# Four theories in search of an A(I)uthor

# FOUR THEORIES IN SEARCH OF AN A(I)UTHOR

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**ABSTRACT**

*This chapter discusses the question of AI as an A(I)uthor. The increasing use of machines in creating music, literature and art challenges conventional notions of copyright protection and authorship. In particular, protectability of AI-generated works under the current copyright framework is hotly debated. First, this Chapter examines whether AI meets the traditional copyrights standards of legal personhood, authorship and originality. Second, the chapter considers multiple approaches to AI-generated works from a policy perspective. They can be given public domain status, authorship can be granted to humans or the machine, the work can be given sui generis protection or rights can be granted to publishers and disseminators. Finally, this chapter considers the road ahead by assessing justifications for these policy options from different theoretical perspectives, such as fairness, personality, utilitarian/incentive, and cultural theories of intellectual property.*

Keywords: Artificial Intelligence, AI-generated works, Copyright. Authorship, Policy, IP Theories

## I. INTRODUCTION

In 1843, Augusta Ada King, Countess of Lovelace, argued: '[s]upposing, for instance, that the fundamental relations of pitched sounds in the science of harmony and of musical composition were susceptible of such expression and adaptations, the engine might compose elaborate and scientific pieces of music of any degree of complexity or extent'.[1] Ada Lovelace, the first programmer in history, could see far into the future of the computer—or the 'analytical engine' as Babbage termed it at the time—that she just contributed to invent. Today, intelligent machines are coming in multiple shapes to serve diverse purposes and could possibly replace humans everywhere, including the once inherently human-centered field of creativity.[2] AI not only composes music, as Lovelace

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[1] Ada Augusta, Countess of Lovelace, notes on L. F. Menabrea, 'Sketch of the Analytical Engine Invented by Charles Babbage' (September 1843) Scientific Memoirs <https://www.fourmilab.ch/babbage/sketch.html>.

[2] See Arthur Miller, *The Artist in the Machine: The World of AI-Powered Creativity* (MIT Press 2019 (stating that computer creativity will surpass human creativity). See eg Baptiste Caramiaux, Fabien Lotte and Joost Geurts (ed), 'AI in media and creative industries' (version 1, New European Media 1 April 2019) <https://arxiv.org/ftp/arxiv/papers/1905/1905.04175.pdf>; Andreas Pfeiffer, 'Creativity and technology in the in age of AI' (Pfeiffer Report 2018) 15, 29 <https://www.pfeifferreport.com/wp-

predicted, but also writes poems, novels and news articles, edits photographs, creates video-games, and makes paintings and other artworks.[3] The A(I)uthor is already among us. In this context, the adaptation of the Intellectual Property (IP) system to AI-generated creativity and innovation is increasingly becoming a topic of critical interest.[4] Of course, existing IP regimes, including copyright law, trade secrets, and patent law[5], can protect software on which AI-technology is based.[6] However, the protection afforded to the software does not extend to the output possibly generated by the AI. In this context, a report from the European Commission highlights that 'protection of AI generated works […] seems to be […] problematic' as '[i]n light of the humanist approach of copyright law, it is questionable that AI-generated works deserve copyright protection'.[7] Therefore, the report continues, 'while some copyright scholars clearly advocate for AI-generated works to be placed in the public domain, others have put forward a series of proposals aimed at ensuring a certain level of protection'; however, '[w]ith notable exceptions, these proposals […] do not always sufficiently detail the possible elements underpinning such protection'.[8]

In searching for a justification to protect AI-generated creativity, this chapter would like to answer a set of emerging legal questions. How does AI-generated creativity fit within traditional copyright theory and existing legal requirements for copyright protection? Is AI legal personhood available under the present legal framework? Should it be considered in as an option for legal reform? Is AI an author under traditional copyright standards? Does a machine meet the copyright standard for originality? And, again, from a more general techno-legal perspective, is it perhaps an oxymoron referring to AI-generated creative

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content/uploads/2018/10/Creativity-and-technology-in-the-age-of-AI.pdf>; European Audiovisual Observatory (2019), 'Artificial Intelligence: Summary of Observatory workshop on AI in the audiovisual industry' (EAO, 17 December 2019) <https://rm.coe.int/summary-workshop-2019-bat-2/16809c992a>.

[3] For example, a novella written by a machine has made the first rounds of a literary competition in Japan, beating in the process thousands of human authors. See Danny Lewis, 'An AI-Written Novella Almost Won a Literary Prize' (*Smithsonian Magazine*, 28 March 2016) <https://www.smithsonianmag.com/smart-news/ai-written-novella-almost-won-literary-prize-180958577>. *Sunspring*, a sci-fi film written entirely by an AI, placed top ten in Sci-Fi London's annual film festival. See Carys Craig and Ian Kerr, 'The Death of the AI Author' (2019) Osgoode Legal Studies Research Paper, 1-2. AIVA—as well as Amper or Melodrive—runs an AI that composes music, which is marketed to accompany audiovisual works, advertisements or video games.[3] Meanwhile, Sony's Flow Machine can interact and co-improvise with a human music performer. See Sony Flow Machines <https://www.flow-machines.com>. Again, the AI-generated *Portrait of Edmond de Bellamy* sold at Christie's for an astounding $432,500. See Craig and Kerr (n 29) 3-4.

[4] See Maria Iglesias Portela, Sharon Shamuilia and Amanda Anderberg, 'Intellectual Property and Artificial Intelligence: A Literature Review' (Joint Research Centre, Publications Office of the European Union 2019). See also Jeremy Cubert and Richard Bone, 'The law of intellectual property created by artificial intelligence' in Woodrow Barfield and Ugo Pagallo (eds), *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar 2018) 411-427.

[5] Whether protecting software as a computer implemented invention or as such, depending on the jurisdiction.

[6] Nathan Calvin and Jade Leung, 'Who owns artificial intelligence? A preliminary analysis of corporate intellectual property strategies and why they matter' (2020) Future of Humanity Institute, University of Oxford Working Paper <https://www.fhi.ox.ac.uk/wp-content/uploads/Patents_-FHI-Working-Paper-Final-.pdf>.

[7] Massimo Craglia and others, 'Artificial Intelligence: A European Perspective' (Joint Research Centre, Publications Office of the European Union, 2018) 67 <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC113826/ai-flagship-report-online.pdf>.

[8] ibid 68.

works? After answering what can be summarized as the question of the A(I)uthor,[9] this chapter will be finally considering the road ahead by reviewing policy options and looking for their justification from different theoretical perspectives, such as fairness, personality, utilitarian/incentive, and cultural theories of intellectual property.

## II. IN SEARCH OF A THEORETICAL JUSTIFICATIONS OF IP FOR AI

The theoretical framework justifying copyright differs substantially among jurisdictions. It is important to outline these differences from the very beginning as both the policy options available and those potentially applicable as a result of legal reform will depend on the theoretical perspective from which the question of the A(I)uthor is observed.[10]

Four IP theoretical clusters have been emerging throughout the history of copyright law: fairness theory, personality theory, welfare theory and more recently cultural theory.[11] Fairness and personality theory have been traditionally the theoretical pillars of European copyright law. Both fairness and personality theory are natural right theories that emphasize individual exclusive rights. Fairness theory does so on the basis of Lockean natural law property theory. According to Locke, each person has a natural right to the fruits of his or her labor upon land held in common.[12] Later William Blackstone applied the same principles to intellectual labour as well.[13] Personality theories, instead, characterize the civil law tradition and are rooted in German idealism. Intellectual products are manifestations or extensions of the personalities of their creators, who enjoy an unrestrained natural right over them.[14]

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[9] Besides the question of the A(I)uthor, there are two other fundamental questions that are beyond the scope of this chapter: the questions of the (Machine) Learner and the (A)Infringer. They refer to whether an AI can infringe copyright through the machine learning process and training that enables the AI to generate creativity and whether an AI can infringe copyright by creating an infringing output. The question of the (Machine) learner has been studied by abundant literature. In particular, this author, and his co-authors, have reviewing the matter extensively. See eg Christophe Geiger, Giancarlo Frosio and Oleksander Bulayenko, 'Text and Data Mining: Art. 3 and 4 of the Directive 790/2019/EU' in Concepción Sáiz García and Raquel Evangelio Llorca (eds.), *Los Derechos de autor en el mercado unico digital Europeo* (Tirant lo Banch 2019); Christophe Geiger, Giancarlo Frosio and Oleksander Bulayenko, 'Text and Data Mining in the Proposed Copyright Reform: Making the EU Ready for an Age of Big Data?' (2018) 49(7) IIC 814-844. An essential bibliography including literature treating this question can be found at Giancarlo Frosio, 'L'(I)Autore inesistente: una tesi tecno-giuridica contro la tutela dell'opera generata dall'intelligenza artificiale' 29 AIDA 52-91, 54, fn 13 (2020). Very recently, see also Mark Lemley and Bryan Casey, 'Fair Learning' (2021) 99 Texas L Rev 743, 743-785.

[10] See also, for a recent discussion of the theories justifying intellectual properties rights in the context of AI-generated creativity and innovation, Reto Hilty, Jörg Hoffmann, Stefan Scheuerer, 'Intellectual Property Justification for Artificial Intelligence' in Jyh-An Lee, Reto Hilty, and Kung-Chung Liu, *Artificial Intelligence & Intellectual Property* (OUP 2020).

[11] See William Fisher, 'Theories of Intellectual Property' in Stephen Munzer (ed), *New Essays in the Legal and Political Theory of Property* (Cambridge University Press 2001) 168-200.

