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From Alhambra to Digital Projection: Designing a Digital Media Cultural Heritage Project Based on the Transformative Qualities of Islamic Calligraphy

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Abstract. This paper traces how the design of a new media cultural heritage project was inspired by the transformative qualities found in many specimens of Islamic calligraphy. As certain scholars have pointed out, Islamic art is filled with examples of letters and words that appear to transform into things other than text. Indeed, such transformative qualities can be seen across the Islamic world and on a diverse range of artefacts, including the epigraphs on the walls of the Alhambra palace and the religious texts on Ottoman Turkish scrolls written in *ghubār* (which literary means "dust" in Arabic) script. In this paper, the author outlines two broad types of transformative qualities that can be distinguished in many specimens of Islamic calligraphic art, namely, the metamorphosis of the form and the transformation of the function of the letters and words. The paper then demonstrates how, inspired by such transformative qualities, the designers of a cultural heritage project created a calligraphic installation for museums and galleries in which letters are transformed from text to image and vice versa. Using a projection mapping system, words are transformed into images devoid of any semantic meaning, and then revert back into readable text again. Finally, the paper investigates how the transformation of the function of calligraphy renders readability a transitory process in this artwork, and how the technique used in the creation of this artwork can be applied to cultural heritage sites as an educational and entertainment tool.

1. Introduction

The Alhambra, a palatial city in Granada, Spain, contains examples of some of the more visually complex ornamentation found in Islamic art. Constructed in the 14th century on the remains of a Roman fortress by the Nasrids (r. 1238–1492), the last Arab Muslim dynasty that ruled parts of the Iberian Peninsula, its magnificent stalactite-like *muqarnas[1]* ceilings and its geometric tessellations—which famously were a source of inspiration for M. C. Escher (1898–1972)—exemplify Islamic artisanship at its finest. The carefully-designed details of the arabesques that decorate the interiors of the palaces and chambers at Alhambra are particularly mesmerizing to any visitor to this world heritage site. Moreover, visitors to the Alhambra may note that the interior walls of several of its chambers are decorated with calligraphic inscriptions.

The Arabic epigraphs in the Alhambra have been the subject of numerous scholarly investigations. These include detailed analyses of the signification and meaning of both the Qur'anic and the secular poetic inscriptions (see, for example, Grabar [1] and Bush [2]). In this article, I do not intend to discuss the religious and poetic content of these epigraphs. Rather, I take their style of writing as my point of departure. Central to the discussion in this article are some of the calligraphic inscriptions on the walls of the Alhambra, in which words and vegetal decorations appear to blend. Written in a style of calligraphy known as foliated *Kufic*, the shapes of the end parts of the Arabic letters engraved on these epigraphs intertwine and transform into foliage. Indeed, the Arabic phrases on these epigraphs seem

to be in transformation, as they change into leaves and flowers. To an observer, these inscriptions appear as Arabic words for a moment, and then become visual decorations that blend into their vegetal backgrounds.

In fact, as scholars such as Grabar [3] and Marks [4-6] have pointed out, such transformative characteristics can be seen in many specimens of Islamic calligraphy [2] from different centuries and locations. Referring to the transformative quality of Islamic calligraphy, Marks polemicizes that: "throughout its history, from Konya to Khartoum, Granada to Samarkand, Islamic art is rife with text trying to become figure … as though the text could not be contained by its own bounds" [5]. In this article, I expand on Marks' discussion and distinguish two types of transformative quality in Islamic calligraphy. I then explain how a new media cultural heritage project, entitled *The Passion of Love* (2016), was designed on the basis of one of these transformative qualities.

