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Research Article

Animation Special Effects Production Method and Art Color Research Based on Visual Communication Design

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In the context of social informatization, the continuous progress of information technology has promoted the emergence and rapid development of new media. In recent years, the interaction between the design of visual communication and the increasingly popular virtual reality, special effects, and animation has constituted a new way of media communication. In the process of producing special effects of interactive animation, in order to improve the visibility of visual communication design works and achieve excellent information transmission effects, it is necessary to utilize many advanced science and technology methods such as visual communication design. This article, firstly, introduces the visual communication design technology, analyzes and introduces the animation special effects design technology, and then investigates and analyzes the application of visual communication design in real life. Experiments in this article show that animation special effects production based on visual communication design can not only save development companies at least 5% of development costs but also attract 15% of the younger age groups. The most important thing is to better promote the spread of animation film and television works.

1. Introduction

With the development of science and technology, people's production methods, living habits, and ways of thinking have undergone great changes. In particular, the invention and popularization of electronic computers have greatly changed people's lives. The birth of the internet has directly and strongly promoted new types of communication and media based on the internet. In the traditional sense, most of the visual communication design works are graphic works, which are mainly used to produce and promote the technical means of images. The technological innovation of using paper as the carrier of information transmission provides a broader development space for visual communication design. Today, with the rise of new media, visual communication design is not limited to the past logo design and poster design. Vision and other closely related professional design art fields have also begun to set foot in cross-development. The continuous update of media and various developments, communication media, and materials has created an unprecedented multidimensional world in the field of visual communication and has provided more attention to people. In this context, visual communication design has enriched its reasonable development. The designer's design concept can not only be well communicated to the audience, but also meet the audience's new needs and aesthetic psychology.

With the rapid development of the national economy, people's consumption and entertainment levels continue to improve, and the current new media animation market mainly has some common problems, which are reflected in creativity and design. The special effects and colors of animation are important symbolic language in information transmission, and each has a different communication effect. In today's era, for artistic performance, combining multiple visual languages has become the current trend. In the future development, the number of mixed images and graphics will also increase. In the current field of visual communication design, with the emergence and rapid development of new media in recent years, the phenomenon of image special effects and graphic color mixing is becoming more common, and its scope of application is expanding and becoming more extensive. In the previous graphics, simple colors and

geometric forms were mixed in the animation, however, this method is relatively monotonous and widely known. Hence, it is difficult to generate new visual feelings. However, the upgrade of images and graphics that appear today is a fusion of the two and complements each other. At this time, we have a lot of new visual feelings. The mixing and matching of special effects and colors of visual communication design and animation is not only a new revolution in the field of art but also in the field of production. It also brings a new revolution in the development of new technologies. The mixed design of visual communication and the special effects of animation also have a great influence. In order to improve people's artistic aesthetics, the fusion of visual communication design and special effects of animation has become a feature of modern fashion. At the same time, the special effects of visual requirements and result communication design and animation effects will continue the new media, constantly updating, changing, and improving people's various emotions about beautiful things.

Since the emergence of visual communication design technology, it is often seen in people's daily life. In the classroom teaching, Zhu analyzed the problems existing in the teaching of decorative painting for the visual communication design specialty based on the characteristics of decorative painting and proposed corresponding strategies to adjust teaching content, change teaching mode, update teaching thinking, and promote multimedia. The process of technical teaching has improved teaching efficiency [1]. In the corporate logo construction culture, Zomay proposed that the company's corporate image and colors used in logo design have a great impact on shaping the target audience and customer perception. For a business to make its corporate image effective and reach the target audience directly, the logo design should include colors that can attract people's attention and satisfy their requirements. Zomay studied the favorite colors of many students studying visual design by the use of visual communication design technology, and then using various studies showed that the success of the company is related to the colors used in the logo and packaging choices [2]. In people's daily recreational activities, graffiti culture is becoming more popular. In his research on graffiti culture, Wu stated that to further promote the creation of graffiti workers, promote the development of graffiti culture, and strengthen the vitality and expressiveness of graffiti art, he combined cloud computing and the Internet of Things to obtain more visual communication design elements to provide more visual communication design elements with graffiti workers [3]. Zhang pointed out in a survey of computer software development that interface design has become an important part of software development. He proposed to use visual communication design technology to analyze people's perception of the physical and psychological characteristics of colors, graphics, images, text, and animation and use virtual art to focus on creating a natural and beautiful human-computer interaction interface, which is more conducive to the user's interaction interface and the degree of favorite of the software [4]. Visual communication design technology can not only enhance the communication power of works but also improve the expressive power of works using diversified artistic colors. Mahoney said in an event that to show that different colors have important historical significance in art and archaeology, he provided students with a 4-day short course, which involved the chemical synthesis of pigments used in art. His students synthesized four pigments in the chemistry laboratory: Egyptian blue, madder lake (red), cobalt green, and cobalt yellow. It not only shows the charm of chemistry for students but also increases students' understanding of color art [5]. Of course, art color is not just for people to watch. In medicine, art color doctors are an important basis for diagnosing patients' disease. Especially under the influence of the virus epidemic, Yang established a case and rule knowledge representation method, case retrieval technology, and rule conflict resolution strategy. The color case database has been established so that doctors can judge people's health in a timely and accurate manner and strengthen the prevention of virus epidemics [6]. However, in today's society, visual communication technology and art color are more applied to the performance of multimedia, especially in the production of animation. Cheung pointed out in his research on website pages that websites usually use animation to capture the attention resources of online consumers, and the number of individual attention resources may vary under different conditions. To demonstrate this view, he conducted a large number of experiments and concluded that product projects using animation will increase visual attention to all projects on the web page. Animation effects how individuals allocate their attention resources, thus increasing their visual attention [7]. Although most of the current videos, images, pictures, etc., use many visual communication design techniques, it takes a lot of time and capital costs in the production process and production costs, which still need to be improved.

The innovation of this paper is to analyze and study the production methods of animation special effects using visual communication design technology. It can not only express the content that the author wants to express through visual media but also convey to the audience more the combination of art, culture, and technology, which is both practical and beautiful. Moreover, by the use of visual communication design technology, we can accumulate visual language expression forms from the fields of drama, oil painting, calligraphy, folk art, and music and enrich the artistic expression technology of visual communication design, enrich the appeal of visual communication design works, and make the production effect of motion picture special effects more realistic and the colors more diversified. It will be loved by the majority of customer groups.

