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Analysis of the Integration Path of Digital Technology and Oriental Aesthetics: A Case Study of the Visual Effect Construction of Key Characters and Important Scenes in *Nezha2*

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Abstract: Chinese animation films have evolved over several decades, developing from early rough production methods to an industrial, systematic, and digital stage. Released in 2025, *Nezha2* achieved a global box office of $2.26 billion, marking a dual breakthrough in technology and art. Its astonishing visual spectacle realizes a deep integration of Chinese mythology and modern technology. Firstly, this paper analyzed the digital generation logic of the core characters and key scenes in *Nezha2*. Secondly, it synthesized the integration path of intrinsic oriental aesthetic genes and modern digital animation technology, providing theoretical references and practical models for China's domestic animation industry.

Keywords: *Nezha2*; Digital technology; Animation visual effects; Scene constructions; Oriental aesthetics; Animation industry

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1. Introduction

In the early years, animations based on Chinese mythology or folktales, whether domestic or international, usually focused on narrative culture, lacking the construction of three-dimensional special effects for core characters and iconic scenes. As a sequel to *Nezha1—Birth of the Demon Child*, *Nezha2* has achieved new breakthroughs in the digital production of the visual effects of mythological characters and core scenes [1].

For a case, this paper analyzed the visual effects of the core mythological characters, Nezha and Ao Bing, and the digital production of iconic scenes such as the Heavenly Palace and the Four Seas Dragon Palaces. It focuses on three core issues: First, the digital expression and aesthetic analysis of the visual effects of core mythological characters. For example, how modern digital technology achieves animation effects

of core mythological characters through biomechanics, expression driving, and material representation to convey oriental aesthetics. Second, how digital technology enables the oriental aesthetic digital translation and large-scale generation of iconic scenes like the Heavenly Palace and the Four Seas Dragon Palaces. Third, a summary of the integration path of technology and aesthetics in China's animation films [2].

2. Production overview and technical system of *Nezha2*

2.1. Production overview

Nezha2 has 2,427 shots, 1,948 visual special effects shots (accounting for over 80%). It involves more than 150 independent scenes, especially a scene with over 200 million characters fighting simultaneously. The average frame-rendering time is over 20 hours, the maximum rendering time for a single frame reached 48 hours, and the average shot-rendering time exceeds 200 hours, demonstrating extremely high production fidelity and technical difficulty. The total production cost of *Nezha2* reached 86 million US dollars, making it the most expensive one in China's animation history. The film was released on January 29, 2025, and quickly broke numerous box office records, solidifying its status as a landmark work, signifying the maturity of industrialization of China's animation films.

2.2. Technology realizing system

From a technical dimension, the animation groups constructed a technology system including "commercial software tools + self-developing systems + cloud computing power." They applied the commercial and industry-standard soft tools such as Maya, Houdini, NVIDIA Flex and Nuke, covering the full process of establishing model, effects, and compositing. Eight major self-developing systems include the AI Skeletal Dynamics System (Biomechanics), the Spirit Pearl Facial Expression System (Core Character Oriented), the Fuxi Ink Rendering Engine (Core Dynamic Rendering System), the GNN Particles Dynamics System (Core Physics), the Qi Meridian Linking Control System (Oriental Physics), the PanGu AI Scene Generating System, the CV-Scene Real-time Lighting System (Lighting Control), and the Quantum Collaborative Rendering System (Industrial Middle Platform), filling gaps in China's technology of animation films. From the technical dimension of hardware, the whole team of workers applied distributed render farms and cloud computing power to efficiently handle massive scenes and effects, with over 10TB of cache data, ensuring production efficiency and image fidelity [3].

2.3. Industrial system under a collaborative mechanism

Nezha2 was co-produced by COCOANIWORKS and COLORROOM, with whom Jiao Zi (Yang Yu) served as scriptwriter and director. The film adopted a model of "core creative team + distributed collaboration." COCOANIWORKS and COLORROOM were responsible for core creativity, character design, scene art, and effects coordination. 138 partner companies and over 4,000 personnel were involved in the division of labor for modeling, animating, rendering, compositing, and other segments. Through standardized data interfaces and unified production specifications, seamless connections between various stages were achieved, forming a clear division of labor and an efficient, collaborative industrial creative system. This industrial system not only improved production efficiency but also ensured artistic style's consistency, providing a replicable paradigm for large-scale, high-quality domestic animation production.

