



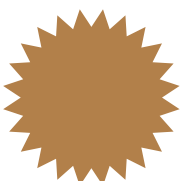
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What is artificial intelligence and why does it matter for Copyright

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WHAT IS ARTIFICIAL INTELLIGENCE AND WHY DOES IT MATTER FOR COPYRIGHT

Summary

The main purpose of this article is to show that the understanding of nature and features of artificial intelligence (“AI”) is necessary to address legal issues posed by AI in the copyright area. Although AI is widely discussed in many legal fields, scholars do not appear to pay enough attention to the nature and types of AI, its state of art and differentiation of AI with similar concepts. However, understanding the nature of any phenomenon is a necessary task to develop the rules for its regulation. For example, AI’s legal personality is the topic widely discussed nowadays by scholars and legislators. Nevertheless, most writing focuses on the philosophy of law and leaves aside the current level of AI technologies and their features, which is the foundation of establishing AI’s legal personality.

Therefore, the first part of this paper explores the nature of AI, its types and current state of art. AI is seen in the comparison with similar concepts: robots, machine learning, deep learning and neural networks. Thereafter, the types of AI are explored. Although AI is a complex technology, the issues identified do not require deep analysis of technological sources. The sources of popular science explaining the difficult concept in an intelligible way are more useful for the purposes of the current research.

Following the analysis of AI’s concept in general, the second part of this paper covers AI’s legal status. The relevant EU legislation and case law are used as the main sources to explore the current legal status of AI. While the future possible status of AI is more hypothetical and complex, the legal doctrine of different countries is examined in this respect.

Basing on the findings of two previous parts, the third one demonstrates how the nature of AI and its legal status influences copyright. Specifically, allocation of authorship and ownership of potentially copyrightable works generated by AI is a challenging task. Although many subjects are involved in the AI projects, a real creator is always AI. Therefore, this paper argues that unless AI is provided with legal personality, no authorship of works generated by AI can be attributed. What are the consequences of this for copyright? The paper finds that the current copyright system needs to be revised in order to prepare for AI-driven era and so some guidelines are suggested.

Introduction

“Now humankind stands on the threshold of an era when ever more sophisticated robots, bots, androids and other manifestations of artificial intelligence (“AI”) seem to be poised to unleash a new industrial revolution, which is likely to leave no stratum of society untouched, it is vitally important for the legislature to consider its legal and ethical implications and effects, without stifling innovation.”¹

The cited recital of the European Parliament Report with recommendations on Civil Law Rules on Robotics (**“Recommendations on Civil Law Rules on Robotics”**) is a brief summary of two issues: 1) How artificial intelligence (**“AI”**) changes and challenges society, and 2) How regulators try to respond to these challenges. While policymakers are still attempting to foresee the coming challenges for many areas of AI’s application and assess the potential consequences, intellectual property is one area where the impact is self-evident: AI generates² a host of objects that would typically be protected under copyright law.

The areas to apply creative AI are countless. AI generates big dramatic colorful paintings³ exhibited in many museums, writes novel passing through the first stage of literary competition,⁴ composes music such as 90-seconds piano melody⁵ and musicals to debut in London.⁶ “It can write movies, angsty poems, and truly awful stand-up comedy.”⁷ AI is even able to generate pieces of software’s code.⁸

In contrast with technologies development, the law has not kept up with technological progress. “Policy and law are always a step behind innovation and that is almost by design.”⁹ So far, copyright law does not provide any clear answer or even guidelines on the question of who should be deemed as an author and owner of works generated by AI. This situation is dangerous for the AI industry. Due to lack of legal certainty, companies and natural persons can be demotivated to invest monetary and creative efforts to the development of AI systems. This, in turn, could disrupt the progress in this area of AI’s application. To

¹ European Parliament Report with Recommendations on Civil Law Rules on Robotics as of 27 January 2017

< <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A8-2017-0005+0+DOC+XML+V0//EN> > accessed 12 July 2018, [*“Recommendations on Civil Law Rules on Robotics”*], Recital B

² Whereas protection of AI’s works is questionable, the term “generate” instead of “create” is deemed more appropriate

³ Jane Wakefield, ‘Intelligent Machines: AI Art is Taking On the Experts’ (BBC News, 18 September 2015)

