

AI in the Animation Industry: A Quantitative Analysis of Its Impact on Independent Creators, Artistic Integrity, and Legal Concerns

Han Thar Htin, Dr. Bruce Edward Weeks*

Master of Science in International Digital Business, Rangsit University, Pathum Thani, Thailand *(Corresponding author), bruceweeks@gmail.com

Abstract

This study offers a quantitative assessment of the adoption of Artificial Intelligence (AI) technologies in the United States animation sector, focusing on independent creators, industry practices, artistic value, and legal considerations. A structured survey was administered to a statistically representative sample of 500 professionals-including animators, illustrators, production staff, and writers-spanning all levels of seniority from recent entrants to industry veterans. The dataset included detailed demographic information, professional backgrounds, and varying degrees of familiarity with AI tools. Statistical analyses, including t-tests and regression, revealed that 73.6% of respondents believe AI tools significantly reduce barriers for independent creators (p = 0.003), making professional animation more accessible across the industry. However, 52.2% felt that AI-generated content lacks the emotional depth and artistic quality of traditional methods (p < 0.001). Furthermore, 77% of participants agreed with the urgent need for robust copyright legislation to protect practitioners from the unauthorized use of their work in AI training datasets. The findings also indicate that nearly half of large studios are motivated to adopt AI primarily for cost savings and accelerated production timelines. These results underscore both the democratizing potential and the creative risks associated with AI integration in animation. The study highlights the necessity for balanced regulatory frameworks that foster innovation while safeguarding artistic integrity and economic interests. Ultimately, this research provides actionable insights for policymakers, industry leaders, and creators, guiding the sustainable and ethical integration of AI in animation and informing future regulatory developments and cross-industry comparisons.

Keywords: Artificial Intelligence (AI), Animation Industry, Independent Creators, Artistic Integrity, Intellectual Property, AI Tools

1. Introduction

The development of artificial intelligence (AI) has significantly impacted technology and transformed daily life for many decades. AI mimics human cognitive functions, such as learning and problemsolving. The journey began in the mid-20th century with pioneers like Alan Turing and the 1956 Dartmouth Conference, which established AI as a formal academic discipline. Early AI programs tackled mathematical problems and played chess, but progress faced setbacks known as "AI winters" due to unmet expectations and limited computational power (Collins et al., 2018). Renewed breakthroughs in machine learning, neural networks, and computational power in the late 20th and early 21st centuries, combined with the advent of Big Data, IoT, and cloud computing, enabled large-scale data analysis. Deep learning, a subset of machine learning, significantly improved image and speech recognition, natural language processing, and autonomous systems. AI now handles complex decision-making processes and predictive analytics across various industries, raising ethical considerations such as data privacy, security, and potential job displacement (Kaplan & Haenlein, 2019).

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In the entertainment industry, AI has revolutionized content creation, distribution, and consumption. Technologies like real-time translation, generative AI, and natural language processing (NLP) have fostered innovation and creativity. AI tools generate music, scripts, and entire scenes, reducing content creation time and cost. Real-time translation enables global communication, while AI-driven NLP enhances virtual assistants and chatbots. Moreover, Prasad (2023) believes personalized recommendations provided by AI have improved user engagement and satisfaction.

Despite these benefits, adopting AI in entertainment presents ethical challenges related to data privacy, intellectual property rights, and potential job displacement. Collaboration among industry stakeholders, policymakers, and researchers is essential to develop guidelines and regulations addressing these issues. AI's transformative impact on entertainment includes efficient content creation, improved audience engagement, and expanded global reach (Kadam, 2020). However, many studies have focused primarily on technological advances, with limited empirical research examining the creative and legal implications of AI within animation specifically. Most existing literature generalizes AI's impact across media industries without addressing how AI affects emotional depth, storytelling, or the role of independent creators to access professional-grade production capabilities but has also raised concerns about the preservation of artistic integrity and the future of creative labor."

This study provides a foundational framework for understanding the relationship between artificial intelligence (AI) and creativity in the animation industry. By identifying opportunities and risks associated with AI integration, it paves the way for future research. One key area is the long-term effects of AI on creative industries, particularly its impact on storytelling, character design, and audience reception. Generative models and automated motion capture systems that streamline production processes may affect the emotional depth and originality of animations. Similarly, Sharma and Juyal (2023) warned that AI's widespread use could lead to homogenized creative content.

