

An Introduction to the Application of Mixed Reality Technology in Museum Immersive Displays

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Abstract: With the rapid development of the times, visual language expression is no longer a single transmission of information, but can superimpose and compound a variety of information such as text, image, sound and animation, and present and transmit them to the public in an interactive and digital form, bringing a visual impact to the public as well as a new immersive space. In recent years, museums and art galleries have seen an explosion in the number of ways and forms of exhibition, particularly augmented reality and immersive viewing, due to the strong development of artificial intelligence. In this paper, I will analyse visual art displays and discuss the characteristics, creation and changes in artistic methods of visual art from the perspective of mixed reality technology, with a view to providing reference for the future development of visual art displays.

Keywords: Mixed Reality Technology; immersive, Visual display in museum; AI

With the rapid development of technology, the development of visual art has also seen two major trends: firstly, a gradual shift towards immersive visualisation, which may seem like a sensory act, but a phenomenon of social image piling. Through various means such as photography and advertising, designers complete the visual accumulation of images and present them to the public as real or virtual phenomena. Secondly, there is a shift from imitation to mimesis. Mimesis refers to being created, but with an independent logic of growth. These two major trends in visual art allow for innovation and change in the world. Mixed reality technology improves our grasp of the creation, presentation and consumption of art and design as a whole, and builds a more systematic research framework for the recent development and direction of mixed reality in the integration space, taking into account the latest achievements in current technological development. Mixed reality technology is an inevitable trend in the technologisation of art. The study of mixed reality technology is of great importance in promoting the development of art and design theory and visual art, and in improving art forms.

The relationship between technology and art has always been a topic of discussion in the scientific and artistic communities. Nowadays, artificial intelligence has exploded in full force, which brings to art and design far more than a simple technical means, but more of an impact on human thinking patterns and subjective consciousness. As a combination of traditional art and design with cutting-edge technology, mixed reality technology has attracted widespread attention from artists. The study of mixed reality technology can help us push traditional art towards technology.

1 Overview of Mixed Reality Technology

The technology that merges “virtual” and “real”, which we collectively refer to as Mixed Reality (MR) Mixed reality is the blending of the physical and digital worlds, enabling natural and intuitive 3D interactions between people, computers, and the environment. This new reality is based on advances in computer vision, graphics processing, display technology, input systems and cloud computing. The term “mixed reality” was first introduced by Paul Milgram and Fumio Kishino in their 1994 paper “A Taxonomy of Mixed Reality Visual Displays”. The paper explores the concept of a “virtual continuum” and a taxonomy of visual displays.

2 Mixed Reality Technology User experience types

The classification of mixed reality technology user needs can be deduced according to the classification of museum visual application scenarios, and the MR products and interactive behaviors corresponding to each type of user needs can be positioned through the usage habits of each type of user. MR users can be classified into the following categories:

Passive users, who are less likely to actively use MR products, lack a certain degree of initiative in downloading mobile apps or using MR glasses in advance, will often try them out because of the herd mentality, but will become active users once they recognize MR.

Active users, who have a positive attitude towards MR products and whose needs cannot be met by the mobile-based experiences, so they are more concerned about the development trend of MR products and are willing to try more new interactive means. Moreover, any lacking or imperfect function in visual art experience would constrain their recognition of the relevant MR product.

Participatory users, who have a certain sense of identification with new technologies, will actively use MR products and other technology-based products, but they are somewhat demanding in terms of the functionality of MR products, therefore, they should be the core of the creation of the visual art design so as to bring more technological experience.

Conservative users, who do not actively use MR products or devices, but will gradually embrace AR technology as it becomes part of the visual arts.

3 Current Status of the Application of Mixed Reality Technology in Visual Arts

Firstly, museum displays are divided into traditional and modern forms. Among them, the traditional form is the most popular.

Museology 4.0 has yet to improve the positioning of the concept of visual display in museums. The field of museum display in Europe and the United States is currently developing, and the number of artists engaged in curating exhibitions is gradually increasing. However, some of them lack certain knowledge and MR operation skills; others blindly pursue the current trend, are unable to accurately position visual art design and MR technology, and as a result, the work created is blind, and the development of visual design is constrained.

Secondly, the market for visual art design is relatively confusing. Although the mode of operation of visual design is gradually developing towards modularity in the industry, a few creators have relatively little professional knowledge when it comes to creation, and some even borrow a lot from some excellent works in their creation, causing confusion in the visual design market. In addition, because the main characteristic of MR technology is diversity, the effectiveness and relevance of a few creators in the application of technology will be lacking, and confusion will appear in their works.

