Augmented Reality and Art

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Abstract

Augmented reality (AR) is one of the significant digital technologies today. Apart from discussing the technical and commercial realms, this paper examined augmented reality’s new paradigms in visual perception and physical existence simultaneously, which have long been a core subject in the art realm. Furthermore, this paper explored Augmented Reality as part of the art creation process. In the process of art creation with AR, framing and exploring were discussed as the main elements for a completed art work. Regarding the elements of framing and exploring, I have investigated the discourses of visual art-related theorists that shifted the viewer’s perspective to become subjective from being objective and the activities of contemporary artist groups, this paper explored the process by which audiences completed an art work. Through this, this paper defined the meaning of AR in art, and discussed future changes in audience engagement in the name of AR art.

Keywords : Augmented Reality; Augmented Reality Art; Visual Arts; History of Art; Art Creation

1. Introduction

Today, augmented reality (AR) is one of the significant digital technologies, especially given its features of living-ness and mobility. However, the concept of AR has already been used for a long time in the art realm, and, recently, it was also used technically. In this sense, AR can be regarded as an innovative visual experiment following Renaissance painting and the invention of the camera. Thus, apart from discussing the technical and commercial realms, this paper discusses augmented reality’s new, simultaneous paradigms in visual perception and physical existence, which have been core subjects in the art realm for along time. The specific elements and the effects of AR will be investigated in comparison with other visual innovations. This paper have investigated discourses of visual art-related theorists that shift the viewer’s perspective to become subjective from being objective, especially in Renaissance painting. Furthermore, following the activities of contemporary artist groups, such as Fluxus, this paper
explores the process by which audiences complete an art work. Following this investigation, this paper explores AR as part of the art creation process. Ultimately, this paper is aimed at defining AR art and to contribute to the discussion of the future of AR art.

2. Augmented Reality in Art Context

What would Augmented Reality Art refer to? Why should Augmented Reality Art be discussed at this point? In this section, this paper will explore the concept of AR in the art realm by investigating artistic experiments where visual perception and physical existence overlap without the aid of digital technology.

2.1 Current Use of the Term in Augmented Reality and Art

The use of the term Augmented Reality has been raised significantly recently by the public due to the success of Pokémon GO. However, augmented reality and art have not been the concern of academics. When the keyword of augmented reality and art are searched via Google, most images of the results show its use in art museums, and some images are about drawing with AR effect onto books.

However, this paper classifies both examples above in the category of education, not the art realm. When augmented reality is used in artistic context, it should be included in these cases: (1) Augmented Reality included in the art works of the artist, or (2) Augmented Reality included in the artistic process of the audience. I will explain the examples in the cases above in the following section in the perspective of the frame and the viewer’s movement. First, historical context regarding visual innovation will be investigated.

2.2 Art Works with the Concept of AR

Many art works have tried to overlap virtual images on real images prior to what we call augmented reality. At present, augmented reality refers to the use of digital and mobile technology to merge a virtual image with the real. However, several artistic experiments depart from using digital and mobile technology.
As art works shown from Fig. 1 and , where virtual images overlap, window-like frames exist to demonstrate the different origins of images. In the examples where the location of the images matter, as shown in Fig. 2, physical existence is considered significantly. The overlapped image is a moving image showing another actual event at another time and space, so that the viewer’s movement and timing seem affective in perceiving realities. The movement of the body and the location of the viewer are important while watching and perceiving live, changing realities. In this sense, this paper will argue the audience’s body as an important aspect in perceiving visuality and its following meaning. The role of the body in augmented reality will be investigated in the following section.

Here, I would like to emphasize that augmented reality refers to being on a digitally assisted device. Furthermore, in its aim to investigate the role of the viewer’s body in changing locations more effectively, this paper is limiting the augmented reality’s environment to the mobile devices used by the viewer.

