CRACKS IN THE CODE – LEGAL AND ETHICAL CHALLENGES IN THE DIGITAL SPHERE

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ABSTRACT

Intellectual property in the digital era has been completely transformed into how intellectual property is created, shared, and consumed. Technology such as artificial intelligence (AI), blockchain, and digital content platforms is evolving faster, faster, and challenging traditional legal frameworks. Challenges with legal and ethical aspects when innovation overruns the pace of regulation are looked at that include authorship of artificial intelligence made works, ownership of digital assets like NFT, along with a complex licensing and enforcement in the virtual ground.

Human creativity, territorial jurisdiction, and physical ownership were the foundational principles of intellectual property laws, principles on which the tolerance has now become a world that is being driven by automation, decentralization and global connectivity. It is seen through this chapter that these changes create gaps and inconsistencies in the protection and regulation of intellectual property and leave creators, innovators, and consumers in the dark as to their rights and obligations.

The chapter argues that without significant reform, these cracks in the IP system risk undermining the very creativity and innovation the law is designed to support.

1. CONTENT CREATION AND DISTRIBUTION IN THE DIGITAL ERA

The digital age has radically changed the way content is created, shared, and consumed. Unlike traditional models, where creation was slow, centralized, and relatively easy to monitor, digital platforms today allow millions of users to directly produce and distribute content around the world. Platforms like YouTube, Instagram, TikTok, blockchain marketplaces, and AI tools have authorized individuals to create music, art, videos, and software on unprecedented scales. However, this explosion in content creation has also revealed significant shortcomings in existing intellectual property frameworks (IP).

One of the biggest changes is that content creation is now decentralized and often collaborative. In many cases, the creators build on existing works and mix videos, sampling music, or generating art with AI models. This poses a direct challenge to the traditional principles of copyright, based on clear definitions of authorship and originality. As Gurpal Singh (2016) rightly pointed out, digital platforms make unauthorized copying and modification so easy that copyright enforcement becomes almost impossible in their traditional form.[1]

Moreover, the speed of distribution causes additional difficulties. A photo uploaded on Instagram can be copied, shared, and even sold as NFT within hours, sometimes without the original creator's knowledge or permission. Blockchain technologies, while offering new ways to authenticate property via NFTs, have also introduced confusion about what rights are actually transferred As Wang, Lee and Liu stressed (2024), many buyers mistakenly believe that buying an NFT means buying the full copyright on the artwork, while in reality they often acquire only metadata associated with the digital file.[2]

Another important factor that complicates content protection is the increase in AI-generated content. All tools can now independently write paintings, poems, songs and even academic writing Novelli et al (2024) investigated how AI-generated works challenge copyright by asking if there is a true author in the legal sense.[3] If an AI system like DALL·E creates a digital painting without human involvement, can it be protected by copyright? Traditional

[1] Gurpal, Singh. "Intellectual Property Rights in the Digital Age: Challenges and Solutions for Copyright and Patent Protection." International Journal of Advanced Research in Management and Social Sciences, vol. 5, 2016, pp. 143– 150.
[2] Wang, Runhua, Jyh-An Lee, and Jingwen Liu. "Unwinding NFTs in the Shadow of IP Law." *American Business Law Journal*, vol. 61, no. 1, 2024, pp. 31–55.
[3] Novelli, Claudio, et al. "Generative AI in EU Law: Liability, Privacy, Intellectual Property, and Cybersecurity." *Computer Law & Security Review*, vol. 55, 2024.

frameworks, which require human creativity as a core element, do not clearly address these scenarios.

The distribution models themselves have shifted dramatically. Decentralized platforms built on blockchain are not controlled by a single entity, making takedown notifications and enforcement actions much more difficult to carry out. Traditional copyright enforcement was based on targeting publishers or distributors; in the blockchain world, there is often no central authority to hold responsible. Luke Lee (2024) also emphasized how the decentralized nature of digital assets complicates traditional enforcement mechanisms, creating a gap between legal rights and practical realities.

