

Design of Immersive Sci-Fi Space based on Industrial Ruins

Jiu Zi^{1,*}, Zhigang Wang², Tongge Yao³

¹Post-doctor of information art design, School of Fine Arts, Tsinghua University, Beijing

²Dean, Associate Professor, Professor, School of Fine Arts, Tsinghua University, Beijing

³Phd student of Information Art Design, School of Fine Arts, Tsinghua University, Beijing

*Corresponding author Email:357834493@qq.com

ABSTRACT

Industrial sites have important historical value, cultural value, social value. How to make industrial sites coruscate new vitality and life in today's society is a very important proposition. This work aims to explore an immersive exhibition space design idea that combines industrial sites and science fiction theme. According to the concept of "Immersion" and the natural conditions of industrial sites, the design ideas and methods of immersive sci-fi space based on industrial sites are explored. The design of immersive sci-fi space based on industrial ruins should be based on three aspects: "Sense", "Imagination" and "Interaction" so as to satisfy both narrative immersion and game immersion. The design of "Sensuous immersion" should adopt new technologies such as 3D Mapping, VR, AR and holographic projection to influence all the senses of the audience and make them surrounded by sci-fi elements; "Imaginative immersion" should rely on science fiction stories and tour movements to help the audience to complete the transition from the real world to the virtual world; "Interactive immersion" should be in the exhibition hall design interactive exhibits, so that the audience immersed in the task of the challenge.

Keywords: Industrial Sites, Science Fiction Space Design, Sensory Immersion, Imaginative Immersion, Interactive Immersion

1. INTRODUCTION

In 2016, the International Federation for the Protection of Industrial Heritage presented the Moscow Charter, which states, "All the material and spiritual entities brought about by industrial production, as well as the recording and study of these entities, constitute the remains of industrial civilization.". Heavy industry is the only way for every big country to develop its economy. However, with the economic development and urban expansion, negative effects such as environmental pollution and waste of resources brought by heavy industry are gradually conflicting with the development of the city. In this case, heavy industry had to withdraw from the stage of history, become the witness of urban development remains. This raises some urgent questions: what should we do when these industrial zones, which once created much value and hosted the imprint of national development, no longer produce economic value? How can we keep not only their temporal significance and emotional value, but also infuse them with the vitality of the present and give them new cultural connotations?

For today's audience, the traditional science fiction exhibition, science fiction museum cannot meet the requirements for the tour. Visitors expect to immerse in it, experience its history and culture. From this point of view, industrial sites and science fiction field has a natural combination of funds, so this paper is expected to explore a combination of industrial sites and science fiction theme of the immersive exhibition space design ideas.

2. RESEARCH ON THE SENSE OF SPACE IMMERSION OF INDUSTRIAL SITES

The concept of "immersion" began as a metaphor for being immersed in water. As scholars developed this concept, it was described as the act of taking someone through a sensory experience that is different from reality; this act draws the viewer into the storyline or spectacle of the book or movie being read or watched, as if the viewer were being immersed in the experience. In addition, "Immersion" can also be described as a feeling of active engagement at work, such as being immersed in a math problem or writing a computer program. Marie-Laure

Ryan has distinguished between these two types of immersion, which she calls narrative immersion and playful immersion [1]. Narrative immersion presupposes a participant in physical activity. It is a “Participation” in the construction and contemplation of the construction and contemplation of the story world, in which the imagination relies purely on mental activity. In which imagination relies purely on mental activity; Game immersion, on the other hand, involves deep, focused participation in a task, just as a player focuses on a task upgrade in a game.

Industrial sites tend to show a larger space, so industrial sites fundamentally meet the space design of narrative immersion, while most of them retain the original factory building or steel structure, it also opens up the possibility of playful immersion. First of all, we should start from the visual sense to establish sensory immersion, then build up the imaginative immersion from the narrative. Finally, the challenge-based immersion needs to be established through interaction.

2.1 Sensory Immersion

Sensory immersion affects all senses, making users feel as if they are completely surrounded by a different reality [2]. This fictional world will take over all our attention and sensory organs. Sensory immersion occurs when the viewer is drawn to the visual effects of the venue and then placed within the planned movement and narrative space of the venue. Therefore, in order to create sensory immersion in the sci-fi future scene for the audience, designers can use such technical means as 3D Mapping, virtual reality, ball screen, hologram, and so on. Relying on the real industrial heritage of the space features, to complete from the reality to the future of science fiction immersion journey.

