

Samantha Keppler

Alisa Crowe

Rita Herfi

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The Future of Filmmaking and the Rise of AI

Introduction

Imagine a world where your favorite blockbuster was crafted not by humans, but by intelligent machines. This is not science fiction; it's the reality of today's film industry. Since the recent boom of artificial intelligence tools, AI has been revolutionizing the film industry. While many critics claim that AI will never be capable of creating artistic products in the way that humans do, AI tools are being developed and improved to accurately create expressive movies that are difficult to differentiate from human-created projects. While new technologies have already made huge leaps in the industry, there are still many potential applications that we could create in the future.

The integration of artificial intelligence in the film industry presents many exciting opportunities and areas for development. From pre-production to production to post-production and beyond, AI is drastically changing the way the entertainment industry operates in the near future. AI is currently being used by producers, editors, marketers, and streaming platforms in the industry. It is applied to many aspects of the film industry, from pre-production development and planning to post-production editing and marketing tactics to maximize audience engagement.

In the future, automation of tasks that are redundant or repetitive will allow filmmakers to focus on more creative aspects of film production, improving efficiency and overall quality. This paper will explore the transformative role of AI in the film industry, examining its current applications and potential future developments across all phases of filmmaking.

Pre-Production Phase

With regard to pre-production, the film industry is increasingly leveraging artificial intelligence to enhance various aspects from scriptwriting to developing animation. To aid in scriptwriting, AI models can analyze successful films within the same genre to generate recommendations and map out entire storylines and dialogue tailored to the target audience's preferences. Large Language Model (LLM) tools like ChatGPT and Squibler analyze pre-existing films and literature and create similar narratives that follow trending arcs and genre patterns, drastically speeding up the writing process and providing human writers with inspiration. This not only enhances creativity but also ensures that the content resonates well with the audience, increasing the chances of a film's success.

Additionally, AI can help producers make informed decisions about investments and resource allocation by providing accurate algorithms for predicting the financial success of a film based on several factors, including genre and cast. Cinelytic is a machine learning model that does just that, offering predictive analytics for film financial performance to help producers optimize budgets. Finally, AI can help plan production by figuring out budgets, finding shooting locations, and creating shooting schedules.

In the future, there are several steps in the pre-production process that will be either transformed or completely taken over by artificial intelligence. For example, the role of casting

directors can be simplified greatly by making use of predictive machine learning algorithms to analyze features such as physical appearance, past performances, and audience feedback in order to cast the most ideal candidate for a particular role. Additionally, actors can sell their images to be used by AI, allowing for the creation of digital doubles that can perform in various scenes without the actor being physically present.

Another promising area is enhanced script analysis and development. AI could analyze scripts to ensure that the emotional tone and pacing align with the desired audience response, helping writers fine-tune their scripts to evoke specific emotions at key moments. Additionally, AI could review scripts for cultural sensitivity, identifying and suggesting changes to avoid stereotypes or offensive content, ensuring that films are more inclusive and respectful of diverse audiences. In terms of casting, AI could facilitate virtual auditions where actors perform in front of a camera, and the AI analyzes their performance in real-time, providing feedback on their suitability for the role based on various criteria. Actors could also create digital avatars for virtual auditions, allowing directors to see how different actors would look and perform in specific roles without the need for physical presence.

AI-driven storyboarding and visualization could revolutionize pre-production processes. Automated storyboarding could generate detailed visual representations of scenes, camera angles, and movements from scripts, helping directors and cinematographers plan their shots more effectively. Additionally, AI-powered virtual reality (VR) environments could allow filmmakers to visualize and explore sets and scenes before they are built, making it easier to plan and make adjustments in the early stages. Optimized scheduling and resource management is another area where AI could make a significant impact. AI could create dynamic shooting schedules that adapt in real-time to changes in the availability of actors, locations, and

equipment, optimizing the use of resources and reducing downtime. It could also analyze historical data and current trends to predict the most efficient allocation of resources, ensuring that production stays on budget and on schedule.

Predictive market analysis is another exciting application of AI in pre-production. AI could analyze social media, streaming data, and other sources to predict future audience trends and preferences, helping filmmakers tailor their projects to meet market demands. It could also provide more accurate financial forecasts by analyzing a wide range of variables, including market conditions, competitor performance, and historical data, helping producers make informed investment decisions. Finally, AI-assisted location scouting could transform how filmmakers choose filming sites. AI could create virtual tours of potential locations, allowing directors and producers to explore and evaluate sites remotely, saving time and travel costs. It could also assess the environmental impact of filming at various locations, helping production teams choose sites that align with sustainability goals. These future applications of AI in pre-production have the potential to significantly enhance efficiency, creativity, and inclusivity in filmmaking, paving the way for a more innovative and dynamic industry.

