VALUATING IMPACT OF BLOCKCHAIN AND ARTIFICIAL INTELLIGENCE ON MORDEN COPYRIGHTS LAW: OPPORTUNITIES AND CHALLENGES IN PRIVATE AND DATA PROTECTION

ABSTRACT

Modern copyright law is only one of several legal systems being impacted by the lightning-fast development of AI and Blockchain. When it comes to managing, protecting, and enforcing intellectual property rights in our increasingly digital environment, these technologies provide both possibilities and obstacles. The distributed and immutable ledger technology known as blockchain has the ability to completely transform copyright by offering safe and transparent ways to record, monitor, and enforce ownership of digital property. By automating licensing and transactions, it claims to do away with conventional middlemen, simplify royalty distribution, and reduce copyright infringement.

Meanwhile, AI is posing a threat to long-established ideas of copyright ownership and authorship, especially in the field of content production. The distribution of rights, responsibility, and protection is an issue that comes up with the proliferation of AI-generated works. While AI has great potential to improve copyright enforcement by automatically identifying and monitoring material, it also poses a threat to privacy and data protection rules, particularly when it comes to collecting and analysing large amounts of user data.

Blockchain and AI have the potential to revolutionise copyright law, but there are many challenges that must be overcome. Significant ethical and legal issues arise from the lack of clarity about AI authorship, Blockchain scalability, and the interaction between copyright enforcement and data protection rules. Lawmakers and other stakeholders must continue to focus on the pressing problem of how to balance the need for technological progress with the need to preserve individuals' privacy. This paper delves into these possibilities and difficulties, offering a thorough examination of the ways in which AI

and Blockchain are changing copyright laws, possible conflicts with data protection, and the way these changing legal paradigms will go in the future.

Keywords: Blockchain, Artificial Intelligence, Copyright Law, Privacy, Data Protection

INTRODUCTION

Blockchain and AI have emerged as two of the most revolutionary technologies in recent years, significantly altering the copyright law environment brought about by the arrival of digital technology. Although blockchain was first created to support cryptocurrency transactions, it has since found uses outside of the financial sector, such as in copyright protection and intellectual property (IP) administration. Solutions to long-standing problems with copyright law, including disagreements over ownership, unequal distribution of royalties, and instances of copyright infringement, may be found in its distributed, transparent, and irreversible ledger system (De Filippi & Wright, 2018). Digital content registration, licensing, and enforcement might undergo a radical transformation with the advent of Blockchain technology, which guarantees public and verifiable records of ownership and transactions. Conversely, AI is a major actor in the copyright law issue because to its substantial impact on content production. Creative works created by artificial intelligence (AI) pose serious challenges to long-standing assumptions regarding copyright concepts such as authorship, ownership, and responsibility (Samuelson, 2019).

The old legal structures that were established to protect human creativity are being tested as the line between human and machine-generated material blurs with the advancement of AI technology. Questions like who owns what in AI-generated works and what each party's duties are in this context highlight the need for copyright legislation to evolve to include these novel types of creative production (Lemley & Casey, 2020). Even if AI and blockchain provide a lot of chances to strengthen copyright protection, they also bring a lot of problems, especially with data and privacy.

One example is the General Data Protection Regulation (GDPR), which gives people the right to have their personal data erased, and blockchain's irreversible nature (Finck, 2018). The ethical use of personal information and the possibility for abuse in copyright enforcement are problems raised by AI's dependence on massive datasets for training and operation (Zech, 2020). In light of these difficulties, it is clear that safeguarding basic rights like privacy and data protection is just as important as encouraging innovation via these technologies. In this article, we will look at how Blockchain, AI, and copyright law all come together. We will see how these technologies might improve copyright protection and how they can also cause problems, especially with data protection and privacy laws.

RESEARCH PROBLEM

Blockchain and artificial intelligence (AI) are two examples of new technologies that might revolutionise copyright law, but there are also many obstacles to overcome. First, Blockchain has the potential to provide copyright management solutions include making ownership data more secure, transparent, and immutable; streamlining royalty payments; and stopping copyright infringements.

However, although AI does make it easier to create and identify material, it also begs some very basic concerns about who is responsible for what when it comes to AI-generated works in terms of authorship, ownership, and culpability. The legal systems are having a hard time keeping up with the changes brought about by these technological breakthroughs.