The challenge of cross-border enforcement is to increase this complexity. An online infringement may involve parties that spread across different countries, each with different IP laws and levels of protection. Khan and Wu (2020) emphasized that the digital economy has made national IP legislation insufficient without closer international cooperation. Content creators need protection, not only in their own country but worldwide, something that existing IP systems cannot effectively provide.[4]

The ethics of creating digital content is also highlighted. As Ricardo Fits (2025) emphasized in his manifesto on ethical copyright in the AI era, human creators' rights must be respected, even in a world where AI instruments are widely used.[5] Digital platforms need to find ways to ensure that original creators are recognized and reasonably compensated, even if innovation pushes the limits of what is considered "authorship."

In summary, the digital age has shifted the creation of content from a relatively controlled process to a free-flowing global activity. This democratizes creativity and gives new opportunities but also creates serious challenges for existing IP legislation. The problems of authorship, originality, ownership, and enforcement have become more complex, making creators often vulnerable to abuse of their works.

[4] Kahn, Asif, and Ximei Wu. "Impact of Digital Economy on Intellectual Property Law." *Journal of Politics and Law*, vol. 13, no. 3, 2020, pp. 117–126.
[5] Fitas, Ricardo. "The Author Is Sovereign: A Manifesto for Ethical Copyright in the Age of AI." *arXiv preprint arXiv:2504.02239*, 2025.

2. AUTHORSHIP AND ETHICAL DILEMMAS WITH AI

Intellectual property law has always been centered around the issue of authorship. Authorship has traditionally referred to the act of a human person in coming up with something original, something no one has ever seen or heard before, such as a book, a painting, a song or an invention. It is essential to this idea that copyright law and patent law both rely upon it in determining who owns what, and what rights and reward. Yet the rise of artificial intelligence (A.I.) threatens to undermine this foundational principle, and none of the existing legal systems has yet been able to overcome this inescapable challenge.

AI systems such as ChatGPT, Midjourney, and many other generative models are able to generate content that, even upon close inspection, appears to have been written, spoken, and written by humans. While still in the early stages, many of these tools can now compose music, write a story, design a product, or even invent a new technology with little human involvement. And this uncovers a fundamental question: Who is the author in the case of something generated by an AI? Who is the human who should build the AI? The user who provided prompts? Is it possible to recognize the AI, although it is not a legal person, or should it recognize itself in the first place?

What follows is a real legal and ethical dilemma. The copyright law, as discussed in Novelli et al (2024), has traditionally sought to protect only human creativity by demanding originality and personal intellectual contribution.[6] If an AI creates a new piece of art from scratch, all computed according to the dictated algorithm, is the output considered ‘human originality’? Presently, most copyright systems, including systems in India, the European Union, and the US, now answer 'no,' that purely AI attended works may not have legal protection under existing law.

Patents face similar challenges. In other words, to create an invention, a natural person must be involved. But AI is now assisting in the design of new molecules, materials and even technologies. Cases like Thaler v. Currently, systems in the United States and in the European Patent Office are resistant to labelling AI as an inventor, as Vidal illustrates. As outlined by

[6] Novelli, Claudio, et al. "Generative AI in EU Law: Liability, Privacy, Intellectual Property, and Cybersecurity." *Computer Law & Security Review*, vol. 55, 2024.

Gurpal Singh (2016), emerging technologies never cease to challenge traditional IP doctrines to their utmost, and it is with AI that has become the poster child of this tension.

The problem is, there are a number of issues of ethics beyond the legal confusion. If AI systems are properly credited for their works, there is also a very real chance that people will be overshadowed or exploited by the more powerful AIs as Ricardo Fitas (2025) argued in his manifesto for ethical copyright. For example, there are many AI models trained on already created human made content that was scraped from the internet with no permission and no compensation.

AI generated versions of your style, created by artists, musicians and writers, could be displaced in general markets of traders that don't recognize nor pay for the work.

Another is creative authenticity. When audiences consume art, music, or literature, what they value most is the human emotions, personal experiences and experiences of the people involved. In many cases, AI generated creations on the market could undermine the authenticity and the emotional value of human creativity if there is no clear labelling of these creations coming from humans. Ethically one must ask if such content created by AI should be labelled? If it's what you, as a consumer, are nourishing your mind or fending off dust, must you be aware that you are indeed consuming it?

