

Man-Machine Co-Creation, Technology Empowerment and Ecological Co-Construction: Exploration of Film and Television Art Creation in the AIGC Era

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ABSTRACT

Artificial intelligence science has gone through more than half a century's development process from theoretical germination to practical application. Nowadays, with its powerful algorithm generation ability, AIGC technology has been more and more deeply involved in the creative process of the film and television industry, and has played an important role. However, as an emerging technology, it is bound to face many risks and challenges while promoting the progress of the industry. How to correctly guide AIGC technology to be good and beautiful, and build a new pattern of film and television creation with man-machine cooperation and skill combination has become a major issue that the film and television industry must face when it develops forward.

KEYWORDS

AIGC; Film and television creation; Man-machine cooperation

1 Introduction

In 1950, Turing, a British computer scientist known as the father of computers, published his paper *Computer and Intelligence*, which formally put forward the topic *Can machines think?* and opened the prelude to Artificial Intelligence (AI). American computer scientist John McCarthy, the founder of artificial intelligence technology research field, put forward the concept of "Artificial Intelligence" for the first time at Dartmouth Conference in 1956, emphasizing the importance of artificial intelligence to the development of human intelligence, laying a theoretical foundation for the research in this field, and this year was also marked as the first year of artificial intelligence.

From concept embryonic form, theoretical construction, method breakthrough to technical practice, AI technology has officially become a new science after more than half a century of development. Nowadays, "AI-Generated Content"(AIGC) derived from AI is springing up like mushrooms after a rain and is gradually applied to various production fields of human society. This technology can realize digital production of text-generated image, text-generated video, text-generated 3D, image-generated video and so on according to the preset conditions input by users, such as ChatGPT, Sora and other typical representatives. For a technology-intensive industry such as the film and television industry, its own development is deeply affected by technological innovation. The emergence of AIGC will undoubtedly lead to a new round of huge changes in film and television creation and production.

However, the application of AIGC in the film and television industry is not smooth and natural, and it also contains many risks and challenges, such as the influence of algorithm bias on content orientation, the difficulty in defining the copyright ownership of works, and the difficulty in breaking through technical bottlenecks. Therefore, how to grasp its essence in the wave of technological innovation and guide the application of technology to goodness and beauty has become an important topic that the development of the film and television industry must face.

2 Empowered by technology, AIGC helps film and television creation and production

2.1 Audio-visual sensory experience upgrade

From the perspective of AIGC technology empowerment, the audio-visual sensory experience of film and television creation and production presents multi-dimensional technological innovation and artistic breakthroughs, and its essence belongs to the deconstruction and re-encoding of traditional film and television media symbols. In the picture dimension, AIGC breaks through the technical bottlenecks such as physical shooting and post-synthesis in traditional film and television production, and can automatically complete the operations such as text video, image animation and sound visualization according to preset conditions. At the same time, this kind of direct transformation can transcend the actual physical laws, form a unique visual spectacle, and present the abstract artistic idea imagination that does not exist originally in an intuitive and three-dimensional visual way. For example, China's first text-generated video AI series cartoon *Poems of a Thousand Years* produced by CCTV Main Station is a "text-generated video" generated by the "CCTV Listening Media Large Model" jointly developed by CCTV Main Station and Shanghai AI Laboratory. The production team combined the content of the poetry and related background stories to make a national style animated poetry story.

In the auditory dimension, AIGC's audio generation technology promotes the process of dynamic simulation and intelligent fusion of sound field. This technology is based on the sound generation model of deep learning, and automatically matches the suitable auditory content such as environmental sound effects, character dialogues and cushion melodies by analyzing the plot rhythm and scene layout in real time^[1]. This not only strengthens the audience's emotional resonance, promotes the deep coupling between audio and video, but also breaks the standardized process of "picture first and then music" in traditional film and television production, realizes the two-line parallel and synchronous rendering of audio-visual elements, and makes the sensory narrative more immersive.

2.2 Production energy conservation was greatly boosted

AIGC technology effectively reduces the proportion of resource consumption in the creative process and reconstructs the energy consumption structure of film and television production through technical empowerment and process change. Compared with the traditional film and television production, this not only greatly improves the production efficiency, but also effectively saves the original production cost.

At the level of material resources, AIGC reduces the consumption of physical resources through virtualization and digital means. In the process of traditional film and television creation, it takes a lot of building materials such as wood, metal and plastic to build scenes alone, and AIGC technology can build a large number of high-precision scenes in virtual space with digital modeling and algorithmic rendering. For example, virtual cities and natural landscapes generated by AI can replace physical scenery, thus reducing consumables and avoiding environmental damage.

