Research on the Integration of Film and Television Photography and Aesthetics in the Era of AI Intelligence

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Abstract: With the advent of the AI intelligent era, film and television photography has undergone earth-shaking changes. Artificial intelligence technology has penetrated into the post-production of film and television photography, which has brought great changes to the post-production of film and television photography and had a profound impact on technology and aesthetics. The integration of film and television photography and aesthetics has become a new trend in the development of film and television industry. It is of great significance to explore the integration of film and television photography and aesthetics in the AI intelligent era, which is conducive to opening up new ways of film and television creation, improving the artistic level and appreciation of film and television works, and promoting the innovative development of film and television industry.

***Keywords*:** AI era, film and television photography, aesthetic development

1. Introduction

The continuous evolution of digital technology promotes the changes in various industries, and the film and television industry is no exception. As an important branch in the field of artificial intelligence, AI is gradually integrated into the whole process of film and television photography and production with its powerful content generation ability. From the script conception and conceptual design in the early stage, to the shooting scheduling and scene construction in the middle stage, and then to the editing special effects and sound effect synthesis in the later stage, AI has shown its unique value.

2. The logic of technological evolution in the later stage of film and television photography in the AI intelligent era

(1) Algorithm-driven image processing paradigm transformation.

The core application of deep learning algorithm in image denoising, super-resolution reconstruction and dynamic range expansion shows a multi-dimensional breakthrough. Convolutional neural network (CNN) achieves pixel-level noise suppression by multi-layer feature extraction, which preserves edge details more accurately than traditional median filtering. In the super-resolution task, Generative Confrontation Network (GAN) completes the transformation from low-resolution image to 4K/8K HD by using the confrontation training between generator and discriminator, and the authenticity of the picture texture is maintained. As for the dynamic range expansion, neural network based on HDR reconstruction can synthesize multiple exposure image sequences, and in this process, it gets rid of the brightness limitation of traditional LDR images and forms a natural transition high dynamic range picture. The nonlinear reconstruction of the traditional linear processing flow by neural network is reflected in the color grading link: the traditional LUT (look-up table) is replaced by the AI-driven color mapping model, which can automatically produce a color matching scheme that suits a specific aesthetic tendency by learning a large number of classic film color style data, and the creator can realize meticulous style shaping by means of interactive parameter adjustment. In terms of motion compensation and frame rate transformation, After the optical flow estimation algorithm is combined with recurrent neural network, it can intelligently generate intermediate frames to achieve smooth and slow action effect, or rely on intelligent frame insertion technology to raise the picture from 24fps to over 60fps to adapt to those devices with high frame rate display ability[1].

(2) Reconstruction of editing process by generative AI.

Generative AI completes intelligent innovation in automatic scene stitching, shot transition improvement and dynamic narrative rhythm adjustment. In the scene stitching, the semantic content of multiple camera materials can be analyzed by relying on the AI model of Transformer architecture, and perfect angle and composition combination can be selected independently to achieve seamless connection; By comparing the visual coherence parameters (color histogram, motion vector) between shots, AI can intelligently select the transition effect types (dissolving, scratching, dynamic masking), and adjust the transition duration to conform to the narrative rhythm. In the aspect of dynamic narrative rhythm adjustment, with the help

of emotional calculation model to analyze the emotional characteristics of audio waveform and picture content, we can intelligently determine the key plot points and change the clip density—for example, add fast clips in action scenes to strengthen the tension, and lengthen the lens time in emotional scenes to deepen the sense of substitution. AI-assisted intelligent frame selection system can automatically select the most expressive frame as the key frame by relying on object recognition and behavior prediction algorithm, and form a preliminary clip sequence according to narrative logic. Emotional editing decision-making relies on analyzing the characteristics of actor's micro-expression, scene atmosphere, etc., and referring to the preset aesthetic rule base, it gives intelligent editing suggestions that meet the director's intention, such as accurately grasping the actor's subtle emotional changes with facial expression recognition technology, and then adjusting the editing points according to these changes to strengthen emotional expression.

3. The internal tension and adjustment path of the later integration with aesthetics

(1) The conflict and balance between technical rationality and artistic intuition.

