Computer Technology-Based Three-Dimensional Animation Production System Management

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Abstract. Animation is one of the most fascinating industries in recent years. Nowadays, the most popular three-dimensional animation creation design, three-dimensional animation creation is to rely on CG technology to simulate and realize through the powerful computing power of computers. As designers have higher and higher requirements for animation, the animation creation process has become more complicated, so the skill-based management of the 3D animation creation process will be a problem. This article will study the management of the 3D animation creation system based on computer technology. On the basis of the literature, the relevant theory of the 3D animation creation system is understood, and then the computer technology-based 3D animation creation management system is designed, and the designed system is tested. The test results show that the maximum concurrency of the system in this article The number is 400. After 400, the delay time and packet loss of the system start to rise.

Key words: Computer Technology, Three-Dimensional Animation, Animation Production, Management System

1. Inductions
The 3D animation industry is an emerging industry and is considered a potential industry [1-2]. The three-dimensional animation industry is based on the latest computer information technology [3-4], with "creativeness" as the core of the animation film, drama, audio-visual products, animation products production industry, so the development prospects of the three-dimensional animation industry is broad and it is called the "smoke-free industry" in the 21st century is the most promising sunrise industry in the creative economy [5-6].

Regarding the study of 3D animation creation, some researchers pointed out that our country's animation industry is still in its infancy. Compared with foreign animation industry, our country's animation industry has no competitive advantage. Among young people, animation has a significant impact on their outlook on life and culture, especially in the process of development. However, due to the lagging development of domestic animation, it is unable to effectively convey the traditional values and cultural essence of our country. From a cultural point of view, this is a big loss [7]. Some researchers also pointed out that in the field of animation, our country is also actively using shadow puppet elements as a form of animation, which is loved by the general public. However, during this
period, under the influence of the booming animation industry in the United States, Japan and South Korea, our country's animation industry seems to have been Westernized, and more and more animation creations use foreign elements. There are few scenes of Chinese opera, paper-cutting and other elements used in the Chinese animation industry, causing domestic animation to lose the traditional culture of China. This is a very dangerous signal[8]. For the application of computer technology, some scholars have proposed character control methods and introduced a three-layer group motion model. In this model, each role is an autonomous element in the environment, when they recognize their environment and decide what they need to do. Role behavior is divided into three steps: behavior selection, behavior programming and behavior achievement, with the focus on behavior planning [9]. Some researchers have proposed an artificial life method for making animated images on a computer, and used this method to develop "Xiaoyuan Yisha", "Xiaoyuandao" simulated fish training, roaming, obstacle avoidance and other basic behaviors[10 ]. In summary, three-dimensional animation is a rising industry, and the application of computers in three-dimensional animation creation is also relatively wide, ranging from small to three-dimensional modeling to large-scale scene control, but the creation of three-dimensional animation is a process that involves a wide range. It is also necessary to manage it.

This paper studies the management of 3D animation creation system based on computer technology, analyzes the basic characteristics of 3D animation production and the application of computer software technology on the basis of literature data, and then analyzes the management system of 3D animation creation based on computer technology, then design and test the designed system, and draw relevant conclusions through the test results.

2. Research on Three-Dimensional Animation Production

2.1. Basic Characteristics of 3D Animation Production

The creation of 3D cartoons inherits the traditional creation methods. Creating animation is a complex process, including artistic conception, pre-production, mid-production and post-processing, and involves different art disciplines, interconnected logic and artistic thinking, as well as the coordination and collaboration between the individual and the entire system. It not only has the characteristics of traditional animation, but also has its own complex characteristics.

(1) Process complexity. After nearly 100 years of development, the production of traditional comics has become very mature and has formed a complete system. This is usually pre-design, script, art background, design drawing, original painting, animation, color matching, composition, and other links [11]. These processes are linear progressive work in a typical linear model, and each link is closely intertwined. The creation of 3D animation is developed from traditional animation and is divided into three stages: first, middle, and last, but this work is a non-linear feature of digital features, especially models and participation. These tasks are independent of each other, and they also influence and limit each other, forming a non-linear mechanism of action.

(2) Diversity of related branches. As a member of the art field, animation is finally presented in the form of works of art, but its creative process involves multiple disciplines. The script creation stage includes drama and literature, and the lens design uses a lot of film language. The process of designing and making art is inseparable from art. The later composing requires the participation of music and editors. Creating 3D animation also requires computer graphics technology, anatomy and kinematics. This interdisciplinary way of working requires a non-linear way of management thinking [12].

(3) The process of creating 3D animation is dynamic. In traditional animation production based on manual design, changing the design artwork and model is often fatal. Even a small change may result in many or dozens of additional tasks. This is also based on the shortcomings of the linear model. However, this can be greatly improved in the production of 3D animation. Since the process is non-linear, each project can be relatively independent. In short, work can be a dynamic evolutionary process. There are more choices in the production process to adjust the progress and quality at any time. This is a vital advantage of D animation production and an important factor for its continued
development.

