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Navigating Copyright in AI-Enhanced Game Design: Legal Challenges in Multimodal and Dynamic Content Creation

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ABSTRACT

The integration of artificial intelligence (AI) in video game design has transformed traditional workflows, allowing for the generation of text, images, music, videos, and code at unprecedented scales. However, this advancement presents complex challenges for copyright law, traditionally rooted in human originality and authorship. This article examines recent case law that underscores the evolving legal landscape, exploring landmark cases such as *Zarya of the Dawn* and *Andersen v. Stability AI*. These cases reveal the tensions between AI-generated outputs and copyright eligibility, especially in the dynamic, multimodal compositions inherent to video games. The review analyzes how various AI tools are employed across the stages of game development—from design documentation to character modeling, soundtrack composition, and cinematic sequences—and the legal uncertainties surrounding each. Emphasis is placed on the role of human input in determining copyright eligibility, proposing that human-AI co-creation models and enhanced metadata standards may offer pathways to reconcile AI-driven innovation with intellectual property protections. As video games exemplify the unique challenges in AI-generated, temporally interactive works, this study calls for a nuanced copyright framework that acknowledges both technological capabilities and the irreplaceable contribution of human creativity. The findings advocate for policy adaptations that align legal protections with the realities of AI-integrated creative processes, ensuring a balanced approach that supports both innovation and creator rights.

KEYWORDS

Ai-Generated Content; Copyright Law; Game Design; Multimodal Creation; Human-Ai Co-Creation

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1. Introduction

Artificial intelligence (AI) is rapidly changing the video game industry by enabling the automated generation of diverse modalities integral to game development: textual content, visual art, music, video, and programming. Each of these modalities can now be generated, at least partially, by AI, from narrative structures and character dialogues created through text generation tools to intricate visual assets produced by AI-driven imaging models like Stable Diffusion and Runway (Rath & Preethi, 2021). Similarly, AI is advancing music composition, enabling dynamic soundscapes that adapt to player actions, thus enhancing immersion (Yang & Nazir, 2021). AI-based programming tools like GitHub Copilot facilitate the rapid creation of code for gameplay mechanics, while video generation tools streamline the production of cinematic sequences that enhance storytelling within games (Colado et al., 2023; Feuerriegel et al., 2024). Consequently, these advancements allow game developers to achieve new levels of efficiency and creativity, but they simultaneously raise critical legal questions regarding authorship and intellectual property.

Copyright law, traditionally grounded in principles of human originality and creativity, faces significant challenges in adapting to AI-generated multimodal works in video games. Copyright law, traditionally governed by *17 U.S.C. § 102*, stipulates that a "human author" is necessary for a work to qualify for copyright protection, a criterion that AI-generated creations challenge due to the absence of direct human authorship (Abbott & Rothman, 2023). Recent cases, notably *Allen v. U.S. Copyright Office* (2024) (1:24-cv-2665), underscore the complexities in attributing authorship and securing protection for works perceived to involve limited human contribution (Epstein et al., 2023). For instance, game assets generated by AI may lack the intentional creative decisions typically associated with copyrightable works, prompting debate on whether such content can or should be protected under existing intellectual property frameworks. As the role of these tools expand, these challenges are becoming more pronounced, particularly as games involve complex, interactive, and temporally dynamic compositions that differ from static media like photographs or illustrations (Farmaki, 2023; Straeubig, 2020).

Central to these discussions is the question of how current copyright laws influence AI-generated content across different stages of game design and the implications this has for intellectual property rights. Answering this requires examining not only how copyright standards apply to individual game elements, such as text, visuals, and music, but also how they relate to the interactive, temporally dynamic nature of video games as a whole. This complexity demands a nuanced understanding of both copyright law and the evolving technological landscape in game development, as legal systems begin to confront the implications of AI in creative industries (Wu et al., 2023). Given these ambiguities, this article investigates how copyright law might adapt to better address the challenges of AI-assisted and AI-generated works, aiming to support human creators while fostering AI innovation.