In terms of manpower and time cost, AIGC is also helpful to reduce costs and increase efficiency in film and television product creation. Through automation and intelligent model to reduce duplication of labor, reduce the indirect energy consumption caused by human resources investment. For example, the production team of the AI cartoon Poems of a Thousand Years launched by CCTV once said that according to the traditional production process, only one episode can be produced in a month, but with the blessing of AIGC technology, three episodes can be produced in a month. The manufacturing period is greatly shortened, and the manufacturing cost is significantly reduced. At the same time, the emergence of AI screenwriters has also improved the efficiency of the initial finalization of scripts steadily. Creators can use AI to intelligently evaluate and further optimize scripts, and help scripts avoid quality inspection problems. For example, Haima Qingfan's "intelligent evaluation of scripts" has been applied to the initial screening of many large IP scripts such as The Wandering Earth 2 and Hi, Mom.

2.3 Diversified business formats let a hundred flowers bloom

With its powerful algorithm generation ability and efficient data processing efficiency, AIGC technology has broken through the media boundary and artistic paradigm of traditional film and television creation, and stimulated the brand-new vitality of film and television industry format innovation. In recent years, sci-fi works are constantly emerging, AI miniseries appear on users' screens, and AI virtual digital people have been applied in practice one after another. All these phenomena together constitute a brand-new landscape for the format innovation of China film and television industry.

Since the release of the phenomenal work The Wandering Earth in 2019, China's science fiction film and television field has officially stepped into a new stage of vigorous development. AIGC technology has become an important driving force to promote the creation of sci-fi films and television, and it has been deeply integrated into the whole process of works creation. For example, in The Wandering Earth 2, with the help of AIGC's image generation and processing algorithm technology, the roles played by Jing Wu, Andy Lau and other actors in a specific scene are presented in a younger way, and the digital image with high restoration degree surpasses the makeup techniques of traditional film and television shooting, breaking the restrictions of time and space and age. At the same time, aiming at the problem that Teacher Li Xuejian's voice limitation caused by illness, the production team used AI speech repair technology to build an acoustic model through machine algorithms based on deep learning of his past sound materials, and completed the repair and restoration of his sound.

With the release of literary video models such as Sora in 2024, literary video technology has been widely used in creative practice. Under this background, the creation of AI miniseries has gradually emerged. In March, 2024, CCTV Headquarters launched a series of AI miniseries such as Tales of China and AI Reading Classics, which were widely praised once broadcast. At the same time, major We Media platforms have also begun to get involved in the creation practice of AI micro-short dramas, such as the AI micro-short drama Sanxingdui · Future Apocalypse launched by the TikTok platform in July 2024.

The role of AIGC technology in film and television development is not only reflected in the early or late production process, but also in the technical presentation of AI virtual digital people, which can directly interact with users. For example, on the Spring Festival Evening stage of Beijing Satellite TV in 2023, "Virtual Teresa Teng" appeared on the stage and sang classic songs with artists, which caused countless fans to feel nostalgic. This shocking interpretation across time

and space shows that virtual digital humans can not only become a bridge between the virtual world and the real world, but also break the limitations of real physical space and provide audiences with an immersive interactive experience beyond traditional media.

3 Technical out of focus, the realistic dilemma of AIGC in audio-visual field

3.1 Algorithm discrimination intensifies contradictions

In the process of AIGC guiding the transformation of the film and television industry, algorithms have become the core driving force for its content generation. However, due to the influence of multiple factors such as training data, model design and algorithm black box, the algorithm itself is not completely objective and fair^[2].

At the level of technical logic, the decision-making mechanism of the algorithm is based on the stacking of databases. When the training data with cognitive bias or implicit bias is encoded into the algorithm, the generated content or setting will continue this inequality and solidify its representation.

At the level of social impact, algorithmic discrimination has the dual characteristics of concealment and amplification effect. The concealment is influenced by the black box effect in algorithm decision-making, and its internal logic is hidden, which is difficult to be recognized intuitively, leading to discrimination prejudice infiltrating into the final result with the appearance of technical justice. However, AIGC itself relies on the Internet media and streaming media platform, which will lead to the expansion of the negative impact of this discriminatory content, thus triggering contradictions and oppositions among different groups in society and shaking the social cohesion of the film and television industry as a carrier of cultural communication.

