Quality Control of Digital Animation Image in the Era of Interactive Media

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Abstract: As the scope of interactive media applications continues to expand, people's exploration of animation technology continues to deepen, and digital animation is a perfect combination of technology and art. Digital animation in the era of interactive media is an animation technology that uses corresponding control commands or functions to achieve interactive feedback actions, animation input and output, and two-way feedback from audiences during the gradual improvement of animation works. More and more viewers and investors are beginning to pay attention to the creation and development of digital animation images. Therefore, the production of high-quality and high-level digital animation images has become an urgent need for the market and audiences. This research analysed the production elements of digital animation image quality control in the era of interactive media after analysing the process flow and production technology of digital animation in the era of interactive media, and analysed the interaction between light and shadow, sound, audience and objects in animation, Characters and the expressions of the audience's eyes are used to study the quality control of digital animation images in the era of interactive media. After analysing the relevant factors that affect the creation quality and artistic level of digital animation images, we believe that only by ensuring that the film strives for excellence in all production links can we finally create excellent digital animation images.

1. Introduction

In the context of the era of interactive media, the combination of interactive media art and digital technology has promoted the development of interactive digital animation. This has changed the way people study and entertain, and it has also significantly promoted the development of social culture and economy. The invisible language, thinking, creativity, etc. are digitally processed through computer software, and things in the virtual world are represented in the real world. It makes it easier for the audience to understand and experience many aspects of art design, interaction design, digital image processing technology, computer language, computer graphics, information and communication technology, etc. Compared with traditional media, digital media in the era of interactive a is more free, diverse, open, sharing and interactive, making the virtual world more real. The difference between digital animation in the era of interactive media and other film and television animation lies in its interactivity [1]. In the production of interactive animation, it is

not only research, sorting out information, planning, design style establishment, painting, and motion design, but also brings innovations in interactive animation design technology.

Since the creation of high-quality digital animation images is the common goal of the audience and the market, a thorough understanding of the production techniques and creation process of digital animation images is essential. Analysing and researching the relevant elements that affect the creation quality and artistic level of digital animation images has become a problem that animation creators must face. The increasingly popular 3D movies have also strongly promoted the advancement of digital animation images. How to create high-quality digital animation works that meet the needs of the film market has become a new topic of concern to film creators and film investors.

Based on this, this research analysed the technological process, production technology and production elements of digital animation in the era of interactive media. From the aspects of light and shadow, sound, the interaction between the audience and the objects in the animation, the expressions of the characters and the audience, the quality control of digital animation images in the era of interactive media was studied. Meanwhile, we should start with the pre-production, mid-term production and post-production of digital animation images in turn, carefully analyse and understand the key elements of each creative link, so as to create high-level and high-quality digital animation works.

2. Process and Production Technology of Digital Animation Image Production in the Era of Interactive Media

The development of digital technology has changed the procedures and processes of animation production. From shooting, printing, editing to digital post-compositing, the cost of animation production is reduced, and the difficulty of production is reduced. Animated images are no longer limited to traditional film and television forms, completely still images may no longer exist, and the interaction between virtual animation and the real world will not stop. Digital animation technology is to construct virtual space through corresponding software, and construct three-dimensional models and virtual scenes of objects to be represented. After setting the relevant lighting and animation parameters according to the target requirements, the abstract virtual visual image generated by the material is used. Compared with traditional flat animation production technology, digital animation technology not only subverts the audience's experience visually, but also realizes a comprehensive innovation in production concepts [2]. It can be said that digital animation technology has the characteristics of interactivity and virtuality. In-depth research on the production process and production technology of digital animation images in the era of interactive media will help us better control the quality of digital animation images.

