

Research on 3D Animation Creation Practice under the Background of Virtual Reality Technology

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Abstract

The human life in a three-dimensional world full of three-dimensional objects, with the quick development of science and technology, computer graphics to make 3D performance technology is more and more perfect, it enables us to reproduce 3D objects in the world, with three-dimensional objects represent complex information, on the basis of the 3D graphics developed the three dimensional animation technology and virtual reality technology more make our world colorful. If animation technology allows designers to use your imagination to follow one's inclinational digital art creation, the 3D graphics technology is what the virtual reality technology based on, which can combine the technology of multimedia and the principal part of visual and sensor technology in order to create a world of immersive virtual life. This article mainly discusses the relationship of the virtual technology and the three dimensional animation technologies and the impact on the art design.

Keywords: *Virtual reality platform, Three dimensional animation, Plastic arts*

1. Introduction

The virtual simulation is also well-known as the VR technology and simulation technique, is to use a system that was an invented to imitate another real system technology. Due to the development of computer technology, simulation technique is gradually, become the mathematical reasoning, scientific experiment after the third type of basic method of objective laws of nature in human knowledge, and is developed into human knowledge, the transformation and the creation of the objective world a generality, strategic technology. Virtual Reality technology, VR for short, is a comprehensive integrated in the 1980 s the rise of new technology, involved in a graphics that can be applied in computer, an interaction technology between human and computer, sensor technology and the artificial intelligence, etc. It is made up of the hardware plus software, and all kinds of sensor 3D information of factitious environment, a virtual environment, should be the one that can simulate the living world in a realistically way (even non-existent) people are into the environment, feel "in its" at once, and can be operated in person, naturally interact with the virtually environment.

2. The Meaning of the Three Dimensional Animation Design

With the further development of our country's digital electronic technology, in order to meet the requirement of the animation market, on the basis of the digital electronic technology to strengthen the use of the three dimensional animation technology. In the three dimensional animation designs, mainly is the combination of static and dynamic animation vivid visualization, movement to give more artistic appeal is the essence of animation design, animation is one of basis, is a form of sports art performance. The essence of animation design is expressed in the form of dynamic picture. In short, animation design includes two aspects, the dynamic and the combination of dynamic and static images. With the improvement of animation design technology, changed the

traditional form of animation design, each picture will be displayed in the form of dynamic, in the true sense given the picture dynamic image and a sense of improve the expressive art of animation. With the gradually mature of the three dimensional animation design technology, digital art in the design of animation design using the same principle and traditional animation design, using computer technology and the related design technology, animation design and production, under the condition of the same basic principle, strengthen the reform and perfect technology, essentially improve the effect of the performance of animation design. Digital art the use of electronic technology for animation design provides a new development direction and forms, can meet the designers of the animation more expression of subjective thought, enhances the light shadow, screen, texture of animation design, sports and so on each aspect of the expression effect, animation design, a new leap. In the process of the three dimensional animation design, is using the digital electronic technology to create a real 3D scene, visual and vivid animation design more. In today's digital electronic technology becoming mature, many advanced sports theory was introduced into the three dimensional animation design software, 3D animation, in the design of these designer does not need to design each frame. Only need to design a good link between animations, meet the automatic conversion of animation, to form a dynamic picture. This technique effectively improves the design efficiency, and makes the picture of cohesion between natural, smooth, forming a sense of the whole dynamic picture. Through the three dimensional animation design software, the static picture designed first, and then using the kinematics theory, design a key turning point in the picture, finally from the images of the whole, the three dimensional animation effect.

