Research on the Mixed Properties of Space and Body in Virtual Reality Art

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Abstract: Based on the embodied perspective, this study aims to further explore the ways and characteristics of the integration of virtual reality art space and the heterogeneity of participant bodies. Combining concepts such as virtuality, whole-body immersion, non locality, hyperspace, and utopia, this study examines the pioneering and exploratory works of early virtual reality artists. It can be observed that while the perceptual space of participants is expanded by virtual reality art, they actively involve the materiality of their bodies. At this time, the virtual reality art space is a mixed art space of virtual and reality, and the participants' bodies are also virtualized in the process of experiencing and constructing this space, becoming an open utopia with virtual potential. Virtual reality art is still in the evolutionary stage, and the key to its direction is the participants' bodies that are both virtual and real.
Keywords: Virtual; Immersion; Hyperspace; Non venue; Heterotopia

1. INTRODUCTION

With the rapid development of science and technology, virtual reality is widely used in daily life and cultural arts. Wearing VR devices to enter the virtual image space for manipulation and transformation is no longer unattainable. The expansion and evolution of the virtual world, especially the emergence of the concept of metaverse, has prompted people to re-examine the potential issues of virtual survival, in which changes in participant perception and cognitive structure are considered an important exploration category. The body perception of virtual reality participants is not only influenced by virtual images, but also actively participates in the construction of virtual images. This cyclic response means that virtual is no longer just an illusion and fiction in opposition to reality, but an interactive

state. Therefore, exploring the virtuality of the digital world is not only ontological, but also requires an epistemological perspective. For a long time, people have been accustomed to using Cybernetics models to understand the problems of virtual reality and the body from the perspective of disembodiment. Existing research has mainly focused on the interaction between digital images and participant bodies, the scalability of image space, or the emphasis on the ways in which the body functions before and after disembodied. It can be said that there is a certain degree of disconnection between virtual and reality. Taking virtual reality art as an example, in the interaction between virtual reality images and participant bodies, the body is not only encoded but also actively involves materiality, playing an important role in constructing and expanding the image space. At this point, the body encoded and imaged by the participants is not a state of material detachment, but a mixture of the non-material and physical aspects of the encoded image. Therefore, based on embodiment, this study further explores the heterogeneity cracks and gaps between non-material encoding and material body, combined with the pioneering and exploratory works of early virtual reality artists, and explores the ways to construct and expand the virtual reality art space based on the heterogeneity between participant bodies and encoded images, as well as the mixed characteristics of participant bodies. We will examine concepts such as full-body immersion, body virtualization, transspatial domain, non-place, and heterotopia as heterogeneous fusion. Revealing the mixed and heterogeneous bodies of virtual reality art participants has the potential to become a utopia while constructing new visual spaces.

2. VIRTUAL AND IMMERSIVE FEATURES

Art has a long history of imitating reality, expressing reality, mediating reality, or transcending reality (Nechvatal, 2010). With the development of technology, we have now reached a stage where we need to reveal and reconsider its virtuality through digital imaging or virtual reality. As Elizabeth Grosz once said, "We have always lived in a virtual world, without waiting for movie projectors and computer screens to enter the virtual space (Grosz, 2001)". Although the meaning of "virtual" has been given a more open meaning with the changing times, it is difficult to directly position the "virtual" achieved through cutting-edge technology as the aesthetic "virtual" in the development of art. This is because virtual reality images themselves have characteristics different from traditional