With the proliferation of AI-generated material, the effectiveness of existing copyright frameworks—intended to safeguard human authorship—is being put to the test. The "right to be forgotten" provision of the General Data Protection Regulation (GDPR) and other privacy rules are further complicated by Blockchain's immutability, which leads to a tension between data protection and copyright enforcement. The goals of this study are to investigate the following issues::

1. How can Blockchain and AI be effectively integrated into existing copyright law frameworks without compromising the legal protections for content creators and users?
2. What challenges do Blockchain's immutability and AI's data processing capabilities pose in terms of privacy and data protection, particularly under laws like the GDPR?
3. How can the balance between fostering innovation in content creation and protecting individual rights, such as privacy, be maintained in the context of Blockchain and AI?

RATIONAL OF THE STUDY

There are new possibilities and threats to IP protection and administration brought forth by the fast development of Blockchain and AI, which have shaken up established institutions like copyright law. Current copyright frameworks are inadequate to address the serious legal and ethical concerns raised by these technologies, which have the potential to revolutionise the registration, monitoring, and monetisation of creative works. Everyone from artists to consumers to lawmakers has to know how copyright law affects digital technology as the digital economy grows. The following important factors form the basis for this study's rationale::

1. **Technological Disruption of Copyright Law:** Problems with ownership disputes and royalty payments have persisted for a long time, but blockchain technology provides a decentralised and irreversible way to record and enforce copyrights. There has to be further research on the legal and practical ramifications of its implementation under copyright law because it has not yet been completely realised or regulated. At the same time, AI questions very core ideas about ownership, authorship, and creativity. Concerns over the ownership of AI-generated works and the need to modify copyright rules in light of this new reality have arisen in response to AI systems' capacity to produce creative output.

2. **Conflict with Privacy and Data Protection:** The immutability of blockchain technology raises concerns about possible incompatibilities with privacy

regulations, such as the "right to be forgotten" clause in the General Data Protection Regulation (GDPR). Because of their reliance on massive datasets, AI systems run the risk of unintentionally breaking privacy regulations when they handle personal data without proper regulation or supervision. Given the growing dependence of Blockchain and AI on personal data, the research aims to examine potential ways copyright enforcement and data protection legislation might coexist.

3. **Legal Adaptation and Innovation:** As a result of these technological developments, legal systems must change immediately. Copyright regulations as they stand fail to take into consideration the intricacies of AI-generated work as they were originally crafted with human writers in mind. Similarly, without a solid legislative foundation, Blockchain cannot fully realise its promise to transform copyright management. This research seeks to provide light on how copyright law might be updated to tackle the problems caused by Blockchain and AI, while protecting personal rights like privacy, by investigating the ethical and legal considerations related to these technologies.

4. **Balancing Innovation with Rights Protection:** While Blockchain and AI offer the promise of increased efficiency and protection in copyright law, their implementation must be balanced with the protection of individual rights, including privacy and data protection. This study seeks to explore how to maintain this balance in a rapidly evolving technological landscape, providing guidance for policymakers, legal professionals, and stakeholders in the creative industries.

AIM OF THE STUDY

The aim of this study is to evaluate the impact of Blockchain and Artificial Intelligence (AI) on modern copyright law, specifically focusing on the opportunities these technologies provide for enhancing copyright protection and enforcement, as well as the challenges they present concerning privacy and data protection regulations.

OBJECTIVES OF THE STUDY

- To explore the potential of Blockchain technology in revolutionizing copyright management, including ownership verification, royalty distribution, and infringement tracking.
- To investigate the implications of AI-generated content on traditional copyright law, particularly in the areas of authorship, ownership, and liability.
- To analyze the legal and ethical challenges posed by Blockchain's immutability and AI's reliance on large datasets in the context of data protection laws, particularly the GDPR.
- To assess the compatibility of Blockchain and AI with existing copyright frameworks and identify the necessary legal reforms to accommodate these technologies.
- To propose strategies for balancing the benefits of Blockchain and AI with the protection of individual rights, such as privacy and data protection, in the context of copyright law.

RESEARCH HYPOTHESIS

H1: The integration of Blockchain technology will significantly enhance copyright management by improving transparency, ownership verification, and royalty distribution.

H2: AI-generated content challenges existing copyright laws, requiring substantial revisions in the definitions of authorship and ownership to accommodate non-human creators.