< <https://www.bbc.com/news/technology-33677271> > accessed 26 November 2018

⁴ Olewitz Chloe, ‘A Japanese AI Program Just Wrote a Short Novel, and It Almost Won a Literary Prize’ (Digital Trends, 23 March 2016) < <https://www.digitaltrends.com/cool-tech/japanese-ai-writes-novel-passes-first-round-national-literary-prize/> > accessed 26 November, 2018

⁵ Brandom Russell, ‘Google’s Art Machine Just Wrote Its First Song’ (The Verge, 1 June 2016)

< <https://www.theverge.com/2016/6/1/11829678/google-magenta-melody-art-generative-artificial-intelligence> > accessed 26 November, 2018

⁶ Mark Brown, ‘World’s First Computer-generated Musical to Debut in London’ (The Guardian, 1 December 2015)

< <https://www.theguardian.com/stage/2015/dec/01/beyond-the-fence-computer-generated-musical-greenham-common> > accessed 26 November, 2018

⁷ Robert Hart, ‘If an AI Creates a Work of Art, Who Owns the Rights to It?’ (Quartz, 15 August 2017) < <https://qz.com/1054039/google-deepdream-art-if-an-ai-creates-a-work-of-art-who-owns-the-rights-to-it/> > accessed 26 November, 2018

⁸ Jade Boyd-Rice, ‘New A.I. Application Can Write Its Own Code’ 25 (Futurity, 25 April 2018)

< <https://www.futurity.org/artificial-intelligence-bayou-coding-1740702/> > accessed 26 November, 2018

⁹ Carole Piovesan in Amanda Jerome, ‘Artificial Intelligence ‘Game Changer’ for IP Law, Legal Experts Say (The Lawyer’s Daily, 2 March 2018) < <https://www.thelawyersdaily.ca/articles/5955/artificial-intelligence-game-changer-for-ip-law-legal-experts-say> > accessed 26 November, 2018

avoid this, copyright law should develop alongside technologies. “AI is a game changer. The very essence of intellectual property has to be revaluated.”¹⁰

The described issue is the result of uncertainty with AI’s legal status. Current copyright system rewards creators by granting them moral and exclusive proprietary rights in their works. Under the economic analysis of law, the main purpose of this reward is “to provide adequate incentives for the creation of a socially optimal output of intellectual products.”¹¹ When it comes to AI, the situation is more difficult. Does the incentives to create new works apply to AI, given its impossibility to enjoy the rights or incur obligations. In other words, providing AI with intellectual property rights should be analyzed with regard to its legal personality.

In turn, the legal status of AI should be defined on the basis of its possibilities and features. It is extremely important to understand the nature of any phenomenon in order to develop effective rules for its regulation. Therefore, the first part of this paper will primarily explore the nature of AI, its types and current state of art. Following the analysis of AI’s concept in general, the second part will cover the AI’s legal status. Finally, the third part will provide some conclusions on how the legal status of AI challenges the rules of copyright allocation.

1. What is Artificial Intelligence

AI is a current trend; everyone speaks about it. However, only a very small number of people understand what AI really entails. The term is actually used to combine many concepts such as neural networks, robots, machine learning, and deep learning.¹² Although these concepts are similar and may overlap, they are not identical.

The difficulties with the perception of AI technologies does not, however, prevent a discussion of the challenges posed by AI. Yet without comprehension of AI, effectively responding to these challenges is impossible. Without understanding the nature of a threat, the fight against it is already lost.

Providing a comprehensive definition of AI is a difficult task. The European Parliament specified in its Recommendations on Civil Law Rules on Robotics: “There is a need to create a generally accepted definition of robot and AI that is flexible and is not hindering innovation.”¹³ This statement shows the challenges for those bravehearts who try to develop the definition of AI: general acceptance for a myriad of industries using AI, flexibility for extremely fast technological development and in the same time making this development possible.

