

Application Analysis of Holographic Projection Technology in Intelligent Exhibition

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ABSTRACT

Holographic projection technology, as a new technology, can completely record the light information such as amplitude and phase contained in the reflected or projected light waves of the target object. It has the characteristics of interactivity, plot, transitivity and so on. It can be divided into air projection technology, laser beam projection technology, 180 degree holographic projection technology, 360 degree holographic projection technology and so on. Holographic projection technology can bring changeable scene, realistic effect and immersive experience in product release, stage performance, science and technology display, and has great application space in the field of intelligent exhibition.

Keywords: Holographic projection, intelligent exhibition, technical features, innovative application

1. INTRODUCTION

Holographic projection technology, also known as virtual imaging technology, is a modern technical that enables the three-dimensional image of the subject to be presented under the action of interference and diffraction principles [1]. Holographic projection technology is simply an advanced technology to make virtual images appear in the air by using the principle of light diffraction and reflection. Based on its characteristics of high authenticity, good interaction and immersion, holographic projection technology has been paid more and more attention in the field of intelligent exhibition.

2. FEATURES OF HOLOGRAPHIC PROJECTION TECHNOLOGY

Holographic projection technology is essentially a reverse display of holography technology, which is a new photographic technology to record all information such as the amplitude and phase of the reflected or transmitted light waves of the subject [2], the principle is shown in Figure 1.

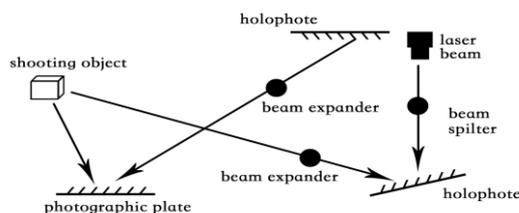


Figure 1 Principle of holographic imaging

Its implementation takes two steps. The first step is to record: the optical information, such as the amplitude and phase of the reflected or transmitted light waves, required for imaging, is recorded under holography. As is shown in Figure 2, the second step is reproduction: the complete recorded light wave information in holography is reproduced by diffraction principle.

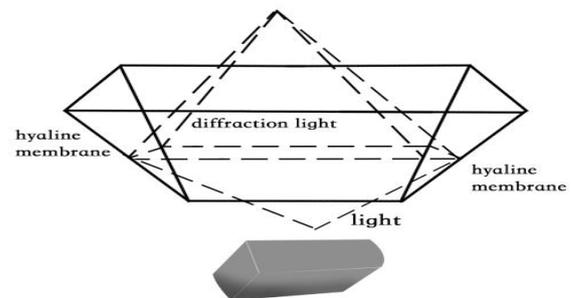


Figure 2 Holographic projection imaging

The whole process of imaging is as follows: under the action of holography technology, a raster image can be generated that seems to have nothing to do with the final image, and the sinusoidal hologram can generate two images immediately, that is, the starting image and the conjugate image, once the specific laser direct shot. By using coherent light interference, the amplitude information and phase information of the light wave are recorded, so the whole information of the object including shape, size and so on can be obtained [3], and the original image reduction ability is still lost while having strong visual outstanding effect. Features of holographic projection techniques include:

2.1. Interaction

In the traditional exhibition activities, there are obvious differences between the audience and the communicator, while the intelligent exhibition blurs the boundary between the two. The audience can not only choose the hot information of interest in the intelligent exhibition environment, but also participate in the secondary production and dissemination of information [4]. With the help of holographic projection technology, the display activities can pay more attention to the overall effect of the promotion, truly to the customer as the basic starting point to do the design, enhance the interaction ability of the scene — that is, the virtual environment of the real-time response to human operations. With the help of infrared, touch screen, sound control devices and other equipment, people in the process of visiting said, see, touch, can be perceived by virtual images, so that through the realization of good interactive effect to truly grasp the audience's eyeball and inner needs, efficient and accurate input and output of information. Finally, through the change of communication mode, the fundamental purpose of communicating and obtaining information is realized.