Although AI technology can autonomously generate creative content, there are nuanced legal considerations. First, AI-generated content that results from minimal prompting still requires a re-examination of copyright protections, particularly regarding ownership, fair use in training datasets, and authorship rights (Jiang et al., 2023). Second, creatives using AI-assisted technologies should be eligible for copyright protection when they can demonstrate "significant human contributions." Many artists meet these criteria by documenting their creative processes, using their own works to train models, and further refining AI-generated outputs post-production (Hutson et al., 2023).

Thus, a revised copyright framework could include flexible standards for both AI-assisted and AI-generated content, balancing the rights of creators to opt out of having their works used for training with the rights of creatives employing AI tools for novel outputs. Such an approach encourages innovation while upholding traditional notions of creativity and authorship. As AI continues to permeate creative industries, a legal reevaluation of copyright is crucial to ensure that this technology bolsters human creativity without undermining established intellectual property rights. This challenge calls for a balanced framework that respects the contributions of human creators

within AI-enhanced processes, ensuring a future where AI acts as an aid to human expression rather than a replacement for it.

2. Background on Copyright Law in Game Design

Copyright law traditionally aims to protect original works of human authorship, emphasizing the requirement for originality in creative expression. The foundational case, *Feist Publications, Inc. v. Rural Telephone Service Co.*, clarified the necessity of a "modicum of creativity" for copyright protection, rejecting the prior "sweat of the brow" doctrine, which protected factual compilations purely based on the labor involved (Hamilton, 1990). This decision determined that mere data collection without creative selection or arrangement lacks the originality required for copyright. For video game design, where vast datasets often inform AI-generated content, *Feist* sets a precedent, indicating that copyright requires distinct creative choices rather than automated or purely mechanical processes. Consequently, this case has substantial implications for AI-generated components in games, as it raises questions about whether machine learning (ML) outputs, created with minimal human involvement, meet this threshold of creativity.

The *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.* case (2008) reinforced *Feist's* creativity requirement, addressing digital works and affirming that copyright only extends to expressions demonstrating personal creativity. In *Meshwerks*, digital 3D models of Toyota cars, created by replicating existing designs without adding unique artistic input, were deemed uncopyrightable because they lacked independent creative expression beyond their source material (Landsman, 2009). This ruling highlights the importance of human creativity in digital works, establishing that mere reproduction, even in a new format, does not suffice for copyright. For video games, where AI-generated 3D models or textures often replicate or remix existing content, *Meshwerks* raises critical questions about the copyright eligibility of such AI-driven assets in game development.

Both *Feist* and *Meshwerks* underscore the challenges AI-generated content faces under current copyright standards, especially in the interactive and evolving field of video games. These cases illustrate that copyright law prioritizes originality linked to human authorship, potentially disqualifying AI-generated elements in games unless substantial human input is present (Sunray, 2020). As AI tools increasingly assist in creating complex game components—ranging from visual art to dialogue scripts—the industry faces a legal dilemma regarding whether and how AI-generated works can be protected under copyright. The implications of these rulings are significant, as they may necessitate a revised framework to address the unique intersection of human and AI creativity within copyright law (Wagh, Peerzada, & Rote, 2023).

As these generative tools increasingly contributes to video game development, copyright considerations surrounding AI-generated and AI-assisted works have become pivotal. Traditional copyright frameworks are largely designed to protect human creativity, emphasizing originality and authorship (Wan & Lu, 2021). However, AI challenges these concepts, as it often generates content with minimal or no direct human intervention, leading to uncertainties regarding ownership and protection. In game development, where complex, multimodal assets are produced across various stages—from concept art to interactive gameplay mechanics—this raises significant questions about how copyright applies to content partially or fully generated by AI (Wu et al., 2023). As each stage in the game development lifecycle involves distinct types of creative work, understanding copyright's role in these phases is essential. The following section explores these stages, highlighting the application of copyright law in pre-production, production, and post-production, and examining how AI influences copyright eligibility within each phase.