The study also underscores the importance of cross-industry comparisons to examine how AI reshapes other creative fields, such as music, literature, and visual arts. Semarakilmu (2023) noted that these comparisons can reveal shared challenges, like the risk of oversaturation, and unique opportunities, such as enhanced global accessibility through real-time localization. Another crucial area of exploration is the adaptation of regulations and ethical frameworks. Francis Press (2023) pointed out that current intellectual property laws and data protection measures lag behind technological advancements, raising questions about effectively safeguarding artists' rights and ensuring fair use of their works in AI training datasets. In addition, Yellowbrick (2024) discussed the automation of entry-level tasks, such as in-betweening and rendering, which risks displacing traditional roles essential for skill development and professional growth. This concern extends beyond animation, affecting creative workforces across industries.

Sharma and Juyal (2023) advocated for innovative AI applications that expand creative possibilities without undermining human contributions or artistic integrity. However, the study acknowledges several limitations. The rapid evolution of AI technology, as noted by Francis Press (2023), presents challenges in capturing its full impact since tools and applications continually advance, potentially rendering findings outdated. Regional differences in regulations and cultural attitudes also pose challenges. Moreover, limited access to AI tools and unequal distribution of technological resources among creators constrain the generalizability of findings.

Additionally, the lack of consensus among professionals on best practices for AI integration, discussed by Yellowbrick (2024), complicates the establishment of definitive conclusions. Despite these

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challenges, this study lays a crucial foundation for future discussions and investigations into the intersection of AI and creativity, offering insights to guide the sustainable growth of the animation industry.

The study aims to analyze ethical considerations and regulatory frameworks needed to ensure responsible AI usage and safeguard intellectual property rights. This exploration will provide valuable insights for policymakers, industry stakeholders, and researchers, contributing to the discourse on the digital transformation of the animation industry and the broader implications of AI adoption. This study explores how AI tools can reduce financial and technical barriers for independent animation artists, enabling them to create professional-quality content with limited resources. It investigates the impact of AI on human contributions to animation, focusing on the potential loss of artistic richness and emotional depth compared to traditional methods. The research also examines how industry giants like Disney use AI to prioritize profits, potentially leading to less innovative storytelling and homogenized content.

Additionally, the study evaluates current intellectual property laws and data protection measures, proposing solutions to ensure artists receive recognition and compensation for their works used in AI training datasets. It emphasizes the need for AI to enhance, not replace, human creativity, preserving the collaborative nature of animation production. Furthermore, the study explores the risks of AI-induced job displacement, particularly for entry-level roles critical for nurturing new talent, and suggests strategies for workforce adaptation and reskilling in this evolving technological landscape.

This study aims to address that gap by exploring how AI tools influence production accessibility, artistic quality, and IP protection in the U.S. animation industry. By analyzing perspectives from 500 professionals, this research highlights both opportunities and risks tied to AI integration, providing a foundation for future regulation and ethical implementation. The following section outlines the study's objectives and proposed hypotheses.

2. Objectives

- (1) To determine whether AI tools significantly reduce barriers to entry for independent animation artists by lowering costs and technical requirements.
- (2) To assess the impact of AI integration on the preservation of distinctive human creativity and artistic expression in animation production.
- (3) To evaluate how dominant animation companies might use AI to prioritize commercial success, potentially leading to less imaginative and innovative content.
- (4) To examine the adequacy of existing intellectual property laws and data protection measures in ensuring that artists and rights holders are properly recognized and compensated for the use of their creative works in AI training datasets.

HA: Independent animation artists who use AI tools will report significantly lower barriers to entry than those who do not use such tools.

HB: The use of AI tools will reduce distinctive human contributions that generate artistically rich animation content.

HC: Major animation studios that adopt AI tools will be more likely to prioritize commercial profitability over imaginative or innovative content compared to studios that do not adopt AI.

HD: Strong intellectual property laws and data protection measures are associated with higher levels of recognition and compensation for artists whose works are used in AI training datasets.

