Use of 3D Computer Animation Technology in TV Program Production

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Abstract

With the development of society and people's aesthetic improvement, people's requirements for quality and style of television programs are also increasing. In order to increase the attractiveness and   the power of television programs, three-dimensional computer animation technology is integrated into the TV shows. With the rapid development of computer technology, the computer hardware and software level have been constantly upgraded. Thus three-dimensional computer animation capability has also been increased, which can making TV programs very vivid and realistic .This paper will center on the origin and role of three-dimensional computer animation techniques in television programs and prospect in filming TV programs.

Key words: Computer; 3D animation technology; Television programs; Use

With constant social progress and development, the audience feel at a loss when they watching various TV programs. Such enormous information is absolutely a challenge and a test to the tolerance of their visual and hearing senses. At the same time, there's more intensive competition among the TV stations, TV channels, and TV programs. All TV program production parties hope to be at the dominate position and remain invincible in the market competition. In order to achieve this aim, they must work hard to effectively enhance the visual impact which is composed by audio and visual elements. They also need to significantly increase the interest of these elements. The appearance and the development of 3D computer animation technology provide us with good conditions to solve this problem. Complying with the needs for TV program production, this technology is a symbol that TV program production is more mature. This article discusses in the following paragraphs the use of 3D computer animation technology during the production of TV programs.

1. ORIGIN OF 3D COMPUTER ANIMATION TECHNOLOGY

The organic combination of both computer graphics and art forms the 3D computer animation. It offers people a new world to fully demonstrate their imaginations and artistic talents. Now this technology is widely applicable in the fields of TV program special effects and games. The computer animation was originated from the United States. People could use computers to simulate figures' activities in the end of 1970s. In 1982, Walter Disney released *Tron*, the first computer animation film. Painters first made freehand sketching of real persons' actions. Then they copy such actions onto the cartoon figures. This is the operation process for traditional animation. The computer technology in New York City College of Technology developed extremely rapidly in late 1970s. Ms. Rebecca Aron, the tutor of Computer Graphics Laboratory of the College, projected on the computer display the dancers' effects through videos. After that, she utilized computer graphics to record the effected actions. Then she depicted the contours. Around 1982, the College and Massachusetts Institute of Technology were using the optical tracking technology to record human movements: First they put luminous objects on different parts of the performers. The performers would move only within the

range for shooting. A number of digital cameras were used to take into videos the movement of the performers. Next, these two colleges took advantage of computer systems to analyze the photoelectric movements. Finally they accelerated the formation of three-dimensional action effects. In 1983, Ginsberg and Maxwell developed in Massachusetts Institute of Technology a set of system which was used to control cartoon actions via computer languages. However, it usually took a long time for making a simple computer animation because the hardware speed was pretty slow at that time. Following the rapid development and unceasing progress of the computer technology, both computer hardware and animation software developing significantly. More and more research and commercial institutions are working on computer animation. The production level of computer animation is improving increasingly with the mutual efforts of all relevant parties.

2. USE OF 3D COMPUTER ANIMATION TECHNOLOGY IN TV PROGRAM PRODUCTION

2.1 To show to the Audience Audio and Visual Elements Through Images

Computer animation refers to a series of pictures about landscapes and objects. The processing techniques put into use include graphics and image processing techniques, and the software products under use are transition production software and animation production software. A picture used in the previous part of the program becomes the current picture after partial changes are made to it. The principle of computer animation is to generate moving effects for landscapes and object while the static pictures are played continuously. Computer animation uses computer techniques during the processing and application of the animation. In this way, the splendid and colorful animation effects are produced. Most TV programs have their tiles and trailers. During the production of a TV program, the principle of an attractive beginning, the plentiful and rich middle part, and the strong and concise ending should always be adhered to in arranging the structure of or in handling the relationship of the beginning, the major part, and the ending of a program or a video. The materials obtained from site shooting will be edited through the use of 3D animation and synthetic means. The trick scenes are fabricated to make the whole program complete. Then the voice is put into the program. The audios and visual factors with pictures are shown to the audience within a short period of time. The audience are allowed to make effective identification so as to have deep impressions to the programs. The animation technique may, based on the rules of audio and visual language, perfectly combine the

forms and the contents together. It also mixes the audio and visual factors like colors, lines, and music so that the audience can experience the strong impact from the audio and visual elements and have visual and hearing recognition and memory of the program.

