

# **Digital Extensions to Cultural Objects – Object Identity through ‘Contextualized’ Presentations**

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## **Abstract**

Displays of cultural heritage representations - whether physical or digital – tend to lack substantial intrinsic cultural and symbolic values. They are often contextualized within filtered environments which are usually much too sterilized to suggest depths beyond their visual aesthetic worth. In this era of digital possibilities, the choice of media and their modes of executions in such displays require a degree of reassessment and explorations. Although there is a need to acknowledge the limitations that the digital platform could presently afford, at the same time, there are numerous opportunities that cannot be ignored.

This paper recognizes the notion that an in-depth understanding of cultural semantics cannot be derived solely from the display of inanimate objects and its textual support. Showing relationships between heritage objects and their users could assist in enriching the identity of these objects, thus their values and cultural significance. As a case study, the project examines the use of motion capture and 3D digitization in the documentation of a cultural dance movement and the cultural symbolisms used in this performance. It is aimed that with the presence of these digital cultural objects or artifacts within a possible interactive, suggestive ‘context’, it would contribute to a deeper understanding of the identity of the objects.

The paper outlines the processes, and it evaluates the importance of the above method of digital presentation by analyzing and highlighting its added values to

current digital representations. While the issues related to the collection of relevant data are crucial, the methods of presenting this information will also be discussed.

*Keywords: Digital presentation, Cultural preservation, Motion capture, 3D scanning, Media contextualization*

## **1 Introduction**

Digital technologies have facilitated the continuing exponential growth of content collections today. As a result, we also see a tremendous increase in digital presentations of cultural subjects – both tangible and intangible. It seems appropriate to establish that at this juncture, a representation or a signifier – digital or otherwise – cannot be likened to the object it represents or the signified. This is despite numerous attempts to digitally replicate the real in terms of experience and tactility. Immersive CAVE system (Gaitatzes et. al. 2001) to experience cultural spaces, data gloves as an extension to human biological movement (Ozcan 2000), haptic devices to ‘feel’ remote objects (Laycock et. al. 2006) and many other state-of-the-art technologies do not appear to lead us any closer to experience reality.

Arguably, apart from providing a sense of scale and textures, ‘real’ cultural objects in glass compartments affixed in museums do not communicate much more, especially of symbolic meanings, than, for example, their respective images on the internet do. It may, therefore, be a fruitless exercise if not an impractical one to exert our focus on the issues related to ‘authenticity’. In this vast digital content generation, the argument in presenting cultural objects has to shift to the appropriateness of depth and quality of information presentation relevant to specific groups of audience.

It has been previously suggested that a standardization of information depth and rigor need to be implemented (Beacham et. al. 2006). However, the quality of cultural object presentation cannot be ignored too. A recent survey of users’ perception indicated that apart from accessibility and other factors, coherence and organization of information are also ranked highly significant in the delivery of cultural objects - in this case, of architecture (Kwee et.al. 2006).

Contextualization of representative abstractions is an option in the information presentation of cultural objects or artifacts. In this paper, we investigate the relocation of such object representations within an appropriate, but less tangible cultural activity representations. This is aimed to ‘reclaim’ a degree of intrinsic symbolic significance that has been lost when such objects or their representations are removed from their rightful activities and/or contexts.

The following section outlines our project targeted at a particular section of the general public.

## **2 Project Background**

The United Arab Emirates is a fast-evolving country – socially and economically. As a sense of detachment from cultural identity appears to be growing, especially among the younger generation, there is a pressing need not only to document but to present cultural objects in a manner that is attractive to them. The project outlined in this paper aims to explore satisfying this need to some level. This is done through the contextualization of cultural artifact representations within a cultural activity representation.

### **2.1 Considerations**

#### **2.1.1 The scene.**

Most of today's digital preservation projects do not appear to record intangible aspects of cultural objects such as custom, dance and skills (Yang et. al. 2006). In our project, a selection of artifacts is presented in a cultural scene or activity to inject an idea of the context in which these artifacts are normally present. This project adopts local customs and events in the UAE cultural scene in which various objects usually add to specific moods and thus defining their roles within such activities.

#### **2.1.2 The characters.**

The clean characters in a highly popular local digital cartoon series, 'Freej' (Figure 1) have been identified to be examples of a potential vehicle. Although this approach may justifiably question of the authenticity of the 'context', the simplicity appears to be an attractive asset often linked to the entertainment or edutainment industries, appealing much to the younger crowds. The use of less complex environment and characters could also assist in enhancing the presence of the cultural objects of interest.



