

Transformation and Reflection on Digital Animation Design in the AI Era

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Abstract

In recent years, with the continuous development and innovation of AI technology, it has brought certain convenience to various industries in the current market, but also forced many design industries to face the transformation under the tide of the times, including digital animation design. Traditional animation design methods and processes require innovation and upgrading with the intervention of AI tools. On the one hand, this transformation has indeed improved the efficiency of digital animation production, but on the other hand, the integration of AI has also brought some new problems to animation design. This article will combine AI animation cases in the market to explain the innovative ideas, problems, and challenges of digital animation in the current era.

Keywords

Digital animation design, AI technology, development of animation industry, animation innovation.

1. Characteristics of Traditional Digital Animation and AI Animation

1.1. Production Mode and Characteristics of Digital Animation

As an art form that has witnessed significant technological changes, animation has undergone a transformation from traditional handmade animation to digital animation over the past century. 2D animation has shifted from traditional pigment drawing to using hand drawn tablets and 2D animation production software for design and production. 3D animation relies on 3D software and bone binding systems to render frame by frame to complete the creation. Digital animation production generally adopts a linear production mode, which gradually progresses from "early stage to mid stage to late stage". The mid stage and early stage work includes: pre planning, animation original design, storyboard design and drawing, and digital asset production; Mid term work includes: frame by frame production of motion effects, special effects, and lighting rendering; Post production work includes: editing and compositing, as well as dubbing and composing music. The biggest feature of digital animation is that it has high production flexibility, and individuals can also create independently; The production efficiency is relatively controllable, and some duplicate assets can be reused repeatedly. Compared with traditional 2D animation, the emergence of digital animation has greatly solved the problems of long production cycles, high labor costs, and difficult production in traditional animation.

1.2. Overview of AI Animation Technology

AI animation is generated based on artificial intelligence algorithms, utilizing AI's generative, deep learning, and data collection and analysis functions to significantly change the traditional digital animation production mode. Digital animators require humans to primarily complete a large amount of work, while AI animation achieves automation in multiple design and production processes. For example, digital animation scripts can use AI to refine and split shots, utilize text and image functions to achieve conceptual original design, and even use AI to supplement frames for dynamic character generation. The advantage of AI animation is that it reduces the threshold for animation creation, significantly shortens the rendering time, and

improves the efficiency of animation production. Material assets can iterate quickly, improving the creative trial and error rate in the early stages of animation. At present, AI animation is developing rapidly, with various generative AI platforms competing to emerge, leading to a surge in AI animation in China. Short video animation and independent animation works have also formed a certain scale in the domestic animation market, prompting a large number of young animation professionals to gradually abandon traditional digital animation production forms and turn to the embrace of AI.

2. Innovative Path of Digital Animation Design in the AI Era

2.1. Transformation of the Creative Process

Traditional digital animation production highly relies on manual operations. The original artwork requires designers to manually adjust the visual elements, while animation requires designers to manually adjust various parameters and repeatedly render. This workflow will consume a lot of time for trial and error, with high modification costs and low fault tolerance, which limits the efficiency of digital animation creation. The integration of AI technology can effectively solve these problems. In the early stages of animation production, it is possible to quickly disassemble the animation script and complete the original design based on the script settings, allowing the designer's creativity to be quickly implemented; In the mid-term of animation production, AI can generate digital models with one click and complete dynamic frame supplementation based on prompt words or prompt images, improving rendering efficiency. The development of generative artificial intelligence has brought new possibilities to action production, and the most typical one is the technology of generating actions based on text descriptions. This technology can understand the requirements given by users in natural language and directly generate corresponding 3D character animations [1]; In the post production of animation, AI technology also performs well in image color grading, voice acting, and music. Compared to traditional digital animation post production, AI technology can free designers from the tedious production process.

2.2. The Transformation of Creative Thinking

The application of AI in digital animation not only boosts production efficiency but also reshapes the design mindset of animation professionals. Traditional digital animation has long been constrained by high production costs and lengthy creation cycles, requiring creators to spend considerable time repeatedly comparing design options and making revisions. Every creative attempt must be approached with great caution. AI technology, powered by intelligent generative capabilities trained on vast amounts of artistic data, can deeply explore the latent possibilities of animation concepts, opening up unprecedented dimensions for creative generation in contemporary animation art [2]. The integration of AI enables creators to rapidly generate multiple design proposals-especially during the pre-production phase. In traditional digital animation, characters, scenes, and storyboards are often interdependent; adjusting one element may necessitate revising or rebuilding the others entirely, resulting in significant production costs. AI, however, can simultaneously process multiple design iterations, allowing designers to focus more on "creativity" as the core of early-stage work while reducing financial concerns.

Secondly, the integration of AI technology has also lowered the threshold for creating digital animations, giving rise to a large number of more popular creative thinking. Traditional digital animation belongs to team based industrial creation, but AI animation can enable individuals to independently complete a large amount of drama content. Taking domestic AI animated dramas as an example, the average animation duration per episode ranges from 3 minutes to 10 minutes. Independent AI animation creators can use AI technology to complete up to 50

episodes of animation creation within a week. AI technology has broken down barriers in the animation industry, making digital animation more diverse.

