The Wave and Reshaping of AIGC: On the Integration, Challenges and Future of AI Generated Content and Film and Television Creation

XiaoYi Ren

Inner Mongolia Normal University 010020, China

Abstract: The rapid advancement of Artificial Intelligence Generated Content (AIGC) technology is permeating every aspect of film and television production with unprecedented depth and breadth. This paper systematically explores the relationship between AIGC and cinematic creation by synthesizing recent academic literature and industry practices. It first outlines AIGC´s current applications and integration across the entire production lifecycle—from conceptual design in pre-production to post-production editing and special effects. The analysis then delves into its paradigm-shifting impacts, including narrative evolution, aesthetic innovation, and reduced production costs. The study also critically examines challenges such as copyright conflicts, ethical dilemmas, creative authenticity issues, and structural employment shifts in the industry. Concluding with forward-looking projections, it suggests that human-machine collaborative "director-centered systems" will become the new normal in the film and television industry. Rather than replacing human creators, AIGC serves as a powerful "new brush" reshaping the language and industrial ecosystem of cinematic art.

Keywords: AIGC; film and television creation; artificial intelligence; human-machine collaboration; film industry; copyright ethics

0. Introduce

Since cinema´s inception, technological advancement has been the driving force behind its artistic evolution. From silent to sound, black-and-white to color, and 2D to 3D, each technological revolution has dramatically expanded the expressive boundaries of cinematic art. Entering the second decade of the 21st century, artificial intelligence technologies represented by deep learning, generative adversarial networks (GANs), large language models (LLMs), and diffusion models are sparking a creative wave dubbed AIGC (Artificial Intelligence Generated Content). This movement goes beyond merely optimizing existing workflows—it directly engages in the generation of content itself, transforming traditional production methods through text, images, videos, and music.

The film and television industry, as a complex system where technology and artistry converge, has become the frontline for AIGC implementation. From the stunning concept art generated by Midjourney and Stable Diffusion to the dynamic videos produced by Runway and Pika Labs, and the remarkable potential demonstrated by Sora models, AIGC is proving its value across the entire production chain—from scriptwriting and previsualization to filming, editing, special effects, and voice acting.

This paper aims to transcend superficial technical phenomena by synthesizing cutting-edge literature and case studies from recent years, providing a comprehensive analysis of the multifaceted relationship between AIGC and film/TV production. We begin by mapping out how AIGC empowers cinematic workflows, then examine the profound paradigm shifts it triggers, critically assess emerging challenges, and ultimately outline a future trajectory for human-machine collaboration in creative industries.

1. echnology integration: The penetration and application of AIGC in the whole process of film and television creation

AIGC, or Artificial Intelligence-Generated Content, has revolutionized the film and television industry by integrating into every stage of production. From initial planning and scriptwriting to mid-production filming and acting, and finally post-production editing and special effects processing, AIGC plays a pivotal role throughout the entire workflow. This application represents not just a simple toolchain addition, but a fundamental overhaul of the traditional creative process in the film and television sector.

In the pre-production phase of film and television production, AIGC assists human creators in scriptwriting, concept illustration, and storyboard design. During the mid-production stage, its applications primarily focus on filming and performance execution. In post-production, AIGC plays a key role in editing, special effects processing, and music composition. Overall, AIGC not only enhances production efficiency and reduces costs in the film and television industry, but more importantly, it opens up new possibilities for creative development and heralds a new era in the field.

1.1 Early creation and development stage: from "inspiration acceleration" to "visual preview"

During the initial creative incubation phase of film and television projects, AIGC (Artificial Intelligence Generated Content) has played a pivotal role akin to a "super brainstorming assistant". It not only provides abundant inspiration and creativity for scriptwriting, helping screenwriters break through mental blocks, but also offers precise guidance and optimization suggestions for visual presentation. This empowers the entire creative team to achieve comprehensive improvements in both textual expression and visual representation, ensuring high-quality creative foundations from the very beginning of the project.

1.1.1 Script Creation and Support: AI writing tools powered by large language models (e.g., GPT-4) can rapidly generate story outlines, character profiles, dialogue lines, and even complete script drafts. For instance, a screenwriter could input "create a sadistic opening for a time-travel romance" into the AI, which would instantly provide multiple options. This significantly accelerates the process of creative brainstorming and material accumulation. However, as scholar Marcus du Sautoy (2019) noted in *The Creativity Code*, current AI-generated content fundamentally relies on combing and optimizing massive data patterns, lacking authentic human emotional experiences and intentional intent. Consequently, such outputs often require human screenwriters to conduct thorough screening, revisions, and infuse soul into the work [1]. AI functions more like an indefatigable "junior screenwriter" providing raw materials, while human "chief screenwriters" must guide the narrative's core themes and emotional trajectory, breathing life into the cold text with human warmth and depth.

