Research and Application of LDA Model in Movies Images Based on the Visual Effects of Computer Images

Yitian Zheng*
Communication University of China, Beijing 100024, China
*Corresponding author: yitianzheng@cuc.edu.cn

Abstract. With the advent of the image age, the popularity of war-themed film and television dramas in the new century has promoted a new wave of thematic narratives. Facing the era of computer graphics, the main theme narrative adopts a series of new reconstruction strategies, namely: the spectacle strategy of visual expression, the typification strategy of narrative subjects, and the striation strategy of character modelling. As an important genre of Chinese movies, war-themed themed movies often focus on the education and dissemination of national ideology, but "The Eight Hundred" broke the stereotype of this type of movie to the audience. Taking the film "The Eight Hundred" as an example, using the LDA model of computer image characteristics, combined with the related theories of visual effects, the thesis explores how the main theme of contemporary warfare movie content is expressed through images and its unique image style.

Keywords: Computer graphics, visual effects, war theme, movie images.

1. Introduction
Entering the new century, with the advent of the image age, Chinese movies and TV series have developed by leaps and bounds, and the main theme of the TV series is also heating up. It can be clearly seen from the box office and ratings of many popular TV series in recent years. Out of this change. As an important genre of Chinese movies, war theme movies often focus on the education and dissemination of national ideology. However, with the marketization of Chinese movies, more and more domestic war movies have stepped out of the tragedy of history and began to build more A humanized world of images [1]. As an epic film that promotes the main theme, "The Eight Hundred" uses image language such as composition, colour, and sports photography to construct an image world that is different from previous war-themed movies. While delivering the content of the main theme, it also uses images to convey humanity. The call of the image and the exploration of modern consciousness have achieved the echo of the image and the content. Its unique image style is achieved by breaking people's psychological balance in traditional movie watching.
2. Principles and Techniques of Visual Cue Effects

2.1. Analysis of effect principle
Suggestion is a psychological concept. Visual suggestion belongs to psychological suggestion. It refers specifically to the suggestion produced by visual means to human psychology [2]. There are many ways to achieve psychological cues, such as language, gestures, expressions, actions, symbols, etc. In film and television works, the form of space, the arrangement of paths, and the texture of materials can also achieve psychological hints to the viewer.

2.2. Visual cues
Gestalt theory believes that people first see the whole composition, and then see the parts that make up the whole composition. According to the different cognitive dimensions, the things that can be seen can be divided into three different levels from micro to macro, namely graphics, content, and order. Among them, "graphic" refers to the specific form of the work, such as triangles, squares, and circles, which give people different feelings. "Content" refers to the substantive things contained in the work. These things themselves have unique marks and rich meanings, which are easy for the viewer to recognize and understand [3]. For example, when people use words, they pay attention to the content they refer to, rather than what strokes constitute. "Order" refers to the specific arrangement of the content in the work. If the same things are arranged in different ways, the feeling is completely different.

3. Film image computer vision LDA model framing method

3.1. Introduction to LDA model
LDA is a three-layer Bayesian data model established for discrete data sets. Initially, this is a generation probability model for text classification. As shown in Figure 1. The model is determined by 5 main parameters, among which α and β are image layer parameters, α reflects the probability distribution of hidden topics in each type of image, and β reflects the probability distribution of feature codes in each hidden topic [4]. The random variable θ is a topic layer parameter, and its component θᵢ represents the probability distribution of each hidden topic in the target image i. z and w represent the feature code layer, z represents the hidden topic assigned to each feature code of the target image, and w is the feature code representation form of the target image. Among these 5 parameters, except w which is measurable, the rest are hidden variables.

The specific mathematical expression of the LDA model is as (1) - (4):
\[ \theta \circ p(\theta | k, \alpha) = \prod_{j=1}^{c} \text{Dir}(\theta | \alpha_j) \]  

(1)

\( c \) represents the type of image, \( \theta \) is a polynomial distribution parameter, the polynomial distribution represents the distribution of topics selected in a specific image, and \( \alpha \) represents the distribution of hidden topics in various images.

\[ z_n \circ \text{Mult}(\theta) \]  

(2)

\( z_n \) represents the probability distribution of the subject of each feature code in the image \( n \), and its distribution obeys the polynomial distribution with the parameter \( \theta \), and the distribution of the parameter \( \theta \) is shown in equation (1).

\[ w_n \circ p(w_n | z_n , \beta) \]  

(3)

\( w_n \) represents the \( n \)th feature code in the feature code library. The above formula represents the probability distribution of feature codes in a topic, and the parameter represents the distribution of feature codes in each topic.

\[ p(w, z, \theta | \alpha , \beta) = p(\theta | \alpha) \prod_{n=1}^{N} p(z_n | \theta)p(w_n | z_n , \beta) \]  

(4)

\( p(w, z, \theta | \alpha , \beta) \) reflects the hidden theme in the image collection and the joint probability distribution among the signatures. \( N \) represents the number of all themes in a certain type of image.