2. Animation Special Effects Production Method Based on Visual Communication Design Technology

2.1. Visual Communication Design Technology. Visual communication design is an activity that spreads specific things using visual forms. Most or part of it depends on vision, using two-dimensional images, such as logo,

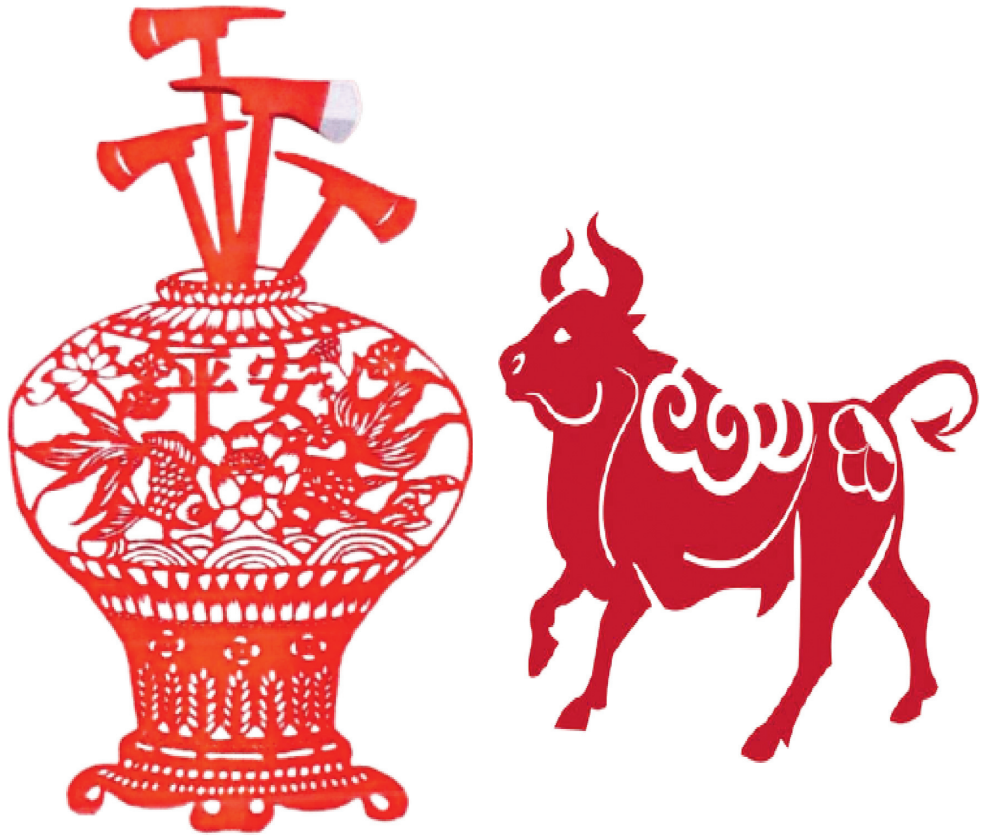

Figure 1: An illustration based on visual communication design.

typography, painting, graphic design, illustration, color, and electronic equipment to express [8]. The phenomenon was discovered during the visual communication design process. The images of communicating, educating, and persuading the audience will have a greater impact on language. It is the process of guiding according to a specific purpose, conveying specific information to the object conveyed in the form of visual art, and having an impact on the conveyed object [9]. In the visual communication design, we must grasp the use of color. First of all, on the basis of following the principles of the inherent customary color attributes, overall collocation, and regional characteristics of the design object, we should skillfully use different colors in a wide range of visual design fields. To achieve a good publicity effect. Science and technology, such as computer design, bring changes to designers, however, they also bring uniformity. For example, a column can divide the text into two vertical rows, thus, to a certain extent, the creativity and conception of designers are less obliterated.

First of all, visual communication design, which is guided by a certain purpose, conveys a series of specific information to and affects the conveyed object in a form that can be conveyed by the naked eye. Visual communication design is mainly to convey all kinds of information to people through vision. We can see symbols that can express certain properties of things, such as photography, film, television, buildings, plastic arts, and various design products. As you can see, they are all in the category of artistic symbols [8]. The so-called "transmission" is actually the process by which the sender of information uses symbols to spread the information to the recipient. The basic elements of visual communication design can be summarized as follows: graphics, text, and color. color, such as designing posters, industrial products, and signs. Visual communication design includes logo design, illustration design, layout design, font design, display design, packaging design, advertising design, etc. Among them, it is most widely used in animation special effects design, illustration design, advertising design, and display design, and it has achieved satisfactory comprehensive effects. At the same time, it is also one of the most economical, most convenient, and fastest communication methods used in the field of animation special effects production. It has the characteristics of good publicity effect, no time limit, and wide audience. It is not only of practical value for communication but also has a high art collection value and appreciation value [10]. As shown in Figure 1, it is an illustration designed and produced using visual communication design.

It can be seen from Figure 1 that it is a natural phenomenon for people to watch illustrations on computers or books at this stage. In the process of observing illustrations, people can also obtain basic economic and cultural characteristics at a certain time and stage through illustrations. Otherwise, it is the ideology that the writer wants to express in the writing process. An example diagram of artistic color is shown in Figure 2.

Figure 2: Example of artistic color.

At the same time, the use of illustrations can make the expression of words more modern, and it can also allow people to accept and recognize the content of the words. In fact, illustrations are not only a visual form of expression but also a major carrier of information dissemination. Therefore, in the process of the development of science and technology, with the continuous maturity of network technology, modern illustration art also follows its own characteristics and shows many styles on the basis of traditional illustrations. Hence, it can be seen that the technological development of advances in illustration design has a very important impact.

2.2. Animation Special Effects Production Technology. Whether it is an animated movie or an actual movie, adding animation and special effects will give the movie a more significant visual effect. To let the audience feel the story and experience driving, animation and special effects are very important for the movie. Animation and special effects can not only make animated movies but also complete movies and TV shots that cannot be solved with actual shots, and they are not affected by factors, such as weather and seasons [11]. In addition, high-level changes can be made, and this product can be controlled more simply to bring unprecedented audiovisual effects.

2.2.1. Animated Image and Video Keying Technology. In the 1990s, the alpha-based matting technology was proposed, and the alpha channel was introduced to generate complex digital images by synthesizing multiple images. The description of the most general combination operation summarizes it as a combination equation, and the formula is as follows:

$$A = \alpha B = (1 - \alpha)C. \quad (1)$$

A represents the composite image, B represents the foreground image, C represents the three-dimensional vector of the background image, and α represents the opacity of the color, and its value is between (0-1). The keying process is actually the inverse process of the combination process, and its goal is to reconstruct the alpha channel, B foreground image, and C background image from the original image A. The production process of extraction and synthesis are shown in Figure 3.

Environmental keying is also a kind of keying technology, however, its alpha image is mainly used to highlight the optical interaction of reflection, refraction between the object and the surrounding environment, and semitransparent or transparent objects [12]. It introduces the ambient light C, and the formula is as follows:

$$F = \alpha B + (1 - \alpha)C + C. \quad (2)$$

2.2.2. Video Keying and Synthesis Technology. Because of the large size of images processed every day, most of the existing algorithms cannot achieve a proper compromise between calculation speed and accuracy. Based on previous work, a fast image keying algorithm is designed—Bayesian keying based on binary segmentation [13]. Firstly, use the GraphCuts algorithm to roughly divide the image, and then use the Bayesian keying algorithm to calculate the opacity. Figure 4 shows the first frame of video segmentation process.