1.1.2 Concept Design and Storyboarding: This remains one of the most mature and impactful applications of AIGC technology. By leveraging text-based generative models like Midjourney and Stable Diffusion, art directors and concept artists can now produce high-quality scene concept art, character designs, and costume props through simple text prompts (Prompts). This approach not only reduces time-intensive manual rendering from weeks to hours, but more importantly, dramatically lowers creative trial-and-error costs. It allows production teams to explore and visualize diverse aesthetic styles virtually before committing substantial resources. As highlighted in the 2023 article "The Rise of AI Painting: A Visual Revolution from 'Reproduction' to 'Generation'," this marks a paradigm shift in visual creation from manual reproduction to language generation, fundamentally altering both the threshold and focus of artistic creation [2]. Furthermore, using generative video models like Animatediff and Sora, production teams can convert static storyboard scripts into dynamic animatics with basic camera movements and pacing, providing precise visual references for final filming.

This "visual previsualization" process, evolving from text to images and then to dynamic videos, has revolutionized the traditional linear "imagination-first, implementation-later" model in film

and television production. The creative team can visualize the final product's prototype early on, allowing timely adjustments to narrative pacing, cinematography, and even core plotlines—preventing costly revisions in post-production. Moreover, AI-generated previews serve as a cross-departmental "common language," enabling directors, cinematographers, art designers, and VFX teams to establish aesthetic consensus during pre-production, significantly boosting collaboration efficiency. Notably, while AI excels in visual previsualization, human creators remain irreplaceable in grasping abstract aesthetic dimensions like "atmospheric quality" and "emotional intensity." Sometimes, AI-generated "perfect visuals" require human directors to infuse soul through fine-tuning lighting, color grading, and even actor performances.

1.2 Mid-term shooting and production stage: virtual production and performance enhancement

In the filming phase of film and television production, Artificial Intelligence Generated Content (AIGC) technology is deeply integrating with cutting-edge innovations like virtual production systems. This convergence is fundamentally transforming on-set workflows. Through AIGC, production teams can generate and adjust elements such as scenes, characters, and lighting in real-time during filming, significantly enhancing efficiency and flexibility. The application of this technology not only reduces post-production pressure but also empowers directors and cinematographers to unleash their creativity, producing richer and more diverse visual effects. Meanwhile, virtual production technology enables the simulation of both realistic and fictional scenarios at shooting sites, providing actors with more authentic performance environments that further elevate the quality and entertainment value of productions. Overall, the deep integration of AIGC and virtual production is driving revolutionary changes in filmmaking, making shooting processes more efficient, flexible, and brimming with creative possibilities.

1.2.1 The Intelligent Engine of Virtual Production: Industrial Light & Magic's LED virtual production technology, such as StageCraft, has revolutionized traditional green screen filming. AIGC can serve as the real-time generation engine driving content creation on these massive LED screens. Directors can now request AI to dynamically generate and adjust background environments in real time—such as seasonal transformations and architectural style changes—allowing actors to perform in more realistic, flexible dynamic settings. This enhances lighting reflections and eye contact accuracy, ultimately elevating the authenticity of performances.

1.2.2 The restoration and enhancement of actors 'performances: AI technology has been applied to correct filming imperfections, such as using deep learning algorithms for automated "face replacement" (Digital Face Replacement) or "face retouching" (like removing wrinkles and fatigue marks), as well as fine-tuning actors' performances during post-production. While this raises ethical debates, it offers technical solutions in specific scenarios—such as when actors pass away and require reshoots.

1.2.3 AI-powered Production Aids: Leveraging cutting-edge computer vision and machine learning technologies, these intelligent tools have become essential on-set assets for cinematographers. They analyze real-time camera setups, actor movements, and lighting conditions to provide instant optimization suggestions. For example, when detecting unbalanced compositions, the system automatically displays adjusted composition reference lines in the viewfinder. During dynamic filming, it predicts actors' movement trajectories and recommends optimal focus tracking settings. This "AI assistant director" empowers novice photographers to rapidly master professional techniques, significantly boosting both shooting efficiency and image quality.