images, and virtual reality art based on these characteristics is also judged to have heterogeneous aspects in the artistic context. So the same name is "virtual", but its nature is different. What are the similarities between the "virtual" of traditional art and the "virtual" of virtual reality art? It will be an important inspection point and discussion basis of virtual reality art. Oliver Grau views art history from the perspectives of "illusion" and "immersion", positioning the history of art within the context of virtual history, attempting to find a connection between virtual traditional art and virtual reality art. He examined virtuality as the essential relationship between humans and images, hoping to prove this relationship through the keyword "illusion". Assuming that the technological integration of media is ultimately driven by hallucinatory desires, the paradigm of virtuality is defined as one of the physical psychological perceptions indicated by the viewer's sensory experience (Grau, 2003). In this sense, the history of art can be said to be the creation of "illusions" or "virtual" history. According to Grow, the hallucinatory features of virtual art have already emerged in ancient Roman murals, Baroque dome murals, panoramas, stereoscopes, movie screens, and displays, and the virtuality in the sense of digital technology is also included. The presentation effect of these art cases is related to the desire of the audience and the works to integrate or exist in the art works, which promotes the technological development of new media to create a continuous immersive illusion space. Of course, Grow does not view the entire history of art as a "virtual" history. The art cases he mentions depict heterogeneous and special aspects, creating realistic illusions through extraordinary efforts (Grau, 2003). However, given the close relationship between creating illusions and virtuality, and the fact that this hallucinatory feature is applicable to all previous art, we can find some clues from Grau's discussion to link the virtuality of traditional art with that of virtual reality art (Gombrich, 1964). Anne Friedberg also attempted to connect traditional artistic virtuality with digital virtuality through the metaphor of "virtual window". In her opinion, it is necessary to break free from associations reinforced by numbers when dealing with virtual related terms. In addition, considering that Oliver Grow's artistic scope or strategy is limited to immersive rhetoric, it is also necessary to break away from the scope of what Grow referred to as immersive illusion space. Friedberg believed that including reproducible media such as paintings, photos, and screens within the scope of "virtual windows" is necessary to break away from the discussion of the particularity of digital media as an ontological virtuality (Friedberg, 2009). For her, these reproducible media have changed the materiality of constructing space, serving as a virtual window

that can dramatically change the concepts of space and time. This illusion allows the audience to meet the world in new ways and evolve continuously (Baker, 2005). As Friedberg's discussion shows, many artistic images that depict the three-dimensional world and materiality in a two-dimensional manner are actually presented through virtual space as a medium, and these artistic images are clearly associated with the illusion effect mentioned by Grow. In this sense, the history of art may be referred to as the history of illusions or virtual history. Although Grogg claims that virtual reality art is not directly linked to the history of illusion space, it is clearly a new illusion technique, and in this sense, it is also a virtual art like other arts (Grau, 2003). Before discussing the virtuality of digital art, the virtuality in traditional art is mainly related to the implementation of fictional images. So digital images and virtual reality images, as technological images, are related to the potential brought by technology. In fact, the term virtual reality itself contains two contradictory concepts, "virtual" and "reality". It is precisely because these two concepts are considered contradictory that virtual implies the absence of reality. Virtual reality needs to be re recognized as an ability to expand reality, rather than fiction or non reality. Virtual reality or virtual reality art based on it inevitably includes the perception and action of participants, and inevitably requires an immersive mechanism closely related to reality in the interaction of images. Grau believes that the important difference between digital based virtual reality art and traditional art lies in the sense of immersion, which maximizes the illusion effect. Immersion is a process of transitioning from one state to another, which refers to the state of deeply immersing oneself in emotions and losing critical distance in situations such as images. When this immersive state is maximized, the effect of the experience is also maximized, and participants will experience a state that exceeds their maximum perceptual ability. Glau pointed out that although immersive or immersive illusion spaces appear in existing art, virtual reality art can achieve an optimal state of immersion. Due to the combination of various perceptual information in virtual reality images, they can provide a more realistic feeling and maximize immersion. In other words, although immersion is not a phenomenon that only occurs in virtual reality experiences, the way and intensity of immersion in virtual reality are significantly different from other media or artistic experiences (Grau, 2003). It should be noted that in virtual reality art, this kind of immersion has a tendency towards "full- body immersion". If immersion in traditional art assumes to some extent the distance between the image and the viewer, then full body immersion means a state where physical distance completely

disappears. The participant's body serves as the interface for contact with the image, and the body overlaps with the image in the virtual space. Although immersion exists in any form of art, full body immersion is clearly related to the characteristics of virtual reality art. In fact, early works of virtual reality art, such as Char Davies's 《Osmose》" and 《Ephemere》 (see Figure 1), vividly demonstrated the full body immersion state of actively participating in virtual art spaces (Penz, Radick, & Howell, 2004). It is precisely because of the pioneering practice of early virtual reality art in this area that it is more conducive to revealing this characteristic. As Davis himself said, the most important aspect of this virtual reality art experience is for participants to feel their bodies as the center of existence. That is to say, for Davis, his work did not evade the existence of the body, but rather reminded the position of this body to enter another space. Participants put on HMD and motion tracking vests to enter the virtual art space, where the images will change according to their position, movement, breathing, and line of sight, creating an experience of wandering between multiple spaces and changing images. For example, 《Osmose》 starts from the Cartesian Space marked by a three-dimensional grid, traverses 12 spaces, and the space is reorganized and arranged as the audience moves. 《Epemier》 also explores three spaces in a way that connects the participants' bodies and image space, creating blurry boundary points. At this point, the participant's body directly acts on the image, becoming the first medium or Embodies Interface to perceive the image, so the virtual image is the participant's body. From this perspective, the difference between virtual reality images and traditional images lies in the fact that the virtuality of virtual reality art transcends the meaning of simple external fiction or fantasy objects.