[12] See John Locke, *Second Treatisie of Government* (Awnsham Churchill 1689) ch. 5.

[13] See William Blackstone, *Commentaries on the Laws of England*, vol 2 (Clarendon Press 1776) 455.

[14] See eg Immanuel Kant, 'Von der Unrechtmäßigkeit des Büchernachdrucks [On the injustice of counterfeiting books]' (1785) 5 Berlinische Monatsschrift 403; Johann Fichte, 'Proof of the illegality of

In contrast, welfare and cultural theories are collectivistic and prospective. Welfare theory, based on Bentham and Mill's utilitarianism and economic analysis of law, looks at maximisation of social welfare.[15] In particular, welfare theory portends that rights should be crafted to provide the "greatest happiness of the greatest number".[16] It is also known as "incentive theory" as the law should create a system of incentives which will induce creators to create.[17] In this respect, this approach looks at creativity dynamically, not only rewarding labour or personal entitlements for today's creativity but setting the foundations for tomorrow's creative ecosystem. Cultural theory also looks at well-being of society at large but with a more marked prospective emphasis by focusing on promoting a just and attractive culture.[18] Although the result of multiple interdisciplinary contributions, this theoretical approach might find its foundation in Thomas Aquinas' ideas that identified law's primary function in the 'common good of humanity'.[19] In particular, for Aquinas, the role of society is to define a framework for human happiness, according to universal human values, including education, culture, environment, health. Therefore, for Aquinas, the good of mankind is one that maximizes happiness. From this perspective, cultural theory would like to overcome the utilitarian paradigm that measures aggregated consumer welfare according to what consumers want by identifying instead conditions which will support widespread human flourishing. As Fisher puts it, "[t]his approach is similar to utilitarianism in its teleological orientation, but dissimilar in its willingness to deploy visions of a desirable society richer than the conceptions of "social welfare" deployed by utilitarians".[20] Cultural theory approaches to would like to readjust the intellectual property policy framework by promoting enhanced "distributive justice" beyond the traditional market-based approach of welfare and utilitarian theories.[21]

## III. Assessing Protectability of AI-generated Creativity under the Present Copyright Legal Framework

First, this chapter shall consider whether AI-generated creativity can be protected under the current copyright regime. This investigation will be looking into three major conditions

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reprinting: a rationale and a parable' (1793) 21 Berlinische Monatsschrift 447; Georg Hegel, *Philosophy of rights* (Thomas Knox ed, Clarendon Press 1821) para 69. See also Fisher (n 11) 168.

[15] See Jeremy Bentham, *An Introduction to the Principles of Moral and Legislation* (T. Payne and Sons 1780); Jeremy Bentham, *A Manual of Political Economy* (Putnam 1839); Stuart Mill, *Principles of Political Economy* (Little and Brown 1848); Arthur Pigou, *The Economics of Welfare* (Macmillan & Co 1920). See also William Landes and Richard Posner, 'Trademark Law: An Economic Perspective', (1987) 30 Journal of Law and Economics 265; William Landes and Richard Posner, 'An Economic Analysis of Copyright Law' (1989) 18 Journal of Legal Studies 325.

[16] Jeremy Bentham, *The Works of Jeremy Bentham, published under the Superintendence of his Executor, John Bowring*, vol 9 (William Tait 1843) 5.

[17] See Fisher (n 11) 177-180.

[18] ibid.

[19] Tommaso d'Aquino, *Summa Theologiae*, 1265-1273, 2.2.26.5.

[20] Fisher (n 11) 172.

[21] See, for an essential bibliography on the cultural theory approach and the emerging focus on "distributive justice" in intellectual property and copyright in particular, Frosio (n 9) 57, fn 25; Giancarlo Frosio, 'Reforming the C-DSM Reform: A User-Based Copyright Theory for Commonplace Creativity' (2020) 51(6) IIC 733, fn 158.

for copyright protection of creative works: (1) legal personality, (2) authorship, and (3) originality.

### III.1. Legal Personality

Perhaps surprisingly, some theoretical thinking has been supporting the idea of legal personality of intelligent machines. Nick Bostrom, for example, notes: "machines capable of independent initiative and of making their own plans . . . are perhaps more appropriately viewed as persons than machines'.[22] Authors have highlighted how there are no legal reasons or conceptual motives for denying the personhood of AI robots as the law should grant personality on the grounds of rational choices and empirical evidence, rather than prejudice.[23] Therefore, arguments have been made in favour of granting personhood to future hypothetical strong AI that are autonomous, intelligent, and conscious.[24] Even more surprisingly—but in line with the conclusions of the literature just mentioned—the European Parliament (EP) is considering the possibility of declaring AI and robots 'electronic persons'. In a Resolution on *Civil Law Rules on Robotics*, the European Parliament wonders whether ordinary liability rules are sufficient or whether AI calls for new rules.[25] The Resolution claims that 'the more autonomous robots are, the less they can be considered simple tools in the hands of other actors (such as the manufacturer, the owner, the user, etc.)'.[26] The EP endorses the view that EU legislation cannot fully address non-contractual liability for damages caused by autonomous AI. Traditional rules would still apply if the cause of the robot's act or omission can be traced back to a specific human agent such as the manufacturer, the operator, the owner or the user, such as in the case the robot has malfunctioned or the human agent could have foreseen and avoided the robot's harmful behaviour. But, what if the cause of the robot's act or omission cannot be traced back to a specific human agent? What if there are no manufacturing defects and the AI has not malfunctioned but acted autonomously in causing damages for which no causal link with the manufacturer can be proved? In this scenario, Directive 85/374/EEC on Product

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[22] Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies* (OUP 2014).

[23] See Lawrence Solum, 'Legal Personhood for Artificial Intelligences' (1992) 70 North Carolina L Rev 1231, 1264. See also Ugo Ruffolo, 'Il problema della "personalità elettronica"' (2020) 2(1) J of Ethics and Legal Technologies 75-88, 86 (noting that anthropomorphic and anthropocentric prejudices should be avoided).

[24] Meaning respectively that the AI should be capable of taking a decision without input action, of self-programming and integrating information in a framework, and of subjective experience. See Evan Zimmerman, 'Machine Minds: Frontiers in Legal Personhood' (2017) 14-21 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2563965>. See also Patrick Hubbard, 'Do Androids Dream? Personhood and Intelligent Artifacts' (2010) 83 Temple L Rev 406; Rosa Ballardini and Rob van den Hoven van Genderen, 'Artificial Intelligence and IPR: the quest or pleading for AI as legal subjects' in Taina Pihlajarinne, Anette Alen-Savikko, and Katri Havu (eds), *AI and the Media - Reconsidering Rights and Responsibilities* (Edward Elgar 2021) (considering the possible need to create a new sui generis legal subjectivity for independently functioning AI entities and systems).

[25] European Parliament, Civil Law Rules on Robotics: European Parliament resolution with recommendations to the Commission on Civil Law Rules on Robotics, 2015/2103(INL), 16 February 2017 <https://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.pdf>. See also David Vladeck, 'Machines without Principals: Liability Rules and Artificial Intelligence' (2014) 89 Washington L Rev 117.

[26] Civil Law rules on Robotics (n 25) AB.

Liability should not apply. Therefore, the Resolution highlights that this makes the ordinary rules on liability insufficient and calls for new rules to clarify whether a machine can be held responsible for its acts or omissions.[27] Although the Resolution recognizes that "at least at the present stage the responsibility must lie with a human and not a robot", in the long run the Resolution calls for (1) an obligatory insurance scheme which takes into account all potential responsibilities in the chain[28]; and (2) the creation of a specific legal status for robots, "so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons responsible for making good any damage they may cause".[29]

However, whether quasi-human or hyper-human AI will be coming, legal personality of machines is certainly unavailable under the present legal framework. Scholarship has been consistently stressing how any hypothesis of granting AI robots full legal personhood has to be discarded until fundamental technological changes might occur.[30] Pagallo highlights, among the normative arguments against legal personhood, the "missing something problem", according to which current AI robots lack most requisites that usually are associated with granting someone, or something, legal personhood: such artificial agents are not self-conscious, they do not possess human-like intentions, or properly suffer.[31] Statistical analysis of different conditions for legal personhood set up by U.S. case law, for example, would also show incompatibility between legal personhood and AI entities.[32] This empirical analysis proves that to grant personhood courts look at whether it is granted directly or indirectly by a statute, if the artificial entity can sue and be sued, and finally if the entity is an aggregate of natural persons.[33]

Caution against construing AI as a legal person emerges in fact also from the European Parliament's 2017 Resolution, which is finally excluding any form of AI legal personality at least in the short and mid-term. In addition, the EU Parliament seems now to reject AI's legal personality in specific connection to AI-generated creativity. In a recent *Draft Report on intellectual property rights for the development of artificial intelligence technologies*, the European Parliament's has noted, as part of a motion for a Parliament Resolution, that 'the autonomisation of the creative process raises issues relating to the ownership of IPRs [but] considers, in this connection, that it would not be appropriate to seek to impart legal personality to AI technologies'.[34] Rather than establishing legal personality of machines, the policy challenge would be to properly allocate accountability and liability for the

[27] ibid

[28] ibid para 59.a.

[29] ibid para 59.f.