2.1 The Technological Process of Digital Animation Production in the Era of Interactive Media

In the era of interactive media, based on the advantages of digital animation technology [3], the process of modern digital animation image production is the same as traditional hand-painted animation, which is divided into three stages: early, mid and late. Moreover, the improvement and innovation of interactive digital technology and the innovation of expression methods are important factors for the survival of digital animation films (Figure 1).
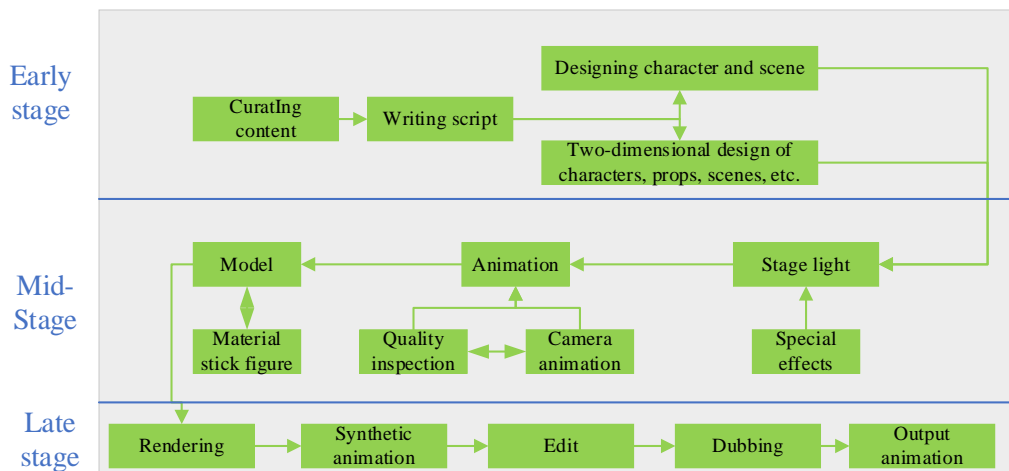
Fig.1 The Production Process of Digital Animation in the Era of Interactive Media

2.2 Digital Animation Production Technology in the Era of Interactive Media

The application of interactive technology to digital animation production has a good effect of introducing, substituting, and interactive "empathy" for initiative, personality and image. It currently includes complex object modeling technology, implicit surface modeling and animation, performance animation, three-dimensional deformation, artificial intelligence animation, etc. Different digital animation image effects depend on the functions of different computer animation software and hardware, and have the dual characteristics of art and technology. Figure 2 shows the interactive model of human-computer information exchange in the process of making digital animation in the era of interactive media.
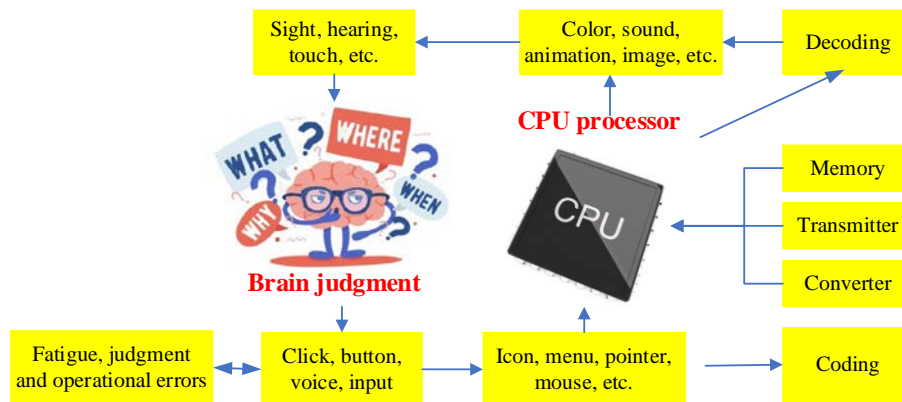

Fig.2 The Interactive Model of Man-Machine Information Communication in the Process of Digital Animation.