Technical rationality pursues standardized and efficient processing logic, while artistic intuition pays attention to personalized and emotional creative expression, which forms a strong tension in the later practice of film and television. Standardized algorithm processing will eliminate the director's individual visual style, and the lack of manual intervention in automatic color matching algorithm will lead to the convergence of different film color styles; If the intelligent editing tool completely relies on the preset rules, it will suppress the director's improvisation inspiration. To coordinate the relationship between the two, it is necessary to build an adjustable parameter module to dynamically match the AI tool with the artist's aesthetic intention-setting a "style intensity" slider in the color matching software so that the artist can freely switch between AI recommendation style and manual adjustment; Adding "creative mode" into the editing software allows the creator to override the automatic editing suggestions of AI, leaving room for independent decision-making. At the same time, through the construction of "man-machine collaboration" creative process, such as the joint creative mechanism of engineers and artistic directors in the later stage, the advantages of technical rationality and artistic intuition can be complemented — the technical experts are responsible for improving the performance of the algorithm, and the artistic directors are responsible for controlling the aesthetic direction, and feedback each other iteratively to achieve the goal[2].

(2) The adaptive evolution of classical aesthetic principles under the algorithm generation.

The classical aesthetic principles, such as montage theory, long lens aesthetics and color symbol system, should be reconstructed adaptively under the algorithm generation. Montage theory attaches importance to the rhythm and meaning creation of lens combination. AI can analyze the meaning correlation and emotional curve between lenses, automatically recommend editing schemes that conform to montage rules—calculate the visual similarity and motion continuity between lenses, and automatically generate lens combinations that conform to the "Kurishov effect", thus strengthening narrative tension. Long lens aesthetics seeks spatial continuity and time authenticity. With the help of motion compensation algorithm and dynamic stabilization technology, AI can achieve smooth movement and stable shooting of long lens, and expand the narrative capacity of long lens with generative AI—for example, stretching the length of long lens with intelligent framing skills, or relying on scene expansion algorithm to create a virtual scene to broaden the spatial scope of long lens. In terms of color symbol system, AI can learn the color symbol system of classic films (red = passion, blue = melancholy), automatically generate color schemes with specific symbolic meanings, and creators can also adjust color tendencies through interactive color palettes to realize individual expression.

(3) Reconstruction of the rights and responsibilities of creative subjectivity and technological autonomy.

Creative subjectivity emphasizes the initiative and creativity of directors, photographers and other creators, while technical autonomy focuses on the automation and intelligence characteristics of AI tools. When creating, it is necessary to determine their respective rights and responsibilities to achieve the purpose of collaborative creation. In the early stage of creation, the creator controls the setting of aesthetic style and the choice of technical route to ensure that the application of AI tools conforms to his own creative intention; In the middle of creation, let AI tools undertake repetitive and intensive processing tasks (such as batch color matching and intelligent editing, thus freeing the creator's time and energy for creative work; In the later stage of creation, the creator should manually review and adjust the results generated by AI to ensure that the artistic quality and emotional expression of the final work achieve the expected effect. In order to prevent technical autonomy from dominating creation too much, it is necessary to build a decision-making mechanism of "artificial priority"—for example, the decision-making power is reserved in key creative links (emotional drama editing and theme color setting), and AI is allowed to handle it in non-key links (routine transition and basic color matching); And create an "interpretable AI" system, so that the creator can know the decision logic and parameter settings of AI tools, thus better controlling the creative process[3].

In interdisciplinary collaboration, the theory of film and television aesthetics should make a reverse input to the research and development of AI algorithm-turn the key principles of montage theory (such as rhythm control and meaning generation of lens combination) into the purpose of improving AI algorithm, so that AI tools can better achieve the director's ideas. In the later stage, engineers and artistic directors should form a close cooperative creative system-through regular communication, iterative feedback, common choice and other means, to achieve the integration of technical rationality and artistic intuition; It is also necessary to build a "creative subjectivity maintenance" mechanism-with the help of copyright statements, creative signatures and other forms, indicating the dominant position of creators in AI-assisted creation; Restrict the application scope of AI tools by means of technical ethics and algorithm transparency standards, so as to prevent technical autonomy from excessively infringing on creative subjectivity.

4. Conclusion

The integration and development of film and television photography and aesthetics in the AI intelligent era, the transformation and upgrading from "technology-driven" to "aesthetics-led" is realized through the synergistic effect of technology evolution logic and adjustment path. Technical tools have become an effective help for creators to pursue aesthetic ideals, and the reconstruction of creative subjectivity and technical autonomy has given creators more initiative. The adaptive evolution of classical aesthetic principles has revived traditional aesthetics in the AI era. This kind of integration and innovation will create new development opportunities for the film and television industry and create more artistic and ornamental film and television works.

References

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