



Application of Artificial Intelligence in Screenwriting and Concept Design in Filmmaking: Turning Points and Challenges in the Film Industry

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Abstract

As artificial intelligence (AI) reshapes the entertainment industry, its impact on filmmaking's Pre-Production phase has become a subject of serious examination. This paper reviews how AI-involving technologies are fundamentally disrupting traditional workflows, especially focusing on scriptwriting and concept design, which are crucial parts of the Pre-Production process. In the field of screenwriting, AI has emerged as a major technological turning point. The process is shifting from one in which humans primarily handle drafting and editing to one supported by AI tools that provide real-time analytical feedback and ongoing consultation, drastically accelerating the scriptwriting creative cycle, as seen with Scriptbook. In the meantime, the evolution of concept design marks a move away from traditional hand-drawn techniques toward innovative AI-generated imagery, where static and moving imagery are produced with instant precision, offering a new paradigm for visual development. However, these AI transitions come with major challenges. In the context of screenwriting, the paper identifies a persistent emotional gap, where AI struggles to convey authentic human nuance within complicated narrative structures. Similarly, in terms of concept design, the paper discusses unsettled legal and moral issues regarding intellectual property and ownership of AI-generated content. Ultimately, the study concludes that industrial practitioners must maintain a balance, leveraging AI to improve the efficiency of work creation while protecting the original creative vision and legal integrity in a continuously transforming work environment.

Keywords: Screenwriting, Concept Design, Artificial Intelligence, Pre-Production, Film Industry

การประยุกต์ใช้เทคโนโลยีปัญญาประดิษฐ์ในการพัฒนาภาพยนตร์และการพัฒนาแนวคิด : จุดเปลี่ยนและความท้าทายในอุตสาหกรรมภาพยนตร์

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บทคัดย่อ

ในขณะที่ปัญญาประดิษฐ์ (Artificial Intelligence: AI) เข้ามามีบทบาทในอุตสาหกรรมภาพยนตร์อย่างมาก โดยเฉพาะในขั้นตอนการผลิตภาพยนตร์ซึ่งกลายเป็นประเด็นที่ควรได้รับการพิจารณาอย่างจริงจัง บทความนี้ ทบทวนว่าเทคโนโลยีที่เกี่ยวข้องกับ AI กำลังเปลี่ยนกระบวนการทำงานแบบดั้งเดิมโดยเฉพาะในด้านการเขียนบทภาพยนตร์ และการออกแบบแนวคิดซึ่งเป็นส่วนสำคัญของกระบวนการผลิตภาพยนตร์ ในด้านการเขียนบทภาพยนตร์ AI ได้ กลายเป็นจุดเปลี่ยนทางเทคโนโลยีที่สำคัญ โดยกระบวนการเปลี่ยนจากมนุษย์ที่เป็นผู้ร่างและแก้ไขบทเป็นหลักไปสู่การใช้ เครื่องมือ AI ซึ่งให้ข้อเสนอแนะเชิงวิเคราะห์แบบเรียลไทม์และให้คำปรึกษาได้อย่างต่อเนื่อง ส่งผลให้วงจรการสร้างสคริปต์ ภาพยนตร์รวดเร็วขึ้นอย่างมาก ดังปรากฏจากกรณีของซอฟต์แวร์ Scriptbook ในขณะเดียวกันพัฒนาการของการออกแบบ แนวคิดแสดงให้เห็นถึงการเปลี่ยนผ่านจากการวาดด้วยมือแบบดั้งเดิมไปสู่การใช้ภาพที่สร้างขึ้นโดย AI ซึ่งสามารถผลิตได้ทั้ง ภาพนิ่งและภาพเคลื่อนไหวได้อย่างแม่นยำในทันที อย่างไรก็ตาม การเปลี่ยนผ่านที่เกิดจาก AI เหล่านี้มีมาพร้อมกับความท้าทาย ที่สำคัญหลายประการ ในบริบทของการเขียนบทภาพยนตร์ AI ยังมีข้อจำกัดในการถ่ายทอดอารมณ์ของมนุษย์ผ่านโครงสร้าง การเล่าเรื่องที่ซับซ้อน ขณะที่ในด้านการออกแบบแนวคิดยังคงมีประเด็นด้านกฎหมายและจริยธรรมที่ยังไม่ได้ข้อยุติเกี่ยวกับ ทรัพย์สินทางปัญญาและความเป็นเจ้าของผลงานที่สร้างขึ้นด้วย AI ท้ายที่สุดการศึกษานี้สรุปว่าบุคลากรในอุตสาหกรรม ภาพยนตร์ต้องรักษาความสมดุลระหว่างการใช้ประโยชน์จาก AI เพื่อเพิ่มประสิทธิภาพในการสร้างสรรค์ผลงาน ควบคู่ไปกับการรักษาคุณภาพของงานสร้างสรรค์ดั้งเดิมและความถูกต้องทางกฎหมายภายใต้สภาพแวดล้อมการทำงานที่เปลี่ยนแปลงไป อย่างต่อเนื่อง

