Application Research of Installation Art Based on Digital Media

Case Study on LED Display Technology

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ABSTRACT. With the development of science and technology in the world today, humanity has entered a digital high-tech information era, and the wide application of digital media has also been reflected in various fields. Looking at the current society, film, music, projection technology, and other technological forms with scientific and technical content are also slowly involved in the creation of contemporary art, among which the emerging installation art is deeply affected in the current digital era. The use of digital media has become a very common way of presentation in installation works. This article takes led display technology as an example, analyzes the use and principles of led devices, and uses the technology in the researcher's work "life with water" to design an installation with an audiovisual language that connects the audience's emotions to the installation.

Keywords: Digital Media Technology, Installation Art, LED Display Technology, Audio-visual Language.

1   Introduction

The installation art based on digital media technology is a relatively new field, which is the result of technological progress. One of the main advantages of applying digital media technology in installation art is that it can create an immersive appreciation environment, which acts as a bridge between the works created by artists and the emotions of the audience. Computer operating system can control these environments and create a unique emotional resonance for everyone.

This article will take the viewer's emotion as an entry point to explore the value of digital media technology in installation art and their mutual relationship, hoping to provide more ideas and possibilities for future digital media installation art design.

## 2	Installation art

Lawra. S. G. Conklin said: "Installation art is the visualization of human inner feelings, presented in three-dimensional space in real time and space [1]." Unlike traditional art forms such as painting or sculpture, installation art is created for a specific location and typically comprises multiple media, such as sculpture, video, sound, and lighting.

As an emerging art form, installation art has certain connections with Pop Art, Minimalism, and Conceptual Art in the 1960s. At the beginning of the 21st century, this term was reintroduced into contemporary art and described as works that radically differ from traditional art forms. It refers to the reconstruction of found objects through techniques such as copying, overlapping, displacement, suspension, and division, placed in a spatial environment, inviting the audience to participate [2] [3]. Installation works can be interactive or static, giving new meaning to work. It is a way of creating and displaying art.

## 3	Analysis of the relationship between digital media technology, installation art and human emotion

Digital media technology provides artists with new tools and technologies to create installation art that can arouse the audience's emotional response. For example, LED display devices can create an immersive environment, which can transmit the audience to another world, thus enhancing human emotional feedback. On the contrary, installation art can create a unique emotional experience for the audience and let them interact with the art in a way that traditional two-dimensional graphic art cannot achieve.

Human emotion is the ultimate goal of installation art, because the artist's creation purpose is to connect with the audience at a deep emotional level. Digital media technology can enhance this connection because it provides artists with a new way to create immersive and interactive experiences that can trigger a series of emotional reactions.

Overall, the relationship between digital media technology, installation art, and human emotion is complex, as each element is interrelated, and there is an inseparable circular relationship where all three are indispensable [4] and profoundly influence the installation (as shown in Figure. 1).
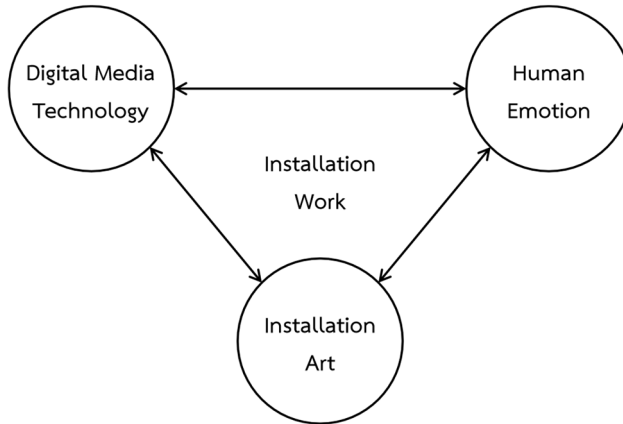
Fig. 1. Structure diagram of relationship between digital media technology, installation art and human emotion

4   Application of digital media technology in installation art

The extensive use of digital technology makes the expression forms of installation art increasingly rich, diverse, and changeable. Because of the extensive use of these emerging digital technologies, the expression forms and aesthetic experience of installation art are constantly changing [5].

