

Application Research of Expression Recognition Based on Image Analysis in Animation Production

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Abstract: With the continuous advancement of technology, its production technology has also been significantly developed and improved in the field of animation. At present, the expression capture method has become a popular method in the animation production process. This method requires relatively simple equipment, and only needs to be named with an ordinary color camera. Therefore, an important precondition for the popularization and promotion of the method is laid. In this paper, the application of image recognition based on image capture in animation production, in-depth research and analysis, and combined with the actual situation to provide reliable suggestions to improve the level of animation production in China, and promote the development and progress of China's animation industry.

1. Introduction

The generation of expression capture technology is benefited from the development of computer technology. In the field of animation, the application of computer technology should be thoroughly and thoroughly applied, and the animation production method is completely subverted, so that the traditional manual frame-by-frame drawing is transformed into a comprehensive use of professional soft-shell. The production mode, including the character movements, can also be realized by software, which greatly improves the efficiency and quality of animation production. The main principle of the expression capture technology born in this background is to use a color camera to capture video, and then use image processing and pattern recognition software and related technologies to process the image in the video frame by frame. At the same time, it is also possible to effectively identify the image content, such as eyes, ears, etc., to determine its physical coordinates, and prepare for the next stage of animation production. The advantages of this method are extremely obvious, not only do not require complicated equipment, but also have high real-time performance, which has an outstanding effect on improving animation production efficiency and shortening production time.

2. Composition of the expression capture system

In the actual application process, the expression capture system has low requirements for hardware devices, which is one of the important reasons why this technology can be widely used in animation production. Its system hardware equipment is mainly an ordinary high-definition color camera to meet the requirements of technical applications. Place the camera on top of the computer screen. During the design process of the computer, the animation designer will capture the frontal features of the face and apply the captured image to the animation. In this aspect, the designer can perform impromptu performance at any time according to actual needs during the process of designing and making the facial movements and expressions of the animated characters, and can be adjusted at any time according to the actual situation and specific requirements until the desired effect is achieved. The application of the expression capture system not only provides great convenience for the animation design process, but also facilitates the design and production staff to improvise creativity during the production process, giving the animation design and production staff ample space for creativity and improving the quality of animation production. And efficiency has played an extremely important role.

Compared to simple hardware, the expression capture system is more complicated in terms of software. The general process is that the camera obtains the expression action view and then performs face recognition. The rectangular area obtained at this time is also a rectangular image. In this area, the facial features of the face are included. The next step is to extract the facial features area, extract a series of processing, get relevant information, and then bind the processed facial features to the CG character, and complete the expression capture processing of the animated characters (such as 1). This is the software structure of the expression capture system and the main process for its operation. In this work flow, the effective recognition of faces, eyebrows, eyes and mouth is the key to completing the expression capture process in animation.