[30] See eg Nadia Banteka, 'Artificially Intelligent Persons' (2020) 58 Houston L Rev 537, 537-596; Eliza Mik, 'AI as Legal Person?' in Reto Hilty and Kung-Chung (eds), *Artificial Intelligence and Intellectual Property*, (OUP, forthcoming) 12; Ugo Pagallo, 'Vital, Sophia, and Co.—The Quest for the Legal Personhood of Robots' (2018) 9(9) Information 230, 230.

[31] Pagallo (n 30) 237-238.

[32] Banteka (n 30)

[33] ibid 581-595.

[34] European Parliament, Draft Report on intellectual property rights for the development of artificial intelligence technologies, 2020/2015(INI), 24 April 2020.

activities of AI robots in cases of complex distributed responsibility, for example through contracts and business law.[35]

### III.2. Authorship

The question of AI-generated creativity's copyright protectability requires also to consider whether an AI is an author according to traditional copyright standards. Put it bluntly, is a human author an intrinsic requirement for authorship? Although international treaties do not include a definition of author that can provide a definitive answer, some textual references to human creation in the Berne Convention might exclude AI from the scope of the notion of author. First, the term of protection linked to the life of the author would be hard to reconcile with machines as authors.[36] Again, reference to the nationality—or residence—of the author seems also to imply that the notion of authorship only applies to human agents.[37] Overall, it has been argued that "Berne's humanist cast" and its deference to personality theories strongly support a "human-centered notion of authorship presently enshrined in the Berne Convention" that would exclude non-human authorship from Berne's scope.[38]

A close review of EU law would most likely lead to similar conclusions.[39] Although there is no transversal definition in statutory law of the notion of authorship, an author is defined as a natural person, a group of persons or a legal person both by Art. 2(1) of the Software Directive[40] and Art. 4(1) of the Database Directive[41]. Actually, the *travaux préparatoires* of the Software and Database Directive fully endorsed an anthropocentric vision of authorship by referring specifically to "the human author who creates the work" and "the natural person [that] will retain at least the unalienable rights to claim paternity of his work".[42] Again, the original proposal for a Software Directive concluded: "[t]he human input as regards the creation of machine generated programs may be relatively modest, and will be increasingly modest in the future. Nevertheless, a human 'author' in the widest

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[35] Civil Law rules on Robotics (n 25) para 59; Pagallo (n 30) 239-240.

[36] Berne Convention for the Protection of Literary and Artistic Works, Art. 7

[37] ibid, Art. 3

[38] Jane Ginsburg, 'People Not Machines: Authorship and What It Means in the Berne Convention' (2018) 49 Int'l Rev of Intell Prop and Comp L 131, 134-135; Sam Ricketson, 'People or machines? The Berne Convention and the changing concept of authorship' (1992) 16 Columbia VLA Journal of Law & the Arts 1, 34. See also Tanya Aplin and Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Maria Ballardini, Petri Kuoppamäki and Olli Pitkänen (eds), *Regulating Industrial Internet Through IPR, Data Protection and Competition Law* (Kluwer Law International 2019) §5.04

[39] See eg Jean-Marc Deltorn and Franck Macrez, 'Authorship in the Age of Machine Learning and Artificial Intelligence' (2018) CEIPI Research Paper No 2018-10, 22-23 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3261329>; Jean-Marc Deltorn, 'Deep Creations: Intellectual Property and the Automata' (*Frontiers in Digital Humanities* 2017) 8 <https://www.frontiersin.org/articles/10.3389/fdigh.2017.00003/full>

[40] Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs, O.J. L111/16.

[41] Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases, O.J. L077/20.

[42] Ana Ramalho, 'Will Robots Rule the (Artistic) World? A Proposed Model for the Legal Status of Creations by Artificial Intelligence Systems' (2017) 21 J of Internet L 12, 17-18

sense is always present, and must have the right to claim 'authorship' of the program".[43] In the CJEU *Painer* case, the Advocate General Trstenjak stressed the same point by noting that "only human creations are therefore protected, which can also include those for which the person employs a technical aid, such as a camera".[44] EU national legislation confirms this approach. For example, Art. L.111-1 of the French Intellectual Property Code[45] requires copyrightable work to be the "creation of the mind"; Art. 5 of the Spanish Copyright Act plainly states that "the author of a work is the natural person who creates it";[46] and Art. 11 of the German Copyright Act attaches authorship to a personality approach by protecting 'the author in his intellectual and personal relationships to the work'.[47] In addition, EU law—as well as multiple national legislations[48]—endorses a human-centric approach when providing a presumption of authorship for the *person* whose name is indicated in the work, in absence of proof to the contrary.[49]

The U.S. legal system would also leave little room for mechanical authors. The US Copyright Act does not have an express statutory definition of authorship, so that some commentators have argued that, textually, the Statute does not limit authorship to human authors.[50] However, both additional textual references and case law apparently exclude the possibility of construing non-human agents as authors under the statute. In particular, Section 101 of the Copyright Act defines anonymous works as "ones where no natural person is identified as an author",[51] thus pointing at natural persons as potential authors. Also, there is a long-lasting understanding that the constitutional history of the word 'copyright' would dispose in favour of only humans as 'authors'.[52] U.S. courts have been

[43] Commission, 'Explanatory Memorandum to the proposal for a Software Directive' COM (88) 816 final, 21

[44] Case C-145/10 *Evan-Maria Painer v. Standard VerlagsGmbH* [2011] ECR I-12533, Opinion of the AG Trstenjak 2011, para 121

[45] Loi 92-597 du 1er juillet 1992, Code de la propriété intellectuelle, L111-1 (France) (hereafter 'French IP Code').

[46] Real Decreto Legislativo (RDL) 1/1996, de 12 de abril, por el que se aprueba el texto refundido de la Ley de Propiedad Intelectual, regularizando, aclarando y armonizando las disposiciones legales vigentes sobre la materia, BOE-A-1996-8930, art 5 (Spain) (hereafter 'Spanish IP Law).

[47] G. v. 09.09.1965, Gesetz über Urheberrecht und verwandte Schutzrechte (Urheberrechtsgesetz – UrhG), art 7 and 11 (Germany).

[48] See Wet van 23 September 1912, Auterswet, art 4(1) (Netherlands); French IP Code (n 45) L113-1 (France); Spanish IP Law (n 46) Art. 6(1) (Spain); Law for the Protection of Copyright and Neighbouring Rights 1941, art 8 (Italy) (hereafter 'Italian Copyright Law').

[49] Directive 2004/48/EC of the European Parliament and of the Council of 29 April 2004 on the enforcement of intellectual property rights, O.J. L195/16, Art. 5

[50] See Robert Denicola, 'Ex Machina: Copyright Protection for Computer-Generated Works' (2016) 69 Rutgers University L Rev 251, 275-283; Annemarie Bridy, 'Coding Creativity: Copyright and the Artificially Intelligent Author' (2012) 5 Stanford Technology L Rev 1, ¶49; Arthur Miller, 'Copyright Protection for Computer Programs, Databases, and Computer-Generated Works: Is Anything New Since CONTU?' (1993) 106 Harvard L Rev 977, 1042-1072; Pamela Samuelson, 'Allocating Ownership Rights in Computer-Generated Works' (1986) 47 (4) University of Pittsburgh L Rev 1185, 1200-1205

[51] 17 U.S.C. § 101.

[52] See Atilla Kasap, 'Copyright and Creative Artificial Intelligence (AI) Systems: A Twenty-First Century Approach to Authorship of AI-Generated Works in the United States' (2019) 19(4) Wake Forest Intell Prop L J 335, 358; Ralph Clifford, 'Intellectual Property in the Era of the Creative Computer Program: Will the True Creator Please Stand up' (1996) 71 Tulane L Rev 1675, 1682-1686; Timothy Butler, 'Can a computer

consistently supporting this understanding. The Supreme Court has plainly stated that "[a]s a general rule, the author is […] the *person* who translates an idea into a fixed, tangible expression entitled to copyright protection".[53] In *Feist v Rural*, the U.S. Supreme Court discusses at length the notion of authorship and author by reviewing the notion of originality, which would refer to inherently human features, such as "creative spark" or "intellectual production, of thought, and conception".[54] Earlier cases would support the same conclusion. The *Trade-Mark Cases* state that the copyright law only protects "the fruits of intellectual labor" that "are founded in the creative powers of the mind".[55] In *Burrow-Giles*, then, the US Supreme Court reminded that copyright law is limited to "original intellectual conceptions of the author".[56]

A recent case, finally, has perhaps put the matter at rest in the United States. In *Naruto v. Slater*, two selfies were taken by the seven-year-old crested macaque 'Naruto' when wildlife photographer David Slater left his camera unattended in one of his visits to Indonesia. Later, in 2014, the 'Monkey Selfies' were published in a book through Blurb Inc. which identified Slater and Wildlife Personalities Ltd as the copyright owners. In 2015, People for the Ethical Treatment of Animals (PETA) filed a complaint of copyright infringement as next friends and on behalf of Naruto against Slater, Wildlife Personalities Ltd and Blurb Inc. before the District Court, California. In this context, the court had the opportunity to consider whether Naruto could be vested with a copyright in its selfie. The District Court granted the motion to dismiss filed by the Defendants on the basis that Naruto failed to establish statutory standing under the Copyright Act and noted: "[i]f the humans purporting to act on Plaintiff's behalf wish for copyright to be among the areas of law where nonhuman animals have standing, they should make that dubious case to Congress – not the federal courts".[57] The decision was appealed and while the parties agreed to a settlement, the Court of Appeals declined to dismiss the appeal and affirmed the lower court decision. The majority found that while animals have Article III standing to sue, animals do not have statutory standing under the Copyright Act.[58] The court relied on the Ninth Circuit decision in *Cetacean Community. v. Bush,* where it was held that animals have statutory standing only if the statute plainly states so.[59] Moreover, the terms "children," "grandchildren," "legitimate," "widow," and "widower" used in the Statute necessarily imply that the Copyright Act excludes animals that "do not marry and do not have heirs entitled to property by law".[60] Of course, the findings in *Naruto* decision can easily be extended to any non-human and AI-generated creativity. In this regard, the Third Edition of the Compendium of U.S. Copyright Office Practices, which was published in

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be an author? Copyright aspects of artificial intelligence' (1981) 4(4) (Comm/Ent), A J of Communications and Entertainment L 707, 733-734; Karl Milde, 'Can a Computer Be an "Author" or an "Inventor"?' (1969) 51 J of the Patent Office Soc'y 378, 391-392.

