Research on the Application Status and Pros and Cons of AI in Animation Production

Cao Jingyang

Shanghai Institute of Visual Art, Shanghai, 201600, China

Abstract: *With the continuous advancement of technology, artificial intelligence (AI) has shown great potential in many fields. The field of animation is no exception, and its application brings new opportunities and challenges to animation production. While bringing new momentum to the animation industry and promoting its emerging development, AI has also planted problems and hidden dangers for the current industry development. Due to high intelligence and convenience, producers can break away from solid techniques and theories and rely on past artistic creation data to produce products that meet market demand, changing the composition of the producer group. The increase in the proportion of unconscious output by producers may lead to intangible cultural invasion in the corresponding fields. As users, we should fully consider the pros and cons of the integration of AI and animation, deeply think about the problems we are facing, propose solutions from them, and provide sustainable support for the application and innovation of AI in the animation field.*

Keywords: *AI; Animation field; Application status; Continuity*

1. Introduction

As a unique art form, animation attracts a large audience with its rich imagination, vivid visuals, and exciting stories. In the past few decades, animation production technology has continuously evolved, from traditional hand drawn animation to digital animation, and now to 3D animation and virtual reality animation, with continuous improvement in production level and quality. However, animation production is still a complex and time-consuming task that requires a significant investment of manpower, resources, and time. With the rapid development of AI technology, its application in animation has gradually become a research hotspot. AI can automate tasks such as character design, scene construction, and animation production through technologies such as online learning and simulation training, greatly improving the efficiency and quality of animation production. At the same time, it can provide new creativity and inspiration for animation creation, expand the forms of expression and artistic styles of animation. However, we also need to be cautious about the pros and cons of this double-edged sword in the field of animation. It is necessary to fully leverage its advantages while actively addressing the problems it brings, in order to promote sustainable development of both the art and industry of animation.

2. Application of AI in Animation

From the perspective of AI output principles, it has the ability to schedule all dependent data for recombination and fully test various forms of possibilities. When the combination of elements is a field that has not been attempted by humans, AI output also has a certain degree of novelty. However, from the perspective of active creation, the algorithm logic currently open to general users does not produce original artistic results, but for the tools applied to products, the calculation conclusions of AI have already met the general market demand.

2.1 Art Design

In today's animation production, AI can quickly generate various styles of animated characters and scenes based on specific themes and keywords provided by creators. By deeply learning from a vast array of existing animated art works, AI can provide meticulous optimization suggestions for the appearance of characters and scenes. By analyzing and learning from a large amount of image and scene data, AI can accurately grasp the characteristics and atmosphere of different scenes, helping

creators create highly infectious animation scenes. In terms of artistic visual presentation, ensure that the picture is more harmonious and beautiful, and improve the overall quality of the animation[1].

From the perspective of market products, AI has stable capabilities and is a powerful tool for improving production capacity by reducing costs and increasing efficiency in output.

2.2 Animation production

AI can automatically generate keyframe animations by learning animation production rules and techniques. The use of deep learning algorithms can automatically generate keyframes for actions such as walking, running, and jumping of characters, and then generate intermediate frames through interpolation algorithms to complete animation production. Among them, motion capture technology can capture actors' movements and convert them into digital data. AI can automatically process this data, remove noise and errors, and then apply them to animated characters, greatly improving animation production efficiency; Particle system is a commonly used animation special effects production technique that can simulate effects such as flames, smoke, explosions, etc. AI can improve the realism and expressiveness of special effects by optimizing particle system parameters; Physical simulation technology can simulate object motion and collision, and is widely used in animation special effects production. AI can automatically add physical effects to special effects by learning physical laws, such as gravity, friction, elasticity, etc. In addition, AI can automatically edit and post produce animations by analyzing their content and rhythm. Automatically adjust the animation colors to make them more vivid and lively. At the same time, it can automatically process sound effects, remove noise and noise, add appropriate music and sound effects, making the animation more infectious.

There are numerous high-quality samples of mainstream products in the current market, providing ample data for the output of AI. For the popular market visual style of mass production, the calculation conclusions of AI are even much higher than those of general manual production.

2.3 Story creation

A story generation model based on AI deep learning can use deep learning algorithms to learn a large number of story cases and automatically generate story summaries. These summaries can provide inspiration and reference for animation creation, helping creators quickly determine the story theme and plot. A structured story framework can help creators quickly construct stories. Based on different story types and themes, corresponding story templates are automatically generated, and creators can modify and improve them according to their own needs to quickly create complete stories. Through deep learning, AI can analyze character relationships in stories and construct character relationship networks. This network can help creators better understand the relationships between characters and plot development in stories, providing guidance for story creation. Automatically generate the development of the middle plot, as well as the climax and ending of the ending.

