

Application and Analysis of Art Design Based on Computer 3D Technology

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Objectives: Multimedia art design has entered into our life and spread rapidly, and even almost all visual related areas have traces of digital art design. **Methods:** This paper takes multimedia design as the theme, the research of the multimedia art design environment, discusses the general elements of visual design, the original multimedia art design, as well as the factors of multimedia pattern design is the key problem; **Results:** At the same time the application of category of multimedia design are studied deeply; **Conclusion:** Finally pointed out facing multimedia pattern design challenges and need to address the issue, to explore the future of multimedia design.

Keywords: multimedia art; 3D art design; application

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With the rapid development of computer technology, microelectronic technology, communication technology and network technology, information and digitalization have become a reality. People integrate various kinds of digitalized information, forming a new way of information expression, multimedia technology. Methods and means it provides a sound and video in the most common visual information, the computer in addition to text, data and other information, but also can handle voice, images, video and other information, to enhance the depth and breadth of computer application¹. Multimedia technology is a hot topic in the computer circles the most concern, all countries in the world have invested a lot of manpower, material and financial resources to the research and development of multimedia technology, multimedia technology development and mature of computer application will open a new page, but also brings great influence on the further development of the computer industry². The emergence and development of multimedia technology, it will change the way we work,

education, training and family life, will have a far-reaching impact on human and economic and social activities. Therefore, it is necessary to understand and master the multimedia technology in time. Multimedia is one of the hottest topics in the field of computer research and production. To a great extent, it reflects the latest achievement of modern computer technology development³. With the help of data compression technology, high-capacity optical disk storage technology and high-speed broadband network technology, multimedia can realize real-time transmission and processing of multiple media information, making the paperless world possible.

There are two aspects of the development trend of multimedia technology. One is that every big company is based on its own special chip, multimedia hard card and multimedia application system. The two is to develop operation system and multimedia creation platform under various environments. Although multimedia technology in just a few years has developed very rapidly, but overall is still in the initial stage of development, the multimedia technology is a highly comprehensive technology, is an important part of

the contemporary electronic information industry, it must be with a variety of high-tech complementary common development⁴. Combined with the actual situation of our country, the development of multimedia technology will be limited by the domestic economic level and technical level, and can only be realized gradually. Although China is in the middle stage of development, we are still exploring new ways of application in many fields, and still have to make great efforts. But we can believe that through perseverance, we will be able to achieve significant results and meet the challenges and move towards the twenty-first Century. The application of multimedia technology is very extensive. The broad prospect of multimedia technology is promoted not only by people's insatiable desire, but also because of its excellent technical performance⁵. Because multimedia technology is more natural and richer computer technology, it can cover most of the application fields of computers, but also expand the new application field. It will play a great role in all walks of life⁶.

METHODS

The Analysis of the Visual Principle of Digital Art

As an important rule of form beauty, the visual principle of digital art has been widely attached to people since ancient times. It refers to the relationship between the whole and the local and the local and the local. All the plastic arts have the problem of whether the proportion is harmonious. The harmonious proportion can cause people's aesthetic feeling, and make the total combination have obvious ideal artistic expressiveness. The beauty of the number ratio was discovered by the ancient Greek philosopher Pythagoras in the sixth Century B.C., and he thought that beauty was the harmony of a certain number of relationships. The ancient Song Yu of our country called "if a part of the increase was too long, but if a part of it was subtracted, it was too short." It also refers to the relationship of proportion. The Renaissance painters thought, "The beauty of beauty is entirely based on the sacred proportions between the various parts,"

and therefore attaches great importance to the use of proportions. In order to get the proportion, since ancient times, many people have made valuable exploration. It refers to the proportion between the whole and local symmetry relationship is formed between the elements of symmetry, symmetry and it also can satisfy the requirements of rationality and the eyes, it is the basic structure of artistic beauty. The good composition has a moderate proportion and size, that is, the proportion between the parts of the composition and the relationship between the part and the whole. Proportional beauty is the visual perception of people, it is a mathematical relationship.