Figure 1: A local television animated television series 'Freej'. A screenshot from <http://www.freej.ae/>.

### 2.1.3 The media and content.

The target audience is one of the main influencing factors in the choice of media and the depth of content. Secondly, since to a large extent, cultural artifacts need to be illustrated by three dimensional representations, the choice of predominantly visual media is deemed appropriate. Meanwhile, intangible aspects maybe conveyed through other media- e.g. texts and sounds.

## 3 Processes and Instrument

### 3.1 Selection and 3D scanning or reconstruction of culturally significant objects/artifacts.

Some culturally significant objects were selected to support the scene. These include:

- A traditional UAE coffee pot ("dellah")
- A food covering straw hat, which is nowadays only used as a party hat ("magdah")
- A vase for burning incense ("medhan")
- A UAE water amphorea ("yehalla")

- A straw basket of dates ("mahrafa")

The objects were then digitized using the Minolta Konica VI-910 3D Scanner. Laser scans of the objects took across multiple viewpoints, and the resulting point clouds were then stitched and post-processed using Minolta's "polygon-editing tool" (Figure 2) and also GeoMagix. Artifacts that required fewer details were reconstructed in a 3D modeling software.

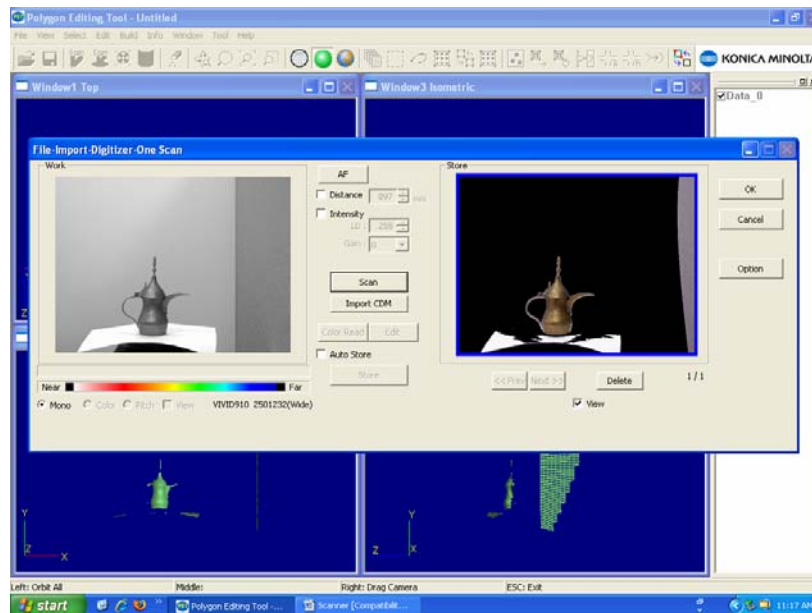


Figure 2: Polygon editing of a 'coffee pot'.

### 3.2 Selection and motion capture of a number of culturally significant human movement sequences.

The movement sequences include for example:

- The traditional UAE "stick dance" ("razfa")
- Walking sequences for men and women
- Basic gestures or mannerisms

The choice of capturing movement data as opposed to presenting a linear animation or video sequence was primarily based on the possibility of:

- applying the same movement to an unlimited number of characters and the same data may be re-used in the future for different scenarios.

- including 3D interactivities such as rotating and displacing the characters in a scene whenever required for a multi-view capability.
- controlling the speed of movement to allow a closer examination of the cultural objects.
- controlling the characters' level of details, if needed.
- manipulating data to reveal the movement sequences in various manners for other future applications.

The above factors missing in linear video sequences are crucial for digital media platform to be fully tapped.

The dance motions were captured using an STT six-camera motion capture system (Figure 3). An 'actor' wore a suit with spherical infrared-reflecting markers, of roughly one inch in diameter. The cameras used were Ethernet VGA cameras from Standard Deviation Inc. These cameras were equipped with a controllable power sensor infrared LED illuminator, comprising multiple LED's in the form of a thick ring around the camera lens. They were mounted on ptz-tripods, and the system was calibrated using a vertical rod with equidistant spherical markers. The total capture area of our arrangement was limited, and was on the order of 4m x 4m. The software used for the capture was MotionCaptor, which proved to be sufficient but seemed unstable in its operation, necessitating multiple unsuccessful takes for each move. The instability manifested itself in the form of frequent inability of the trackers to initialize in the "arms-spread" initialization position, multiple random crashes etc. MotionCaptor also provided a basic character for trying out animation, displayed within a polygonal prism, which was used before transferring the data to MotionBuilder.

