BLOCKCHAIN AND COPYRIGHT: VAIN HOPE FOR PHOTOGRAPHERS?

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Abstract: Blockchain technology has near unlimited application potential, and its influence could extend all the way to the copyright industry. For photographers, blockchain technology might serve as a safe and efficient tool to detect infringement. However, this notion must be treated with caution. Blockchain’s security applications are indeed a valuable prospect, but the technology has critical flaws that prevent it from becoming the panacea for photographers.

I. INTRODUCTION

There are different types of reactions to the word “blockchain.”¹ Some people acknowledge its relationship with bitcoin while others simply declare it is a fraud-inducing technology.² Although blockchain is a popular term, not many people can give it a clear, precise definition.³ For an ordinary person, however, a thorough scientific understanding of blockchain technology is not required to appreciate its immense value.⁴ Putting every technical detail aside, the core value of blockchain is quite simple: blockchain can store computer data without a threat of manipulation.⁵ For those with experience using computer anti-virus software, this definition of blockchain might not sound like an innovation.⁶

² See id. (describing diverging reactions over the word “blockchain”).
³ See id. (explaining the gap between the popularity of blockchain and understanding of it).
⁴ See id. (explaining the mechanism of blockchain without using technical terms).
⁵ See MELANIE SWAN, BLOCKCHAIN: BLUEPRINT FOR A NEW ECONOMY x–xi (2015) (introducing several applications of blockchain and its potential values).
⁶ See Lee, supra note 1 (introducing the data security feature of blockchain).
However, the simple value that blockchain provides has near unlimited application potential and may even extend its influence to the seemingly unrelated legal industry.7

II. BLOCKCHAIN TECHNOLOGY’S IMPACT ON COPYRIGHT

The impact of blockchain technology is not limited to scientific industries.8 Blockchain technology may lead to significant changes in intellectual property litigation.9 Specifically, blockchain has the potential to become a saving grace for photographers seeking to protect their intellectual property.10 This is because blockchain technology can empower photographers to track down infringers and demand injunctions and/or damages.11 Although blockchain technology may become valuable to many different types of copyright owners, such as songwriters or filmmakers, this article focuses on the technology’s application to photographers.12

A. What Is Blockchain Technology?

Sometimes, the technical data science terms surrounding blockchain can be overwhelmingly complex.13 Blockchain is easiest to understand through an analogy to

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7 See SWAN, supra note 5, at 5 (explaining the broad applications of blockchain technology).
8 Id.
10 See id. (explaining that blockchain can protect photographers from copyright infringements).
11 Id.
12 See Lee, supra note 1 (explaining the wide scope of potential blockchain applications).
13 See id. (explaining the difficulty in understanding technical aspects of blockchain).
Lego® blocks.\textsuperscript{14} To visualize blockchain technology, think of a Lego block filled with computer data.\textsuperscript{15} In the world of blockchain, when one Lego block attaches to another block, the two become inseparable.\textsuperscript{16} Although Lego blocks can contain many different types of information, for the purpose of this article, assume that the Lego block contains at least the following information: (1) the name of the photographer who originally created the photograph, (2) the time and date of the photograph’s creation, and (3) the names of all people who have previously used the source photograph in the stream of the internet.\textsuperscript{17}

Now, think of the binding part of a Lego block, which holds the two Lego blocks together.\textsuperscript{18} Blockchain technology connects the two Lego blocks by creating an adhesive data structure called a “hash.”\textsuperscript{19} For the two blocks to bind together, the two hashes must match perfectly.\textsuperscript{20} If the two Lego blocks contain even slightly different data, it causes the two blocks to have two different types of hash, which prohibits the connection of those two blocks.\textsuperscript{21} For example, if the first block has the name of the photographer as John Doe and the second block has the name of the photographer as John Smith, then the two blocks