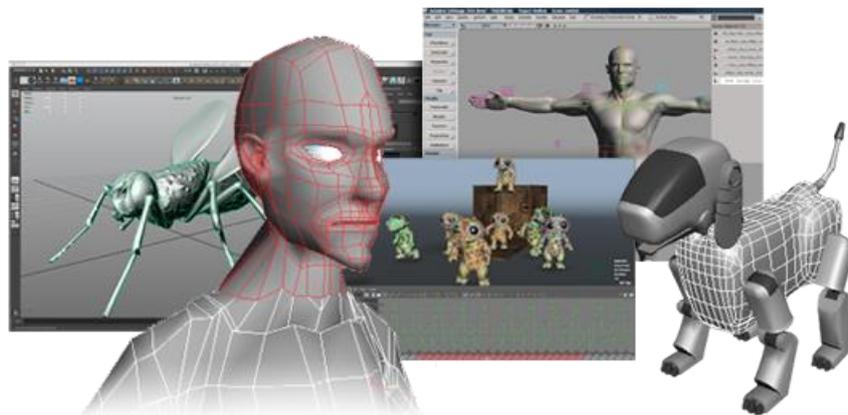


Figure 1. Animation design software

3. 3D Animation Production Process and Technical Analysis

3.1. To create the model

Creating the model, this is the first process to create a 3D animation, can also be referred to as the modeling work. Designers need in the production process based on the story, using 3D software on the computer for three dimensional model of the sculpture, sculpture is the process of creating a model of the process. Generally there are two kinds of commonly used modeling methods, one kind is to form the basic set of animation depicts a model, and use the tool to produce the required shape, finally using the relevant methods to these model components are combined into a complete model, such a model to create work that is completed. Another kind is the lofting modeling technology; the first

to map the animation, the 2 d contour of the object is obtained from the skeleton, and then place the geometric form on the frame to produce the required three-dimensional model.

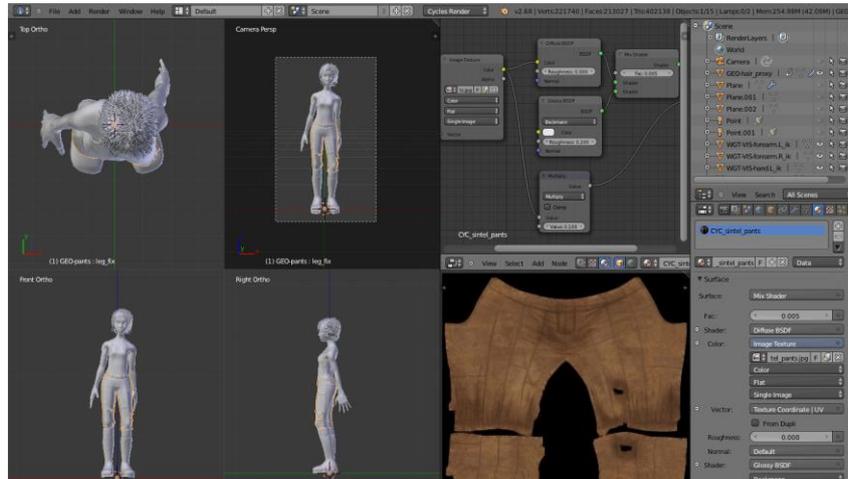


Figure 2. 3D software

3.2. To create material and texture

Through the first process created in the model belongs to the original tire body, it is similar to porcelain firing before the unpainted clay idol, and therefore in a 3D animation of the second program requires model to specific "decoration", namely to create material and texture. In order to let the created model more in line with the animation object characteristics, which requires the designer according to the story of object properties to choose a suitable material to material performance object, to make the object color, transparency, and the photometric joint objects of real materials, equivalent to the production model of the skin. And so-called map, its equivalent to wear the right clothes, animated objects designers using 3D animation software to model the corresponding position of the corresponding images, which make the model more resembles the real object.



Figure 3. Material and texture

3.3. To create the light

Lights in the process of 3D animation plays an indispensable role, not only is the illuminating the main scene, but also build and tone and atmosphere is an important tool to foil scene, 3D animation of the visible image design cannot leave the lighting to create. So, 3D animation of the third program is to create lighting, general lighting is mainly composed of natural light and artificial light, natural and artificial light three types, designers need to know in advance when creating 3D lighting scene environment type, understand the environment type related scenario in the storyline, and determine the main light, supplementary light, background light, grasp the tone of the scene and atmosphere. Coordinate in the 3D lighting to create three types of light sources to cooperate with each other, so as to realize to build the preliminary scene effect from light source and to supplement the light to enrich, foil scene depth of field and the actual effect, to separate the background light makes the target object.

