

Study on the Trend of Realistic Production of 3-D Digital Animation Movie

Peng Li

Department of Art & Design
Teaching and Research Section
Yantai Nanshan University
Yantai, Shandong, China
e-mail: 1098236684@qq.com

Abstract—With the rapid development of computer hardware technology, 3-D digital animation movie becomes more expressive with all kinds of forms. In terms of the figures' characteristics, there are mainly two trends of animation production. The first one is exaggeration and abstract represented by America. The second one is the simulation of figures with Japan as its main representative. Given the box office receipt of American and Japanese animation movies over past years, characters in animation movies represented by America are very concise and have distinctive characteristics, thus attracting large amount of audience and gradually becoming a fashion in animation movie production. Nevertheless, Japanese animation movies which emulate the real persons flopped badly at the box office. Although such movies keep popping up in the film market, they can hardly bear comparison with their American counterparts. Such a situation sparks our introspection. In which way could we get the most of 3-D digital animation movies? Can 3-D digital emulation technique really show the charm of animation? This article mainly discussed some limits facing emulation technique in the production of 3-D digital animation movies, hoping that animation producers could take those limits into consideration and make a wise choice.

Keywords—*emulation technique; simulation; psychological expectations; facial expression*

I. ADVANTAGES AND DISADVANTAGES OF USING EMULATION TECHNIQUE IN CHARACTERIZATION

Given closely the main stream of commercial 3-D digital animation movies, their trend of development can be divided into two directions in terms of character presentation. One kind of them, represented by America, tends to exaggerate the characters and events. This kind of animation movie is likely to put emphasis on being amusing and humorous. The other kind is represented by Japanese. It prefers to simulate the real person in life and also lay stress on the presentation of characters' mental activity and logically complex narration.

Realistic production of 3-D digital animation movies means using 3-D digital animation software to simulate the figures, their movements, expression and way of photographing in the real world so as to make the scene in movies come alive. Admittedly, the realistic production of 3-D digital animation movies shows its strong power of

representation. With the support of simulation techniques, those highly-risky or dangerous scenes which are impossible to be shot and some splendid visual effects can be made now. Therefore, such techniques have an inbuilt advantage over others in shaping relatively complex creatures and inanimate objects. For instance, monsters are products of humankind's imagination by which they combine many kinds of real creature together. For non-existent creatures or phenomena, their presentation in the animation movies does not have to be consistent with the real objects. So the animation makers are given more freedom to exert their imagination. At present, 3-D animation techniques have already been used to produce scenes which are quite close to the reality, thus having the inbuilt advantage in producing grand scenes and fancy visual effects which are impossible to happen in the real world. For example, the animation movie "Resident Evil: Damnation" produced in 2012 by Japanese director Shinya Makoto adopted the most advance techniques of 3-D display and motion capture at that time, making the characters, actions and scenes maximally close to the reality, particularly in the presentation of the tactile appeal brought by the clothing, metals and calcareous objects. As a result, the audience could have a visual feast. Nevertheless, it lacks strength in characterization of figures such as their metal activities, facial expression and spiritual outlook because it is hard to invent characters completely consistent with the real ones. Admittedly, the figures' expression and actions were depicted vividly in the movie "Up". However, it was based on the exaggerate appearance design. The figures subtle facial expressions are expressed through exaggeration. Without such exaggeration, the depiction of characters is doom to appear rigid and stiff.

II. TO BE REALISTIC IN THE ART OF ANIMATION NOT EQUAL TO REALITY REPRODUCTION

Art derives from the reality while embodies more than just reality. It is not simple imitation and representation. The very part in the art that values most lies in those higher than life, that is, those expressing humankind's metal activities. The essence of animation lies in vitalizing the objects and showing the topics so that the charm of art can be displayed. Only by achieving an effect most close to the real life can the