When the video segmentation is completed, it is convenient to use Bayesian keying algorithm and other techniques for video synthesis, as shown in Figure 5.

As can be seen from Figure 5, our basic idea of video keying is based on the Bayesian keying method of binary segmentation. Firstly, we use the background subtraction method based on background modeling to automatically divide the foreground and background regions of the first frame of the input video, i.e., the binary segmentation result trimap is obtained. The second frame calculates the color likelihood probability of each pixel according to the trimap of the first frame, sets the threshold to divide the image into three parts, namely foreground, background, and unknown area, and optimizes each pixel in the unknown area by Graphcut. It is finally determined that it belongs to the foreground or background so that each frame after the trimap of the second frame is obtained by binary segmentation according to the trimap of the previous one.

2.2.3. Introduction to Video Keying and Synthesis. To be able to key the video sequence more accurately and conveniently,

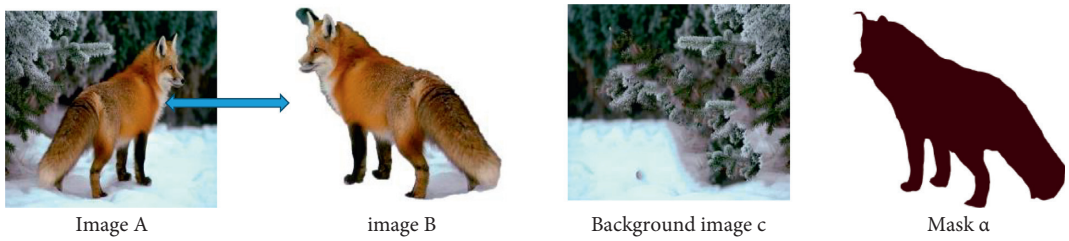

Figure 3: Image keying and synthesis.

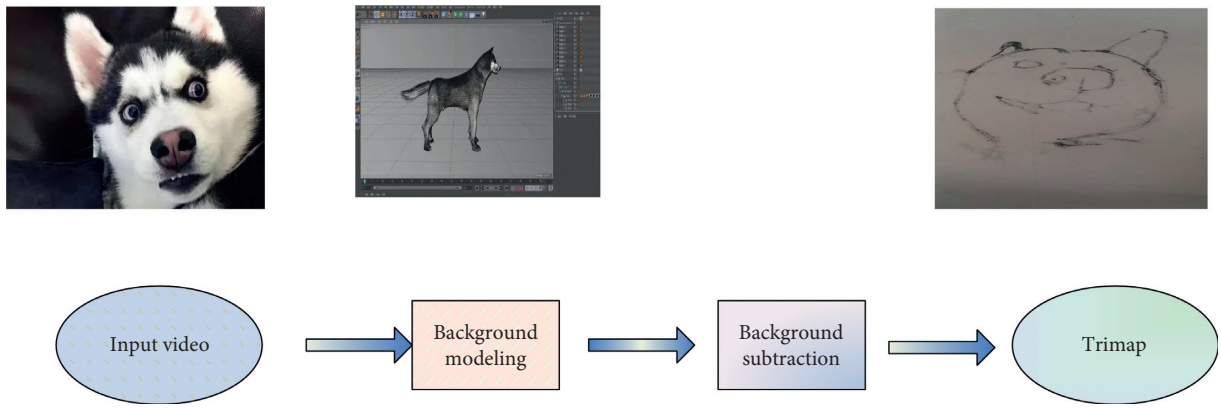

Figure 4: The first frame of video segmentation process.

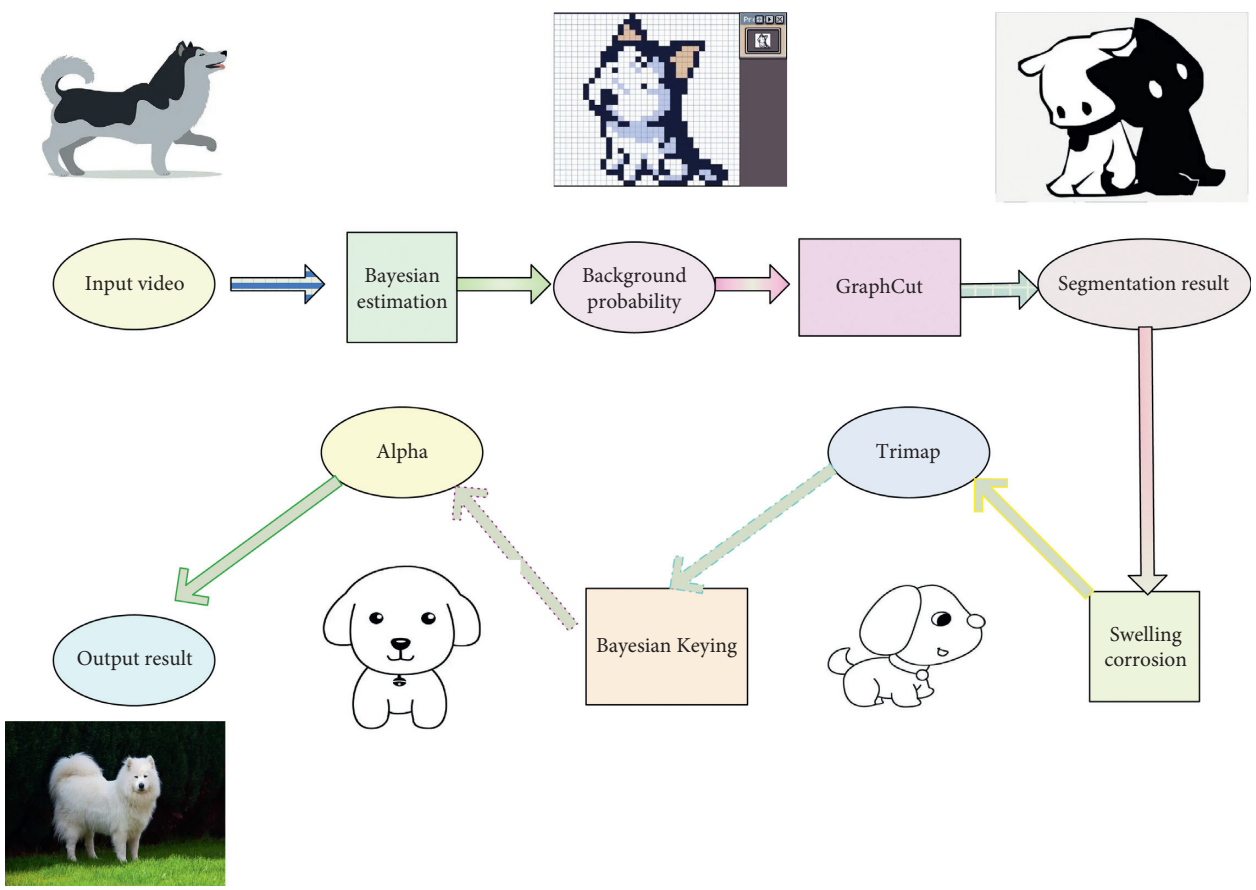

Figure 5: Keying and synthesis flow chart.