Yet practical solutions are starting to come, though unevenly and still in the process of development. Other proposals involve the creation of a third sort of protection for works that were created with the assistance of AI, where the human who supervised the AI would be treated as the copyright holder if a sufficient amount of original thinking was involved. Collective licensing models are suggested for the situation where the works of others may be used to train AI models, and those whose own works are used might be paid a royalty. These solutions, however, would need major legal reforms and international agreements to be implemented, however.

The situation gets further complicated with cross-border issues. Kahn and Wu (2020) pointed out that like the digital economy, legal protection is in no way global, the patchwork from country to country in overwhelming scope. One jurisdiction might not protect against AIs created art that lacks copyright protection while it does in other places without clarity which might disadvantage creators and innovators.

Therefore, in conclusion, AI is upsetting the authorship and creativity doctrine into a deep rethinking of IP law. However, it cannot be easily applied to AI created works. Failing to protect human creators so as not to exploit them and push them out of the market would do harm to the wider innovation ecosystem. But AI raises such ethical dilemmas that go beyond technical legal fixes to a larger conversation on what creativity might be in the digital age.

3. LICENSING AND OWNERSHIP COMPLEXITIES FOR DIGITAL GOODS

Things associated with the digital revolution are the new types of assets that are by their nature different from conventional physical goods. Now, because digital goods offline—and as such digital goods are not physical goods—do exist offline but do have real world value. Despite these innovations exciting new opportunities for creators and consumers, they also expose large gaps in the existing intellectual property (IP) and licensing frameworks. The biggest challenge today is understanding who indeed has the right to use these digital goods.

However, in the case of buying a book, paint set or patented device, ownership is traditionally known, and the buyer has ownership of the physical object, but not usually ownership of the IP rights that underline the object (i.e. copyright or patent). In the case of the digital goods, however, that is simply not the case at all. Let's say that you are buying an NFT; it does not, for example, automatically mean that whoever purchased it, owns the copyright of the material that is an NFT. As explained by Wang, Lee, and Liu (2024), NFTs typically represent a proof of ownership over digital asset, but do not convey intellectual property rights unless clearly mentioned in the smart contract or license terms associated with it.

As a result, consumers are generally confused by this misunderstanding. When legally, they only own a receipt or token to digital content, many NFT buyers think that means they can reproduce, sell or commercially exploit the same. It shows also the need for clear and standards licensing in the digital asset space.

In the case of NFT transactions, smart contracts are usually used to automate some part of licensing, but they also have shortcomings. Legal complexities are unencodable in smart contracts, and can even be reduced, which is why it's important to have smart contracts, but it's never going to be as foolproof as it seems maybe. According to Luke Lee (2024), the blockchain is actually extremely rigid with regards to completely altering or changing rights that have been issued after a digital asset has been sold. In traditional licensing agreements

parties can bargain, fill out, or terminate agreements in time. Unlike smart contracts, the blockchain transaction tends to be immutable; mistakes and predatory terms in the blockchain can be locked in forever.

One other challenge is the secondary market sales. Digital goods are more difficult still to track when they are resold (sometimes many times over) and it is impossible to know the rights of the new owners, if any. Enforcing these goods in the digital realm without clear, enforceable licensing structures can open up spaces where people use digital goods in ways the original creator never envisioned, both legally and ethically.

This further complicates with jurisdictional issues. Digital ownership varies from country to country, and cross border transactions create conflict of law. For instance, the rights of a European buyer of an NFT from a vendor in the United States depends on which country's law has been applied for the claim. This is in line with what Kahn and Wu (2020) observe: first, the inconsistency under IP treatment across jurisdictions leaves creators and consumers with uncertainty and asks for higher risks.

Decentralization of blockchain only adds to the complexity of ownership rights. In contrast to the platforms of Amazon or Spotify where there is a central authority that can enforce license agreement, there is no central body that regulates blockchain platforms. As such, it is difficult for right holders to enforce their rights and for consumers to get their remedies if misled or if disputes arise.

These also have an important ethical aspect. In a world of evolving technology, Ricardo Fitas (2025) reminds us that it needs to stay central, creating the rights of creators. Creators should not be relinquished of their ownership of their works solely because the works are entering digital marketplaces. Such systems are clear, fair, and it is vital for creators to maintain benefits from their work, and consumers to know what they are buying.