2. The Letters' Desire for Transformation in Islamic Calligraphy

Let us now revert back to the Alhambra's epigraphs that are written in foliated *Kufic*. Kufic is one of the oldest styles used for writing in Arabic script [7], and different variations of it are found across the Islamic world [8]. These variations developed as a result of differences in regional tastes, or because of the purposes for which calligraphy was used. For example, some were more suitable for writing on paper, while others were developed solely for architectural decorations. One of these variations was foliated *Kufic*, which was most often used in the decoration of buildings. In this style of writing, the end parts of Arabic letters (the top of the vertical strokes and letter apices) break and branch out into vegetal motifs. In foliated *Kufic*, the shapes of the letters appear to metamorphose into flowers and plants. As Marks argues, this style of calligraphy seems to aspire to transformation. The words appear to be under "pressure from inside" to seek organic life and to transform into something other than text [6].

In other instances, calligraphy appears to transform into other things, such as birds and other animals. For example, on a pottery bowl from the city of Nishapur in Iran (probably created from the 10th to the 12th century), the letters of the Arabic word *baraka* (i.e. blessing) seem to have been transformed into birds (see Figure 1). Written in *kufic* style, the shapes of two of the letters have changed into bird-like creatures. Ettinghausen [9] calls such inscriptions "ornithomorphic" because the figures of the birds form integral parts of the words.

Figure 1- The word *baraka*, in ornithomorphic writing. The image is a drawn image of the inscription on a pottery bowl from Nishapur, Iran. The original pottery bowl is in the collection of Heeramaneck Galleries, New York.

Ornithomorphic inscriptions such as the one described above demonstrate that letters and words are not contained in their own contours in Islamic calligraphy. Rather, they desire to become alive. There are many other examples of Islamic calligraphy in which letters and words appear to transform into organic things, including humans, animals, and plants. Moreover, we can observe other specimens of Islamic calligraphic art in which transformation occurs in a different way.

In the Asian Civilizations Museum in Singapore there is an Ottoman paper scroll on which some Shi'i[3] invocation phrases are inscribed. The scroll is rather large (14 x 112 cm), as are the words of the invocation written on it. Looked at from the distance of a few meters, the Arabic phrases inscribed on this Ottoman scroll seem to have a texture. However, when viewed from a closer distance the magical aspect of this scroll becomes apparent. A closer inspection of the Arabic phrases in these Shi'i invocations reveals that what appeared to be the texture of the words is actually minuscule written text of the Qur'an. The Shi'i invocations on this Ottoman scroll actually contain the whole text of the Qur'an, written in the miniature-sized style of calligraphy known as *ghubār* (see Figure 2). Literally meaning dust-

like, *ghubār* script was probably originally used for written communications sent by pigeons [10], but it was later used for other purposes, including writing miniature Qur'ans that were sometimes carried by people as a form of protection.

Figure 2- Ottoman Qur'an scroll written in *ghubār* script, 15th century, 14 x 112 cm, ink on paper, collection of the Asian Civilizations Museum, Singapore. Courtesy of the Asian Civilizations Museum in Singapore.

As the viewers move closer towards the object in this Ottoman Qur'an scroll, the Shi'i invocations reveal their hidden secret and suddenly transform into a container for the words of God, the text of the Qur'an. Both an outward and an inward transformation occurs here. The large-sized invocations become the outline for the small-sized Qur'anic text, while the smaller Qur'anic text becomes hidden (as if protected) inside the larger Shi'i phrases. This transformation reminds us of the Shi'i doctrine of *zāhir* (i.e. manifest) and *bātin* (i.e. latent). The doctrine of *zāhir* and *bātin*, which is believed by some Shi'i and Sufi[4] branches of Islam, holds that there is a deeper esoteric meaning behind the exoteric surface of things, particularly in religious texts and in the Qur'an itself [6]. According to this belief, the esoteric meaning is not available to everyone, but only to a few. While most people of faith see only a manifest layer of meaning, there is a latent hidden layer in the Qur'an that is not readily available to most people. Hence, in the Ottoman Qur'an scroll described above, the larger words and phrases comprise the exoteric layer, and they only transform and reveal their esoteric meaning to those who inspect them carefully.

