Influence of Digital Media Technology on Animation Design

Geng Liu*
Art Design College, Nanyang Institute of Technology, China, 473004

*Corresponding author e-mail: 137848014@qq.com

Abstract. With the rapid development of modern computer technology, information communication, etc., fruitful achievements have also been made in digital media technology, which has gradually penetrated all walks of life. In the related design and production process of animation TV works, the integration of digital media technology allows richer contents and forms of animation and brings more real visual enjoyment to the audience. Digital media technology has driven the design and production of animated TV works. In this paper, mainly the related development of digital media technology is expounded and analyzed. Its application in animated TV design is studied for reference only.

Keywords: Digital Media Technology, Animation TV, Animation Design

1. Introduction
With the rapid development of modern science and technology, many advanced technologies are constantly sprining up [1-2]. In the field of animation television design, the adoption of digital media technology also ushered in new development opportunities for the development of the whole industry and produced a large number of excellent animation films and television works [3-4]. Digital media technology makes the design of animation television have an unprecedented significant change, which presents a new mode in front of the audience, and also promotes the transformation and development of the film and television animation industry [5-6]. The use of digital media technology in the design of animation television design in the aspects of role modeling, scene, role action, and color has brought vibrant and colorful effects. Hence, it has made significant contributions to the design and development of film and television animation, and has gradually become an indispensable key part of animation television design, with tremendous market development opportunities.

2. Overview of digital media technology
Due to the better compatibility and openness of digital media technology, it can effectively change the traditional model of information dissemination, and bring a broader audio-visual enjoyment to the audience, which also has great influence on the design and production of animated TV. First of all, it
can effectively promote the innovation and development of the animation industry. The traditional animation design and creation often rely on the pattern of hand-painted designers, and the application of digital media technology can introduce computer technology into the design of works, which can make designers create more imaginative and artistic works. For example, traditional photos can be processed by related software, which often gives them a new life and better performance. Secondly, the digital information technology that animation TV design depends on in many times has also significantly expanded. The traditional art is often limited by technologies, materials, and other carriers. However, the application of digital media technology can show some more grand and illusory scenes, for example, to show the fighting scene in ancient times, which is very difficult for the traditional art performance, but with the help of digital media technology, it becomes very easy, and also brings special visual enjoyment to the audience.

3. Overview of film and television animation technology
After the 1980s, with the continuous development of digital media technology, the development of 3D animation technology has also entered a high-speed stage. In 1988, the appearance of the movie “Titanic” officially announced that people had entered the 3D era. However, in China, the starting time of 3D animation technology is very late, mainly because 3D animation technology is costly, which requires many operators and requires high standards for computer performance. Some small film and television animation companies want to try 3D animation technology, which can be easily limited by funds. Some large film and television animation companies have not received enthusiastic audience responses after the application of the 3D animation technology, which has resulted in their investment not being directly proportional to the return of funds. So no longer try 3D animation technology. Hence, in the early stage of the development of 3D animation technology in China, people did not welcome the 3D animation technology. In the eyes of some people in the animation industry, they even did some left-handedness to complete the animation design. However, in recent years, with the continuous application and promotion of 3D animation technology in many famous movies such as Shrek, Jurassic Park, and the Ice Age, people can have a correct understanding of 3D animation technology. Currently, the main research direction of multimedia technology is a sparse representation of lights, which can achieve the following three goals: designing the perception matrix, performing compressible verification, and reconstructing lights.

(1) The sparse representation of lights is a vital a priori condition of multimedia technology. As shown in formula (1), \( \mathbf{x} \) represents the original lamp light \( \mathbf{x}=\left(x_1, x_2, \ldots, x_n\right) \), \( \mathbf{\Psi} \) is the sparse basis of \( \mathbf{x} \), and \( \theta \) is the efficiency coefficient of animation design.

\[
\mathbf{x} = \mathbf{\Psi} \theta \quad (1)
\]

(2) The observation model of the multimedia technology can project the original light and project it onto the perception matrix \( \mathbf{\Phi} \) that has no correlation with the transform base. From this, the observation vector \( \mathbf{y} \) can be obtained from it, and the observation vector can be obtained using the following formula (2):

\[
\mathbf{y} = \mathbf{\Phi} \mathbf{x} \quad (2)
\]

Based on equations (1) and (2), the relationship between the observation vector and the efficiency coefficient of animation design can be expressed as follows
\[ y = \Phi x = \Phi \Psi \theta \]