3.4. To set the animation

For animation control, to achieve animation "move" the change of the state, by using the key frames in computer animation, 3D animation is the same principle, thus need to be more a key program, namely the animation set. So-called animation Settings, but in fact set key frames in scene and its object, or scene changes in the animation set for the biggest moment in key frames, then by the computer to complete the interpolation (i.e., to complete the transition between the key frames). In 3D animation software, animation curve (transverse frames, vertical axis is animated value) is the expression of animation information, animated objects in the set speed status, such as mobile, jumping up and down, can be seen in the animation curve.

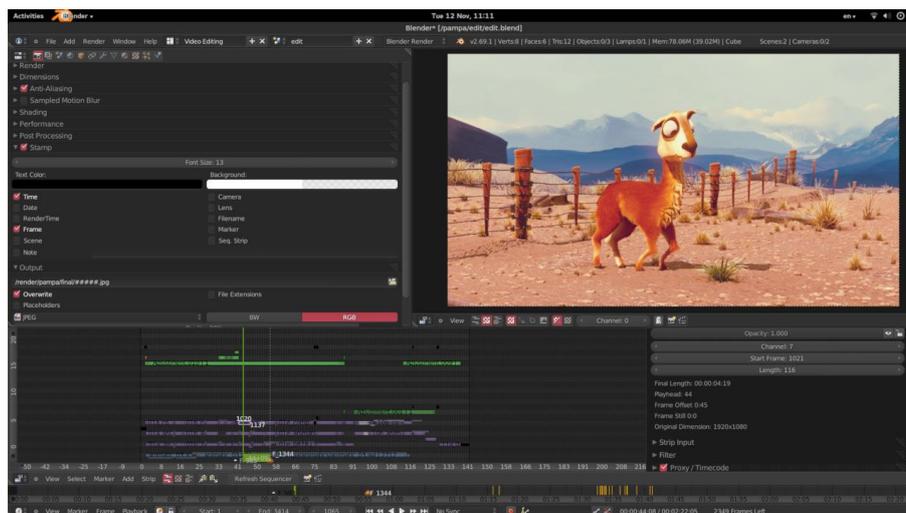


Figure 4. 3d animation key frames

3.5. Rendering

The three dimensional animation software is used the dynamic images of 3D animation, then need to complete a final program, namely the rendering. Rendering process is after a program calculation, mapped the course of the animation in the process need stylist to input all information in the scene into the computer, including the three dimensional shape, texture, lighting information, such as the information input to the established procedure of calculation, and finally get the results of the animation. After finished the rendering process, a 3D animation production can be basically completed.



Figure 5. 3D Rendering

4. The Key Technologies of Virtual Reality Platform

GA the start of the standard process for all possible solutions of a collection, constitute a part of this collection is a gene sequence of the individual. And the characteristics of the individual are distinguished chromosomes. Decide the appearance characteristics of the material are individual chromosomes (phenotype), it is composed of a certain number of genes, known as the main carrier of genetic material, it is the essence of the free combination of genes (genotype). So, in order to use the GA must work is coding, is to establish the corresponding relation of phenotype and genotype. It can be realized through the following five forms code: matrix, structure, symbols, real Numbers, and the binary tree. Original set identified, must follow the natural law of "survival of the fittest, superior bad discard", and through many generations of evolution may step by step to achieve the optimal solution. Every cycle, for the following operation: first, based on the fitness of each possible solution to choose size, and then executed according to the genetic parameters of crossover and mutation operations, a collection of possible solutions to produce more excellent. The process is similar to the biological evolution, each a cycle will produce more excellent collection. Until the last cycle, it will produce an optimal solution. Finally perform decoding operations. The standard GA process:

- (1) The initialization: number of evolutionary, crossover rate and mutation rate is initialized three parameters, and randomly generated a number of individuals.
- (2) For each individual in the initial population respectively calculate the fitness of these parameters.
- (3) To choose: refer to the fitness of each individual parameter; choose a scale of excellent individuals directly into the next generation.
- (4) To cross reference rate for a certain a certain gene structure of the individual exchange gained excellent individuals into the next generation.
- (5) To refer to mutation rates change some individuals a number of genes into the next generation.
- (6) If meet the termination conditions, to get the optimum in the process of genetic offspring; Vice continue (3).