While the transformation has a religious and almost mystical signification in the above mentioned Qur'an scroll, a secular transformation occurs in the calligraphy genre of *sīyāh-mashq*. Literally meaning "black-exercise" in Persian, *sīyāh-mashq* refers to a category of calligraphic works in which a whole page is almost completely covered with calligraphy. The practice was originally used as a form of exercise for calligraphers in order to warm-up their hands, but it gradually evolved into a high caliber art form and became a collectible category of calligraphic art. Figure 3 is an example of a work of *sīyāh-mashq*.

Figure 3- Bahman Panahi, *Never Got Tired of You*, 2001, page of *sīyāh-mashq*, ink on paper, 21 x 27 cm. Courtesy of Bahman Panahi.

As the figure demonstrates, letters and words are repeatedly inscribed on the page in *sīyāh-mashq* specimens, usually in an irregular manner. Different letters and words overlap and cross on sheets of *sīyāh-mashq*, rendering an arrangement of calligraphic forms that usually subsumes the semantic content of the calligraphy, and leaves little room for a reading of its literal content. While some of the letters and words on the pages of *sīyāh-mashq* are usually recognizable, and all of them are sometimes recognizable, it is rare for a meaningful phrase to be read from these sheets of calligraphic work. In fact, in many specimens of *sīyāh-mashq*, calligraphic forms appear to oscillate between being text and being an abstract image with little or no semantic signification. It can be argued that pages of *sīyāh-mashq*, such as the one in Figure 3, do not invite viewers to read them as text, but rather encourage an appreciation of the aesthetic quality of their image. Similarly to the previous examples, letters and words once more appear to transform into something other than text.

In all of the four examples presented above, calligraphy appears to fluctuate between being text and being image. Although the letters and words in these examples do not literally change over time, they demonstrate a desire for transformation. They point to a reversibility between word and image in Islamic calligraphy. As Marks [6] has argued, this internal force—the desire for transformation of the letters and words in Islamic calligraphy—can best be explored in time-based media such as animation.

In her article "Calligraphic animation: documenting the invisible", Marks claims that animation is a wonderful "playing field" for the transformative qualities of Islamic calligraphy [6]. Indeed, the transformative qualities of Islamic calligraphy, some of which have been seen in the above examples, can inform the temporal behavior of Arabic writing[5] in time-based media. All of the calligraphic inscriptions noted in this section suggest a form of temporal behavior, a transformation of text to or from something else. While transformation is only suggested in these specimens of calligraphy, and does not literally occur, a full transformation can occur over time in time-based media. I argue that specimens of Islamic calligraphy with transformative qualities, such as those discussed in this section, can inspire the design of time-based calligraphic artworks. Later in this article, I explain how these transformative qualities have inspired the design of a digital media cultural heritage project. However, I first distinguish between two types of

transformative qualities that are observable in the examples discussed above and in many other examples of Islamic calligraphy.

3. Two Types of Transformation

The previous section presented four different examples of Islamic calligraphy in which the calligraphy appears to transform, and oscillates between text and image. In general, I argue that two similar but distinct types of transformative qualities can be observed in the above examples and in many other specimens of Islamic calligraphy. These are transformation of identity and transformation of the function of calligraphy.

In order to understand the difference between these two types of transformation, let us reconsider the examples discussed in the previous section. I began by referring to foliated *kufic* and ornithomorphic inscriptions. In these two types of calligraphy, one sees that it is indeed the shape of letters and words that appear to be in a process of transformation. In fact, it is the form of the letters that appears to change shape in these examples. This means that the contours of the letters are affected and are transfigured into organic shapes in these calligraphic styles. This clearly suggests a change or transformation in the shape of the calligraphic forms. It is because of this visual transformation in the shape of the letters that these calligraphic forms appear to oscillate between a verbal identity and a pictorial identity. In considering foliated *kufic* and ornithomorphic calligraphy, it appears that the identity of the calligraphic forms are oscillating between being text and being image in these types of inscriptions. Indeed, in such examples, the calligraphic forms seem to oscillate between having a verbal identity and a pictorial identity. Therefore, one can argue that such specimens of Islamic calligraphy suggest the transformation of the form and, consequently, of the identity of the letters and words.