One is to set up and use of blank, it plays an important role cannot be ignored in the design of the picture, but also an important means of artistic expression, it can ease the tension and complexity of the picture, break and occlusion, to arouse imagination, well-organized and highlight the theme, strengthen the contrast to achieve the balance of the screen, deliberately the blank, leaving the artistic imagination world, increasing spiritual and charm picture. In the design, we should leave blanks around the elements that must be emphasized, highlighted and imprinted strongly, so that we can expand and improve the visual effect, meanwhile, we are also good at seeing the flow, breaking the sense of boredom, and seeing the special role of blank in the virtual reality processing of the picture.

The two is the space design of the picture. Many owners always want to make full use of the layout, so they want to make full use of the layout of the text and image. They think it is a waste to have space in the design screen. But they don't know that such a complicated and blocked composition often makes people dislike, leaving no impression. Space plays an important role in composition. A small amount of composition is actually a lot of effect. It can arouse people's attention, make people interested, leave a deep impression on people, and thus maximize the purpose of communication. The blank of these pictures is very valuable. After a brief analysis of the above main rules of form beauty, we need to point out that although the rule of formal beauty has formed some regular aesthetic characteristics, it is not fixed, nor the law of death. With the

development of the times, the rule of formal beauty will also develop and change. We must combine the requirements of visual art design theme and creativity to help us create, rather than constrain the creation of beauty by these laws. The significance of studying the rule of form beauty is to flexibly apply these rules of form beauty to visual art design, so that form can express the content of visual art design better, and get the effect of highly unified artistic form and content of beauty.

Extraction Algorithm Analysis of Digital Art

In the above, we have elaborated the way of image feature extraction. In computer technology, the most complicated part of voice and signal is sports. Therefore, the ideas of this article are the basis of this paper, and the extraction of sound art signals is expounded in detail. The basic characteristics of voice and hearing are usually considered from the angle of hearing, such as the characteristics of sound and media, the principle of acoustics and the quality standard of sound⁷. Voice three elements: three elements refer to the tone, sound intensity and sound. The tone is related to the frequency of the sound (unit zH). The sound is faster and the frequency is slow and the sound is low; the reciprocal of the frequency is called the cycle. The intensity is also called loudness, depends on the amplitude of the sound; the magnitude and intensity: the loudness of sound and frequency, if the frequency constant amplitude high amplitude low voice to sound, if the amplitude is constant, VHF and VLF voice seemed sound to tender more than intermediate. The amplitude and period are constant voice called tone; voice, music, natural voice in the world most is generally not pure tone, but by the same frequency and different amplitude of the acoustic wave to the combination of a tremolo. The lowest frequency of polysyllabic refers to the complex frequency (also called pitch), is a basic factor to determine the tone of the voice, it is usually a constant. In other polyphonic frequency called homophonic (also called partials). The combination of the pitch and the sound of the car determined the tone (sound quality) of a particular sound. That is to say, the timbre is mixed by pitch 5 Overtone decision; each voice

has its inherent frequency and intensity of different overtones, so that each voice has a special sound effect. It can be seen that frequency and amplitude are the two most basic parameters of the sound signal⁸. The relationship between the three elements of the voice information processing of the multimedia computer mainly refers to the audible sound. Frequency can reflect the tone of the sound, the sound we hear, if it is thin, indicates a high frequency, but if the sound is low, the frequency is low. In general, the voice signal of a person speaks at a frequency range of 300-3000HZ.

The maximum displacement of the wave is called the amplitude. It represents the intensity of the sound signal. The intensity of the sound is quite different, from the weakest sound to the strongest sound that people can hear, and the intensity can be 1 trillion times the difference. In order to describe the strength of sound, decibel (dB) is used as a dimension. Decibel refers to the ratio of two intensities, which refers to the gap between the sound and the reference sound. In general, according to the sound is a very low voice, which is about the weakest human auditory organ can perceive in a voice in 100Hz. The quality of sound is related to the frequency range of sound, the wider the range, the higher the quality, but sometimes the sound media cannot provide the required bandwidth. Therefore, there is a standard for voice quality. Speech is measured by intelligibility, clarity and whiteness. Music is judged by fidelity and spatial effect. It is usually scored according to the actual effect. The highest score is 5 points. The quality of the sound is like table1.

