

A Study of Digital Convergence And Integration Contents Utilizing Ink Painting Technique

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수묵화 기법을 활용한 디지털 융복합 콘텐츠 연구

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Abstract Ink painting is an important art creation method in oriental culture. Although ink painting lacks of sense of reality compared to western painting, it contains its unique drawing skills, which is of great significance to the inheritance and development of Oriental culture. Animation or game utilizing by ink painting technique are derivative contents from ink painting. This paper will through research the brief history of 3D ink contents works and traditional drawing skills to research existing ink works' art characters and the general production method. Also describe the extensibility of 3D ink animation contents. There has extremely high research value of new convergence contents as mobile game, VR / AR etc. And according to those research ink style image contents can be assumed get further development in the future.

Key Words : Ink Paint, Ink Style Image Cotents, VR, AR, Convergence Contents

요 약 수묵화는 동방 문화에서 중요한 예술 제작 방식 중 하나이다. 수묵화는 서양화보다 현실감이 다소 떨어지는 면이 있지만, 수묵화가 가지는 특별한 화법을 포함해서 동방 문화의 전파와 발전에 크게 기여하였다. 수묵화 화법을 활용한 3D 애니메이션이나 게임 등은 수묵화에서 파생한 콘텐츠이다. 본 논문에서는 3D 수묵화 콘텐츠의 역사와 전통적인 수묵화법 연구를 통하여 전통 수묵화 작품의 예술적 특징과 3D 수묵화 콘텐츠 제작 방법을 연구하였다. 또한 수묵화법을 활용한 디지털 콘텐츠의 확장성을 제시하였다. 모바일 게임, VR, AR 등 새로운 융합콘텐츠로서의 가능성에 대한 연구 가치가 높다고 생각하며, 따라서 수묵화법을 활용한 다양한 영상 콘텐츠는 향후 큰 발전을 기대할 수 있다고 사료된다.

주제어 : 수묵화, 수묵화법 영상콘텐츠, VR, AR, 융합콘텐츠

1. The Meaning of Ink Painting Style Works

Ink painting is the orient's original art and it is

a very important painting style for orient art history. Ink painting derived from China Han Dynasty(105 A.D.), then spreaded throughout to many east Asia area. The basic ink painting's

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screen only has water ink, that means only has white and black color. After Song Dynasty(960 A.D), there appeared ink antique flower and bird painting as Fig.1, ink painting became colorful, that ink antique paint was also known as color ink painting. The traditional ink paintings have characteristics include: drawing clear when it is close, drawing blur when it is distant, using subtle colors, and focusing on the artistic conception[1].



Fig. 1. Ink Antique Flower And Bird Painting By Emperor Huizong Song Dynasty. 1110. A. D

Compared with occidental oil painting, oriental ink painting lacks of sense of reality, lacks of light and shadow effect, and can not replace camera in no camera age. After the 19th century, many oriental ideologists as Kang Youwei and Cai Yuanpei proposed that ink painting was not scientific and advocated to abandon ink painting and study oil painting. But art is not science originally, art is a product of emotion[2], when artists use scientific way to create, they also have to feel emotion. Oriental and occidental artist have different value conception system in painting, the oriental artists express their very personal view of nature through paintings, which means they want show nature in their eyes rather than in other people's eyes[3]. And the humanitarianism and personality spirit in Confucianism have exerted a profound

influence on the formation of oriental literature and art thought. In Confucianism thought, art creation also has an aim which helps people to be kind; Artistic appeal has a value pursuit is "happy without immorality, sad without hurt". That means artistic emotions express has restricted by moral theory. Confucianism thought think art has a harmonious spirit and moral inner, so that let drawing is regarded as a way to cultivate one's morality in the east, and drawing also has its moral imperative[4]. Influenced by Confucianism, the eastern artist pursuit of personality cultivation like "as for the Tao, according to virtue, according to people, swim in art" in their subconscious. So, ink painting is a kind of lift-style in the east, the meaning of its existence is the Confucian culture and Confucian values behind it. Ink painting also has its Systematic theoretical system, and that theoretical system is very complete and scientific.

Thus it can be seen ink paint style as a kind of traditional oriental culture has a great meaning in cultural inheritance. At the same time it focuses on the painting skills, it also seeks for spirit and artistically's unification, embodies the painter's personal accomplishment and artistic conception. And it also reflects the Orient national consciousness and aesthetic temperament , represents confucianism artists' knowledge of nature, society and the related aspects such as politics, philosophy, religion, moral cognition[5]. Ink style animation is the development and derivative product of ink painting, it is able to reflect the values and ideas of the east.