2.2 To Remarkably Improve Editing Efficiency

An editing machine is an essential means for traditional TV program editing. It consists of a video player and a video cassette recorder. An editor uses the video player to choose a section of proper materials and record them onto the tape which was in the video cassette recorder in advance. Then he looks seriously for the next section. It would be much faster if the editing is done on a computer. Open Window/Timeline, and drag the related elements shown in the window to the relevant track. Put the elements which are connected with each other to the same track. With this editing method, the elements are put together for display. In case that cutting is necessary for some elements, use Razor icon in Window and click the mouse at the place where cutting is needed. The elements are split. Then select different parts and press "Delete". Polish the program with the skills of transition, filter, overlay, and special effects. The whole editing is completed easily. The editing methods achieve great development under the role of non-linear digital editing technique on the computer. This technique allows an editor to record materials in a computer and uses a computer for editing. It makes use of the non-linear mode of film editing. The manual operation of scissors plus pastes is replaced with simple mouse and keyboards. The editing results can be replayed at the first time. Thus the editing efficiency is notably improved. This feature of non-linear editing has further development with the application of animation technology. By way of combined pictures, it makes the pictures more rich, solid and vivid, which in turn effectively satisfies the audience's psychological needs to the media.

3. USE OF 3D COMPUTER ANIMATION TECHNOLOGY IN TV PROGRAM PRODUCTION

3.1 Conception and Originality Are Critical

Conception and originality are the key issues in animation production. In this process, techniques are the major way for the creative team to make artistic polishing of the programs. The artistic level of the production team is reflected in every aspect of the program such as the shape and the color of an object as well as the color and the brightness of the whole picture. This requires the production team to make harmonized combination of science and art in the production process. On the one hand, they need to strictly follow the development rules of the objects themselves while creating an object and

structuring its picture. On the other hand, they should give full play to their artistic imaginations on the basis of conforming to the science law by making the colors and the shapes in compliance with the audience's aesthetic psychology. For example, *Universe and Man*, a science program, makes a coordinated integration of science and art. It displays the scenes about the birth of the Earth and the evolution of life through the production of wonderful pictures. Without the organic combination of science and art, it would be very difficult to show to the audience such unimaginable pictures, which are hard to produce. Only in this way will the production team make it possible for the audience to be deeply attracted by the impact expressed through the pictures.

3.2 Techniques Are the Warranties

3.2.1 Modeling

Modeling refers to that an animator, based on the style designed in the earlier stage, paint the models of different figures in the computer via a 3D modeling software. This is a heavy and complicated work in 3D animation. The creation of the shapes of figures and buildings in an animation film is the first step in the course of animation production. That is, the shape of an object should be designed first. The use of graphics is the easiest method for making the shape. They are the simple 3D geometrical images attached to the Command Panel of a software product. The combinations with these cubes, cylinders, and pyramids under different modification commands will enable the production and formation of more complex shapes for objects. First, a designer will set up a 2D model. Based on different needs, he will adopt various ways to put it into a 3D world. Another method is to annex a three-dimensional shape onto this 2D model. A 3D animation software product may produce a model with different lines or graphics. The types of lines are different in different software programs. Every line has its own features. Another way is to show the backbone of a model with 2D splines. Then the modeled backbone to attach it to the basic patches through the use of the modification and edit functions in the menu. The formation of a model with complicated patches is promoted.

3.2.2 Texture & Mapping

Texture means the character of materials. In other words, the vivid surface features are given to the models. Such features are specifically represented on the colors, transparencies, reflectance, reflection intensity, self-illumination, and roughness of the materials. Mapping is the process that a producer sticks a 2D picture to the 3D model through the software calculation so as to take shape the surface details and structure. Texture mapping is the next step after modeling so as to give images to different materials. The shape of an object depends on its form and the form on the surface of an object is determined by the texture. A series of materials such as metals, woods, and glass are available in most

3D animation production software products. We just select them from the menu and put them on an object for effective use. Meanwhile, we may also produce relevantly different textures based on our own needs. Different materials have different reflective patterns. Different elements take shape of different objects, which give us different visual perceptions. The elements for making an object include the colors, the reflective degrees, the projection of surrounding environment on the object, and the transparency. The materials containing the above-mentioned elements are fabricated in advance in all software products. We may, according to our needs, make various combinations to these elements in order to get the purposes we need. The producers have to make detailed and numerous deliberations and modifications during this process. They should complete the production of every picture according to the required standards.

