Research on Computer Animation Action and Acceleration Technology based on Composition Editor

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Abstract. Traditional animation needs complex animation technology, which is mainly operated by hand. Therefore, traditional animation production needs a lot of work, which will lead to a variety of problems, such as long cycle, high rework rate, high cost and so on. With the development of computer technology, great changes have taken place in animation production, including speed, effect, etc., which has created a variety of methods in two-dimensional and three-dimensional animation production. Through computer-aided, the traditional manual animation technology has been gradually replaced by computer, which has become a key issue in animation art production. By combining the advantages of manual animation and computer animation, we can continuously improve the ability of animation industry. Through the synthesis editor, we can improve the animation action and accelerate technology research, which can achieve a new animation world. First of all, this paper analyzes the commonly used 3D animation production software. Then, this paper analyzes the animation action and acceleration technology.

Keywords: Synthesis Editor, Animation Action Technology, Animation Acceleration Technology

1. Introduction

Through the composition editor, we can describe the data and define the structure according to the basic elements in animation. Through the combination of general graphic editing and animation production technology, we can design a special graphic editor for animation editing [1]. With the popularity of computer, graphics and image processing technology has been applied to all directions, especially in the field of animation, including drawing graphics, rendering graphics [2-4]. Compared with the traditional manual drawing, computer drawing can reduce the repeated operation, which will improve the synthesis of animation action and its acceleration technology. 3ds Max is a kind of software for making 3D animation, which has an open system [5]. Through the synthesis editor, we can show users more perfect quality, which can complete advanced and complex tasks through 3D vector, matrix, four-dimensional and other tools [6-7].
2. **3D animation software**

Among all kinds of animation software, 3D creation software accounts for the largest proportion. People are often attracted by the world of 3D animation. With the rapid development of computers, software companies will not continue to launch new versions of software, which will be more popular computer animation technology. This paper introduces the popular animation software, as shown in Figure 1.

![Figure 1. Three dimensional animation production software.](image)

2.1. **Avid Softimage XSI**

Avid launched a new 3D animation software XSI at the end of 1999, which improved a lot of its nonlinear animation. Therefore, avid Softimage XSI is known as the third generation of 3D animation software representing the future trend, which has strong nonlinear animation character production ability. Through constant innovation, avid Softimage XSI improves its effect in many aspects, such as model, rendering, particle effect, fluid, rigid body, flexible body dynamics effect, hair, cloth simulation, etc. Based on the built-in Internet browser net view, avid Softimage XSI can quickly exchange creative materials with remote through the network. Through the integrated built-in synthesizer of animation synthesis, we can solve the multi animation special effects that have plagued the production for many years, which can be accurately aligned. Softimage XSI is the most famous mental ray super render, which has rich algorithms and excellent image quality. Softimage XSI has super animation ability, which supports various animation methods and realistic motion. Among them, the function curve function can easily adjust the animation, which has good real-time feedback ability.

2.2. **Lightwave 3D**

Lightwave 3D is a 3D software designed by newtek for Amiga platform. Lightwave 3D has become a powerful 3D animation software, which can realize particle animation, different types of image mapping and image fusion. With lightwave 3D, we can integrate one effect into another. Lightwave 3D is easy to operate, which is extremely powerful in biological modeling and character animation. Based on the rendering module of ray tracing, light energy transfer and other technologies, the rendering quality of lightwave 3D is almost perfect, which can perform a variety of functions, such as modeling, compositing, bones, motion blur, lens flares, inverse kinematics, etc.

2.3. **Maya**

Maya is a high-end and complex 3D computer animation software. It is a 3D production software launched by alias avefront company in 1998. Maya is now a software product of Autodesk. Maya has many advantages, such as perfect function, flexible work, easy to learn and use, high efficiency, strong rendering realism, etc. It is a high-end production software of movie level. Maya integrates the most advanced animation and digital effects technology of alias / wavefront. The new Maya has more powerful control over complex scenes, which can perform well in collaboration, circulation and
production process processing. In modeling, animation, rendering and effects, we can maximize productivity, optimize workflow and innovate. Therefore, Maya is widely used in the creation of digital special effects in movies, TV, advertisements, computer games and video games.