3. The Problems and Challenges Faced by Digital Animation Design in the AI Era

3.1. Lack of Creativity Leading to Content Homogenization

Although AI technology has injected new vitality into digital animation development, many current AI-generated animated works on the market present significant issues that require attention and reflection from professionals. A common trend in AI-assisted animation creation is the gradual transformation of works into mere demonstrations of technical capability [3]. The most pressing issue is the severe homogenization of visual styles and narrative content. Many AI animators overly rely on AI-generated techniques, directly adopting existing models and stock materials from databases-including art styles, voice acting, and musical scores. This reliance leads creators to abandon originality and distinctive artistic expression, resulting in highly repetitive and formulaic final outputs.

Taking domestic AI animated dramas as an example, in order to cater to the updated platform rules of Gaoping and users' fast food browsing habits, some creators attach great importance to technology. Currently, the facial expressions in AI animated micro dramas show a highly templated trend, with characters often swinging between exaggeration and rigidity, and the flow of movements is insufficient. Domestic anime often suffers from homogenization issues such as "one script being used for multiple purposes", high similarity in character design across multiple works, and a lack of assets for a single work, with one character's face being used for multiple characters. Such works not only lack artistic height, but also hinder the development of digital animation.

3.2. Unclear Ownership of Copyright

The training of current AI models relies on data available on online platforms. Existing animation works are limited by these styles, and the character's art style, composition, and camera usage are all borrowed or even applied. And most of the data used to train AI models is not legally authorized by the original author, which poses an implicit risk of infringement. And the animations produced by trained AI models naturally have copyright flaws. The current market regulation of AI technology is not yet sound, and the ownership of content generated by AI cannot be clearly defined, which also makes it difficult for original authors to protect their rights. The blurring of copyright boundaries has fostered the bad habit of following trends in creation, causing serious concerns for legitimate original teams and hindering the commercial flow of digital animation works, hindering the healthy development of digital animation.

4. Optimization Thinking on High-quality Development of Digital Animation Design in the AI Era

The widespread adoption of AI technology in the animation industry has broken the limitations of traditional digital animation-long production cycles, high costs, and complex workflows-driving a shift toward human-machine collaboration. While AI should expand the boundaries of animation aesthetics, the reality is that as AI-generated animations flood various video platforms, they appear to be heading toward a form of "refined mediocrity." [4] This trend has also given rise to serious issues such as content homogenization, weakened creative input from designers, and ambiguous copyright ownership, all of which have, to some extent, hindered the high-quality development of digital animation in today's era. When AI animation production begins directly with AI-generated visuals, it often requires constant "structural patching"

around the generated material, resulting in narrative structures and emotional arcs that can only be passively adjusted in post-production[5].

Therefore, the future development of digital animation should focus on leveraging AI technology while avoiding its drawbacks, establishing a positive model of human-machine collaborative creation as the core direction for industrial upgrading. Based on this, I propose the following considerations: First, improve the copyright regulatory system by clarifying copyright ownership and royalty mechanisms for AI-generated animations, thus enhancing the overall creative environment. Strengthen relevant laws and regulations to standardize AI data training processes at the legal level, prevent platforms from secretly using original works for fusion-based creations, and minimize copyright disputes. Clearly define the rights and responsibilities among AI creation platforms, platform users, and original material creators, refine authorization rules for works, commercial usage rights, and permissions for derivative works, and safeguard the legitimate rights and interests of digital animation originators.

Second, optimize talent development models by integrating AI technology to cultivate versatile animation professionals. In the AI era, digital animation creation demands not only solid artistic foundations, strong aesthetic sensibilities, and innovative thinking from designers, but also proficiency in using AI tools throughout the animation production process, enabling them to adapt flexibly to emerging digital animation paradigms. Strengthen professional ethics in animation design, instill awareness of copyright among students, and eliminate plagiarism. At the same time, guide creators to adopt sound creative philosophies, overcome passive reliance on AI, and prioritize originality and innovation supported by intelligent technologies, thereby elevating both the artistic quality and intellectual depth of their works.

5. Conclusion

In summary, AI technology has indeed brought transformative changes to the digital animation industry, particularly in 2D animation, not only reconstructing new production workflows but also influencing the visual presentation of digital animations today. It has also driven technological upgrades in the animation industry, injecting fresh vitality into the development of digital animation. However, the digital animation sector enhanced by AI also faces numerous challenges as mentioned in the text. In the future, leveraging AI technology for digital animation production is inevitable. We must further explore novel collaborative creation models between humans and machines, gradually establishing relevant guidelines and regulatory measures for AI-driven digital animation. Only by prioritizing original creativity, supporting it with technological empowerment, and ensuring institutional safeguards-balancing technical efficiency with artistic value-can the industry overcome development bottlenecks, achieve high-quality and sustainable growth, and realize the harmonious coexistence of art and technology.

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