2.2. Application of Computer Technology
(1) C/S refers to client/server. Obviously, C/S is a two-tier architecture consisting of a client and a server. The task is completed through the initial message of this interaction, which is the basis for connecting two TCP/IP communication protocols. The advantage of the C/S structure is that it can make full use of the processing functions of the client computer. After processing the client program, many tasks can be sent to the server, so that the customer service can respond more quickly. In view of the current situation of resource transfer and lack of customer resources, most software systems currently adopt C/S structure design ideas. With the weakening or disappearing of the two major congestion effects of the Internet, software systems are gradually developing in the direction of distributed networks. With this open architecture, users have a lot of freedom when accessing the current application system. By upgrading to this foundation through platform-based advantages, C/S is moving towards resource integration and more freedom.

(2) B/S means that the client only needs to install the browser function. With the rapid development of the network and the speed of data transmission on the Internet, it has effectively met people's needs. Through C/S improvement and creativity, B/S creation meets the needs of real-time information browsing functions. The B/S manipulation mechanism is that most of the data processing is done by the server, and the client’s browser page only displays the results without doing any work, forming a three-level structure. The optimized C/S client is a B/S system. Most of the data processing and storage business logic is done on the server side. The B/S system has simple maintenance and upgrade methods, cost savings and options. In addition, the application server performs a higher data load.

2.3. System Algorithm
In traditional group search optimization algorithm, if the discoverer and the joiner fall into a certain local extreme point, the whole will fall into the local optimum, resulting in the decline of the algorithm's optimization ability. For this reason, this paper proposes a group search optimization algorithm based on trend prediction. In this algorithm, the discoverer and the joiner update the position of experience and 3D modeling according to formula (1) (2).

\[
D^k_i = c_1D^{k-1}_i + c_2r_1(X_{best}^k - X_{best}^{k-1}) \quad (1)
\]

\[
X_i^k = X_{best}^k + r_2V_i^k \quad (2)
\]

Among them, \(X_{best}^k\) is the optimal value of the k-th iteration, \(c_1, c_2\) is a constant coefficient, and \(r_1, r_2\) is an n-dimensional vector whose components are random numbers from 0 to 1.

3. Design of 3D Animation Creation Management System Based on Computer Technology

3.1. The Overall Functional Architecture of System Management
According to the basic characteristics of 3D animation creation above, the total structure of the 3D animation creation management system design in this paper is shown in Figure 1:
3.2. 3D Scene Management
The system scene management part of this article focuses on scene division and terrain planning under various environmental conditions, as well as the organization of scene nodes in the scene. Basically, the division of the scene and the organization of the internal elements of the scene are managed by constructing a scene structure tree. In the scene structure tree, the relationship between nodes corresponds to the relationship between elements, and the relationship between trees is the relationship between segmented scenes. In the form of management, the system considers the characteristics of scalability and provides a user interface in the form of open plug-ins. Users can define their own management strategies based on additional specifications. The system provides default binary and eight strategies.

3.3. 3D Rendering Management
It is impractical to directly use graphics tools to perform performance operations, because the design process includes not only complex performance algorithms, but also a set of functions that constantly change graphics card parameters and graphics card performance status. In addition, if multiple performance paths are required, the graphics card parameters are repeatedly configured, and the performance status changes repeatedly, resulting in a large amount of repetitive work and significant performance efficiency loss.

The animation system in this article is designed and implemented through the performance management module. By defining the concept of rendering path and rendering stage, the performance process and mechanism are integrated and processed. The performance path means that the physical performance covers various elements required by the performance process, such as data sources, performance status, performance objects, output results, and so on. The physical performance path can be used as an independent process to obtain performance results, or it can be combined with other performance channels to complete more complex performance tasks. The rendering stage represents a series of sequential rendering operations, through rendering management to complete the rendering of complex special effects.

3.4. Message Processing
The processing of the message processing system goes through four stages: preparation stage, user operation stage, system messages and irrelevant messages. Among them, the message initiation phase mainly carries out the monitoring strategy of operating system messages and the crisis handling of message categories, as well as the priority management of message processing. Different message response strategies are applicable to different types of messages. The user mode responds to user mode
requests and executes operation events related to the scene. All these messages are passed to the operating system.

