

The Production Process of 3D Film and Animation ‘The City of Paper Folding’

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ABSTRACT

The design of three-dimensional animation is based on multimedia computer, which integrates literature, aesthetics, dynamics, film art and other disciplines. Practical operation requires cooperation of many people, bold innovation and continuous improvement. With the enhancement of science and technology and the support of software, three-dimensional design, a new design method, has been widely used in many fields, such as architecture, industry, mould and so on. The following is the process of collecting and arranging three-dimensional design for you. Interested can see. At present, most of the architectural animation is divided into three major steps: early stage of animation design. 3D animation pre-production: refers to the use of computer before the formal production of animation planning and design, mainly including: script creation, sub-lens script creation, modeling design, scene design. 3D animation pre-production: refers to the use of computer before the formal production of animation planning and design, mainly including: script creation, sub-lens script creation, modeling design, scene design.

KEYWORDS

3D; Computer; Animation; Design

1. A BRIEF INTRODUCTION TO 3D ANIMATION

1.1. Basic Overview of 3D Animation

Three-dimensional animation, also known as 3D animation, with the development of computer hardware and software technology and emerging technologies.

3D animation software in the computer to establish a virtual world, the designer in accordance with the shape and size of the object to be expressed in this virtual three-dimensional world to establish the model as well as the scene, and then according to the requirements of the model to set the trajectory of the movement of the virtual camera movement and other animation parameters, and finally, according to the requirements of the model assigned to a specific material, and play the lights. When all this is done, the computer can automatically calculate and generate the final picture [1].

The way 3D animation technology simulates real objects makes it a useful tool. Because of its accuracy, realism and unlimited maneuverability, it is widely used in medicine, education, military, entertainment and many other fields. When it comes to the production of movie and TV commercials, this new technology is able to give people a refreshing feeling and is therefore popular among many clients. Three-dimensional animation can be used in advertisements and special effects production of movies and TV dramas (such as explosions, smoke, rain, light effects, etc.), stunts (crashes, deformation, illusory scenes or roles, etc.), advertisements and product displays, opening credits, flying characters and so on. With the extension of the computer in the field of film and television and

the increase of production software, three-dimensional digital imaging technology has greatly broadened the scope of film and television effects of live action; it is not subject to the limitations of location, weather, personnel and other factors; and it saves a lot of money compared to live action in terms of cost [2].

1.2. The Development of Three-Dimensional Animation

Three-dimensional animation industry is the emerging industry, the first stage of computer three-dimensional animation is the budding stage from 1972 to 1985. In this stage, the main work is the use of computer-assisted three-dimensional animation production. 1974, H.R. Foldes produced some simple three-dimensional animation film, and began to show practical significance. This is a major breakthrough in the field of computer animation in the film, from then on, computer-aided animation production has really been the general attention of the people.

The second stage is the development stage from 1985 to 1995. This stage is the practicality of computer-aided 3D animation, as well as to a higher level to lead the development of the stage. In this phase, the world's first complete and practical 3D animation film was first developed by E. Catmull's group at the University of Utah in the United States. In the following ten years, due to the continuous accumulation of quantity, computer-aided 3D animation production technology has finally had a qualitative change, which has integrated cybernetics, modern mathematics, artificial intelligence, graphics and imaging, computer software and art of the latest and greatest achievements.

The third stage is 1995 to the present, with the world's first fully three-dimensional production of animated films 'Toy Story' came out, the three-dimensional animation industry's full rise has officially opened the prelude. To date, three-dimensional animation industry can be described as blossoming, these are with the high degree of maturity of computer technology is inseparable. The use of computer graphics technology to produce animation began in the early 80's, only large-scale work site to use this technology, it is in the DOS system under the operation of the PC to carry out, and the software 3D Studio is in an absolute monopoly, there is no other software to surpass its existence. Things did not change until the late 80's, the computer began to become rapidly updated, hardware and software is constantly updated, the application of computer graphics processing technology has been unprecedented development. And it was at this time that the new vocabulary of computer art was born.

With the development of modern technology, animation can now be generated through digital technology, both from the production method and to the concept of operation, have produced revolutionary changes. The drawing of computer animation not only gets rid of the tedious and boring manual creation, but also gets more and more widely recognised and applied for its simplicity, high efficiency and extraordinary expressive power.

Compared with the traditional two-dimensional animation, three-dimensional animation is easier to create a realistic texture, not only will not damage the real but more complete virtual reality, especially in the presentation of powerful magical scenes, will always let the viewer as if they were there, to play a vivid, real characteristics, but also by the public's favourite.

2. 3D ANIMATION 'THE CITY OF PAPER FOLDING' PRODUCTION PROCESS

2.1. Pre-planning of the Animation Film

2.1.1. Conception

Initially intended to make a simulation of the city of three-dimensional animation, taking into account the time problem can not be a complete display of the entire city, so the selection of the city's iconic

buildings, while the use of origami concept to make a similar city simulation of the shape of plant growth animation. Animation performance at the beginning of the dynamic city for the stop-motion lens, later considered to be changed to a small car to advance the lens, showing a complete paper city growth process.

2.1.2. Animation short film creation tools

Operating system: Microsoft Windows 8.1

Design environment: CINEMA 4D

Auxiliary software: Adobe Photoshop, Adobe Premiere Pro

2.2. Mid-term Production of the Animated Short Film

2.2.1. Conception

There is a total of 1 scene, reference (Figure 1, Figure 2, Figure 3). Lighting and material adjusted several times, the material has been unable to find a suitable origami material, it is best to take normal mapping to simulate the effect of pulp.