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3. Materials and Methods

This study utilized quantitative methodologies to explore the role of AI in the animation industry. Surveys were employed to collect numerical data on perceptions, experiences, and the impact of AI tools, and questionnaires were created using Google Forms.

The study targeted a diverse group of individuals and organizations involved in animation, including independent animators, corporate studio professionals, writers, and legal experts. To ensure that varied experiences with AI in animation were reflected, the sample population included professionals from different geographic locations. Using Cochran's formula for sample size determination, the study aimed to gather at least 500 survey responses to account for potential non-responses, with a calculated minimum sample size of 384 for an estimated global population of 100,000 animation professionals. The survey was distributed through professional animation forums, LinkedIn groups, Discord servers, and Reddit communities related to digital art and animation. Additionally, personalized outreach was conducted via email and professional networks to animation studios in the United States. To maximize the response rate and reach the target sample size, the study used a combination of direct invitations, follow-up reminders, and snowball sampling, where initial respondents were encouraged to share the survey with colleagues.

The research instruments comprised structured surveys. The survey was divided into several sections:

- 1. Demographics (e.g., role, years of experience, geographic location)
- 2. Perceptions of AI in animation, focusing on the tools used and the extent of adoption.
- 3. Impact of AI on creativity, collaboration, and artistic integrity
- 4. Ethical and legal considerations

Survey items were organized into thematic categories and coded numerically using a Likert scale (1 = strongly disagree to 5 = strongly agree) to enable statistical analysis. Responses were coded and entered into SPSS for analysis. Surveys were disseminated through professional networks, online forums, and social media platforms targeting animation communities. The researcher also conducted surveys with professionals from U.S.-based studios such as "Floyd County" and "Newscape Studios." The survey data collected were analyzed using descriptive and inferential statistical methods. Tools like SPSS and Excel facilitated calculations of frequencies, percentages, and averages. The analysis primarily utilized independent samples t-tests to evaluate differences between respondent groups. The data analysis involved a thorough examination of demographic information and responses from 500 respondents. Statistical methods identified trends, correlations, and significant differences within the dataset. These methods were employed to gain a more profound understanding of the impact of AI tools on variables like barriers to entry, artistic quality, prioritization, and protection of artistic property. These insights were crucial for validating the proposed hypotheses and guiding future research. The study adhered to strict ethical guidelines, ensuring participant anonymity and confidentiality. Data was securely stored and used solely for research purposes. Participants were informed of their right to withdraw from the study at any stage.

4. Results and Discussion

This section is divided into three parts: Demographics Profile, which outlines respondents' characteristics; T-Test Analysis, which compares respondents' perceptions statistically; and Respondents' Perceptions Toward AI Tools, which provides insights into their views on AI's capabilities and impacts on the animation industry. This structured approach provides a comprehensive understanding of respondent profiles, statistical validation of hypotheses, and broader attitudinal trends.

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4.1 Demographics Profile





The pie chart shows the gender distribution of the surveyed population. The largest group was males (231 individuals, 46.2%). Females made up 25.8% (129 individuals). Additionally, 15.2% (76 individuals) preferred not to disclose their gender, and 12.8% (64 individuals) identified as non-binary.



Figure 2 Age Data

The majority of respondents were aged between 25 and 34 years (44.8%), followed by 34.8% aged 18 to25. Other age groups included 10% aged 35 to 44, 7% aged 45 to 54, and 3.4% aged 55 and above. This

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distribution indicates that most respondents fall within the 25 to 34 age range. This age distribution reflects a younger, tech-adaptable workforce, which may influence openness to AI adoption.

4.2 T-Test Analysis

HA: Independent animation artists who use AI tools will report significantly lower barriers to entry than those who do not use such tools.