2.2 Imaginative Immersion

As the viewer’s mind follows the designed lines and narratives into the realm of science fiction, and they’ve put themselves in a different kind of sci-fi space, imaginative immersion happening. At this time, all the elements in the stadium are assembled like a window, they exist outside the language, spread out in time and space, beyond the window frames, into a science-fiction universe [3]. Thus, immersing oneself in the imagination to interpret content is not the medium’s output to the senses. The scholar Samuel Taylor Coleridge described this dramatic experience as “The direct contradiction of the willing”, suggesting that the audience forgets everything by putting their minds in an imaginary world and just focusing on what is happening on stage [4].

2.3 Challenge-Based Immersion

Challenge-based immersion is fundamentally based on interaction, this occurs when “The challenge and the

ability to achieve a satisfactory balance” [5]. Therefore, after the members of an audience feels that they have successfully completed a task because of their ability, they may also feel that they have been immersing themselves in the action that has completed the task. This idea is similar to the concept of “flow”, where a user is neither anxious nor bored, but right in the middle of the experience [6]. It’s a state of “Sustained attention input,” creating a balance between skill and challenge. Therefore, the interactivity of the exhibits should be considered in the design of immersive science fiction space. If all the exhibits and installations in the venue only have a one-dimensional presentation, the audience will not be able to create a challenge-based immersion. Therefore, some of the exhibits and installations in the stadium need to retain the one-dimensional display function, but also need to increase the two-dimensional interactive function.

3. RESEARCH ON SPATIAL NARRATIVE OF SCIENCE FICTION

For the new media art exhibition, which takes science fiction as the theme, the space has the pivotal art function. New media art which are based on sci-fi content shapes the setting of sci-fi stories with the latest VR, AR, holography, sound, light, electricity and other multi-media technology to create a dynamic “Future space” that constitutes an “immersive” experience and a scene finished with multi-dimensional narrative and information transmission. In the narrative space created by the new media, artists, venues, time, lighting, climate and other peripheral conditions can become an organic part of the work, they can have “Dialogue and communication” between them, and the works are not isolated static objects, but become the main body in a variety of ever-changing posture presented, in essence, to overturn the traditional aesthetic way [7].

According to the media theory of Canadian media theorist Marshall McLuhan, “Media is space”: technology produces media which determines its space, and an artistic space is closely related to its medium of expression.

With the development of computer technology, artists have come to realize the value of new media for creating new spatial relations and new spatial experiences. They superimpose images, sounds and other multi-sensory channels and explore the various dimensions of the new media art form by coming to the work space itself while the narrative, the scene, the structure and the development vein carry their omni-directional excavation [8].

The narrative logic of immersive science fiction space based on science fiction is different from the fanciful and rather grandiose setting of science fiction; it also differs from sci-fi films in terms of the story settings, emotional arcs, plot clues and complex dramatic conflicts that can

be accomplished in just two hours^[9]. It has the extension of the narrative space in the multi-dimensional space, the biggest difference is that its narrative is interactive, beyond the traditional narrative space text of the order and logic. The performance medium and narrative text of new media art is a complicated body of space, with guidance and exploration that disbands and reorganizes its original space narrative time axis. The interactive narration between history and reality across time and space is one of the common expressions of new media art^[10]. The main technique is to copy and stagnate the irreversible time and space, and to smash the traditional historical logic in time, in space, scenes are described from multiple perspectives, breaking the principle of time and space, and establishing a new order of time and space, which leads to nonlinear, unreasonable, parallel and multiple narratives. The narrative is not predetermined, but is triggered and engaged by the audience. For example, in 2014 Avatar super immersive theme park, it was using the latest "User interactive bio-organism" technology, where exotic flowers and plants were fitted with sensors as visitors arrived, flowers and plants respond to visitors' movements, and virtual organisms "live" and "breathe" as if they had souls.

4. CASE STUDY—SCI-FICENE

Sci-Fi as the 2021 of Beijing Science and Technology Week, held in Shougang Garden three blast furnace of Beijing, Shijingshan District. Sci-Fi based on immersive storytelling. This chapter is a case study of immersive storytelling in Sci-Fi.

4.1 Theme 3D Mapping Show to Match Industrial Heritage Scene

Traditional 3D projection can be understood as a way to map points in a 3D to a 2D plane. But, the 3D projection shown in the Sci-Fi maps the points in the 3D to the 3D objects in the industrial site, making the 3D lighting projection as one with the real architectural carrier, and in the original invariable building on the animation effect, three-dimensional effect to maximize.