At the same time, the intervention of new media such as smart phones, tablet computers, somatosensory game consoles, and virtual reality glasses has made animation, such as the original one-way output art form, become more diversified, which provides convenience for the production of digital animation. Therefore, understanding the production technology of digital animation in the era of interactive media is of great significance for improving the quality of digital animation images in the era of interactive media, as follows:

2.2.1 2D Animation Production Technology

To a certain extent, two-dimensional animation is closer to the art of painting. It uses point, line,

surface modeling, composition and colour modeling methods, and pays attention to the modeling of flat visual images. Therefore, digital tools of graphic design are usually used in the image modeling of two-dimensional animation. Such as Adobe's comprehensive image processing software Photoshop, vector graphics processing software Illustrator, and drawing software SAI, Painter and so on. With the development of network technology, Flash software is gradually replaced by Animate software that supports HTML5 Canvas output. Even if they do not differ much in the operation of animation production. Another mainstream animation software is After Effects, which is used with graphics and image software such as Photoshop and Illustrator. It has powerful functions and rich effects, which can realize various animation design.

2.2.2 Virtual Digital Animation Image Production Technology

Compared with flat two-dimensional animation, digital animation images need to undergo complex processes such as modeling and texture mapping in the early model production. However, it has digital advantages in post-animation production, such as the use of bones, key frames, lights, and cameras. Digital animation images can simulate the spatial relationship of the real world, and are as flexible as shooting real objects in the scheduling of shots, and are more economical and effective than shooting real objects. The mainstream digital animation image production software includes 3DS Max, Maya, Cinema 4D and Blender. In the production of different modules of digital animation images, there are also corresponding independent software and plug-in support, such as modeling Rhino, Silo, engraving Z Brush, topology Topogun, texture Photoshop, Body Paint, environmental special effects Houdini, Realflow and V-Ray renderer, etc. With the development and application of 3R (VR, AR, MR) technology, digital animation images have gradually become closely linked with virtual reality [4].

2.2.3 Stop Motion Animation Production Technology

The production of character and scene models for stop motion animation requires sensitivity to materials and fine craftsmanship. The modeling of a character needs to go through many levels from bone making, material filling, to coloring, facial features and hair details, and costume props making. And the same character should make multiple copies of the same to deal with various damage situations encountered during shooting. Digital shooting technology and digital processing technology for film and television post-production are also added. The scene model is built with the green screen, and the post-compositing technology is used to achieve a larger space effect. When shooting stop motion animation, pay attention to whether the shot frames are connected into a smooth and coherent motion. Therefore, the production software of stop motion animation has calibration functions that can view the pictures before and after shooting in real time, such as Stop Motion Pro, Dragon frame and I Stop Motion.

3. Analysis of Control Elements of Digital Animation Image Quality in the Era of Interactive Media

Good image quality has an invisible promotion effect on interactive animation design. The visual design, experience design, sense of form, and interactive design of interactive animation have a new form of expression. In addition, there are richer expression techniques in the form of interactive visual design works, the content is more substantial and concrete, and the user experience is better and more realistic. From a technical perspective, digital animation images in the era of interactive media integrate computer interactive media technology, interactive technology and network technology. Therefore, this part of the content starts from the three stages of the early, middle and late stages to analyse the control elements of digital animation image quality in the era of interactive

media.

3.1 Early Script Creation

Whether it is two-dimensional animation or three-dimensional animation and digital animation under interactive media, the animation script plays a decisive role in the quality and standard of a film. On the one hand, whether the plot of the script is popular with the audience directly affects the film's consumer market and audience. On the other hand, the character modeling and story scenes involved in the animation script affect the creative space and total amount of work of the animation creators, which are directly related to the overall effect of the film. Therefore, to create a high-quality digital animation film, the quality and standard of the animation script should first be improved. Specifically, we should increase the audience breadth and ups and downs of the script to enhance the artistic and commercial value of the film [5]. For example, the American cartoon "The Groods 2" released in 2020 has won unanimous appraisal from the audience for its humorous, ups and downs storyline, and has brought it huge economic profits.

3.2 Mid-Term Digital Animation Video Production

After having script creation and character setting, it is the character modeler who converts these flat images into three-dimensional models. And the rigger binds the different joint control points of these models, so that the actionist can make the character move with movements and expressions. Next is the scene. After the scene is built, many background objects need to be filled so that the environment looks real. The work of the scene modeler needs to communicate with the director in time so that the director's ideas can be consistent with the final picture. This involves the four steps of 3D modeling, 3D scenery, animation adjustment and lighting rendering [6].