3.2. Application of image visual features

3.2.1. Colour. Since colour is the most significant and intuitive feature of an image, it is also one of the important perceptual features of image vision. For example, the night scene mode is dominated by dark tones, and the snow is dominated by white and light gravy. And compared with other features, the calculation of this feature is simpler, so it is the most widely used in image recognition. The colour characteristics of the small square can be calculated by formula (5).

\[ \text{block}_k = \arg \min_{i=1}^{64} \| \text{block} - \text{color}_i \| \]  

(5)

\( \text{color}_k \) represents the \( k \) colour after uniformly quantizing the RGB colour space into 64 colours. \( \text{block} \) represents the average value of the colour of the small square. \( \text{block}_k \) represents one of the 64 colours mapped by the block, which is specifically judged by comparing the average value of the colour with the Euclidean space distance of the 64 colours in the colour space.

3.2.2. Texture. Texture is the basic feature of an image, and the texture features of different subjects have obvious differences. For example, themes such as blue sky, fireworks, snow, lights, etc., among which themes such as blue sky and snow are mainly low-frequency information, while the information of fireworks, lights, etc. is mostly concentrated in the high-frequency area [5]. The variance of each sub band is calculated as the wavelet coefficients, and then the calculated wavelet coefficients of the four subbands LL, LH, HL, and HH are respectively used as the 4 to 7 dimensions of the signature code, which is:
3.2.3. Direction. In order to make the small square have invariance such as translation and rotation, the gradient histogram is used to determine the main direction of the square. That is, after calculating the gradient and direction of each pixel in the square. Let the gradient of the pixel be $g_{x,y}$ and the direction of the pixel be $\text{ang}_{x,y}$ (x, y represents the coordinates of the pixel in the square). Now the entire circumference is evenly divided into 18 levels, namely $0, \pi/9, \ldots, 17\pi/9$.

\[
\text{ang}'_{x,y} = \arg\min_{i=0}^{17} \left\| \text{ang}_{x,y} - i\pi/9 \right\|
\]  

Among them, $\text{ang}'_{x,y}$ represents one of the 18 directions mapped by $\text{ang}_{x,y}$.

4. Analysis of the visual effects of the images in the movie "The Eight Hundred"

4.1. The big scenes and small people in the composition

It is a common picture style in war films to show the scenes of Hongda in the war with a long-term view and a big panorama. Whether it is the retreat scene in "Dunkirk" or the fierce battle scene in "Wolf Warrior", the creation is conscious in the composition. Keep your balance. However, in the pictures and composition of "The Eight Hundred", the creators often consciously broke this sense of balance and created a stronger psychological impact. In a visual image, the distribution of gravity is uneven. In these images, there seems to be an arrow from left to right shooting into them, thus becoming a factor that disrupts the balance. If you want to maintain balance, you must make up for it. The creators of "The Eight Hundred" did not compensate for this imbalance through composition, colour, and light, but deliberately magnified this imbalance (Figure 2). From the beginning of the film, the extreme rainy weather set the tone of this imbalance, shaped the tragedy scenes of the war, and brought a strong sense of immersion to the audience [6]. Then came the design on both sides of the Suzhou River. The south bank was a concession with warm neon lights, where high-ranking officials lived, while on the other bank were hundreds of lone soldiers fighting tens of thousands of Japanese troops. A large number of long-range shots and even aerial shots are used in the film to show the imbalance between the two sides of the strait. As the line in the film said: "The south bank of the four-line warehouse is heaven, and the north is hell." Such a picture composition perfectly echoes the grand theme of the film and provides an imaginative space for the audience.
The big scenes not only construct epic war scenes, but also serve the movie content itself. However, unlike other war-themed films, "The Eight Hundred" not only focuses on the construction of a large structure, but also focuses on the small characters and details. In the film, a bipolar lens is used many times, and the viewpoint lens is used interspersed. The previous shot used a distant view to show the big scene, while the next shot used a close-up to focus on the reaction of the characters. This strong contrast and imbalance created a psychologically tense feel for the film. In the movie Dragon Boat Festival, when looking at the executed uncle from the fence in the warehouse, a framed composition is formed. The Dragon Boat Festival is confined to a difficult and dangerous situation surrounded by heavy surroundings. Although the other side is panoramic, the composition is not balanced. The houses destroyed by the war occupies most of the houses. The executed people and the sky only squeeze a small "corner", and even the characters cannot be seen clearly, giving the audience a sense of oppression from the composition [7]. In addition, it is the alternate use of the perspective shots of the characters on both sides of the strait. The soldiers trapped in the warehouse use binoculars to look at the dancing girls on the other side of the river. Looking down at hell from heaven, looking up at heaven from hell, in the context of the narrative of the times, the psychological details of every little person in such a gloomy era are also portrayed through composition and picture transmission.