In video game development, the pre-production phase serves as the foundation for a game's narrative, visual identity, and technical requirements, setting the stage for the entire project (Yu, 2017). This phase encompasses concept art, storyboarding, initial character designs, and often includes the preparation of level design

documentation and gameplay mechanics. AI tools play a significant role in pre-production by generating initial visual and narrative concepts based on textual prompts, enhancing efficiency but complicating copyright eligibility. Traditionally, copyright in this stage has protected individual elements created by human authors, such as character sketches or concept art, as these works were products of human creativity. However, with AI generating assets, such as preliminary artwork or script drafts, copyright application becomes ambiguous, as traditional frameworks are oriented toward human-authored originality (Samuelson, 2023).

The production phase is where the bulk of game assets, such as 3D models, animations, music, and coding, are developed and implemented. AI-driven tools like Blender and Unreal Engine now contribute to character modeling and behavior programming, offering automated processes for tasks traditionally requiring human design (Jeon, 2023). In this stage, AI can automate the generation of textures, animations, and even code snippets, allowing developers to streamline workflows (Begemann & Hutson, 2024). However, copyright traditionally extends to discrete human-generated elements like animations or coding scripts, which makes it challenging to apply to assets created with limited human intervention. Since copyright law requires human authorship, AI-generated assets in production—while valuable for efficiency—often lack the originality required for legal protection, thus questioning ownership rights when these AI tools contribute substantially to game content (Abbott & Rothman, 2023).

In post-production, the focus shifts to refining, testing, and enhancing the game before launch. This phase includes tasks such as audio mixing, visual effects, and bug fixes. In post-production, AI tools are often employed to optimize performance, manage pipeline tracking, and enhance graphics, with some tools capable of making significant modifications to the final output (Huang et al., 2023). Traditional copyright protection in post-production typically covers the final, polished versions of human-generated assets. However, as AI tools now contribute to elements like video rendering, audio refinement, and even complex debugging, the line between human and AI contribution blurs, raising questions about the copyright status of these finalized, AI-enhanced elements.

3. Legal Case Studies Across Game Design Modalities

3.1. Text Generation for Game and Level Design Documentation

The use of AI in generating textual content for video game design and world-building documentation presents unique copyright implications, particularly concerning authorship and originality. Text generated by AI, whether for narrative development or level design instructions, raises questions about who holds ownership over these creations. Current copyright law primarily emphasizes human creativity as a prerequisite for protection, leaving AI-generated texts in a gray area regarding legal status. For instance, recent studies explore how text generation models can be integrated into game design, yet they underscore that such integration challenges the traditional criteria for copyright due to the minimal human intervention often involved in these outputs (Burylo, 2022).

The case of *Théâtre D'opéra Spatial,* (Figure 1) where artist Jason Allen used Midjourney, an AI text-to-image model, to produce artwork, underscores the copyright implications of using text-based prompts for creative output. This case illustrated that the court required substantial human contribution in prompt crafting and post-processing for the work to qualify as copyrightable, highlighting a significant precedent for AI-assisted creativity in text generation (Samuelson, 2023). Although Allen argued that his creative input through carefully crafted prompts should be protected, the decision emphasized the need for tangible human originality beyond mere prompt engineering, reflecting the current legal hesitation to grant full copyright to AI-generated works. For game design, where textual inputs contribute significantly to narrative and level design, this case underscores that copyright protection is more likely when AI serves as a tool for enhancing human creativity rather than fully generating content autonomously.

Figure 1. Jason M. Allen, *Théâtre D'opéra Spatial,* 2022. Midjourney. (CC 0).

This legal stance suggests that in video game development, AI-generated text for documentation may not meet copyright standards without direct, substantial human intervention. Research has further highlighted the need for frameworks that recognize AI's role in creative processes while safeguarding human authorship rights, especially as text generation tools become prevalent in game design (Dimitrova, 2023). Thus, *Théâtre D'opéra Spatial* sets a critical precedent, indicating that as AI tools become increasingly integrated into creative workflows, legal standards may require adjustments to address the complex interplay between human authorship and AI-generated content in the gaming industry.