There are some emerging industry led solutions. NFT holders also proposed creative commons type of licensing models that allow creators to specify what NFT owners can and cannot do with the digital content. Yet, adoption is limited, and there is still no enforced standard or model.

Finally, licensing and ownership in the digital world are way more complex than in the traditional market. Weighing them all against what it feels is right and wrong for our users, there is a lot to consider before launching the buy button. Creators can lose control of their work, and consumers cannot come to own what they thought they would. There is a need for a strong, flexible legal framework to determine ownership, licensing, and enforcement in a manner that either promotes innovation, or fosters the trust of consumers in the digital economy.

4. Enforcement Challenges in the Digital Economy

It has always been one of the strongest actions to take against protecting intellectual property (IP) rights. Enforcement in traditional markets took the form of taking legal action against counterfeiters, unauthorized distributors or plagiarists who were operating within defined national boundaries. However, in the digital economy, enforcement has become much less predictable, much more complex and, more often than not, ineffective. Today, content can simultaneously be copied, altered, and distributed worldwide rapidly — this kind of traditional enforcement is outdated and hard to use.

The fast and huge scale of digital infringement are among the biggest challenges. There are millions of pieces of content uploaded every day in these types of platforms as YouTube, Instagram, and TikTok. With automated systems, it's extremely difficult even to detect copyright infringement in such amounts of data. This is what Gurpal Singh (2016) explains, the digital environment being so open to download and distributed so fast that it is almost impossible for right holders to know when users are using their work without permission.

On top of this, the platforms are now global. When a video uploaded from Canada streams to Europe, a copyrighted song recorded in India is illegally used in it. In such cases, legal action means dealing with different legal systems, different levels of IP protection and complicated international procedures. This is because, as Kahn and Wu (2020) emphasize, the internet knows no physical boundaries and as national IP laws have difficulty coping with cross border infringement.

Anonymity and decentralization also pose major barriers to enforcement. In blockchain based platforms users can create, buy and sell digital goods without their real-world identities being revealed. In case an artist's work is stolen and minted as an NFT automatically by an

anonymous user the infringer is almost impossible to find and sue the thief. Luke Lee (2024) has highlighted that although enabling creators by means of decentralized technologies, such as blockchain, certainly enable some, decentralized technologies create enforcement gaps that traditional legal systems are not prepared for.

Enforcement mechanisms like DMCA takedown notices may be slow, ineffectual, or worse, used fraudulently on even centralized platforms such as YouTube. Copyright filters can sometimes be wrong — flagging legitimate content — and the actual infringers can re upload the modified versions of infringing material as easily as anyone. It fuels frustration for creators who feel powerless to protect their rights when it comes to online.

In addition, especially for small creators and startups, enforcement is costly, complex, and an obstacle. Filing lawsuits in many countries, hiring lawyers who are familiar with foreign IP laws and working with different courts are horribly expensive and time-consuming. Consequently, creators often give up attempts to secure their works abroad, which forms a culture of impunity when infringement occurs.

Digital works can be protected by technological solutions such as digital rights management (DRM) systems, watermarking and blockchain authentication. While these tools have some hope, they are not without fault. DRM can be bypassed, watermarks can be removed, blockchain authenticity doesn't equal legal or forced ownership or enforcement. Enforcement can be helped by technology, but it cannot substitute for powerful, flexible legal frameworks.

Improving enforcement now increasingly depends on international cooperation. But the enforcement of these mechanisms is still weak and treaties such as the Berne Convention and TRIPS Agreement have set forth the foundation for such a necessity. New initiatives like the digital are trying to develop new cross border enforcement models while global organizations such as World Intellectual Property Organization (WIPO) are also striving to build better models to have their enforcement models implemented in overseas countries. Unfortunately, however, progress is slow, and a lot remains to be done for IP rights to be effectively protected across the digital domain.

Finally, there are also important welfare or ethics concerns about enforcement. IP rights can sometimes be overprotected and can harm freedom of expression, access to knowledge and generation of new innovations. Ricardo Fitas (2025) observes correctly that such a system must

straddle these legitimate rights on the part of creators with wider public interests to avoid the exaggeration of monopolies and creative suppression.