2.2. Episodic

Living in a fast-paced era, the ability to quickly impress and catch people's eyes requires the ability to tell stories and plot, which can be transformed into information particles that stimulate the human brain to a greater extent, thus stimulating the length and depth of the human brain's memory [5]. The holographic projection technique, which is free from the traditional complex and complicated entity set, has this impressive ability. The greatest advantage of holographic projection is that the virtual image created by holographic projection can bring the viewer into the scene well compared to the reality and non-difference of the real object. In the light, dance, environmental color conditions are complete, which organizer does not want to choose a better live display effect? Which visitor does not want to have an immersive perfect user experience? With the help of relevant projection equipment, this technology creates a fascinating and perfect scene environment with the help of 3D image display and control system. Modern technology with great substitution provides objective support for telling better and more true stories.

2.3. Transient

The biggest difference from the solid scene is that holographic projection, while easy to represent and switch, is fleeting. At the end of a show, past scenes will remain in that space and time, except that modern photography, photography and other techniques can preserve the original image. Because technology and

equipment are not widely available, people can not easily see the virtual image created by holographic projection like watching movies, which weakens some convenience, but also gets the attention of the viewer because of its scarcity and brevity.

3. CLASSIFICATION OF HOLOGRAPHIC PROJECTION TECHNIQUES

In recent years, under the joint action of the three main components shown in Table 1, holographic projection technology has made a strong promotion in its performance, on-site presentation and other aspects, and has a pivotal position in the field of intelligent exhibition. The main classifications of holographic projection techniques include:

3.1. Air Projection Technology

Air projection imaging, also known as fog screen imaging, is a technique in which laser light uses the unbalanced motion of particles in the air and combines aerodynamics to ban traditional projection and form virtual images in water mist. Because the air is accompanied by people, air projection technology — more than laser, photosensitive media and other nouns let ordinary people want to understand and experience curiosity. It is also because of the universality of this carrier that this technology is increasingly used in product launches and stage performances. It is believed that to give sufficient space for the development of projection technology, people's life in the future can also be gradually separated from the physical display to achieve better interactive effects and innovative functions. In the field of intelligent exhibition, fog screen imaging technology also appears in the public view as a brand-new display media, only a projector and an air screen system can be in the enterprise exhibition hall, science and technology museum, exhibition hall and other display windows, using air projection technology to bring outstanding audio-visual experience.

3.2. Laser Beam Projection Technology

Laser beam projection, in short, is a small blast of slurry-like material in the air. The certificate material involved in the blast is a mixture of nitrogen and oxygen diffusion in the air. The technology was first invented by a Japanese company Science and Technology, which can combine each short 3D images into a solid, complete virtual image. In large-scale exhibition activities, laser beam projection technology focus on the exhibition stand, while releasing heavy new products to promote in-depth industry exchanges. The holding of related technology exchange activities contributes to the development and application of related technology in the field of intelligent exhibition.

3.3. 180-degree Holographic Projection Technology

Unlike other holographic projection techniques, the 180-degree holographic projection technique is better at displaying the details of the interior structure of the projected object in digital form. Among many devices, the transparent holographic projection screen, which is the back projection screen that provides dynamic display in the air, is one of the biggest highlights, because the transparent projection screen does not hinder the sight of the surrounding objects while providing viewing functions. This has also become 180-degree holographic projection technology in the museum, science and technology museum and other intelligent exhibition places are widely used one of the main reasons. For the realization of the virtual host exhibition item in the intelligent exhibition and exhibition, we need the support of this technology. The cartoon characters formed by 3D are originally static images on the holographic projection screen, and when the audience passes by, they begin to work to introduce the information of the theme distribution and characteristics in the exhibition hall.

3.4. 360-degree Holographic Projection Technique

If frequent in the major museums or exhibition activities, perhaps 360-degree holographic projection is no stranger. The 360-degree holographic projection technique makes the stereo image suspended in mid-air for imaging. This dynamic and dynamic product display system uses the principle of spectroscopic imaging, using a three-dimensional model to capture the object completely in the scene, so that the object is real as if in sight, when reaching out to find out, but found not within reach. Combined with holographic projection perfectly free from the traditional 3D glasses can achieve the real effect, to the audience brought a strong sense of appreciation and zero binding. All these are the unique features of holographic projection technology. Using the optical illusion principle of phantom imaging technology as a branch of holographic projection, through the effect of scene reproduction for the wisdom of Xiamen City Planning Museum exhibition, this technology also play a unique role in the domestic celebrity residence, theme parks and other places. Moreover, holographic projection technology also include air projection and interaction technology, edge blanking technology, rotation LED display technology, such technology on the basis of holographic projection and 3D functions help to better serve the needs of intelligent exhibition.