(1) Modeling. Modeling is the first step in the mid-term production of digital animation images. The applicable 3D model will well present the character modeling and scene design concepts. This is the foundation of the visual performance of digital animation images and one of the key links in the entire mid-term production. Among them, the model is divided into rough mold and fine mold. Rough mold is the basis of Layout. They can assist the director to complete camera placement, basic action settings, and control of lens timing based on the content of the script and the storyboard. Fine molds are three-dimensional models that are carefully crafted on the basis of rough molds according to the director's suggestion and storyboard. They are the final protagonists of the animation film. The quality of the model directly affects the subsequent production and visual performance of the cartoon, so the fine and practical three-dimensional model is the beginning of the film's success.

(2) Scenery. Among them, the texture map is generally for animation scenes. We have seen that different texture maps will affect the performance and visual appeal of the movie. In order to shape characters and scenes well, it is essential for creators to carefully screen and compare different texture maps. The texture maps and bone skins of the American digital animation film "*Kung Fu Panda*" are extremely sophisticated. The decorative patterns with Chinese classical flavour are harmoniously integrated into the characters and scenes under the careful drawing of the creators. This not only enhances the artistic effect of the film but also renders the theme atmosphere of the film.

(3) Animation adjustment. Animation adjustment is the key to whether a cartoon can vividly express the director's creative intentions and the plot of the script. Here, the animation adjustment of the film should follow the law of motion, and only the way of motion that conforms to the law can be more smoothly and natural in visual performance. The American digital animation film series "*Ice Age 5*" is extremely exaggerated and bold in its action performance. Its beautiful action settings

and character performances add to the film a lot.

(4) Light rendering. Lighting rendering refers to the process in which the lighting engineer designs the renderings based on the preliminary scenes, lighting and detailing the animation scenes. Good lighting rendering can heighten the theme atmosphere of the film and add to the plot narrative of the film. Most of the digital animation films with good box office and well-made can better control the scene lighting, so as to render the atmosphere of the story and enhance the beauty of the picture.

3.3 Post Film Production

The editing team handles the final film and sound editing, and the post effects team adds some post effects. (1) Film and television special effects. Film and television special effects are the process by which special effects artists add electricity, flash, thunder, smoke, water, fog, fire, light and other effects to the 3D software or post-production special effects software according to the storyline of the movie. Reasonable and brilliant film and television special effects will effectively heighten the film atmosphere and improve the production level of the film. This not only requires us to carefully analyse the plot of the script and understand the director's creative intentions, but also to be careful about the aesthetics of lens performance and visual communication. (2) Editing and dubbing. Editing refers to the process in which the editor uses the editing software to combine and process various shots. It can be combined into different versions for selection according to the director's requirements and montage rules. The soundtrack refers to the process of dubbing characters and adding sound effects to the film by the dubbing engineer according to the director's requirements and the storyline [7]. (3) Other elements. In addition to the many details of the digital animation production process that will affect the quality and artistic level of the film, subtitles and posters are also part of the film. They also affect the overall level of the film, so creators also need to pay attention.

4. Digital Animation Image Quality Control Strategy in the Era of Interactive Media

Interactive design in the era of interactive media draws on the theories and techniques of traditional design and engineering science, and is a complex with unique methods and practices, not just a partial superposition. The basic rules of interactive design include: ethical interactive design, intentional interactive design, practical interactive design, elegant interactive design, expressing the simplest and complete plan, with internal consistency, appropriate tolerance, cognition and emotion stimulation. Therefore, the digital animation image quality control strategy in the era of interactive media should focus on the principles of combining traditional elements with multi-directional narrative, diversification and humanization, and continuous innovative thinking [8]. At the same time, it is necessary to start with the light and shadow, the interaction between the audience and the objects in the animation, the use of sound, and the use of the expressions of the characters and the audience to control the image quality of digital animation.