คำสำคัญ: การเขียนบทภาพยนตร์ การออกแบบแนวคิด ปัญญาประดิษฐ์ การเตรียมการผลิตภาพยนตร์ อุตสาหกรรม ภาพยนตร์

1. Introduction

The presence of Artificial Intelligence (AI) in the film industry is not a distant future. It is a rapidly accelerating reality. In just a year, the market value of AI in filmmaking is projected to grow from \$1.59 billion in 2025 to \$1.97 billion in 2026 at a compound annual growth rate (CAGR) of 23.9% [1]. This dramatic growth signals a transformative shift in how films are conceptualized, produced, and consumed. In the context of the film industry, AI technologies are being applied across various stages of the filmmaking process, from Pre-Production to production to post-production and distribution, transforming the way films are created, examined, and consumed [2]. These approaches are considered both advantages and concerns. AI significantly helps filmmakers explore more options and enhances the distinctive elements of their movies with less time. However, the technology also affects career availability over time, and will slow creativity as humans produce less and less new art and content [3]. This study reviews the definitions of AI and focuses exclusively on the Pre-Production phase of filmmaking, as it serves as the project's foundational blueprint. Therefore, the integration of AI at this stage dictates the efficiency and quality of every movie's final result. This paper is a documentary review. It draws on secondary sources, peer-reviewed literature, industry reports, vendor documentation, and published practitioner work. No primary data were collected from industry practitioners, and the findings should therefore be read as a synthesis of documented international practice rather than as verified evidence of workflow conditions in any single national industry.

2. Definition of Artificial Intelligence (AI)

AI is capable of a wide range of tasks and outputs, so it is quite challenging to give a single clear definition. The same idea is shared by the AI researcher from Goethe University Frankfurt, Jonas Schuett [4], who mentioned in his 2019 academic paper that there is no one-size-fits-all definition of the technology. Given that there is no universally accepted definition of AI, this study collected definitions from 3 types of sources, which are dictionaries, academic scholars, and organizations, to establish a comprehensive understanding of the term.

One of the most famous and trusted dictionaries, the Oxford Learner's Dictionaries, defines AI as *"The capacity of computers or other machines to exhibit or simulate intelligent behaviors"* [5]. While another credible dictionary, the Cambridge Learner's Dictionary, defines AI as *"The use or study of computer systems or machines that have some of the qualities that the human brain has, such as the ability to interpret and produce language in a way that seems human, recognize or create images, solve problems, and learn from data supplied to them"* [6]. These leading dictionaries agree that AI is fundamentally about the capabilities of computers, or machines, which highlights the technological basis of AI. However, in terms of scope and emphasis, the Oxford Dictionary offers broader terms that allow for wider interpretations, while the Cambridge Dictionary offers more comprehensive, descriptive definitions. These general dictionary descriptions serve as a useful starting point for understanding Artificial Intelligence, but a more comprehensive and in-depth understanding often requires exploring the intricate frameworks and theoretical underpinnings provided by academic scholars.

Historically, the conceptual foundations of AI can be traced back to the 20th century. John McCarthy, the computer scientist at Stanford University who is widely considered the father of AI, coined the term in 1955 as: *“It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable”* [7]. Besides, Dimitar Dobrev [8], another scholar from the Institute of Mathematics and Informatics, defines computational intelligence in his paper, stating that *“AI will be such a program which in an arbitrary world will cope no worse than a human.”* Longjun Zhou [9], a Chinese AI researcher, defined that *“AI refers to the interdisciplinary field of study that involves the development of computer systems and machines capable of performing tasks that typically require human intelligence, such as learning, problem-solving, and decision-making.”* Zhou gives a slight difference in the meaning, that it is the technology that still requires human intelligence.

