

Research on Generative Artificial Intelligence-Driven Innovation and Aesthetic Expansion in Film and Television Art Design

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ABSTRACT

The article aims to analyze the design innovation and efficiency improvement brought by generative artificial intelligence in film and television art creation, and explore the emerging algorithmic aesthetic characteristics that have emerged as a result. At the same time, the article also points out the challenges and ethical issues faced by artificial intelligence in creation, with the hope of providing useful references and insights for theoretical research in this field.

KEYWORDS

Film and television art; Generative AI; Algorithmic aesthetics

1 Analysis of the Current Situation of Film and Television Art

1.1 The Transformation of the Era in Film and Television Art Creation

For a long time, film and television art creation has been a field highly dependent on manpower, experience, and material resources. From the conceptual sketches of every stroke and brush to the construction of every brick and tile, the entire process is lengthy and costly. However, in recent years, especially between 2023 and 2025, the explosive growth of generative AI technology is disrupting this traditional creative mode.

1.2 Overview of the Artificial Intelligence in the Film and Television Art Industry

AI technologies, represented by diffusion models, Generative Adversarial Networks (GANs), Neural Radiance Fields (NeRFs), and Large Language Models (LLMs), have rapidly penetrated into various aspects of film and television production from laboratory research^[1]. They are no longer merely auxiliary tools, but partners capable of deeply participating in the generation and execution of creativity. From the visual interpretation of scripts to the one-click generation of high-precision 3D assets, and to real-time rendered virtual production, AI is compressing time, liberating productivity, and driving the transformation of creative thinking. It can be said that film and television art creation in the era of artificial intelligence is at its "singularity" moment.

2 Generative Artificial Intelligence Revolution in Film-TV Art Segments

2.1 Conceptual Art and Visual Exploration

In the early stages of film and television production, conceptual art and visual exploration lay the foundation for the visual tone and aesthetic direction of the entire project. The intervention of generative AI has upgraded this stage from static and isolated image creation to dynamic and systematic worldview construction.

In traditional workflows, artists need to spend days or even weeks hand-drawing concept art based on script descriptions. However, nowadays, the relationship between AI and painting is becoming increasingly close. With the help of text-to-image models such as Midjourney, Stable Diffusion, and the DALL-E series, artists can generate a large number of high-quality concept images in just a few minutes by simply inputting descriptive text prompts, covering character design, scene atmosphere, keyframe images, and more^[2]. For example, the production team of "Reunion Order," the first AIGC full-process animated film in China, used the giant pandas Tuan Tuan and Yuan Yuan as the prototype. After inputting keywords such as "stupid panda, ink texture," the AI generated multiple visual schemes that matched the description. This has significantly accelerated the iteration speed of the team's creative ideas, helping to quickly explore and determine the visual direction.

The emergence of video generation models such as Sora, released in 2024, marks a significant leap in the field of concept art^[3]. Artists can now generate not only static concept images but also short dynamic video clips^[4]. This enables teams to intuitively experience the atmosphere of a scene, changes in lighting and shadows, material dynamics, and even camera movements at the earliest stages.

2.2 Scene Design and Virtual Set Construction

The scene and set design provide the physical space and environmental atmosphere for the unfolding of the story. Generative AI has broken through the barrier from 2D images to 3D space, significantly shortening the production cycle

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of scene assets.

The current workflow for scene design typically begins with a 2D concept image generated by AI. Subsequently, artists utilize techniques such as Neural Radiance Fields (NeRF) or 3D Gaussian Splatting to reconstruct realistic 3D scenes from multiple 2D images^[1].

In addition, these AI-generated 3D assets can be quickly imported into mainstream DCC software such as Unreal Engine 5 or Blender. Within the engine, artists can utilize AI-assisted procedural generation tools to intelligently arrange these basic assets on a large scale, thereby quickly constructing grand and detailed virtual scenes. This greatly addresses the pain points of traditional virtual production, where creating massive amounts of high-quality 3D assets is costly and time-consuming.

For example, in the first episode of "The Case of Judge Dee in the Tang Dynasty," Youku's first AI-assisted special effects series, the production team utilized nearly 20,000 individual digital assets such as buildings and environments created with the help of AI for the overhead shot of Chang'an City in the first episode. They also employed AI technology to quickly assemble, combine, and arrange these basic assets according to the director's vision and scene requirements, achieving "one-time creation, multiple reuse" and greatly enhancing the efficiency of scene construction.



Figure 1 Digital assets of Chang'an City generated by AI are utilized

2.3 Character Design and Prop Development

Characters and props are crucial carriers of film and television narratives. Generative AI empowers designers to create characters and props that are more personalized, diverse, and capable of being quickly 3D rendered.

Unlike the extensive exploration of conceptual art, character and prop design requires precise creation within a predetermined artistic style framework. Based on the Stable Diffusion model, combined with fine-tuning techniques such as DreamBooth, it has become the mainstream practice mode in the industry. Artists first collect a small number of images that represent the core characteristics and style of the target character or prop, forming a small, high-quality dataset. Then, this exclusive dataset is used to fine-tune a general-purpose base model. This process teaches the model to understand and reproduce specific design styles, facial features of characters, or structural details of props. After fine-tuning, designers can generate a large number of design variations that meet the requirements and have a unified style through simple text prompts using the exclusive model. Finally, designers select the best from the numerous schemes generated by AI, and perform manual fine-tuning and final rendering to complete the design. In addition, Generative Adversarial Networks (GANs) are also used to enhance designers' creativity. By learning from massive data, GANs can generate brand-new and sometimes even unimaginable character images, providing designers with unexpected inspiration.