4.1 Start with Light and Shadow to Design Interaction Points

In an interactive digital animation scene, how to illuminate, where is bright and where is dark, will help guide the story well, guide the audience, and attract the audience's attention. Therefore, starting with light and shadow to design interaction will make the audience have a very obvious sense of participation and interaction. If the effect of the spotlight is added, the main part is illuminated by the spotlight, and the secondary area is in a darker scene without good light, so that the audience's attention will be concentrated at once. For example, the virtual reality animations of

"buggy night" produced by Google and "dumbo" make good use of the spotlight for interactive design. The audience's sights began to search with the spotlights, and at this time the interaction had actually occurred.

4.2 Design from the Interaction between the Audience and the Objects in the Animation

As the first VR interactive animation short film of Pinta Studios, "Old Man Picking Up Dreams" was produced by combining traditional CG and Unreal Engine. According to the director of the film, the film tells the story of the old man picking up trash and the puppy he raised, looking for people's dreams of discarding in a huge garbage dump. The film chooses puppy as the interactive object, because puppy is very affinity, this feature helps guide the audience. Such interaction will also resonate the audience more in the plot

4.3 Using Sound to Design Interaction Points

When virtual reality technology is combined with animation, we truly immerse ourselves in the film environment. In interactive reality digital animation films, if the sound has no sense of space, direction, and distance, it will cause us a lot of confusion and hinder the advancement of the plot. The location and direction of the sound source can reasonably and naturally guide the audience to develop according to the plot you imagine. If the sound source is not clear, the audience is likely to start looking around, so the interaction of virtual reality animation is carried out from the perspective of sound.

4.4 Using the Expressions of the Characters and the Audience to Design Interactions

Virtual reality technology can track head data in real time, and of course it can also detect in real time when the user's head starts moving. With these data, you can use these data to transform into interaction. Because if the head stops moving in a waking state, then it must be thinking or paying attention. In this way, using this feature, we can use the head stop motion data as a trigger for interaction. Figure 3 is the principle behind the use of virtual reality head tracking technology for interactive design. This picture was originally studied in the game field, so there will be button-to-send words. And with this technology, you can do a lot of interaction design, one of which is the interaction of the eyes when the smart person communicates with the person.
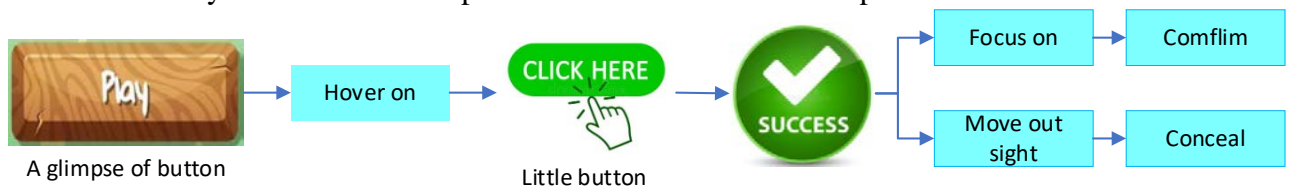

Figure 3. Using interactive media technology to realize the principle of head tracking

5. Conclusion

The continuous deepening of the application of interactive animation in the development of social civilization can promote the continuous development of digital media art. We use modern technology and media art to promote the transformation and innovation of interactive animation. And we further expand the application field and use scale of animation based on the specific attributes of animation, so as to make the development of various industries and fields more obvious and more efficient, and promote the progress and development of society. After analysing the relevant factors that affect the creation quality and artistic level of digital animation images, we

found that the creation of digital animation images is relatively harsh and complicated. Specifically, we should carefully analyse and understand the key elements of each creative link from the pre-production, mid-production and post-production of digital animation images. This creates high-level, high-quality digital animation video works that audiences love to hear. In the future, animation and interaction are required to work together technically, and practitioners need to break the knowledge barriers between disciplines, give full play to the spirit of integration of art and technology, so that technology can be carried forward and art can be better presented.

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