

Application of Dunhuang Mural Elements in the Modeling and Action Design of the “Luo Shen’s Graceful Flight” Segment in the Animated Film *Yang Jian*

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Abstract: Taking the 3D animation *Yang Jian*’s segment “Luo Shen’s Graceful Flight” as an example, this paper analyzes how Dunhuang mural elements inspire the modeling and action design in 3D animation. It explores the influence of Dunhuang murals on animation modeling and movement design, and offers an artistic analysis of the “Luo Shen’s Graceful Flight” in *Yang Jian*. This study discusses how to retain the core aesthetic of Dunhuang mural art within the scope of current technological methods, and how to convey the distinctive Eastern characteristics of Chinese traditional culture beyond the principles of Disney-style modeling and action design, providing a viable approach for Chinese animation creation.

Keywords: Dunhuang Murals; 3D Animation; Action Design; Character Design; Principles of Motion.

1. Introduction

Dunhuang, for over two thousand years, has been a significant nexus connecting the Western Regions, bringing together various civilizations and cultures from different ethnicities worldwide. This diversity and uniqueness in regional culture laid a foundation for the integration and mutual learning between Han culture and other ethnic cultures, fostering an environment where different cultural value systems coexist harmoniously. By showcasing elements from Dunhuang murals, not only can we witness the dissemination and development of China’s outstanding traditional culture, but we also gain rich inspiration and insight for animated art creation.

2. The Inspiration of Dunhuang Murals for Animation Modeling and Action Design

2.1. Sub-section Headings

The art of the Dunhuang grottoes has evolved over a millennium, with rich and vast content that incorporates foreign Buddhist culture and various social factors from different dynasties. As a result, these murals exhibit a diverse style with a unique fusion of Eastern and Western characteristics. By comprehensively utilizing elements such as color and composition, the murals create an aesthetic of ethereal grace and dynamic beauty. The figures, costumes, and ornaments depicted in the murals are based on traditional Chinese painting techniques, while also incorporating Western painting principles of volume and perspective. These characteristics give Dunhuang murals a distinctive charm, with unique lines, colors, and compositional methods that offer abundant visual inspiration for modern animation creation. Examples include animations from the 1980s like *Havoc in Heaven*, *Nine-colored Deer*, and *The Deer Girl*, as well as recent animated adaptations of Dunhuang elements in exhibitions such as *Amitabha Pure Land Transformational Painting* and *Cloud Garments and Feathered Clothes*. These works have drawn upon Dunhuang mural elements, providing audiences with a visual experience that transcends a thousand

years [1].

2.2. The Influence of Dunhuang Murals on Animation Modeling and Action Design

The unique lines, colors, and bold, layered patterns in Dunhuang murals, along with their exaggerated and intricate designs, present a distinctive artistic style that serves as a rich source of inspiration for modern animation creation. As early as the 1980s, the animated film *Nine-colored Deer*, which is often regarded as a “living” Dunhuang mural, incorporated elements from Dunhuang murals. In addition to the prominent color schemes inspired by the Dunhuang murals, the character designs in the animation also drew from them. For example, the design of the “Nine-colored Deer” character references the image of the Deer King in the Deer King Jataka mural in Mogao Cave 257. The overall shape of the deer, with a white body and simple lines outlining the head, antlers, legs, and tail structure, faithfully reproduces the original form in the mural. Even the postures during movement in the animation closely resemble those in the Hunting Scene mural from Dunhuang (see Figures 1, 2).



Fig 1. Detail from the Deer King Jataka mural, Mogao Cave 257



Fig 2. Animation Nine-colored Deer

The design of the queen character draws inspiration from the “Feitian” (flying apsaras) figures in Dunhuang murals. She is depicted with a high bun, adorned with a necklace, and wears a flowing dress that seems to dance gracefully in the wind, held by ribbons. This composition forms the classic “S” shape, a fixed representation of the Dunhuang flying apsaras, which vividly showcases the beauty of human body rhythm and has become an iconic figure in Dunhuang murals.[2] (see Figures 3, 4).