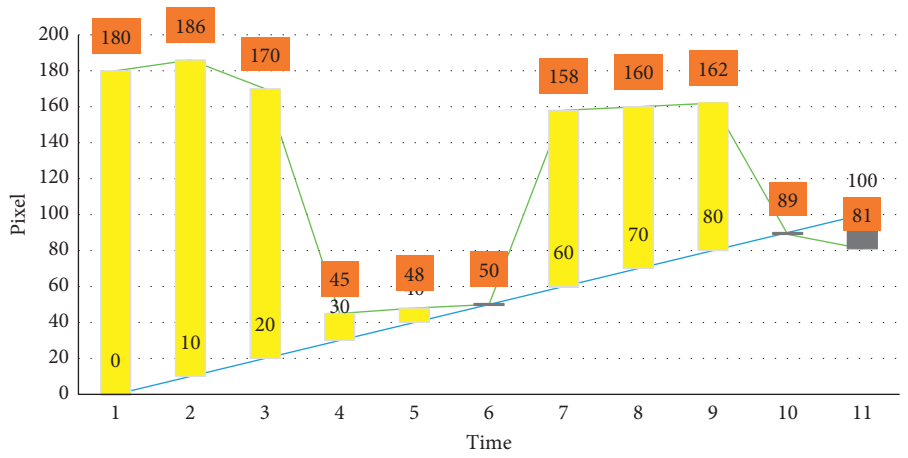

Figure 6: Schematic diagram of the R value of a pixel in an image sequence changing with time.

we need to know the foreground and background segmentation results of the first frame. A completely automatic method is used here. Generally, automatic image segmentation has two methods: interactive segmentation and background subtraction according to the target video type [14]. If the background of the real-time video is fixed before shooting, the first frame can be segmented using background subtraction. Hence, the entire segmentation process does not require user operation.

The principle of the static background subtraction algorithm in this paper is to perform histogram statistics on the three channel values during modeling, and the highest frequency value obtained is used as the background model pixel value [15]. With reference to the gray-scale statistical classification method, the pixel values are statistically classified and the background model is established. The value with the highest current frequency is used as the average value of the background pixels, as shown in Figure 6.

As shown in Figure 6, frames 1 to 20 belong to one category, frames 21 to 53 belong to other categories, frames 54 to 83 belong to a new category, and frames 84 to 100 belong to a new category. Find the category with the highest probability of occurrence, and take the average value to obtain the pixel value. It can be seen from the figure that the probability of the first category is the highest, the average value is about 168, and the value component of the pixel is 168. By traversing the values of all pixels in this way, a complete color background model image can be obtained.

2.2.4. Introduction to Background Subtraction Algorithm. In video synthesis technology, the most common is background subtraction. According to the comparison between the background model and the current video image, it is found that different pixels are classified as foreground targets, and pixels without distinction are classified as background. It is a common background subtraction [2].

Use DW $(x, y) = (G, F, Q)$ to represent the GFQ value of the (x, y) pixel in the current video image and FB $(x, y) = (G, F, Q)$ to represent the background of the corresponding position number of pixels.

$$\begin{aligned} s_1(x, y) &= |G - G_1|, \text{ Interpolation of the red component,} \\ s_2(x, y) &= |F - F_2|, \text{ Interpolation of the green component,} \\ s_3(x, y) &= |Q - Q_1|, \text{ Interpolation of the blue component.} \end{aligned} \tag{3}$$

If none of $s_1(x, y)$, $s_2(x, y)$, $s_3(x, y)$ is greater than the specified value set in the image sequence, then (x, y) is judged as the background. Otherwise, it is judged that (x, y) is the prospect target.

Of course, the distance between two corresponding pixels in the GFQ spatial distribution point can also be calculated, and whether the pixel has changed can be judged by the distance between the two points.

The formula for calculating the spatial distance between DW $(x, y) = \{G, F, Q\}$ and FB $(x, y) = \{G, F, Q\}$ is as follows:

$$K = \sqrt{(G - G_1)^2 + (F - F_1)^2 + (Q - Q_1)^2}. \tag{4}$$

If K is greater than the specified value, the pixel is the foreground target, otherwise, it is the background.

In this article, the process of inferring the pixel foreground of a video frame is a Bayesian classification process. We know the classification result of the previous frame, i.e., because we know the conditional probability density and the prior probability, we assume that the conditional probability density and the preprobability of two adjacent frames are almost the same [16]. The basic principles of Bayesian classification are introduced below.

Proving the category posterior probability $H(b|y)$ is a place where the Bayesian algorithm is widely used. Its formula is as follows:

$$\begin{aligned} H(b \mid y_i) &= \frac{H(b \mid y_i) H(y_i)}{H(b)} \\ &= \frac{H(b \mid y_i) H(y_i)}{\sum_{i=n}^{n} H(b \mid y_i) H(y_i)}, \quad i = 1, 2, \ldots, n. \end{aligned} \tag{5}$$

In the case of using the 0–1 loss function, to minimize the classification error, the category y of b is determined as follows:

$$y = \arg\max_{1<i<n}\{H(b \mid y_i)\}. \tag{6}$$

However, $H(y) = \sum_{i=n}^{n} H(b \mid y_i)H(y)$ can be regarded as a constant, using formula (5), we can get the following:

$$\mathrm{y} = \arg\max_{1<i<n}\{H(b \mid y_i)H(y_i)\}. \tag{7}$$

We apply Bayesian classification to the foreground estimation and calculate the probability $I_{\mathrm{prob}}(H)$ that each pixel H belongs to the foreground. Calculate the conditional probability using the Bayesian formula.

$$I_{\mathrm{prob}}(H) = H\left(A \mid B_p\right) = \frac{H\left(B_p \mid A\right)H(A)}{H\left(B_p \mid A\right)H(A) + H\left(B_p \mid C\right)H(C)}. \tag{8}$$

B_p is the pixel point, $I(x, y) = aF(x, y) + (1 - a)B(x, y)$ color vector, F and B are recorded as foreground and background, $P(*)$ represents $*$ probability, and probability $H(B_p \mid A)$ and $H(B_p \mid C)$ are estimated from foreground and background color histograms. The foreground probability $H(A)$ is estimated from the segmentation results of the previous burst using spatiotemporal consistency.