3. Augmented Reality Art

3.1 Definition of Augmented Reality Art

Reinwald[1] noted that augmented reality is a new way of ‘seeing’. Art has a history in the form of an evolution of changing the way of seeing in an art realm. Berger[2] argues about
an evolutionary way of man’s seeing in the art realm in his book <A Way of Seeing>. He discusses the two main evolutions of seeing, first, the Western painting of perspective in the 15th and 16th centuries, and, second, the invention of the camera in the 19th century. Now, augmented reality can be regarded as the third revolution in the history of man’s seeing in the art realm. On the same basis of the Renaissance painting that tries to capture a reality as it is shown to the human eye and a camera’s mechanical eye, I would like to insist that augmented reality can be discussed as an evolutionary way of seeing a reality. Augmented reality art produces two different realities on the same screen to capture and create a new reality.

<table>
<thead>
<tr>
<th>Renaissance Painting (15th-16th century)</th>
<th>Camera Technology (19th Century)</th>
<th>Augmented Reality (20th Century)</th>
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<tbody>
<tr>
<td>• Capturing reality</td>
<td>• Capturing reality of the moment</td>
<td>• Capturing New Reality</td>
</tr>
<tr>
<td>• A viewer as a subject emphasized by the unity with human eyes</td>
<td>• Exploration encouraged by camera eyes capturing the moment</td>
<td>• Combination of each different realities</td>
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As mentioned earlier, defining what augmented reality art should be based on measuring an evolutionary way of seeing. As a new way of seeing, human visual perception should be a core element when augmented reality is regarded in the art realm.

AR has two elements rooted from visual art history aspects, namely, framing and exploring. “Framing” is representation that pursued maximizing Western rationalism from the Renaissance perspective expressed in oil paintings and camera technology. Furthermore, “Exploring” is performance shown in the contemporary art movement in the 1960s, which brings questioning audiences into completing art. “Framing” and “Exploring” began and developed in controversial aspects, yet the two elements consist of augmented reality art as core ideas.

It is obvious to take account of the visual objects as augmented reality expressed on the interface. However, the interface is a process of action[3], and I would also like to emphasize that the interface of augmented reality invites users into another reality’s realm by taking the role of a doorway. Yet, the doorway does not mean that it closes the real world, rather it opens another world and brings it to the real world. Thus, this process cannot be analysed as its visual aspect, yet as a cognitive flow of consciousness between two worlds and, ultimately, their combination. As mentioned earlier, the interface of augmented reality keeps changing according to the user’s movement and location. Thus, the user cannot immerse oneself into the
virtual world. Rather than standing at the threshold, the user regards visual-ness on the interface that can be expanded into achieving practice, and not as a fixed element. Therefore, here, visual-ness is not material. It is a mediation of materialized reality into non-materialized reality. Thus, again, the process of experiencing augmented reality art is transferred to having an artistic effect on the commonplace with interactivity. As shown in several cases with augmented reality in the art realm, ordinary physical spaces changed into controversial or artistic worlds within the frame. Further, augmented reality requires the user’s participation prior to seeing augmented reality. With the participation of the users, numerous augmented reality applications allow users to respond actively to see proper images. I will argue that this ‘active physical participation’ is a term on ‘exploring’. To activate the augmented reality image, first, users must create a framing with the mobile device’s interface onto a flat image, and then explore it to see a proper augmented reality. In this sense, this paper suggests two elements of framing and exploring as core elements in making augmented reality art.

### 3.2 Elements of Augmented Reality Art

#### 3.2.1 Framing

There is a good example that shows how the frame affects the viewer’s visual perception toward a subject. Fig.4 seems that it is a conventional Renaissance painting that follows the rule of the 3D perspective.

![Fig. 4](image_url) Antonella da Messina, StJerome in His Study, 1475 (Courtesy by National Gallery, London)

Yet, a window-like frame is exceptionally drawn. Thus, the edges of the painting are covered by a window frame. Throughout the window frame, we feel like watching Saint Jerome reading a book, like a character included in the painting, or a viewer outside of the painting as well. Through a perspective technique, a Renaissance painting has arranged a man in the center and makes him (her) as the subject. However, the existence of the frame shifts a subject...
into an object seen by a viewer, and creates an invisible viewer as a clear subject who stares at an object[4]. Thus, the subject feels like seeing the reality transparently, yet it is an illusion. According to Friedberg[4], it is because the viewer’s body is fixed where an object can be seen as it is likely to be seen. In addition, the notion of a viewer’s body has been argued among several scholars and philosophers, such as Alberti and Panofsky. Here, the body becomes a standard in creating a relation with its surroundings[4]. Thus, size, height, and location of body matters in interpreting a context through perspective.