At the level of industry ecology, algorithmic discrimination has eroded the creativity and artistry of film and television works. Influenced by algorithm preference, film and television production has gradually formed a solidified creative paradigm, and the homogenization of works has intensified. This not only violates the principle of cultural diversity, but also hinders the development of the film and television industry in a more inclusive and diverse direction.

3.2 Technical bottleneck needs to be broken

At present, most of AIGC's production ideas are based on the study and imitation of existing data, but there is still room for breakthrough in independent innovation. This technical limitation leads to the homogenization tendency of its generated content and the lack of unique artistic charm. In addition, there is also a lack of consistency in the logic of content, for example, when creating a script, the content generated for the first time cannot be connected with the subsequent creation, and it is inconsistent or the plot development is out of common sense.

In the creative practice stage, due to the lack of integration between the physical engine and the generation model, some scenes will appear abnormal and props and building materials will be distorted. When processing multi-modal data such as text, video, audio, and images, due to the high data alignment error rate, it will lead to problems such as out-of-sync sound and picture, distorted character movements, and mismatch between emotions and expressions.

In addition, as a new technical field, there is still a shortage of talent resources related to AIGC, especially in the film and television industry, which lacks compound talents who can master the technical principles of AIGC and understand film and television creation. Therefore, when creating, the advantages of AIGC technology may not be brought into play due to improper operation, and even other problems may arise.

3.3 Fall of intellectual property barriers

One of the problems that AIGC urgently needs to deal with at present is the copyright ownership dispute in the process of generating its content. AIGC's algorithm model requires a large amount of data in the daily training process, and most of this data comes from network crawling^[3]. Without the authorization of the copyright owner, it is very likely to constitute infringement to crawl non-open data such as film and television pictures and scripts. At present, there have been related cases in the industry. For example, iQiyi sued MiniMax, arguing that its unauthorized use of film and television content owned by iQiyi harmed the legitimate rights and interests of the platform. In the current field of film and television creation, it is difficult to clearly define the copyright ownership of film and television works produced by AIGC. There is no uniform standard as to which of the developers, platforms, and users the final copyright of the works belongs.

In addition, due to the low production threshold of AIGC, a large number of "magic change" versions of classic film and television works have appeared, and even some "magic change" videos involve paid services. These videos gain traffic by maliciously editing the plot, defaming the reputation of the original, and stealing the popularity of the original, which not only makes the IP of the classic works deteriorate, but also has a negative impact on the original and its creative team to

varying degrees, infringing on other people's information network communication rights and other related rights.

4 Governance strategy, AIGC film and television practice stage development strategy

4.1 Break the shackles of algorithm bias

In order to get rid of the algorithm bias in AIGC film and television practice, we must first control the data source to ensure the diversity and balance of training data. Joy Buolamwini, founder of the Algorithmic Justice League and an American computer scientist, pointed out that to improve the diversity of training data, it is necessary to improve the diversity within the technology companies that design these systems, because the repair of technology first requires people to understand the world from different standpoints. When the film and television content covers different cultural, gender, age, group and other dimensional elements, it can better avoid the stereotype caused by data deviation. At the same time, using the classification and auditing model of the algorithm, a comprehensive data auditing mechanism is established, discriminatory and biased material content is put forward, and the same type of data involving violations is marked and recorded, so as to reduce the possibility of learning deviation of the algorithm from the bottom.

In addition, corresponding industry self-examination standards and supervision systems should be established. Promote the establishment of industry norms for AIGC film and television applications, and clarify the quantitative standards for algorithmic bias governance, such as the proportion of role diversity and the evaluation of work values. The regulatory authorities may require film and television project producers to submit algorithmic data descriptions and bias detection reports when using AIGC technology, so as to estimate and review high-risk content.

4.2 Defending human subjective consciousness

As the core issue under the background of AIGC's deep involvement in film and television creation practice, the subjective position of human beings can not be ignored, and the establishment of man-machine cooperation mechanism is urgent.

First of all, it is necessary to define the role of AIGC as an assistant, establish a limited empowerment framework, and firmly establish the identity of the final decision-maker on the side of human creators. After the content is generated, the creator needs to conduct a second review from a humanistic perspective to ensure that the content can reflect sufficient humanistic value.

Secondly, on the value-oriented level, the humanistic creation concept is strengthened through industry norms and education system, and human subjective consciousness, true feelings and critical thinking are integrated into AIGC film and television creation system. Control the intervention depth of instrumental rationality in creation, and avoid the value orientation finally conveyed by the work deviating from the humanistic system.