3.2. Image Generation for Concept Art

The advent of AI models such as DALL-E, Midjourney, and Stable Diffusion has transformed concept art generation in game development, introducing complex copyright considerations regarding authorship and derivative rights. These tools allow artists and developers to generate images based on text prompts, leading to discussions on whether AI-generated art, especially when derived from copyrighted material, qualifies for protection under traditional copyright frameworks. As AI models often rely on extensive datasets that include copyrighted works, there is a growing debate over the rights to derivative designs, with concerns that these tools may infringe on the intellectual property of original creators (Veiga, 2023).

A landmark case exemplifying these issues is the *Zarya of the Dawn* (Figure 2) ruling, where the U.S. Copyright Office denied copyright for the AI-generated images within a graphic novel, ruling that AI creations lack the necessary human authorship to warrant copyright protection. This decision underscores the legal stance that substantial human involvement is essential for copyright eligibility, even if the artwork appears indistinguishable from human-made pieces (Hutson & Lang, 2023). The court maintained that while the narrative text of *Zarya of the Dawn* could be copyrighted due to its human authorship, the visual elements generated via Midjourney were excluded, reinforcing the requirement that copyright protection applies only to content directly created by humans.

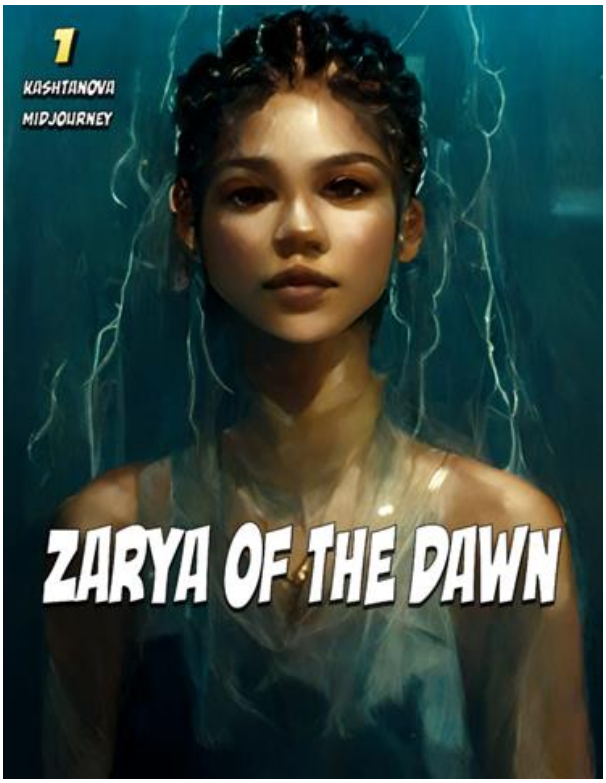

Figure 2. Kris Kashtanova, *Zarya of the Dawn Cover*, Comic Book, 2022. (CC 0).

This precedent has significant implications for game developers who utilize AI tools in concept art creation, as it emphasizes the need for human creativity in securing copyright. The ruling suggests that AI-generated visual assets, commonly used for preliminary design, are legally vulnerable if minimal human authorship is involved. Moving forward, this case encourages developers to incorporate substantial human-led modifications to AI-generated imagery if copyright protection is desired, reflecting an evolving legal landscape in response to AI's role in the creative industries (Zhou et al., 2023).

3.3. Music Composition for Scores and Soundtracks

The application of AI in music composition, particularly for generating video game soundtracks, introduces complex questions about originality and copyright eligibility. AI models like Google's MusicLM have advanced significantly, producing high-fidelity compositions based on textual prompts. However, as these systems learn from large music datasets, they often face scrutiny regarding whether generated pieces replicate copyrighted content or genuinely produce novel works. Copyright law mandates originality in creative works, traditionally ensured by the unique input of a human creator. Yet, AI-generated music challenges this criterion, as such models can mimic existing genres, styles, and even specific composers, raising questions about whether these compositions meet the standards for copyright protection (Agostinelli et al., 2023).