Table 1 initialize of Al Tools on Barriers to Endy						
Barriers to Entry	Ν	Mean	t-value	p-value	Mean Difference	
Reduce	368	2.72	3.006	0.003	0.37920	
Not Reduce	132	2.34	3.282	0.001	0.37920	

Table 1 Influence of AI Tools on Barriers to Entry

Results from 500 respondents indicated that 368 (73.6%) believed AI tools reduced barriers to entry, while 132 (26.4%) did not. The mean barrier to entry score for artists not using AI tools was 2.72, higher than the 2.34 for those using AI tools, suggesting that AI users faced lower barriers. The t-values (3.006 and 3.282) and p-values (0.003 and 0.001) indicated significant differences between the groups, supporting the hypothesis. This study proves that AI tools are essential in reducing barriers to entry, including technical skills, production time, financial expenses, and resource availability. By making animation production more accessible, affordable, and creatively enriching, AI tools enable independent artists to create high-quality animations and compete with larger studios. This fosters innovation and diversity within the industry. These findings support Hypothesis 1 (H₁), confirming that AI tools significantly lower barriers for independent artists, making animation more financially and technically accessible.

HB: The use of AI tools will reduce distinctive human contributions that generate artistically rich animation content.

Artistic Quality	Ν	Mean	t-value	p-value	Mean Difference
Reduce	261	3.5824	-6.975	< 0.001	-0.96731
Not Reduce	239	2.6151	-7.001	< 0.001	-0.96731

Table 2 Influence of AI Tools on Artistic Quality

Based on the results, (261) artists agreed on the fact that AI tools reduced artistic quality, while (239) disagreed. The mean artistic contribution score for artists not using AI tools was (3.5), compared to (2.6) for those using AI tools, suggesting that AI users were perceived to produce lower-quality content. The negative t-values (-6.975 and -7.001) and p-values (<0.001) indicated that these differences were statistically significant. With p-values below 0.05, the null hypothesis was rejected, indicating a significant difference in artistic contribution scores between artists using AI tools and those not using them. The results suggest that AI tools reduce distinctive human contributions to artistically rich animation content.

T-test results supported the hypothesis, showing that artists using AI tools were perceived to generate less artistically rich content. This finding highlights the necessity for AI tools to enhance, rather than supplant, human creativity. Although AI brings advantages in terms of efficiency and cost savings, preserving human

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creativity is crucial to maintaining the artistic richness of animation content. These results align with Sharma and Juyal (2023), who reported that AI-generated works often lack the emotional depth and spontaneity found in human-created animation.

HC: Major animation studios that adopt AI tools will be more likely to prioritize commercial profitability over imaginative or innovative content compared to studios that do not adopt AI.

Prioritization	Ν	Mean	t-value	p-value	Mean Difference
Imaginative Contents	314	3.5701	-10.317	< 0.001	-1.16684
Profits	186	2.4032	-9.403	< 0.001	-1.16684

Regarding the table, the mean score for those who favored imaginative content was 3.5, higher than the 2.4 for those who prioritized profits, which means respondents who did not prioritize earnings had higher scores. The t-values (-10.317 and -9.403) and p-values (<0.001) indicated significant differences between the two groups. As the p-values were both less than 0.05, the null hypothesis was rejected. Specifically, dominant animation industry participants who prioritized profits had lower scores compared to those who prioritized imaginative content. This study points out that profit-driven projects may lead to less imaginative content, as studios focus on commercially viable projects over creative innovation.

Therefore, the t-test analysis results supported the hypothesis, indicating that the use of AI by dominant animation industry participants leads to a focus on profits over imaginative content. This underscores the importance of using AI tools in a balanced manner to maintain the production of diverse, innovative, and artistically rich animations in the industry. These findings support Hypothesis 3 (H₃), indicating that studios leveraging AI tend to prioritize cost-efficiency and market trends over imaginative storytelling. This result reflects broader industry trends noted by Kadam (2020), who observed AI's role in streamlining production at the expense of creative experimentation.

HD: Strong intellectual property laws and data protection measures are associated with higher levels of recognition and compensation for artists whose works are used in AI training datasets.

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Protection	Ν	Mean	t-value	p-value	Mean Difference
Not Protective	115	3.5130	-5.349	< 0.001	-0.76228
Protective	385	4.2753	-4.959	< 0.001	-0.76228

Table 4 Relationship between Artists' Intellectual Property and Intellectual Property Laws and Data Protection

According to the table, 115 respondents (23%) felt their intellectual property was not protected, while 385 (77%) believed it was. The mean score for those not protected was 3.5, indicating lower recognition and compensation when IP laws and data protection measures are not considered protective. In contrast, the mean score for those who felt protected was 4.2. The negative t-values (-5.349 and -4.959) and p-values (<0.05) indicated significant differences.