Finally, from the perspective of technical ethics, develop interpretable algorithms and ethical review partitions to visually trace the creative logic of AIGC tools to ensure that technology should be used to serve the subjective expression and value sublimation of human beings. Achieve a dynamic balance between technological innovation and humanistic persistence, safeguard the unique value of film and television art as a carrier of human spirit, and avoid the deterioration of "technical carnival" into "technical disaster".

4.3 Deepen platform-driven integration

As the core driving force of content flow and value creation, the platform has now become fertile ground for the development of AIGC and can guide the development of AIGC technology to good and beautiful.

First of all, through the construction of cross-subject collaborative governance platform, strengthen the consensus of technical ethics. Aggregate the multi-platform involved in film and television production, such as industry associations, science and technology enterprises, creators' communities, etc., and form a normal collaborative cooperation. The platform can try to set up a tripartite review mechanism of "technology-art-ethics" to classify the access standards for AIGC application scenarios, and the technical scheme can only be implemented after passing the review. At the same time, cross-platform data resources can be shared and interoperated, and large databases, content generation tracks and user feedback can be integrated to establish risk early warning indicators.

Secondly, use the platform as the carrier to build a creative process management and control system to standardize the boundaries of human-machine collaboration. For example, in the aspect of script creation, the platform can be embedded with the dual mechanism of "human-machine". AIGC tools only provide reference content such as scene modeling and dialogue content, while the core narrative logic and emotional core of works can only be designed by human creators, which limits the direct intervention of AI algorithm on the creative core.

Finally, give play to the participation function of the platform, promote the acceleration of technological development

and personnel training, and build a new production pattern of the film and television industry. For example, the Kwai platform launched the "Starmist Short DramaxKeling Large Model" creator incubation plan in July 2024. This not only effectively relieves the pressure of many start-up teams in terms of capital and technology, but also stimulates the creative enthusiasm of the creators and promotes the evolution of AIGC creative field in a more diversified and quality direction.

4.4 Build a strong defense line of privacy and copyright

While generating content, AIGC will monitor and collect massive information data, which inevitably includes user browsing records, personal information and other private content. In addition, due to the vague subject of rights and the hidden form of infringement, the original copyright of other creators is also threatened. Therefore, the governance and protection against the infringement of others' privacy and copyright by AIGC technology has become the top priority of this technology development.

First of all, the protection barrier between users' privacy and other people's property rights can be built by formulating and perfecting relevant legal systems. At present, internationally, the 'Artificial Intelligence Act' pioneered by the European Union came into effect on August 1, 2024. This act requires the disclosure of the corpus information of AI model training, so as to ensure that copyright owners have the right to keep their works from being trained by models. In China, according to Articles 2, 3 and 11 of the Copyright Law of People's Republic of China (PRC), AIGC must meet the requirements of "originality" and "human intellectual achievement" if it is to constitute a protected work. The Cyberspace Administration of China and other relevant departments have also issued documents such as the Interim Measures for the Management of Generative Artificial Intelligence Services, requiring content generated by AI to be clearly labeled with content nature to help assist copyright protection.

Secondly, we can build a full-process technical protection system for copyright protection by strengthening technical governance capabilities. Use blockchain, digital watermarking and other technologies to develop copyright traceability and confirmation technology. For example, embedding non-tamperable creative records in script generation, special effects production and other links, or completely recording the creative process, material sources, and modification operation traces, forming an all-round copyright evidence chain from creation to dissemination.

Finally, self-regulation and collaborative governance within the industry are also particularly important. Relying on industry organizations, we can build a fast channel to solve AIGC film and television copyright disputes, and introduce technical experts, legal practitioners and other professionals to form a regulatory team, so as to reduce the cost of rights protection and improve the efficiency of copyright dispute resolution.

5 Conclusions

To sum up, the emergence of AIGC has opened up countless new paths for the development of the film and television industry. With efficient information integration, accurate content output and powerful kernel processing, AIGC, as a cutting-edge productivity, allows creators to see countless possibilities in the future of the film and television industry. However, in the final analysis, film and television creation is still an artistic creation with human beings as the main body. Creators should not blindly indulge in the joy brought by technological development, but should also be aware of the risks and challenges hidden behind the various conveniences provided by technology. As a creator, we should balance the cooperative relationship between the two, take humanistic emotion as the main body and scientific and technological tools as the wings, and guide the creation of film and television art to a high-quality, stable and sustainable development path.

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