2.2.5. Trimap Introduction. Trimap roughly divides the image into the foreground area, the background area, and the unknown area to be obtained by drawing the boundary. As Trimap has a more obvious guiding effect, it is easy for people to know how to classify a better Trimap to get a better keying result. Common keying synthesis equations are as follows:

$$G = \partial F + (1 - \partial)A. \tag{9}$$

It can be concluded from figure (9) that the keying problem has a lot of incompatibility. Therefore, we construct the corresponding Trimap according to the relevant rules, which contain three values. The corresponding relationship formula is as follows:

$$\begin{aligned} f\left(I_{\mathrm{peob}}(H) < \varepsilon\right)&: Tr(H) = A, \\ f\left(I_{\mathrm{peob}}(H) > 1 - \varepsilon\right)&: Tr(H) = B, \\ \text{otherwise}&: Tr(H) = V. \end{aligned} \tag{10}$$

Among them is a small real number.

2.2.6. Graphcut Algorithm. Unlike the Trimap algorithm, the Graphcut algorithm is mostly used to solve the problem of interactive foreground segmentation [17]. This method is fast and effective. In recent years, it has become an important algorithm in foreground segmentation.

To better solve the optimal segmentation, they defined the energy function of the segmentation as follows:

$$M = N\mathrm{cut}(A, B) = \frac{\mathrm{cut}(A, B)}{\mathrm{assoc}(A, S)} + \frac{\mathrm{cut}(A, B)}{\mathrm{assoc}(A, W)}. \tag{11}$$

We have

$$\mathrm{assoc}(A, S) = \sum_{n \in A, i \in S} M(n, i). \tag{12}$$

It is the sum of the energy weights of the edges between the connected nodes in A and S. Under this definition, the segmentation of isolated small areas is no longer the optimal segmentation. As ASSOC (A, S) will be small at this time, its proportion will be relatively large. The Graphcut algorithm establishes a connection between the energy function optimization and the maximum flow minimum cut algorithm in the graph theory. In many cases, it can be used to find a more reasonable local optimal solution. In some cases, the global optimal solution can be obtained [18]. Figure 7 is a schematic diagram of Graphcut's algorithm structure.

Firstly, the user interactively sets some front scenic spots and background points on the image. Then, add two imaginary nodes a and b to the graph defined in the above figure, which visually represent the foreground and background colors, respectively. These two nodes are connected to each node in the graph with an edge, and the weight of the edge indicates the similarity of the pixel point corresponding to the node with the foreground and background [19]. The segmentation result divides the graph into two parts, namely h and y, and a belongs to h, whereas b belongs to y. The segmented pixels are the front scenic spot, and the pixel point it belongs to is the background point. The split energy is defined as follows:

$$N = \sum_{m} N_g + \lambda \sum_{n} E_v. \tag{13}$$

Here,

$$N_g = \begin{cases} -\log \mathrm{MA}(I_N \mid O) I_N \in O \\ -\log \mathrm{MA}(I_N \mid B) I_N \in B \end{cases}. \tag{14}$$

The above formula reflects the similarity between the pixel and the foreground or background, MA (.) represents the probability that the point belongs to the foreground, which can be obtained from the statistical information of the foreground and background. When the point is the front scenic spot or background point specified by the user, the value is infinitely small at this time, which is mainly used to ensure that it still belongs to the foreground or background specified by the user after segmentation:

$$Ca = \exp\left(-\frac{\left(I_i - I_n\right)^2}{2\sigma^2}\right) * \frac{1}{\mathrm{dist}(i, n)}. \tag{15}$$

As the number of people using the Graphcut algorithm increases, the Graphcut algorithm is continuously optimized by people. We use the optimized Graphcut algorithm to perform image segmentation on an unknown area. Let sc be an image segmentation, where sc (n) selects M for each pixel. Define the energy function.

$$W(\mathrm{sc}) = \mathrm{Data}(\mathrm{sc}) + \lambda \mathrm{sm}(\mathrm{sc}). \tag{16}$$

The data item Data (sc) evaluates the cost function of a single pixel, and the smoothing item sm (sc) evaluates the cost function between pixels. It is the weighting factor. This function can be optimized by the min-cut algorithm, and

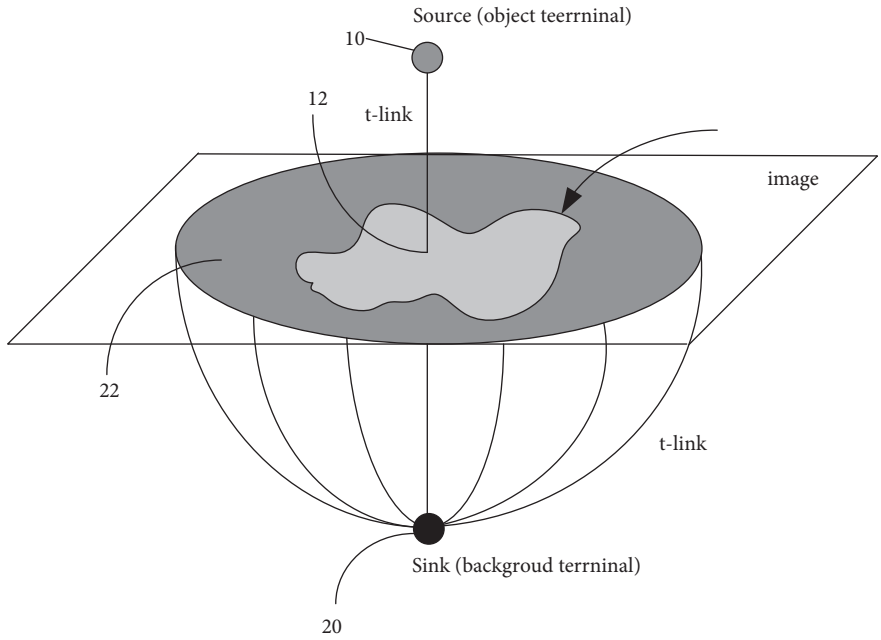

Figure 7: Schematic diagram of Graphcut algorithm structure.

this optimized solution can get a better segmentation result. Definition of Data (sc) and sm (sc) is as follows:

$$\begin{aligned}\text{Data}(\text{sc}) &= \sum_{z\in n} -\log\left(p\left(c_2 \mid \text{sc}(z)\right)\right) + \mu \sum_{z\in n} -\log\left(I_{\text{prob}}(z)\right),\\ \text{sm}(\text{sc}) &= \sum_{(z,m)\in n} [\text{sc}(z) \neq \text{sc}(m)] \frac{e^{\left\|C_X - C_y\right\|^2 / \left(2a^2\right)}}{\|\text{dist}(z,m)\|}.\end{aligned} \tag{17}$$

where sc(z) represents the set of adjacent pixel pairs, and dist ($p.q$) represents the Euclidean distance between pixels p and q.