Figure 1: 《Osmose》; 《Ephemere》

In short, full body immersion is the most prominent manifestation of the difference in virtuality between virtual reality art and traditional art. It can be said that virtuality in virtual reality art gains "potential" through the participants' bodies. This potential lies in the virtuality between the artificial and real domains, connecting the potential and processing processes of both, as well as the possibility of generating creative meaning through perceiving participants. What makes these possible is the immersive body of the participants.

3. THE VIRTUALIZATION OF THE BODY

As an interactive art, the experience of virtual reality art cannot exclude the participants' bodies. From this perspective, the virtuality of virtual reality art is different from that of traditional art. From Pierre L é vy's philosophical perspective, virtuality in digital virtual reality is reality, a reality that can be transformed into reality through a perceptual subject in a certain state, and also a reality that makes the expansion of this reality possible. Virtual is not opposed to reality, but can become reality through the process and experience of visualization. When something is virtualized, it is not so much a loss of realism as a change in identity (Lévy, 1995). The non-material information encoding that constitutes virtual reality cannot be directly read, but rather is achieved through personal usage context and certain technological methods, especially through the participant's body. This virtuality, accompanied by the participants' bodies, has the ability and potential to become reality, echoing Bergson's concept of virtuality. Henri Bergson attempted to overcome the dualism of matter and spirit, defining all matter as images, whose properties are closely related to his concept of virtuality. Bergson completely subverted the image concept that has long been regarded as a depiction of the original or an inner spiritual object of consciousness in philosophical traditions, believing that all matter is an image, an intermediate stage between things and appearances (Grumbach, 2004). Images are no longer real, incomplete illusions, and matter is considered to have infinite diversity, rather than being attached to sub concepts or fixed things of the mind. This kind of image is non real and belongs to the realm of virtuality as reality, containing the potential to become reality at any time. The characteristics of Bergson's imagery and the concept of virtuality are consistent with the fluidity and potential of virtual reality imagery to become reality. G.L.R. Deleuze inherited the unique characteristics of Bergson images through his own image theory,

which largely illustrates the uniqueness of virtual reality images. But even if there is a certain connection between the virtuality in Bergson's sense and the virtuality of virtual reality, this alone cannot fully demonstrate its characteristics. As mentioned in Deleuze's theory of the unknown and art, the virtuality in Bergson's sense has already been manifested in other artistic images such as painting and film. In order to clarify the differences between existing art virtual and virtual reality art, further discussions should be added, including the participants' bodies. At this point, Bergson and Merleau Ponty's unique concept of the body has enlightening significance. Another characteristic of Bergson is that he views the body as a special image within the image. In Bergson's view, the body dominates relative to the object, while other images are reconstructed and arranged around the body's image. The body, as the center of action, performs both action and reaction movements with its surroundings, but is not limited to mechanical movements. It also increases the possibility of uncertainty by confirming time intervals. It is precisely this characteristic of the body as a "Centre D 'in é termination" that makes the emergence of new things possible. M. Merleau Ponty advanced the philosophy of the body based on Bergson's logic. If for Bergson, the body is a special image, then for Merleau Ponty, the body is a spiritual and material entity with intersubjectivity. It is not a fixed substance, but a fleshly consciousness with directionality. It is a "Corps Vécu" that interacts with the world, based on the principle of "Body Corporel", understanding the world and its conditions, and constantly expanding itself (Merleau-Ponty, 2001). Just like Bergson's body characteristics as a "non deterministic center", the gap between stimuli and responses was mentioned by Merleau Ponty in his later stages through the concept of "chair", which refers to these "gaps" (Écart) and "cracks" (Déchirue) (Deng, 2024). The reason why the interaction between the body and the world can expand, rather than end with stimuli and reactions, is because of the "gaps" and constantly changing "body patterns" that make existence possible. The virtuality of virtual reality art is defined by the physical nature of participants who inevitably intervene in the experience. The uncertainty, gaps, and cracks mentioned by Bergson and Merleau Ponty have become clues to reveal the differences between virtual reality art and existing art virtuality. It is these gaps and gaps that provide participants with room for technical intervention, promoting the virtualization of their bodies. This virtualized body is once again integrated and interacts with virtual reality images, repeating virtualization and realism. It can be said that when the virtualization process involving this body is included, the virtuality of virtual reality art can be accurately