Table1
The Quality of the Sound

Grade		Distortion level
5	Excellent	Unaware
4	Good	Just to be aware but not to lose
3	Difference	A little perceptible

The sound data of process sound has strong correlation, large amount of data and high demand for real time. Sound is an analog signal, and a computer can only handle digital signals. in order to enable the computer to process audio signals, digital audio signal is required for every fixed time interval, the analog audio signal interception of an amplitude value, and is represented by a binary number specified length, from the analog audio signal into a continuous discrete digital audio signal. The process of intercepting the amplitude value of the analog signal is called sampling, the obtained amplitude is sampled, and the sample value is called the quantization in binary form.

The processing of digital audio signal and processing of digital audio signal usually include the following processes: sampling audio signal is analog signal, it is a continuous signal of time, or continuous time function $x(t)$. When processing these signals with computers, we must first sample the continuous signals, that is to say, we get the discrete signal $x(nT)$ (n is integer) at a certain time interval T value. $1/T$ is called the sampling period, and $1/T$ is called the sampling frequency. The Shannon sampling theorem points out that more than two samples must be sampled in each cycle of the sound to ensure the quality of the original analog signals. The sampling theorem also stipulates that the frequency spectrum of the continuous signal $x(t)$ is $X(f)$ as the cut-off frequency. The frequency submersible $X(f)$ can be completely determined by the discrete signal $x(nT)$.

$$X(f) = T \sum_{n=-\infty}^{\infty} x(nT) e^{2\pi f n T} \quad (1)$$

It can also be obtained that $x(nT)$ can fully

determine the continuous signal $x(t)$:

$$X(t) = \sum_{n=-\infty}^{\infty} x(nT) \frac{\sin \frac{\pi}{T}(t - nT)}{\frac{\pi}{T}(t - nT)} \quad (2)$$

When the sampling frequency is equal to $2T$, that is, $f_v - 1/2T$ is called the Nai Lester frequency. If the sampling frequency is less than F , the discrete signal $X(nT)$ can uniquely determine $X(t)$. At this time, the discrete signal spectrum $X\Delta(f)$ is folded by the continuous signal spectrum, namely:

$$X\Delta(f) = \sum_{n=-\infty}^{\infty} X\left(f + \frac{m}{T}\right) = \sum_{n=-\infty}^{\infty} X(f + 2f_c m) \quad (3)$$

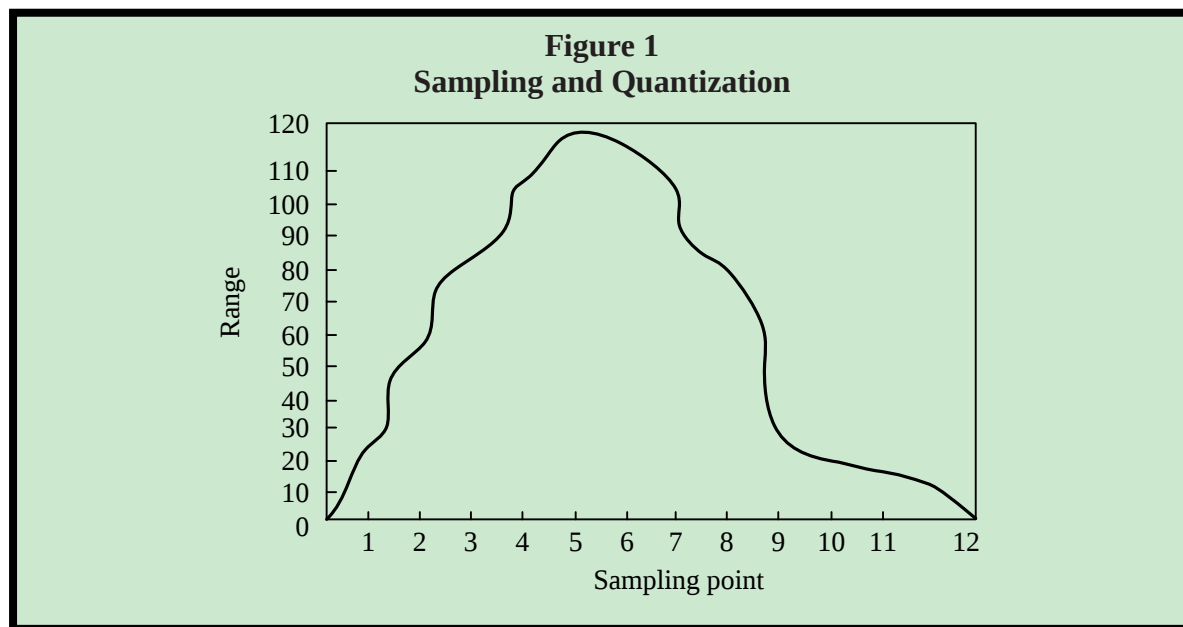
The higher the sampling frequency is, the more the number of voice samples is acquired in the unit time, the higher the quality of the digitalized audio signal, and the greater the amount of storage it needs. Too little sampling will result in frequency aliasing, resulting in distortion.