However, in examples of Islamic calligraphy such as the Qur'an scroll from the Asian Civilizations Museum in Singapore and specimens of *sīyāh-mashq*, the shapes of the calligraphic forms are not in transformation. In such specimens, the shapes of the letters and words are fully preserved. For example, the shapes of the larger Arabic phrases (the Shi'i invocations) in the Ottoman Qur'an scroll do not change as one moves towards the scroll. Rather, the form of the words is intact in this specimen of Islamic calligraphy. Likewise, in *sīyāh-mashq* specimens such as that in Figure 3, while the calligraphic forms appear to oscillate between being text and being image, their shapes are preserved. I argue that in these cases it is not the form (or the identity) of the calligraphy that is in transformation, but rather its function. The term function here refers to the intended purpose for which something (in this case calligraphy) is used in a particular context. The purpose of written language is naturally expected to be the verbal communication of meaning. Therefore, we can say that the main function of writing is semantic communication. However, calligraphy transcends this as it is intended to add an aesthetic quality to writing. Nevertheless, in many contexts the function of calligraphy remains predominantly a semantic one. But in specific contexts, such as in some specimens of *sīyāh-mashq*, the balance between these functions of calligraphy may shift. In such cases, the semantic function of calligraphy may be subsumed under its aesthetic function. In some *sīyāh-mashq* specimens, for example, calligraphy is completely transformed from being text with a semantic function to being an abstract image with a purely aesthetic function. In such instances, one can say that a transformation in the function of calligraphy occurs. Such transformation is clearly different from a transformation in the form and identity of calligraphy. As is demonstrated in the following section, the digital media cultural heritage installation studied in this paper (*The Passion of Love*) was made based on the second type of transformative behavior, namely transformation of the function of calligraphy.

4. Transforming the Function of Calligraphy through Projection Mapping

As the above discussion indicates, the transformation of identity and the transformation of the function of calligraphy are the two distinct types of transformation suggested in many specimens of Islamic calligraphy that this author identifies. I have argued that the balance between the functions of calligraphy shifts in many specimens of *sīyāh-mashq*. Instead of having a predominantly semantic function (which is expected in written language), calligraphy comes to function primarily on an aesthetic level in these artworks, in which it therefore appears to become transformed from text into abstract image. Together with the art of *sīyāh-mashq*, this transformative quality informs the design of the digital cultural heritage installation considered in this paper. While such a transformation is only

suggested and does not literally occur in *sīyāh-mashq* specimens, this transformative quality can unfold over time in time-based media, as we will see below.

   The Passion of Love, the cultural heritage project considered in this paper, is a new media installation inspired by the transformative quality of Islamic calligraphy. It includes a calligraphic sculpture made from the words of a verse of a poem by the prominent Persian poet Rūmī (1207–1273). Figure 6 shows this calligraphic sculpture. Although the calligraphic forms (i.e. the letters and words from the poem) are legible (i.e. recognizable) in this sculpture, they are not readable due to the way in which the calligraphic forms are arranged in this composition. The letters and words of this sculpture overlap and collide. This specific visual structure of calligraphic forms impedes readability, if it does not make it totally impossible. In designing this sculpture, the emphasis was clearly on the aesthetic quality of the visual composition, rather than on the communication of the verse's semantic content. This visual structure of the calligraphic sculpture encourages the viewers to enjoy the aesthetic quality of the calligraphic forms and the composition they have comprised, rather than inviting them to read the semantic content of the text. It can be argued that, like a specimen of *sīyāh-mashq*, the calligraphic forms of this sculpture have a predominantly aesthetic function. In other words, the semantic function of calligraphy is subordinated to its aesthetic function in this art piece.

Figure 4- A photograph of *The Passion of Love,* 2016, digital media installation, 90 x 60 cm, exhibited at the photography studio of Nanyang Technological University, Singapore. Copyright © M Javad Khajavi.