Before the 3D Mapping design of the three blast furnaces, the project team first selected the furnace body structure in the middle of the three blast furnaces as the carrier for Mapping, and then carried out detailed on-site measurement work on it, the data of building façade need to be measured and recorded accurately, which lays a solid foundation for the following work of 3D software to build virtual scene. Secondly, according to the site conditions, the project team needs to set the best viewing range for the 3D Mapping show and decide on the placement of the virtual camera in the 3D software. Finally, design the video content for the 3D Mapping show. Considering the practical use of the original No. 3 blast furnace, the project team added a steelmaking

process to the design video content, and the use of the actual venue furnace pipes, steel structures, such as the production of steel flow, gear machinery and other animation content, video content and the actual scene one by one match, bring a visual immersion feast.

4.2 Holographic Stage and Virtual Idol

Holographic projection technology is the use of the principle of optics, so that the image displayed in the air to a three-dimensional effect. Viewers do not need to wear 3D glasses to see three-dimensional virtual objects. The holographic stage is a big field of holographic projection technology. To create a real three-dimensional image, the holographic stage can create a fantasy space, with "virtual scene + real person" or "real scene + virtual person" mode, lead the audience into the virtual and real fusion of the dual space. At the Sci-Fi exhibition, the team set up a holographic stage with a whole phantom film at a 45-degree angle, while, from above, the projector projects the "Zero" singing and dancing performances of the virtual idol into the main model landscape in the scenery box, combining the real scene with the virtual idol, with a strong sense of depth, increase the sense of immersion of the audience.

4.3 Panoramic Screen

Panoramic screen is a new display technology, which breaks the limitation that the projection image can only be a plane plan figure, but adopts dome structure, the screen adopts a hemispherical structure, and the hemispheres are at a certain angle, the audience is in it. The film is shot with a wide-angle fisheye lens and is projected on a dome-like screen. As a result, the film has a large image area, clear picture quality and stereo output, making the audience feel as if they were there. "sci-fi World" ball curtain exterior design and industrial sites and sci-fi theme match, by the steel triangle structure, and these steel with interactive light belt, the effect is full of sci-fi. The ball curtain content design uses the low poly point line style to carry on the creation, fills the future science and technology feeling, the audience may lie on the ground also may sit, enhances the sense organ immersion.

5. CONCLUSION

The immersive sci-fi space experience based on industrial heritage is a high-value experience that integrates a great deal of technology, wisdom and creativity. On the one hand, it needs to combine a variety of cutting-edge technology to build the structure and form of immersive experience. On the other hand, the key node is the spatial environment of the industrial site, which is shaped by the interactive space and the situational narrative space, to keep people constantly immersed in certain sci-fi situations, atmospheres, and themes. In

addition, it combines multi-sensory experience, enabling the viewer to experience high-quality arts and culture from all directions. The theme of sci-fi will be injected into the cultural connotation, so that cultural resources can be creatively transformed into an innovative field of cultural science and technology.

REFERENCES

- [1] Marie-Laure Ryan. *Narrative as Virtual Reality: Immersion and Interactive in Literature and Electronic Media*[M].Press All Rights reserved. Published 2001.
- [2] Murray,J.H. *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*[M].Free Press, New York,1997.
- [3] Manovich,Lev. *The Language of New Media*[J]. Cambridge:the MIT
- [4] Ryan, Marie-Laure, and Thon Jan-Noël. *Storyworlds Across Media: Toward a Media Conscious Narratology*. University of Nebraska Press, 2014.
- [5] Ryan, M.-L.: Interactive narrative, plot types, and interpersonal relations. In: Spierling, U., Szilas, N. (eds.) ICIDS
- [6] Murray, J.H.: Why Paris Needs Hector and Lancelot Needs Mordred: Using Traditional Narrative Roles and Functions for Dramatic Compression in Interactive Narrative. In: André, E. (ed.) ICIDS 2011.
- [7] Aylett, R., Louchart, S.: Towards a narrative theory of virtual reality. *Virtual Reality* 7, 2–9 (2003).
- [8] Ermi,L,Mayra,F. *Fundamental Components of the Gameplay Experience: Analysing Immersion*[C].In *Proceedings of the Authors and Digital Games Research Association Conference*,2005.
- [9] Jocelyn Spence, David M. Frohlich, and Stuart Andrews. *Performative Experience Design*[C]. In *CHI '13 Extended Abstracts on Human Factors in Computing Systems (CHI EA '13)*. ACM, New York, NY, USA, 2013:2049–2058.
- [10] Rafaeli,Sheizaf. *Interactivity: From New Media to Communication*[C], in *Advancing Communication Science: Merging Mass and Interpersonal Process*, R.P.Hawkins, J.M.Wiemann and S.Pingree, eds. Newbury Park,CA,1988:110-134.