancient rituals engraved on the walls Fig. 7

Fig. 7

C. The zodiac of Dendera

The zodiac of Dendera is one of four episodes dedicated to show of the four unique ancient Egyptian temples. This multimedia product can be shown on a special multi-screen system or via regular DVD video that can be shown on a normal screen.

Dendera was the capital of the sixth Upper Egyptian Nome and is one of the important historical and religious sites. The site is famous for the best preserved and magnificent Temple of the Hathor goddess, known as the temple of Dendera. The main temple dates to Ptolemaic to the Roman Period and is dedicated to Hathor, the cow goddess whose main cult center was Dendera. She was the goddess of motherhood, fertility, agriculture, joy, love and music. She was also a sky-goddess and a goddess of the underworld.

The Zodiac of Dendera Movie consists of three main parts, each associated with different types of challenges. The first part shows the architectural building of the temple. For this purpose a 3D model were created to show the building and its parts (fig. 1) as well as an animation representing the spaces inside the building with the same sequence that ancient Egyptians followed to build their temples Fig. 8

Fig. 8

The second part is a comparison between the zodiac of Dendera and the ceiling of the tomb of Seti I which was built more than 1000 years before the temple and of course in a different location and a completely different geometry. A lot of image processing techniques and illustrations over the images where used to make this comparison visually clear for the audience. Fig. 9

Fig. 9

This part also shows another comparison between the zodiac of Dendera and a recent sky map. For both comparisons the screen design had to have a clear visual link emphasized by animation to prevent confusion. Also illustration of the zodiac of Dendera were created and used because the monochrome wiped drawings were not clear enough. Fig. 10

Fig. 10

The third part shows what's considered a religious poem by the four goddess' who held the sky. Composing this piece of music, experts worked on the text and wrote the ancient Egyptian text with Latin letters to enable opera singers to pronounce the words the same way it is thought that ancient Egypt did. Cooperating with the orchestra of the Library of Alexandria and the composer Dr. Sherif Mohie El Din, the text on the wall turned into an alive musical show accompanied by visual and ancient Egyptian text (illustrated) along with its English translation. Also corresponding animated highlight appear synchronized with the singing. [4]

The visual treatment includes three levels of details. The whole ceiling appears on the right hand side and the selected part is highlighted zoomed in the center of screen while the illustrated ancient Egyptian text with its translation are located at the left hand side. Fig. 11

Fig. 11

The zodiac of Dendera participated in Fiamp Award by Avicom - Icom (The International Council of Museums) UNESCO and was mentioned with Honor in the Educational Film Category.

D. The Battle of Kadesh

The battle of Kadesh between the forces of the Egyptian empire under Ramsses II and the Hittite empire (turkey), took place at the city of Kadesh on the Orontes River, south the city of Hems in the Syrian Arab Republic

The battle is generally dated to 1274 BC. It is the earliest battle in recorded history for which details of tactics and formations are known. It was probably the largest chariot battle ever fought, involving perhaps 5000 – 6000 chariots.

The Ancient Egyptian drawings have a unique pattern of projection as mentioned earlier, in which the vertical (elevations) and horizontal projection (plan) are mixed in the same drawing. The below shot from another multimedia show produced by CULTNAT explains the idea of the ancient Egyptian representation of scenes Fig. 12
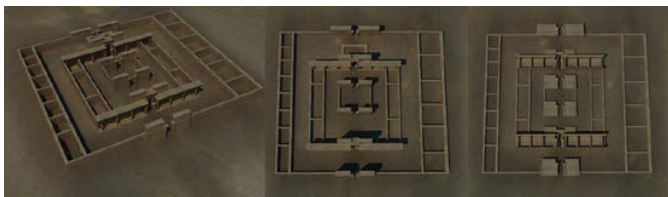

Fig. 12

The battle of Kadesh wall of Abu Simbel temple describes the battle in scenes along with the topology of the battle field. A 3D model was created to simulate this topology and a rising up animation of the drawings perpendicular on the plan showing the battle scenes in a more familiar way than that of the ancient Egyptian representation. Fig. 13
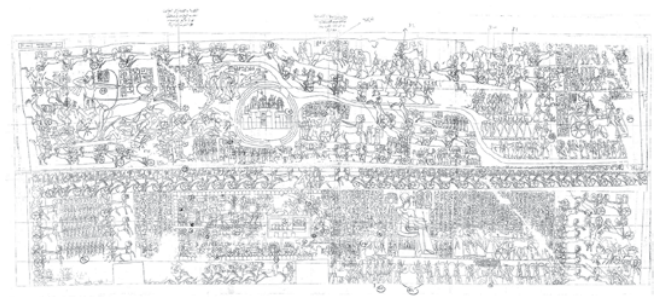

Fig. 13

The elevation depiction of the castle, other buildings and the river where turned into a 3D mass, Fig. 14

Fig. 14

The scenes where illustrated and colored accompanied by narration that describes each scene, animated with the exact chronological order of the battle as found on the wall by the location and not chronologically. This way the scenes are shown by its right location and right chronological order. Fig. 15, Fig. 16

Fig. 15

Fig. 16

IV. CONCLUSION

We presented in this paper, different challenges -resulting mainly from the nature of ancient Egyptian documents- that we faced. We also introduced different projects the Center for Documentation of Cultural and Natural Heritage (CULTNAT) has implemented highlighting how we handled those challenges in explaining and presenting the content of different ancient Egyptian scenes.

ACKNOWLEDGMENT

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