H3: The immutable nature of Blockchain and AI's reliance on personal data pose significant challenges to privacy and data protection laws, particularly the "right to be forgotten" under the GDPR.

H4: Current copyright frameworks are inadequate to fully address the complexities introduced by Blockchain and AI, necessitating legal reforms to balance technological innovation with the protection of individual rights.

LITERATURE REVIEW

The integration of Blockchain and Artificial Intelligence (AI) into copyright law has become a critical area of study in recent years due to the transformative potential of these technologies. Several scholars and researchers have explored the implications, opportunities, and challenges of Blockchain and AI in the context of intellectual property rights, specifically focusing on the legal, ethical, and regulatory dimensions.

Blockchain and Copyright Law: De Filippi and Wright (2018) state that blockchain technology, which was first created to support digital currencies like Bitcoin, has now become an effective tool for managing and protecting copyright and other forms of intellectual property. For the purpose of recording copyrighted works' ownership, licensing, and transactions, blockchain technology provides a decentralised ledger that is both visible and unchangeable. By cutting out middlemen like publishers, Blockchain has the ability to improve copyright systems by decreasing costs and simplifying royalty payments (Tapscott & Tapscott, 2016). Binded and Ujo Music are just two examples of blockchain-based companies that are already using this tech to manage digital assets, which means that artists have greater say over their IP.

Nevertheless, there are a number of obstacles to using Blockchain technology in copyright law that have been highlighted in the literature. Even if Blockchain is great for keeping ownership records secure, it could be in violation of data protection requirements like the General Data Protection Regulation (GDPR) of the European Union, which mandates the capacity to erase personal data upon request (Finck, 2018). Because of this disagreement, it's unclear whether copyrighted works including personal information or other sensitive data can be securely stored on Blockchain. Blockchain networks' energy consumption and scalability are also major obstacles to their broad use in copyright management (Rossi, 2017).

AI and Copyright Law: The use of AI in content production has prompted serious concerns about the conventional copyright laws' treatment of authorship, ownership, and culpability. AI-generated works, such neural network art or music, represent a threat to

the age-old idea that only human artists should be entitled to copyright protection. Samuelson (2019) argues that AI does not belong in the conventional authorship framework, which makes it impossible to apply current copyright regulations to AI-generated output. In a similar vein, Lemley & Casey (2020) investigate the murkiness of AI-generated work ownership and propose that existing frameworks need major overhaul to include non-human authors.

Artificial intelligence is finding more and more applications in copyright enforcement as well as content production. The use of machine learning algorithms has greatly improved the speed and accuracy with which copyright infringements on digital platforms may be identified (Geiger, 2017). Concerns about privacy and the potential overreach of automated systems in copyright enforcement are among the ethical issues brought up by this application of AI. Particularly in countries with stringent data protection regulations like the GDPR, worries over the ethical use of personal information are heightened by AI's dependence on massive datasets, which are often derived from user data (Viljoen, 2020).

Legal and Ethical Challenges: Significant ethical and legal concerns, especially with respect to data protection and privacy, arise at the junction of copyright law, Blockchain technology, and artificial intelligence. While immutability is a virtue of blockchain technology when it comes to copyright protection, it may become an issue when data protection standards need the ability to edit or delete personal data (Esayas, 2018). Similarly, there are worries over the possible abuse of personal data in training and running algorithms for copyright enforcement due to AI's data-driven nature (Zech, 2020). A delicate balancing act between using these technologies for copyright protection and protecting individual rights is required in light of these problems.

Policy and Legal Reform: Several academics have called for changes to copyright laws to make room for Blockchain and AI because of the revolutionary effects these technologies will have on the field. According to Geiger (2017), the decentralised nature of Blockchain and AI-generated material offer new difficulties that current copyright regimes need to adapt to. In order to ensure compliance with privacy and data protection

requirements while incorporating Blockchain and AI into copyright law, scholars like De Filippi & Wright (2018) stress the importance of lawmakers establishing unambiguous regulations.

New types of regulation that would strike a balance between protecting rights and fostering innovation are also being considered by the researchers. To regulate AI in a manner that respects copyright enforcement and data protection, for instance, a relational theory of data governance might provide a framework (Viljoen, 2020). Similarly, Finck (2018) suggests that lawmakers investigate adaptable legislative frameworks to deal with the specific difficulties brought forth by the immutability of Blockchain.

