Research on virtual scene design Based on 3D vision

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Abstract: In order to meet the design realism and high efficiency requirements of product display scenes, C4D is used to complete 3D virtual scene modeling and virtual design. Use C4D software to make a three-dimensional model of the scene, first make part of the sub-model of the display area, increase the realistic effect of the scene design through material editing and adding textures (UV, normal, Alpha, etc.), combine multiple sub-models for appropriate layout and adjustment acquisition Complete three-dimensional scene model; after completing the three-dimensional virtual scene modeling, in the rendering of the stage environment, add effects through regional lighting and environmental scenes to realize the three-dimensional scene design. Experiments show that the fidelity of 3D virtual scene design is higher than that of similar methods, and the 3D modeling performance is outstanding. This method is suitable for 3D virtual scene design and special effect scene production. The modeling method in 3D virtual scene design is proposed, which takes virtual character painting and 3D model design as the core to complete character painting and modeling, and realize the interaction and display with users.

1. Introduction

With the rapid development of computer technology, three-dimensional virtual scene technology has also been developed by leaps and bounds. At the same time, its application in people's production and life has become more and more extensive. In terms of product display scene design, virtual reality also has its place. For product display scene design, three-dimensional design is a key step. How the product display should be expressed is determined by the designer combined with the subjective needs of customers. This paper proposes a product display scene optimization and design scheme based on C4D software manufacturing three-dimensional virtual scenes, which aims to help users more conveniently and quickly choose the product display scene matching that meets their wishes, and help designers more accurately meet user needs.

2. Three-dimensional virtual scene design

In the past, the product display scene design was usually drawn with AutoCAD software and presented in two dimensions. Based on the secondary development of AutoCAD software, a large number of product display scene planning software appeared, but there were few technical software with three-dimensional rendering effect. Virtual reality technology is an important technology that can establish a three-dimensional simulation environment. The use of virtual reality technology to design product display scenes through three-dimensional reconstruction can make the designed product display scenes presented in a better way. The virtual 3D visual reconstruction of the product display scene can improve the design quality, enhance the applicability of the product display scene design, and use virtual reality technology to establish a product display scene simulation environment, which
is immersive and realizes the further optimization of the 3D virtual scene design. Design a simulation system of virtual 3D vision technology. This system takes 3D virtual scenes as the core and has the professionalism of 3D virtual scene design. It effectively simulates the details of planning technology and building information through the system, and establishes 3D terrain models and designs garden-related details. The facility parameters fulfill the design requirements of the 3D virtual scene.

In addition, nowadays commonly used 3D modeling software, such as BIM, 3Dmax, Maya, also has a problem: when the model in a large scene has too many faces, it will greatly increase the requirements for hardware equipment. Even if a texture is used instead of a fine model, the resolution of the texture will have to be increased due to the detailed effects that need to be achieved, resulting in the same problem. Therefore, the product display scene design will be virtualized through Cinema4D and the modeling will be summarized. Laws and methods to avoid the above problems.

3. Sub-model modeling

For the modeling of sub-models with complex structures in the product display scene, polygon modeling must be considered first. Good wiring principles can greatly improve modeling efficiency. First of all, adopt a uniform quadrilateral wiring method that is conducive to computer operations to avoid the generation of triangular or pentagonal surfaces, that is, the generation of poles. This can reduce the generation of N-GON polygons, make the loop tangent controllable, easy to operate, and can effectively solve the model caused by the refinement operation. The phenomenon of broken faces, wrinkles and black faces in the animation. Second, because the normal of the polygon determines its surface orientation, it must be ensured that the normal always faces outward. In the production of large scenes, "backside ignore" can be used to avoid tracing calculations of redundant rays during rendering. Next, use the "diamond facet" structure at the corners or curves to split one edge into two different directions while maintaining the shape of the edge, and ensure that the surface size formed is even. Finally, "shrink wrap deformer" can be used as a core tool for interspersed combination of product display scene structures. Project the established component mesh or geometry onto the surface that needs to be interspersed, so that the transition surface is soft, and no redundant faces and polygon lines are changed. Among them, the modeling of scene characters is the most complicated. This design uses C4D for virtual character painting, trying to reduce the complexity of the characters and the number of polygons. C4D comes with a human body model, the skeleton is preset after adjustment, and then the model is bound, and the movement of the character model is added to realize the interaction and display with the user.