Step1. Artificial given basketball video segmentation, capture panoramic camera video similar to figure 2 period of 20 s, and all of them as experiment frame sequence image frames;

Step2. To regional segmentation of experimental frames used way, keep the middle area.

Step3. Calculate all the frames used in HSV color components in the space the sum of the histogram H_{sum} .

$$H_{sum} = \sum_{i=1}^n H(I_i)$$

n is the total number of image frames in the 20s video.

Step4. Calculate the sum of all pixels $Total_{sum}$ in the H_{sum} .

$$Total_{sum} = \sum_{i=1}^k H_{sum}$$

k is for image frames color quantization level. Here we will attune (original h component of HSV space for grade 360) quantitative level of 40, namely k = 40. The experiment proved that after the quantitative stadium has good color clustering.

Step5. Calculate the average color.

$$col_seq = \frac{\sum_{i=1}^n (col_{max_i}(Total_{sum}))}{n}$$

$col_{max_i}(Total_{sum})$ is the i in the value of the corresponding color in the $Total_{sum}$, the main color sequence number is 5, so n = 5, the largest of the five values corresponding to the average value in the $Total_{sum}$.

5. The Application of the Virtual Reality Platform in the Three Dimensional Animation Plastic Arts

5.1. The effects of the three dimensional animation in the animated film

The 3-dimensional animation effects in the field of film and television, outstanding works emerge in endlessly in recent years. Step by step towards the higher technology innovation. 3D animation, special effects technology application is very extensive, allowing more of the pitchman in them. But still cannot reach the market demand. The 3D animation and special efficiency technology has a special fascination. As a result, many masters are keen to it, with the three dimensional animation technologies to create the great classics of each.

The three dimensional animation, special effects technology constantly are updated and development, and its fierce competition among the industry. Let the three dimensional animation markets even more. It also inspired designers and animators create interest. In the animated film, both 2 d animation and 3D animation, with the three dimensional animation effects to join, make no matter from the images or visual impact. There were obvious increases. The special effects technology is to promote the development of animated films. Make record animation industry achievements. The production of animation film cost greatly reduced. The liberation is on the staff. The most significant effect is that the continuous development of the three dimensional animation effects.

Make animated films also constantly change of blood. Avoid the occurrence of the audience "visual fatigue". It ensures that the important position in the field of animation film in the film and television. From a business perspective, the three dimensional animation, special effects add and update. It can make the animated film steadily to the box office and to the highest point of the sentiment. Thus more get the attention of the pitchman. Also because of this, animated movies will continue to develop, into a new era.

5.2. The effects of the three dimensional animation in the animation films for the future

According to the current level of movie and TV field development, the integration of the 3-dimensional animation effects for animation film industry to the height of a high fever again. China's cities have a lot of big cinema open, and also the development of martial arts in the industry. Even if the price does not poor, we still can see the crowds, queuing to buy tickets came in an endless stream. This only shows that fans still want excellent animation film in the cinema. The three dimensional animation effects to today's animation film market become more and competition is very intense. There is competition development. Such a scene at the same time also stimulated the market consumption and the shortage of demand. 3D animation, special effects technology more and more attention, because the real world we live in a three-dimensional world. For people, three-dimensional can let a person feel close to the reality.



