Research on Physical Phenomenological Innovation Technology in Virtual Reality Movies

Moyang Li*
University College London, London, WC1E 6BT, United Kingdom

*Corresponding author: moyang.li.20@ucl.ac.uk

Abstract. From the perspective of physical phenomenology, the experience of the experiencer in the virtual reality space is not only achieved by external technical means. The key to the experience of the experience is the operation of the "body field". This process involves three important roles: body space, body intentionality, and body habits. Based on phenomenological theory, virtual reality technology has been widely used in genres of science fiction, magic and other themes, making movies more appealing. Based on body phenomenology, this article discusses the application of virtual reality technology in the design mode of movie scenes.

Keywords: Phenomenology, innovation, virtual reality, film.

1. Introduction
Virtual reality technology was first proposed by the American expert Lanier. The early meaning was an artificial world synthesized by electronic computers. Virtual reality was first applied to military departments and aerospace industries [1]. Its principle is to use computer graphics to simulate scenes and track them through technology. The object's movement trajectory and orientation change, and then use multifunctional sensors and controllers to control the virtual scene, bringing an immersive experience. Virtual reality technology brings together a variety of technologies, including three-dimensional reality technology, three-dimensional graphics real-time generation technology, language input and output technology, sensing technology, etc., through sensing, computer, simulation technology to generate virtual objects, through stimulation, sensing It is presented to the user in a way that combines human perception and virtual reality system well, so that the user can obtain the experience and feeling of hearing, vision, touch and force.

Virtual experience arises from the interaction between the user and the machine. It is neither completely material nor completely spiritual. It is difficult to describe it purely and objectively in a scientific manner. However, only by analysing it as a special phenomenon of consciousness and material, can we determine the possibility of "virtual reality" as a way of human existence, thereby providing inspiration for people's current choices [2]. With the advent of the digital age, more and more movies apply virtual reality technology in the production of movies, especially in surreal-themed movies such as science fiction and magic. Virtual reality technology has brought unprecedented shocking effects to the audience in terms of audio-visual experience, even to a certain extent, it is more imaginative and artistically appealing than traditional movies.
2. The phenomenological nature of virtual reality
Art is virtual reality; it is the symbolic expression of reality. No matter painting or drama, the virtual experience they provide is present and fulfilling. The only virtual reality is the materialized reality, as shown in Figure 1 for the phenomenological nature of virtual reality. This is the original meaning of virtual reality. But the "virtual reality" in science has achieved a qualitative leap: from creating an eternal illusion aimed at the material to creating an eternal illusion aimed at the mind. This process is done through language. When science defines "reality" as "a process that can be accurately reproduced under certain conditions", this has embodied its attempt to verbalize reality, because "reproduction" is to make a description. In the final analysis, virtual reality is also composed of a nearly completely formalized computer language [3]. What supports it behind it is a reductionist theory of scientism and naturalism. If science makes virtual reality and reality indistinguishable, it means that perception has been reduced to a series of physical and chemical reactions under the operation of algorithms, which in a sense proves that "humans are machines". To be precise, it proves that human is a machine dominated by universal grammar, and this grammar is scientific language. It is different from the language of literature, art and philosophy in reality. The language in virtual reality is governed by logic and is presented as a perceptual image of the world. It does not affect the individual in the abstract logical context, but penetrates into the concrete perceptual experience. The phenomenological essence of "virtual reality" is language, and only language. It is purer than ordinary literature, art, and even philosophical language. It is a concrete form that embodies the order of things.

Figure 1. The phenomenological nature of virtual reality

3. Analysis of movie scene design
In the design of movie scenes, it is necessary to start with the script and construct according to the director's intention and expression style. The design of movie scenes must be unified with the art style, creative team consciousness, creative techniques, and character tonality. The movie scene integrates the process of creativity and thinking [4]. When designing, it is necessary to combine the design through contrast, association, and related thinking, and combine various unrelated things to form a new thinking mode. For the design of movie scenes, light and shadow, tones, geographical features, scene architecture, etc. must also be considered.