explained. On the basis of Merleau Ponty's body diagram, Mark B.N. Hansen referred to this virtual body that was exchanged through technology and virtual reality images as the "Body in Code" (Hansen, 2012). The encoded body refers to a body that shares virtuality while exchanging images and structures. Hansen believes that the bodies of participants who experience virtual reality art are not collections of information or entities of digital information, but rather the embodiment of technology. Hansen carefully explored the imaging interaction properties and the possibility of non locality with this body. In this process, utilizing Merleau Ponty's concepts of "flesh", "gap", "division", etc., and through the interpretation of Maurice Benayoun's virtual reality art work 《World Skin》, its content is presented more specifically. 《World Skin》 is a typical CAVE type virtual reality artwork (see Figure 2), consisting of a group of 6-7 participants wearing LCD goggles, perceiving images and navigating in this immersive space. Participants hold their cameras and press them against the scenes of war, causing the focus of the camera to be removed and the artwork to be rearranged and arranged. Although the screen contains reproducible images, the specific time and space still require participants to develop their imagination. In the process of experiencing these images being destroyed, disappeared, and reconstructed by their own actions, participants are not only the operators of the images, but also the creators and observers.

Figure 2: 《World Skin》

In Hansen's view, through the active operation of participants, the rearrangement and reconfiguration of virtual space intervenes technically

between the body world or the audience's body virtual reality images. Through this intervention, the body and image are continuously separated and fused to achieve this process. The gap between the body and virtual reality image permeates the embodied technology, and through the repeated encounter and separation of the embodied technology with the participant's body, this work is experienced and completed. It can be said that what made the virtual reality artwork 《World Skin》 possible was the action of the audience pressing the camera while receiving the image through the goggles visual vision. This indicates that the image and the participant's body are intertwined, forming a reproducible photographic image in virtual space. The process of the participant using a camera to separate and reconstruct the positioning contains the synchronicity and duality of instant flesh shedding and flesh turning during the encounter with digital information. According to Hansen, this process is known as "Dismembered Embodiment."Hansen actively applied the concept of "division" that emerged in Merleau Ponty's later philosophy, believing that this state of de fleshing and de fleshing division made this situation possible. Just as the origin of meat is based on the duality and undivided state of the body world, the inside outside, and the self others, virtual reality art has the conditions of de fleshing image information and non segmented participants' bodies, which makes the intersection and exchange of the two possible (Hansen, 2012). Therefore, as a technological virtual, virtual reality images are constructed and rearranged by the body, in which the participant's body repeatedly virtualizes and realistically, decontralizes, and terrifies along with the virtual image. This body is an embodiment mediated by technological imagery, and it is a "virtualized body" that opens up and expands its system through the virtuality of virtual reality art. The virtualized body refers to the body that exists as a "Prepersonal" sensation, surpassing the body that simply interacts with virtual reality art on both the visual and physical levels. The so-called personal things all originate from the things of the previous individual, so from the perspective of the previous individual, the ultimate goal is to define the body in a state and level where all possibilities for dynamic changes are open. In other words, in the pre individual stage, virtual reality art is achieved and virtualized through the body, and this virtual body repeatedly activates virtual reality art. The virtuality of virtual reality art is the virtuality that encompasses the meaning of this virtualized body, thereby obtaining the power of realism contained in virtuality. As mentioned above, the implementation of virtual reality art is closely linked to the bodies of participants. This art takes the

body of the participants as an essential element, and can only be completed as a work when the body and image are fused together. This is also the characteristic that distinguishes virtual reality art from traditional art as virtual. It is both a virtual image and a necessary condition for virtual bodies, and uses this virtuality to virtualize the bodies of participants. At this point, virtuality refers to the virtuality that includes the participant's body and the image of the work, and is a force that will become reality. It should be understood as the virtuality shared with the virtual body. This distinguishes virtual reality art from both traditional art and other types of virtual reality. Because the function of this body is different in general virtual reality experiences, games, and virtual reality art experiences. The body that constitutes virtual reality art is a virtual body with active intervention, through which the perceptual space of the body can be restored and expanded.