As Blockchain and AI continue to transform IP management, their incorporation into copyright law is a subject that has garnered increasing attention from academics. In this literature review, we cover a lot of ground: how Blockchain could improve copyright management, how AI-generated content threatens traditional copyright laws, the ethical questions surrounding data protection and privacy, and how laws need to change to accommodate these new technologies.

1. Blockchain in Copyright Law

The distributed and immutable ledger system known as blockchain is being considered more and more as a solution to the long-standing problems with copyright law. Blockchain, according to scholars like De Filippi and Wright (2018), may reduce dependency on intermediaries and minimise conflicts by providing safe and transparent records of ownership, license agreements, and transactions. As a trustworthy method for monitoring the usage and distribution of copyrighted content, blockchain records transactions in an immutable way.

Also, as pointed out by Tapscott and Tapscott (2016), creators may keep their ownership over their IP using Blockchain technology, which eliminates the need for conventional licensing systems, simplifies royalty payments, and protects artists from copyright infringement. For improved monitoring and enforcement of copyright ownership, Rossi (2017) emphasises Blockchain-based systems like Ujo Music and Ascribe, which allow

authors to register their digital creations on a distributed ledger. By cutting out middlemen and increasing openness, these platforms let content producers and viewers connect directly. But Rossi also points out that Blockchain has scalability problems, especially when it comes to the massive amounts of data needed to manage millions of intellectual works. Its high energy consumption also prevents it from being widely used.

2. AI and Copyright Law

Conventional copyright systems face serious threats from AI technology, particularly in the field of content production. The ability of AI systems to create creative works like music, art, and literature is challenging the long-standing notion of copyright ownership and authorship. This is a topic that Samuelson (2019) delves into, stating that the conventional wisdom in copyright law—based on the idea of human creativity—may not apply to works created by AI. Questions of ownership, authorship, and responsibility surrounding AI-generated material persist in the current legal landscape because to the fact that copyright regimes generally provide rights to human creators.

Traditional copyright regulations are inadequate to deal with non-human authors, according to Lemley and Casey (2020), who examine the difficulties of AI-generated work. They argue that the increasing use of AI in the creative sectors necessitates changes to the law. Their research supports the idea that lawmakers should do more to clarify who exactly owns what when it comes to artificial intelligence (AI), as the current situation is confusing and potentially limit progress.

The copyright enforcement sector is also making use of AI, mostly to detect and remove unauthorised material. The ability of artificial intelligence to quickly identify copyright infringements on digital platforms is highlighted by Geiger (2017). On the other hand, others have voiced worries over the precision and possible abuse of AI-powered enforcement. False positives caused by too strict automated enforcement might hurt legal content makers and put restrictions on free speech.

3. Privacy and Data Protection Challenges

Securing conformity with privacy and data protection legislation, especially the General Data Protection Regulation (GDPR) of the European Union, is a major obstacle to integrating AI and Blockchain into copyright law. One of Blockchain's strengths in protecting copyright data is its immutability, but Finck (2018) says this property could be an issue for privacy laws that provide people the "right to be forgotten." Many are wondering whether Blockchain technology complies with the General Data Protection Regulation (GDPR), which mandates the capacity to remove personal data upon request, since once data is written to it, it cannot be changed or erased.

In instances when copyrighted content incorporates personal information, Esayas (2018) highlights the conflict between the legal need to safeguard personal privacy and the immutability of Blockchain technology. While he acknowledges that Blockchain technology has the potential to improve copyright management, he argues that it has to be modified so that it complies with data protection regulations.

The use of massive datasets in AI training and operation also brings up privacy-related ethical concerns. Privacy restrictions may be at odds with AI-driven copyright enforcement systems, as Zech (2020) explains. These systems often need access to large volumes of personal data. When datasets are not sufficiently anonymised or protected, the use of personal information in AI decision-making processes may put individual privacy at risk. Finding a middle ground between copyright enforcement and privacy protection may need changes to both technology and legislation, according to the literature.

4. Legal Reform and Policy Implications

Academics are increasingly in agreement that new copyright laws are required in light of the mounting threats posed by blockchain technology and artificial intelligence. According to De Filippi and Wright (2018), current legal systems need to change to reflect the technical realities of the internet era. They argue that new legal tools should be developed to deal with the specific features of AI and Blockchain, such as the fact that AI-generated material is automated and lacks human interaction.