In conclusion, the integration of artificial intelligence in the pre-production phase of filmmaking is already transforming the industry and holds even greater potential for the future. Currently, AI enhances scriptwriting, aids in making informed production decisions, and optimizes planning processes, thereby increasing efficiency and creativity. Looking ahead, AI's capabilities could further revolutionize pre-production through advanced script analysis, virtual auditions, automated storyboarding, dynamic scheduling, predictive market analysis, and AI-assisted location scouting. These innovations promise to streamline workflows, reduce costs, and foster more inclusive and engaging content. As AI continues to evolve, its role in

pre-production will undoubtedly expand, offering filmmakers powerful tools to bring their creative visions to life more effectively and efficiently than ever before.

Production Phase

During production, AI offers a multitude of applications that can enhance the filmmaking process. Directors and cinematographers can leverage AI-powered tools, trained on extensive datasets from past films, to meticulously plan shots and automate camera movements. This automation reduces the reliance on manual camera operation, allowing for more efficient and precise filming. AI can also assist in lighting design by analyzing the scene and adjusting the lighting setup to achieve the desired mood and affect.

AI tools are capable of providing accurate, real-time tracking of actors' movements and facial expressions. This capability enables filmmakers to make precise adjustments during filming, minimizing the need for corrections in post-production. For instance, AI can ensure that an actor's performance is captured perfectly in each take, adjusting lighting and camera angles on the fly to match the director's vision.

Moreover, AI can assist in managing complex scenes involving numerous actors or intricate choreography, ensuring that every movement is captured seamlessly. This real-time feedback loop not only enhances the quality of the footage but also saves valuable time on set, allowing for a smoother and more efficient production process. AI can also be used to generate virtual sets and backgrounds, reducing the need for expensive and time-consuming location shoots.

Furthermore, the integration of AI in the film industry has revolutionized the way background music is created, offering innovative tools that streamline production processes and enhance creativity. Several AI platforms are now capable of generating music that aligns with the tone, genre, and mood of films, providing filmmakers with a range of options from orchestral scores to contemporary tracks. Key tools include Artificial Intelligence Virtual Artist (AIVA), which specializes in creating dramatic orchestral pieces for emotional scenes; Amper Music, which generates songs based on the user's selected mood, style, and instrumentation; and Google's Magenta, which contains unique tools to generate and transform unique auditory experiences based on niche factors such as timbre and transfer. For films that opt to use human composers, tools like AIVA and MuseNet can assist the composer by providing initial starting points for complex compositions, helping to spark creativity. These tools improve the quality of film scores, ensuring seamless integration of music to evoke the desired emotional impact.

AI's contributions to the production phase represent a significant advancement, enabling filmmakers to achieve their creative vision more efficiently and effectively. By automating routine tasks and enhancing various aspects of production, AI allows creative professionals to focus more on storytelling and artistic expression. As AI technology continues to evolve, its role in production is likely to expand, offering even more sophisticated tools and capabilities. This ongoing evolution promises to further revolutionize the industry, paving the way for new possibilities and innovations in filmmaking.

One exciting future application is the development of AI-driven autonomous camera systems. These systems could use advanced machine learning algorithms to automatically adjust camera angles, focus, and movements based on the action in the scene, ensuring optimal shots

without the need for manual intervention. This would allow cinematographers to focus more on the artistic aspects of filming rather than the technical details.

Another promising application is the use of AI for real-time visual effects (VFX) integration. AI could enable the seamless blending of live-action footage with computer-generated imagery (CGI) during filming, allowing directors to see a more accurate representation of the final product in real-time. This would significantly reduce the time and cost associated with post-production VFX work and allow for more creative experimentation on set.

AI could revolutionize the sound capture and processing methods during production. Advanced AI algorithms could automatically filter out unwanted background noise, enhance dialogue clarity, and even generate realistic sound effects in real time. This would improve the overall audio quality of the footage and reduce the need for extensive sound editing in post-production.

In addition, AI has the potential to enhance actor performance through real-time feedback and coaching. AI systems could analyze an actor's performance on the spot, providing instant feedback on aspects such as emotion, delivery, and body language. This would help actors refine their performances during filming, leading to higher-quality footage and reducing the need for multiple takes.

Furthermore, AI could be used to create more immersive and interactive filming environments. For example, AI-powered virtual production stages could adapt in real-time to the movements and actions of actors, creating dynamic and responsive sets that enhance the storytelling experience. This would open up new possibilities for creative expression and allow filmmakers to push the boundaries of traditional filmmaking techniques.