animations realize the most profound signifying function because real objects don't have such function. However, applying simulation techniques in the animation making is viewed as an attempt to utilize virtual image technology to emulate the real objects. It denies animation's artistic value fundamentally especially in the figure characterization and object modeling. Its excessive pursuit of reality brings much restriction on displaying the artistic value. For example, from the perspective of role playing, simulation 3-D digital animation requires the imitation of actors' condition through virtual instruments. Nevertheless, in the real life, actors perform and express their feeling according to specific backgrounds. Their performance is quite subjective and based on their personal creativity and imagination. They feel, then they imitate. On the contrary, simulation 3-D digital animation uses scientific 3-D technology driven in animation producing. Different person's feeling and mental activity may have something in common under some occasion; therefore, effective role play in the real life is possible. However, if we imitate the real actors with computer virtual images, the virtual roles may lack a direct link to the real ones, thus hardly to display the same mental states. From the perspective of the audience's psychological expectation, scenes and images of the animations using simulation techniques are expected to be highly close to the real world, which is a heavy burden for the animation makers. Such potential psychological expectation, once not met, will bring about some bad results. Audience will refuse to watch the animations because of thinking it fake. Such antipathy may cut the link between audience and the movie that was expected to be established. Therefore, the movie will fail in storytelling. For example, the movie "Beowulf" screened in 2007 seemed attractive in its plots and narration style. It also applied the then most advanced 3-D simulation technique to emulate the actors such as the famous actress Angelina Jolie. As a result, it got mixed comments. Some pointed it out that using simulation technique will make the audience feel that they were watching a group of "wax people" performing. As to those using exaggeration and abstract methods, the audience will not demand that the image of characters be highly close to the reality because they have already acknowledged their fictitious existence. Therefore, images in such animations will not fail the audiences' expectation.

III. STATIC AND EXTERNAL OBJECT EASIER TO BE SIMULATED WHILE MENTAL ACTIVITIES AND DYNAMIC CHARACTERS SIMULATION HARDLY APPLICABLE

For the inanimate objects especially the static ones, using simulation techniques can achieve a level of visual verisimilitude. That's because all that need to be imitated are the objects' appearance. If the computer technology can simulate human's consciousness, it surely can simulate human's performance whether of external appearance or of mental activities. However, if the computer technology really becomes that smart, whether animation movies should continue to exist will be questionable. But the computer neither thinks for itself nor performs creatively. Thus, it cannot

get the feeling of actors so as to make the virtual characters true to life. Nowadays, 3-D simulation techniques display its huge developing potential in the fields of scientific experiments, medical science, military, education, architecture, design, game and advertisement making. Nevertheless, can they really work in developing 3-D digital animation movies? Are they worth exploring? If all the characters and scenes can be presented through simulation, the existence of actors will be meaningless. If the technology reaches a certain level that all real and natural objects can be represented, can it really replace the actors? If it does, then what's the meaning of human existence? In fact, to make a character true to life, we should display both his/her external appearance and inner feelings. The premise of using simulation technique lies in the existence of real existence. Actors' inner mind, thoughts, spirits are all internal aspects of an individual which can be sensed while not expressed. Of course, the performance of actors also shows subjectively their understanding of a role. It's hard for an inexperienced actor, let alone for the inanimate computer. Therefore, those sparkling mental things rooted deeply in human being's inner part can never be displayed easily by simulation techniques.

IV. INSUFFICIENCY OF 3-D DIGITAL EMULATION TECHNIQUE IN SHOWING CHARACTERS' DYNAMIC SKIN MOVEMENT AND FACIAL EXPRESSION

In the 3-D animations, peoples' skin is presented through the techniques of texture mapping, lighting and rendering. The movements of subcutaneous tissue make the skin viable as well as form the facial expression. There are mainly two methods of simulating the facial expression with 3-D technology. One method is to use the skill of "Skin" and "Skeletal binding"; another is to use the action capture system. Due to their different principles of movement, these two methods cannot exactly present the vitality of human skin. Real skin has good air permeability. Under the skin, there are flowing blood, nerves as well as muscles. All of these elements form a complicate system. Therefore, it's hard to really achieve the perfect simulation by simply applying the technique of "Skin" and "Skeletal binding" especially for the skin of face, which is essential to convey one's feeling. Any tiny movement of the facial skin is influenced by both the nervous system and musculature. Using "Skin" and "Skeletal binding", we can merely simulate the facial movement roughly. In the animations applying simulation techniques, characters' skin appears to be tight and stiff like the wax rather than being fresh and viable. The inner vitality of the skin and its air permeability are hard to be realized through computer simulation. That's why sometimes we may feel that the 3-D animation movie looks like the dummy wax performance. Under such circumstance, the audience will come up with the idea of seeing "wax people" because the degree of making a "true-to-life" skin directly affects the emotion link and information exchange between the audience and the movie. The animation movie "Resident Evil: Damnation" produced in 2012 adopted the most advance techniques of 3-D display and motion capture at that time,