The current paper does not intend to provide a universal definition of AI. This task should be resolved within the scope of a separate interdisciplinary research, taking into consideration social, economic, legal,

¹⁰ See *Jerome*, above fn. 9

¹¹ Edwin C. Hettinger, ‘Justifying Intellectual Property’ (1989) 18(1) PPA

¹² John Pavlus, ‘Stop Pretending You Really Know What AI is and Read This Instead’ (Quartz Media, 6 September 2017)

< <https://qz.com/1067123/stop-pretending-you-really-know-what-ai-is-and-read-this-instead/> > accessed 26 November, 2018

¹³ See *Recommendations on Civil Law Rules on Robotics*, Recital C

ethical, technological and many other aspects. Understanding AI as a “technology performing some tasks that would otherwise require human intelligence”¹⁴ is sufficient for the purposes of this paper.¹⁵ More importantly for the purposes of this paper is a comparison of AI with similar concepts: neural networks, machine learning, deep learning, robots. And even more crucial is an understanding of the constitutive features of AI, its types, and state of art in the AI industry. As the statement of the European Parliament already distinguished AI and robots, it is deemed reasonable to start with them.

Robots are the most frequently confused and interchanged with AI as both robots and AI substitute some of the human functions and have some level of autonomy. However, AI and robots are not synonyms. The difference can be explained as follows: “AI is a reference to the software that manifests intelligence, whereas robots infer a physical element, a shell which carries out the decisions made by the AI engine behind it. Not every AI needs a robot to carry out its functions, and retrospectively, not every robot needs true AI to power its functionality.”¹⁶

The term ‘robotics’ gets used under the AI banner, but not all the robots are ‘smart’.¹⁷ Requiring a robot to ‘think’ suggests that it has some level of artificial intelligence.¹⁸ Because of this, the first comparison coming into the mind when thinking about AI and robots are the human body and brain. However, it is not a precise analogy because the human body and brain cannot properly function separately from each other, while AI and robots can. AI can be a possible but not an inherent part of the robot. “Even when AI is used to control robots, the AI algorithms are only part of the larger robotic system, which also includes sensors, actuators, and non-AI programming.”¹⁹ On the other hand, AI does not need any physical appearance such as a robot to complete tasks that would otherwise require human intelligence. Moreover, most AI programs are not used to control robots.²⁰ Instead of this, AI algorithms are implemented in the product we use every day: Google’s search and Google’s translate, Gmail spam filter and e-mails’ categorization, Amazon’s recommendations’ system.²¹

Machine learning is another concept often being understood as equal to AI. However, this understanding is not correct. In 1959, Arthur Samuel defined machine learning as “the ability to learn without being explicitly programmed.”²² Machine learning is a current application of AI based on the idea that we should just give machines access to data and let them learn for themselves.²³ At its foundation, machine learning is

¹⁴ Benedict Dellot and Fabian Wallace-Stephens, ‘What is the Difference Between AI&Robotics?’(Medium, 17 September 2017) < <https://medium.com/@thersa/what-is-the-difference-between-ai-robotics-d93715b4ba7f>> accessed 26 November, 2018

¹⁵ As explained further, it includes intelligence limited to resolving specific tasks rather than general thinking as a human

¹⁶ Ben Dickson, ‘What is Narrow, General and Super Artificial Intelligence’ (Tech Talks, 12 May 2017)

< <https://bdtechtalks.com/2017/05/12/what-is-narrow-general-and-super-artificial-intelligence/>> accessed 26 November, 2018

¹⁷ Dell Technologies, ‘The Difference Between AI, Machine Learning and Robots’ <<https://www.delltechnologies.com/en-us/perspectives/the-difference-between-ai-machine-learning-and-robotics/>> accessed 26 November, 2018

¹⁸ Alex Owen-Hill, ‘What’s the Difference Between Robotics and Artificial Intelligence?’ (Robotiq, 19 July 2017)

< <https://blog.robotiq.com/whats-the-difference-between-robotics-and-artificial-intelligence> > accessed 26 November, 2018

¹⁹ Ibid

²⁰ Ibid

²¹ Gautam Narula, ‘Everyday Examples of Artificial Intelligence and Machine Learning’ (TechEmergence, 22 July 2018) < <https://www.techemergence.com/everyday-examples-of-ai/>> accessed 26 November, 2018

²² Ibid

²³ Ibid

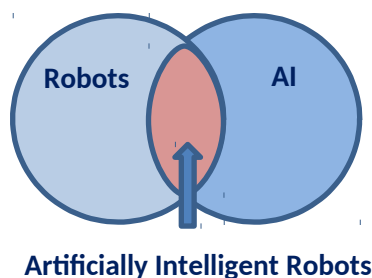
a subset and way of achieving true AI,²⁴ but not the AI itself. All machine learning is AI, but not all AI is machine learning. While machine learning is often described as a sub-discipline of AI, it's better to think of it as the current state-of-the-art – it's the field of AI which today is showing the most promise at providing tools that industry and society can use to drive change.²⁵

Deep learning is a subset of machine learning.²⁶ While machine learning is the advanced field of AI, the deep machine learning is the cutting-edge of the cutting-edge.²⁷ “Of all the AI disciplines, deep learning is the most promising for one day creating a generalized AI.”²⁸ What makes deep machine learning so sophisticated is the use of artificial neural networks and availability of big data.