4. VIRTUAL BODY AND HYPERSPACE CREATOR

In virtual reality art, space is considered more important than traditional art. This is because this space is not only an image composed of participants, but also a necessary condition for participants to perceive and experience as immersive observers. Therefore, the image space composed of the virtualized participant's body is a phenomenological space that cannot be separated from the participant's subject. Therefore, the overlapping characteristics of the virtualized participant's body and space must be considered together with this space. As mentioned earlier, the heterogeneous combination of virtual reality technology images and the audience's body is accompanied by the process of de fleshing or de fleshing, and the conflicts and tensions that arise during this process create cracks and gaps between the images and the body. These cracks and gaps are opportunities for de fleshing and de fleshing, and also serve as opportunities for body image expansion through the triggering of mindfulness (Gutting, 2001). The mindfulness and perception generated in cracks and gaps are stronger, and the body will be responsible for actively screening images. And this mindfulness caused by passive experiential activities of participants is more intense in virtual reality art than in general virtual reality. As a virtual reality of art, it not only generates stronger emotional reactions than general virtual reality based solely on algorithms, but also subjectively and actively participates in the composition of images in the experience of virtual reality art works. In this process, the cracks and

gaps between images and bodies will inevitably deepen. Under this interaction with virtual images, the virtual body continuously generates new image spaces through these cracks and gaps. The creative process carried out by some early virtual reality artists can be seen as an experiment exploring how technological images or media can create this artistic space together with the audience's body. Jeffrey Shaw, as a pioneer in this field, explored the integration of technology and art in a series of creative works in the field of image body relationships, becoming a classic case that showcases the process of virtualization and image space expansion in stages. Although his works can be considered classical virtual reality art by the standards of modern cutting-edge technology, after decades of evolution, his creations can still be seen as a process of artistic exploration of how the heterogeneity of technological images and virtualized audience bodies constitute new artistic spaces and domains, as well as how to virtualize and expand audience bodies. Regarding this, Lev Manovich noticed that the interface overlap and expansion in another space within the same space in Jeffrey Shaw's works will strengthen the audience's execution dimension (Manovich, 2002). The uniqueness of Jeffrey Shaw's virtual reality works lies in the overlapping nature of images and the physical movements of the audience experiencing this process (Hansen, 2004). By transforming the audience's perception into another form, it implies the emergence of a new visual space. Furthermore, according to Hansen, Jeffrey Shaw's processes are also a series of experimental processes that demonstrate how the audience's body frames the virtual reality image space. In this regard, Manovich further explains that Hansen believes that the virtual reality image space is not only formed by the framework specified by the author, nor is it formed by strengthening the execution dimension of the audience's body, but also needs to be structured through the interaction with the audience's body. It can be seen that an early form of virtual reality art still holds significant significance for examining the uniqueness of virtual reality art. 《Legal City》 (1989-1991) is an early work of Jeffrey Shaw. Participants ride bicycles, traveling and exploring various parts of the city depicted in text. The speed, direction, and movement of stepping on the bicycle pedal make the image space different, that is, the most basic form of action between the participant's body movements and virtual reality. The helmet with a tracking device in 《 E.V.E 》 (1993) conveys the movements of participants to a mechanical projector, creating a three-dimensional image from inside the dome to showcase virtual reality art in accordance with the direction of the participants' movements.

《The Golden Calf》(1995): When viewers directly operate a display equipped with a magnetic motion tracking system that can recognize spatial movement and move their bodies in various directions, the LCD display will present a golden calf image from different perspectives, just like a real calf on a pedestal. His design emphasizes interaction, presenting the typical mechanisms of virtual reality art and the artistic space created by the audience's body as relatively simple examples. 《Place: Ruhr》(2000) has almost the same form of expression as the previous work 《Place: A User's Manual》(1995), both of which involve the audience exploring a 360 degree panoramic projection space by manipulating the joystick. At this point, the audience's body is surrounded by a physical cylindrical panoramic space. By controlling the joystick, they enter different scenes and are responsible for opening up these spaces or constructing new image spaces. The audience is already surrounded by the image space. The body meets and collides with the completely heterogeneous and unpredictable space unfolding in front of oneself, intervening in the composition of the image space in a more complex way (see Figure 3) (Mey, 2020).