This paper will through research 3D ink animation's brief history, characters, production methods and extensibility to express what is digital convergence and integration contents utilizing ink painting technique, and it as a new research area is very special, has high research value.

2. A Brief History Of 3D Ink Work

2D Ink animation once had brilliant achievements from 1960s to 1980s, and that also had a great meaning to the world animation industry[6]. However, due to the cumbersome production process of 2D ink animation, and the workload of 2D ink animation product is 3 to 5 times than normal animation, so the situation and development of traditional 2D ink animation has great challenges[6]. That means, traditional 2D ink animation needs innovation while maintaining its cultural heritage. With the development of computer graphics technology, the creation of 2D ink animation is simplified by using shader material balls in 3D software, which is an innovative method for ink style animation.



Fig. 2. Chinese Paladin. 1995

Research on 3D ink animation originated in Japan in the 1970s, but due to the limitations of computer performance, and also due to lack of industrial benefits, the development of 3D ink animation was very slow in that times[7]. In the 1990s, computer game industry began to become bigger. With a large amount of investment, some computer game's cut-scenes started to use 3D ink style. For example, the computer game "Chinese Paladin", which was produced by Softstar in Taiwan, used 3D ink style animation in its cut scenes as Fig.2. That animation used 3D rendering in the foreground and 2D ink painting in the background, although it is a little brusque,

but it also gave players an amazing visual experience at that times. After 2000 years, with the improvement of computer performance, the spring of 3D ink animation came. In 2003, RonHui from China published his 3D ink animation work <Ode to summer> at SIGGRAPH(Special Interest Group on Computer Graphics). That short 3D ink animation was modeled and rendered scene by Maya, proved high level 3D ink animation can be made[7]. After that work, many excellent 3D ink animation emerged in East Asia, such as <100 horses>, <ink lotus pond>, <Chinoiserie> and so on[8].

In 2019, the Palace Museum teamed up with NetEase company made a game named <Painting True -- Wonderful thousand mountains> to promote the Palace Museum's collection[9]. Because the characters and scenes in the game are controllable and interactive, that game pushed 3D ink style work into a new height. And in that game, also has VR mode for show wonderful 3D ink painting, that mode allowed people to freely watch 3D ink painting in a certain space.

3. Production of 3D Ink Work

3.1 Characteristics of Traditional Ink Work

3D ink animation looks good but it takes a lot of time to make it. However, in order to understand the production of 3D ink animation, we must know the style and characteristics of traditional ink animation first.

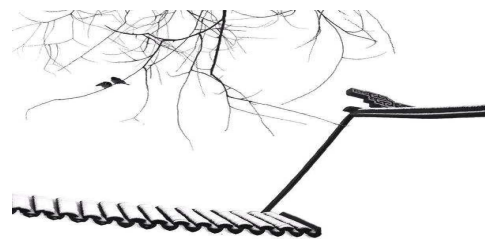


Fig. 3. "LiuBai" Skill

There are many differences between traditional ink painting and western realistic painting, the biggest different in that is "LiuBai", which means leave a blank space comparable to the inked space as Fig.3. "LiuBai" can reflect line's virtual and real change, and it has 4 kinds of layout which are sparse, close, together, scattered[10]. In the blank part, one often uses calligraphy, poetry and seals to supplement the blank. And that is specially aesthetic style of oriental ink painting[11].

Second character is that the performance of traditional ink painting space is reflected by the shade of ink, usually the farther the lighter. In the 3D ink painting works, rendered image in the 3D soft usually only has monotonous color. Although one can use ramp materials to reduce the problem, there is still a lack of virtual and real changes compared with 2D ink painting. However, take those images into AE or Nuke can use mask feather for solve this problem[12]. And, ink painting usually with a special line painting skill named "flying white(FeiBai)", commonly used "flying white" to paint relatively hard and dry objects, such as rocks and dry branches as Fig.4. "Flying white" is in the middle of the ink with a little bit of white marks in calligraphy creation, it can give people the feeling of flying[13], it is a special painting skill. However, "flying white" used in 3D animation may produce many errors, so designer often try to avoid using "flying white" in 3D animation work between 2000 to 2010. But nowadays that problem can be improved by using the method of modeling detail stacking.

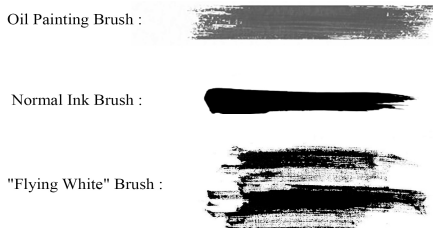


Fig. 4. Oil Painting Brush & Normal Ink Brush & "Flying White (FeiBai)" Brush In Photoshop

3.2 The General Production Methods

At present, the general methods of 3D ink animation are as follows :



Fig. 5. Ode To Summer. 2003

(1) Build a 3D model, take the ink painting of the plane as the texture map, endue to the surface of the 3D model, and finally make 3D ink animation through key frame animation. The animation <Ode to summer> was made in this way as Fig.5.