2.3. Art Color. Color is the most sensitive shape element and can evoke our common aesthetic joy. Because of its nature, color directly affects people's feelings. Hence, it is one of the most expressive elements. The rich and varied colors can be divided into two categories: neutral color and color. Color has three basic characteristics: hue, purity (also called chroma, chroma), and brightness [20].

Color estimation is a very important process in the color design process. First of all, we have to define a reasonable Bayesian framework and establish a color estimation model and a calculation model for m-values. Use the maximum posterior probability (MAP) to optimize the solution. In MAP estimation, for a given unknown area pixel A, look for the most likely estimated values of V, F, and m. This problem is described as an optimization problem on the probability distribution $T(A, F, m \mid N)$, namely,

$$\begin{aligned}&\arg\max_{A,F,m} T(A,F,m \mid N)\\ &= \arg\max_{A,F,m} \frac{T(N \mid A,F,m)T(A)T(F)T(m)}{T(N)}.\end{aligned} \tag{18}$$

After the samples are clustered, the points in each cluster obey the Gaussian distribution in the RGB color space, and the weighted mean Σf and covariance matrix f are as follows:

$$f = \frac{1}{A}\sum_{N\in M} \omega_N F_N, \sum f = \frac{1}{A}\sum_{N\in M} \omega_N \left(F_N - f\right)\left(F_N - f\right)^t, \tag{19}$$

in $\omega_N = m * m * g_i$, and m is not a transparency value.

3. Experimental Process and Result Analysis

3.1. Preliminary Research on Traditional Animation Special Effects Production. Animation is characterized by dynamic art, and the exquisite paintings of each plane cannot be said to be animation. What the animation needs is the time dynamics accumulated by the plane painting to gradually form a complete action presentation. The character conveys the storyline information to the audience through physical activity. An animation production company has previously produced five two-dimensional animations, *A*, *B*, *C*, *D*, and *E*, and three three-dimensional special effects animations, *Q*, *W*, and *R*, respectively, for preschoolers, lower grades of elementary school, upper grades of elementary school, junior high school, and Bao Da Bao Mom. Animation developers conduct a survey on the degree of affection and obtain the average value (the higher the score of 1–10, the higher the degree of affection). The survey results are shown in Table 1.

3.2. Preliminary Research and Analysis of Traditional Animation Special Effects Production. By the analysis and data comparison of Table 1, obtain the distribution of the degree

Table 1: Results of the survey on the degree of favorite animation.

	A	B	C	D	E	Q	W	R
Preschooler	8	5	9	8	7	2	1	3
Lower grades of elementary school	9	5	7	5	8	3	2	2
Upper grades of elementary school	7	4	8	9	8	5	3	5
Junior high school student	5	5	2	4	8	7	6	9
Bao Mom and Dad	3	1	4	2	6	8	8	9
Animation developer	1	2	6	4	5	6	8	9

of preference for animation special effects between high and low age groups (Figure 8).

After analyzing and judging Figure 8, we can get a trend graph of different age groups' preference for different types of animation special effects, as shown in Figure 9.

3.3. Analysis of Animation Special Effects Production Methods Based on Visual Communication Design. Through the above experiments, it can be concluded that the animations produced based on traditional animation production technology, whether in two-dimensional or three-dimensional animations, have more serious imbalances in different age groups. In two-dimensional animation, the proportion of people in the lower age group is as high as 72%, and in three-dimensional animation, the proportion of people in the senior group is as high as 60%. The survey data is shown in Table 2.

By the analysis of the data, it can be concluded that there are big differences between different groups of people based on traditional animation production technology. To further confirm that the animation special effects production method based on visual communication design technology is more conducive to people's love, a company also investigated the animation produced based on visual communication design technology (A_1, B_1, C_1, D_1, and E_1 are two-dimensional animation, Q_1, W_1, and R_1 are three-dimensional animations). The data results obtained are shown in Table 3.

By comparing with the previous data and some other data, the percentage change before and after the improved technology can be obtained (Figure 10).

From the figure, we can find that in the animation special effects designed based on visual communication technology, both high and low age groups and animators have a high degree of preference for them. From data analysis, whether it is two-dimensional or three-dimensional animation, the degree of affection of different groups of people has increased by at least 5%.

From Figure 11, it can be concluded that animation production based on modern visual communication technology has a decline in the proportion of technical production costs. It not only reflects the progress of technology but also implies the application of visual communication design technology. The scope is getting wider.

3.4. Art Color Research Based on Visual Communication Design Technology. The so-called color composition, i.e., the interaction of colors, is based on people's perception and psychological effects of color. It uses scientific analysis methods to restore complex color phenomena to basic elements, and it uses color in space, quantity, and quality. Variability is the process of combining the interrelationships between components according to certain rules and then creating new color effects. Color composition is one of the basic theories of art design. It has an inseparable relationship with plane composition and three-dimensional composition. Color cannot exist independently of shape, space, position, area, texture, etc.

Color is one of the most basic needs of human beings and an indispensable element in life. Because of colors, we can feel the beauty of the world and the splendor of life. Hence, colors play a very important role in our lives. An organization conducted a survey on people's love of color in daily life, the survey results are shown in Table 4.

The higher the number, the higher the priority. On the contrary, the opposite is true.

After comparing the data, the results shown in Table 5 are obtained by making a short film with several common colors as the main color.

By the analysis of the data in Table 5, although most people do not like dark colors and other colors, once they are incorporated into the film, they will also increase people's liking for these colors.

4. Discussion

This article is dedicated to the study of animation special effects production methods based on visual communication design, and it is committed to applying its production technology to more animation special effects production. We not only researched the technology of visual communication design but also have a detailed understanding of the production technology of animation special effects. This paper analyzes and investigates some of the film and television works designed and produced by the early animation special effect technology and modern visual communication design technology. This article, firstly, analyzes the investigation of animations designed and manufactured by different groups of people in the early stage of technology and then organizes and summarizes the relevant data. Then, the animation special effect videos designed based on modern visual communication design technology are surveyed on the popularity of the crowd. By investigation, comparison, analysis, and sorting of one after the other, it is concluded that the production of animation special effects based on modern visual communication design technology is good. A good way of expression is also more conducive to the acceptance and love of different groups of people.