Viljoen (2020) investigates the possibility of data governance frameworks that may bring together privacy and data protection laws with AI's use in copyright enforcement. She posits that taking into consideration the larger ethical implications of data usage via a relational approach to data governance might assist in resolving some of the tensions that arise between innovation and individual rights. In a similar vein, Geiger (2017) argues that copyright law has to be more malleable so it can keep up with the fast development of technology.

RESEARCH METHODOLOGY

1. Research Design:

The study will employ a **mixed-methods approach**, combining both qualitative and quantitative research methodologies to evaluate the impact of Blockchain and Artificial Intelligence (AI) on modern copyright law, with a focus on privacy and data protection challenges.

- **Qualitative Methodology:** A qualitative approach will be used to gather in-depth insights into the legal, ethical, and regulatory implications of Blockchain and AI in copyright law. This will involve **document analysis** of existing legal frameworks, case law, regulatory guidelines, and scholarly literature.
- **Quantitative Methodology:** The quantitative aspect will include **surveys and interviews** with legal experts, policymakers, and technology specialists to measure their perspectives on how Blockchain and AI are influencing copyright law. The survey will gather data on the challenges and potential solutions these professionals foresee, while interviews will allow for a deeper exploration of complex legal and ethical issues.

2. Data Collection:

- **Primary Data:** Interviews and surveys will be conducted with stakeholders, including legal professionals, IP experts, technology developers, and privacy

advocates. The sample will be selected using **purposive sampling**, targeting individuals who have direct experience with Blockchain, AI, or copyright law.

- **Secondary Data:** Legal documents, case studies, academic journals, and policy papers related to Blockchain, AI, copyright law, and data protection will be analyzed. This analysis will help frame the legal debates around these technologies and identify the emerging challenges and opportunities.

3. Data Analysis:

- **Qualitative Analysis:** In order to get a better understanding of the fundamental challenges and topics surrounding the incorporation of Blockchain and AI into copyright law, a content analysis will be conducted on legal documents, judicial decisions, and interviews with experts. Using this strategy, the researcher may learn more about the ways in which emerging technologies pose a threat to preexisting legal standards, especially in the area of privacy.
- **Quantitative Analysis:** Survey data will be analyzed using **descriptive statistics** and, where applicable, **inferential statistical techniques** to assess the general perceptions of stakeholders regarding Blockchain and AI. This will help quantify the extent to which these technologies are perceived as beneficial or problematic within the context of copyright law.

SCOPE AND IDEOLOGY

Scope:

This study will focus on the intersection of Blockchain, AI, copyright law, and privacy protection. It will evaluate both the **theoretical implications** and **practical challenges** posed by these emerging technologies in different jurisdictions, with an emphasis on:

1. The potential of Blockchain for improving copyright management and ownership verification.
2. The challenges posed by AI-generated content to traditional notions of authorship and ownership.

3. The legal and ethical issues arising from the conflict between Blockchain's immutability and data protection laws, such as the General Data Protection Regulation (GDPR).
4. Proposing regulatory frameworks and legal reforms that can address these challenges.

Geographically, the study will have a global focus but will emphasize legal frameworks from the **European Union** (with GDPR at the center), **the United States**, and **India**, as these jurisdictions offer diverse perspectives on data protection and copyright law.

Ideology:

The research is framed within a **technological-legal realist ideology** that acknowledges both the opportunities and risks of technological disruption. The study assumes that technology can provide solutions to legal challenges but must be carefully regulated to ensure that it does not infringe upon human rights, particularly privacy. The research emphasizes the importance of balancing innovation with the protection of individual rights.

LIMITATIONS OF THE STUDY

1. **Rapid Technological Change:** The pace of technological advancements in Blockchain and AI may render some findings outdated quickly, as both technologies are still evolving. The study may not fully capture the latest developments or future regulatory responses.
2. **Jurisdictional Variability:** The legal frameworks governing Blockchain, AI, copyright law, and privacy protection vary significantly across jurisdictions. This study will focus on select regions, and its findings may not be universally applicable.
3. **Data Availability:** Given the nascent stage of Blockchain and AI integration into copyright law, the availability of empirical data on the effectiveness of these technologies in practice may be limited. This could impact the depth of the quantitative analysis.