[53] *Community for Creative Non-Violence v. Reid* (1989) 490 U.S. 730, 737 (USA)

[54] *Feist Publications v. Rural Telephone Service* (1990) 499 U.S. 340, 345, 347 (USA)

[55] *Trade-Mark Cases* (1879) 100 U.S. 82, 94 (USA)

[56] *Burrow-Giles Lithographic Co. v. Sarony* (1884) 111 U.S. 53, 58 (USA)

[57] *Naruto v. David Slater* (2016) 15-cv-04324-WHO ('*Naruto 2016*') (USA)

[58] *Naruto v. David Slater* (2018) F.3d 4189th Cir, 426 ('*Naruto 2018*') (USA)

[59] *Cetacean Community. v. Bush* (2004) 386 F.3d 11699th Cir., 1175 (USA).

[60] *Naruto* 2018 (n 58) 426.

December 2014 after the *Naruto* case started, has provided a non-binding guidance that excluded non-human authorship.[61] The compendium repeatedly refers to persons or human beings when discussing authorship. More specifically, under Section 306, 'The Human Authorship Requirement' limits registration to 'original intellectual conceptions of the author' created by a human being. As clarified under Section 313.2, 'Works that Lack Human Authorship,' works produced by nature, animal or plants and similarly, works created by a machine or by a mechanical process without intervention from a human author are not copyrightable. Referring to the *Trade-Mark Cases* and *Burrow-Giles*, the Copyright Office concluded that it would refuse to register a claim if it determined that a human being did not create the work.[62]

In China, AI authorship has been discussed by multiple courts. In *Beijing Feilin Law Firm v Baidu Corporation*, the Court denied copyright protection to works created solely by machines and confirmed that copyright protection requires human authorship.[63] The case dealt with a report published a Beijing-based law firm on its official WeChat account. After an unidentifiable internet user published the report online without permission, the law firm brought an infringement suit before the Beijing Internet Court. The report was generated using Wolters Kluwer China Law & Reference—a legal information query software. While the Plaintiff argued that the tool was used only for assistance, the Defendants claimed that the entire report was generated by the software. During the proceedings, an automated report generated by the software on key words set by the Plaintiff's attorney was compared to the disputed report. The two reports were found substantially dissimilar. While the disputed report was eligible for protection under Chinese Copyright Law due to the original human contributions that it included, the court considered also the protectability of the report automatically generated by the software. In discussing protection of works exclusively generated by an AI, the Court held that the notion of authorship requires the work to be created by a natural person. However, the Court believes, that some sort of protection should be given to the user[64] of the software that generates creative works in order to incentivize purchases of that software as well as generation and distribution of the works. However, the judgment does not provide clarifications nor suggestions in this regard.

In a later decision, *Shenzen Tencent v Yinxun*, the Nanshan District Court in Shenzhen *de facto* confirmed the Beijing ruling by granting protection to the original contributions from human agents, rather than creativity exclusively AI-generated.[65] Tencent Technology

[61] U.S. Copyright Office, 'Compendium of U.S. Copyright Office Practices' (3rd edn, U.S. Copyright Office) <https://www.copyright.gov/comp3/comp-index.html>.

[62] ibid section 313.2.

[63] *Beijing Feilin Law Firm v Baidu Corporation* (26 April 2019) Beijing Internet Court, (2018) Beijing 0491 Minchu No. 239; Kan He, 'Feilin v. Baidu: Beijing Internet Court tackles protection of AI/software-generated work and holds that copyright only vests in works by human authors' (*The IPKat*, 9 November 2019) <http://ipkitten.blogspot.com/2019/11/feilin-v-baidu-beijing-internet-court.html>; Ming Chen, 'Beijing Internet Court denies copyright to works created solely by artificial intelligence' (2019) 14(8) JIPLP 593.

[64] Rather than the software developer who is already rewarded by a copyright over the software. ibid

[65] See *Shenzhen Tencent v. Yinxun*, Nanshan District People's Court of Shenzhen, Guangdong Province [2019] No. 14010 (China) <https://mp.weixin.qq.com/s/jjv7aYT5wDBIdTVWXV6rdQ>. See also Kan He, 'Another decision on AI-generated works in China: Is it a work of legal entities?' (*The IPKat*, 29 January 2020)

developed an AI writing assistant *Dreamwriter*. In August 2018, Tencent published one of *Dreamwriter*'s works on its website, informing the reader that the article was written by Tencent's AI. Shortly thereafter, the Defendant allegedly published the article online without Tencent's consent. Bringing a law suit for infringement, Tencent argued that the article was generated under its supervision and Tencent was responsible for the organisation and creation of the article as well as any liability arising thereof. The Court ruled in favour of Tencent by noting that the article met the requirements of being an original literary work as the content was a product of the input data, trigger conditions and arrangement of templates and resources selected by a Tencent's operational group. Since the expression of the article came from individual choices and arrangement made by the Tencent's team, the (AI-generated) article was considered a work for hire under Article 11 of the Chinese Copyright Law and the defendant was held liable for infringement. Although the court might have viewed the work as an integrated intellectual creation, deriving both from the contribution by the human team and the operation of 'Dreamwriter", the protection granted apparently steams from the human team's contribution, rather than any AI contribution.

### V.4. Originality

Even if a textual anthropocentric construction of authorship is disregarded, also originality as a condition for copyright protection seems to prevent protection of AI-generated creativity. Actually, textual references and case law construe originality via an anthropocentric model that emphasises self-consciousness. Originality is widely defined in most jurisdictions in light of a so-called personality approach that describes an original work as a representation of the personality of the author.[66] This construction of originality has sidelined earlier approaches endorsing 'sweat of the brow' doctrines that rewarded 'skills, labour and efforts' in creating intellectual work regardless of whether the work was representative of the personality of the author.[67] Therefore, originality as a representation of 'self' and self-consciousness would be, in theory, beyond the reach of machine-generated creativity.[68]

In the European Union, three Directives have vertically harmonized the notion of originality. According to the Software, Term, and Database Directive a work is original if it is "the author's own intellectual creation".[69] Later, the CJEU "horizontally" expanded this harmonized notion of originality to all copyright subject matters. In *Infopaq*, the CJEU noted that "[i]t is only through the choice, sequence and combination of those words that the author may express his creativity in an original manner and achieve a result that is an

[66] This characterization of originality builds upon Idealist personality theories, according to which intellectual products are manifestations or extensions of the personalities of their creators. See (n 14).

[67] See eg *International News Service v Associated Press* 248 U.S. 215 (1918) (USA); *Jeweler's Circular Publishing Co. v Keystone Publishing Co.* 281 F. 83, 88 (2nd Cir. 1922) (USA); Andreas Rahmatian, 'Originality in UK Copyright Law The Old ''Skill and Labour'' Doctrine Under Pressure' (2013) 44 IIC, 4–34

[68] The word author itself would bear this meaning on its face as the most accredited etymology of the word would have it deriving from the ancient Greek "αὐτός", which means "self". See Frosio (n 25) 16.

[69] Respectively, Article 1(3), Article 6, and Article 3(1). For a discussion, see Eleonora Rosati, *Originality in EU Copyright - Full Harmonization through Case Law* (Edward Elgar 2013)

intellectual creation".[70] The *Eva-Maria Painer* decision further explained that a work is original and can be protected, if it is an (1) intellectual creation of the author (2) reflecting his personality and (3) expressing his free and creative choices in the production of that photograph.[71] By making those various choices, the author of a portrait photograph can stamp the work created with his 'personal touch'.[72] In *Football Dataco*, finally, the CJEU rejected any remaining "sweat of the brow" doctrines and noted that significant labour and skill of the author cannot as such justify copyright protection, if they do not express any originality.[73]

The personality approach to originality has become the dominant standard in the United States as well. Since early cases, such as *Burrow-Giles v. Sarony*, the U.S. Supreme Court has concluded that originality derives from the free creative choices of the author that imbues the work with his personality[74] "such as the final product duplicates his conceptions and visions" of what the work should be.[75] In particular, *Burrow-Giles* held photographs copyrightable because they could be traced from the photographer's "own original mental conception".[76] Later, in *Feist v. Rural*, the U.S. Supreme Court clearly states that only works with a minimum of creativity that represents the personality of the author can be original, labour and efforts alone in creating a work would not qualify for copyright protection.[77] In light of these principles, output such as computational shorthand[78] or listing of automatically numbered hardware parts created using software systems have been found to lack the originality for protection under copyright.[79] The United States joining the Berne Convention in 1988 and *Feist* in 1991 sign the crystallization of a global more harmonized view of copyright, which would include a construction of originality in personality theory terms.[80] Actually, a few authors argued that there are no statutory limitations in the U.S. on treating machines as authors as "[t]he copyright standard of originality is sufficiently low that computer-generated works, even if found to be created solely by a machine, might seem able to qualify for protection".[81] I would note that, after *Feist*, originality is not only

[70] Case C-5/08 *Infopaq International A/S v Danske Dagblades Forening* (2009) ECR I-6569, para 45.