3.5. Graphic Resource Management
The 3D animation material management system is the most critical of all functional requirements. Resource management is mainly for a large number of 3D animation materials, and ensures the high availability and reliability of these 3D animation materials. In fact, the 3D animation material management system mainly uploads and downloads a large number of 3D animation materials, in addition to find, delete, change and other functions. At the same time, because the classification and characteristics of users are also diverse. Therefore, simultaneous uploading and downloading is often just a need that cannot be met by the simultaneous downloading and uploading function of a single material, but more is to realize the function of uploading and downloading multiple materials at the same time. The system can also realize query and display through keywords, as well as make changes, cancel keywords and other functions.

4. System Performance Test
In this article, a comprehensive stress test was conducted to test the system performance load, information processing capability, and transmission integrity. In other words, this article uses the simultaneous connection function to send a large amount of text messages in a short period of time while logging in. Determine the content and quantity of the sent short messages, check the way to check the omissions of the receiving end, and judge the speed of the group sending. The data results are shown in Table 1:

|            | System delay | Packet loss |
|------------|--------------|-------------|
| 1          | 0.1          | 0           |
| 100        | 0.3          | 0           |
| 200        | 0.35         | 0           |
| 300        | 0.4          | 0           |
| 400        | 0.5          | 0           |
| 500        | 0.6          | 0.25        |
| 600        | 0.7          | 2.5         |
| 700        | 1.5          | 2.5         |
| 800        | 2            | 2.5         |
| 900        | 2.5          | 2.7         |
| 1000       | 3.4          | 2.7         |
It can be seen from Figure 2 that when the number of group short messages exceeds 400, the packet loss rate begins to appear and slowly rises. It can be seen that when the number of group short messages exceeds 500, the packet loss rate rises rapidly and the data begins to lag. Therefore, in order to maintain the transmission efficiency of the system and avoid system delay, it can be concluded that the large data transmission volume of the system developed in this paper should not exceed 400 as much as possible. If a similar situation occurs, you can use the SMS server-side compilation buffer.

Buffer the queues accessed by users to always keep the bulk data volume below the peak value. Of course, upgrading the system to the original foundation can further meet the requirements of various components for high-performance system performance.

5. Conclusions
This paper studies the management of 3D animation creation system based on computer technology. After understanding the relevant theories, we design a 3D creation management system based on computer technology, and then test the designed system. The test results show that the system data of this article The group sending volume cannot exceed 400.

References
[1] Talapka J, J Hlubík, Kamencay P, et al. 3D Modelling, Animation and Simulation of Mammal's Migration Across Roads[J]. Civil & Environmental Engineering, 2016, 12(1):27-33.
[2] Dr, Jamie, L, et al. Three-Dimensional Computer Reconstruction of the Levator Veli Palatini Muscle in Situ Using Magnetic Resonance Imaging[J]. The Cleft Palate-Craniofacial Journal, 2017, 44(4):421-423.
[3] Ha-Young, Cheong, Chong-Hwan, et al. A Study on the automatic vehicle monitoring system based on computer vision technology[J]. Journal of Korea Institute of Information, Electronics, and Communication Technology, 2017, 10(2):133-140.
[4] Jaime A, Miguel Blanco J, Dominguez C, et al. Spiral and Project-Based Learning with Peer Assessment in a Computer Science Project Management Course[J]. Journal of Science Education & Technology, 2016, 25(3):439-449.

[5] Smith P K, Kwak K, Toda Y. School Bullying in Different Cultures: Linguistic issues in studying bullying-related phenomena: Data from a revised cartoon task[J]. 2016, 10.1017/CBO9781139410878(14):280-298.

[6] Ogle A D, Graham D J, Lucas-Thompson R G, et al. Influence of Cartoon Media Characters on Children's Attention to and Preference for Food and Beverage Products[J]. Journal of the Academy of Nutrition and Dietetics, 2017, 117(2):265-270.

[7] Wang Q, Chen D, Li S, et al. An adaptive cartoon-like stylization for color video in real time[J]. Multimedia Tools and Applications, 2017, 76(15):1-16.

[8] Kelly R M, Akaygun S. Insights into How Students Learn the Difference between a Weak Acid and a Strong Acid from Cartoon Tutorials Employing Visualizations[J]. Journal of Chemical Education, 2016, 93(6):págs. 1010-1019.

[9] Fan Y R, Huang T Z, Ma T H, et al. Cartoon-Texture Image Decomposition via Non-convex Low-rank Texture Regularization[J]. Journal of the Franklin Institute, 2017, 354(7):3170-3187.

[10] Wang M, Cheng W L. Alternating Direction Method for TGV-TGV* Based Cartoon-Texture Image Decomposition[J]. IET Image Processing, 2016, 10(6):495-504.

[11] Abuzahra N, Farrah, Zalloum S. Using Cartoon in Language Classroom from a Constructivist Point of View[J]. SSRN Electronic Journal, 2016(3):229-245.

[12] Klionsky D J. Why do we need autophagy? A cartoon depiction[J]. Autophagy, 2018, 14(5):739-742.