4. Analysis of the application of digital media technology in the design and production of animated TV

Vivid and perfect story development scenario is an essential part of excellent animated TV work. To better promote the development of the overall story, it is also necessary to make the character's shape more vivid and character more distinct. In the whole animation, the design of role modeling is a crucial link. Like the real actors in the real-life movies, to better convey the development of the story and shape the character of the characters, the design of the role modeling is indispensable. In a sense, the quality of the animation character image directly determines its commercial value, which also represents its artistry, such as the famous animation character Donald Duck, Mickey Mouse, etc., which has developed into the image endorsement of relevant commercial products, and its great commercial value is no less than the real movie and TV stars. Compared with the traditional two-dimensional animation modeling design, the use of digital media technology breaks through the traditional “flat” role modeling constraints, making the role modeling more realistic, three-dimensional feeling more real; in addition, it also makes the audio-visual language of animation more colorful. Through the use of digital media technology, the character can be more lifelike, with real hair, skin, clothes and other elements; for example, the more than 2.3 million hairs on Sulley, the character blue hair monster in the famous animation “monster company”. It gives the audience an unusual real visual experience, as shown in Figure 1, where the strong support of digital media technology is indispensible from.

Beside the high requirements for the design of character modeling, the complete animation work is also a very important part for the design of the scene of story development. Generally, the development of the plot and some activities of the characters need to be matched with appropriate scenes, such as social environment, living environment, natural scene, historical environment, etc.. The design of animation scenes is often for the needs of plot development, but also to form the symbolic elements of animation style. Compared with the two-dimensional animation scene design, the use of digital media technology can make the expression language richer breaking the traditional model of line based modeling, and modeling the real scene by simulating the real light and shadow space.
Figure 1. Real visual experience of the application of multimedia technology

Animation, film and television art is a kind of dynamic visual art expression. Generally, it is through setting the action of the character to shape its distinctive character characteristics and continuously promote the development of the story. The characters with distinctive action design can bring the audience a genuine and credible visual enjoyment, and it also has a positive role in improving the visibility and interest of the story, even can be called the essence of the whole animation. Usually, after the role model is made, corresponding actions need to be set for it. The design of actions should consider the actual characteristics of the role comprehensively and conform to its own personality characteristics. The designed actions can directly and effectively convey the different changes of the role's psychology, emotions, and other aspects. In 3D animation works, the body movements and facial expressions of characters are the most commonly used expressions of action design. In the process of 3D animation character action design, the action design part of the character is often controlled by the internal skeleton, so we should follow the characteristics of the body structure to build the model, so as to lay the foundation for later expression and action design. For example, when building a fat character, the skeleton of the model must conform to the characteristics of fat people in reality, as shown in Figure 2. Only in this way can a more real character be created. Digital media technology can adjust the design of action through non-linear time keyframes. It can control every part of the character's body, and then synthesize a complete action.

Figure 2. Model optimization of real visual experience
The use of digital media technology can reasonably set the color of the picture, which can make the color of the picture in the animation more distinct, the picture has a clear sense of hierarchy, and bring the audience a beautiful visual experience. Compared with the two-dimensional color design, its clear color and bright color cannot achieve this effect. Digital media technology makes the color design of animation to a higher level. Compared with ordinary animation works, the color visual impact is more vibrant, and animation works present a stronger sense of reality.

5. Conclusions
In conclusion, with the rapid development of contemporary technology, to keep up with the development pace of the times better, animation television design-related industries should also be combined with digital media technology to make its forms of expression more colorful. During this process, the advantages of digital media technology can be effectively leveraged to inject fresh blood into the animation industry for its healthy development, thereby driving the healthy and sustainable development of the film and television animation industry in China.

References
[1] S. Sinan Erzurumlu, Jane Davies, & Nitin Joglekar. (2014). Managing highly innovative projects: the influence of design characteristics on project valuation. IEEE Transactions on Engineering Management, 61(2), 349-361.
[2] C.-X. Tian. (2015). Research on the influence of lateral expansion of bridge on the deformation of the ballastless track. Journal of Railway Engineering Society, 32(3), 25-30.
[3] Tarek A. Ramadan. (2016). A novel design of a wideband digital vertical multimode interference coupler. Journal of Lightwave Technology, 34(17), 4015-4022.
[4] Yan Cai, Min Wu, Jin-Ni Zhou, & Xin Chen. (2012). Design of a digital management system for the sintering material ground. International Journal of Automation and Computing, 9(6), 587-593.
[5] Masayoshi Nakamoto, & Shuichi Ohno. (2014). Design of multi-band digital filters and full-band digital differentiators without frequency sampling and iterative optimization. IEEE Transactions on Industrial Electronics, 61(9), 4857-4866.
[6] Yuta Nakamura, Kenta Kono, & Masayoshi Yamamoto. (2013). Stabilization design of digital control for multi-phase trans-linked type boost chopper circuits. Ieej Transactions on Industry Applications, 133(5), 566-567.