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## The Study of The Application of 3DsMax and Photoshop Software in The Simulation Effects of Home Textile Products

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### Abstract

From the perspective of the finished products simulation, the paper studied the functions of 3DsMax and Photoshop in creating the simulation effect of home textile. On the basis of comparing and analyzing the simulation forms available, the paper puts forward the plan of simulating maps by the method of lattice offered by Photoshop. By comparing and studying the two soft wares, the paper puts forward the plan to use the both of them to simulate the home textile in the hope that it will contribute to the development of computer aided fabric design system in China and benefit numerous medium sized and small home textile enterprises.

**Index Terms:** Computer aided fabric design system; home textile; scene; simulation of appearance

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Computer aided design has been widely applied in all walks of life. In the field of the textiles products, guided by the image of the finished textile products, the textile enterprises can design the products through CAD. The designers can test the design effect of the finished products in the designing process and the customers can choose the products they like according to the simulation effect of the products in the simulation scene. The application of the simulation software of home textile products shortens the development cycle of the products, reduces the design cost and helps the enterprises and customers communicate with each other more effectively, thus boosts the sales of home textile products considerably.

Generally speaking, there are two ways to simulate the home textile products [1]. The first one is the three-dimensional simulation of products based on the graphic processing technique. It is achieved by establishing a three dimensional model and mapping the bitmaps of fabrics into the three-dimensional surface. The second is the effect simulation of home textile products based on the graphic processing technique. The procedures are as follows: select one fashion figure or picture as the scene, and then draw the outline of the models before assigning the materials to them. The popular 3DsMax and Photoshop are taking the lead in the two-dimensional and three-dimensional respectively. The simulation software of home textile products in foreign countries is rather expensive, and there are not mature software applied in China, so developing and applying 3DsMax and Photoshop to simulate the home textile products worth our exploration and study.

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In the process of simulating the home textile, by assigning the material to the models and using UVW maps to adjust the parameters, 3DsMax creates lifelike scenes. Photoshop takes advantage of the powerful graphic processing techniques to make tile bitmaps and transform and synthesize the graphics to create the three-dimensional effects. The two kinds of software have their own specialties, so we should make them complement each other and find out the best method of simulating the finished products.

## **1. The preparation of simulation scenes**

The scene is one of the most basic elements in displaying the home textile products. The scene should be in good taste and practical. We should also emphasize the diversity of its styles in order to meet the demand of different customers as best as we can.

In most cases, we use the 3DsMax to create the three dimensional models for the simulation scenes and then establish the surface models according to the shapes of textiles in the three-dimensional space so that the textile simulation effect drawing is created. This method can achieve desirable simulation effect. However, the establishment of three-dimensional models for the simulation scenes is complicated, which limits the application of this method. By contrast, the sources of the two-dimensional scene pictures are rich. They can be imported into computers by devices such as digital cameras and scanners and create lifelike effect, thus they have great prospect of being used widely [2].

### *A. Using 3DsMax to create three dimensional models*

As a kind of popular three-dimensional animation software, 3DsMax is most widely applied in the architecture design [3]. The designers often use it together with Photoshop and Vray render to simulate and preview the decoration effect and scenes in and outside architectures. The lifelike effect drawings from different angles can be obtained according to the virtual three-dimensional models created by computers.

Establishing three-dimensional models for rooms by 3Dsmax is characterized with convenient making process and diverse scene styles, so it fits the field of home textile design enormously. By using 3Dsmax we can set up scenes including a series of home textile soft models such as beds, pillows, window curtains and sofas. The preparation of virtual scenes paves way for the simulation bitmaps of home textile products.