\textsuperscript{14} See id. (explaining the mechanism behind the formation of blockchain data).
\textsuperscript{15} See id. (describing the process of how one data block attaches to another to form a blockchain).
\textsuperscript{16} Sergii Kushch & Francisco Prieto-Castrillo, A review of the applications of the Blockchain technology in smart devices and distributed renewable energy grids, 6 ADVANCES IN DISTRIBUTED COMPUTING & ARTIFICIAL INTELLIGENCE J. 75, 75–76 (2017).
\textsuperscript{17} Scoblete, supra note 9.
\textsuperscript{18} See Jessie Willms, Is Blockchain-Powered Copyright Protection Possible?, NASDAQ NEWS (Aug. 9, 2018), https://www.nasdaq.com/article/is-blockchain-powered-copyright-protection-possible-cm662619 (explaining that two different data blocks attach to form a single data chain).
\textsuperscript{19} Id.
\textsuperscript{20} Id.
\textsuperscript{21} Id.
cannot bind together.\textsuperscript{22} This is because the two blocks’ different name data created two different hashes, which prevent the two blocks from binding together.\textsuperscript{23}

The next step is to analyze why one Lego block binds to another block.\textsuperscript{24} The simple answer is that the Lego block attaches itself to another block in order to record its movements around the internet.\textsuperscript{25} In other words, whenever a copyrighted image transfers from one person to another, previous user’s block attaches to the next image user’s block to record the transfer between them.\textsuperscript{26} Starting from the original Lego block of a photographer, the block attachments continue indefinitely as the photograph transfers from one person to another.\textsuperscript{27} The result is the formation of a long blockchain that contains identity data of all people who have used the image since its creation from the photographer.\textsuperscript{28}

\textit{B. Mechanism of Copyright Protection Through Blockchain}

The following illustration is a chronological example of how blockchain technology can protect a photographer’s copyright: (1) A copyright infringer uploads a photograph without obtaining the copyright license; (2) as soon as the infringer uploads the photograph, the infringer’s information block is recorded (attached) on the master

\textsuperscript{22} See id. (explaining the hash system that prevents copyright infringements by comparing the identities of IP address holders).
\textsuperscript{23} See id. (describing a situation where two different hashes prevent themselves from binding because of the different hash data).
\textsuperscript{25} Id. at 463.
\textsuperscript{26} Id.
\textsuperscript{27} See id. at 463–64 (explaining the basic mechanism of hash-stack procedures).
\textsuperscript{28} Id. at 463.
blockchain of the original photograph; and (3) finally, the photographer examines the master blockchain of the image and discovers the copyright infringement.\(^{29}\)

Blockchain technology can be an effective alternative to the customized efforts to track down each illegal use of a person’s photograph.\(^{30}\) In addition, since the master blockchain is strictly maintained by the hash system that goes through constant verification procedures from peer-to-peer networks, the risk of data manipulation is almost non-existent.\(^{31}\) Accordingly, blockchain technology has a huge potential value for photographers who want fair compensation for their copyrighted works.\(^{32}\) As a result, a number of companies are currently offering blockchain-copyright protection services for photographers.\(^{33}\) Nevertheless, this does not mean that blockchain technology will be a savior for all photographers whose works are being infringed upon.\(^{34}\) There are a number of practical obstacles and flaws in implementing blockchain technology into actual practice.\(^{35}\)


\(^{30}\) See id. (explaining blockchain’s promising but imperfect potential to resolve copyright infringement problems).

\(^{31}\) Kushch & Prieto-Castrillo, *supra* note 15, at 76.


\(^{34}\) See id. (explaining potential obstacles for photographers who want to use the blockchain-copyright protection service).