From a product perspective, story patterns and plotlines that meet market demand have similarities. Stories generated by AI summarizing experience can efficiently attempt to combine various elements to form a prototype of the story, without creating obstacles such as inspiration depletion or poor creative status. They can continue to work and save a lot of manpower and discussion tasks.

3. Impacts of AI on the Animation Industry

3.1 The Change in Animation Production Mode

The application of AI will change the animation production mode, shifting from traditional manual production to automated production. Traditional animation production requires a large amount of manual drawing and production, with a long production cycle and high costs. AI can automatically complete some repetitive tasks, such as character design, scene construction, animation production, etc., greatly improving production efficiency and reducing production costs. The application of AI will promote changes in collaboration and division of labor among animation production teams. In traditional animation production, personnel from different positions such as animators, designers, and screenwriters need to work closely together to complete animation production tasks. The application of AI can automate some tasks, thereby changing the way teams collaborate and divide labor. It will promote the optimization and innovation of the animation production process. The traditional

animation production process is usually linear, starting from character design, scene construction, animation production, and post production. The application of AI can make the production process more flexible and efficient, adjust production plans in a timely manner, and improve production quality[2].

3.2 The Increase in the Importance of Creativity and Connotation

The application of AI can improve animation production efficiency and reduce costs, enabling animation production companies to complete more projects in a shorter period of time and enhance market competitiveness in terms of technical quality. The users of AI have mastered the same powerful tools, and superb painting skills are no longer the first moat for creators, making the ability to coordinate products and works with audience empathy even more important. Animation works or products that can stand out from equally excellent visual effects have essentially become more determined by art, and at the same time, the creator's cognitive and aesthetic abilities are more important than in the past.

3.3 The Evolution in Animation Industry Ecosystem

Technological reforms often bring about disruptive changes in the overall industry model. The output with the same technical difficulty and scale, compensated by AI algorithms and data, greatly reduces the requirements for producers. There are more choices on the consumer side, and various aspects of supply and demand have changed. Changes bring new business models and profit channels to animation, promote the sustainable development of the animation industry, create a new competitive environment, promote continuous progress in animation production technology, and drive innovation and development in the animation industry.

4. Problems Faced by AI in Animation

4.1 The Convergence of Compositions

When animation production unconsciously relies on AI, its generation logic is based on the assembly and splicing of existing works, which can easily lead to the phenomenon of convergence in style, plot, and other aspects of the produced animation works. The lack of truly emotional and purposeful creation makes it difficult for animated works to showcase their unique artistic charm and profound connotations. As AI takes on more and more animation production tasks, producers may gradually reduce the exercise and improvement of their original ability. Over the long term, the drawing skills and storytelling abilities of animation creators may deteriorate. In addition, the generation logic of AI is based on existing data and algorithms, which may limit the free expression of ideas by animation creators to a certain extent. Creators may be influenced by the results generated by AI, making it difficult to break through established patterns and frameworks, thereby suppressing the emergence of truly creative and forward thinking ideas.

4.2 The Risk of Cultural Invasion

Due to the overall logic and algorithms of big data models originating from Western countries, when using these models for animation creation, it may unconsciously incorporate Western values. Some animated works may reflect strong Western ideology in character development, plot setting, and other aspects, which may have an impact on the values of Chinese audiences, especially young people. In addition, comics, animations, and even game works from regions such as North America and Japan have a significant global influence, and their artistic styles may become more popularized through the use of AI by humans. This may lead to the passive shaking and blurring of China's traditional animation art style, while the receiver is not aware of it. This may lead to more unconscious identification with Western culture among the audience, which will have a certain impact on the inheritance and development of excellent local culture in China.

4.3 The Lack of Creators' Subjectivity

When creators overly rely on the results generated by AI, the creative process may be "hijacked" by AI, making them more inclined to accept the advice given by AI and give up their original ideas,

resulting in the character losing its uniqueness. Due to some content directly accepting suggestions from AI, the work may lack the creator's personal thoughts and characteristics. Every creator has their own unique artistic perspective and creative philosophy, but when overly reliant on AI, these personalities may be obscured. As mentioned earlier, accepting the advice of AI when creators have no firm idea about the content they create may make some of the content meaningless, thereby reducing the ideological value of the creation. Animation works are not just about presenting visuals, but more importantly, conveying the creator's thoughts and emotions. If the creator loses control over the work, it may become hollow, lacking depth and meaning.