4.1   Case study 1

Random International's Rain Room (as shown in Figure. 2) is a landmark large-scale art installation that inspires the audience to become participants in an unfamiliar stage while creating a subtle emotion between performer and viewer. In the rain-pouring "rain house" space, you are in it and will not get wet at all. The 3D camera will capture the participants' figures inside the installation in time, and the system will automatically control the direction of rain to avoid pedestrians. This work incorporates the multiple magic of nature and technology, evoking an exploration of life in the ecological environment.

Fig. 2. Rain Room.

https://www.artforum.com.cn/print/201307/5424

4.2   Case study 2

In urban public spaces, installation art often plays the finishing point, can enhance the aesthetic and cultural value of public spaces, and can also promote social interaction, community engagement, and environmental awareness.

Chicago Millennium Park's "Crown Fountain Crown Fountain" is a very successful case (as shown in Figure. 3), designed by the Catalan artist Jaume Plensa, opened in July 2004. The use of recognizable LED screens in the regular venue makes it an eye-catching signifier, using digital multimedia with a computer-controlled 15-meter-high display screen that alternates different smiling faces of 1,000 citizens representing Chicago, welcoming visitors from all over the world. They were bringing people a strong visual impact and attraction so that the combination of image and water spray effect immediately presents a vivid and exciting atmosphere. People are no longer the viewers of the installation art in the city but also the participants and users. A sense of identity and belonging to the urban space will gradually be formed.

Fig. 3. Crown Fountain

https://www.waterdesign.cn/h-nd-32.html

Results: Digital media technology has brought unprecedented changes to art, changing art's thinking and creation mode at a certain level, closely combining art and technology. For example, LED light displays and computer system manipulation are all part of the display of digital media technology, making installation art gain more diversified expression.

5 Installation art design based on digital media technology

5.1 Digital Media Technology

The application of digital media technology in installation art is an excellent response to the discussion on the relationship between art and technology. In designing installation art under digital media technology, designers must collect, integrate, select, process, and output relevant information comprehensively and systematically [6] [7]. In particular, establishing modeling in installation art requires a scientific and perfect information model. On this basis, establish a professional information database, and this information database is the result of getting participants' emotional feedback. Based on the information model applied to various devices, the relevant structures in digital graphic design are optimized and adjusted. In the graphic design development process to improve the quality and efficiency of device art (as shown in the Figure 4).
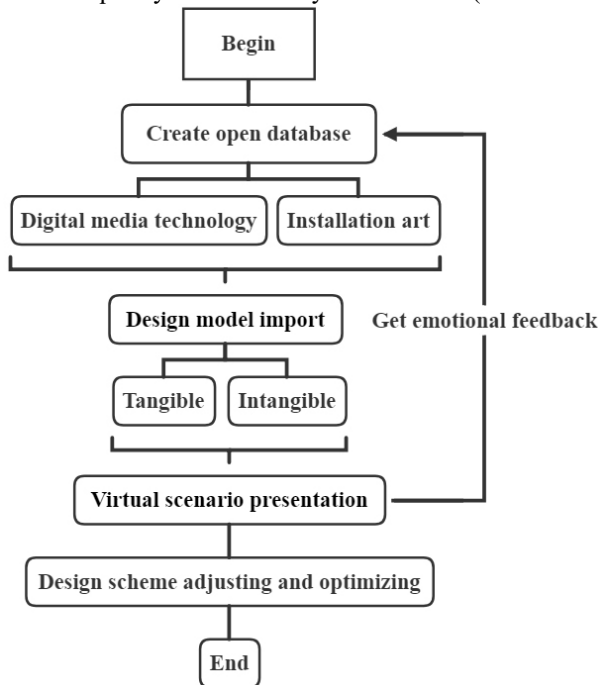