\(^{35}\) Naylor, *supra* note 29.
C. Critical Flaws in the Blockchain Technology’s Copyright Protection

Despite blockchain’s merits, the technology still has a number of critical flaws in relation to copyright infringement problems. First, a blockchain of an image file can be a proof of transfers or usages, but the chained data itself does not provide any proof of authenticity of the image. Using the blockchain-copyright company’s service, a photographer can initiate the master blockchain of his photograph by embedding his own block of data to the image file. However, just as the photographer started his own master blockchain, a copyright infringer can just as easily insert his own blockchain to the photographer’s image. This newly built blockchain’s hash cannot attach to the original photographer’s block, but it can develop its own thread. If this new blockchain traverses the internet and builds a rich chain of blocks that contain transfer records, the infringer’s blockchain will seem just as authentic to the original master blockchain because there is no definite proof of the original date of the photograph’s creation. Therefore, if the original photographer fails to present sufficient evidence to prove the authenticity of his image file,

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36 See id. (explaining the problems which prohibit the blockchain-copyright protection service from becoming an effective solution to resolve copyright infringement problems).
37 See id. (elucidating why the blockchain-hash verification system cannot resolve copyright infringement problems entirely).
39 Naylor, supra note 29.
40 See id. (illustrating that a third-party may duplicate the original blockchain to jeopardize the photograph’s authenticity).
41 See id. (explaining why it is difficult to identify a duplicate blockchain from the original one).
then the existence of the infringer’s blockchain might destroy the entire copyright ownership of the original photographer.\textsuperscript{42}

The second problem with blockchain-copyright protection is that the blockchain database has no legal significance.\textsuperscript{43} Currently, there are companies that provide blockchain-copyright protection for photographers.\textsuperscript{44} On their websites, the companies present themselves as having legal authority with phrases such as “register your copyright here,” “copyright enforcement worldwide,” or “copyrights registry on blockchain.”\textsuperscript{45} These statements are misleading because no private organization can have a legally valid registry of copyrights.\textsuperscript{46} Only the U.S. Copyright Office reserves such authority.\textsuperscript{47} For approximately a decade, the U.S. Copyright Office has been offering an online copyright registration service.

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\item See id. (explaining potential consequences that might arise from the presence of a duplicated blockchain).
\item See Allen Murabayashi, \textit{PSA: No, Blockchain Doesn’t Replace Copyright Registration}, PETAPIXEL (June 20, 2017), https://petapixel.com/2017/06/20/no-blockchain-doesnt-replace-copyright-registration/ (explaining the superfluous nature of the blockchain-copyright protection because of the presence of the eCO system).
\item See id. (analyzing how the blockchain-copyright protection service provided by a company called “Binded” falls short of being an effective solution to copyright infringement problems).
\item See COPYTRACK, https://www.copytrack.com (last visited Apr. 9, 2018) (providing examples of the blockchain-copyright protection companies’ misleading advertisement phrases); IPSTOCK, https://ico.ipstock.com/ (last visited Apr. 9, 2018) (providing examples of the blockchain-copyright protection companies’ misleading advertisement phrases).
\item Nathan Lands, \textit{Why should I register my work if copyright protection is automatic?}, BINDED, https://help.binded.com/u-s-copyright-office/why-should-i-register-my-work-if-copyright-protection-is-automatic (last visited Apr. 9, 2018) (providing an example of a blockchain-copyright protection company’s misleading advertisement phrase).
\item Id.
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registry service called the Electronic Copyright Office (“eCo”) system.\textsuperscript{48} The eCO system allows photographers to register their works to the online government database.\textsuperscript{49} Once a photographer has completed the eCO registration, any unauthorized commercial use of a registered photograph is an infringement under the federal copyright statute, 17 U.S.C. § 106.\textsuperscript{50}

Lastly, the financial prospects for photographers using the blockchain-copyright service are questionable.\textsuperscript{51} The companies that offer blockchain-copyright protection claim that their services are free.\textsuperscript{52} However, their services are free only to the point of registering photos to their online copyright database.\textsuperscript{53} After registration, if a photographer discovers an infringing act through the blockchain service and settles the case, the company will step in and take approximately thirty percent of the settlement award.\textsuperscript{54} Even worse, if a photographer using the blockchain service does bring his or her infringement case to court and wins statutory damages, the blockchain-copyright company might even be entitled to collect half of the damages.\textsuperscript{55}