4. HOLOGRAPHIC PROJECTION TECHNOLOGY FOR INTELLIGENT EXHIBITION APPLICATION SCENE

4.1. Product Release

Product release, as its name implies, the ultimate goal is to let participants know the product, understand the product and remember the product. At this time, if the holographic projection technology is used, it will achieve twice the result with half the effort. First of all, holographic projection, as an advanced technology that has not been widely used in the market, the image formed by the use of three-dimensional virtual technology will certainly fully reflect the bright spot of the product, and the novelty of the product will be doubled to attract the audience. Holographic projection can cater to the needs and change rapidly, make the most perfect foil for the exhibition center, and use the latest display technology to bring an unique experience to the audience, and attract their desire to buy products.

4.2. Stage Performance

Effect of stage performance is influenced by many factors, among which stage technology and stage art creation are two important factors [6]. The use of holographic projection in the direction of stage acting can help it quickly enter the vision of young people. In recent years, the virtual idols frequently appeared in various variety shows, which made the "paper man" of quadratic element become a popular singer and actor in the third dimension through holographic projection technology. Take the player Rainbow who appeared in the popular draft show "Youth with you 2" in 2020 as an example, although as a virtual singer, but she has a very complete and distinct character image settings, "band RICH BOOM member, female drummer, e-sports king" and so on are all her labels. Quadratic element fans are very willing to pay for these virtual idols, go to concerts, buy peripheral products, organize cinemas and a series of fan's "daily", the same as treat real idols.

4.3. Technology Display

Holographic projection technology obviously has strong science and technology, but how can it be not so obscure difficult to understand, and imperceptibly into the public impression, it needs to be built in the construction of science and technology museum in frontier cities. As an example, the "3D holographic projection technology exhibition room" in Shantou science and technology museum in Guangdong Province, the combination of virtual imaging and virtual reality experience reflects the unique attraction of intelligent exhibition, and creates a full of interesting and dynamic product display effect under the

joint work of cabinet, lighting, spectroscopy and other equipment. In addition to the use of science and technology museum, another type of display is close to people's daily life, such as using holographic projection to simulate the cooking scene, experience the whole process of firewood cooking, and connect the holographic projection with "cooking gens" in a special form, which draws closer the connection between special groups and technology, and can also make the viewer feel almost real easily.

4.4. Model Reproduction

In the early planning of large objects (such as engineering vehicles, tower cranes, etc.) exhibition, the organizers must focus on whether the bearing capacity of the holding site is up to standard, and the access of the site. Even if the venue hardware facilities pass, how the exhibits are moved, stored and related costs are a thorny problem. With the help of holographic projection, the intelligent exhibition with holographic projection technology can get rid of the limitation of traditional display activities, and make 3D models and then give them material, so that the model can realize virtual stereo transformation through 3D technology, thus generating virtual three-dimensional image under the action of holographic projection. It is believed that in time, the technology of holographic projection can be extended to more difficult fields after more in-depth development, covering the needs of more aspects of intelligent exhibition.

4.5. Wedding Ceremony

Contemporary wedding etiquette industry pays more and more attention to enhance the scene atmosphere through decoration props, and help the guests on the scene to have a better sensory experience. But in general, the wedding scene construction needs a lot of time, whether it is the purchase of materials before the wedding, scene layout or the circuit, candles, fireworks and a series of safety issues to be considered during the activity. Wedding as a major branch of the exhibition industry, thanks to the development of intelligent exhibition and with more material delivery and theme choice, the use of holographic projection technology can achieve all the imagination of new people, whether romantic fantasy or classical literature and art, can move the hearts of guests in a more impressive way.

5. CONCLUSION

Holographic projection technology has successfully broken through the traditional means of display, opened up the aesthetic of visitors and more chance for organizers to improve the effect of intelligent exhibition. The author believes that with the continuous progress of research results, holographic projection technology in the future will

inevitably have a broad market prospect in the field of intelligent exhibition.

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