### *B. Obtaining two-dimensional graphic scene*

The sources of two dimensional graphic scenes are rather rich. We can select pictures on the Internet, in books or magazines, or take pictures. We can also obtain them by photographing the actual sites. When choosing the two-dimensional pictures we should select the materials with pure color if possible. What's more, the area needing to be simulated should be void of patterns [4]. This is because when the color of the texture is mapped into the appointed area, the brightness and saturation of the picture element of texture is the calculating result of those of the previous material and those of target object. In this case the three-dimensional effect and the sense of reality are strengthened. So the texture of the original scene will affect the final simulation drawing to some degree.

Generally these scenes must be modified and bettered by Photoshop to meet the demand of simulation bitmaps. For example, it will delete the dark colors, increase the brightness of environment, increase saturation level, and remove noises and other irrelevant elements.

## **2. The application of 3Dsmax in the simulation of home textile products**

3Dsmax can observe models from different angles and there is no texture on the model surface. The clients can assign the material to models according to their individual needs. In most cases several kinds of textures will not overlay. Three-dimensional scene models use light raying to create shadows, so the materials serving

as texture could have either light color or dark color. Meanwhile, if the Vray render is used, the room space will become more real, achieving the effect of photos.

Taking the pillow as an example, the operating procedures of simulating a single home textile product are as follows:

A. Import some model file made previously; select the scene objects; open the material editor; set the parameter of material ball; add the textile pattern whose materials are pressed to the diffuse colors; add the pictures having the effect of folds into the concave-convex, to simulate the special effect of folds of the object and adjust the parameter. When finishing setting the parameter, click "Assign Material to Selection"; use bitmaps to simulate the pillow.

B. Set the material bitmaps for other models in the scene separately; add the UVW bitmaps to the object, adjust the parameter to make the length and width of the pattern in accordance with the actual size. For example, in Fig. 1, the pillow model is 50 cm long, 50 cm wide and 10 cm high. And the length and the width of the unit cycle of the matching maple pattern are 37.5 cm. consequently, the reasonable simulation effect should be that the pillow surface can display more than one pattern cycle, thus the real textile effect can be achieved.

C. Use the Vray render to strengthen the final effect making the scene look more real. The effect is shown in Fig. 1. When setting simulation bitmaps for the whole indoor home textile products, pay attention to adjusting UVW bitmaps parameter. The reason for doing so is that sometimes when the complete repeat of a single home textile product is inappropriate, the harmony of the match of the whole textile product will be undermined. The desirable matching effect can be achieved after adjusting the UVW parameter. This embodies the timeliness and the flexibility of computer aided fabric design system. It enables designers to modify the size to patterns quickly in order to match the size of model, and go well with the effect display of finished textile products. Then, the size of the textile products can be adjusted and the best scheme can be chosen to produce the products. The possible loss can be avoided before the actual manufacture of the products. The overall effect can be seen in Fig. 2.

3Dsmax possesses powerful three-dimensional model function. The function of the material bitmap of models is concise and clear. Combined with Vray render, it can display the material effect of home textile products truly. It's a great way to simulate the home textile products. However, the establishment of 3Dsmax models is complicated, which requires delicate operation and complex calculation. It takes a lot of time and energy to rendering light effect and texture effect.

### **3. The application of Photoshop in simulating home textile products**

Photoshop can showcase the product effect at a relatively fast speed. It can draw the silhouette of many different simulation area of the scene by selecting polygon area by hand and introducing quadratic Bezier curve to obtain simulation area. It can simulate scenes by tile bitmaps [1]. Due to the fact that home textile products are often have folds and are transformed, the simulation effect by ordinary method looks less real. Consequently, I introduced the concept of lattice model to establish the two-dimensional surface lattice model by lattice division, so that the simulation effect is strengthened.