3. Digital expression of core mythological characters' visual effects and aesthetic expression of oriental symbols in *Nezha2*

The core mythological characters in *Nezha2* are Nezha and Ao Bing. Their special effects not only achieve ideal-realistic physical precision, but also through the digital expression of oriental aesthetics, endow the characters with distinct personalities and emotional hierarchy. This chapter primarily analyzed the biomechanical effects, expression driving system, materials representation, and aesthetic connotations of the core characters, deconstructed the technical pathways and artistic logic [4].

3.1. Digital expression of core mythological character: Nezha's visual effects

3.1.1. Digital expression of Nezha's body and facial expressions

As an important mythological character, Nezha's effects run all through the film, achieving a breakthrough from a "virtual character" to a living being, from muscle movement to hair flowing, and eye gazing.

Nezha's muscle dynamic special effects broke through the limitations of manual weight painting in mythological animation by using the self-developing AI Skeletal Dynamic System. By training on hundreds of sets of Chinese Kung Fu movements data, this allows for more automatic, physics-driven feedback on muscle contractions and skin folds. For example, in scenes where Nezha leaps into a strike or breaks free from the "Piercing Heart Curse," the system calculates the stretching of his neck muscles, the tearing of his shoulder fibers, and even simulates how blood might evaporate in flames.

For facial expressions, the team used what they call the "Third-Generation Spirit Pearl System." The face system contains several hundred virtual muscle control points. An angry expression, for instance, is built by layering multiple emotional states. Using AI micro-expression transfer and the FACS coding system, they achieved a decent level of detail. In a calm state, Nezha's look is more subdued, appearing youthful. When angry, the performance relies on subtle details like furrowed brows and trembling mouth corners to convey his rebellion and rage, rather than over-the-top effects. A double-layer refraction algorithm was used for his pupils, giving him more natural, film-like eye-light. Combined with the muscle movement around his eyes, this helps his expression balance both a "demon child's" defiance and a "teenager's" innocence, trying to tie the technical work to the character's emotion.

3.1.2. Digital expression of China's symbols and oriental aesthetics of Nezha's accessories

In the early years, the animation *The Monkey King: Havoc in Heaven* (1927), Nezha, as a supporting character, left a deep impression on Chinese audiences [5]. The Red Armillary Sash, Wind Fire Wheels, Golden Hoop, and Fire-tipped Spear were his typical accessories, which are essential in *Nezha2*.

The Wind Fire Wheels take their look from Dunhuang fire patterns, the Taiji symbol, and Han dynasty chariot wheel designs. In the movie, they show up as flames that look like an ink wash painting.

The Golden Hoop is built around Taoist circular symbols and bronze talisman patterns. It gives off a different feel depending on whether it's being used for sealing, attacking, or defending.

The Fire-tipped Spear is designed to work with Nezha's martial arts moves. It's flexible, letting him switch between nimbly attacking and defending.

These effects were done using the Fuxi Ink Rendering Engine (the main rendering system) and the GNN Particle Dynamics System (for physics). They're all tied together by the Qi Meridian Link Control

System, which is basically their take on Eastern-style physics. With these tools, they managed to bring these traditional artifacts to life on screen, mixing in elements from Chinese cultural heritage, relics, Taoist culture, and more.

3.2. Integration of Ao Bing's ice effects and oriental temperament

Ao Bing, the Dragon Prince who's reborn with the Spirit Pearl in Nezha2, relies deeply on the film's self-developing systems for how he looks and comes across on screen. His overall vibe is introverted, elegant, and noble—very much an Eastern aesthetic.

The Fuxi Ink Rendering Engine gives his dragon scales and ice effects a warm, slightly translucent look, kind of like an ink wash painting. It fits the idea of "a gentleman as pure as jade," which is a classic Eastern ideal.

With the GNN Particle Dynamics System, the ice crystals, water waves, and his dragon tail all move in a fluid, natural way. It has ink-wash freehand quality—sometimes solid, sometimes empty, soft yet firm at the same time.

The Qi Meridian Link Control System visualizes the Taoist idea of "Qi" by showing blue Spirit Pearl light running through his body like energy channels. It gives him a sort of mystical Eastern feel.

