Development and implementation of product interactive design platform based on 3D virtual vision

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Abstract: At present, the model of product interaction platform mostly adopts two-dimensional display, which has many defects, such as low interaction, heavy workload and difficult to update. Therefore, the 3D virtual vision is integrated into the product interaction design platform, and the product interaction scene is modeled according to the 3D virtual vision technology. By simulating product information with 3D digital model, we can realize the development of product interactive design platform based on 3D virtual vision. The platform includes interactive design module, 3D virtual vision display module and interactive display module. Firstly, this paper analyses the implementation process of platform construction structure. Then, this paper analyses the realization process of product interaction function. Finally, the human-machine interface of product interaction platform is analyzed.

1. Introduction
With the development of computer simulation and virtual reality technology, 3D simulation is widely used in fire rescue, data mining and other fields. Product Interactive Platform (PIP) is a kind of information platform based on network, which integrates various media expressions and forms. It enriches the content of products and has high application value. Virtual reality is based on computer technology and related science and technology, which puts users in a virtual 3D world. In this way, we can ensure that users can interact with objects in the virtual scene. At present, the model of product interaction platform mostly adopts two-dimensional display, which has many defects, such as low interactivity, heavy workload and difficult to update. With the continuous development of multimedia technology and virtual reality technology, product interaction mode presents the trend of networking and diversification.

2. Implementation process of platform construction technology
2.1 Platform architecture
The overall structure of product interactive design platform based on 3D virtual vision is shown in Figure 1. The key parts are interactive design module, 3D virtual vision display module and interactive display module.
2.2 3D model and animation production
Through 3D software model and rendering, we can make animation, which is the first step to build a display platform. Product model is the most important part of the whole platform, which is the most frequent part of the interaction between the platform and users. At present, the commonly used model software is: 3D Max, Auto CAD, Maya, Solidworks, Pro-e and so on. Different softwares have their own characteristics and different model methods. Following is an example of 3D Max to describe the specific model steps.

First, the collection and collation of 3D data. By acquiring 3D data related to products, we can analyze and sort out the data, which lays a foundation for the following work.

Second, the structure of the model is analyzed. By dividing the structure and level of the product, we can decompose the components, which can determine the size of each component and the model method.

Third, visual model. Through the analysis and arrangement of the first two steps, we can model and combine each part of the product.

Fourth, the model is sorted out. By simplifying the built model, we can remove unnecessary auxiliary lines and some redundant data, which can reduce the amount of data and improve the speed.

Fifth, give material. The material of the model is edited by mapping and texture mapping to make the model closer to the real product.

Sixth, animation production. After completing the 3D model and animation of the product, we can convert the model file into the file format supported by the follow-up work, which can facilitate the next work.

In addition, the product model can also be obtained by 3D scanning. By scanning the 3D information of the product with a 3D scanner, we can get the model data. Then we can save the output to get the desired model format. Finally, by modifying and simplifying the model, we can get the final model.
2.4 Virtual interaction design

After the model is established, we can design the virtual interaction of the model through related software. Through the 3D network interaction technology, we can process the 3D model, which will achieve the following operations, such as zooming, rotation, transformation and so on. At present, the popular network interaction technologies mainly include Java 3D, Fluid3D, Viewpoint, Cult3D and so on. With the development of network technology, related technologies are becoming more and more mature. Taking Cult 3D as an example, the steps of virtual interaction design are mainly shown in Figure 2. Through virtual interaction design, the model meets the requirements of virtual interaction with users, which is also the most important part of the interaction between display platform and users.

3. Realization of product interaction function in 3D virtual vision

3D virtual vision is a new interactive mode of product interaction platform, which can ensure that the communication distance between users and product interaction platform is minimized. Its implementation mainly includes the following four processes.

First, 3D virtual vision model. By collecting the 3D virtual vision data of the interactive products, we can analysis their structure levels. By obtaining the models of different components of products, we can simplify the established models. We can use texture mapping and other methods to set the material of the model, and use 3D Max, AutoCAD and other model software, which can shape the product's 3D virtual vision model.

Second, the animation display process. Animation is the key part of the interactive platform, which is the key to realize the interaction between users and products. At the same time, we can demonstrate the information of complex products, which shows users more comprehensive product information.

Third, virtual interaction design. After completing the 3D product model and animation in the interactive platform, we can design the virtual interaction between them, which can ensure that users control the product rotation, scaling and so on. This paper uses VRML (Virtual Reality Model Language), which is called Virtual Reality Model Language (VRML), to design the interaction of product models.

Fourth, platform release. By integrating the product interaction platform framework and the product model of interactive design into a whole, we can produce a complete product interaction platform interface with the help of pictures and time and frequency. Users can interact with each other through this interface.

4. Design principles of platform interface

4.1 Interface information quantity

Most of the information people receive through external senses is visual information. Therefore, the research of visual information transmission is the most important in interface interaction design. From a purely physiological point of view, people's ability to transmit information is amazing. The theoretical
value of the human visual nerve's ability to transmit information is 1 billion bits per second. However, from the point of view of human information processing system, the ability of human information transmission in practical activities depends not only on the ability of physiological organs to transmit information. The human sensory pathway has a certain capacity. The information that people receive through the external senses greatly exceeds the "channel capacity" of the human central nervous system. However, a large amount of information is filtered out in the process of transmission, and only a part of it enters the high-level part of the nerve center, thus forming the "perceptual bottleneck" of information processing. Therefore, the design of interactive interface should pay attention to ensuring that the amount of information can’t exceed people's affordability. Information should not be too complex, which will make users unable to judge their own psychological activities, which will greatly reduce the efficiency of users' work.

4.2 Nike platform interactive display example

This paper lists a successful interactive design demonstration platform case. The interactive design of Nike's website is excellent, mainly in the following aspects. First, successful user positioning. Design a website from the user's point of view, which satisfies the usability goal and user experience goal of the website. Second, humanized behavior design. Through reasonable function orientation and content classification, users can get the information they want and accomplish what they want to do. Third, beautiful interface design. Simple and fashionable, unified style. This style is consistent with the corporate image, which allows users to enjoy the beauty in the operation. The interactive display of Nike Platform is shown in Figure 3.

5. Conclusions

This paper builds a design platform based on 3D virtual vision and interactive design. After introducing the design of interactive display and 3D virtual visual effect display in detail, the interactive function and 3D virtual rendering function of the design platform are designed.

References

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