Application of Virtual Reality Technology in Post-disaster Reconstruction

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Abstract: With the development of modern science and technology, the prediction and treatment methods to deal with natural disasters have developed in various fields. But the process of human civilization is accelerating, natural disasters are also escalating, the damage caused by a single natural disaster is expanding, the role of a single method in the face of large disasters is limited, and how to quickly rebuild and keep up with the pace of economic development in the short period of time after the occurrence of natural disasters is a subject facing every country today. Fortunately, the era has pushed virtual reality technology to our front, this technology in many industries have great achievements, and with the further development of technology, its application is wider, the field is deeper, also provides a new idea for post-disaster reconstruction. This paper takes virtual reality technology as the object, discusses the function of this technology in post-disaster reconstruction and how to use it to serve post-disaster reconstruction. In order to be able to deal with similar situations in the future, there are useful lessons to learn from.

1. Introduction

Virtual reality technology is a kind of high-tech technology which combines many kinds of technical means. It has many characteristics, such as interactivity, immediacy and so on. When using this technology, people can immerse themselves in the virtual world produced by computer through the help of technical means, and can also interact with the related language and action in this virtual world, produce the same effect as the real space, and create a suitable interpersonal space. In this space, people can go beyond the limits of time and space to make a real feeling of things thousands of miles away and not in line with the season, at the same time, can also according to their own feelings of the observation of all feedback. Virtual reality technology, as a technology method with high technology content, has developed rapidly in recent years under the blessing of the development of science and technology, has gradually entered people's daily life, has been sought after by more people, and has shown its own strengths in more and more fields, including film and television works and the production of some online games, even on some stage live performances, the technology has become a new bright spot. Of course, in the post-disaster reconstruction, the technology can also play its own role, the use of this technology, can also carry out spatial composition, the complete architectural style to show the audience, this is what is needed in the post-disaster reconstruction, designers can design the manuscript in a short time in a three-dimensional observable detail way to show investors, such a way is intuitive and efficient, so that the post-disaster reconstruction work quickly to the next step, very timely to meet the requirements of post-disaster reconstruction.

Figure 1 Virtual reality technology

2. Application of Virtual Reality Technology in Post-disaster Reconstruction

2.1. Timely Understanding of Post-Disaster Status

Disasters in people's daily life, usually have irresistible and powerful destructive. And after the disaster, the shorter the post-disaster reconstruction time, relatively speaking, for the disaster area people's psychological guidance and economic development recovery is more beneficial. To carry out the post-disaster reconstruction work, the first need to understand is the disaster area after the disaster appearance, the post-disaster situation to carry on the concrete analysis, according to the different problems according to the local conditions, so as to be able to carry out the next plan. Virtual reality technology can quickly compose the current situation of disaster areas after collecting post-disaster data [1]. The virtual reality technology is particularly important for the reconstruction of post-disaster areas, especially when people are not easy to enter and post-disaster work is difficult and only relevant detection instruments are available. It can make a complete composition of the disaster areas in a short time according to the data obtained. At the same time, this composition will also be a blueprint for disaster reconstruction.

2.2. Coordination of Disaster Recovery Projects

After the disaster, there are many projects waiting to be built, the design of professionals and personnel is unusually extensive, the workload is very complex, how to find a clue in this complex project, which requires the intervention of virtual reality technology. Using virtual reality technology, the post-disaster reconstruction work can form a systematic thinking on the whole, planners and designers can draw a cocoon from the clues of virtual reality technology, and quickly formulate the feasible method [2]. Virtual Reality (VR) technology, as a technology that can simulate real-world scenarios, can bring together multiple projects, present a holistic view, make overall planning simpler and more convenient, make people feel it, point out irrationalities as soon as possible, make a practical analysis of the feasibility of design and have indicative significance for future construction.

Figure 2 Post-disaster reconstruction site

3. How to Apply Virtual Reality Technology in Post-disaster Construction

3.1. Information on the Construction of the Building as a Whole

At present, in post-disaster reconstruction, the most adopted design form is two-dimensional expression, but such expression is difficult to show the overall picture of the whole project, and can only provide a part of the building single or several parts of the relevant information, and virtual reality technology can build the whole post-disaster reconstruction project, in which each detail can be observed, put forward relevant corrective advice. Post-disaster reconstruction is not only the work of the government and construction units, but also related to the livelihood of many people in the disaster areas. Virtual reality technology can not only enable the construction units to build up the whole post-disaster situation, but also enable the people in the disaster areas to experience the post-disaster reconstruction home in advance, and put forward their own requirements and suggestions. In the later period of implementation, it can be better implemented but also can meet the wishes of more people, conducive to the psychological construction of the people after the disaster.[3].