Finally, AI could play a crucial role in ensuring the safety and efficiency of film sets. AI-powered drones and robots could be used to perform hazardous tasks, such as setting up complex rigs or handling dangerous props, reducing the risk of accidents and injuries. Additionally, AI systems could monitor the set for potential safety hazards and provide real-time alerts to crew members, ensuring a safer working environment.

These future applications of AI in the production phase have the potential to transform the filmmaking process, making it more efficient, creative, and safe. As AI technology continues to advance, its role in production is likely to expand, offering filmmakers powerful new tools to bring their creative visions to life.

Post-Production Phase

In the post-production phase, AI tools can greatly speed up the video editing process and reduce its tedium. AI-powered software can identify the best takes from raw footage and suggest cuts, allowing editors to concentrate on the more artistic aspects of filmmaking that AI cannot yet master. Programs like Adobe Premiere Pro and DaVinci Resolve can automatically correct color and enhance audio as needed. Additionally, computer-generated imagery (CGI) can create spectacular visual effects, transform actors in ways that makeup cannot, and generate digital stunt doubles, among other capabilities.

Moreover, audio restoration algorithms can eliminate unwanted noise and enhance overall audio quality, saving time and effort for sound engineers. For example, iZotope RX, widely regarded as the gold standard for audio repair and restoration, offers advanced noise reduction, spectral editing, and dialogue isolation features. It helps eliminate unwanted noise and

improve overall audio quality, making it indispensable for sound engineers. Similar tools include Adobe Audition and Auphonic.

One potential future application of AI in the post-production phase is the development of AI-driven automated editing systems that can analyze footage and make initial editing decisions based on the director's style and preferences. These systems could suggest edits, transitions, and effects, significantly speeding up the editing process while maintaining a high level of artistic integrity. Additionally, AI could be used to create more advanced color grading tools that automatically adjust the color palette of a film to match the desired aesthetic, ensuring visual consistency across all scenes. Another promising application is the use of AI for real-time visual effects (VFX) integration, allowing editors to see and adjust CGI elements in real-time, which would streamline the VFX process and reduce the need for extensive post-production work. AI could also enhance audio post-production by developing more sophisticated algorithms for sound design, enabling the creation of complex soundscapes and effects with greater ease. Furthermore, AI could assist in the creation of personalized content for different audiences by automatically generating multiple versions of a film tailored to specific demographics or preferences, enhancing viewer engagement and satisfaction. These future applications of AI in post-production have the potential to transform the filmmaking process, making it more efficient, creative, and responsive to audience needs. AI tools could also be used to create different versions of movies for various countries without the need for traditional dubbing. Instead, AI could alter the lip movements of actors to match the new language, ensuring a seamless and natural transition. The integration of AI in the post-production phase of filmmaking is revolutionizing the industry by enhancing efficiency, precision, and creativity.

Current applications, such as AI-powered tools for video editing, color correction, audio enhancement, and CGI, are already transforming how films are polished and finalized. Looking to the future, AI promises even more groundbreaking advancements, including automated editing systems that align with the director's style, advanced color grading tools, real-time VFX integration, sophisticated sound design algorithms, and the creation of personalized content for different audiences. These innovations not only streamline the post-production process but also open up new possibilities for creative expression, allowing filmmakers to bring their visions to life more effectively and responsively. As AI technology continues to evolve, its role in post-production will undoubtedly expand, further revolutionizing the filmmaking industry and setting new standards for what is possible in cinematic storytelling.

Animation

The process of creating animated films differs somewhat from that of non-animated films, with blurred lines between different phases of production. However, there is just as much room for artificial intelligence to contribute to the artistic process.

In the initial stages of animation, artists create detailed sketches and concept art that define the appearance, personality, and style of the characters. These drawings serve as the foundation for the animation process, providing a visual reference that guides the development of the characters throughout production. AI can then step in to generate consistent and high-quality animations that stay true to the original designs. Tools such as Blender and Runway specialize in rendering 2D and 3D animations while maintaining the style of the artist's designs. Additionally, AI can assist in refining and optimizing animated character designs. For example, convolutional neural network models can analyze sketches and suggest improvements or variations that align

with the desired aesthetic and narrative goals. This iterative process helps artists explore different creative possibilities and refine their designs more efficiently. The collaboration between human creativity and AI efficiency can lead to more visually appealing and cohesive animated films.