His reserved and gentle expressions are handled by the Spirit Pearl Facial Expression System, which fits the subtle, understated way Chinese culture tends to show emotion.

The AI Skeletal Dynamics System helps him move with grace and stretch into his dragon form. It has rhythmic beauty you see in Eastern aesthetics—the balance between motion and stillness.

Then there's the CV-Scene Real-time Lighting System, which uses soft, cool lighting to recreate the empty space and gradient washes you'd find in traditional Oriental paintings.

Finally, the Quantum Collaborative Rendering System pulls everything together, making Ao Bing look like a real embodiment of the Eastern ideal: noble, elegant, gentle like jade, and in tune with nature.

In summary, what makes the character effects in *Nezha2* stand out is how they blend technology with oriental aesthetics. On one hand, the team used AI and Physics engines to get realistic biomechanics and material details—things that used to be really hard for mythological animation. On the other hand, they made sure the designs carried an Eastern cultural feel, like the ink-wash elegance of the Red Armillary Sash, the traditional patterns on the dragon scales, and the free-flowing, mood-driven magic effects. It's a good example of "conveying reality through virtuality." All of this makes the characters look better and feel more culturally grounded. The audience gets to experience the unique charm of Eastern mythology while still being impressed by the tech. For domestic animation, this offers a pretty solid direction for how to approach character effects.

4. Digital construction and aesthetic expression of core scenes in *Nezha2*

Nezha2 builds an Eastern mythological world that includes the Heavenly Palace and the Four Seas Dragon Palaces. Each scene tries to bring together digital technology and Eastern aesthetics, and they also serve as a key part of moving the story forward and showing emotions. This chapter looks at how these main scenes were made, what technical challenges they solved, and what aesthetic ideas they carry—breaking down how they were put together.

4.1. Heavenly Palace scene: Procedural generation and eastern architectural aesthetics

The Heavenly Palace is one of the core locations in the film. It represents the power and authority of the Celestial Court. To design it, the team used the Pangu AI Scene Generation System along with procedural generation techniques. This helped them create large-scale scenes efficiently while still keeping a strong Eastern architectural style.

4.1.1. Digital generation technology: How AI and procedural generation work together

The Heavenly Palace scene includes 7,200 pillars with coiled dragon carvings and about 8.9 square kilometers of building complexes. The team generated all of this using the Pangu AI Scene Generation System combined with procedural generation. They finished the full scene setup in just three weeks — about 18 times faster than doing it manually with standard 3D tools.

For modeling, they used a system that switches between high and low detail depending on the camera. Buildings in the distance automatically use fewer polygons but still keep key features like overhanging eaves. When the camera moves closer, it switches to high-precision models so you can see details like glazed tile patterns and carvings on the pillars. This helps balance rendering speed with image quality.

For lighting and materials, the Heavenly Palace uses ray-traced rendering to create a soft, celestial light effect. The main materials are white jade, gold, and colored glaze. By layering multiple material properties, they got a pretty good result in terms of gloss and texture, which gives the whole place a sacred and majestic feel.

4.1.2. Eastern architectural aesthetics: Blending mythological form with visual imagery

The design of the Heavenly Palace borrows from Tang and Song dynasty architecture, as well as patterns from Shang and Zhou bronzes. Features like overhanging eaves with upturned corners follow the building style rules from the Song dynasty. At the same time, they added mythological touches like coiled dragon pillars, glazed tiles, and cloud carvings. All of this helps create a look that feels both mythical and grounded in the scene's setting.

The layout uses a symmetrical structure, with Lingxiao Hall at the center and pavilions and towers arranged around it. This fits with the symmetrical aesthetic you often see in Eastern architecture and gives the Celestial Court a solemn, majestic atmosphere.

4.2. Digital effects of the Four Seas Dragon Palaces and expression of oriental aesthetics

As the habitat of the Dragon Clan, the Four Seas Dragon Palace is another core scene in *Nezha2*. It is a classic symbol of oriental mythological aesthetics, embodying oriental aesthetics highly, whether in literature, art, or digital scenes.

4.2.1. Where the designs take form from

Architectural structure prototypes: Dragon pillars, Dougong brackets, and caisson ceilings from the Yingzao Fashi (Building Standards) of the Song Dynasty. Fujian Tulou: an overall layout of circular, enclosed, and nested layers. Shanxi Hanging Temple: a precipitous sense of hanging over cliffs and layered structures.