3 New Paradigm of Film and Television Aesthetics Driven by Artificial Intelligence

If process innovation represents the revolution brought by artificial intelligence to the efficiency of film and television art, then aesthetic expansion signifies its profound empowerment at the artistic level. Generative AI, driven by data and inherent mathematical logic, is giving birth to a brand-new industrial aesthetics of film algorithms.

3.1 Aesthetic Expression of Modularization and Hierarchy

The algorithmic system of generative artificial intelligence is capable of analyzing vast amounts of visual data, learning the characteristics of different artistic styles, and carrying out innovative recombination based on this. This creative mechanism based on statistical learning enables film and television art design to break through the limitations of traditional manual creation and achieve modular and hierarchical aesthetic expression^[5]. For example, in character design, AI can generate thousands of facial texture variations, providing creators with a rich selection space; in scene construction, algorithms can quickly generate architectural groups that conform to a specific historical period or fantasy style. This human-machine co-creation model not only improves creative efficiency but, more importantly, expands the boundaries of artistic expression, making film and television art present unprecedented diversity and complexity^[6].

3.2 Reconstruction of Aesthetics of Fear and Cognitive Experience

AI-generated imagery naturally produces a "creepy aesthetic" experience that lies between the familiar and the

unfamiliar through its unique creative mechanism. This aesthetic feature stems from the fundamental differences between algorithmic generation logic and human cognitive methods: AI understands the visual world based on probabilistic modeling rather than physiological perception, resulting in generated results that often exhibit a certain sense of incongruity at the detailed level. For example, an AI-generated face may achieve 95% realism, but it is precisely those 5% deviations that can trigger strong cognitive dissonance in the viewer. This continuous tension between certainty and uncertainty, familiarity and unfamiliarity, transforms AI from a flaw that needs to be controlled into a narrative and aesthetic tool that can be utilized ^[7]. Film and television art design can actively utilize this characteristic to create a unique psychological atmosphere in horror films, science fiction films, and other genres, or enhance the digital art qualities of the work by deliberately retaining certain algorithmic traces.

4 Challenges and Ethical Issues

4.1 Current Technological Bottlenecks and Challenges

The challenges of controllability and consistency are the most common pain points in the application of generative AI in film and television art. Although AI can generate stunning single frames, it is still very difficult to maintain absolute consistency in characters, costumes, props, and scene styles across long shots or different shots. Its precise control over image details remains limited. The quality and usability of 3D generation are also significant issues. Although AI-generated 3D models are fast, they generally suffer from problems such as low resolution, chaotic topological structure, and inability to be directly used for rigging and animation. They can usually only serve as rough designs, requiring artists to perform extensive manual cleanup, rewiring, and detailed sculpting to meet industrial standards.

In addition, seamlessly integrating AI-generated digital assets, such as dynamic backgrounds and virtual characters, with real-life footage remains a significant challenge in the field of visual effects. Higher technical and artistic processing is required for lighting matching, color space unification, and the realism of physical interactions.

4.2 Ethical Controversy and Copyright Ownership

If a film's art design heavily relies on AI, who is its author? Is it the art director who came up with the idea, the artist who wrote the prompts, the engineer who developed the AI model, or the original creator of the massive data used to train the model? This question remains unresolved in both legal and ethical terms.

Moreover, most generative AI models are trained using images crawled from the Internet, which contain a large number of copyright-protected images. This has triggered serious disputes over copyright infringement. Although companies such as Adobe have attempted to mitigate risks by using legally licensed datasets through their Firefly model, this remains a significant legal challenge facing the entire industry ^[8].

5 Conclusion and Outlook

Generative artificial intelligence is profoundly transforming the creative paradigm of film and television art, significantly enhancing the efficiency of core aspects such as concept design, scene construction, and character development, and driving innovation in visual storytelling. At the same time, based on data and algorithmic logic, it has given rise to a new type of modular and hierarchical aesthetic form, reshaping the cognitive experience of the audience and expanding the boundaries of artistic expression. However, the technology still faces challenges such as controllability, consistency, and generation quality, and ethical and copyright issues also urgently need to be clarified.

In the future, the continuous innovation of film and television art relies on the deep integration of human creativity and artificial intelligence, thereby constructing a new ecosystem of visual narrative that is more expressive and innovative.

References

- [1] Ruihan Zhang, Borou Yu et al. Generative AI for Film Creation: A Survey of Recent Advances[J/OL]. arXiv preprint arXiv:2504.08296, 2025.
- [2] Guoxing Ao. "Resonance" Between Fine Arts and Artificial Intelligence: AI's Disruption and Innovation in Artistic Creation[J]. Art Observation, 2023, (11): 74-75.
- [3] Yixin Liu, Kai Zhang et al. Sora: A Review on Background, Technology, Limitations, and Opportunities of Large Vision Models[J/OL]. arXiv preprint arXiv:2402.17177, 2024.
- [4] Agarwal Niket, Ali Arslan, et al. Cosmos World Foundation Model Platform for Physical AI[J/OL]. NVIDIA, 2025-01-08.
- [5] Yanwen Li, Meishu Wang. The Semiotic Dimension of Industrial Aesthetics in Film Algorithms: From the Intertextual Mediation of Sci-Fi Film Symbols to Technological Humanism [J]. Film Review, 2025, (10): 14-19.
- [6] Kaixiong Wu, Siqi Li. "Aesthetic Characteristics and Narrative Strategies of Animated Films in the 'Human-Machine Co-Creation' Era" [J]. Film Review, 2025, (14): 88-93.
- [7] Wang Hao. Algorithm generated 'terror aesthetics': research on the mechanism of AI generated image' new attraction '[J]. Contemporary Film, 2025, (07): 91-98.
- [8] Jiang Harry H., Brown Lauren, et al. AI Art and its Impact on Artists[C]//Proceedings of the 2023 AAAI/ACM Conference on AI, Ethics, and Society. 2023-08-08.