\textsuperscript{48} Murabayashi, supra note 43.
\textsuperscript{50} See generally 17 U.S.C. § 106(a) (2012) (explaining a wide range of exclusive rights that a copyright holder earns by registering his or her work in eCO); eCO Help Desk, supra note 49 (confirming the eCO’s legal significance by introducing the shortened version of infringement claim that can only be made through the eCO system).
\textsuperscript{51} Lands, supra note 45.
\textsuperscript{52} See id. (providing an example of a blockchain-copyright company’s misleading advertisement phrase).
\textsuperscript{53} Id.
\textsuperscript{55} Id.
D. Digital Watermarking Technology to Solve the Legal Authenticity Problem

The blockchain-copyright protection system may seem impractical due to the obstacles, but it is still a valuable prospect.\(^5\)\(^6\) While the eCO database is secured by a relatively vulnerable centralized protection, blockchain is protected by a peer-to-peer verification process, which makes the data nearly impossible to manipulate.\(^5\)\(^7\) This security feature is desirable because, under the current government copyright registry system, one successful manipulation of data can jeopardize the entire database.\(^5\)\(^8\) On the other hand, with the peer-to-peer protection system, even if one data block is manipulated, continuous peer-to-peer verifications will invalidate the manipulated block and restore the entire blockchain back to its original structure.\(^5\)\(^9\)

Despite this advantage, in copyright litigation, since a blockchain record can only serve as a proof of transfer, photographers still have to prove the photograph’s authenticity.\(^6\)\(^0\) Thus, to utilize blockchain’s security feature in litigation, a photographer must overcome this evidentiary hurdle.\(^6\)\(^1\) A solution to this problem may be the synthesis of blockchain and digital watermarking technologies.\(^6\)\(^2\) Digital watermarking allows photographers to prove the authenticity of their works by inserting a digital code, which is

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\(^{56}\) Kushch & Prieto-Castrillo, *supra* note 15, at 76.
\(^{57}\) *See id.* (explaining the difference between the centralized database system and the peer-to-peer database system).
\(^{58}\) *See id.* (explaining the inherent risks of data fraud underlying the centralized database system).
\(^{59}\) *See id.* (explaining the advantages of peer-to-peer database system by comparing it to the centralized system).
\(^{60}\) Naylor, *supra* note 29.
\(^{61}\) *Id.*
only detectable by the person who embedded it.63 If a digital watermark attaches to a photograph at the time of its creation, the mark becomes the authentic time stamp of creation.64 Even if an infringer attempts to manipulate the authenticity by developing a duplicate blockchain, the presence of a watermark will reveal the fraudulent nature of such a blockchain.65 A digital watermark will show the conflict between the date of a blockchain’s creation and the date of a photograph’s creation, thus preventing an infringer from questioning the authenticity of a photograph.66 In addition, since human eyes cannot detect a digital watermark in a photograph, photographers do not have to worry about digital watermarks affecting the appearance of their photographs.67

CONCLUSION

Blockchain-copyright technology has the potential to provide efficient and secure copyright protection for photographers. The most distinguished feature of blockchain technology is a high level of security through continuous peer-to-peer verification procedures. However, there are also a number of obstacles to blockchain technology becoming a practical alternative to the current government copyright registry. If these obstacles are not overcome, blockchain-copyright technology will be able to play only a limited role in copyright litigation. Digital watermarking might resolve blockchain’s

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63 See id. at 25 (introducing the combination of blockchain technology and digital watermark to overcome obstacles of the blockchain-copyright protection services).
64 See id. (explaining the basic mechanism of digital watermark technology).
65 See id. at 26 (explaining that the presence of watermark can prevent copyright infringements).
66 See id. at 23–26 (explaining that the problem of blockchain-authenticity could be resolved by digital watermark technology).
67 Id.
authenticity problem, but other difficulties remain as obstacles to utilize blockchain to protect copyrights.