While McCarthy, Dobrev, and Zhou offer a more in-depth understanding of AI, it is also crucial to consider how this concept is understood and applied within various organizational contexts. For instance, the International Organization for Standardization (ISO) gives the definition of AI as *“The ability of machines to think, learn, and adapt”* [10]. Google Cloud describes AI as *“A set of technologies that enable computers to perform a variety of advanced functions, including the ability to see, understand, analyze data, or even make recommendations”* [11]. In terms of AI policy, a section of the National Defense Authorization Act mentions AI as *“A broad range of artificial systems capable of performing tasks under unpredictable conditions with minimal human oversight. These systems may be implemented through software, hardware, or hybrid platforms, and are designed to mimic or approximate human-like abilities such as perception, cognition, learning, planning, and decision-making”* [12].

According to all the information gathered from two world leading dictionaries, three academic scholars, and three credible organizations, the definition of AI is the science, engineering, and interdisciplinary field of study of making intelligent machines such as computer systems to understand human intelligence and capable of performing tasks that typically require human intelligence such as learning, adapting, problem-solving, and decision-making without having to confine itself to methods that are biologically observable.

3. AI and Pre-Production

To produce a movie, filmmakers must start with Pre-Production. The clarification of the term Pre-Production is commonly known as the phase where people prepare their project for shooting before production, which comes early in the filmmaking process [13]. While Pre-Production in filmmaking involves numerous processes, this article will focus on 2 crucial elements: the movie script and concept design, as they are significantly affected by AI.

3.1 Scriptwriting

A movie script, which will be mentioned as ‘script’ in this article, is a written document that details all of the narrative and visual elements for a feature-length or short movie [14]. In general, the higher the emotional content in the textual content, the greater the demands on artificial intelligence [15]. AI's influence on the movie industry starts early in the scriptwriting process. There are numerous programs in which AI is involved in scriptwriting. However, this article will focus on ScriptBook as an example because it has a proven track record in Hollywood. It offers a comprehensive analysis of both the creative process and success prediction, which are essential components during the Pre-Production phase.

ScriptBook is an AI-driven tool that helps analyze scripts and offers insights into plot and character development. ScriptBook offers more details about their work on their ScriptBook.io website, where their system is used in the Pre-Production process for numerous projects, such as *Ben is Back* (2018), *Harriet* (2019), and *The Outpost* (2019) [16]. 20th Century Fox employed AI to analyze the script for *Logan*, which helped inform decisions about the movie's plot and themes [17].

The scriptwriter Alex Avakian describes his feelings when he submitted his scripts to the system and first received the analysis from ScriptBook, which stunned him. The first thing Avakian noticed was the impressive speed of the report, which he estimated would take a human reader about a week, was returned in roughly two hours [18]. ScriptBook provides a detailed analysis of every scene in the submitted scripts, an additional idea-generating function, and a consulting function by AI for improvement, which are all available all day and night [18]. One of the most useful outputs from ScriptBook is the prediction of audience satisfaction and return on investment, as shown in Figure 1.

From Figure 1 below, ScriptBook predicts that the project has strong potential based on audience feedback from the Internet Movie Database (IMDB) and Rotten Tomatoes, two of the most popular sources in the movie industry. The system also provides possible financial projections and estimates the potential that the project would get greenlit to the production stage. This set of information is highly beneficial for refining script content during the Pre-Production stage. Normally, these insights are analyzed by humans using general data on which genres are successful. The human-based process could take weeks, but ScriptBook offers a tailored analysis based on a specific script at a much faster pace.