3.1. Explain the relationship between time and space
Movie scenes can explain the relationship between time and space. It is the space environment in the development of the movie. It is closely related to the narrative content and plot structure of the movie.
It conforms to the plot content and the nature of the plot and can show the development process of the story. Interactivity is the use of equipment to input information and get feedback to complete the communication and interaction between humans and the system. In a virtual reality system, users are no longer passive recipients of information, but can communicate and communicate with the virtual world through gyroscopes, helmet-mounted displays, data gloves, etc. In this way, users can feel like they are in the real world. It also interacts with virtual objects.

### 3.2. Create an atmosphere

According to the needs of the plot, movie scenes can also express special emotions and atmospheres, either lonely, or desolate, or joyful, or romantic. If you want the experiencer to get the feeling of being completely immersed in the virtual world, virtual reality technology must simulate all the human sensory experience, but because the current virtual reality technology has not yet developed to a high level, it can only simulate better Human visual perception, auditory perception and tactile perception, and other aspects of perception simulation technology have not yet matured [5]. However, since most of the information that people obtain about the perception of the real world depends on vision and hearing, the mature simulation of auditory perception and visual perception in virtual reality technology can completely immerse the experiencer in the virtual world. This is very similar to the principle that movies act on the audience through pictures and sound.

### 3.3. Characterization

Because virtual reality technology can simulate scenes and characters in real life, and can simulate the subtle facial expressions of characters and various performances that real actors cannot show, virtual reality technology is widely used by film directors. The movie character is in production. The animated film "Toy Story", jointly launched by Walt Disney Pictures and Pixar Animation Studios in 1995, should be regarded as the first virtual reality film made entirely using virtual reality technology in history, as shown in Figure 2. The production cost of this film is US$30 million, and the entire cast and crew are only 110 people, because the animated characters in this film, such as Toy Cowboy Sheriff Woody and Space Mount Police Buzz Lightyear, are entirely composed of Manufactured by digital virtual reality technology.

![Figure 2. Toy Story](image-url)
3.4. Action pivot

The design of the movie scene needs to be set according to the behaviour and actions of the characters, not to be far away, let alone to isolate the characters, but to be integrated with the characters. In disaster films or science fiction films, in a real shooting environment, some actions cannot be completed by real actors [6]. At this time, motion capture technology in virtual reality technology is needed. Motion capture technology is to use some special equipment to digitally process and record the behaviours and actions of objects or characters in the movie. The conventional shooting technology used in general movies can only shoot one frame after another. The objects in each frame cannot be stored separately.

Taking the virtual shooting of the movie "Avatar" as an example (as shown in Figure 3), they set up a set of "collaborative work cameras" in the studio. This technical system is composed of 140 digital virtual cameras spread over the top of the studio. These cameras form a capture stage on the top of the studio, and perform surround photography of all the objects and actors to be shot in the studio. The camera traces the reflected light from the on-site LED lights, which is similar to the infrared spectrum, and transmits the captured motion data to another set of technical systems with data analysis capabilities in time, and then combines the reflection of the spectrum with the motion curve of the real actors for analysis, so as to get a three-dimensional model of the entire lens. After the above-mentioned series of technical processing procedures, the processor of the virtual camera remaps these data to the subsequent computer processing procedures, so that the virtualized scenes and images present a highly realistic visual effect.

![Avatar](image)

**Figure 3. Avatar**

4. Virtual reality movie production process

From the analysis of the production process of the entire design case, the overall design and production process framework is shown in Figure 4.
4.1. Sketching
Before drawing the scene, you must observe the shot picture. At this time, you should pay attention to the perspective relationship. Due to the focal length of the camera lens and the position of the camera, the shot picture shows a certain perspective, which must be in line with the perspective of the virtual shooting actor. The shot here is a panoramic shot of the character, and the post-production is to be synthesized into the distant scene [7]. Therefore, when drawing a sketch, the digital scene painter is required to draw the foreground, middle ground and western scene in accordance with the perspective of the sketch, so as to achieve the desired expression artistic conception.