I would like to add here that the body’s existence is recognized by framing. Thus, when there is a framing, the body’s size, height, and location matters in seeing an object at the threshold of the real and the virtual. A viewer’s body stands and sees an object at between-ness. Below are the examples of framing in augmented reality works.

[Fig. 5] Digital variations of the shapes for viewers to reconfigure into their compositions (Courtesy by St Louis Moto Museum)

In Fig. 5, a viewer’s body stands in front of the real construction first, then when framed with an augmented reality device, he/she can see another reality of artistic variations that is in harmony with a real building. This example shows a framing of AR at the threshold of the real and the virtual. Framing is the first step in clarifying a viewer’s body after seeing an object. Consequently, when a viewer does framing, relationship with the work is created more subjectively. In this case of framing, augmented reality then inherits the Renaissance painting’s context. Arguably, a viewer’s body in augmented reality is not fixed, as the mobile device is separate from a fixed body in a Renaissance painting.

[Fig. 6] Biermann, in collaboration with Transmedia, EANMering creative companies and Re+public
In Fig. 6, 3D street art images become animated and shift into other forms by framing of the augmented reality. The example shows more dynamic variations, such as Fig. 6, yet Tamiko Theil’s art works investigate how contemporary art’s critical spirit turns up with augmented reality. With framing, the virtual turns the spaces that we already know into unknown spaces with a cynical message on contemporary society.

![Fig. 7] Tamiko Theil, “Reign of Gold” Seen with New York Stock Exchange

Tamiko Theil has showed art works by using augmented reality onto object, space or building that have been symbols of contemporary society. Through the work in Fig. 7, she creates a framing onto the New York Stock Exchange, which used to be a normal space for economic activity, and turns its meaning toward contemporary capitalism with money dropping from all over the place.

![Fig. 8] Tamiko Thiel, “ARt Critic Face Matrix” Seen with Lai Chih-Sheng’s “Life-Size Drawing”, 2010/11

In Figure 8, the real space is ordinary, but a quiet space is where the people in suits talk gently. However, when framing, funny, laughing faces begin to exist everywhere, and turns the space into a bizarre feeling. In Tamiko Thiel’s works, the technique of augmented reality is simple, yet the works’ meaning by framing of the AR clarifies how contemporary art should communicate to the public. Here, the AR technique was used very effectively.

To sum up, framing in AR inherits the relationship of the viewer’s body and the surrounding clarified by the Renaissance’s painting. It changes the passive viewer into an active subject. By framing, he/she sees the real with unfamiliar eyes, and the virtual merged onto the real. I have discussed the situation of the body at the threshold, feeling liminality in previous
sections. Ultimately, fantasy is constructed throughout this process of framing and perceiving. Furthermore, I noted the mobile body in augmented reality. This will be investigated further in the next section on the participatory aspect, namely, exploring.

3.2.2 Exploring

Since the invention of the camera, modern art has emerged with meaning and concept rather than representation. This tendency is linked to the audience’s mental participation in understanding the artist’s creative works. Further, since the 1960s, contemporary art introduced the audience’s physical participation into the artistic process. The art group ‘Fluxus’ experimented with several participatory ways of the audience, and emphasized them as important artistic processes[5]. As more artistic expressions become abstract and ask questions, wider audiences participate into making art works through immersion. Participation is both mental and physical. The participatory level of each type of audience should be different in this process. Artistic outcomes in this process are not fixed images or objects, but events[5]. Jeffrey Shaw already introduced digital assisted augmented reality art works in the early 1990s, prior to considering augmented reality in the art realm. In a gallery space, there is only an empty exhibition stand and a table hanging. When the audience holds the table and points at the stand intuitively, digital images on the stand start to appear in the frame. Without this activity from the audience, the completed work cannot be exhibited. In this sense, augmented reality is used for completing and showing the art work, and the audience’s participation is at the core of this process.