making the characters, actions and scenes maximally close to the reality. However, its presentation of the characters' facial expression was barely satisfactory. That's exactly what put the application of simulation techniques to 3-D animation production into plight. The producers of "Shrek", a 3-D digital animation movie, hired a group of specialists, spent ten years on studying and developing a set of nervous systems and kinetic systems and finally made the characters' facial expression appear natural and vivid. However, all of these achievements were under the premise of exaggeration and characterization of "Shrek". Moreover, there is no such monster as Shrek existing in the real world. Therefore, the animation makers will not feel burdened of being realistic. Besides, there are many differences between simulating monsters and human beings. The American 3-D digital animations are produced based on exaggeration. Characters' movements and facial expression are exaggerated to gain more powerful expression. Such processing method can also make the characters more humorous and strengthen the artistic value of animation. For the above reasons, movements and facial expression of the characters in American animations are not limited by the realities. Contrarily, 3-D animations using simulation techniques may face many restrictions on exhibiting the characters' actions and facial expression, thus being not lively and lacking artistry.

V. CONCLUSION

If the 3-D animation can reach the level of being natural, what influence the techniques will have on its development? Does it merely mean that those animation movies using such techniques can match the real ones? For the movie makers, the simulation techniques will spare them the cost of hiring actors (a large group of actors will lose their job). For the audience, however, it merely means having a forever young virtual actor. Besides, if the 3-D animation can really achieve the effects of real movies, what's the meaning of animation then?

It's quite demanding to use the simulation techniques, which need high standard of network storage, transmission and displaying equipment. Compared with concise and simple expression, using simulation techniques cost much more time, human resource and investment than the other. Simulation techniques have broader development space in designing computer games and making special effects in movies. Producers can put their imagination and creativity into full play through such techniques. On the contrary, the abstract expression of characters is quite symbolic so that it is easier to be transmitted. It also makes the exaggeration of movements, facial expressions and dubbing possible, which makes the characters more vivid and attractive. Meanwhile, characters' mental activities can be expressed through exaggeration. What's more, it can relieve the technological burden loaded on the animation makers and reduce the cost of animation making. There is no doubt that simulation techniques can produce the splendid effects and are indispensable in fields of

In general, the 3-D digital animation doesn't necessarily need to be realistic. The excessive pursuit of being "true to

life" will damage the artistry of animation, thus making the movie dull and hollow. Furthermore, the virtual things will never become the same as the real objects. That is especially true of facial expressions and mental activities, which reflects that there are insufficiencies in the realistic production of 3-D digital animation. At present, even if the 3-D animation can reach the level of being natural, for the animations using simulation techniques, they are just movies without real actors and are useless for the development of animation. Admittedly, the simulation techniques are essential in producing splendid effects, making 3-D animation advertisements, and forming animations depicting experiments. However, they also have limitations when reflecting the characters' subtle psychological activity. Certainly, we cannot rule out the influences caused by other aspects such as topics of animations, styles of expression, the director's personal preferences. Yet if we discuss it mere from the display of figures and objects, the more excessive we seek the level of "true to life", the more damage we will cause on the artistry of animation.

REFERENCES

- [1] Wang Ming. Animation Characters and "Super-realistic"[D]. Shandong Normal University, 2010
- [2] Li Tao. Study on Characterization in American and Japanese animations over a hundred year [D]. Sichuan University, 2007
- [3] Huang Xuelong. On the Influence of Digital Technology On the Movie Arts [D]. Central China Normal University, 2002
- [4] Ye Feng. On the Art Creation of 3-D Digital Animation[J]. Decoration. 2007(04)
- [5] Cao Yanyan. Brief Analysis on Content Design in American and Japanese Animations and the Direction of Chinese Animation Production[J], Beijing Institution of Graphic Communication.