

Paulo Moura Oliveira · Paulo Novais ·  
Luís Paulo Reis (Eds.)

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# Progress in Artificial Intelligence

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*Editors*

Paulo Moura Oliveira   
INESC-TEC  
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and Alto Douro  
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Paulo Novais   
University of Minho  
Braga, Portugal

Luís Paulo Reis   
LIACC/UP  
University of Porto  
Porto, Portugal

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# Learning from Monkeys: Authorship Issues Arising from AI Technology

Jacopo Ciani<sup>(✉)</sup>

Università degli Studi di Torino, 10100 Turin, Italy  
jacopo.cianisciolla@unito.it

**Abstract.** Artificial intelligence is experiencing rapid growth, taking centre stage in R&D investments, policy-making forums and academic literature.

The protection of AI generated artwork under copyright law is only one of many policy questions across a range of issues within the intellectual property domain, considering AI as both object and subject of IP protection. However, it has already sparked debates all over the world for the re-examination of copyright legal framework. This Article wishes to contribute to this debate, addressing two research questions: (a) whether works independently created by artificial intelligence systems are eligible for copyright protection under the existing legal framework and (b) whether copyright is actually the best solution for protecting investments in robot-artists.

**Keywords:** Artificial intelligence · Machine-generated works of art · Copyright · Authorship · Autonomy

## 1 Introduction

Artificial intelligence (intelligence exhibited by machines [1], hereinafter only “AI”) is experiencing rapid growth and taking centre stage in R&D investments [2], policy-making forums [3] and academic literature [4].

Policy documents as the U.S. Government’s Report on Preparing for the future of Artificial Intelligence [5] and the draft report of the European Parliament to the Commission on Civil Law Rules on Robotics [6] surveyed its existing and potential applications, raised unanswered questions for society and public policy and made recommendations to governmental agencies and stakeholders for specific further actions.

Among them, the European Parliament called on the Commission to elaborate criteria for an “*own intellectual creation*” for copyrightable works produced through AI.

The G7 Countries as well, building on the debate initiated by the 2017 G7 ICT Ministerial in Torino, advocated the need for effective and adequate protection and enforcement of intellectual property rights among the principles, which should foster investments and trust in the Next Production Revolution and underpin growth in the global digital economy [7].

Intellectual property law [8] takes into consideration AI both as object or subject of protection. From the first point of view, the European Patent Office (EPO) released —

for the first time—Guidelines on the patentability of AI and machine learning technologies [9]. Under the second aspect, instead, scholars explored the eligibility of AI-generated works for different forms of IP protection, such as patent [10, 11], trade secrecy law [12] and—of course—copyright [13–15].

This Article wishes to contribute to the latter point of debate, addressing two research questions: (a) whether works independently created by artificial intelligence systems are eligible for copyright protection under the existing legal framework (par. Sect. 4) and (b) whether copyright is actually the best solution for protecting investments in robot-artists (par. Sect. 7).

## 2 The Automated Authorship Issue

Some scholars marked the computer authorship just as a “bad penny of a question” [16]. They claimed that the underlying problems of assigning authorship of a work to an “author”, who is causally responsible for the work’s existence, are more apparent than real: “Old-fashioned pen-and-paper works raise all the same issues; there is nothing new under the sun” [17].

On the contrary, it seems to me that the legal ownership over the results of any inventive or creative activity should be a key issue to any regime based on exclusive rights [18], therefore also to the copyright protection system [19]. Then, such a debate very clearly fits within the wider discussion around the need of re-evaluation and reform of the current copyright system.

Scholars addressing the topic in the past mostly focused either on whether copyright law permits the authorship of legal entities or on the challenges arising from instances where multiple actors are involved in the creative process [20, 21]. Until recently, instead, few studies have considered “non-human” authorship.

### 2.1 AI as a Human-Tool or as a Self-generating Source: A Matter of Autonomy

When an AI system is employed as a tool for creating a work (so-called “computer-aided works”), the individual using it will clearly be considered the author. Indeed, machine-assistance does not disqualify the human agent from being deemed the author. An example is the copyright treatment of photographs [22].

Yet, today we are in the throes of a technological revolution that may require us to rethink the interaction between computers and the creative process. Indeed, we are progressively dealing with agents, rather than simple tools [23]. More and more creative works are, in fact, the result of non-human creative processes, having been entirely [24] left up to intelligent systems.