[71] Case C-145/10 *Eva Maria Painer* (2011) EU: C: 2011: 239.121, para 94.

[72] ibid para 92.

[73] Case C-604/10, *Football Dataco Ltd and Others v Yahoo! UK Ltd and Others* (2012) ECLI:EU:C:2012:115 [42]

[74] See *Burrow-Giles* (n 56) 60-61 (USA) (considering the copyrightability of a portrait photograph of Oscar Wilde).

[75] *Lindsay v The Wrecked and Abandoned Vessel R.M.S. Titanic* 52 U.S.P.Q.2d 1609, 1614 (S.D.N.Y. 1999) (USA).

[76] *Burrow-Giles Lithographic* (n 99) 54-55 (USA)

[77] See *Feist Publications* (n 97) 362-363

[78] See *Brief English Systems v Owen* (1931) 48 F.2d 555 2d Cir, 555 (USA)

[79] See *Southco, Inc. v Kanebridge Corporation* (2004) 390 F.3d 276, 276 (USA)

[80] See Monroe Price and Malla Pollack, 'The Author in Copyright: Notes for the Literary critic in Martha Woodmansee and Peter Jaszi, *The Construction of Authorship: Textual Appropriation in Law and Literature* (Duke University Press 1994) 717-720.

[81] Samuelson (n 50) 1199-1200. See also Nina Brown, 'Artificial Authors: A Case for Copyright in Computer-Generated Works' (2019) 9 Columbia Science and Technology Law Review 1, 24-27; Margot Kaminski, 'Authorship, Disrupted: AI Authors in Copyright and First Amendment Law' (2017) 51 *UC Davis Law Review* 589, 601.

a question of quantum. For AI-generated creativity purposes, it is irrelevant whether the standard of originality is low or high. The standard the AI fails to reach is qualitative rather than quantitative. AI cannot express "self". The creativity that it generates cannot express the personality of the author because AI has none.

More recently, a few remaining—mainly common law—jurisdictions have been also endorsing a personality approach to originality. This has been the case in Australia,[82] India,[83] and the United Kingdom,[84] which have finally rejected previous "labour, skill and efforts" approaches. Just few countries still follow 'sweat of the brow' doctrines and reject personality approaches to originality, including South Africa[85] and New Zealand.[86] In sum, the notion of originality seems to be consistently construed via an anthropocentric vision positing that a work is original if it is a representation of "self", a representation of the personality of the author. Of course, only a sentient self-conscious being would be capable of representing "self" through a work. In turn, absent the creator's self-consciousness, the originality requirement that lies in the representation of the personality of the author cannot be met. Therefore, unless machines achieve self-consciousness—which might be the case of futuristic hypothetical strong AI—AI-generated creativity cannot meet the originality requirement under the present legal framework.[87]

## VI. Policy Options

As our earlier review of requirements for protection has suggested, the construction of the notion of legal personality, authorship and originality under the present copyright regime might exclude AI-generated creativity from copyright protection.[88] However, scholars and courts have been wondering whether not granting protection to AI-generated creativity would be a suboptimal solution, in particular from an "incentive theory" perspective.

In fact, future policy directions depend heavily on the application of alternative—and competing—IP theoretical approaches. Incentive theory or utilitarianism,[89] which is

[82] See eg *IceTV* (n 88) [43] (AUS)

[83] See eg *Eastern Book Co. & Ors v D.B. Modak & Anr* (2008) 1 SCC 1 (India).

[84] See eg *Temple Island Collections v New English Teas (No. 2)* [2012] EWPCC 1; Rahmatian (n 67) 4–34.

[85] See eg *Appleton v Harnischfeger Corp.* (1995) 2 SA 247 (AD), [43]–[44] (SA).

[86] See eg *Henkel KgaAv. Holdfast* [2006] NZSC 102, [2007] 1 NZLR 577 [37] (NZ).

[87] See eg Peter Mezei, 'From Leonardo to the Next Rembrandt – The Need for AI-Pessimism in the Age of Algorithms' (2020) 84(2) UFITA 390-429; Daniel Gervais, 'The Machine as Author' (2019) 105 *Iowa Law Review* 1; Deltorn and Macrez (n 39) 8; Ramalho (n 42) 22-24; Madeleine De Cock Buning, 'Artificial Intelligence and the creative industry: new challenges for the EU paradigm for art and technology by autonomous creation' in Woodrow Barfield and Ugo Pagallo (eds), *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar 2018) 511-535; Deltorn (n 39) 7; Clifford (n 52) 1694-1695.

[88] See Mezei (n 87); Aplin and Pasqualetto (n 38) §5.01-09; Gervais (n 87) 1 ff; Megan Svedman, 'Artificial Creativity: A case against copyright for AI-created visual work' (2020) 9(1) IP Theory 4, 4; Garrett Huson, 'I, Copyright' (2019) 35 Santa Clara High Technology Law Journal 54, 72-78; Victor Palace, 'What if Artificial Intelligence Wrote This: Artificial Intelligence and Copyright Law' (2019) 71(1) Florida L Rev 217, 238-241; Ralph Clifford, 'Creativity Revisited' (2018) 59 IDEA: The IP Law Review 25, 26-29; Ramalho (n 42) 22-24; Clifford (n 52) 1700-1702.

[89] See Fisher (n 16) 168, 177-180.

dominant in the United States and common law jurisdictions, is less concerned with the humanity of the author than personality theories, influencing instead civil law jurisdictions.[90] This provides more room for arguments in favour of nonhuman authorship and protectability of AI-generated creativity. According to the incentive theory approach, "providing financial incentives in order to encourage the growth and development of the AI industry and ensure the dissemination of AI generated works is arguably the ultimate goal of assigning copyright to human authors".[91] Although a computer does not need an incentive to produce its output, the incentive may be useful for the person collaborating with the computer.[92] In particular, authors argue that there should be some additional incentive to encourage industry to invest the time and money that it will take to teach machines to behave intelligently[93] or to reward users training and instructing AI generating content.[94] In contrast, most civil law jurisdictions might be less responsive to welfare and incentive arguments and prefer to value systemic balance, thus rejecting any departure from the personality theory approach that shapes the civil law copyright perspective—and its notion of originality. In addition, although AI generated creations may justify incentives to bolster innovation and commercialisation, the necessity of such incentives is questionable considering the impact it can have on human creations.[95] For example, considering the vast number of automated creations, granting protection for these works could devalue human authorship and existing jobs in the field,[96] hamper creativity as it could discourage artists from publishing their creations due to the fear of infringing protected material[97] or clog the creative ecosystem with standardized and homogenized AI-generated outputs, impacting cultural diversity and identity politics.

Put it bluntly, the policy question to be determined is whether expansion of current copyright protection to computer generated works is useful. The current legal framework might provide already enough protection through patent and copyright law to the underlying software, *sui generis* protection to databases or other legal mechanisms, such as competition law, to protect automated works without extending the existing copyright regime to non-human authors.[98] As suggested, the questions should be investigated from a

[90] See Kaminski (n 81) 599.

[91] Kalin Hristov, 'Artificial Intelligence and the Copyright Dilemma' (2017) 57 *IDEA: The Intellectual Property Law Review* 431, 444. See also Brown (n 81) 20-21.

[92] See Hristov (n 91) 438-439; Miller (n 50) 1067.

[93] See Kasap (n 52) 361-364; Ryan Abbott, 'I Think, Therefore I Invent: Creative Computers and the future of Patent Law' (2016) 57(4) Boston College L Rev 1079, 1098-1099; Evan Farr, 'Copyrightability of Computer-Created Works' (1989) 15 Rutgers Comp & Tech L J 63, 73-74; Butler (n 52) 735; Milde (n 52) 390.

[94] Brown (n 81) 37; Denicola (n 50) 283; William Ralston, 'Copyright in Computer-Composed Music: HAL Meets Handel' (2005) 52 J of the Copyright Society of the USA 281, 303-04; Samuelson (n 50) 1224-1228.

[95] Craglia and others (n 7) 67-68.

[96] Enrico Bonadio and Luke McDonagh, 'Artificial Intelligence as Producer and Consumer of Copyright Works: Evaluating the Consequences of Algorithmic Creativity' (2020) 2 Intell Prop Quarterly 112, 123.

[97] De Cock Buning (n 87) 511-535; Deltorn (n 39) 7.

[98] Deltorn and Macrez (n 39) 24.

law and economics perspective before favouring any solutions.[99] Before trying to answer this question, the next few pages will be presenting the major policy options under consideration.