3.2.3 Light and Cameras

The purpose of lighting is to simulate to the maximum extent the natural and man-made light types. Lighting is insignificant at the early stage of modeling. However, it becomes important after when the modeling is finished. Light has an extremely consequential position and role in 3D animation production. Some functions are already available in 3D software products. The final effects of animation are directly and deeply affected by the setups in the menu. As to the beginners for 3D animation, the most challenging work in 3D animation creation is to illuminate the landscapes and the objects. During this process, they need to keep the basic colors and shapes of the landscapes and the objects unchanged on the one hand. On the other hand, they should make effective adjustments, renders, and creations to the animation atmosphere. The satisfactory effects will not be achieved if the producers do not have long-term practice and unremitting trials. In order to create proper products, we may take effective controls to the zooming and color of every light. The functions of virtual camera used in 3D animation are much similar to that of a real camera. Both physical and environmental conditions cannot restrain its movement. Such camera can zoom, move forward or backward, and change the focus. It may fly in the air for automatic tracing of the objects moving within its lens. Without calculating the aperture, we may use visualized range lines to set up the depths of the focus. We can also put the camera on a moving object so that it goes with the movements of the object. In this way, we can produce the outstanding visual effect when the camera follows and gets inclined with the object. But there's one thing we should not forget. The visual camera is only a camera. In order to give effective guidance to the audience and to make the audience better observe the animation world, the operators need to have higher level of professional accomplishments and innovative conceptions for creation. The good pictures should be designed prior to operation.

3.3 Establishment of Correct Conception for Animation Creation Is the Precondition

Our creation room becomes more spacious with the application of computer animation technology. We should set up a correct animation creation conception in our mind. There's a dependence relationship between animation techniques and the contents in our creation activities. That is to say, the premise for the use of animation techniques is required by the contents. If the contents do not need any animation technique, the utilization of an animation technique is nothing else but to paint a snake with feet. We should try to avoid the phenomenon that the subject content of a product is diluted and confused by different types of digital special effects. At present, the quality of some TV programs is seriously affected by the fancy expressions from various "digital wastes". Under such circumstance, the production teams should truly set up correct conception for animation creation and production. They should make the animation techniques play their larges and best roles while taking their full advantages.

4. PROSPECT ON USE OF 3D COMPUTER ANIMATION TECHNOLOGY IN TV PROGRAM PRODUCTION

The effective solution of 3D animation problem is the key for China's 3D animation technology to achieve considerable progress. On the one hand, there's broad prospect for the development of 3D animation industry in China. On the other hand, there's a big gap between China's 3D animation industry and that in the rest of the world. We can do the following in order to narrow the gap. First, those who are engaged in and are still studying 3D animation production should have long-term perspective and firm belief. They should not be reckless in the course of study and creation. A down-to-earth attitude is necessary. They should also establish the correct conception for innovation. Second, the training institutions on 3D animation should work hard to improve their own skills. In this way, they can provide the animation industry with good quality personnel. Third, the enterprises involved in 3D training should make their efforts to create local branded products. The animation products made in China should be the star products in the world. Fourth, the governments of all levels need to give more support to both training institutions and production enterprises on 3D animation. More favorable conditions should be offered to local animation industry. Finally, we should strengthen international exchanges and cooperation. The 3D animation industry will have better development under international exchanges and cooperation. The techniques for 3D animation will also be improved sharply. Such exchanges and cooperation will facilitate China's animation industry to go into the international market and have an invincible position in the increasingly fierce international competition. We believe that there's a vast vista for the development of 3D computer animation industry in China. However, there's still a long way for its development. As those who are working on TV program production, we should be more active in exploring the technologies for 3D computer animation technology so as to make positive contributions to the rapid development of 3D computer animation industry in China.

With the skyrocket social and economic development, people's material life is improving incessantly. So they are more eager to go into this dream world. One of the mainstreams in today's entertainment field is to build a virtual world. Computer technology provides good technical conditions for the establishment of the virtual world. Since the computer technology is developing so fast, the hardware and software products are upgraded. The abilities for 3D computer animation production are also advanced rapidly. More and more products are more truthful to life. Currently, most of the TV programs we are watching are adopting 3D computer animation technology. The computer animation gives us a series of pictures about the landscapes and the objects. The processing techniques it uses include graphics processing technique and image processing technique. The software product it utilizes is the transition production software and animation production software. 3D computer animation technology and digital special effects must be fully made use of in order to satisfy the director's requirements for production and to achieve the perfect visual effects. 3D computer animation technology, to some extent, breaks the upper limit for art and technology development. It is another revolution in the history for the production of films and TV programs. Thus, it brings us good preconditions and spacious room for our artistic pursuit.

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