1.2.4 Real-time On-site Content Generation: When faced with situations requiring rapid background creation or temporary prop solutions, AIGC technology demonstrates its unique instant generation capabilities. Through wearable devices or tablets at the scene, art teams can quickly input text descriptions, enabling AI to rapidly generate 3D models or texture maps tailored to specific scenarios. This capability allows production crews to flexibly handle unexpected

challenges. For instance, when scheduled outdoor filming is canceled due to weather conditions, AI can swiftly create realistic virtual exterior replacements, ensuring uninterrupted shooting progress.

AIGC serves as a versatile "production assistant" that provides comprehensive support for film and television production teams. It not only significantly enhances production efficiency and reduces costs, but also sparks new artistic inspiration, driving continuous innovation and breakthroughs in content, format, and style of cinematic works. With the ongoing maturation and refinement of AIGC technology, its applications in film and television production are expected to expand further and deepen, delivering audiences increasingly diverse and spectacular audiovisual experiences.

1.3 Post-production and special effects: the ultimate leap in efficiency

The post-production phase stands as the pivotal domain where AIGC technology fully demonstrates its commercial value of "cost reduction and efficiency enhancement". By leveraging automated image processing, video editing, and special effects generation, AIGC significantly reduces manual complexity and time consumption, thereby substantially lowering production costs. Moreover, AIGC enables rapid content generation while maintaining high quality, dramatically boosting productivity. This makes post-production a crucial battleground for AIGC to achieve cost-effectiveness goals. In this critical stage, AIGC not only helps enterprises save substantial capital investments but also generates higher output efficiency, positioning them strategically in competitive markets.

1.3.1 Visual Effects (VFX): AI algorithms are extensively applied across all stages of special effects production. Key applications include: • Keying: While traditional methods require manual frame-by-frame processing, AI tools like Adobe After Effects' Roto Brush leverage machine learning to automatically identify and separate foreground from background with far greater precision and efficiency than manual work. • Material generation and scene expansion: AI can rapidly create realistic natural elements such as rocks, trees, and clouds, or generate massive digital crowds and architectural complexes for constructing grand virtual environments (Matte Painting). • Motion capture and facial expression generation: By analyzing minimal sensor data or ordinary video footage, AI can accurately reconstruct complex human movements and subtle facial expressions, significantly reducing the cost of high-end motion capture systems.

1.3.2 Video Editing and Color Grading: AI technology has demonstrated remarkable potential in this field. It can perform preliminary content analysis on video materials, accurately identifying key shots and standout clips. Moreover, AI can intelligently conduct initial rough cuts based on music rhythms and melodies, enhancing the video's rhythmic flow and coordination. In color grading, AI also delivers impressive performance. It learns and imitates the distinctive tonal styles of classic films, enabling one-click batch application across all shots in new projects. This ensures high consistency and unity in visual style throughout the video, significantly improving post-production efficiency and output quality.

1.3.3 Sound Design and Music Composition: AI-powered audio tools like AIVA demonstrate exceptional music generation capabilities. These systems analyze emotional shifts in narratives to automatically create matching background scores, significantly boosting production efficiency while ensuring seamless integration between music and storytelling to enhance audience immersion. Furthermore, AI voice synthesis technologies such as GPT-SoVITS have shown remarkable performance in replicating specific vocal characteristics with remarkable accuracy, finding wide application in voice acting and narration production. Particularly when addressing unclear actor recordings or voice replacements, these AI solutions can swiftly generate high-quality substitute tracks, effectively resolving audio post-production challenges and providing robust support for audio development in film, television, and gaming industries.

2. Paradigm Revolution: AIGC's Reshaping of the Logic of Film and Television Creation

The application of AIGC is not only the upgrade of tools, but also profoundly changes the internal logic and industrial paradigm of film and television creation.

2.1 The evolution of the creative subject: "man-machine collaboration" has become the new normal

Traditional film and television production has always been a human-centric endeavor, but the emergence of AIGC (Artificial Intelligence Generated Content) has blurred and diversified creative roles. In his book<The History of Motion Graphics>, Michael Betancourt foresaw this transformation when analyzing automation's impact on motion graphics, noting that technology shifts creators from mere "executors" to "curators" and "editors" [3]. Today, creators—directors, screenwriters, and designers—no longer manually craft every frame or write every line. Instead, they formulate precise creative prompts (Prompts), evaluate AI-generated outputs, and strategically guide them toward artistic objectives. This represents a new paradigm of "curatorial creation" where humans provide creative vision, aesthetic judgment, and emotional depth, while AI generates diverse implementation options and explores possibilities. Together, these elements form a powerful creative cycle that redefines the industry.