In sum, the enforcement of IP rights in digital economy is a matter that poses quite a lot of multilayered challenges. All of this means that existing enforcement models are fast, difficult to keep up with, anonymous and inflexible. To ensure that IP law is relevant in the digital age, it will have to adapt to these enforcement challenges by improving international cooperation, advancing the use of smart technologies and lowering the legal barriers. Only then can real innovation be protected in a global digital world.

5. Balancing Protection and Innovation

It is one of the most challenging jobs for IP law in the digital age to find the right mix between protecting creatives' rights and being permissive enough for innovation and access to knowledge. Creators might have lost the incentives to develop new ideas if IP protection were too weak. However, if too strong, protection can stifle further creativity, hinder information access, and retard the country's overall advancement. Steering a balance struck by the wheels of speed in today's fast moving digital environment is even harder, and even more crucial.

IP systems of the past were traditionally designed to reward inventors and artists, then, in time, public availability of these works. Limited copyrights and patents were given for a limited time after which the creations would go into the public domain. However, digital technologies have completely changed the landscape. What was unthinkable even 10 years ago is now only really difficult: copying, remixing, and building upon existing works. It opens the door to new ways to be creative, but, also, makes unauthorized use or infringement a possibility.

As Gurpal Singh (2016) and Novelli et al (2024) illustrates, digital platforms have given rise to digital consumers who are also both creators of content, therefore new forms of innovation have been possible like mashups, remixes and AI generated content. It can be unfair to apply strictly the traditional IP rules to these forms. However, completely ignoring artists' and inventors' rights would leave creators defenseless and discourage their motivation to create, at the same time.

The second difficulty is that the digital economy is controlled increasingly by large corporations, which buy enormous numbers of patents, copyrights, trademarks, and such. This

can lead to monopolies formed by only a few companies controlling major technological platforms as well as creative resources. Ricardo Fitas (2025) noted that IP law proceeds with great caution because it must not be put in the service of continuing excessive market control based on unfair power over creators and public interest.

Fair use doctrines (like those existing in the United States) and exceptions benefiting research, education, parody (as in the EU and India) attempt to give breathing space within the context of IP law. They are tools that provide the certain conditions with which limited use of copyrighted works can be allowed without any permission. Yet these doctrines are usually difficult to follow, vary radically from jurisdiction to jurisdiction, and are not always applied in the same way, especially in the digital realm.

The urgency of this need is even stronger, as it relates to AI and blockchain. If, however, AI generated works are to be protected like human made ones, they must be considered as original works, in itself. But if so, might it flood the market with machine-created works that would make it more difficult for humans to distinguish themselves? Likewise, if blockchain produced digital assets have automatic legal protection of intellectual property even if the rights of ownership remain obscure?

International cooperation is going to help to set it up in the right balance. Standards and guidelines shared help protect the creators around the world and still let innovation thrive. In a 2024 delivered by Luke Lee and a 2020 paper by Kahn and Wu, the need for refreshed harmonized structures that consider the truth of the computerized economy without blocking imagination and cooperation was addressed.

Finally, protecting and innovating are not only legal answers, but they are also social dilemmas. The patent and copyright systems need to adapt to reward real creativity, protect real rights, and at the same time, create a more open, collaborative, and enabling environment for knowledge. For building a digital innovation ecosystem that benefits creators and society at large, the ability to achieve this balance is essential.

CONCLUSION

In the digital world, innovation has been transformed in nature but with exciting new opportunities for creators as well as difficult legal and ethical challenges. This chapter

highlights how traditional approaches to intellectual property (IP) lack the ability to deal with the digital content creation realities, digital authorship facilitated by AI, complex licensing in a blockchain environment as well as enforcement in decentralized and global platforms.

Real world examples and insights gained from the existing literature are utilized towards showing that IP law needs to get in alignment with a world where ownership, originality and distribution no longer happens according to conventional paradigms. In a digital borderless environment, it becomes especially difficult to enforce law, in fact it takes well thought out legal reforms to balance protection and encourage innovation.

These challenges also have ethical dimensions, in particular with regard to human creators' rights and public access to knowledge should not be ignored. New problems require new laws. In fact, what is needed is flexible, coordinated international IP systems that understand the movement of the digital ecosystem.