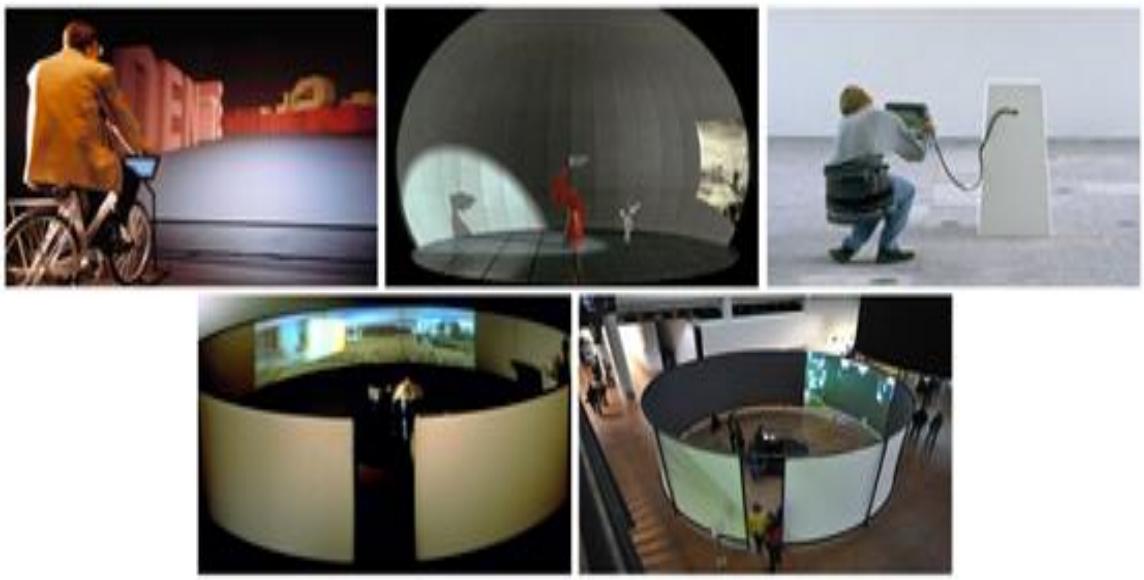

Figure 3: 《Flexible City》;《E.V.E》; 《The Golden Calf》;《Place: A User's Manual》; 《Place: Ruhr》

From the analysis of the above works, it can be seen that the characteristic of these virtual reality art experiences is that the physical movement of the participants in the experiential image space promotes the movement of the image. Integrating technological images with the heterogeneity of the audience's body, and continuing to create new image spaces, that is, the superposition of encoded images with physical bodies

and the indistinguishable feeling between images and bodies generated through the process of de fleshing, continuously constitute and transform new images. In the early stages, Jeffrey Shaw adopted a simple approach, mainly positioning the audience's body in the image and turning the image into a space for the audience's sensory movement. The subsequent works presented a more complex structure, promoting the audience's perception ability and mindfulness formation through nested interactive interfaces, and achieving non empirical or pre empirical domains of experience within the audience. In this visual space, the audience's body is not only manipulated in space, but transformed into a virtual body through sensory movements, Build a so-called Transspatial Domain with virtual images (Hansen, 2004). The hyperspace domain is a concept proposed by Raymond Ruyer, (Ruyer, 2015) which refers to the structural domain of organisms that are invisible and capable of realizing the real experience space. Unlike Cybernetics, which views neural networks and mechanical mechanisms as homogeneous, he believes that organisms exist in hyperspace domains that are different from general machines. This hyperspace domain produces information based on the meaning and value that mechanical objects do not possess, and generates information through external and internal circuits of the organism, forming a source of information (Ansell-Pearson & Pearson, 2012). For Yale, the boundary between the inner and outer realms is not a boundary between two completely different independent domains, but rather serves as a dividing but connecting function, which is interpreted as a connection between circuits. Hansen developed this logic as the connection between technological imagery and the body experiencing it, which constitutes and explains that the hyperspace region is the architectural foundation for achieving image virtuality and constructing image space. In virtual reality art, this foundation connects the unknown architecture itself with the audience's fleshly ability, and is achieved through the construction of meaning in the realm of hyperspace. The virtual image architecture is not preset, but is repeatedly constructed and reassembled based on the relationship with the participant's body in hyperspace (Hansen, 2004). According to Hansen, Jeffrey Shaw's two attempts were not limited to showcasing the audience's body's ability to filter images, but rather to demonstrating that the audience's body has been expanded through constructing its own framework and creating spatial boundaries (Hansen, 2004). Beyond the simple screening function of the body, it preserves the unique characteristics of virtual reality images themselves, which are unregulated, unpredictable, and shaped by the audience's body. In this