2.2 The innovation of aesthetic style: surrealism and "AI texture"

The AIGC model learns from existing human artistic styles, yet its generative outputs often manifest a unique aesthetic characterized by hybridity, collage-like elements, and even transcendence of reality. This "AI texture" —a visual signature that oscillates between precision and distortion, familiarity and novelty———is establishing a new aesthetic paradigm. Notably, intentional explorations of this aesthetic have already emerged in cinematic works like 'AI and'Love Crash". Lev Manovich proposed in <AI Aesthetics>(2020) that AI art creates a form of "meta-realism," which does not replicate reality but mirrors "cultural perception" —the established framework through which we interpret reality via media culture [4]. This breakthrough opens up unprecedented expressive possibilities for film and television arts, enabling the depiction of surreal imagery such as dreams, hallucinations, and futurism that were previously unattainable through live-action filming.

2.3 The transformation of production mode: cost reduction and "democratization of creativity"

The high production costs have long been a major barrier to film and television creation, particularly for independent and low-budget projects. AIGC has significantly lowered the financial and time thresholds required for visual development and special effects production. With AI tools, independent creators can now conceptualize and deliver visuals with cinematic quality. This trend has democratized film and television creation, allowing more diverse ideas to gain visibility. The book *AIGC: The Age of Intelligent Creation* (2023) emphasizes this shift, arguing that AIGC is building an ecosystem where "everyone can create" [5]. However, whether this democratization truly means equal opportunities or will lead to new technical barriers and resource monopolies remains to be seen.

3. Realistic challenges: The difficulties faced by AIGC in film and television applications

While actively embracing the technological dividends and leveraging the immense convenience and productivity of Artificial Intelligence Generated Content (AIGC), we must soberly recognize and confront the serious challenges posed by AIGC in practical applications. These challenges extend beyond technical aspects like security and reliability to encompass complex social and legal issues including ethical considerations, copyright protection, and information authenticity. Only through comprehensive understanding and proactive responses to these challenges can we ensure the healthy development of AIGC technology and fully realize its potential to benefit society.

3.1 The gray area between copyright and ethics

The creation process of AIGC essentially involves the crawling and integration of relevant content from massive databases. This content generation method inevitably sparks intense debates about originality and copyright issues, which has become the most acute and urgent challenge currently facing AIGC.

3.1.1 Training Data Copyright: Existing AI-generated content (AIGC) models like Stable Diffusion and Midjourney have been trained by automatically scraping and learning from billions of images on the internet without explicit authorization. This results in generated content that may closely mimic the styles of specific living artists or contain fragments of copyrighted original images. This has sparked legal and ethical debates such as "Does AI-generated content constitute copyright infringement?" and "Is imitating styles legally permissible?" Existing copyright law systems appear inadequate in addressing these emerging issues.

3.1.2 Content ownership definition: Who owns the copyright to a script that is drafted by AI and refined by humans? Is it the writer of the prompt, the designer of the model, or the human who creatively processes the final product? This definition is still not settled worldwide.

3.1.3 Deepfake and Abuse Risks: When AI face-swapping and voice cloning technologies are maliciously exploited to create defamatory videos, fraudulent content, or misinformation, they pose severe threats to both society and individuals. The film and television industry must establish rigorous industry standards and technical watermarking protocols to prevent such technological misuse.

3.2 Artistic originality and homogeneity crisis

AIGC, built on "learning" from the past, produces probabilistic outputs that essentially represent "averaging over optimizations". Over-reliance on AI may trap creative processes in an echo chamber effect – where content achieves technical perfection but lacks genuine innovation and emotional impact, ultimately leading to aesthetic homogenization and monotony. The concepts of "overproduction" and "self-exploitation" criticized by Byung-Chul Han in *The Burnout Society* could manifest in new forms in the AIGC era: massive amounts of mediocre AI-generated content will overwhelm all other outputs, making it increasingly difficult for truly original human creations that require time to mature to stand out [6]. The core value of art lies in its irreplaceable originality and humanistic perspective – qualities that AI currently cannot match.

3.3 Impact on the employment structure of the industry

AIGC (Artificial Intelligence Generated Content) technology has automated numerous fundamental and repetitive tasks, including basic concept art creation, image compositing, and 3D model building. The widespread adoption of this technology has inevitably impacted frontline workers in related fields. As AI continues to advance and gain popularity, traditional work models are being transformed, and industries are undergoing structural adjustments with growing pains. In this transformative era, effectively retraining existing professionals to master AI collaboration skills—such as Prompt Engineering and AI Art Direction—has become an urgent challenge. Simultaneously, redefining human value in higher-level domains like creative management, emotional expression, and complex decision-making to ensure our unique and irreplaceable role in the AI age has emerged as a critical issue requiring joint exploration by both industry and academia. This not only concerns career development for practitioners but also impacts the sustainable growth of entire industries.