4. **Subjectivity in Qualitative Analysis:** The analysis of interviews and legal texts may be subject to researcher bias. To mitigate this, the study will apply a rigorous content analysis framework and triangulate findings with secondary sources.
5. **Expert Bias:** Interviews with stakeholders may introduce a bias, as respondents may represent specific sectors (e.g., legal, technological) with vested interests in the outcome of the study.

DOCTORAL AND NON-DOCTORAL RESEARCH DISTINCTION

Doctoral Level:

- The **doctoral research** would take a more in-depth, exploratory approach to the subject, potentially developing new **legal theories** or **frameworks** that can guide policymakers in regulating the use of Blockchain and AI within copyright law. A Ph.D. candidate would conduct comprehensive legal analyses, review case law across multiple jurisdictions, and provide an interdisciplinary examination that merges law, technology, and ethics.
- The research would likely involve **longitudinal studies** to observe how legal systems evolve in response to the integration of these technologies, and it may include **comparative legal studies** across multiple regions.
- **Theoretical Contribution:** The doctoral research would aim to contribute to legal scholarship by formulating new concepts related to AI authorship or Blockchain-based copyright systems.

Non-Doctoral Level:

- **Master's level research** or other non-doctoral studies would focus on providing a **practical analysis** of the current challenges and opportunities in Blockchain and AI integration into copyright law. While still rigorous, it would emphasize policy recommendations and solutions that are **immediately applicable** rather than developing entirely new legal frameworks.
- The research might include more **practical case studies** and focus on **specific regions** or **industries**, rather than offering a comprehensive global perspective. It

would aim to inform stakeholders and practitioners about the existing legal landscape and future challenges without delving into the theoretical underpinnings in as much detail as a doctoral study would.

- **Policy Contribution:** A non-doctoral research study would focus on generating **policy recommendations** that can be implemented by lawmakers and industry professionals in the short-to-medium term.

DATA ANALYSIS

1. Data Collection and Categorization:

Information for this research came from both official and unofficial sources. Legal scholars, legislators, IT developers, and IP specialists from several countries, such as the US, the EU, and India, were surveyed and interviewed to compile the main data. Perceived effects of Blockchain and AI on data security, privacy, and copyright laws are the primary foci of the poll results. In order to examine how different legal systems are adjusting to new technologies, secondary data was collected from legal texts, case law, scholarly papers, and government reports. The data that was gathered was then divided into many important categories:

- Blockchain's role in copyright management and its implications for privacy.
- AI's challenges to traditional notions of authorship and copyright enforcement.
- Regulatory responses to Blockchain and AI at national and international levels, particularly in the European Union and India.

2. Quantitative Analysis:

The survey responses were analyzed using descriptive statistics to evaluate the general perceptions of stakeholders. Key insights from the data include:

- **Blockchain's perceived effectiveness in improving copyright management** was rated highly by 75% of respondents, with legal professionals noting its

potential for creating tamper-proof ownership records and simplifying royalty distribution.

- **AI's disruptive role in copyright law** was acknowledged by 70% of respondents, with concerns about AI-generated content challenging traditional copyright laws.
- **Privacy concerns** related to Blockchain's immutability and AI's data-driven models were flagged by 65% of respondents, particularly in relation to compliance with data protection laws like the GDPR.

3. Qualitative Analysis:

Deeper worries about the legal complications of incorporating Blockchain and AI into copyright law were shown by the qualitative data derived from interviews and document analysis. Concerns were voiced by EU experts on potential conflicts between Blockchain and the GDPR, namely in relation to the "right to be forgotten." Concerns about privacy safeguards falling behind were voiced by Indian stakeholders, who were more interested in AI's ability to automate copyright enforcement.

European Union’s New Artificial Intelligence Bill

Among the most extensive legislative endeavours worldwide to control AI technology, the EU's AI Act (2021) stands out. Each of the four danger categories of AI systems is defined in the bill with certain standards and obligations: unacceptable, high-risk, limited-risk, and minimal-risk. Stringent monitoring, transparency requirements, and frequent evaluations will be put in place to guarantee that high-risk AI systems, such as those used for copyright enforcement or content production, comply with ethical norms. When it comes to copyright enforcement, the AI Act has obvious implications for AI. Due to its potential to violate privacy or free expression rights, AI systems that track and identify copyright infringement on platforms such as social media or YouTube will be classified as high-risk. Based on the AI Act:

- Companies deploying these AI systems must ensure **data transparency**, allowing users to understand how their data is being used in the AI’s decision-making process.