4.2. Large environment drawing
With the approval of the director, you can then collect information based on the draft, and collect appropriate picture materials according to every detail. The digital painter needs to shoot or draw it by himself.

4.3. Digital painting
First of all, the "painting" in digital painting is explained in the context of conceptual design, emphasizing the importance of the content and atmosphere of the script, studying the rendering method step by step, and summarizing its guiding role in special effects films; secondly, Understanding and mastering the camera and shooting materials that meet the requirements are the basis of digital painting [8]. Thirdly, the analysis of "scene" further expands the role of space, light and colour effects in digital painting. Most of the content of digital painting is beyond the reach of actual shooting, which not only expands the space for film creation, but also saves film production expenses. The perfect combination of digital background and lens picture also reflects the importance of digital painting for the film.

4.4. 3D scene mapping
The texture material production of the 3D scene is the next step after the model is created, so that the model has the proper texture. In 3D software, materials are mainly used to express the color, gloss, texture and other characteristics of objects, which can be understood as a combination of material and texture. To make materials in 3D software, we must first have a comprehensive understanding and detailed analysis of the structure, shape, and characteristics of the object. What color is it, what kind of texture it has, whether it is transparent, whether it transmits light, whether its surface is smooth,
whether there are highlights, whether it can reflect the surrounding objects, whether the reflection is clear, and so on. Mapping refers to attaching a two-dimensional picture to a simulated three-dimensional model. In all three-dimensional design software, there are multiple mapping coordinate methods such as plane, cylinder, and sphere. These methods are relatively simple and are only suitable for objects with simple rules. For complex models to get accurate texture effects, UV mapping mode is generally used. First, apply the UV texture modifier to the 3D model, expand the model surface into a plane, and then draw the required texture on the output model surface, and finally paste the texture back to the 3D model.

5. Conclusion
Virtual technology has enriched people's material time and space and opened up more degrees of freedom. The virtual reality environment, as the "survival realm" for the experiencer, not only ensures that the experience gained by the experiencer in it has the first person to be given, but also has the contextuality of survival, so that the experiencer obtains a kind of living A sense of presence. The organic combination of film art and reality technology has changed the form and nature of the film, and brought shocking visual effects. With the widespread implementation of virtual reality technology, the movie scenes have become more and more fantastic, and the scenes have become more and more fantastic. The magnificence has greatly improved people's viewing experience.

References
[1] Mateer, J. Directing for Cinematic Virtual Reality: how the traditional film director’s craft applies to immersive environments and notions of presence. Journal of Media Practice, 18(1) (2017) 14-25.
[2] Ding, N., Zhou, W., & Fung, A. Y. Emotional effect of cinematic VR compared with traditional 2D film. Telematics and Informatics, 35(6) (2018) 1572-1579.
[3] Kang, J. Study on Characteristics of Digital Realism Aspect for HMD based Virtual Reality Films. Journal of Digital Contents Society, 18(5) (2017) 849-858.
[4] Golding, D. Far from paradise: The body, the apparatus and the image of contemporary virtual reality. Convergence, 25(2) (2019) 340-353.
[5] Bunnenberg, C. Mittendrin im historischen Geschehen? Immersive digitale Medien (Augmented Reality, Virtual Reality, 360°-Film) in der Geschichtskultur und Perspektiven für den Geschichtsunterricht, geschichte für heute, 13(4) (2020) 45-59.
[6] Jones, S., & Dawkins, S. Walking in someone else’s shoes: creating empathy in the practice of immersive film. Media Practice and Education, 19(3) (2018) 298-312.
[7] Bramley, I., Goode, A., Anderson, L., & Mary, E. Researching in-store, at home: Using virtual reality within quantitative surveys. International Journal of Market Research, 60(4) (2018) 344-351.
[8] McSwan, A. Exploring Animation and Virtual Reality to Represent the Perceptual-Experiences of Art-Practitioners with Sight-Loss. The Design Journal, 24(2) (2021) 315-324.