In the case of MusicLM, researchers have demonstrated the model's ability to generate compositions that align closely with textual descriptions, such as producing "a calming violin melody backed by a distorted guitar riff." This ability, while innovative, has sparked concerns among legal scholars and musicians regarding the extent to which these compositions may infringe on original works (Burylo, 2022). MusicLM, like other AI music generation models, relies on datasets of existing compositions for training, leading to concerns that such outputs may be derivative of copyrighted materials. The originality requirement central to copyright law becomes difficult to apply here, as AI-

driven compositions blend learned musical structures in ways that may or may not constitute creative expression beyond mere replication.

Research highlights the need for a nuanced approach to copyright standards in AI-generated music, suggesting that without substantial human contribution, such compositions may not meet the legal thresholds of originality. Some legal analysts argue that stricter regulations on dataset usage or alternative copyright frameworks may be necessary to balance innovation with intellectual property protections. These discussions underscore the evolving legal landscape for AI-generated music in game development, where soundtracks must be both immersive and compliant with copyright standards (Xiong et al., 2023).

3.4. Video Generation for Cinematic Sequences

Video generation models like Runway (https://www.youtube.com/watch?v=HP76MCYkIfU) have introduced powerful tools for creating dynamic, visually rich cinematic sequences in video games, yet these innovations have stirred legal uncertainties, particularly around copyright. AI video generation often utilizes large datasets containing potentially copyrighted videos to train models that autonomously produce new, coherent sequences. As AI's role grows in producing video content, the legal status of AI-generated sequences remains unclear, as copyright law traditionally focuses on human authorship and originality standards. Video generation's unique temporal aspect also challenges current copyright frameworks, as it creates dynamic works that evolve over time rather than static outputs (Lee et al., 2023).

A prominent case highlighting these challenges is the ongoing dispute involving Stability AI. In this case, the company has faced allegations regarding unlicensed use of copyrighted video datasets for training purposes, which has raised significant concerns about data provenance and the legal use of copyrighted materials in generative AI training (Samuelson, 2023). Critics argue that, without proper licensing, Stability AI's model outputs may infringe upon the intellectual property rights of the original creators. This lawsuit underscores a broader issue within generative AI: when models generate content similar to copyrighted works, it blurs the line between original creation and derivative work, prompting a need for clearer legislative guidelines.

Such cases reveal the pressing need for legal frameworks that address the specificities of AI-driven video generation. As video generation tools increasingly shape the visual storytelling in games, developers must navigate a landscape where copyright protections for AI-generated sequences remain legally ambiguous. Some scholars suggest adopting more transparent licensing requirements for training datasets or establishing "fair use" standards specific to generative AI, potentially mitigating legal risks while supporting creative freedom (Elkin-Koren et al., 2023).

3.5. Code Generation for Gameplay Mechanics

AI-driven code generation tools like GitHub Copilot are transforming game development by accelerating the production of gameplay mechanics, yet they introduce unresolved copyright and ownership challenges. Copilot, which generates code based on extensive public code repositories, has sparked significant legal debate regarding whether AI-generated code derived from open-source material constitutes an original work or falls under fair use. Current copyright law requires human authorship for protection, creating ambiguity when AI models generate new code that may closely resemble its training data, blurring the line between original creation and reproduction (Lee et al., 2023).

A prominent legal case exemplifying these issues is *Doe v. GitHub*, where the plaintiffs argue that GitHub Copilot's reliance on open-source code for training violates copyright, as it reproduces code segments without attribution or a clear transformative use. In this case, the court examines whether the use of open-source code by

AI for training purposes constitutes fair use, particularly when the output resembles or incorporates segments of the original code. This litigation raises essential questions about the intellectual property rights of developers whose code is used in training and the extent to which AI-generated outputs can be considered transformative or derivative (Yetistiren et al., 2023).

This legal scrutiny has broad implications for game developers who use Copilot or similar tools to streamline coding processes. The outcome of *Doe v. GitHub* could set a precedent on whether developers retain ownership over AI-assisted code or if this output falls into a legally ambiguous domain. Scholars suggest that the case underscores the need for transparent guidelines on training dataset use and calls for potential reform in copyright laws to address the unique nature of AI-generated code, balancing innovation with respect for intellectual property rights (Wermelinger, 2023).