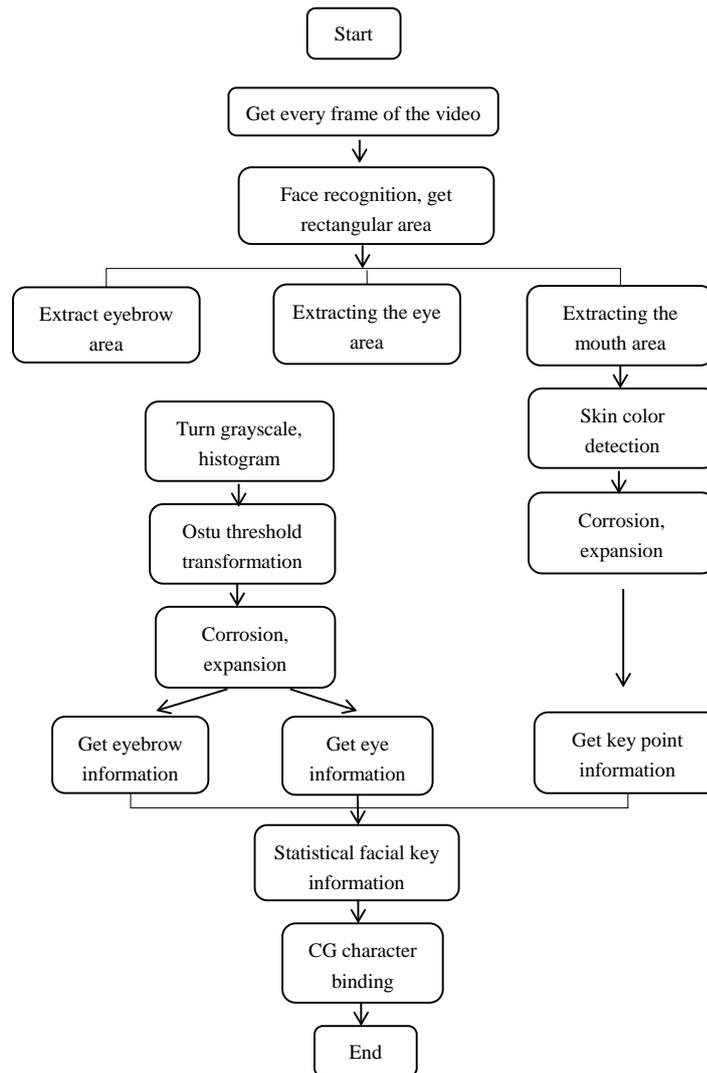


Figure 1 Expression capture architecture diagram

2.1 Face recognition

When using the camera to capture the face, not only the facial features and facial expressions of the person are captured into the camera, but even the back is captured. This allows the obtained video to include background information, but this background information is not needed during the animation process. So the first step after getting the video is to remove the background information and just keep the face information. This process is called face recognition.

The entire image is analyzed by software and then the area where the face is located is detected. After the area is locked, the faces in the area are identified. In the process of face recognition, it is necessary to analyze each frame of the video or image to obtain the face information required for the animation. Once the information is identified, it is identified by a box. At present, the

technology has been mature and perfect, and has achieved good application results in the practice process. According to the results of practice, when the face of the person is facing the camera and the front face information is obtained, when the head is not inclined too much, the face recognition rate of the software is the highest, and when the side information of the face is recognized, The recognition rate will drop significantly. Therefore, the animation designer needs to pay attention to this during the animation process, and capture the face information according to actual requirements. If there is no special requirement, it is best to capture the face information to improve the recognition rate of the face.

2.2 Eyebrow recognition

After completing the face recognition step, it is necessary to extract the facial features in the face. The first thing to extract is the eyebrow information. To extract the eyebrow information, the first step is to identify the area where the eyebrows are located. At this time, the face area has been locked, so the eyebrow recognition is also limited to the image range of the face, and the excess background can be effectively eliminated, leaving only the key information required. This has a key impact on the quality of animation.

The face is intrinsic, and the position of the eyebrows on the face is roughly fixed. According to this feature, the image of the area where the eyebrows are located can be effectively intercepted, thereby obtaining the eyebrow image initially. The eyebrow image identified at this time includes a lot of useless information, so it needs to be further processed to retain only the required eyebrow information and remove other information. After expected processing , the area where the eyebrows are located on the image will appear in a specific way. The expected processing of eyebrows is as follows:

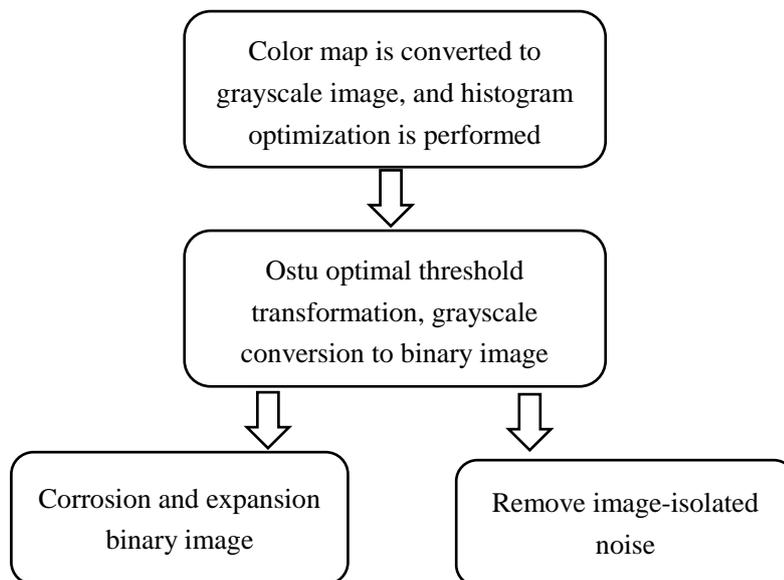


Figure 2 Eyebrows are expected to be processed process

2.3 Eye recognition

The recognition of the eye is similar to the procedure and method of eyebrow recognition. It is characterized by the fact that the position of the eye is relatively fixed in the face part. After image analysis, the eye is effectively recognized, and the area image is selected, and then the same processing method is adopted., effective predictive treatment of the eye area. It should be noted that in the process of eye information processing, it is necessary to eliminate the influence of noise while paying attention to the skin color treatment of the eyelids and non-eye areas. Since the eyelids are very close to the skin color of the non-eye area, they may be affected during the budget process. In particular, the performance of the eyelashes and the position of the eyeballs must be handled with

greater care.

In addition, affected by the structure of the eye, after the region information of the eye is extracted, the position information of the eyeball is extracted in the eye region, and information such as the corner of the eye is processed. In this process, the most important task is to perform black image at least threshold processing to ensure that the eye image has a good sensory effect. In order to enhance the picture effect, the center point of the eye should be the center of gravity of the black pixel.

2.4 Mouth recognition

For the recognition of the mouth, the initial steps are the same as the eyebrows and the eyes, and the image is intercepted according to the feature that the mouth is fixed at the face, and then the unwanted background information is processed. Since the color of the mouth is mostly composed of red, and the surrounding is the skin color information, the colors of the two have obvious differences, and there is no other factor. Therefore, in the process of recognizing the mouth, it is only necessary to adopt a relatively simple skin color recognition method. A good recognition effect can be achieved and the mouth can be effectively identified.

Using the skin color detection function provided in the expression capture software, the rectangular area of the selected mouth part is processed, mainly by dividing the skin color as the basis, first separating the non-skin area, and processing the part area as white, color After processing the skin color area as black, you can get the binary image of the mouth. It should be noted that when handling the mouth and identifying its information, it is necessary to obtain two types of information when the mouth is closed and opened. The same is true for the recognition of eye-eye information, in order to obtain information on the two states of closure and opening. Also use the operation of corrosion, expansion, etc. to remove the noise of the image.

2.5 Summary

After the above operation, the main position information of the facial features of the face is obtained. At this point, you can be bound in advance to make good CG characters, and bind the facial features to the animated characters to complete the expression of the animated characters.

3. The application of expression capture in animation production

In the process of making animations using expression capture technology, based on the principle of image analysis, through the effective analysis of the images, the features of the facial features can be accurately captured, and then the facial features of the animated characters can be matched one by one to complete the expression of the animated characters. In this process, the camera is required to capture the video and then perform the relevant operations on the single frame image. In the process of analyzing a single-frame image, it is necessary to pay attention to the key points that must be identified. The process of expression capture generally has seven key points, and these seven key points are the key elements for completing the animation character expression, which is closely related to the animation production effect.

4. Conclusion

Based on image analysis, the expression capture technology is applied in the animation production process, and its production efficiency is much higher than the traditional manual drawing production method. In addition, the technology also has a very high flexibility, can be used to change the expression, greatly enrich the animation production materials, and also play a positive role in improving the quality of animation production. It can be said that the wide application of expression capture technology in dynamic production has played an important role in improving the level of animation production in China. At the same time, it has also strongly promoted the development and progress of the animation industry. In the history of animation development, the widespread application of expression capture technology. It is an important symbol of the

modernization of China's animation industry.

References

- [1] Yan Congquan. Research on face-based animation generation system based on performance-driven [D]. Zhejiang: Zhejiang University, 2017.
- [2] Cai Ruitao. Interactive facial expression animation system [D]. Zhejiang: Zhejiang University, 2017.
- [3] Liu Gang. Reconstruction of facial expression model and expression animation research and implementation in linear regression [D]. Hunan: Hunan University, 2016.
- [4] Wang Jianlei. Facial expression capture technology and its application in animation games [J]. Artworks, 2018,000 (11X): P.93-94.