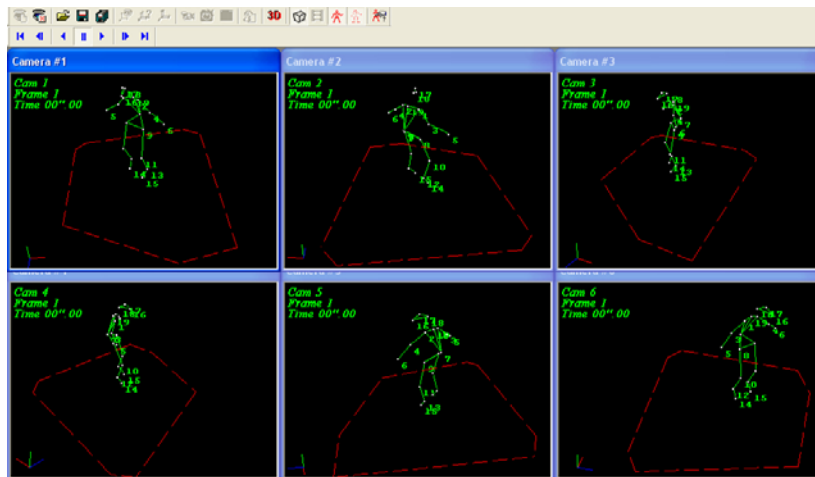


Figure 3: Six-camera motion capture screenshot.

### 3.3 Creation of characters to be animated

Although as mentioned, the appearances of the characters in this paper maybe simplified versions (Figure 4) which appeal to the younger generations, there are future possibilities of creating more 'realistic' figures and applying the same movement to them.

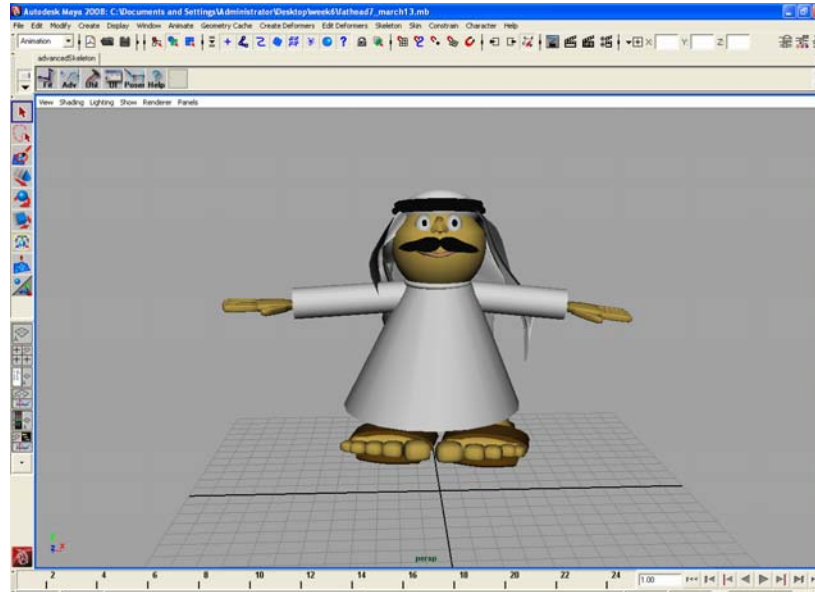


Figure 4: 'Hasson' – a simplified cultural dancer.

A number of characters were created in Maya, which were later animated using MotionBuilder. Character creations in Maya were done manually, and to keep the level of simplicity, no imported textures were used.

Maya-generated characters were imported to MotionBuilder and after suitable mapping to actor points, the captured movement sequences were played back on the characters. Then, scanned and manually-created objects were imported, as well as 2D textures for the background and sound clips.

### 3.4 Creation of project website

Interactivities in most online museums have been limited to hyperlinks of texts or images to their respective information. For instance, one local online virtual museum (Figure 5) is 'UAE Interact' (The United Arab Emirates National Media Council 2008). The merits of this example include the ease of hyperlink navigation and manipulation of views using object VR.