Fig 3. Mogao Cave 303, Sui Dynasty



Fig 4. Queen character from animation Nine-colored Deer

In the game Honor of Kings, The Apsaras-themed skin of Yang Yuhuan in the game Honor of Kings draws inspiration for every detail—such as her hairstyle, makeup, attire, and movements—entirely from the celestial musicians and dancers depicted in Dunhuang, the Queen Mother of the West’s gathering, flame patterns, and the “reversed pipa” pose are all derived from Dunhuang murals. In her 3D animated introduction, the character Yang Yuhuan emerges through a broken mural wall, holding a pipa in the classic reversed position, embodying an elegant and graceful figure floating in mid-air. This scene transforms the flat rock-pigment murals of Dunhuang into a three-dimensional form, creating a

character with a strong cultural resonance. This transformation not only reproduces the aesthetic beauty of Dunhuang murals but also allows players to feel the deep historical and cultural heritage, conveying the charm of China’s rich traditional culture within the game environment

3. Artistic Creation Analysis of “Luo Shen’s Graceful Flight” in the Animation Yang Jian

In the animation Yang Jian, the flying dance inspiration for the “Luo Shen’s Graceful Flight” segment in the Xianyuefang (Immortal Music Hall) is derived from the dynamic and enchanting scenes of red and green flying figures in Dunhuang murals. The performance was based on the imagery of the Mogao Cave murals, particularly the “scattering flowers” and musical celestial beings depicted in the flying heavens. In terms of technology, the Vicon motion capture solution, provided by D-Sing Digital, was used. By capturing the movements of professional dancers, it created smooth, fluid, and dynamic body postures, enhanced by the flowing garments, complex folds, and elegantly curling ribbons. Combined with various dynamic movements like soaring, leaping, rushing, and slowing down, the animation presents a visual feast with Eastern characteristics in both form and spirit.

3.1. Retaining the Core Aesthetic of Dunhuang Murals in Character Design

The creator’s conceptual approach, national traditions, and contemporary features shape the animation’s design elements. [3] The flying figures in Dunhuang murals often feature intricate clothing with highly detailed accessories such as sleeves, skirts, waistbands, and headdresses. In the “Lo Shen Fu” segment of Yang Jian, the character’s hairpins and the “golden step-shake” accessory, along with the orange-green gradient dress, are references to the prominent use of red and green colors in the Dunhuang murals from the Wei and Jin dynasties. This choice forms a clear contrast of warm and cool tones, while continuing the Dunhuang flying figures’ characteristic use of layered clothing and flowing ribbons that appear to float effortlessly. The use of textures, area lighting, and soft light sources further enhances the transparency and delicacy of the costumes, highlighting the shining effect of the “golden step-shake” ornament. Additionally, by incorporating the principles of volume and perspective from Western painting, the animation innovatively retains the basic poses of Dunhuang flying figures, including their “S” shaped posture and various dynamic curves. This results in a dragon-like, beautiful form, blending traditional Dunhuang aesthetics with modern visual principles. The design not only preserves the core beauty of Dunhuang murals but also brings these aesthetics to life in dynamic scenes (see Figures 5, 6).



Fig 5. Six-Armed Flying Apsaras, Mogao



Fig 6. Yang Jian animation

Dunhuang murals typically employ either non-perspective or symmetrical compositions. This is reflected in the dance sequence, where the arrangement of multiple dancers in symmetrical formations mirrors the precise symmetry seen in mural compositions. The selected poses and action sequences of the characters organically align with the symmetrical composition style of Dunhuang murals. This strict control over composition and character design emphasizes a sense of balance and rhythm in the image, preserving the traditional artistic features of Dunhuang murals.

In conclusion, the character design in Yang Jian successfully inherits the essence of Dunhuang mural art and traditional Chinese culture, showcasing a perfect blend of Dunhuang aesthetics with modern 3D animation technology across composition, color use, and innovation.

3.2. Decorative Motion Patterns Rooted in Ancient Painting

Modern animation, particularly Disney-style animation, often features exaggerated elasticity and large motion arcs suitable for vibrant and expressive Broadway-style song-and-dance numbers. In contrast, Dunhuang murals, rooted in ancient Chinese painting, reflect restrained and subdued emotions with movements that embody a sense of flow within a planar aesthetic. Outlines of figures and clothing are characterized by smooth lines, where brushstrokes flow seamlessly, creating an integrated aesthetic. Consequently, the poses and movements of figures follow a principle where details align with the overall movement, with every action flowing along an invisible guiding line, creating a subtle and decorative “dynamic” aesthetic. This is especially prominent in the Dunhuang mural flying figures, where twisting, curvilinear lines envelop the figures in swirling robes and sashes, following the body’s movements in an ornamental style, rich in dynamism despite being a static image.