4. The application of C4D in E-commerce web design

Many small workshop-style shops often have limited funds and limited manpower. New products involve white photography and page design, and you want him to often spend money to buy some photo props. Or to build a scene to see the truth, and C4D can model and render almost any scene or picture that the designer thinks of, but it also saves costs. Of course, the premise is that the designer can use this software. C4D's three-dimensional production screen is more three-dimensional and immersive, the scene rendering is more vivid, and the color level is richer. The body visual effect is fully personalized. And compared to PS, AI and other plane software, C4D processing 3D effect is more efficient and convenient, and the effect is more vivid and vivid. The most important function of C4D is the construction of scenes. C4D usually takes two steps to complete a work, one is modeling, and the other is rendering. In analogy with PS, modeling is to draw paths, and rendering is the effect of PS. C4D is much more complicated than PS, but if you learn to model and render, you can basically make works. Then use Cinema4D to make the scene model, which is equivalent to the basis of shaping the phantom shape. It needs to have a certain modeling control ability for the product's own shape, and the overall and partial cooperation, as shown in Figure 1.
5. **Material editing and adding textures**

After the model is set up, material editing and texture addition are required. UV is a commonly used texture method. UV is the abbreviation of UVW (because the W coordinate is not commonly used), it refers to the texture map coordinates, and the XYZ coordinates of the model are related to each other, and UV defines the position information of each point on the picture, as shown in Figure 2. The operation steps are the unfolding of UV, the export of UV texture, the editing of UV texture, and the use of UV texture. In addition to the UV texture in Figure 1, normal maps are used. The normal is the front face of the geometric body (triangle). The angle between this direction and the light is used to calculate whether the geometric body is illuminated and the degree of illumination. Ordinary grayscale maps can only produce bumps in the upper and lower directions, while normal maps are more random based on the bump directions of the RGB channels.

![3D Model and UV Texture](image1.png)

Figure 1 3D Virtual Scenes Model

![3D Model and UV Texture](image2.png)

Figure 2 3D Model and UV Texture
6. Lights, Effects, and Render

First set up the camera, add the camera to the CAD "protection label", use simple materials and area lights, usually for virtual reality scene design, it is obtained by combining indirect light and direct light. The average brightness value of to realize the virtual simulation of related lighting rendering. Among them, the calculation of indirect light is relatively cumbersome, but the inclusion of indirect light can make the corresponding overall brightness in the scene design more integrated, so the lighting method corresponding to the brightness level is described. The simulation processing of surface light source for indirect light can achieve the level of illumination effect corresponding to indirect light. At the same time, in order to achieve the optimal effect of scene light source simulation, certain lighting integration is carried out. To keep the illumination distance consistent with the light distance, the light distance is guaranteed to be half of the attenuation distance of long-distance light. The main light of area light is placed inside the main body, and the top is placed on the main body. There are two area lights: main light and ceiling light. The function of the main light is to make the product produce a light source from inside to outside, while the top light plays a role of rendering. Set up the six basic options of lighting: general--specific color, intensity, type, projection; detail--shape, attenuation. Set the background to sea blue, select the rendering settings, turn on the global illumination, and set the diffusion depth. Save the rendered file as a PSD file and import it into Photoshop software to use CameraRaw. The filter performs post-processing to increase picture detail. Because the light is yellow and white, the overall picture is white, so you can increase the white and reduce the black. Because the picture is blue, you can increase the blue saturation, make the picture more transparent, the color smoother, and enhance the natural saturation. It can make the color of the picture more intense.

![Figure 3 Adjust color with Camera Raw Filter](image)

7. Design display

Figure 4 is the final 3D virtual product display scene rendering. Aiming at the problems of screen freezes, graphic errors, and slow rendering in various types, model optimization methods have been carried out, and 3D animation scripts and light and shadow design have been designed. Realize the interaction and display with users through virtual character painting. The overall visual effect is good, the colors in the scene have high fusion, and it has certain commercial value and design reference value. The design shows that the fidelity of 3D virtual scene design is higher than that of similar methods, and the 3D modeling performance is outstanding. This method is suitable for 3D virtual scene design and special effect scene production.
8. Conclusion
In conclusion, the use of C4D can realize the scene interaction of the three-dimensional virtual scene, and solve the problem that the current virtual reality interaction cannot be popularized by many parties. With the continuous development of virtual reality technology-related hardware facilities, C4D updates more and more functions, and the material library preset library is also constantly expanding. It is conceivable that more designs using C4D for scene creation will be born in the future, and CAD will also be used more in the process of space animation display, film and television dynamic scenery, cultural and creative product development, etc.

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