Cultural and cultural relic prototypes: Underwater light and shadow from Dunhuang murals, with an artistic conception of blending virtual and real, as well as caisson ceiling and flying apsaras patterns. Bronze sacred trees, mask patterns, and guardian beast shapes from Sanxingdui.

4.2.2. Visual aesthetics route is entirely Chinese

In *Nezha2*, colors often include blue, green, gold, and jade white, creating a water-permeable, magnificent yet not gaudy aesthetic, Chinese "elegant and magnificent" style. Architecture features overhanging eaves, bracket sets, caissons, corridors, dragon columns, and a glazed texture, all belonging to classical Chinese architectural aesthetics. The mood is created through mist, clouds, water ripples, and hazy light, pursuing a sense of profound artistic conception and celestial mistiness, rather than realistic accumulation.

4.2.3. Reflecting oriental cultural temperament

Emphasis is placed on order and auspiciousness: the Dragon Palaces represent both an undersea dynasty and incorporate dragon motifs, auspicious beasts, and treasures, symbolizing majesty and good fortune.

The overall look leans toward subtle, airy, symmetrical, and solemn—quite different from the flashy, dark, mechanical feel that often gets from Western mythology.

4.3. Aesthetic value of core scenes: Digital reconstruction of the oriental mythological world

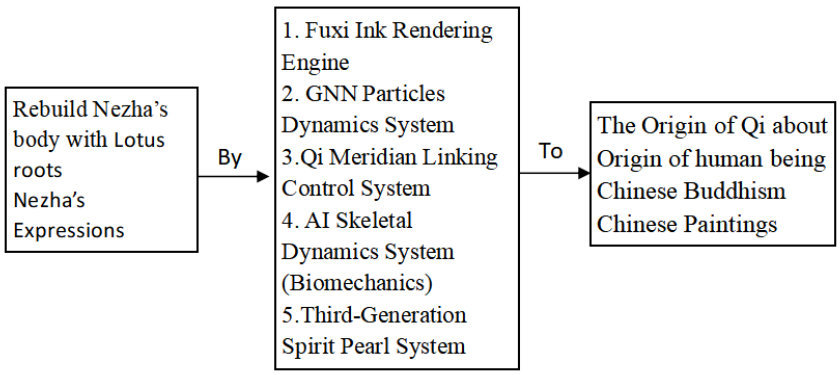
What makes the key scenes in *Nezha2* stand out is how they use digital tools to rebuild the Eastern mythological world.

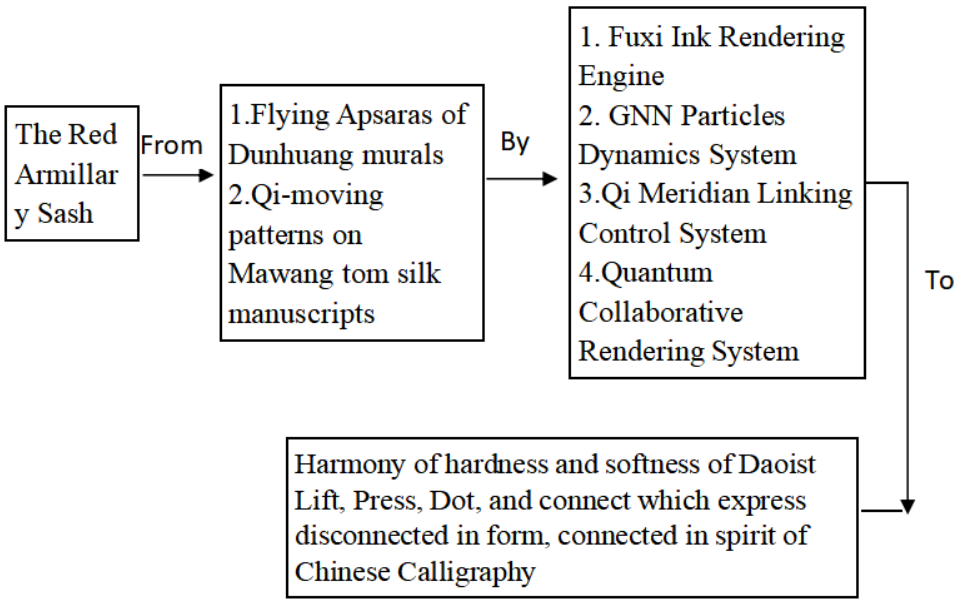
On the tech side, they used AI, procedural generation, and fluid dynamics to get past some of the old limitations in making mythological animation. This allowed them to build huge, highly detailed scenes much more efficiently.