Fig.1 the 3D simulation effect of sofa



Fig.2 the 3D simulation effect drawing of the whole scene



Fig.3 Curved Quadrilateral

Fig.4 the mapping of texture

Fig.5 the define curved grid model

In the scene, a whole fabric can be perceived as a quadrilateral, so we can draw the outline of curved quadrilateral (shown in Fig. 3). By the pattern mapping, this curved quadrilateral can map the fabric texture into the lattice model of the surface quadrilateral. The result of the pattern mapping is shown in Fig. 4. To show the folds and the transformed places of the inside of the area, the controlling lines should be added to the area. The controlling lines inside are determined by the alignment of a certain warp and weft in the area. The lines in different directions divide the simulation area into several small unit grid of curved quadrilateral, wherein a define surface grid model is formed. It is shown in Fig. 5.

The Adobe Company has added the basic function which is three-dimensional design to the Photoshop CS3 version. In the Photoshop CS4, the three dimensional design covers wider and wider areas. Using freely changeable tools of the new version, we can have all sorts of operations on the area, such as rotating, scaling, skewing, distorting, perspective, and transforming to simulate the actual effect of scene bitmap. The transforming function is established on the basis of three-dimensional design, and it can add the grid model to the selection, simulating the distortion and fold effect of models. The detailed operation procedures are as follows:



Fig. 6 the PS simulation effect of the whole textile scene



Fig.7 simulation drawing of sofa by 3DsMax



Fig. 8 simulation drawing of sofa by Photoshop

Open the two-dimensional scene picture, desaturate the object, to free the fabric pattern from the disturbance of noises; select an area whose size is equal to that of the simulation object and you must take into consideration the actual size of the scene model; implement the fill command, fill the fabric pattern which has been processed by the textile simulation procedurals and scaled proportionally; choose the freely changeable tools to implement the transforming demand, add the grid models to the area; drag the controlling lines and dots surrounding grid models, making them coincide and cover the appointed object; apply modification tools such as the define pattern and brushes to revise the details of the edge of the simulation scene. Finally, by adjusting the environment parameters such as light effect, brightness, contrast ratio to beautify the scene and make it look more real. The simulation effect by Photoshop is shown in Fig. 6.

In the simulation effect drawing, we can see that after applying the transforming tools of Photoshop to simulate the scene, the folds of home textile products can be clearly seen, the accuracy of simulation is desirable and the calculating speed is good, so Photoshop enjoys great commercial prospect in the computer aided fabric design system. However, owing to the fact that the quadrilateral controlling lines are drawn by hand, the accuracy is undesirable and we need to modify the details of the picture.

#### **4. The comparing analysis of the product simulation methods of the two kinds of software**

Though the principle of simulating the home textile products by 3DsMax and Photoshop are different, the effects they create are equally outstanding. The key lies in the fact that the two simulation methods both take into consideration the geometry structure, solid space and environment rendering effect.

The two simulation methods have both strengths and weaknesses. Firstly, Photoshop simulation operates on the pictures available, so the angle of background picture determines the observation angle. Secondly, 3Dsmax takes advantage of pattern mapping technique to map the pattern to the model surface, wherein the two kinds of textures won't be overlay. Using the light to create shadow, it doesn't matter whether the color is light or dark. But the establishment of the 3Dsmax three-dimensional models is complex, and the model storeroom can not be expanded easily. Any picture of complicated style or the latest fashion can serve as the background material in the Photoshop scene, so there are a great variety of choices. Thirdly, when setting the simulation bitmaps with 3Dsmax, the turning of the edge of the fabric can not be simulated consecutively. As is shown in Fig. 7, the part of the edge of sofa is not consecutive, but the Photoshop simulation shown in Fig. 8 can avoid this defect.

## **5. Conclusion**

The comprehensive application of the two design software is necessary if you want to have a home textile effect drawing that is elegant in appearance and can display the design effect swiftly. We can achieve this goal by making them complement each other. The strength of 3Dsmax is leading the product design into the three-dimensional world. However, it requires the making of models before designing products. The model structure is complex, requiring complex calculation, and it can't show the quality effect of the material. When we set the stimulation bitmaps of model, we can use the define pattern and the brush of the Photoshop to do some modification and adjust the rendering environment of the scene in order to make the simulation effect of home textile products more natural and real.

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