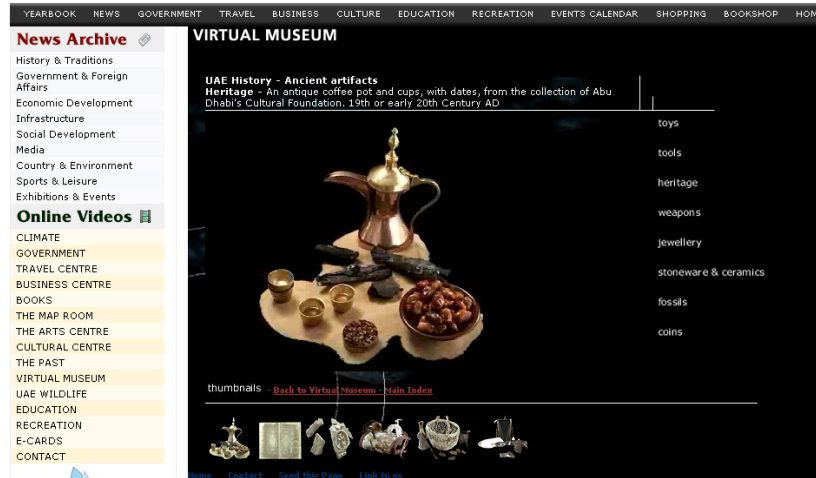


Figure 5: UAE Interact Virtual Museum showcasing local ancient artifacts

Although visually and textually informative, such a presentation of the UAE cultural object appears to be inadequate in engaging the audience. Its effectiveness in delivering contents is comparable to that of the print media. Secondly, the isolation of the objects from the appropriate context has stripped them from a possibly richer identity. In their paper, Chittaro, et. al., argue that guided virtual museum tour would reduce the isolation that may be felt by users. They propose the use of an embodied agent in a virtual environment – VRML (Chittaro, et. al., 2004). Even though this may address the first issue of engaging the audience to a certain degree, the lack of cultural object identity would still remain.

Stretching the capabilities of digital presentation further, digital presentations hold a significant promise in delivering media rich contents with a level of interactivities and seductiveness that is missing in traditional presentations while providing a suitable digital ‘context’ to the cultural objects presented. At present moment, in our project, various technologies are being investigated for the contextualization of information-filled media within media in a virtual museum. Among others, the following are planned to be included:

- Objects
  - descriptions
  - narratives
  - photos
  - 3D models
- Movement Sequences



- descriptions
  - narratives
  - videos
  - character animations of sequences using MOCAP data
- Non-interactive animation
    - video clip of non-interactive tour through virtual museum
  - Link(s) to a virtual world (where the virtual museum resides)

### **3.5 Embedding of museum in virtual world**

Online virtual worlds have captured groups of faithful audience globally. A segment of this project investigates the presentation of the UAE artifacts in such virtual communities. Data are currently being entered / rebuilt in the virtual world platform Novoking, and other such platforms are also being considered. The ability of importing 3D models from external 3D applications is especially attractive in Novoking. Such capability is missing in the more popular online communities such as Second Life or Active World.

Through appropriate architectural and interior design, as well as the use of signs and automated narration; we are aiming towards achieving the creation of an interesting as well as fulfilling experience for our visitors. Furthermore, apart from the automated interactive virtual museum, online human-controlled avatars might also be available during certain times in order to assist our visitors in learning more about the country and the culture of the United Arab Emirates.

## **4 Discussions**

Most research works which deal with digital cultural heritage today often tackle the issues related to the capturing and collection of information. Although their significance is indisputable, considering the vast amount of data that can be and have been documented, it seems that the development of presentation methods needs to be urgently emphasized as well. It is perhaps due to the wide range of user groups that need to be addressed when such presentations are concerned (Costalli et. al. 2001) that the presentations of cultural objects become more complex than merely displaying information.

Like illustrated by the earlier example of the 'UAE Interact' Virtual Museum, the influence of traditional printed publications is still apparent in many digital presentations where the strengths, hierarchy and relationship of the various media used have often been overlooked. Despite this oversight, this mode of presenting cultural object information seems to be an unspoken standard in most online presentations. Should or could a set of digital presentation standard be established to capitalize on the strengths of all media in the future?

## 5 Conclusions

This paper has outlined the ongoing project that deals with data collection while addressing the manner in which the information or representations are to be disseminated. It has highlighted the importance of contextualizing artifact-representing media within an appropriate cultural scene representation as a possible approach to introducing an identity to the 'object(s)'; admittedly, much is still needed to be investigated. Present technologies have opened doors to facilitate this contextualization. However, the convergence of these technologies that is intuitive and usable by both content authors and users has yet to be developed to allow a richer flow of cultural object identities through the digital platform(s). Of course, the authenticity of these identities is another complex issue. This is despite having them contextualized within their suggested activities. Indeed, it is a challenge since we are merely dealing with object and/or contextual representations - the signifiers.

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