regard, Jeffrey Shaw's 《Place》 goes beyond the pure interaction and mixing of the audience's body and image, revealing the movement of the body and senses to open up a new world of images, presenting a new space of images, and can be said to be a more evolved form of virtual reality art than before. This indirectly reveals the conflict and tension between virtual and technological digital images and physical bodies, as well as how the mixing and heterogeneity generated by this relationship construct a virtual and real image space and field. Virtual reality realizes the virtuality of the audience's body through the bodies of participants, and the unknown virtuality once again promotes the virtuality of the audience's body. This is a cycle of reconstructing the image space through the reopening of new domains in hyperspace, where the virtual body mixes and overlaps with the image, thus reshaping the image, creating virtual space and domain. The virtual space generated at this point will re drive the virtualization of the body and reality. This is the most obvious difference between virtual reality art and traditional art, and it is also the uniqueness of virtual reality art that artists such as Jeffrey Shaw have demonstrated through their own artistic experiments.

5. THE MIXTURE OF HETEROTOPIA AND THE BODY

In the continuation of virtualization and reality, the heterogeneous fusion of physical bodies and technological images forms a new image space through hyperspace. This is not a process of breaking away from real space, but a process of expanding visual and experiential space and domain. By experiencing this field, the audience's bodies involved in image construction have been expanded. The virtual reality space and the body are not separated, but are interconnected, mixed and interwoven together. One change and expansion inevitably leads to another change and expansion, which are generated by heterogeneous binding and cracks. The expansion of the domain is related to the previously studied hyperspace domain, as well as the latent and subperceptual domains of the body. This is the dynamic interdependence and overlap of image space, body mindfulness, and perception through a dispersed combination, and this overlap is the core condition that constitutes virtual reality art. This overlapping image space and the bodies of participants continue to undergo a process of technological and material de fleshing, virtualization, and realism, thus possessing a temporary and fluid nature. This property is similar to the "Non-place" property borrowed by anthropologist Marc

Auge. Mark Auger mentioned in his work that modern society has a surplus of event space and individuality, resulting in super modernity, and believes that this super modernity creates a non place (Auge, 1996). It means creating a non anthropological place that is not integrated with the past. Non place only has present nature that is not related to the past, forming a contrast with anthropological places that are historical, relational, and holistic. If "place" is a product of cultural producers characterized by stability, lasting identity, and relatedness, then non place is created by users and can be said to be a personal trajectory that transcends place. Based on liquidity, it is not purely a functional space, but a manifestation of psychological needs, existence status, subjective position, and subject trajectory. It contains the properties of missing and cracked, without the characteristics of stagnation and ending. In this non place, users are based on anonymity, and historicity begins to be cut off. They interact through abstract media such as encoded images, which can create a new, heterogeneous space that expands the flow of regulated space. In this sense, non locality has a de locality nature, but it is not without a place, but rather an alternative to a place that can make a place possible. Virtual reality space does not have connectivity or historicity with existing space, but is based on the virtuality of encoding and participant bodies.

From the perspective of abstract media formation of mobile digital images based on heterogeneity and mixing, it possesses this non locality property. In this regard, Jay David Bolt&Richard Grusin argue that the new media space, including the internet, is not a place detached from reality or an escape from the physical world, but rather has non place properties (Brereton, 2000). Individuals make these places possible through the experience of physical media, and as substitutes for places, they possess non physical hypermedia attributes. That is to say, the user's personal experience is defined by the media rather than historical anthropological realities. The space composed of technological images as a medium is not isolated from the existing experiential space, but presents a completely different form. Its non place nature, the mixture of body and technology, the mixture of material and non-material, is endowed with multiple qualities and mixing. It is possible to deconstruct the daily experience space, break down boundaries, and exhibit scalable characteristics, thereby making heterogeneity and multiplicity linked as virtual receiver physical properties related to this. If this art space has a non place nature, then the body of the experiencer will also share the non