5. Response Strategies and Improvement Directions

5.1 Strengthen Creator Guidance, Promote Human-machine Collaboration and Integration

We should encourage creators to maintain independent thinking and innovative spirit. By organizing creative competitions, seminars, and other activities, we aim to stimulate the creativity of animation creators and cultivate their courage to break through tradition and challenge the status quo. By improving the generation algorithm of AI, the diversity and innovation of its generated results can be enhanced, the data in the database with broad representativeness can be ensured and the trend of data information homogenization can be avoided. At the same time, we must emphasize the importance of human-machine collaboration in animation production, encourage animation creators and AI to participate in the animation production process together, fully leverage their respective advantages, and actively explore new ways and fields of human-machine integration. By combining AI technology with human emotions, creativity, and aesthetic abilities, we can create animation works with greater artistic value and appeal.

5.2 Strengthen the effective construction of local cultural databases and models

We need to deeply explore China's rich traditional cultural resources and emphasize the role of high-level experts, scholars, and outstanding artists in the construction of local databases and large-scale models. At the same time, we need to increase investment in original research and development of AI technology in the field of graphics and images, enhance China's independent innovation capabilities in digital art production technology, including animation, and encourage domestic enterprises and research institutions to conduct original research, develop AI animation production tools and algorithms with independent intellectual property rights, and cultivate animation talents with innovative thinking and technical capabilities.

We need to establish a sound regulatory system for the review of the graphic and image market, including animation works, and propose different standards for different communication environments. While accepting the enrichment and diversity of visual art, we should also protect the evolution of pure traditional aesthetics. In the category of works that combine aesthetic education and publicity tasks, we should ensure that the output of results conforms to China's cultural values and moral norms, strengthen the protection and inheritance of local culture, guide the healthy development of the animation industry, and avoid cultural invasion and other problems.

5.3 Strengthen the subjectivity of creators

We need to cultivate the independent thinking ability and critical thinking of creators. Creators should be able to engage in in-depth thinking and analysis when faced with suggestions from AI, and not blindly accept them. Only with high artistic cultivation and aesthetic level can creators maintain their dominant position in interaction with AI. We should also continuously improve the artistic literacy of creators, so that they can better judge the quality of AI generated results and make targeted choices and modifications. From a technical perspective, the customizability of AI assisted tools is particularly important, which can enable creators to customize AI tools according to their own needs and styles and provide clearer prompts together with feedback mechanisms to better serve their creations. In addition, at every stage of animation production, the core role of creators should be clearly defined to ensure their overall grasp and ultimate decision-making power over the work, which is to establish a human-machine collaborative creation mode to ensure that AI is an auxiliary tool for creators, rather than a substitute[3].

6. The application guarantee of AI in the field of animation

6.1 Strengthen technology research and development

By continuously improving algorithms and models, we aim to enhance the stability of the results generated by AI. We can adopt more advanced generative adversarial network structures, increase the diversity of training data, and introduce more constraints to improve the quality and stability of the generated results. In addition, by combining the creativity and emotional expression of human creators, more artistic elements and styles can be introduced to enhance the creativity and emotional expression ability of AI in animation creation, in order to improve its artistic and infectious power. By incorporating diverse data sources and introducing more unsupervised learning methods, AI can reduce its dependence and bias towards specific data. Training on data from different cultural backgrounds and art styles can enable AI to discover new art styles and expressions through self-learning and exploration.

6.2 Improve copyright protection mechanism

By understanding policies and developing relevant protection mechanisms, the issue of copyright ownership of AI generated content can be clarified. As a new form of work, the copyright issue of content generated by AI is relatively vague compared to the traditional film and television industry. During the production process, we should increase research on copyright issues, strengthen copyright protection measures, and adopt advanced copyright protection technologies such as encryption and digital watermarking to prevent piracy and infringement of content generated by AI. At the same time, we can also strengthen the crackdown on copyright infringement, increase the cost of illegal activities, and protect the intellectual property rights of animation production companies.

6.3 Strengthen the construction of ethics and morality

We should standardize the application of AI in the field of animation, clarify the value orientation of AI generated content, and prohibit content with negative values. At the same time, corresponding review and regulatory mechanisms should be established to ensure that the content generated by AI conforms to the moral and value systems of society. In addition, we can organize public education activities to enhance public awareness and supervision of ethical and moral issues related to AI[4].

7. Conclusion

The application of AI in the field of animation has brought new development opportunities for animation production, demonstrating enormous potential and having a profound impact on the animation industry. However, we must soberly recognize that AI is a double-edged sword. While enjoying the innovation and efficiency improvement it brings, we cannot ignore the potential risks and hidden dangers. Users should make reasonable use of AI tools, adhere to their creative intentions, maintain a leading position, fully leverage their advantages, and avoid excessive dependence. At the same time, it is necessary to enhance the public's awareness of AI and actively create a favorable environment for industrial development. Only in this way can we strengthen the positive effects brought by tool transformation, weaken risks and hidden dangers, enable AI to better serve the animation industry, lead the animation industry towards a healthier and more prosperous future, and bring more exciting animation works to the audience.

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