That said, to our purposes, it is of fundamental importance to understand the level of autonomy of a machine, i.e., from the standpoint of the robotic engineer, the robot ability “*to operate in the real-world environment without any form of external control for extended periods of time*” [25]).

It may not be an easy task. Automated systems operate on several different degrees of automation (i.e. interaction between the man and the machine), according to how

much control is yielded to the human operator. The terms “in the loop”, “on the loop” or “out of the loop” are often used to distinguish between such different level of independence. It is even not unusual to find multiple degrees of autonomy depending on the kind of activity carried out by the machine. For instance, an art-creating robot can depend on a human operator for the acquisition of the previous art from which it can learn and be supervised during the manual working phase (for instance when keeping the brush in contact with the canvas). The selection of the right degree of autonomy (also referred to as dependability) may depend on several factors: (a) technological (like choosing the right balance between safety and performance), (b) social (e.g. social resistance by prospected users), (c) legal (inadequacy with respect to the legal system), or (d) ethical. On the latter point, guidance has been recently provided, among others [26], by the High-Level Expert Group on Artificial Intelligence established by the EU Commission, which recommended leaving little scope for AI’s autonomy [27].

## **2.2 Examples of Artificially Intelligent Devices as the True “Authors” of Creative Works**

Against this background, empirical evidence suggests that advanced forms of AI are able to generate new artworks, learning from inputs (pieces of art, musics, literary works etc.) provided by programmers and taking independent decisions, in a process akin to humans’ reasoning. Racter, an artificial intelligence computer program is the author of randomly generated books based on grammar, syntactical rules and vocabulary provided by the creators of the program [28] (a more recent example is Brutus, developed by Selmer Bringsjord and his collaborators [29]). In other art-related fields, it should be mentioned Aaron, a program autonomously generating drawings and paintings, which was created in the 70s by an art professor and artist [30]. Another case in point is Sony’s Flow Machines project, which has successfully created AI-written pop songs (see <http://www.flow-machines.com>). Other projects have seen AI programs writing poems and local news articles, editing photographs, and composing music [31].

Apparently, such artworks have also a significant financial value. The Portrait of Edmond de Belamy has been sold in auction at Christie’s to an anonymous bidder for \$435,000 (blowing the expected price of \$7,000 out of the water) [32]. It has been created using a generative adversarial network (GAN), trained to seek patterns in a specific dataset and then create copies under the scrutiny of a “discriminator” network which spots the difference between the original and the sample and then checks if they are passable.

All these operations endow the algorithm with a novel sense of agency as it effectively acts in lieu of a human creator and behaves like one.

## **2.3 Oversimplifying the Way in Which Automated Systems Operate Would Be a Mistake**

What is challenging here, before delving into any legal evaluation on computer authorship issues, is to fully perceive to what extent the human element (directly by



human-in the-loop interventions or indirectly at the design stage) is present in the “intelligence” demonstrated by the algorithm [33].

In order to understand that and to localise informational control in the human or machine domain, it would be advisable to adopt a taxonomy of various degrees of automation. Such an effort has been already done in the domain of computer-assisted driving. Both the NHTSA or the Society of Automobile Engineers identified 5 levels of automation, between “No-Automation, Level 0”, where the system automatically assists the driver to regain lost control of the vehicle and “Full Self-Driving Automation, Level 4”, where the driver is not expected to become involved throughout the duration of the trip.

Lacking any indication in this regard, one runs the risk of oversimplifying the way in which automated systems operate, as well as providing unclear, unreliable and incomplete answers to the question of whether non-biologic entities may have autonomous standing under copyright law.

## 2.4 A Long-Standing Issue Offering Something New

Since traditional pillars of copyright law have been the humankind’s central position in the creative universe [34] and the idea that technology represents no more than a tool in the hands of the author, such question brings to the surface serious challenges to the principles of the system.

Despite its recent appearance, the issue is not at all new. Already in 1978 the U.S. National Commission on New Technological Uses of Copyrighted Works (CONTU) addressed it. Its Final Report concluded that the development of an AI capable of independently creating works was “*too speculative to consider*” since “*there is no reasonable basis for considering that a computer in any way contributes authorship to a work produced through its use*” [35].

Today, it is easy to re-consider the situation with the benefit of hindsight and notice that CONTU’s conclusions were mistaken [36].