### VI.1. Option 1: The Public Domain Status of AI-generated Works.

Public domain status of AI-generated creativity is the first available policy option, which is most likely also the solution currently endorsed by the present legal framework. Under this perspective, any attempt of construing AI as an author would be an illusion resulting from a process of anthropomorphisation of the machine, which in fact does not know anything of the actions and role that this misperception would ascribe to it. Anything predicated as free creative choices of the machine—supposedly acting autonomously from the initial instructions provided by developers and users—would in fact be mere chance/randomness programmed into computational processes. Dan Burk powerfully sums up this perspective:

> For any given AI system, a human designed and wrote the program the constitutes the machine learning algorithm. One or more humans selected the training data for the algorithm. One or more humans determined the statistical parameters for the program, modulating overfitting or underfitting of the data. Numerous human choices were made in generating the resulting output. If there is an author, it is one of more of the humans who are sufficiently causally proximate to the production of the output. In some instances there may be joint authors. In some instances, none of them may be sufficiently causally proximate to claim authorship, and there will be no author, as in the case of an errant wind or feral hogs. But the author is never the machine.[100]

According to this policy option, copyright ownership depends only on the amount of human intervention. Mere data selection and classification by human is insufficient to meet the 'originality' requirement, instead actual and substantial human contribution to guide the AI system in creation is necessary for grant of protection.[101] Only when there is substantial human input, and all creative choices are embedded in the computer code or users' instructions, copyright would vest with the human author.[102] In this regard, four models of allocating authorship have been identified: (1) sole authorship to users of the tool—if the designer of the tool does not contribute the creative work generated; (2) sole authorship to developers of the tool—if the user plays no role in the output and the self-generative tool creates output based on the training and creative raw material provided by the developer; (3) joint authorship to user and developer, when the outputs reflect the

[99] See Craglia and others (n 7) 68; Jane Ginsburg and Luke Ali Budiardjo, 'Authors and Machines' (2019) 34(2) Berkeley Tech L J 343, 448 (noting that 'without empirical evidence, it would be imprudent (and premature) to seek to design a regime to cover authorless outputs'); see also Ginsburg (n 38) 134-35.

[100] Dan Burk, Thirty-Six Views of Copyright Authorship, By Jackson Pollock, in Houston L. Rev. (2020) 59 1, 37. Si veda anche Deltorn (n 39); Samantha Hedrick, 'I 'Think', Therefore I Create: Claiming Copyright in the Outputs of Algorithms' (2019) 8(2) NYU JIPEL 324; James Grimmelmann, 'There is No Such Thing as a Computer-Authored Work And It is a Good Thing, Too' (2016) 39 Colum J L & Arts 403.

[101] Niloufer Selvadurai and Rita Matulionyte, 'Reconsidering creativity: copyright protection for works generated using artificial intelligence' (2020) 62 JIPLP 536, 539.

[102] ibid, 538; Gervais (n 87) 51-60.

creative contributions of both developer and user; (4) authorless works—neither designer nor user contribute sufficient expression to form an original work of authorship.[103] In any event, if the creative output results both from human and machine's choices, materials resulting from machine-made choices must be filtered out as it is customarily done with public domain materials.[104] Only independently copyrightable human contributions will be protectable.

### VI.2. Option 2: Copyright Protection of AI-generated Work

In order to avoid that AI-generated creativity falls in the public domain and grant necessary incentives to human agents involved with the AI creative process, proposals have been made to grant copyright protection to AI-generated works. Alternatively, copyright ownership would vest directly in the machine that generates the works or human agents potentially involved with the creative process.

#### VI.2.1. Option 2.1: The Fictional Human Author

Some jurisdictions have enacted legislation to set up a legal fiction, so that authorship of AI-generated works is conferred to the agents spending skills, labour and efforts to create, train or instruct the AI in the first place. This policy approach emerged quite early, when the creative potential of machine learning and AI were wholly unknown.[105] The United Kingdom was the first jurisdiction to provide specific protection to computer-generated creativity.[106] Section 9(3) of the Copyright Designs and Patents Act 1988 (CDPA)[107] clarified that for computer generated works, the author is the person who undertakes the arrangements necessary for the creation of the work. In addition, Section 178 provides that "computer-generated, in relation to a work, means that the work is generated by computer in circumstances such that there is no human author of the work".[108] Under this regime, the term of protection for computer-generated works would be 50 years from when the work was made. Shortly thereafter, other common law countries, including Hong Kong, India, Ireland, Singapore, and New Zealand, have enacted similar legal arrangements.[109]

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[103] Ginsburg and Budiardjo (n 99) 404-445.

[104] Gervais (n 87) 54.

[105] In the UK, the copyright protection of a computer-generated sequence for a lottery was discussed as early as 1985 in *Express Newspapers v. Liverpool Daily Post*. Justice Whitford allowed copyright protection for the automated output to the Plaintiff and refused the notion that copyright in the work could vest in the computer. The computer is a mere tool for creation, arguing that the computer is the author is similar to suggesting that in a written work, "it is the pen that is the author of the work rather than the person who drives the pen". *Express Newspapers Plc v Liverpool Daily Post & Echo Plc* [1985] 1 WLR 1089, 1098 (UK)

[106] Jared Grubow, 'O.K. Computer: The Devolution of Human Creativity and Granting Musical Copyrights to Artificially Intelligent Joint Authors' (2018) 40 Cardozo L Rev 387; Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) Intell Prop Quarterly 169, 169-189.

[107] Copyright, Designs and Patents Act 1988, § 9(3) (UK).

[108] ibid §178.

[109] See Copyright Ordinance cap 528, section 11(3) (Hong Kong); Copyright Act 1957, section 2(d)(vi) (India); Copyright and Related Rights Act 2000, section 21(f) (Ireland); Copyright Act 1987 chapter 63, section 7A (Singapore); Copyright Act 1994, section 5(2) (New Zealand).

However, the fictional human author policy approach might be suboptimal for at least two orders of reasons. The first reason is of practical nature. This approach makes it tricky to determine who is the person in charge of the necessary arrangements.[110] Does the AI-generated work belong to the person who built the system, such as the software developer, the manufacturer, the person who trained it, or the person who fed it specific inputs like a user?[111]

(**1**) **The Programmer**. A first possible answer to the question was provided in *Nova Productions v Mazooma Games* that applied Section 9(3) of the CDPA. The case concerned copyright on frame images generated by a computer program using bitmap files and displayed on the screen when the users played a snooker video-game. The court refused to grant authorship to the user as their input was not artistic in nature.[112] Instead, the Court found the programmer as the sole author as the person who made the necessary arrangements by noting that "[t]he arrangements necessary for the creation of the work were undertaken by [the plaintiff] because he devised the appearance of the various elements of the game and the rules and logic by which each frame is generated and he wrote the relevant computer program".[113] In truth, the *Nova Productions*' outcome might be a direct consequence of the rudimental technology at stake;[114] however vesting authorship in the programmer of AI-generating content raises at least three fundamental critiques. First, the allocation of authorship to the software developer might be a blatant misperception.[115] In fact, at least in state-of-the-art neural network-based creativity, there seems to be no direct causal connection between the software developers and the final AI-generated output, as the expression embedded in that output would be the result of the training of the machine and the instructions given to create that specific output. Second, given that this legal fiction is exactly meant to provide incentives to create AI-generated works, where its public domain status would presumptively fail to do so, a sound economic analysis would probably discourage a policy option that rewards twice the same market player. Actually—as also the Beijing Internet Court highlighted in a case mentioned earlier—the software developer has been already rewarded with exclusive rights over the software that generates works.[116] Third, from a more practical perspective, this policy

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[110] See Emily Dorotheu, 'Reap the benefits and avoid the legal uncertainty: who owns the creations of artificial intelligence?' (2015) 21 CTLR 85. See also Guadamuz (n 106) 177 (arguing, however, that the system's ambiguity should actually be seen as a positive feature that deflects the user/programmer dichotomy question and makes the analysis on a case-by-case basis).

[111] Bonadio and McDonagh (n 96) 112, 117-119; Kasap (n 52) 364-376.

[112] *Nova Productions Ltd v Mazooma Games Ltd & Ors Rev* 1 [2006] EWHC 24 (Ch) 106 (UK); see also Farr (n 93) 75-78

[113] *Nova Productions* (ibid) 104-05 (UK). See also Farr (n 93) 73-74.

[114] See Guadamuz (n 106) 177 (arguing that different allocation of authorship might result depending on the specifics of the case and technology under review). See also Grubow (n 106) 387-424

[115] cf. Ryan Abbott, 'Artificial Intelligence, Big Data and Intellectual Property: protecting computer generated works in the United Kingdom' in Tanya Aplin (ed), *Research Handbook on intellectual property and digital technologies* (Edward Elgar 2020) 322, 334; Svedman (n 88) 10-11; Annemarie Bridy, 'The Evolution of Authorship: Work made by Code' (2016) 39 Columbia J of Law and the Arts 395, 400-401; Bridy (n 50) ¶62; Samuelson (n 50) 1207-12.