   This calligraphic sculpture was intended to be mounted on the wall of a gallery or museum. The installation was first exhibited at the photography studio of the School of Art, Design and Media of the Nanyang Technological University in Singapore.[6] Figure 5 shows the technical setup for this new media installation. A projector was installed in front of the sculpture and animated visual elements were then projected onto the calligraphic sculpture—using a projection mapping technique and the computer software VPT 7 (Video Projection Tools)— through a process that added notions of movement onto the otherwise static sculpture (see Figure 6 and 6).

Light Source
A light source controls the brightness and the intensity of the projected images, gives a sense of depth to the sculpture, and softens the sharp edges of the projected images.

Calligraphic Sculpture
The calligraphic sculpture is mounted on the wall of the gallery/museum. The semantic message of the words written on this calligraphic sulpture are not decipherable, unless the animated images are projected onto it.

Stereo Speakers
Stereo speakers play the synchronized music, blending the movements of the visual images on the sculpture with the rhythm of the sound waves.

Projector
Full HD resoloution projector, casts animated images onto the calligraphic sculpture.

Mac mini
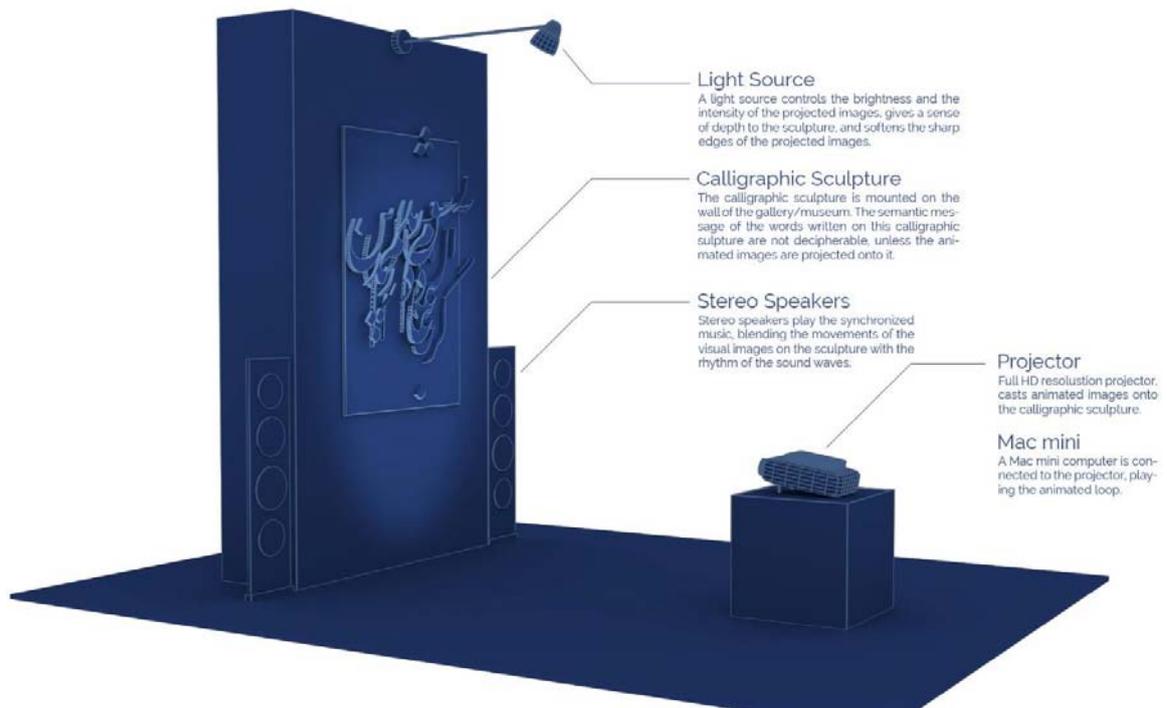A Mac mini computer is connected to the projector, playing the animated loop.

Figure 5- A diagram representing the technical setup of the digital media installation. Copyright © M Javad Khajavi.