place nature. Another concept associated with this is that the virtual reality art space and the body of the virtual receiver can be considered as spatial political concepts-Heterotopia. Heterotopia is a concept first proposed by Michel Foucault, which is related to his unique spatial thinking. Foucault's concept of "heterogeneous space" stands in stark contrast to utopia. This is a temporary space that embodies the realization of the imagined world, a place located on the edge rather than the center, a heterogeneous space that deviates from daily life, and an incompatible space that overlaps and disrupts the existing order. In short, it is a disorderly space that makes order possible (Korsten & Paik, 2010). The utopian space mentioned by Foucault, like non locality, is a heterogeneous, multiplicative, and mixed space that contrasts with homogeneity and rationality. This characteristic is similar to the virtual reality art space, which serves as an alternative space for expanding reality. Just like a utopia, the artistic space of virtual reality, although also in opposition to reality, forms a hyperspace domain through fusion with the virtual bodies of participants. This is a fusion of technical and physical elements, a space of mixing, multiplicity, disruption, and expansion of reality. In addition, the virtual reality art space is also a space between technology and art, artists and audiences, because virtual reality art has the characteristic of deviant space, deconstructing inherent identity through the overlap and intersection of reality and virtual reality. What sets it apart from other artistic experiences is that it creates a highly heterogeneous visual experience that blends invisible data and visible matter. In this regard, the virtual reality art space can be said to be the most exotic space. The important aspect of the dystopian nature of virtual reality art space is that the virtual body of the audience that overlaps with this art space is also a kind of dystopia. The utopian body itself has indetermination, and the invasion of technological images further expands and disperses the cracks and gaps generated by indetermination, thereby accelerating the generation of new things (Marrati, 2005).

Virtual reality images and virtual bodies undergo a repeated process of de fleshing, exchanging heterogeneity, virtualization and realism, delocalization and re domain. In this process, the body, as a place where heterogeneous identities intersect, has the possibility of becoming "another space" - "heterotopia". Although the natural body is also a constantly changing process in communication with the world, the body combined with technological imagery, as the subject of experiencing virtual reality art and actively intervening, is a "utopia" that maximizes

diversity and heterogeneity, thus transcending its limitations. The artistic space of this virtual reality and the body of the audience have the nature of non place and otherworldly utopia, neither virtual nor real, neither material nor non-material. It is the third field that stimulates their potential through encounter and infiltration, exchanging virtuality. It can be said that the virtuality of virtual reality combines and intersects these two different properties, thereby continuously strengthening and expanding its potential and power in this field. As Derrick de Kerckhove said, the virtuality of virtual reality can revitalize the sensations of the body, making the visual experience more intense. Viewing it as an opportunity for sensory return and physical expansion precisely takes into account the potential of this heterogeneity, multiplicity, and mixed whole.

6. CONCLUSION

Although we have always lived under the shadow of virtuality, the problem of virtuality is particularly prominent today. With the rapid development of cutting-edge technology, virtuality is no longer a realm of fiction and fantasy, but a problem closely related to reality. Because the existence of this virtual reality in the modern sense can only be determined through its interaction with a potential virtual body, the virtual reality in virtual reality can be transformed from a perceptual subject into reality. Its significance lies in the fact that it must include the physical, perceptual, and behavioral possibilities of the participants. From the perspective of artistic virtuality, virtual reality art is not only more capable of eliciting heterogeneous emotional responses than algorithmic general virtual reality, but also has a closer relationship between virtual image real body and virtual reality art audience than any other art. It makes it possible to experience the mixing of invisible data and visible matter, further clarifying the virtual significance as potential. The participants' bodies actively participate in image construction as architects, while implying that this art can have a stronger impact on the participants than ever before. Through the experience of virtual reality art, the bodies of participants are virtualized, making their bodies heterogeneous, mixed, and non place utopian. In this way, virtual reality art not only fully realizes the virtual potential through the audience's body, but also drives and strengthens the potential of the participants' bodies. Viewing the virtual reality art space and the audience's body as a cyclic relationship of mutual infiltration and influence means that it will continuously open up to heterogeneous things

and expand into a new reality. So the problem is how to redefine this reality. Virtual reality is still in the evolutionary stage, and it is not anywhere, but also anywhere. It can exist as both negative and positive things. The ultimate decision in this direction is our virtual and real bodies.

Funding

National Social Science Foundation of China Art Project (19CC169) ; A Project Supported by Sichuan Animation and Comic Research Center, Key Research Institute of Social Sciences of Sichuan Province （DM202209） ; Digital Media Art, Key Laboratory of Sichuan Province, Sichuan Conservatory of Music, Chengdu, China, 610021 （22DMAKL16）

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