RESULTS

Based on the above algorithm, the following will be the specific application of the algorithm analysis, the process of quantitative sampling value are as follows: first the entire range is divided into small finite amplitude (the quantization interval) set to fall into some order from within the sample is classified as a class, and give the same quantization value obviously, this has also brought the quantization error (noise). If the quantized value is uniformly distributed, it is called a uniform quantizer. The binary digits of the sampled values are called quantized numbers, also known as quantization precision, which refers

to the range of data expressed by each sampling point after the A/D conversion. There are three commonly used sampling data digits: 8 bits (bi

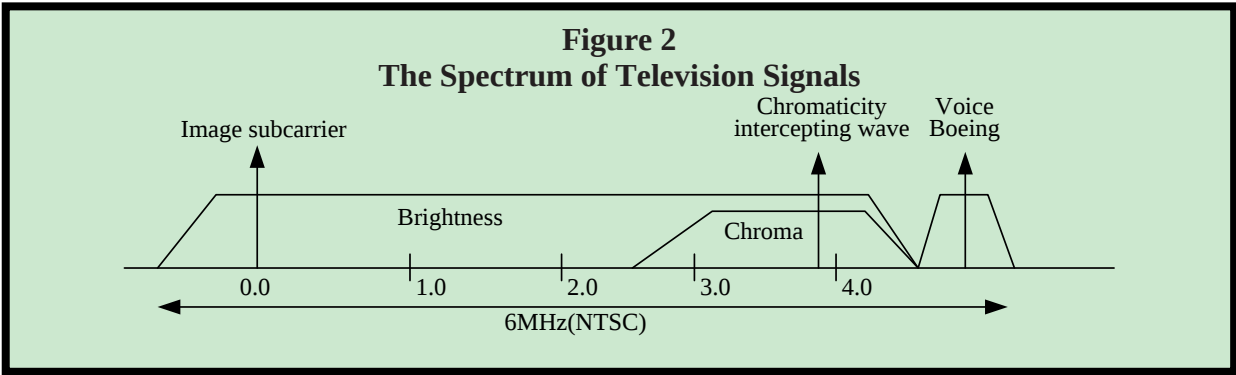
t, 12 bit, and 16 bit. The process of sampling, quantizing and encoding sound signals is shown in Figure 1.