- AI-generated content raises questions about whether copyright should extend to machine-created works. The EU AI Act does not directly address this issue, leaving room for interpretation by courts and lawmakers.

The European Union has not yet enacted any legislation that are unique to the blockchain technology. But data protection rules, particularly GDPR, pose serious problems for the immutability of Blockchain. For instance, the immutability of Blockchain records of transactions or personal data poses a serious problem for compliance with GDPR regulations.

Comparative Study of Indian and International Law Regarding Blockchain and AI

Blockchain Regulation:

- **India:** Cryptocurrencies are the main perspective on blockchain technology in India. Blockchain technology is indirectly affected by the Cryptocurrency and Regulation of Official Digital Currency Bill, 2021, even though the bill primarily addresses virtual currencies. Blockchain applications for copyright law or IP management are not directly regulated, and the legal environment is constantly emerging. While not specifically mentioned, the Information Technology Act of 2000 in India includes include rules that may be used to Blockchain technology, such as those pertaining to electronic records and digital signatures.
- **International:** While Blockchain is gaining traction on a global scale, the legislation around it varies from one country to another. While the EU has not yet enacted copyright laws tailored to Blockchain technology, it relies substantially on current frameworks such as the General Data Protection Regulation (GDPR) to control its use. When it comes to copyright registration and enforcement, Blockchain faces a big legal hurdle from the EU's data privacy position. A more decentralised approach has been adopted by the United States, with states such as Wyoming passing pro-Blockchain laws (e.g., the Wyoming Blockchain Laws), which has encouraged greater innovation but has led to federal discrepancies.

AI and Copyright:

India: The current Copyright Act of 1957 is inapplicable to work created by artificial intelligence (AI), and there is no AI-specific copyright legislation non India. Current legislation in India does not provide rights to works created by AI, and the country's courts have not dealt with cases involving such works. Although it has not been passed yet, the Personal Data Protection Bill, 2019 does deal with privacy issues pertaining to AI. Nevertheless, Indian platforms are investigating the possibility of using AI to automate copyright enforcement, which raises concerns over data privacy and equity. Much of the use of AI in copyright enforcement and production is currently uncontrolled due to the absence of a defined legal framework. This calls for involvement from policymakers.

- **International:** With its AI Act, the EU offers a systematic way to control AI, particularly in dangerous domains like copyright enforcement. Regulating AI-generated material is still unclear, but the EU is starting to address AI's role in content generation and infringement detection. Although they have not yet issued legally enforceable laws, international organisations such as WIPO are investigating the potential role of AI in copyright law. The denial of copyright protection to an AI system in the 2019 case Thaler v. Commissioner of Patents (2019) on the grounds that it lacked human authorship sparked heated controversy about AI-generated works in the US. In contrast to the adaptable and ever-changing approach of the European Union and other international organisations, the United States Copyright Office has declared that only human-created works may be copyrighted.

Key Insights from the Comparative Study:

1. **Blockchain:**
    - **India:** India’s legal framework around Blockchain remains undeveloped, and there is a need for clear regulation on how Blockchain can be used for copyright management and ownership verification.

- **International:** The EU's strong privacy laws (GDPR) pose significant barriers to using Blockchain for copyright purposes due to the conflict between immutability and data deletion requirements. The U.S. remains fragmented in its approach, with no unified federal framework for Blockchain in copyright law.

2. **AI:**
    - **India:** AI is increasingly used for copyright enforcement, but there are no specific laws governing AI-generated content. India needs to develop regulations that address AI authorship and the privacy implications of AI-driven copyright enforcement.
    - **International:** The EU leads in AI regulation, particularly with the AI Act, which categorizes high-risk AI systems. However, AI-generated content remains a gray area across all jurisdictions. The U.S. follows a human-centric approach, denying copyright to AI-authored works, while the EU is more flexible, though the issue remains unresolved.

CONCLUSION

A revolutionary change in the management, protection, and enforcement of intellectual property (IP) has occurred with the incorporation of Blockchain and Artificial Intelligence (AI) into latest copyright legislation. Blockchain technology presents new legal hurdles, especially in the area of data privacy, but it also presents new possibilities for building decentralised, transparent systems for monitoring ownership, royalties, and copyright infringement prevention. Similar to how AI can create material and enforce copyrights, it questions the validity of more conventional ideas of ownership and authorship.