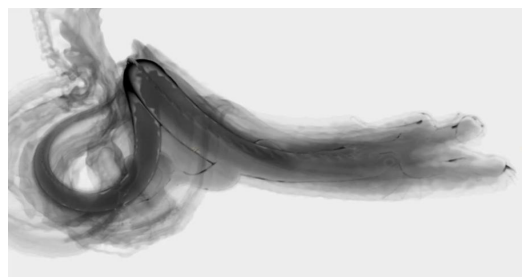


Fig. 6. 3D Particle Ink Effect

(2) Build a 3D model, bind 3D model with particle emitter, and use particle rendering to produce contour lines of varying depth and thickness, simulating ink painting effect as Fig.6. It should be noted that Nurbs are often used for that works' 3D modeling, because of the UV

trend is very similar to the ink brush trend. RampShader is often used as texture mapping for simulate different shades of colors in ink painting[7].

3.3. Problems of 3D Ink Animation Production

Because of subject limitations, it is very difficult to choose the topic of 3D ink animation. 3D ink animation originated from 2D ink painting. Most of the traditional themes of 2D ink painting are landscapes, flowers and birds, etc. Just only a few subjects are made to show peoples, which makes the themes of 3D ink animation very limited. Few works can show the relationship between people, so that 3D ink works are lack of market competitiveness in the modern society that emphasizes telling stories[14]. Therefore, it is urgent to find the market value of 3D ink animation.

4. The Extensibility of 3D Ink Works

Although some problems exist, 3D ink style work still has a good development prospects.

As can be seen from the above, if the 3D ink industry wants to have greater development, it must have a broad commercial market. Today's 3D animation industry has not extended its own value, in the future there have several aspects can have a great prospect of development for 3D ink works.

4.1 Side-line Range Of Products



Fig. 7. Ink Animation Side-line Products

While making a good box office income, American animated film <Zootopia> also developed a series of derivatives, such as toys, games and decorations, to maximize its commercial profits. That is a good example for 3D ink animation industry. In the cross-cultural communication, 3D ink animation is necessary to have a broad vision and an inclusive attitude. And in the process of internationalization, 3D ink animation should not only keep the unique cultural qualities, but also absorb the successful experience of Hollywood films. That is to say ink animation has to neither be limited at east culture nor blind westernization, it should be gradually explore their effective strategies in the trial and error[15]. It should take <Zootopia> as an example, not only create animation works, but also develop corresponding commercial derivatives, such as porcelain handicraft in Fig.7.

4.2 Mobile Games



Fig. 8. Painting True -- Wonderful thousand mountains

Recently, mobile game industry has huge market, because of its huge user base. Some simple and low-cost work also grabbed a huge market profit. As previously mentioned, <Painting True -- Wonderful thousand mountains> is a good example as shown in the Fig.8. Although that game is free, but the aim is to promote the Palace Museum's collection. And it had a great effect, after the game appeared, Palace Museum is full every day. In the future, if more good 3D ink style games land into mobile game market, it

will obtain a large profit, and those money will further promote 3D ink style works' industry.

4.3 VR/AR Ink Animation



Fig. 9. VR Ink Animation

VR/AR industry is also an emerging industry. If 3D ink animation can further develop in this field, it will achieve greater artistic and economic achievements. Just imagine, if one uses VR glasses to see a ink style of martial arts movies, how attractive it will be. To see ink sword over the sky will be very cool as shown in the Fig.9. Besides, many new different ink artistic styles may be born in VR or AR animation.

5. Conclusion

From the above introduction, we can see although 3D ink style work are not easy to make, as a content industry that still has to be developed, 3D ink animation has its value for research. Especially 3D ink animation based new digital contents like mobile game, VR / AR etc has high value for research. There are many new design methods may appear because of those new digital contents.

In addition, 3D ink animation is a way to keep Asian culture, so it will never lose its historical value[16]. Not only in Asia, but also in the world, 3D ink animation will become a new art trend. Because people sometimes lose themselves in a hurried modern society, and ink 3D works often advocate inner focus, which has a cure effect for

modern people. If 3D ink animation expands its market and create commercial value, it will further expand its existence space in the future. It is also has high vale for research, 3D ink animation contents research can get further development in the future.

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