## 3 The Monkey’s Selfies Copyright Dispute

Few judicial rulings address what authorship means, or who is an author. Even fewer laws define authorship.

A valuable lesson in order to answer the proposed question may be given by *Naruto v David John Slater*, a popular dispute where the Northern District of California (no. 15-CV-04324) denied copyright protection to a monkey who authored self-portrait photographs [37].

This case arose out of allegations that Naruto, an Indonesian six-year-old crested macaque, took multiple selfies using Slater’s camera. The complaint, filed by two animal-friendly associations, alleged that Slater published a book with the selfies, infringing on Naruto’s copyright. The plaintiff alleged that Naruto authored the selfies by “independent, autonomous action” and was entitled to defendant’s profit from the infringement of §106 and 501 of the U.S. Copyright Act of 1976. Indeed, the Act has “no definitional limitation” and “author”, for the purpose of such legislation, may be anyone who creates an original work of authorship, including animals.

Judge W. H. Orrick, in a well supported and reasoned decision, dismissed the complaint on the grounds that Copyright Act “does not confer standing upon animals like Naruto”. Indeed, if Congress and the President intended to extend the concept of authorship to animals, it could and should have said so plainly in the Copyright Act.

Arguments have been adduced in support from *Cetacean Cmty v. Bush* [386 F.3d 1169, 1175 (2004)], where the Ninth Circuit denied that the language of the statute under scrutiny evidenced congressional intent to confer standing on animals. Moreover, the Compendium of U.S. Copyright Offices Practices issued in December 2014 repeatedly refers to “persons” or “human beings” when analyzing authorship. As further detailed in § 313.2, titled “Works That Lack Human Authorship”, “to qualify as a work of authorship a work must be created by a human being. Works that do not satisfy this requirement are not copyrightable”.

On 20 March 2016, a notice of appeal was filed to the Ninth Circuit (no. 16-15469) Court of Appeals. Even if a settlement agreement between the parties was reached, the court found there were countervailing interests requiring it to fully adjudicate the matter. On April 23, 2018, the Ninth Circuit confirmed the previous ruling.

## 4 May a Non-human Be an Author?

This ruling, with copyright for animals out of the picture, might be easily applied, at least in the U.S., to artworks made by AI. Indeed, the U.S. Copyright Office Practices at § 313.2 (3d ed. 2014) clearly states that “*the Office will not register works produced by a machine or mere mechanical process that operates randomly or automatically without any creative input or intervention from a human author*”.

Notwithstanding that copyright doctrine on authorship may reveal considerable variation in the comparison of common law and civil law systems, most national legal orders appear to agree that an author should be a human being. This is the result of the inquiry carried out by Ginsburg, exploring the concept of authorship in the US, the UK, Canada and Australia, as well as in the civil law countries of France, Belgium and the Netherlands [34].

A closer look at international conventions (par. Sect. 4.1), European Union directives (Sect. 4.2) and also at national copyright systems (Sect. 4.3) enables us to confirm this assumption.

### 4.1 International Conventions

Despite the number of international conventions in the field of copyright and neighbouring rights protection, the initial ownership of rights has not been subject to systematic international regulation so far.

The Berne Convention for the Protection of Literary and Artistic Works does not define authorship [38], nor provides guidance as to the meaning of the term “author”. It just establishes that an author is whoever says he/she is, if his/her “name appears on the work in the usual manner”, without clarifying if the person whose name appears must be a human being. Nonetheless, the leading authorities on the Berne Convention have agreed that this may be implicit [39, 40]. Indeed, both Article 6-bis and 7 of the Berne

Convention, making reference to the author's life and death (referring to the term of protection granted to the author), necessarily imply that the author can only be a physical person (similar provisions are contained in Article 23 and 25 of the Italian Copyright Act) [41, 42].

Likewise, both Article 27 of the Universal Declaration of Human Rights and Article 15 of the International Covenant on Economic, Social and Cultural Rights acknowledge to "everyone" "the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author". As clarified by the preamble, "everyone" refers to "all members of the human family".