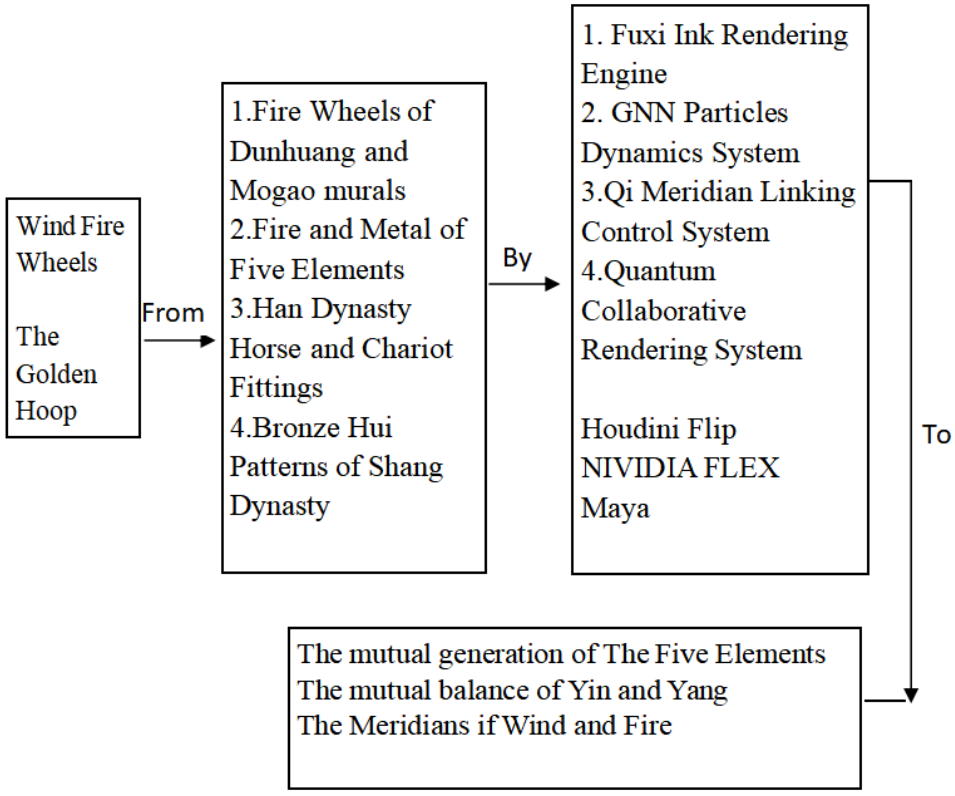
On the design side, they brought in Eastern architectural aesthetics, water-based aesthetics, and war aesthetics into how the scenes were put together. The result is a pretty solid blend of technology and visual style.