Finally, the integration of tradition and innovation in visual art design needs to be improved, with more emphasis on integrating innovation into tradition. However, in reality, most creators only see the efficiency and convenience of MR technology, and tend to ignore how to inherit or promote traditional culture, which to some extent limits the artistry of the work. In addition, given the fast pace of social development, most creators are more concerned with efficiency, not caring whether the technology is reasonable or not, and the sense of innovation still needs to be improved, so the works created will have a corresponding lag.

4 Exploration of Mixed Reality Technology Applied to Museum Display

1. Characteristics of traditional visual display art

Visual display art is an art that uses auxiliary materials, apparatus or equipment to convey and present information in a specific space. The visual impact of the exhibits is stronger and the distance between the viewer and the exhibit is closer, so that information can be transmitted between the two. In addition, as times change, visual art takes on a diverse and innovative trend. At the same time, linguistic symbols will change, more or less, from flat visuals and physical shapes to interactive symbols. The diversification of linguistic symbols will increase the speed of information dissemination, highlighting their value, role and status in the transmission of information. Visual displays can be characterized by mutual transmission of information, the combination of multiple arts, and two-way communication between exhibits and viewers. Therefore, the integration of MR technology into the visual display should not only focus on the arrangement of light in the exhibits, but also on the application of digital media and interactive display technologies to create a new form of visual display and enhance the viewers' sense of experience.

2. The characteristics of creation after applying augmented reality technology to visual art

Firstly, the interactivity feature. Mixed reality technology not only enables real-time rendering, but also the processing of some virtual images. When people apply MR products, their perspective will change accordingly with the virtual images, so that they feel that what they see is what actually exists. This form of delivery not only enhances the viewer's experience, but also conveys a great deal of information. Some MR displays are designed to allow visitors to pick their own steps or to have some influence on the state of the exhibit with the help of interaction.

Secondly, the digital feature. MR technology is a computer real-time processing technology. With distinct digital characteristics, it presents virtual image to the public with the help of intelligent equipment. It makes the visual display of the virtual image more intuitive and easier for the public to understand the message. In the case of assembled toys, for example, the markings are often placed on the box. As people assemble these toys, they can scan the marker image and a model of the assemblage corresponding to the marker will appear at the top of the box. These combinations are digitally modelled in advance by the creator and then presented to the eyes using this technology.

Finally, the intersectionality feature. MR technology is able to superimpose real scenes with virtual images and present them in a variety of forms, such as visual, video, model, picture animation and other forms. It can also be combined with landscape painting, shadow puppets, paper cutting, etc. to present different artistic effects. Thus, augmented reality technology can achieve interoperability with art.

3. The advantages of applying Mixed reality to visual art displays

Firstly, Mixed reality technology can effectively enhance the interest of visual art displays. The application of Mixed reality technology can make visual art displays interesting in their own right. The viewers can enjoy the exhibits with the help of these devices, and perceive changes in the virtual images by adjusting the angle and body alignment of the devices. Designers can also increase communication with visitors through scenario-based games. The integration of new, interesting displays and interactive forms in the display can maximise the interest of the viewers, focus their attention and encourage them to actively engage with the visual display. From passive access to information to active access to information, this strengthens the viewers' ability to understand and remember the information on display and improves the efficiency and quality of information dissemination.

Secondly, MR technology can break the boundaries of space and time and enrich the visual effect of exhibits. It can effectively solve some of the drawbacks of modelling displays and flat displays, i.e., they can only be displayed in a specific time and space, making the display content and elements more diversified. In addition to text and visual symbols, some interactive elements such as sound, animation and video can be added to make all the expressed artistic messages richer and more vivid. With the stimulation of this strong display language, the visitors' acceptance of the information will be significantly increased. After being scanned and screened by the equipment, what is presented to the visitors is full of color, and also those broken exhibits can be restored to their original appearance, accompanied by sound and special effects, etc. The external image and internal artistry of the exhibits will become full, intuitive and vivid to effectively

attract the visitors' attention and enhance their satisfaction.

Conclusion:

In Conclusion, application of mixed reality technology in visual art displays will become a popular trend, and there is infinite scope for the application of mixed reality in visual art displays. Interaction is the essence of MR technology, and it is bound to become an innovative approach to visual displays, and will also gain wide popularity and application. The Mixed reality technology in future should be both technical and artistic, so that the value of the technology can be fully applied to museum visual displays.

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