Audience Satisfaction



US Return on Investment

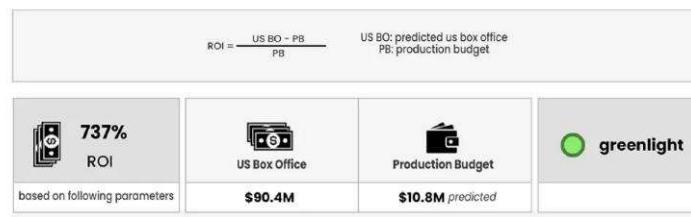


Figure 1 A Part of the Results generated by ScriptBook (2024)

Source: [18]

From the author's analytical perspective, the evidence reviewed above suggests that AI is effective for the script development component, while its contribution to generative drafting remains unproven. In an era of fast production cycles, the traditionally labor-intensive process of script development is often under immense pressure to expedite, particularly in the movie industry, where writers are expected to deliver high-quality content that balances creativity and commercial success within compressed timelines. ScriptBook exemplifies AI's ability to synthesize complex variables effectively. Nevertheless, despite this speed, AI still faces limitations in screenwriting, such as the inability to convey emotion through the script, particularly in non-English languages, which aligns with Fang and Li [15], who conclude that machine-generated text tends toward a monotonous style that lacks human warmth and may reduce audience engagement.

3.2 Concept Design

Unlike the other phases, Pre-Production is defined by conceptual exploration. This is why concept design plays a huge role. Concept designers in film bring scripts to life through visual representations. They

shape the look and feel of characters, environments, and props before production begins [19]. This is mostly used to help visualize the director's vision and other head departments' visions, such as the production designer's or the costume designer's. One of the main responsibilities of concept artists is creating initial sketches for characters, creatures, environments, and props, which serve as blueprints for production design and visual effects teams, including color palettes and lighting schemes [19].

One of the most famous concept designers before the 2000s was Ralph McQuarrie, who created the conceptual world for several renowned films, including the alien spacecraft in E.T. (1982) and Star Trek IV: The Voyage Home (1986), but his most famous work was Star Wars (1977). According to the educational video by Mark Raats [20], there are photos documenting Ralph McQuarrie sketching his work by hand to effectively translate creative visions into images, as seen in Figure 2. This reflects the meticulous craftsmanship and originality that laid the groundwork for one of the most iconic films in history, Star Wars (1977) [20].



Figure 2 Ralph McQuarrie's original concept art for Star Wars (1977). © 2016 Lucasfilm Ltd. All Rights Reserved. Used Under Authorization.

Source: [21]

Nowadays, AI imagery is widely used in Pre-Production to produce quick concepts. AI systems in applications like ChatGPT, Gemini, DALL-E, or Midjourney have a picture-generating function that lets users create imaginary visuals by submitting text to the systems. AI creates these visuals by training on millions of images and their metadata. The AI models recognize essential patterns in style and composition, then use that information to synthesize new content [22]. To demonstrate these capabilities, the author provided a series of text-based prompts to the AI model, Gemini, to generate an image of an astronaut within a spacecraft with a distinctive design, illuminated by intense, luminous lighting. The resulting output is presented in Figure 3.



Figure 3 The AI, Gemini, generated a picture of a space agent in a spaceship (2025).

Source: Generated by Gemini AI from the author's prompt [23]

As shown in Figure 3, Gemini generated this picture in only a few minutes without requiring users' drawing or painting skills. The outcome is sufficient to serve as a guide for concept artists working on lower-budget film productions.

The capabilities of this AI are not limited to concept art design. They can also be applied to conceptual planning for costume design. Luke DiTommaso [24], a graduate of the Computer Arts program at the School of Visual Arts in New York and a co-founder of Molecule VFX, once shared an experience from a shooting day when he was uncertain about the right fabric choice for an actor. To resolve this, he fed prompts and references into DALL-E, an AI system designed to generate realistic images and art from text [25]. This process allowed him and his team to quickly explore a wide range of creative ideas and visual possibilities [24].

One of the most influential impacts of AI on the movie industry, in terms of concept design, is the use of AI-generated videos. Just a few years ago, AI-generated moving images were often riddled with glitches and errors. However, the technology has advanced so rapidly that it is now often indistinguishable from real-life footage. This shift has significantly impacted Pre-Production conceptualization. AI is no longer limited to generating static guidelines but can now simulate complex motion and even produce short scenes. The method involves animating static imagery in sync with dialogue or audio to help plan camera setups, performance blocking, and pacing of the film. This approach supports the early refinement of narrative and visual strategies before the actual production begins [26]. The AI filmmaking expert and owner of the YouTube channel Jack Vs. AI demonstrates techniques for generating moving visuals. In one of his tutorials, he shows how to create an unauthorized fan-made concept trailer featuring Zendaya as Moana, exploring what the actress might look like in a live-action version of the Disney animation, as illustrated in Figure 4 [27]. The image on the left represents the original frame from the animated film Moana (2016),

whereas the image on the right is an AI-generated reproduction created by the content creator of the 'Jack vs AI' channel in 2026.