In adapting Dunhuang murals into animated works, the challenge lies not only in recreating the rock pigments’ texture and the intricate details of the attire but also in capturing the inherent motion patterns. The Yang Jian animation’s “Ode to the Goddess of the Luo River” segment vividly captures the dynamic spirit of Dunhuang. Using data from Dunhuang dance experts, motion capture technology is employed to transfer dance movements into virtual characters, utilizing 360-degree spatial transformations and camera movement. By synchronizing real and virtual cameras, using Vicon’s motion capture to transfer live camera movement data to virtual scenes, it creates Dunhuang-style dance movements where details follow the overall flow seamlessly. The result is a visual where the elegantly dressed dancers float mid-air, gently swaying to the celestial melody of Ode to the Goddess of the Luo River. The flowing attire adheres to the body’s curves,

allowing for graceful mid-air movement. As their garments and sashes respond to the dancers’ motions, a tranquil aesthetic emerges, underscoring the subtle charm of Eastern elegance.

In conclusion, we can see that while conveying “movement,” Disney-style animations with an elastic texture and Dunhuang murals have fundamentally different approaches to expressing dynamics. In the animation *The Legend of Yang Jian*, particularly the “Ode to the Goddess Luo” segment, the dynamic expression effectively integrates the ethereal grace of Dunhuang’s flying figures with modern 3D animation technology. By culturally redesigning and adapting character movements, the animation achieves a successful cultural transmission while maintaining contemporary aesthetic appeal. This combination of multiple technological methods and artistic creation vividly captures the spirit of Dunhuang murals’ dynamic essence, breathing new life into these cultural treasures with the aid of modern technology.

4. Application of Dunhuang Mural Elements and the Value of 3D Animation

Dunhuang Murals: A Treasure of Chinese Ancient Art

Dunhuang murals hold both historical and artistic significance. Incorporating their elements into modern 3D animation not only inherits and promotes traditional culture but also brings abundant inspiration and innovation possibilities for animation creation.

Bringing Dunhuang Culture to Life in a Modern Context

Dunhuang murals embody rich cultural values. Applying these elements in 3D animation allows more young people to understand and appreciate the art form, fostering a stronger sense of cultural identity and pride, especially among the younger generation. In the context of globalization, preserving and transmitting national culture carries significant social importance, enabling Dunhuang culture to thrive in modern contexts. As 3D animation gains global reach, works incorporating Dunhuang mural elements can serve as cultural ambassadors, showcasing China’s artistic heritage and unique aesthetic system to the world. Such cultural export enhances national cultural soft power while promoting cross-cultural exchange and understanding.

Advancing Fusion and Innovation in Visual Animation Arts

In contrast to the exaggerated dynamics and stereoscopic elasticity typical of Western animation, Dunhuang elements emphasize elegant, planar dynamics that align naturally with body movement, reflecting an aesthetic of restrained and highly decorative Oriental beauty. Highlighting these distinctive shapes and expressing dynamic charm enrich animation techniques and inspire new ideas for 3D animation creation.

Driving Technological Progress and Application in the Industry

To faithfully reproduce the intricate details of Dunhuang murals, 3D animation requires the use of high-resolution texture mapping, complex material rendering, precise cloth simulation, 360-degree motion capture, and synchronized real and virtual camera data. The application and development of these technologies not only enhance the precision and realism of animation works but also advance the technological progress of the entire industry.

5. Conclusion

The artistic and cultural value inherent in Dunhuang murals transcends temporal and spatial boundaries. Examining today's cultural development reveals their irreplaceable significance. They not only preserve and promote a valuable cultural heritage but also offer endless inspiration and innovation possibilities for animation creation. Through technological advancements and commercial promotion, the integration of Dunhuang elements with modern 3D animation will provide audiences with more diverse, unique, and culturally rich works of art, while opening new paths for cultural dissemination and industrial development.

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