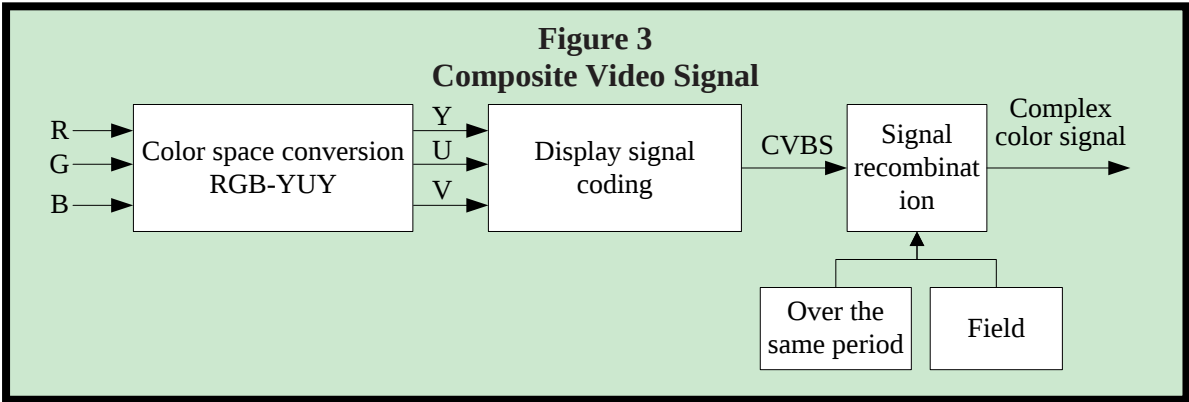
The sampling data bits describe the magnitude of the sample signal, the more number of sampling data, higher quantization accuracy. The better the sound quality is, the larger the amount of data to store, the closer the quantization waveform is to the original waveform. The quantization precision sound of the multimedia computer has two kinds: one kind is to use 8 bit quantization accuracy is 2, the sample is divided into 256 parts, the minimum sample value is the maximum sample value $1/256$; another is the use of 16, is the highest amplitude quantization precision $1/65536$. The general use of 16 bits is able to meet the requirements of multimedia purposes very well.

The image is the same, on video and animation, video is by a single pictures (called frame) sequences, and these images at a rate (Z/s per second frame rate, display frame number) continuously projected on the screen, the observer looks with continuous motion image feeling. The typical frame rate is from $24f/s$ to $30f/s$. This video image looks like a continuous effect. Usually, there is one or more audio tracks associated with a video image to provide sound.

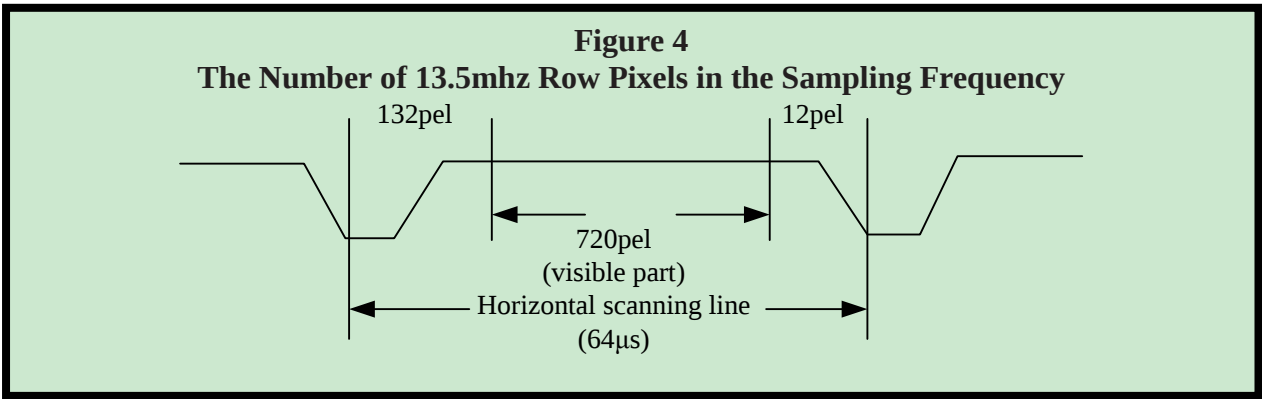
NTSC and PAL: the video standards used in all countries and regions in the world are not exactly the same. There are two main standards of NTSC and PAL. The NTSC standard is used in the United States, Canada and Japan. The NTSC standard is 30 frames per second and 525 lines per frame. Most of the countries in China and Europe adopt the PAL style. The L standard is 25 frames per second and 625 lines per frame. There are also a few countries using the SECAM system. In the transmission of video signals, the spectrum diagram of a spectrum TV signal is shown in Figure 2.