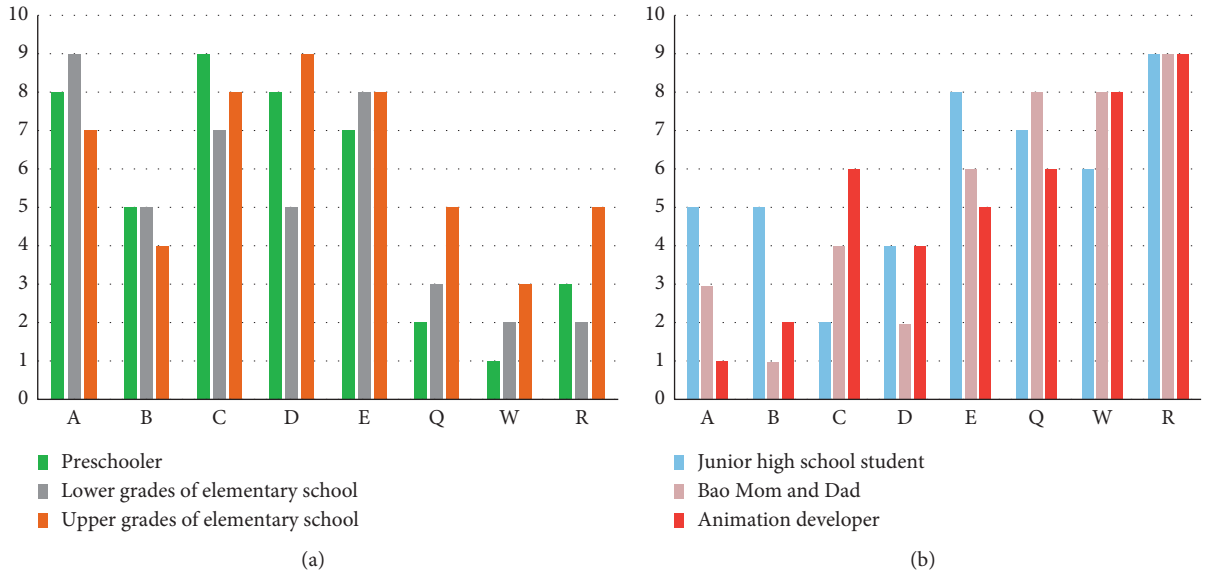

Figure 8: The distribution of the degree of affection in different age groups. (a) Distribution of the lower age group. (b) Distribution map of senior age group.

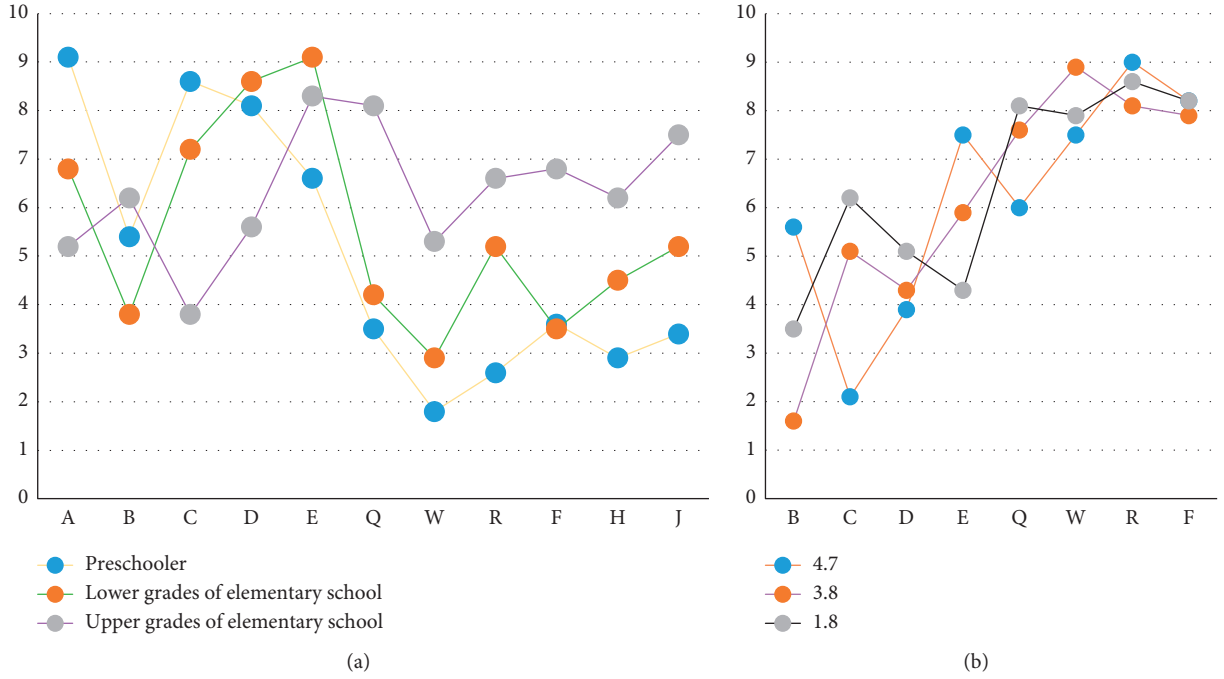

Figure 9: Trends of love levels of different age groups. (a) Trend chart of the younger age group. (b) Trend chart of the senior age group.

By the analysis of the article case, it is concluded that the reasonable use of visual communication design plays a significant role in the production of animation special effects. Continuing to do a good job in the visual communication design of animation special effects is a major event with long-term significance and related to social development and civilization progress for the work in the field of animation production. It also proves the value of visual communication design in the production of animation special effects. The use of visual communication design technology can not only improve the authenticity and visibility of animation special effects but also provide people with more vivid film and television characters. Although it can be seen in domestic animated special effects movies, our digital production technology is still very poor. Compared with the special effects of developed countries, the advancement of China's film and television technology is more than 10 years behind. However, with the

Table 2: Proportion table of the degree of preference for traditional animation among high and low age groups.

	Younger age group	High age group	Animation developer
Two-dimensional animation	72.8	65.4	40.8
3D animation	27.2	34.6	59.2

Table 3: The percentages of different groups of people's preference for the improved animation types.

	A_1	B_1	C_1	D_1	E_1	Q_1	W_1	R_1
Younger age group	8	8.6	9	7	8.9	5.6	6.2	7.8
High age group	5.5	6.9	7.2	6.8	8.1	7.9	8.8	8.9
Animation developer	5.9	7.3	7.6	6.8	8.2	7.1	6.9	8.5