Figure 4 A comparison between the original frames from the animated film Moana (2016) (left) and AI-generated imagery simulating a live-action version featuring Zendaya (right).

Source: [27]

In summary, the two workflows in the Pre-Production processes which are scriptwriting and concept design, are discussed above along four dimensions: time, skill, creative control, and ownership as described in Table 1.

Table 1 Comparison of traditional and AI-assisted workflows in pre-production

	Traditional	AI-assisted
Screenwriting		
Time to first analysis	About one week of human reading [18]	About two hours [18]
Skill required	Trained story analyst	Ability to read and judge a report
Creative control	Reader explains the reasoning behind each note	System returns scores; reasoning is not shown
Ownership	Writer holds the rights	Unsettled (see Section 4)
Concept design		
Time to first image	Days per finished board	Minutes per image
Skill required	Drawing and painting	Writing a prompt
Creative control	Designer interprets the script directly	Designer selects and edits what the model returns
Ownership	Defined by contract	May not be protected (see Section 4)



The pattern across both tasks is consistent. AI delivers clear gains in the first two dimensions and clear losses in the last two. Time and skill barriers fall sharply, while creative control becomes indirect and ownership becomes uncertain. The first two changes are practical and measurable. The last one is legal, and it has not yet been settled which will be discussed in the next section below.

4. Ethical and Legal Considerations

The efficiency gains described above are accompanied by unresolved questions that the industry has yet to settle.

4.1 Copyright and ownership

AI models are trained on very large sets of images and text. Many of these works are copyrighted, and they are often used without permission. Courts have begun ruling on cases related to this, but they have not reached a clear position. In 2025, the UK High Court rejected a copyright claim against a major image model developer, although it did find limited trademark infringement in the model's output [28]. In the United States, a similar case brought by visual artists is still ongoing [29]. The U.S. Copyright Office states that copyright requires a human author. Writing a prompt is not enough to make the user the author of the image [30]. This has a practical result that is easy to miss. A key visual made by AI may not be protected by copyright at all. If a design is not protected, neither the designer nor the production can stop others from using it. A studio may therefore be unable to protect the visual identity of its own film.

4.2 Possible solutions from another industry

These problems can be solved through negotiation, and the music industry provides a useful example, even if incomplete. In 2024, record companies sued generative music platforms. About a year and a half later, the two sides reached agreements [31]. The platforms agreed to retrain their models on licensed music to limit how generated tracks can leave the platform, and to share revenue with rights holders [32].

From the author's perspective, there are three ideas that could be applied to the film industry. First, train models on licensed material, such as a studio's own archive of concept art. Second, treat consent to use an artist's work, credit, and payment as a package, not as separate items that can be traded away. Third, keep generated material within the development process, and hand it over to human-made assets at a clear, documented point. However, the limits of this example should also be stated. These agreements were made between large companies. They did not settle the claims of session musicians and independent artists, whose union later filed its own case [33]. Possibly, people in the film industry would face the same problem because individual concept designers and screenwriters have far less power than the well-known studios that negotiate on their behalf.

5. Conclusion

In conclusion, AI is fundamentally changing how filmmakers approach Pre-Production, shifting the industry toward a model defined by both unprecedented speed and new creative friction. Platforms like

ScriptBook have already begun to standardize the way scripts are analyzed, offering writers a continuously available analytical tool that can return a scene-by-scene report in a matter of hours rather than the several days typically required for human coverage. Simultaneously, AI tools for conceptual design are upending traditional workflows, allowing for the rapid generation of static and moving imagery that would have previously required hours of manual labor. However, this efficiency comes at a cost. While AI tools can accelerate technical tasks in scriptwriting, they have yet to capture the nuance of human emotion in storytelling. There is a critical gap that remains the primary limitation of machine-generated text. Furthermore, although AI helps generate images and sample videos for concept design, the industry faces an ongoing, unresolved debate over the legal and ethical implications of using AI-generated visual content. As these technologies continue to mature, the challenge for filmmakers will not be determining whether to use AI, but rather how to balance these powerful productivity gains with the creative and legal integrity of their work.

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