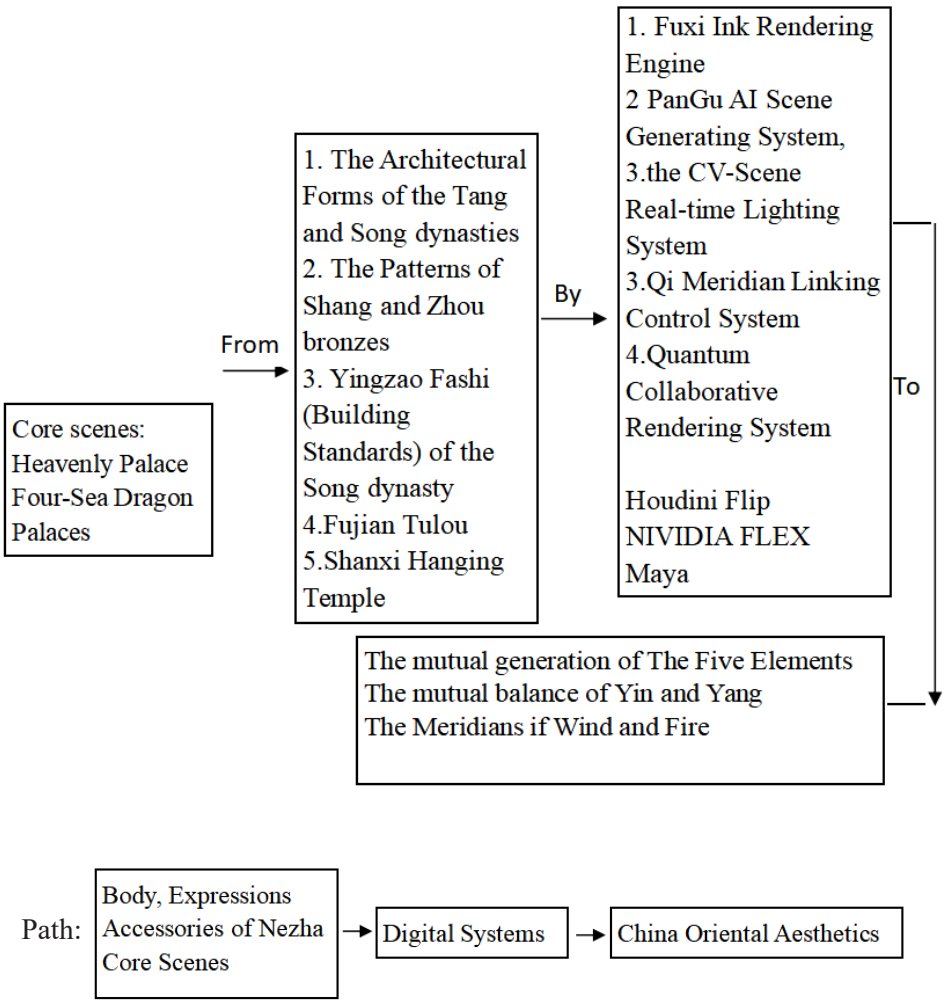
This rebuild does not just create an immersive Eastern mythological world—it also helps with storytelling and pulls the audience in. At the same time, it gives old mythological culture a fresh, modern look. Viewers get to experience the unique feel of Eastern mythology while still being impressed by the visuals. For domestic animation, this offers a good reference for both aesthetic direction and technical approach when building scenes.

5. Graphical representations of the integration path of digital technology and oriental aesthetics




The Red Armillary Sash
From
1.Flying Apsaras of Dunhuang murals
2.Qi-moving patterns on Mawang tom silk manuscripts
By
1. Fuxi Ink Rendering Engine
2. GNN Particles Dynamics System
3.Qi Meridian Linking Control System
4.Quantum Collaborative Rendering System
To
Harmony of hardness and softness of Daoist Lift, Press, Dot, and connect which express disconnected in form, connected in spirit of Chinese Calligraphy


Wind Fire Wheels
The Golden Hoop
From
1.Fire Wheels of Dunhuang and Mogao murals
2.Fire and Metal of Five Elements
3.Han Dynasty Horse and Chariot Fittings
4.Bronze Hui Patterns of Shang Dynasty
By
1. Fuxi Ink Rendering Engine
2. GNN Particles Dynamics System
3.Qi Meridian Linking Control System
4.Quantum Collaborative Rendering System
Houdini Flip
NIVIDIA FLEX
Maya
To
The mutual generation of The Five Elements
The mutual balance of Yin and Yang
The Meridians if Wind and Fire



Path of the Integration Digital Technology and Oriental Aesthetics

6. Conclusion

Nezha2 deeply integrates Eastern aesthetic genes into digital animation production through eight self-developed technical systems (such as the AI skeletal dynamics system and the Fuxi Ink Painting Rendering Engine). In character effects, biomechanics, and micro-expression technologies are employed to recreate the aesthetic of "conveying reality through illusion." In the construction of scenes, procedural generating and ray-tracing techniques are used to revive traditional architectures, ink-water painting aesthetics, and mythological imagery. This approach achieves a collaborative innovation between technical systems and aesthetic expression, breaking through the technical bottlenecks of industrialized animation production in China while systematically transforming intangible cultural heritage, Taoist philosophy, and other cultural elements into visual language. Its significance lies in providing a replicable "technology + aesthetics" production paradigm for Chinese animation, advancing industrial upgrading, and preserving the spiritual essence of Eastern mythology through modern audiovisual language.

Disclosure statement

The author declares no conflict of interest.

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