![Fig. 9] Jeffrey Shaw, “The Golden Calf”, 1994

![Fig. 10] Sarah Kenderdine and Jeffrey Shaw “Pure Land and AR”, 2016
Fig. 10 represents digitally ancient paintings onto the Dunhang stone cave in China in a contemporary exhibition space. It uses minimal, simple, and four-square black and white space, and some digitally presented paintings in white on the wall. Rather than showing all the paintings on the wall, namely, interface, the work lets people investigate other paintings through augmented reality on a tablet. Where other paintings can be investigated, abstract lines lead audiences to suppose detailed images and investigate further through the augmented reality technique.

Usually when we estimate interface, it is discussed as either user-friendly or not user-friendly. A well-established interface is also discussed as intuitive in terms of usability. However, rather than the aspects of usability as surface, interface can be considered, as Galloway[3] claims, as a doorway or a window into another reality. Galloway references Vilém Flusser who defined interface as “a two-dimensional plane with meaning either embedded in it or delivered through it”[3](pp.30). This means that interface embeds particular interpretations that are obscured by its cultural value. In this sense, the interface cannot be theorized by its media formats or simple visual elements that are aesthetically on the interface. Rather, how the interface brings the viewer to investigate beyond the limits of its flat surface is demonstrated. Thus, here, the interface is a system that allows the viewer to be a user and a participant. Some accustomed visual and graphical parts on the interface try to lead the viewer’s action intuitively by providing familiarity to the participant. In this sense, I borrow Galloway’s term of computer as effect, and not as a materialized object to discuss the use of augmented reality technology for creating effect through the process of the user’s participation under the consideration of culture. Uricchio[6] called this process algorithmics, which engenders meaningful data to allow cultural significance to flourish.

As discussed earlier in the Fluxus and Shaw’s works, augmented reality art leads audiences into the threshold, and changes them to become participants in the art process. John Cage in his famous work 4’33” produces silence in front of the piano by not playing it to induce participation from the audience by creating their own sounds. Thus, the example as shown in Fig. 11, cannot be included in the conventional art realm, but it is possible to be noted in the future direction of augmented reality art. As more interfaces become more transparent and devices are intuitively usable, audiences will become more active participants with the least intervention from the artist.
In this point of view, augmented reality art that allows active participation does not limit its position in the conventional art realm, rather creating a new way of artistic process and becoming an event.

4. Conclusion

This paper discussed AR in a sense of the art-making process. In art-making process with AR, framing and exploring are illustrated as core elements of the completed art work. To discuss the elements of framing and exploring, I have investigated visual art history that dealt with framing in the sense of shifting the viewer’s position from being objective to being subjective in Renaissance painting. From contemporary art groups, such as Fluxus[10], I also discussed how the exploring of audiences completes an art work through examples. Furthermore, I have supplemented these elements by investigating several artists and theorists’discourses on visual perception, media shift, such as Galloway, Berger, and Reinwald, etc. Throughout historical investigation, I suggested two elements of framing and exploring as core elements in creating augmented reality art, and defined Augmented Reality Art as a creation process made by cognitive and physical dialogues on a mediated interface.

Research pertaining to AR can be traced to the 1960s when computer scientists attempted its first AR version with heavy, head-mounted devices. Commercial ventures for public use have emerged only after the 2000s. Further, the first successfully recognized AR content with Pokémon Go was only introduced in 2016. Many researchers, including Liestol [7], Azuma [8], and MacIntyre [9], have argued AR as the potential effect for advancing our daily lives in the technological aspect. Thus, AR art might be very new and unfamiliar at this point. However, departing from its technical specification, I argued the concept of AR as already existing for a long time in art history. Driven by the emergence of mobile devices, such as smart phones, in our daily lives, AR has finally flourished by a number of pioneering artists in the art realm, providing possibilities to invite art consumers to become active participants and spectators in the art-making process. In the process, participants experience fragmented data and try to
harmonize them by considering both real-world images in the environment and collected virtual features. Linking involves two aspects: first, to link two virtual (digital) presents, and, second, to identify where the participant stands and the harmonized digital imagery. Considering this linkage, participants will step further to expand both their real and augmented worlds. With the perspective of AR art as collecting creativity, the AR interfaces can be discussed in detail from the design aspect of the user experience and user interface following this paper.

References