Overall, these t-test analysis results supported the hypothesis, indicating that strong intellectual property laws and data protection measures effectively ensure recognition and compensation for original rights holders. This emphasizes the need for a solid legal framework to safeguard creators' interests and [113]

encourage a fair and just creative environment. The findings point out the crucial role of strong legal frameworks in protecting creators' rights when their works are utilized by AI models.

4.3 Respondents' Perceptions Toward AI Tools

Description	Frequency	Percent	Cumulative Percent
Very Unlikely	87	17.4	17.4
Unlikely	255	51	68.4
Neutral	59	11.8	80.2
Likely	49	9.8	90
Very Likely	50	10	100

 Table 5 Perceptions of AI Tools' Ability to Produce Ouality Animations

Table 6 Overall Results for Respondents' Opinions about AI Tools

Mean	Standard Deviation	Standard Error of Mean	Variance	Range	Minimum	Maximum	Valid
2.440	1.1803	0.0528	1.393	4	1	5	500

The data reflected five levels of confidence in AI's ability to produce quality animations. A significant portion of respondents (17.4%) were highly skeptical, believing AI tools were very unlikely to meet quality standards. Another group (51%) also doubted AI's capabilities but acknowledged potential future advancements. On the other hand, 10% of respondents were very confident, and 9.8% believed AI tools could likely produce decent quality animations. The neutral category (11.8%) had no strong opinion, seeing both potential and limitations in AI tools.

Overall, 68.4% of respondents were skeptical of AI's ability to produce quality animations, while 19.8% were optimistic about its potential. The mean score of 2.440 indicates a slight lean towards skepticism, with most respondents falling into the "Unlikely" and "Neutral" categories. The standard deviation of 1.1803 shows moderate variability in opinions, while the standard error of 0.0528 suggests a precise estimate of the population's mean. The variance of 1.393 reinforces the moderate diversity in respondents' perceptions. The data reveals general skepticism about AI tools' ability to create quality animations, with some diversity in opinions and a precise estimate of overall sentiment. These results suggest that skepticism remains high, though not unanimous, highlighting the need for further improvement and transparency in AI-generated creative tools.

Table 7 Agreement on AI's Lack of Emotional Depth and Connection

Description	Frequency	Percent	Cumulative Percent
Strongly Disagree	54	10.8	10.8

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Disagree	63	12.6	23.4
Neutral	140	28.0	51.4
Agree	51	10.2	61.6
Strongly Agree	192	38.4	100

Based on the results, a significant portion 38.4% strongly agreed that AI lacks emotional depth and connection, indicating a firm belief in AI's inability to replicate human emotional nuances. Additionally, 10.2% agreed with this sentiment, showing considerable skepticism. On the other end, 10.8% strongly disagreed, suggesting AI could exhibit some emotional depth, while 12.6% disagreed, recognizing some potential for AI's emotional qualities. The neutral category, 28%, indicated ambivalence, with respondents neither fully endorsing nor rejecting AI's emotional capabilities.

Overall, nearly half of the respondents believed AI lacks emotional depth, but the substantial neutral group suggested room for further exploration. The minority who disagreed highlighted a counter-perspective, indicating some belief in AI's potential emotional capabilities. These results reinforce earlier findings in Hypothesis 2, supporting the idea that AI-generated animations may lack the emotional richness of human-created works.

5. Conclusion

This research examines the integration of artificial intelligence (AI) in the animation industry, focusing on its effects on independent creators, corporate practices, artistic integrity, and legal frameworks. It investigates how AI tools can democratize animation by lowering entry barriers for independent artists while raising concerns about oversimplifying creative processes and diminishing human artistry. The study assesses AI's impact on human contributions, particularly its potential to reduce artistic richness and emotional depth in animations. It also explores how major corporations use AI to prioritize profitability, potentially leading to homogenized content and stifled innovation, and highlights the necessity for strong intellectual property laws and data protection measures to safeguard artists' rights and address unauthorized use of creative works in AI models.