Fig. 4. Digital information model for installation art

For example LED art, as digital media technology, continues to shine in installation works, which can become independent lighting installation art and be attached to the building, converting the building facade into a multimedia wall. LED is a light-emitting diode that has been used in various display fields and gradually entered the field of digital public art. Its rich and changeable dynamic visual image adds new vitality to the city. As shown in Figure. 5, the operation process and principle of LED display devices. This flow chart can be used to evaluate the performance of digital LED, optimize the design and manufacturing process, and guide their use in practical applications.
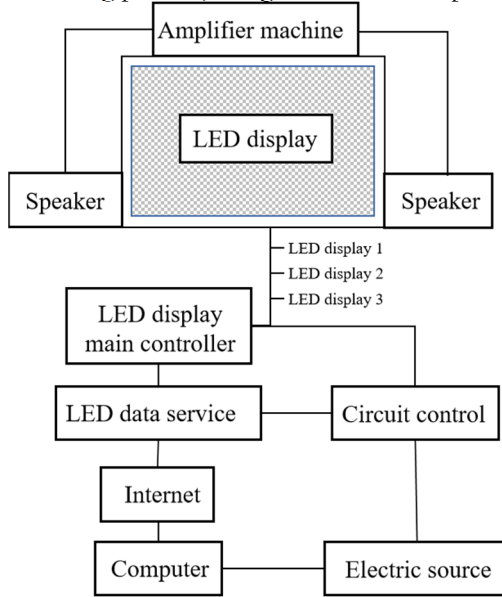

Fig. 5. LED equipment use and principles

The LED installation can be controlled by a computer program to achieve rich changes in patterns and colors, which can create a place full of meaningful rhythm, and the public space is thus more humane and artistic [8]. The installation designed by the researcher is based on the application of digital media LED technology to achieve emotional communication between the work and the audience [9].

5.2   Installation art design

The installation work "life with water" is inspired by the natural element of the waves (as shown in Figure. 6). In the design of graphic elements, researchers abstracted the waves, sketched the dynamics of the waves with simple geometric lines, and designed waves of different shapes and sizes. Rearrange and combine them through installation art such as reproduction and dislocation. By reproducing the waves in nature, we try to create a supernatural and realistic environment through the digital medium to achieve a visual phenomenon where figuration and abstraction are no longer opposed to each other [10].
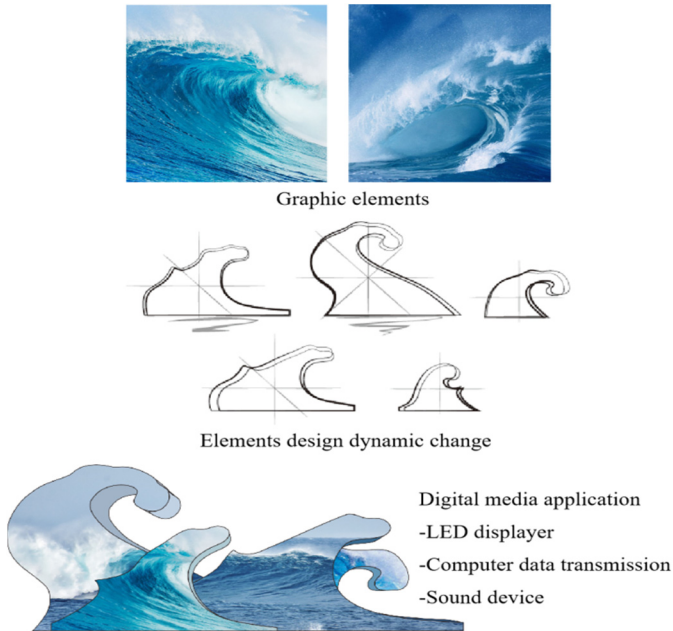
Fig. 6. Sketch

By installing an led display device on the surface based on the shape of the waves and placing the sound transmission device in the device shape to transmit the sound of the waves overturning, both are connected to the computer control system to achieve the synchronization of the picture and sound. The computer system pre-stores the changes in the rhythm of the waves at different times of the day, and the tide rises and falls, sometimes calm and sometimes surging, giving the installation a vibrant and nature atmosphere so that the audience can interact with the vivid installation works emotionally (as shown in Figure. 7).

Fig. 7. Digital media installation art

6   Conclusion

Integrating technology and art has become a significant trend with the advancement of science and technology. In creating the digital media-based installation, the researcher focused on the people living in the city who seek the immersive feeling of the natural environment. The researcher chose the element of sea waves in nature to gain inspiration for the design.

The work combines the materials and technologies of the digital age to expand the expression of the audiovisual language of contemporary installation art. With the progress of the times, technology can generate wireless possibilities for art and stimulate the endless creativity of artists.

These are some of the researcher's explorations and conclusions on installation art based on digital media technology, which will provide reference and help for related learners.

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