3.2. Reduction in Post-Disaster Construction Costs

Post-disaster reconstruction is a large-scale project, in which there are many aspects of the handover, the master planner often to communicate with multiple departments, relatively large time costs. But once virtual reality technology is put in place, this situation will be improved by shortening communication distance and time. The designer can communicate with the construction team through virtual reality technology, and answer and guide the problems encountered in the construction in time. At the same time, the construction team and other departments can also feedback the work they are following to the designer through virtual reality technology. This not only saves the time of communication, but also saves the cost of transportation.

3.3. Comparison of Programmes

In post-disaster reconstruction, multi-scheme design is often carried out for the same disaster area, taking into account different realistic problems, and the indicators of various schemes should be analyzed in detail [4]. Choose the most appropriate option. Using virtual reality technology, different schemes can be made into corresponding models, which can reflect each data index on the model, and different models can be switched arbitrarily. The planner can easily view each part of each scheme and grasp the advantages and disadvantages of different schemes more accurately. Similarly, for various schemes, designers can modify them at any time. Therefore, the investment of virtual reality technology can greatly improve the efficiency and speed up the reconstruction of post-disaster.
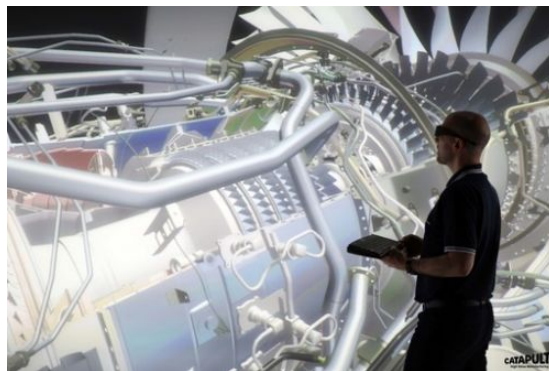

Figure 3 Application of virtual reality technology in building construction

3.4. Facilitating Human-Computer Interaction

Using the man-machine interface, the user and the computer can reach contact, the good man-machine interface can let the user master the system quickly in a short time, and improve the efficiency of the system. Using virtual reality technology, users can quickly connect with the

computer, carry out related operations, and reduce the time to learn operations relative to other technologies. Once a connection is established between the computer and the user, virtual reality technology can work quickly, and in a project that requires rapid implementation in post-disaster reconstruction, this technology that is easy to use and creates a good interaction environment between the computer and the user is naturally very useful [5]. The investment of virtual reality technology will shorten the time for designers and builders as well as people to become familiar with the operation of technology.

3.5. Virtual Reality System

In the traditional post-disaster reconstruction projects, more words and pictures are expressed, the overall composition of the post-disaster reconstruction is depicted, but because of the application of virtual reality technology, in addition to the above expression, it can make a realistic scene. Combined with the design drawings of the building, the construction drawings of the site and the database created before this, the three-dimensional space can be built interactively for the appearance of post-disaster reconstruction. And this application can be put into the whole process of post-disaster reconstruction, according to the plan to continue to update, even in the early stage of the project can be put into use by the masses.

4. Conclusion

From the above, it can be concluded that the virtual reality technology can not only understand the specific situation of the disaster area in time, design according to the relevant indicators, but also quickly reflect the composition of the designer, so that the designer can be personally observed and improved. In addition, the input of virtual reality technology can shorten the communication distance between designers and builders and reduce the communication cost. Using the simple interface of human-computer interaction, all kinds of users can be familiar with the operation as soon as possible. After the construction of the whole post-disaster reconstruction project, the people can realize the overall appearance of the home reconstruction and put forward the relevant suggestions to the specific problems, thus increasing the feasibility of the implementation time. Post-disaster reconstruction is related to national economy and people's livelihood, efficiency is life, and virtual reality technology can greatly improve the efficiency of post-disaster reconstruction, should be used and developed in post-disaster reconstruction.

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