4. Level 1 heading

The dynamic, interactive nature of video games presents distinct challenges for copyright law, especially as modern games integrate multimodal AI-generated content across audio, visual, narrative, and coding components. Unlike static images or traditional text, video games evolve temporally through player interactions and often include AI-driven elements that dynamically respond to user actions (Hu et al., 2024). These evolving, interactive experiences complicate copyright assignment because traditional frameworks are designed to protect static works with fixed content. For instance, character dialogues or environmental details in video games might change depending on the choices players make, creating multiple, unique experiences from a single game—a concept that stretches conventional notions of authorship and ownership.

One significant issue is the legal classification of the content generated in real time by AI within games. As video games increasingly use AI models to generate in-game responses, procedural art, and interactive elements, these outputs often lack the fixed, tangible form traditionally required for copyright protection. This limitation poses challenges for developers who aim to protect the multimodal content created dynamically in response to player actions. Additionally, copyright law has yet to adapt to address whether such AI-generated, reactive content qualifies as original work, especially as it involves complex combinations of audio, text, and visual elements within the same framework (Filipović, 2023).

The *Andersen v. Stability AI* case sheds light on the challenges associated with unauthorized use of copyrighted images in AI training and the resulting implications for multimodal content generation. In this lawsuit, artists argued that Stability AI had used their copyrighted works without permission to train generative models, creating outputs that closely resembled original artworks. This case highlights a key legal ambiguity: when multimodal AI tools use copyrighted materials in training, the resultant works can closely mimic these sources, complicating ownership claims (Sag, 2023). In game development, where multimodal assets such as art, sound, and video are integrated into a cohesive narrative experience, the case underscores the potential for copyright infringement across multiple media types within a single game pipeline.

Further complicating copyright in video games is the collective nature of game development, where numerous individuals and teams contribute to a single project. For instance, character animations, environmental sounds, background music, and narrative elements are often created by different artists and then synthesized through AI models. This collaborative process raises questions about the ownership of AI-generated combinations of these assets, as no single contributor may claim authorship of the final, dynamically generated output. Therefore, copyright assignment in video games is increasingly complex, as the boundaries of individual contributions blur when AI tools integrate and alter these elements in real-time.

To address these challenges, legal scholars suggest a more flexible approach to copyright, potentially involving collective copyright or shared ownership models for multimodal AI-generated content. Such frameworks would

need to account for the dynamic, evolving nature of video games, recognizing the role of AI as a co-creator that enhances but does not entirely replace human input. This approach could help balance the rights of individual creators whose works contribute to the game's overall aesthetic and narrative while ensuring that dynamic, player-influenced content remains protected under intellectual property law.

5. The Role of Human Input in Determining Copyright Eligibility

The requirement of originality in copyright law underscores the necessity for human input in works claiming copyright protection. This human-centered approach remains pivotal in assessing AI-generated and AI-assisted creations, especially in multimodal contexts like video game design, where various media such as text, audio, and visuals are integrated. Historically, originality is tied to human creativity, as highlighted in cases like *Allen v. U.S. Copyright Office*, where the court deemed that human prompts were insufficient for copyright eligibility without substantial creative involvement from a human (Dai & Jin, 2023). This ruling reflects the emphasis placed on direct human authorship within copyright law, challenging the applicability of copyright to fully AI-generated works, especially those that lack significant human intervention.

In AI-enhanced creative processes, the role of prompt crafting has gained importance as it can influence AI outputs, yet the level of human contribution required to meet copyright standards remains debatable. The nuanced role of prompts, as seen in cases involving AI image generation tools, illustrates that although humans guide the creation process by specifying prompts, this guidance often falls short of the originality needed for copyright protection. Scholars argue that copyright eligibility could consider the depth of human input in prompt crafting and post-processing, potentially leading to a co-authorship model where both human and AI contributions are acknowledged distinctly (Militsyna, 2023). Such a model could bridge the gap between traditional copyright requirements and the emerging capabilities of AI, providing a framework for joint ownership that accommodates the distinct roles of both entities.