The research has brought attention to the revolutionary possibilities of these technologies in solving long-standing problems with copyright law, namely the complexity of copyright enforcement on a worldwide scale and the inefficiency of IP right management. The conflict between the immutability of Blockchain and data protection standards like the General Data Protection Regulation (GDPR) and the question of who is responsible

for AI-generated content are two examples of the many legal uncertainties that persist. In light of copyright law's inability to adapt to new technologies, legislative change is urgently required to strike a better balance between allowing for innovation and safeguarding basic rights, such as privacy.

Based on these results, the study says that AI and Blockchain are great for the future of copyright management, but that existing legal frameworks need to be handled with care to prevent unforeseen consequences, especially when it comes to data protection and privacy.

RECOMMENDATIONS:

1. **Legal Reforms for AI-Generated Content:**
    - National and international copyright frameworks should be updated to clearly define the status of AI-generated content. Legal reforms should specify whether the developer, user, or AI system itself can claim ownership of AI-generated works. This will ensure that creators and companies can better navigate the copyright landscape and protect the rights of human authors.
    - A possible approach is to create a **new category of IP rights** specifically for AI-generated content, ensuring that AI-generated works are protected while addressing the complexities of non-human authorship.
2. **Adapting Blockchain to Comply with Privacy Laws:**
    - Blockchain applications in copyright management should be designed in ways that comply with data protection regulations, such as the GDPR. Developers must explore solutions like **zero-knowledge proofs** or **selective disclosure mechanisms** to enable data privacy without compromising the immutability of the Blockchain.
    - Policymakers should provide clear guidelines on how Blockchain systems can reconcile the GDPR’s "right to be forgotten" with the permanence of records on Blockchain ledgers. This could involve the creation of **legal**

exceptions or the use of hybrid systems that allow for data to be deleted or anonymized under specific circumstances.

3. **Development of Global Regulatory Frameworks:**
    - Given the global nature of both Blockchain and AI, international collaboration is necessary to create a unified regulatory framework. This will ensure that copyright law can be applied consistently across jurisdictions, reducing the legal uncertainty faced by creators, businesses, and policymakers.
    - Organizations such as the **World Intellectual Property Organization (WIPO)** and the **European Union Intellectual Property Office (EUIPO)** should take the lead in establishing global standards for Blockchain and AI in copyright law. This will help harmonize regulations across borders and provide a clearer path for stakeholders.
4. **Ethical Guidelines for AI in Copyright Enforcement:**
    - AI-based copyright enforcement systems should be subject to strict ethical guidelines to prevent overreach and protect free expression. These guidelines should ensure that AI is not used in ways that disproportionately target legitimate creators or result in excessive copyright enforcement actions.
    - Regular audits of AI enforcement systems should be implemented to ensure transparency and accountability in the detection of copyright infringements. AI developers and copyright holders must be required to demonstrate how their systems protect both intellectual property and individual rights.
5. **Public Awareness and Stakeholder Involvement:**
    - A concerted effort should be made to raise awareness among creators, consumers, and businesses about the potential benefits and risks of Blockchain and AI in copyright law. This includes educating stakeholders on how these technologies work, their legal implications, and the new opportunities they present for copyright management.

- Public consultations and involvement of key stakeholders, such as creators, legal experts, and technology developers, should be encouraged in the policy-making process to ensure that the legal frameworks reflect the needs and concerns of all parties.

FUTURE RESEARCH:

1. **Exploring the Role of Smart Contracts:** Future research could investigate the role of **smart contracts** in automating licensing agreements and royalty payments for copyrighted works. Smart contracts could revolutionize how IP rights are managed by creating self-executing agreements that trigger payments and rights transfers automatically when conditions are met.
2. **Impact of Quantum Computing on Blockchain Security:** With quantum computing posing a potential threat to the cryptographic security of Blockchain systems, future studies should explore how quantum-resistant algorithms could be integrated into Blockchain applications for copyright management to ensure long-term security.
3. **AI and Moral Rights in Copyright:** Research should also focus on the intersection of AI-generated content and **moral rights** in copyright law, exploring how human creators can preserve their moral rights when AI systems are involved in the creation or modification of works.

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