## 4.2 EU Directives

Also at European level, Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society does not contain any definition of "author", nor of "copyright holder" and is silent on the legal capacity required in order to exercise the copyright holder's prerogatives. This silence should be interpreted in line with:

- (a) Articles 1 to 21 of the Berne Convention: although the EU is not a party to it, it is nevertheless obliged, under Article 1(4) of the WIPO Copyright Treaty, to which it is a party and which Directive 2001/29 is intended to implement, to comply (see, to that effect, judgments of 9 February 2012, *Luksan*, C 277/10, EU:C:2012:65, paragraph 59 and the case-law cited);
- (b) principles and rules already laid down in the previous Directives in force in this area (cf. Recital 20 of Dir. 2001/29/EC). In particular, Recital 13 of Directive 93/98/EEC harmonizing the term of protection of copyright and Article 4 Dir. 96/9/EC on the legal protection of databases both identify as authors respectively "one or more physical persons" or "the natural person or group of natural persons".

The adoption of the Directive 2019/790/EU of 17 April 2019 on copyright and related rights in the Digital Single Market, while includes relevant provision for the development and growth of AI in the European Union (as the mandatory copyright exception for Text and Data Mining under Articles 3 and 4), adds nothing new to this discussion.

Therefore, both international and EU legal framework, as they are currently configured, cannot vest copyright over a machine-generated work.

## 4.3 The "Intellectual" Link Between the "Work" and the "Author"

Italian Copyright Act has mainly followed the developments of relevant international and European Union law [20].

However, looking at it (as at many other national copyright systems, like the French one), may be interesting since it provides other relevant indications of the features that make one an "author".

Article 6 establishes that "Copyright shall be acquired on the creation of a work that constitutes the particular expression of an intellectual effort". This is usually understood

(according to the settled case law of the Court of Justice of the European Union, particularly in its landmark *Infopaq* decision, C-5/08, ECLI:EU:C:2009:465) as meaning that a strong link should exist between authorship and originality assessment. An original work must “bear the imprint of the author’s personality” (cf. Italian Supreme Court, 12 January 2018, no. 658).

From this perspective, the lack of the wilful intention to impress the stamp of its own personality on its artistic effort might be an argument for excluding the non-human creative activity from copyright protection. Indeed, there is large consensus that today’s AI is “weak”: it can act intelligently, but can not understand the true meaning of what it says or does [43].

#### 4.4 AI’s Lack of Legal Personhood

Nonetheless, AI’s lack of wilful intention does not appear to be a decisive argument.

Most authors agree that the willingness of the creative act is not required for a proper attribution of authorship [41]. The awarding of the author’s quality to minors and incapacitated persons may confirm this [44].

Echoing Teubner [45], nothing would prevent from creating legal actors (in this case copyright owners) by social attribution, without the need to possess any ontological human properties, such as reflexive capacities or empathy.

At this stage, however, AI and robots may be conceived as agents in contract and business law [46]. They may be also included in the class of morally accountable agents [47, 48], but they can in no way be treated as legal persons, in spite of the prevailing confusion on the legal notions of agency and personhood [46].

This certainly helps answering our first opening question. Awarding intelligent agents with copyright ownership is not and will not be a viable solution as long as the EU Parliament’s heavy criticised proposal [6] for the introduction of a specific legal status for robots will remain just a proposal.

Therefore, the authorship issue can not be solved without a legislative intervention aimed at introducing an autonomous and specific legal standing for “e-persons” (issue tracing back in the legal literature to the 1980s [49, 50]). Prior to this development, any other subsequent question, like whether an AI generated artwork could fulfil the copyright legal requirements, appears to be premature.

## 5 Positive Legal Provisions Governing Computer-Generated Artworks

If and as long as AI remains without any legal standing, the only other question which makes sense at this stage is to determine who should be the author of a machine-generated artwork.

In the *Naruto* case, there is no trace of any answer to this issue: Judge Orrick never said whether Slater was entitled to copyright in the selfies, in its quality of owner of the camera.

Some guidance may be derived looking at a few common law jurisdictions.

U.K. Copyright, Designs and Patents Act, 1988 [§ 9(3)], Irish Copyright and Related Rights Act No. 28/2000 [§2(1)] and New Zealand's Copyright Act of 1994 (§ 2) vest copyright in works “generated by a computer in circumstances such that there is no human author” in “the person by whom the arrangements necessary for the creation of the work are undertaken”. §12(3) of the UK 1988 Act also refers to the term of protection for the computer generated work as lasting for 70 years from the end of the year of creation.