4. Future Outlook: Towards the "New Director Center System" of Man-Machine Collaboration

Despite numerous challenges, the integration of Artificial Intelligence Generated Content (AIGC) with film and television production has become irreversible. Moving forward, our goal is not

to pit humans against machines, but to foster deep collaboration. This synergy extends beyond technical integration, encompassing holistic alignment in creative philosophies, methodologies, and industrial ecosystems. Empowered by AI technology, filmmaking can transcend traditional constraints to achieve more efficient and intelligent processes. Simultaneously, AIGC can draw inspiration from cinematic works to enhance its own intelligence. This profound convergence will drive innovation in the film industry, delivering richer and more captivating productions. Therefore, we should actively embrace the trend of AIGC integration, jointly explore new pathways for human-machine collaboration, and inject fresh vitality into the future development of the film and television sector.

(1) Enhanced Integration and Real-Time Capabilities of Tools: AIGC (Artificial Intelligence Generated Content) will be deeply integrated into mainstream film and television production software, including but not limited to Adobe suite, Unreal Engine, DaVinci Resolve, and other widely-used industry tools. Through this deep integration, AIGC will evolve from a standalone auxiliary tool into an indispensable component of production workflows, achieving seamless integration. Simultaneously, real-time generation capabilities will be significantly enhanced, allowing directors to generate and flexibly adjust virtual environments through simple voice commands on set without waiting for post-production. This breakthrough will dramatically improve creative efficiency and on-set responsiveness. The real-time interactive experience will revolutionize film production, enabling faster and more precise realization of creative concepts.

(2) "Prompt Engineering" as Core Competency: The ability to communicate effectively with AI—— Specifically, crafting precise and creative prompts (Prompt Engineering)—— will become an essential skill for directors, art designers, screenwriters, and other key creatives. This capability not only requires them to articulate needs accurately but also to unlock AI's potential in generating expected creative outputs. Language description skills are closely tied to visual imagination, serving as a crucial benchmark for evaluating creators' comprehensive abilities. In this context, mastering "Prompt Engineering" has emerged as a pivotal factor in enhancing both creative efficiency and work quality.

(3) Strengthening the "Director-Centric Approach": In an era where AI unleashes boundless possibilities, human aesthetic judgment, philosophical reasoning, emotional expression, and comprehensive artistic control have become more crucial than ever. As the ultimate artistic decision-maker for projects, directors must evolve from being mere "resource coordinators" to becoming "vision architects and AI navigators." They need to communicate their unique artistic visions with greater clarity to both teams and AI systems.

(4) Building an Ethical and Regulatory Framework: Amid the rapid advancement of technology, both industry stakeholders and external entities are accelerating efforts to establish a comprehensive ethical and regulatory system. This framework specifically addresses key aspects of AIGC (Artificial Intelligence Generated Content), including data training, copyright verification, content labeling (such as adding source watermarks for traceability), and usage practices. The establishment of this system aims to effectively regulate the healthy development of AIGC technology while ensuring innovation and application adhere to ethical standards. Through clear legal provisions and industry conventions, it will protect creators' legitimate rights and interests from unauthorized use or infringement. Additionally, the framework will focus on preventing and mitigating potential social risks associated with AIGC technology, ensuring technological progress aligns harmoniously with social stability. This lays a solid legal and ethical foundation for the long-term development of AIGC technology.

5. conclusion

The relationship between AIGC and film/TV production is complex and multidimensional. As a powerful enabling technology, it significantly enhances efficiency, reduces costs, and expands

aesthetic boundaries through full-process integration. Simultaneously, it serves as a disruptive force that sparks profound reflections on creative subjects, copyright ethics, and the essence of art.

At its core, AIGC isn't a replacement for creativity but rather an amplifier and catalyst. It liberates human creators from repetitive technical tasks, allowing us to focus on humanity's most essential and emotionally rich endeavors: crafting brilliant concepts, expressing profound emotions, engaging in philosophical contemplation, and making crucial aesthetic decisions. The future of cinematic masterpieces will undoubtedly emerge from this creative collaboration between humans and AI—— Humans are responsible for "dreaming the dream," while AI helps us present these visions with unprecedented clarity. This journey of human-AI co-creation is just beginning.

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