AI can also assist in other aspects of the animation process, such as creating in-between frames, background design, and special effects. The process of creating in-between frames, which fill the gaps between key poses in an animation sequence, can be automated with AI. Traditionally, this task, known as "tweening," is time-consuming and labor-intensive for animation artists. By automating tweening, AI allows animators to focus on the more creative aspects of animation, such as developing expressive character movements and intricate details. Examples of tools capable of automated tweening include Adobe Animate, DeepMotion, and Renderforest. Dynamic backgrounds can be generated based on the artists' initial sketches and the contents of the script, ensuring seamless integration with the animated characters. AI can also create complex visual effects, such as particle simulations and lighting effects, that enhance the overall visual quality of the animation and make it more realistic.

A future advancement of AI technologies in animation is the development of AI-driven animation tools that can generate entire scenes based on simple sketches or textual descriptions. These tools could allow animators to quickly visualize their ideas and make adjustments in real-time, significantly speeding up the creative process. Additionally, AI could be used to create more sophisticated character animations by analyzing and replicating the nuances of human movement and expressions, resulting in more lifelike and emotionally engaging characters. Another promising application is the use of AI for procedural content generation, where AI algorithms create complex environments, backgrounds, and special effects dynamically, reducing the need for manual design and allowing for more intricate and detailed animations. AI could

also enhance collaborative workflows by enabling real-time collaboration between artists and AI systems, allowing for seamless integration of human creativity and AI efficiency. Furthermore, AI could be employed to personalize animated content for different audiences, automatically adjusting elements such as character design, dialogue, and visual style to cater to specific cultural preferences and viewer demographics. These future applications of AI in animation have the potential to transform the industry, making the animation process more efficient, innovative, and responsive to audience needs. As AI technology continues to evolve, its role in animation will undoubtedly expand, offering animators powerful new tools to bring their creative visions to life.

In conclusion, AI's contributions to animation are transforming the industry by enhancing both the efficiency and quality of animated films. Current applications, such as generating consistent and high-quality animations from artist designs, automating the creation of in-between frames, and producing dynamic backgrounds and special effects, are already streamlining the animation process and elevating the final product. Looking to the future, AI promises even more groundbreaking advancements in animation. AI-driven tools could generate entire scenes from simple sketches or textual descriptions, create more lifelike character animations, and dynamically generate complex environments and special effects. Additionally, AI could enable real-time collaboration between artists and AI systems and personalize animated content for different audiences. These innovations will not only make the animation process more efficient and innovative but also more responsive to audience needs. As AI technology continues to evolve, its role in animation will undoubtedly expand, offering animators powerful new tools to bring their creative visions to life and deliver more imaginative and visually stunning films to audiences worldwide.

Marketing

In the ever-evolving film industry, artificial intelligence has become an invaluable asset, extending its influence beyond production and post-production into the realms of marketing and distribution. By leveraging AI, filmmakers and executives can make data-driven decisions that enhance a film's commercial success and audience engagement.

In this phase, AI can help predict target audiences, develop marketing campaigns aimed at those audiences, and devise release date strategies to maximize commercial success. One such tool is Largo.ai, which uses a film's content, characters, casting, and financials to predict its box office and streaming success. This tool can help make informed decisions on whether a film should be released on streaming platforms or debuted in theaters first.

Streaming platforms like Netflix, as well as film executives, frequently use AI applications. They utilize AI tools to analyze viewer preferences and recommend personalized content, thereby boosting engagement and maximizing user retention. Among these tools are Amazon Personalize, IBM Watson, and Google Cloud AI, all of which enhance viewer engagement.

One way that AI tools could be applied to marketing films in the future is the development of AI-driven predictive analytics tools that can forecast market trends and audience preferences with even greater accuracy. These tools could analyze vast amounts of data from social media, streaming platforms, and other sources to identify emerging trends and tailor marketing strategies accordingly. Additionally, AI could be used to create highly personalized marketing campaigns, delivering targeted advertisements to specific audience segments based on their viewing habits and preferences. This level of personalization could significantly increase

the effectiveness of marketing efforts and boost audience engagement. Another promising application is the use of AI for dynamic content creation, where AI algorithms generate customized trailers, posters, and promotional materials that resonate with different demographic groups. Furthermore, AI could enhance the distribution strategy by optimizing release dates and platforms, ensuring that films reach their target audiences at the most opportune times. AI could also be employed to monitor and analyze the performance of marketing campaigns in real-time, allowing marketers to make data-driven adjustments and maximize their impact. These future applications of AI in the marketing phase have the potential to transform how films are promoted and distributed, making the process more efficient, targeted, and responsive to audience needs. As AI technology continues to evolve, its role in marketing will undoubtedly expand, offering filmmakers and marketers powerful new tools to ensure their films achieve maximum reach and success.