However, there are serious doubts whether these provisions (occurred when today's advancements in automated creation were far from being foreseeable) could be interpreted as covering situations where the end work is created autonomously (indeed with humans not being active at all). Moreover, it is debated what “arrangements” actually means, who made them (the person who built the core AI system, or the person who trained it?), how proximate the person and their “arrangements” must be to the creation of the work and what does it happen if multiple contributors are involved in the development of the art-generating system. Much will depend on how a court would interpret this wording [22].

What we are sure of is that these provisions do not leave any room for the AI itself to be considered as an author for the purposes of copyright law. Conversely, they create a legal fiction of authorship by means of which copyright vests as a matter of law in a party who is not the author-in-fact.

## 6 Vesting Copyright in Persons Other Than Authors?

The common law system has no objections to the attribution of copyright to persons other than the author. For instance, it allows copyright law to protect the interest of professionals other than the author, such as in the case of phonograms producers or broadcasters [20, 44].

The latin-germanic copyright system struggles to cope with this tendency, since its fundamental structures rest heavily on the “intellectual” link. Thus, recognising authorship in favour of AI systems could mean disrupting the traditional notion of authorship [34, 38].

Many authors argue that this traditional “romantic” [51] view of copyright has been long abandoned [52]. At least since Dir. 2001/29, European copyright law shifted its attention towards protecting producers, investors and all those who contribute to the creation of the work in economic and financial terms rather than from the creative point of view [19, 53].

This change of perspective would be coherent with the information society's environment, characterised both by a growing dissociation between whoever engages in the creative effort and who else provides its economic funding and by the minor role played by the author's personality in the creative process.

The so-called “multiplayer model”, describing the multiple stakeholders who are involved in the process through which artworks are created by AI systems (including software programmers, data and feedback suppliers, trainers, system owners and operators, employers, etc.), shows how the efforts of traditional copyright law to identify a single author today appears inadequate and anachronistic [54].

### 6.1 The Work Made for Hire Doctrine as a Fitting Legal Ground for Bypassing the Author-in-Fact

The legal fictions of granting exclusive rights to subjects other than the “author” already exist under copyright law. A well established example is the “work-for-hire” doctrine, where the employer (or other persons for whom the work was prepared) is “taken to be” the copyright holder over the economic exploitation of the work made for hire.

This doctrine already works for vesting rights of economic utilisation in the publishers of collective works and in the producers of cinematographic works, even if the authorship should belong to the editor or to the person who has organised the production.

*Prima facie*, it looks like a fitting framework within which to situate the problem of AI authorship. Indeed, it represents an existing mechanism for directly vesting copyright in a legal person who is not the author-in-fact [55]. To machine-generated works it would be applied for the same cultural reason behind its original introduction: holding out the prospect of economic reward as an incentive [56] to whom is directly concerned with investing in artistic works. Giving exclusive rights to AI programmers and owners would work as an incentive to the future development of the AI industry.

## 7 A Conclusion: A Neighbouring Right or a *Sui Generis* Right-Type of Protection for AI-Generated Artworks

This *rationale* does not coincide with that of copyright law. Indeed, the *rationale* for granting copyright is rewarding authorship. However, authorship is not a central element when dealing with AI-generated artworks. Instead, the right *rationale* for giving exclusive rights on them seems rather to be the protection of investments.

This shows that copyright actually is not the best suited legal framework where finding protection for AI-generated artworks.

Other legal tools, commons to the EU juridical tradition, may be more fit to the purpose. In particular, EU Member States should look at two past experiences: (a) the *sui generis* right on database protection and (b) the neighbouring rights in favour of producers and broadcasters [57].

Both regimes have been used to protect different kinds of investments. Therefore, the introduction of a neighbouring right-type of protection (or a *sui generis* one) in AI-created works would take better accounts of this kind of creativity, being more consistent with past policies and regulatory choices made by the Member States in this field, rather than adapting copyright features to the specific needs of AI [8].

This solution would be also coherent with Recital 5 Dir. 2001/29/EC, when Member States recognised that “no new concepts for the protection of intellectual property are needed, the current law on copyright and related rights should be adapted and supplemented to respond adequately to economic realities”.

Such a new right should be shaped in full awareness of the existing and potential state of AI, after a careful comprehension of the various degrees of automation that may characterize the domain of computer-generated creativity (cf. par. Sect. 2.3).

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