Figure 6. 3D animation scene

Animated film field has become people indispensable entertainment, with the continuous development of animation industry at home and abroad. To the cinema to watch movies, has become a staple of young people to kill time. And studios are caught fan psychology, more and more the launch of the 3D films. Splendid flame, magnificent mountain peaks, even a tornado can realistic rendering in our field of vision. Fans amaze, enjoying the audio-visual feast. Merchants fighting are trying to develop more innovative design. The more the more unique is to attract the public's eyes. The innovation of science and technology, the production of animation films on have to use the three dimensional animation effects to enrich, rich picture. From the earliest two-dimensional hand-painted animation to synthesis, no matter from cost or save a lot of time, and also can get better forecast effect. Three-dimensional effects animation films by fans chase after hold in both hands, the potential development prospect is very considerable. Compared with the early films, even if the early movie is classic. But it is also hard to avoid inferior in 3D films. Tell from the visual sense, the picture is hot enough, thriller, magical and beautiful can

capture fan's heart. In a period of time before the release of "crazy primitive" these were one by one. Many people watched several times, said more recommended stop watching it on a computer. In the theater has impact on the vision. So at the suggestion of you watched the "crazy primitive" this animated film. Personally think that it involves the history, the family love, friendship and love. The picture is very beautiful. Groups of flying birds and turtles are from 3D special effects technology support. Not only picture only beautiful, but also can be breaks up. The audience also follows the staff. This is a trend; it is the inevitable outcome of the development of the three dimensional animation effects. The three dimensional animation effects to replace the cloud in real life, such as rain, thunder weather, and there's no need to reality to performance can show the perfect story.

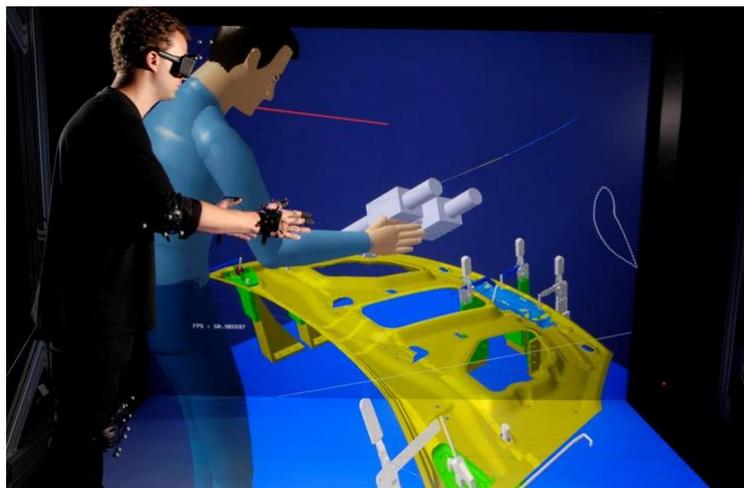


Figure 7. Virtual platform

Just as China is concerned, the three dimensional animation, special effects technology is in a new period. With the reform and opening-up, China's science and technology is changing with each passing day. New ideas and new technology is more and more people know and use. Domestic different institutions have also set up three-dimensional animation technology courses, to develop the emerging field of animation talent. This for the three dimensional animation technology industry in China has become an important institution of output. It is one of China's three dimensional animation technology industries. For China, we not only need to make a good work and need a good guide, to lead us toward the internationalization of the market. China is a vast country, we are not lack of animation talents, lack is the excellent team to be able to understand each other and help each other to each other. Because of this, China's current in the three dimensional animation technology and the world, the gap with the United States.

As we know, Disney cars "battle pigeons fly faster" , "the polar express" and so on outstanding 3D animation works emerge in endlessly can be said to represent the current level of technology and development in the field of 3D. Many large companies such as Warner Brothers also work continuously. For the current us, what we need is a team of professional have enthusiasm to study and discuss the course of the history of Chinese animation industry and animation, grope for the travel of the previous rule. And put forward appropriate we can to go in the path of development in China.

6. Conclusion

The 3D animation is to upgrade the development of computer animation, is the product of technology and art together. Compared with a two-dimensional animation, 3D

animation still follow the 2 d animation related law, the difference is 3D animation puts forward the concept of time, space, so need to 3D animation designer in the process of production have a certain technical and artistic quality. The development of 3D animation in china are still in the exploratory period, thus understanding the process of 3D animation, to master relevant 3D animation software application, technology, etc., this is the 3D animation industry talents that need continuous efforts in the direction.

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