[116] He (n 63); Chen (n 63) 607-611. See also Bonadio and McDonagh (n 96) 112, 117; Samuelson (n 50) 1207-12.

solution would potentially entitle coders to aggressive copyright protection for innumerable pieces of creativity,[117] which would also lower any incentive for the original programmer to create more software.[118]

(**2**) **The User**. Allocating rights in AI-generated output to the user of the generator program has been claimed to be a sounder solution.[119] Pamela Samuelson has argued that the user is the reason the AI-generated work comes into being, thus "[i]t is not unfair in these circumstances to give some rights to a person who uses the work for its intended purpose of creating additional works".[120] In the *Draft Report on intellectual property rights for the development of artificial intelligence technologies*, the European Parliament has seemingly endorsed the same view and proposed to entrust the AI users ("the natural person who prepares and publishes [the] work lawfully") with copyright over AI-generated works, at least unless "the technology designer has not expressly reserved the right to use the work in that way".[121] Also the Beijing decision earlier described has suggested this policy option.[122] This solution would not be novel to copyright standards. For example, in the United States, copyright—and authorship—is given to users for being the instrument of fixation[123] as in the case of a person who tape-records a jazz performance.[124] In this scenario, the user would be the author of the sound recording, rather than the jazz performance. Similarly, the user could be construed as the author of the fixation of the AI-generated work. Of course, a specific provision, such as 9(3) CDPA, should be introduced to that end. Most likely, in some exceptional cases, such as when the user does not have any control over the software other than running it, awarding a copyright to the user would be a suboptimal policy choice at odd with copyright incentive theory.[125] In this cases, joint authorship between users and programmers could be a possible solution, depending on the legal scheme for joint authorship made available by different jurisdictions.[126]

(**3**) **The Employer**. Another possible legal framework for ensuring protectability, ownership and accountability of AI-generated works has been found in work-made-for-hire (WMFH) doctrine.[127] The AI system would be a fictional creative employee or

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[117] Svedman (n 88) 14.

[118] Huson (n 88) 74.

[119] See eg National Commission on New Technological Uses of Copyrighted Works, 'Final Report of the National Commission on New Technological Uses of Copyrighted Works' ('CONTU Final Report') (1978) 45 (United States); Ralston (n 94) 303-04.

[120] Pamela Samuelson, 'AI Authorship?' (2020) 63(7) Communications of the ACM 20; Samuelson (n 50) 1200-04

[121] See Draft Report on intellectual property rights for the development of artificial intelligence technologies (n 34) 10.

[122] See (n 63).

[123] 17 U.S.C. § 114. However, most countries favor neighbouring rights protection for sound recording, rather than copyright as in the Unites States.

[124] Samuelson (n 50) 1202

[125] Ralston (n 94) 304-05

[126] See eg Bonadio and McDonagh (n 96) 117-118

[127] See Shlomit Yanisky-Ravid, 'Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability in the 3A Era, The Human-Like Authors are Already Here: A New Model', (2017) Michigan State L Rev 659. See also Russ Pearlman, 'Recognizing Artificial Intelligence (AI) as Authors and Inventors

independent contractor of its users—whether they are natural persons or legal entities.[128] As Samuelson argues, 'one who buys or licenses a generator program has in some sense "employed" the computer and its programs for his creative endeavors, similar considerations to those that underlie the work made for hire rule support allocation of rights in computer-generated works to users.'[129] In truth, this policy option might stand on shaky grounds. First, the argument that, as well as in the case of AI-generated works, employers are treated as authors of 'work for hire' works despite having no role in the output[130] seems to miss that, as part of the WMFH legal fiction, the underlying work has been created by a human author and fulfils the originality standard under the present legal framework. This would not be the case with AI-generated creativity. Second, this arrangement would face challenges on the ground that it would be a misapplication of the WMFH doctrine as it is difficult to define a legal, contractual employment or agency relationship between a human and a machine.[131] It seems obvious that in order for the WMFH doctrine to apply to AI-generated works some substantial statutory and jurisprudential reconstruction of the notion of "employer" and "employee" must in any event first occur.[132]

Next to the practical issue of identifying of the relevant human agent, the second critique to the fictional human autor policy approach is more fundamental and systemic. Would this approach be sustainable under a legal framework that builds upon the internationally endorsed notion of originality as an expression of the author's personality? Of course, programming, training and imparting instructions would unlikely fulfil the requirement of an original contribution from the human counterparts, as finally any 'expression' would be the result of the AI creative process. As long as the present subjective standard for originality is in place, any fictional human author policy approach would be resting on very shaky grounds given the lack of originality of AI-generated creativity. The work itself, whose fictional authorship is attributed to a human agent, would actually remain unoriginal, thus unprotectable. It is worth noting that the "fictional human author" approach has been adopted in the UK and other common law countries when "sweat of the brow" or "skill and labour" originality standards where still dominant in those jurisdictions. Since then, as mentioned, the personality standard for originality has apparently replaced any alternative approach.[133] This change would challenge Section 9(3) CDPA policy approaches' systemic compliance.

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under U.S. Intellectual Property Law' (2018) Richmond J of L & Tech 1, 15; Kaminski (n 81) 589; 91 (n 136); Bridy (n 115) 400-401; Bridy (n 50) ¶66.

[128] See Yanisky-Ravid, 'Generating Rembrandt' (n 127) 659.

[129] Samuelson, 'AI Authorship?' (n 120) 20; Samuelson (n 50) 1200-04

[130] See Brown (n 81) 39; Kaminski (n 81) 602.

[131] See Bonadio and McDonagh (n 96) 114-115; Huson (n 88) 73-75; Ramalho (n 42) 18-19; Bridy (n 50) 27, ¶68; Butler (n 52) 739-742.

[132] Hristov (n 91) 445-447.

[133] See eg *Temple Island Collections* (n 126). See also Grubow (n 106) 387-424; Guadamuz (n 106) 178-180; Rahmatian (n 67) 4–34.

### VI.2.2. Option 2.2: the A(I)uthor

One policy option would be to construe the AI as the author. A fiction would have to be established in the law to provide AI with legal personality, so that it can author a work and own a copyright, or at least the law should be amended to reflect the fact that a computer can be an author in a joint work with a person.[134] According to Perlman, the law should recognize sufficiently creative AIs as authors when the AI creation is original and developed independently from human instructions, so that the AI is the cause of creativity, not a mere machine working under the instructions of a human author.[135] Once the AI is declared the author, rights would be immediately assigned to a natural or legal person, such as the creator/programmer of the AI, the user of the AI, or as a joint work.[136] The law should identify the person entitled to receive the transfer and exercise the rights.

According to the scholarship,[137] however, this is a quite residual policy option as it must face at least two fundamental critiques. First, the machine should be entrusted with some form of legal personality, which seems an unlikely policy choice at the moment.[138] Again, meeting the requirement of originality could be an insurmountable burden for a machine. The notion of originality should most likely be tweaked to include works originating from a machine according to an objective rather than subjective originality.[139] Overall, allowing AI as author would require substantial amendments to the legal framework. As noted, given the early state of technological development, amending the law before truly intelligent machines have even materialized—and whose materialization and evolution remains as of today just a hypothetical guess—might be a suboptimal policy option.[140]

## VI.3. Option 3: *Sui Generis* Protection of AI-Generated Creativity

Given the difficulties in applying the copyright paradigm to AI-generated creativity, proposals have been also suggesting the creation of a related *sui generis* right—where no authorship or originality would be a necessary requirement—that might protect the investment made in developing and training AI generating creativity. A few policy alternatives might be available.

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[134] See eg Pearlman (n 127) 1, 29-35; Jani Ihalainen, Computer creativity: artificial intelligence and copyright' (2018) 13(9) JIPLP 724.

[135] Pearlman (n 127) 1.

[136] Cf also Abbott (n 115) 334 (noting that the machine would be an author/inventor without being an owner and '[t]he computer's owner should be the default owner of any CGW it produces'); Abbott (n 93) 1121.

[137] See eg Bonadio and McDonagh (n 96) 112, 116; Ralston (n 94) 302-303; Farr (n 93) 79; Samuelson (n 50) 1199-1200.

[138] See section III.1.

[139] See Shlomit Yanisky-Ravid and Luis Antonio Velez-Hernandez, 'Copyrightability of Artworks Produced by Creative Robots, Driven by Artificial Intelligence Systems and the Originality Requirement: The Formality-Objective Model' (2018) 19(1) Minnesota J of L, Science & Tech 1, 40-48 (arguing that judges should look at the final output per se, considering the field of art, the objective opinion of users, and similarity to other works, while disregarding the subjective intention of the author; *de facto* aligning the standard for originality in copyright to the standard for novelty in patent law).

[140] See Huson (n 88) 77-78; Yvette Joy Liebesman, 'The Wisdom of Legislating for Anticipated Technological Advancements' (2010) J Marshall Rev Intell Prop L 10 153, 172.

### VI.3.1. Option 3.1: Protecting Investment

Sui generis rights modelled after database or neighbouring rights have been suggested for protecting AI-generated creativity. For example, while denying protectability under the traditional copyright scheme, the Australian Copyright Law Review Committee noted that, if computer generated creativity needs protection, this should be "more akin to that extended to neighbouring rights […] the protection extended to performers, producers of phonograms and broadcasting organizations".[141] In this respect, broadcasting rights might serve as reference as they exist notwithstanding the underlying sport event cannot enjoy copyright protection. Again, McCutcheon has suggested a *sui generis* rights regime for AI-generated creativity similar to database rights, therefore protecting investment in the creation but not requiring an author, nor authorship, nor originality.[142] With the goal of limiting overbroad protection of algorithmic creativity, some authors propose a thin scope of the *sui generis* right, coupled by strong fair use safeguards, with a short duration around 3 years or so.[143]

### VI.3.2. Option 3.2: the Disseminators' Right

Further proposal would like to provide rights to publishers and disseminators of AI generated works. On one side, the regime for anonymous/pseudonymous works could be applied to AI-generated works. According to several national regimes, such as Spain, France, Italy and Sweden,[144] the person who publishes the work will exercise the rights. On the other side, an additional policy option could provide to the disseminator of AI-generated creativity a right similar to EU's publisher right in previously unpublished works as in Art. 4 of Directive 2006/116/EC.[145] Under this scheme, the protection covers the first lawful publication/communication of previously unpublished public domain works. Similarly, AI-generated works would be in the public domain, therefore the "disseminator's" scheme would only reward someone for the dissemination of AI-generated creation. The duration of the right could be limited to e.g. 25 years as in the case of Art. 4 of Directive 2006/116/EC.[146]

### VI.3.3. Option 3.3: Protecting Goodwill against Unfair Competition

Other policy proposals have been especially targeting unfair competition in the market for AI-generated works. Japan, for example, have been considering a novel *sui generis* regime for non-human created intellectual property based on a trade mark like approach

[141] Sam Ricketson, 'The Need for Human Authorship - Australian Developments: Telstra Corp Ltd v Phone Directories Co Pty Ltd (Case Comment)' (2012) 34(1) E.I.P.R. 54

[142] See Jani McCutcheon, 'The vanishing author in Computer Generated Works' (2013) 36 Melbourne U L Rev 915, 965-966.