Post-processing, which entails refining and modifying AI-generated content, adds another layer of human influence that might align better with copyright's originality requirement. This stage allows creators to add personal touches and modify outputs to meet specific creative goals, which some legal experts suggest could help meet the threshold for copyright if the modifications are substantial. Studies propose that this human intervention could justify a co-authorship model, where copyright law adapts to recognize the blended contributions of human authors and AI systems. As AI tools become prevalent in creative industries, such models could redefine copyright eligibility standards by weighing the significance of post-processing in the final work (Kulinich & Kondyk, 2023).

The concept of shared authorship has been explored in legal frameworks across different countries, with some jurisdictions allowing for limited copyright in works that involve AI, provided there is meaningful human contribution. For instance, in European copyright law, the originality of a work is linked directly to the author's personal input, a standard echoed in other jurisdictions. By recognizing shared authorship, copyright law could evolve to better accommodate works resulting from human-AI collaboration, where the AI serves as an augmentative tool rather than an independent creator. This co-authorship model might be essential in cases involving complex, multimodal works, like those in video game design, where AI and human inputs are intricately intertwined (Geiger, 2023).

However, substantial debates remain over whether AI contributions should qualify as co-authorship, as some scholars caution that granting rights to AI-generated works may oversaturate the creative market. Concerns arise that broadening copyright eligibility to include AI contributions could lead to monopolies over derivative content, potentially stifling creativity and innovation. Thus, while shared authorship offers a path forward, it must be balanced carefully to avoid compromising the accessibility of creative works. Researchers recommend that copyright law maintains a human-centered approach, prioritizing human creativity as the basis for originality,

thereby reserving AI-generated works for public domain use unless extensive human refinement is evident (Iaia, 2022).

6. Policy Developments and Future Directions

Recent legislative efforts, notably the European Union's proposed AI Act, represent significant steps in addressing the regulatory needs posed by AI advancements. The AI Act seeks to create a robust framework that balances innovation with protection, introducing new regulations specifically targeting high-risk AI systems while establishing baseline standards for all AI-driven applications. It mandates transparency, fairness, and accountability, aiming to mitigate ethical concerns and safeguard public interests in the application of AI technologies. This legislation's relevance to AI-driven game design is considerable, as it provides a structured approach to handling copyright in AI-generated content, establishing requirements for transparency and accountability, and ensuring the responsible use of AI in creative industries (Hacker, 2023).

Additionally, the EU has introduced text and data mining (TDM) exceptions, which are crucial in fostering an environment conducive to AI innovation. These TDM provisions allow researchers and developers to legally utilize large datasets without infringing on copyright, provided the data is used for non-commercial purposes. The exceptions support generative AI advancements by clarifying the extent to which data can be processed and analyzed for AI model training, facilitating ethical innovation while respecting intellectual property rights (Dermawan, 2023). Combined with the AI Act, these measures help establish a regulatory foundation that encourages the ethical development of AI technologies, balancing the rights of creators with the need for AI advancement.

To address existing gaps in copyright law, experts suggest the development of AI licensing frameworks that include metadata tagging and opt-in protocols for content creators. Metadata tagging would involve identifying and marking data used for AI training, allowing for easier tracking of content origins and ensuring that creators are aware of how their work is utilized. Opt-in protocols would empower artists and creators to consent explicitly to their works being used in AI datasets, mitigating unauthorized use and potential copyright infringement. Implementing these frameworks could provide a balanced solution, encouraging responsible AI development while preserving the integrity of creators' rights (Gotthardt, 2023).

As AI continues to evolve and its applications become more sophisticated, a proactive approach to policy development is essential to accommodate its unique challenges. The AI Act and TDM exceptions are steps forward, yet further adjustments to copyright frameworks may be needed to reflect AI's capabilities in generating and transforming multimodal content. The proposed licensing frameworks, metadata tagging, and opt-in systems serve as examples of the direction that copyright policy could take to better support both creators and innovators. By establishing clear guidelines that protect both human originality and AI-driven creativity, future policy can ensure a legal landscape that promotes both technological progress and respect for intellectual property (Kazim & Tomlinson, 2023).

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