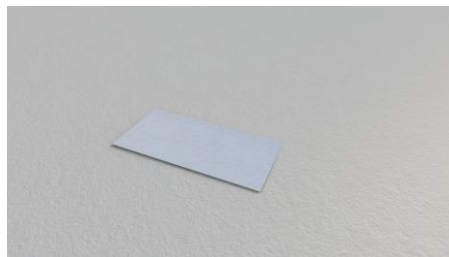


Figure 1. Road Paving

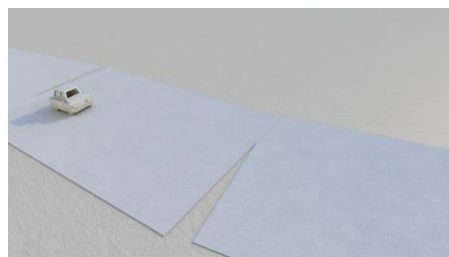


Figure 2. Scene Building

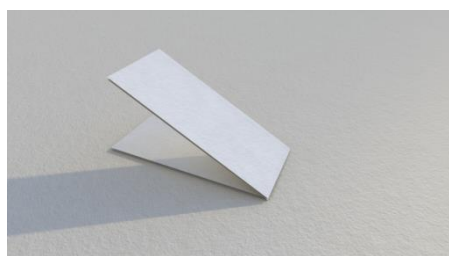


Figure 3. Origami Scene Building

2.2.2. Vehicle Model

Small car model (Figure 4, Figure 5)



Figure 4. Car and Building Models

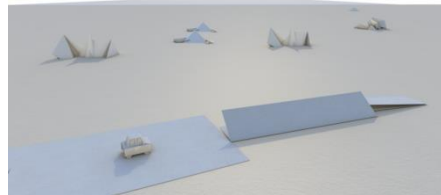


Figure 5. Car Model

2.2.3. Creation of the animation

To make the cart move along the piece of paper, you first have to make the movement of the paper opening.

My theme is origami city, the action must be in accordance with the laws of motion. This part is my reference to life in the origami do, can not imagine the action so must refer to origami related books and architecture origami book.

First of all, make a piece of paper, make a batch line according to the required movement, and then make the bone binding. Open is divided into three steps, the first is to open forward, here we need to pay attention to the need to avoid wear mould so the paper must be slightly open a little bit, this is the first key frame, and then will be opened on both sides. Reference to the action, then the bone binding must be a lead to other, otherwise it will become a separate point of movement rather than origami.

Origami movement is basically adjusted after the start of k origami separate keyframe animation, because it is not a piece of paper to open, so the action will be made into keyframes to copy. After completion, then check whether there is no frame loss, continue to adjust, such as the entire production of the opening animation is not a problem, then begin to plan out the car needs to travel the route of the entire city.

The most difficult thing is the building needs to simulate the origami like from the plane into a tall building, after referring to some books to add fabric to the object to simulate origami. First of all, try to model the building as tetrahedron and trihedron as possible, otherwise it may lead to die wear and calculation error, then add a fabric simulator to the building, then play the animation you can see the building similar to a piece of paper slowly collapsed, here found that one of the fall time is too slow, and did not completely turn into a piece of paper. After adjusting the parameters to continue to play and found that the desired effect has been achieved, then and the same as the piece of paper into the animation keyframes, and then reverse, you can see the animation from a piece of paper into a whole building.

Finally is the rendering of the light, the software just physics effects can be adjusted at will parameters, simulate the sky and the sun at three o'clock in the afternoon, adjust the threshold, so that the sunlight is not so strong, the noise of the shadows must be adjusted to optimise the value to achieve the desired effect.

2.2.4. Lens settings

Our animation is a short film, so we don't have much footage, most of it follows the car's line in k frames, originally it was one frame each for the direct entry/exit points, but found that it can't follow the car, and a lot of it goes directly through the model, so we can only space it out by 50f to let the footage follow the car until the end.

2.3. Post-Editing of Animated Short Film

2.3.1. Rendering

The big problem before rendering was that the material parameters of the building were found to be the same as those of the paper and the ground, resulting in the car and the paper being very fine and fitting the real paper, while the building and the ground were too rough. So then adjust the building material parameters to achieve the desired effect.

Rendering time to find the software C4D in the rendering of several squares will appear in the rendering of the picture, each square represents a thread. If your CPU is 4 cores and 8 threads, then there will be 8 squares to render together; if it is a dual-core 4 threads, then there are only 4 squares. The rendering speed of each grid is related to the main frequency of your CPU, here replaced the Rui Long 5 generation Cpu, six cores and 12 threads, the average rendering speed of one sheet is 1m50s to 2m.

2.3.2. Lens settings

Our film is not long, I will import each shot in order into Adobe Effect, between the shots added a few gradient effects, is more natural over the lens.

Sound effects directly with the online material, can be found in the project file, taking into account the need for sound effects I used the sound of origami, the sound of tearing paper, the sound of the plane taking off from the ground and the sound of seagulls.

Finally, the video export.

3. SUMMARY

The four years of college have come to an end, although the process of creation is very tiring, I still put my heart and soul into it. From the pre-conception to the mid-term modeling, as well as late rendering compositing, these processes, although one person to complete a very tired but more can appreciate the whole animation production between the correlation and the importance of this work can be said to be a blend of my four years of college all the knowledge I have learned. Although it is very tiring, but I never want to give up, because we are a senior student, no longer a freshman youth, this work is the proof of the knowledge we have learned in college. Through the production of the work, I found my own shortcomings and the whole animation process of the production of clear ideas, I am sure that I will be more perfect in the future works.

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