4.2. Psychological guidance in contrast between cold and warm

Throughout the main theme of war movies in the past, in order to restore the real war scenes and maintain the seriousness of history, the use of colour is still relatively conservative. Most of the entire film uses high-saturation cool colours, the picture tone is green, and some even directly use black and white. Compared with these films, the use of colour in the images of "The Eight Hundred" is much richer. The colourist Johannes Eaton mentioned in "The Art of Colour": "Colour effects should be experienced and understood not only visually, but also psychologically. It can transform the dreams of admirers into a spiritual realm. "Colour is not only an element with rich styling significance in the film "The Eight Hundred", it has a unique visual charm, and it has a strong psychological guiding effect on the audience through the use of colour. In the previous article, the unbalanced design on both sides of the Suzhou River was mentioned, which is also reflected in the colour (Figure 3). In the warm-toned casinos in the concession, various neon signs illuminate the sky and the environment in warm colours, in sharp contrast with the green and cool colours on the other side of the river. Through this obvious colour, it gives the audience a strong psychological hint, and also lays the groundwork for the ending.
Figure 3. Colour visual effects of "The Eight Hundred"

The use of colour in the image is also reflected in the processing of details. War theme movies often have obvious plot conflicts, climax passages are ups and downs, and warm-toned pictures are often added to contrast with cool-toned pictures, and a small number of off-toned pictures are used to set off the cool-toned pictures to stimulate the audience's nervousness. The hues of the four-row warehouse in "The Eight Hundred" are mostly high-saturated gravy-green hues, but warm yellow lights are hung on the walls, creating a strong contrast in the picture. The water in the sewer and the walls are highly saturated green, but there is still a row of warm lights on the wall. The rows of lights are connected to illuminate the only passage leading to the opposite bank of the river. For the soldiers in the warehouse, this road is also Their hope. Umbrellas used by people in the concession are not only black. Many people hold warm-coloured umbrellas. On the one hand, they form a strong conflict with the tone of the whole picture. On the other hand, it means that people in the concession always live under a kind of shelter.

In the previous analysis, the entire film image was in a gravy-green hue, but when the plot point of the film reached its climax, the line appeared "the Chinese nation is immortal" and the picture showed a warm yellow hue. At the end of the film, the appearance of flares provides modelling for the characters and at the same time turns the screen tone into a hard tone. From the image style, colour and light are used to push the audience's psychology to a climax.

4.3. Stability in unstable emotions

In order to build an unstable environment, restore the war scenes, and bring the audience a sense of nervousness, the war scenes in the main theme of war movies often choose to use hand-held sports photography and follow the actor's scheduling. This kind of lens movement breaks the balance of the picture, and may even lose the main character during the movement, but it strengthens the rhythm of the lens and also externalizes the inner emotions of the characters in the film through the image.

In addition to depicting tense battle scenes, "The Eight Hundred" pursues stability in sports shots. In the first half of the film, a long shot taken from a high altitude shows the strong contrast of the environment on both sides of the Suzhou River. There are a lot of black-and-white motion shots in the film. The simulated camera shoots real historical material and focuses on each individual soldier through steady motion. At the climax of the plot point at the end of the film, the shots should have been processed at the fastest tempo, but the director instead used a lot of upgraded shots. On the one hand, it magnifies the scene of the soldiers falling down one by one during the retreat, and on the other side is a close-up slow motion of the moved people in the concession extending their hands. The emotions at this time were maximized, which not only awakened the national consciousness of the people in the concession, but also moved the audience in front of the screen. The stable shots that appear in unstable emotions magnify the emotions (Figure 4).
After comparative analysis of multiple films, it is not difficult to find that the war theme film "The Eight Hundred", which is launched in the post-epidemic era, is very different in the same type of film. The handling of the enemy in the film is similar to "Dunkirk". It does not try to portray the strength of the enemy, but only creates a sense of oppression from the details of the soldiers. And through the comprehensive use of video and other audio-visual elements, a retreat is presented so shocking and moving. The film "The Eight Hundred" is undoubtedly a large-scale, high-density film, although there are still some problems with excessive content elements and redundant characters in the drama. However, only from the perspective of image analysis, "The Eight Hundred" has made innovations compared with other films of the same type, and its content and form are perfectly matched, which not only satisfies the audience's perception, but also moved the audience.

5. Conclusion
The research on the visual scenes, graphics and images of the main theme of war movies is a gradual process involving a wide range of difficulties. This article is based on the visual effects of the war theme sub band film movie, taking the movie "The Eight Hundred" as an example to deeply study the visual scene structure characteristics of the war theme theme film movie, and extract the graphics and image elements that express the visual characteristics of the war theme Ye film movie. Structure.

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