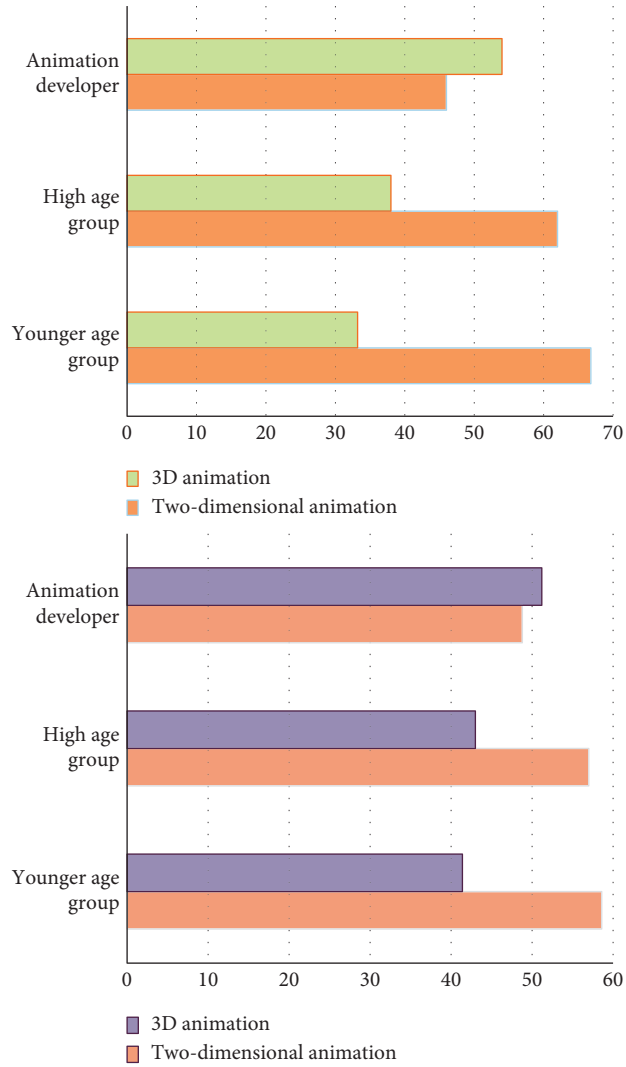

Figure 10: The proportion of people's love of animation after improving technology.

development of the times, filmmakers in our country have gradually realized the nature and functions of digital special effects. At the same time, China has a strong and actively developing computer technology industry. The film industry has given full play to our relative advantages in computer technology, taking digital special effects as the highlight of Chinese films and creating influential domestic hits.

This article analyzes the popularity of animation special effects of a certain company among different groups of people. Firstly, it analyzes the preference of different groups of people for different film and television works. The degree

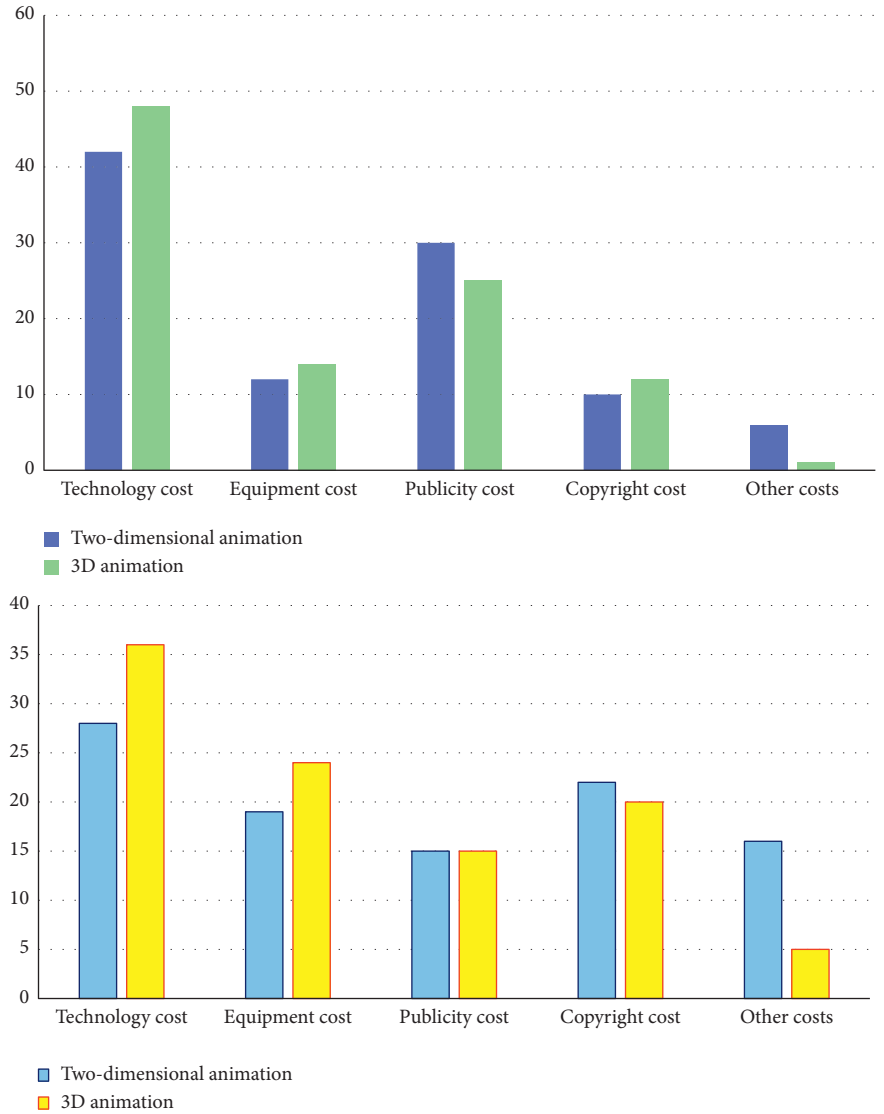

Figure 11: Animation production cost analysis chart. (a) Early animation production costs. (b) Modern animation production costs.

Table 4: The degree of preference for some colors of different age groups.

	White	Red	Black	Purple	Blue	Color	Green	Orange	Yellow
Child	5	9	3	7	8	9	6	5	8
Teenager	3	6	4	8	6	6	5	8	6
Adult	8	5	7	6	5	3	6	7	7
Elder	3	8	5	5	6	8	6	6	5

Table 5: The degree of preference for different colors in different age groups.

	Five colors	Six colors	Seven colors	Eight colors	Nine colors	Ten colors	Eleven colors
Child	6	5	8	9	8	8	7
Teenager	7	8	9	7	8	9	9
Adult	9	8	7	8	8	7	8
Elder	5	6	7	8	6	7	6

of fondness for film and television works is, to a certain extent, restricted by the integration of film and television production technology and colors, rather than unilateral likes or dislikes.

5. Conclusions

This article starts with the influence of visual communication design in the field of animation special effects production on people's love, and it elaborates and discusses the far-reaching influence of visual communication design in animation special effects design and production. From the viewpoints in the article, it can be known that the animation special effects production based on modern communication design technology can not only make the animation effect more expressive but also improve the appeal of its film and television works. However, in some modern film and television environments, the design language expressed by a single graphic design graphic form tends to appear single and lacks expressiveness. Only by continuously strengthening the theoretical and innovative research of animation special effect production in visual communication design can we better promote the deepening and progress of visual communication technology. The understanding of the field of animation special effects production can be used as a basis to give full play to the role of modern communication design technology in the field of animation production. In addition, in visual communication design, we should also focus on exploring and thinking about the problems of animation special effects production, explore the open problems in visual communication design, and give new meaning to animation special effects production through the special media force of visual communication design.

Data Availability

No data were used to support this study.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this article.

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