Looking to the future, AI promises even more groundbreaking advancements in the marketing phase. Predictive analytics tools could forecast market trends and audience preferences with greater accuracy, while highly personalized marketing campaigns could deliver targeted advertisements based on viewing habits. AI-driven dynamic content creation could generate customized trailers and promotional materials for different demographic groups. Additionally, AI could optimize distribution strategies by determining the best release dates and platforms and monitor marketing campaign performance in real-time to allow for data-driven adjustments.

These future applications of AI in marketing have the potential to transform how films are promoted and distributed, making the process more efficient, targeted, and responsive to audience needs. As AI technology continues to evolve, its role in marketing will undoubtedly

expand, offering filmmakers and marketers powerful new tools to ensure their films achieve maximum reach and success.

In conclusion, AI's role in the film industry extends far beyond the creative process, playing a crucial part in marketing and distribution. Current applications, such as predicting target audiences, developing marketing campaigns, and devising release date strategies, are already enhancing a film's commercial success and audience engagement. Tools like Largo.ai and AI applications used by streaming platforms like Netflix, Amazon Personalize, IBM Watson, and Google Cloud AI are instrumental in these efforts.

Ethical Considerations

While many of us have come to view AI as a total advancement for the future of many industries, it has been causing a stir in the job market. Specifically in the entertainment industry, there are questions of ethics and emotions. Would AI be able to write the same type of stories that humans do? Have the same types of creativity with camera shots and specific angles? There are quite a few challenges before AI begins to take over the industry, but it is still advanced enough to cause concern.

Recently, between July and September of 2023, the Screen Actors Guild–American Federation of Television and Radio Artists, also known as SAG-AFTRA, had hundreds of employees go on strike. Most of the concern was getting better working conditions in the industry, but there were significant worries about AI replacing their jobs as writers or even using AI to replace actors without proper compensation for using their image. Because AI uses data for its training models, there was also heavy concern as to *which* data AI would use to create new writing since everything would already be prewritten from writers' past work.

The strike brought up the issue with the ethics of AI in this industry. If AI is using writing and actors for its training models, it can cause a massive copyright and ownership issue. Would the AI company own the creations, or would it belong to the people that the AI gathered that information from? How can it be traced back to prove who it belonged to? Other ethical concerns emerge from AI being misused and having data privacy. If AI is able to generate photos and videos of popular celebrities, it could widely mislead the public on things like marketing, endorsement for politicians, unsolicited pornography, and fake news. Once something goes on to the internet, it is very hard to contain because of its wide access.

Many individuals find it challenging to accept AI as a daily tool, particularly in creative fields such as writing and screenwriting. Although AI can generate content, it lacks the emotional depth and empathy inherent in human creators. Popular franchises thrive on human creativity, which AI cannot replicate.

Conclusion

In conclusion, AI is transforming the film industry by enhancing efficiency and opening new creative possibilities. From pre-production to post-production, AI tools are streamlining workflows, reducing costs, and enabling filmmakers to achieve their creative visions more effectively. In pre-production, AI aids in scriptwriting, casting, and planning, while in production, it enhances camera work, lighting, and real-time adjustments. Post-production benefits from AI's capabilities in editing, color correction, audio enhancement, and CGI. Additionally, AI's role in marketing ensures that films reach their target audiences through data-driven strategies and personalized content.

However, the integration of AI in the film industry also raises significant ethical and practical concerns. Job displacement is a major issue, as AI has the potential to replace roles traditionally held by humans, such as writers, editors, and even actors. Copyright issues arise when AI uses pre-existing works for training, leading to questions about ownership and intellectual property. The authenticity of artistic expression is another concern, as AI-generated content may lack the emotional depth and creativity inherent in human-created works.

It is essential to balance technological advancements with ethical considerations to ensure that AI enhances the film industry without compromising its human essence. It is essential to establish clear guidelines and regulations to protect the rights of creators and ensure fair compensation. Transparency in AI's use and its decision-making processes can help build trust among industry professionals and audiences alike. Moreover, fostering collaboration between human creativity and AI innovation can lead to a more inclusive and dynamic film industry.

As AI technology continues to evolve, its impact on the film industry will undoubtedly grow. Embracing AI's potential while addressing its challenges will be key to shaping a future where technology and human artistry coexist harmoniously. By doing so, the film industry can continue to push the boundaries of storytelling, creating more engaging, diverse, and visually stunning films for audiences worldwide.

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