The findings of this study highlight both the transformative potential and the risks associated with AI integration in the animation industry. Independent artists benefit from AI tools that reduce production costs and enhance accessibility, allowing for more diverse content creation. However, concerns over artistic integrity, corporate prioritization of profits, and intellectual property protection persist. These challenges call for clearly defined ethical frameworks and updated legal protections to ensure balanced AI integration. For independent animators, AI provides a unique opportunity to create high-quality animations with fewer resources, making it easier for individuals to compete with larger studios. However, overreliance on AI-generated assets may result in a loss of traditional animation skills and a lack of originality. Research by Pandit and Kirdat (2024) emphasizes the importance of AI in democratizing animation production, but they caution that its widespread, unregulated use may lead to creative stagnation. One way to prevent this is through structured AI-integrated animation programs, where traditional artistic skills are preserved while AI tools assist in automating repetitive processes. Similarly, open-source AI animation platforms should be encouraged, ensuring that independent creators have access to the same technological advancements as large corporations. This measure would prevent a future where AI-driven animation is monopolized by a few major players while allowing diverse creative voices to flourish.

Beyond accessibility, AI's impact on creativity remains a major concern. The study indicates that AI is highly effective in streamlining production workflows, yet its ability to produce artistically rich and emotionally engaging content remains limited. AI-generated animation often relies on predictive models that replicate existing patterns rather than producing genuinely novel artistic expressions. Sharma and Juyal

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(2023) argue that this pattern-based approach limits the spontaneity and originality inherent in human-created works. To address this, AI developers should focus on designing tools that allow animators to input their own stylistic preferences, ensuring that AI-generated animations maintain unique visual identities rather than conforming to generic algorithmic aesthetics. Additionally, AI-generated content should be subjected to ethical review processes within animation studios, ensuring that the technology serves as an enhancement to creativity rather than a replacement for human-led storytelling.

The study also reveals that major animation studios are increasingly adopting AI to cut costs, raising concerns that artistic integrity may be sacrificed in favor of profit-driven automation. Hale (2024) highlights how AI-driven analytics play a significant role in shaping production decisions, often prioritizing commercially viable content over artistic innovation. To counter this, industry-wide AI governance policies should be developed, requiring studios to disclose how AI is used in their production pipelines. Ethical AI review boards within major animation corporations could be introduced to oversee the implementation of AI in a way that prioritizes creative expression rather than purely financial efficiency. Furthermore, streaming platforms and content distributors should promote a balance between AI-assisted and traditionally animated works, ensuring that human-driven storytelling remains central to the industry.

One of the most pressing issues identified in the study is the inadequacy of current intellectual property laws in regulating AI-generated content. The unauthorized use of artists' works in AI training datasets presents a significant legal and ethical challenge, as current copyright protections are not equipped to address the complexities of AI-generated media. Pardeshi and Mude (2024) propose the development of AI-specific licensing agreements, where artists have the ability to opt in or out of AI training datasets. Implementing such a model would ensure that artists receive proper compensation when their works are used for AI development. Additionally, watermarking AI-generated animation could serve as a transparency measure, allowing audiences and industry professionals to differentiate between human-created and AI-generated content. Blockchain technology could further be explored as a method of tracking AI usage of copyrighted works, ensuring greater accountability in the industry.

This study lays the foundation for future research into AI's evolving role in animation. Future studies should focus on comparative assessments of AI-generated versus human-created animation, analyzing differences in audience perception and engagement. Longitudinal studies tracking AI's impact on employment within the animation sector could provide more profound insights into workforce adaptation strategies. Additionally, further legal research is required to update copyright frameworks to reflect AI's growing role in creative industries. Addressing these concerns through interdisciplinary research and collaboration between AI developers, animators, and policymakers will be essential in ensuring that AI enhances rather than diminishes artistic integrity.

While AI presents significant opportunities for efficiency and accessibility in animation, its longterm impact will be determined by how it is regulated and ethically implemented. Industry leaders, policymakers, and researchers must work together to establish ethical guidelines, AI training models, and legal protections that foster both innovation and artistic diversity. If implemented correctly, AI can serve as a powerful tool that enhances the creative process rather than replacing it. However, without proper oversight, AI risks homogenizing artistic expression, displacing traditional animators, and undermining intellectual property rights. As the animation industry continues to evolve, striking a balance between AI-driven efficiency and human creativity will be critical in preserving animation as a meaningful and expressive art form.

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