2.4. **3DS MAX**
3DS Max is launched by Autodesk company, which is used for 3D animation software of PC platform. The main function modules of 3ds Max are: decibel time modeling, material and mapping, lighting and camera, animation and rendering. Users can easily use the software to create a variety of realistic 3D models and 3D video effects, which can be rendered into a perfect work of photo quality. 3ds Max can inherit the past success, which can be applied to the new IK system of character animation. Through the interactive graphical interface, we can form subdivision surface and polygon geometric models, which integrates the new rendering capabilities of active shade and render elements. At the same time, 3ds Max provides advanced renderers. At present, 3dsmax is the biggest selling 3D production software, which has been applied to most special effects lens.

3. **Detailed design of animated characters**

3.1. **Design of element class**
Animation character drawing realizes a subset of drawing functions. In operation, we can use left click to establish the starting point of graphic object. By moving dynamic, we can adjust the size and position of the graphics. In function, you can select line, rectangle, circle, curve, polygon, fill and delete functions, which can set the properties of the element, mainly including line shape, line width and line color. Each element should have the most basic properties: line type, line width, line color. After picking, we need to draw the primitive. Through the translation operation, we can pick the element, which needs to obtain the bounding of the element first. We can recalculate every key in the key list by translating all the key positions of the element.

3.2. **Design of role class**
A character class is a collection of one or more elements, which can be regarded as a linked list of elements. The object of character class is the main body of action design in animation, which needs to plan the attributes and operations of character class. A role class is a collection of elements, which must have a member variable to record the element information it contains. The operation of characters is similar to that of primitives, which mainly includes self drawing operation, displaying key points of characters, modifying key points of characters, storing characters, etc. The design of the role class includes the function of the role, whose parameter is the element list. When designing role classes, we can regard each newly generated element as a role and put it into the role list. When multiple elements are merged into a role, we can delete the role formed by each element before merging, which can insert the newly merged role into the role list.

4. **Animation action and acceleration technology based on composition editor**

4.1. **The formation of each frame of animation**
Animation is a series of sequential frames played continuously. However, each frame is drawn on the screen by a specific primitive object or a character composed of primitive objects. As shown in Figure 2, we can determine the structure and properties of the object at a certain time according to the description of the role and the data of the object.
4.2. The formation of animation
By generating intermediate frame sequence, we can continuously display and form animation effect. Through the timer, we can display the next frame regularly. By interpolating the frames, we can get the elements in the character list. When there are many roles in the role list, we can do linear interpolation one by one. Therefore, the formation of animation takes a long time, which will affect the efficiency of the program. Therefore, we can set a marker for each character, which will indicate whether the character's position changes when the user continuously inserts keyframes. The animation generation process is shown in Figure 3.

4.3. Key frame adding and setting
Keyframes are mainly the characters in the generated character library. You can import the saved characters through the function of loading existing primitives in the menu bar. After importing characters, we can insert keyframes. First, we use the mouse to select characters. Then, we can move to where we want to be keyframed. By clicking the cursor on the key navigation bar, we can set the number of interpolation images to be generated between two key frames. The number of interpolated images will be reflected in the animation effect, which is the moving speed of the character before the key frame. The more the number of interpolation pictures, the slower the character moving speed. On the contrary, the less the number of interpolation images, the faster the character moving speed.
5. Conclusion
Based on the general class library of composition editor, we can choose a layer structure, which will be flexibly applied to the types of primitives. Combined with graphic editor, we can better use 3D script plug-in, which will be applied to many fields. Through 3D software, we can better study animation action and acceleration technology.

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