The visuals projected directed the eyes of the viewers towards particular elements of the calligraphic sculpture (Figure 6). As the projected animation proceeded, it became clear to those viewers who could read the language that these animated elements were actually highlighting the words of the poem, one after another. They were clarifying the semantic message of the previously unreadable calligraphic forms. Thus, anyone who was able to read the language could follow the animated visuals and read the poem, which read: "This world would be engulfed in flames, if the lover's soul would speak".[7] Hence, the animated visuals that were projected onto the calligraphic sculpture led to a shift. In fact, the balance between the functions of the calligraphy shifted from a predominantly aesthetic function to a principally semantic one. In other words, a transformation occurred in the function of calligraphic forms due to the animated visuals that were projected onto the sculpture. This means that readability is a transitory process in this artwork. When there are no visuals projected onto the calligraphic sculpture, its semantic content is not readable. However, when the animated visuals are projected onto the sculpture, the calligraphic forms become readable and semantically meaningful. While the projection mapping technique used in this artwork is technically simple, it provides the opportunity for the viewers to see a relatively sophisticated process of shifting the balance between the functions of calligraphy.

Figure 6- The animated visuals projected onto the calligraphic sculpture shift the function of the calligraphic forms from aesthetic to semantic, making the literal content of the piece available to the viewers. Copyright © M Javad Khajavi.

5. Conclusion

This article has explored how the transformative qualities of many specimens of Islamic calligraphy inform innovations in new media design. Ünlüer and Özcan rightfully argue that the "formal design solutions of past cultures can generate new innovative ideas" in new media design [12]. Their claim is particularly appropriate here, as this digital media installation received its inspiration from qualities that have existed for centuries in Islamic calligraphy. As we have seen, projection mapping was used in this digital media cultural heritage installation to activate and animate the transformative qualities that exist in many specimens of Islamic calligraphy. The design of this digital media installation was informed by examples of calligraphic art, such as *sīyāh-mashq*, in which calligraphy appears to oscillate between having a semantic and an aesthetic function.

The use of projection mapping to animate the otherwise static calligraphic forms is also of considerable importance here. Further applications of this technique can be explored in museum design and cultural heritage sites. For example, the technique can be used as an educational tool in museums to help viewers recognize the Arabic letters and words in epigraphs in which the calligraphy is written in styles that are not easily recognizable. Aside from projection mapping, other technologies such as Augmented Reality (i.e. superimposing computer-generated image on users' view of the physical world) can be used in Museums, galleries, or cultural heritage sites to transform the form or the function of epigraphs written in sophisticated styles. Clearly, such techniques can be used for educational as well as entertainment purposes. While some museums and heritage sites has started using Augmented Reality technologies to highlight Arabic words in epigraphs or to provide translation for such epigraphs, using such technologies are still limited.

Aside from these, the transformation of the form or the function of calligraphy through projection mapping can have applications in urban art. Currently, as part of a contemporary movement that experiments with Islamic calligraphy in new and innovative ways, there are many calligraphic sculptures decorating the streets, squares and public spaces in different countries, such as Qatar, United Arab Emirates, Kuwait, Iran, etc. The projection mapping technique mentioned in this paper can actually be used to add new aspects to these urban artworks, and animate such static calligraphic sculptures.

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[12] Ünlüer A and Özcan O 2010 Sound and silence in the line: re-reading Turkish Islamic calligraphy for interactive media design *Leonardo* **43** 450-6

[1] Cellular honeycomb-like structures usually used in the design of domes, half-domes, and vaults in Islamic architecture.

[2] The term "Islamic calligraphy" refers to any sort of calligraphy written in Arabic script, and not exclusively calligraphy written for religious purposes.

[3] Shia and Sunni are the two main branches of Islam.

[4] Sufism is a mystical trend in Islam that promotes certain doctrines, values, and practices.

[5] It is important to note that Arabic script is used for writing many languages, including Arabic, Persian, Urdu, Kurdish, Ottoman Turkish, etc.

[6] A video ddocumentation of this exhibition can be found in the following link: https://vimeo.com/217946279.

[7] Translation by Lewis F D [11].