[143] Bonadio and McDonagh (n 96) 136-137

[144] French IP Code (n 45) L113-1; Spanish IP Law (n 46) art 6(1) (Spain); Italian Copyright Law (n 48) art 9 (Italy); Act on Copyright in Literary and Artistic Works 1960, art 7 (Sweden).

[145] Ramalho (n 77) 22-24

[146] ibid

with an emphasis on protection against unfair competition.[147] This approach seeks to limit the protection of AI works by allowing flexibility in levels of protection based on popularity of the AI-generated works as a proxy for goodwill.[148] This would leave out obscure works created for the sole aim of copyright protection. The proposal would allocate ownership of the work to the individual or company that had created the AI.[149]

## VII. CONCLUSIONS: IP THEORIES IN SEARCH OF AN A(I)UTHOR

Anthropocentrism strongly influence the present copyright legal framework. Thus, AI-generated creativity falls short of all fundamental requirements for granting copyright protection, including legal personality, authorship and originality. As a reaction, utilitarian/incentive approaches push for the adoption of legal fictions to protect and incentivise AI-generated creativity. These policy solutions, unfortunately, do not satisfactorily address systemic inconsistencies. Even if the law fictionally claims that the work is human-made rather than AI-made, the work itself remains unoriginal as machines will be inherently incapable of originality under a personality standard. Only a fundamental overhaul of the copyright system, pushing away the present anthropocentric approach can provide full copyright protection to AI-generated creativity proper, when no human intervention can be construed as an original expression. This would be ill-considered, especially given the primitive stage of technological development in the field. Given the systemic difficulties of extending the copyright regime to AI-generated works, residual *sui generis* approaches are also available and, most likely, a preferable option. If policymakers chose to provide monopolistic incentive to AI-generated creativity, the incentive should fall upon the users, if they contributed any meaningful labor and effort to the AI-generated output, as programmers, marketers and investors would be double-dipping on earlier rewards over the AI-generating content software.

The question that lies ahead is whether any incentive to AI-generated creativity is at all necessary. This policy question should be answered from an empirical perspective, carefully weighting positive and negative externalities of introducing new forms of protection of algorithmic creativity. In this respect, the next few pages will seek the help of IP theories to disentangle this policy conundrum by testing the introduction of new exclusive rights over AI-generated creativity against each of the major theoretical justifications of IP.

(1) A justification to new exclusive rights for AI-generated works might be found in Lockean fairness theory, which strongly influenced common law system. Under this theoretical approach, labour and efforts deserve a fair compensation, while a tight causal relationship between the work and the personality of the author becomes less relevant. Therefore, both copyrights and sui generis rights might be a sustainable option under this theoretical perspective. Most likely, the economic incentive should reward users of technologies generating creativity.

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[147] See 'Intellectual Property Strategic Program 2016' <http://www.kantei.go.jp/jp/singi/titeki2/kettei/chizaikeikaku20160509_e.pdf>.

[148] ibid 11.

[149] ibid

(2) Personality theories, instead, might be unfit to justify any copyright protection of algorithmic works. The personality theory's construction of the work as an extension of the personality—and humanity—of the author makes hard, if not impossible, to make room for copyright protection of AI-generated works when the causal link between human agents and the work is so weakened that no protectable expressions deriving from free human choices can be found. The machine, on the other side, is not human, nor self-conscious, thus cannot enjoy any personality and its contribution would not qualify as copyright protectable from a personality theory perspective.

(3) Utilitarian theories, as interpreted in light of welfare theory, incentive theory and economic analysis of law, would like to implement regulatory solutions that generate positive externalities for society at large, rather than authors and innovators alone. From a utilitarian perspective, progress is maximized by social policies that generate the greatest happiness for the greatest number of people. In this respect, the final goal of creativity and innovation policy is social progress, which is not the same as mere technological development. [150] Therefore, although the economic value that might arise from the development of AI generating creativity would be a relevant positive externality, policy changes must bring about overall advantages for society as a whole in terms of social progress. Actually, plentiful arguments might be raised against the notion that incentivising algorithmic creativity via exclusive rights might generate more positive externalities than negative. While, on one side, there is no evidence that new exclusive rights might incentivise growth of the AI industry, on the other side, such exclusive rights might increase copyright overall transaction costs and negatively affect cultural diversity and identity culture.

(i) First, some evidence should be given that the proposed incentives align with the AI industry business models and might incentivise investment in the AI sector. The need for such incentives should be empirically proved together with the positive externalities that they might bring about for the creative ecosystem. In fact, there is well established historical evidence that property rights are not the only incentive to creativity. [151] Miscellaneous research and market evidence show that open and free access to creative works or alternative business models might provide stronger incentive to AI-generated creativity than IP-based protection models, [152] without creating the negative externalities of propertization and exclusive rights. Of course, it is worth noting that AI itself does not need any incentive to create and exclusive rights provided by copyright and patents over the technologies generating creative works might already constitute an incentive sufficient enough for the human agents involved. In addition, other legal tools, such as protection against unfair competition, might provide an adequate remedy against infringement.

(ii) Second, in the context of the maximization of positive externalities, a truly challenging question deals with how AI-generated creativity impacts cultural diversity and identity politics. [153] In particular, AI-generated creativity might homogenize online and

[150] See, on this point, Pierpaolo Pasolini, *Sviluppo e progresso* (1973) in *Scritti Corsari* (Garzanti 1975).

[151] See eg Frosio (n 25).

[152] Bonadio and McDonagh (n 96) 122-123; Svedman (n 88) 13-14.

[153] Octavio Kulesz, 'Culture, platforms and machines: the impact of artificial intelligence on the diversity of cultural expressions' (UNESCO Intergovernmental committee for the protection and promotion of the

offline content. Actually, algorithmic creativity has an inherent propension to average mainstream ideas and perspectives. Neural networks train by acritically collecting information and learn from that training how to create new content. Of course, the new content will reflect all bias and preconceptions of the original database. The machine can only process weighted averages of the collected information and, thus, generates content that reflects those averages. The divergence, which is typical of original human thought, seems intrinsically less probable in algorithmic processes generating content.

(iii) Third, protecting algorithmic creativity might bring about further negative externalities by actualizing the 'infinite monkey theorem' of French mathematician Émile Borel,[154] thus expanding copyright transactional costs to the point of systemic failure. Borel's theorem argues that a monkey randomly hitting typewriter's keys for an infinite amount of time will 'almost' surely type any possible text, such as the complete collection of Shakespeare's works.[155] Jorge Luis Borges evokes, as a possible result of the work of Borel's monkeys, the 'Biblioteca Total', which would contain any possible work written and to be written.[156] Actually, Borel's monkey is a metaphor representing an hypothetical mechanical tool capable of creating an infinite random sequence of letters and symbols. Today, Borel's theorem has become almost reality given the extraordinary—and unpredictable at the time of Borel—development of computational sciences. This development—and the actualization of Borel's theorem—would further affect transactions cost related to that 'copyright soup' that according to William Fisher has become already too thick in the digital environment.[157] AI creative capacities might scale up at singularity pace, overflooding the cultural marketplace with an unmanageable mesh of rights to clear. If new copyright or sui generis rights are granted over AI-generated works, copyright trolling might escalate to final computational doom. Infinite AI monkeys might eat all the 'copyright soup' up, so that no creative materials will be left to use.

(4) Finally, also cultural theories might not provide justification to the introduction of new exclusive rights protecting AI-generated creativity. Instead, the pursuit of happiness via the realization of universal human values, such as culture—which is the final goal in the creativity domain of the normative system promoted by this theoretical approach—might suggest to disincentivize, rather incentivize, the generation of algorithmic works. The widespread availability of algorithmic creativity, possibly autonomously generated by machines, would not accrete human culture but, if any, algorithmic culture. Human culture, in contrast, would be harmed by the limitation of professional and expressive space available to human agents. Meanwhile, as mentioned above, the cultural ecosystem might suffer negative externalities in terms of diversity of creative works, which is a central value to the cultural theory's social project.

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diversity of cultural expressions, Paris 2018) <https://en.unesco.org/creativity/sites/creativity/files/12igc_inf4_en.pdf>.

[154] Émile Borel, 'Mécanique Statistique et Irréversibilité' (1913) 5(3) J Phys (Paris) 189.

[155] ibid

[156] Jorge Luis Borges, *La Biblioteca Total* (1941).

[157] Cfr. CopyrightX, Lectures, 6. The Mechanics of Copyright <http://copyx.org/lectures>.

In sum, a review of theoretical justifications to IP rights would suggest caution in extending them to AI-generated creativity. IP theories in search of justifications for protecting AI-generated works might not finally find any A(I)uthor.