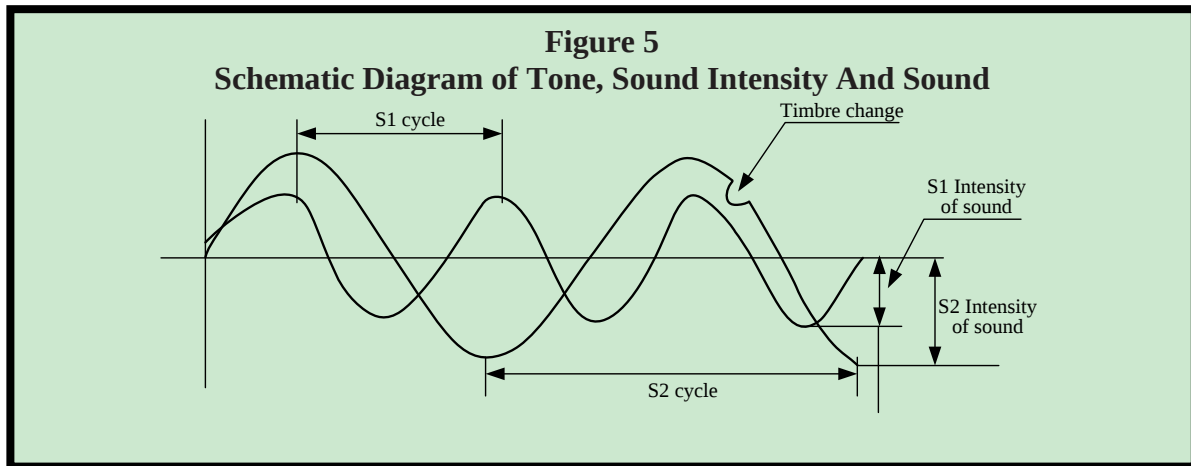
The process of video signal formation is shown in Figure 3.



The sampling frequency can be 13.5MHz or 6.75MHz, and the quantized digit can be 8bit. For the sampling frequency 13.5MHz, the number of pixels per line can reach $13.5\text{MHz} \times 64\mu\text{s} = 864\text{pel}$, the valid pixel = 720 (Y), as shown in Figure 4.



Through the above extraction process, we extract an artistic signal. As shown in the following picture, we can see that the algorithm in this paper can get good application in art signal extraction, so it can also contribute to computer art design.



To sum up, the times are developing constantly, and there are different requirements for design in different times. There are different design conditions in different times. Therefore, designers must constantly update their design concepts based on these factors, so that the design will not lose its time and practical significance. Through the above analysis, we can conclude the key points of application of art design based on computer technology as follows: dissemination of information as the ultimate goal is the basic requirement for design in the age of information dissemination. Therefore, always using information content as the center of design appeal is the fundamental principle of modern graphic design. If it deviates from the objective of design, it cannot accurately convey information. Even completely ignores the content of the information, making the ad graphics no information at all. It has lost both the practical function of the graphics and the loss of the main existence value. Two, the form of modern graphic design is diversified. The various factors of the digital art design between art and technology, useful for any free eclectic information, broadcast live, art and science and technology achievements to create a rich visual representation of the means and form to the visual communication design for endless inspiration and many lessons. The design can absorb all kinds of means and forms which are beneficial to the urgent communication of the letter, and are free to express freely.

DISCUSSION

The creation of art will inevitably experience a process of development from practical to aesthetic and labor as the premise. Such as the construction of art was originally intended to meet the people's basic living needs, in thousands of years in the history of aesthetic and artistic development, this is a time when everything is possible. The pursuit of beauty has become the most important architectural design in art direction. The same is true of digital art design. Based on the graphic design as an example, HTML and Java based language, discusses the general elements of multimedia design, and multimedia elements in pattern design is the key problem; while the multimedia art computer extraction algorithm is designed, and the software algorithm is applied to a design, and sound signals and pattern signal as an example, experiments are carried out on the basis of theoretical research, with excellent design analysis, and finally get the conclusion that this algorithm can play an important role in computer art design, pattern design of multimedia to make a comprehensive and intuitive discussion and demonstration.

Human Subjects Approval Statement

This paper did not include human subjects.

Conflict of Interest Disclosure Statement

None declared.

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