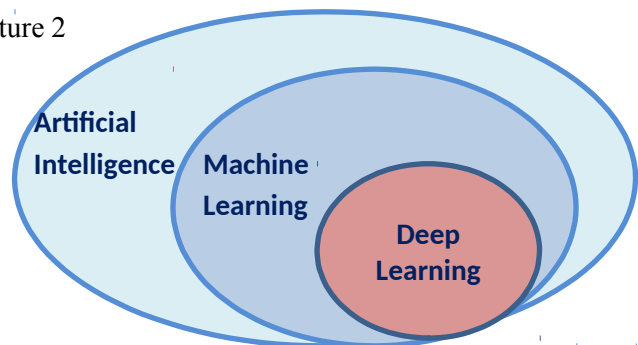
Artificial neural networks are the algorithms used in deep learning. Typical machine learning needs to be told how to make an accurate prediction using the data it is fed. In contrast, deep learning is designed to function like a human brain, using neural networks algorithms to process information as a human would.²⁹ Indeed, the algorithms are inspired by our understanding of the biology of our brains – all those interconnections between the neurons.³⁰ “The development of neural networks has been a key to teaching computers to think and understand the world in the way we do while retaining the innate advantages they hold over us such as speed, accuracy, and lack of bias.”³¹

To summarize the interrelation between AI, robots, machine learning, deep learning, and neural network, a graphic representation can be useful. The interrelation between AI and robot is represented as partly overlapping circles as on picture 1.³² For AI, machine learning and deep machine learning the correlation is presented as concentric circles as on picture 2. While neural networks are an inevitable part of deep learning, for the interests of simplicity in this research they are represented interchangeably.

Picture 1



Picture 2



²⁴ Mike Colagrossi, 'What's the Difference Between A.I., Machine Learning, and Robotics?' (BigThink, 28 May 2018) <<https://bigthink.com/mike-colagrossi/whats-the-difference-between-ai-machine-learning-and-robotics>> accessed 26 November, 2018

²⁵ Bernard Marr, 'What is the Difference Between Artificial Intelligence and Machine Learning?' (Forbes, 6 December 2016) <<https://www.forbes.com/sites/bernardmarr/2016/12/06/what-is-the-difference-between-artificial-intelligence-and-machine-learning/#5a2307522742>> accessed 26 November, 2018

²⁶ See *Dell Technologies*, above fn. 25

²⁷ See *Marr*, above fn. 33

²⁸ See *Colagrossi*, above fn. 32

²⁹ See *Dell Technologies*, above fn. 25

³⁰ Michael Copeland, 'The Difference Between Artificial Intelligence, Machine Learning, and Deep Learning' (NVIDIA blog, 29 July, 2016) : < <https://blogs.nvidia.com/blog/2016/07/29/whats-difference-artificial-intelligence-machine-learning-deep-learning-ai/>> accessed 26 November, 2018

³¹ Ibid

³² See *Owen-Hill*, above fn. 26

The analysis provided above demonstrates the complexity of AI's definitions and differences between the concepts usually labelled as AI. These differences can have a crucial meaning for developing the rules to regulate the mentioned concepts. Therefore, the main purpose of this analysis is to select the specific object to be analyzed in this research and to describe its main features.

Consequently, this paper will deal with the most promising subset of AI – deep machine learning. While all the analyzed concepts have some level of autonomy, deep learning is the one that is the most independent from a human. More precisely, the level of human control of deep learning algorithms is minimal. “As long as learning algorithms are running, humans are not really controlling how they are combining and comparing data.”³³ The other important feature of deep learning algorithms is the lack of transparency. The general principle of these algorithms can be described as “transforming inputs to outputs through a black box.”³⁴ In other words, it is a fast, automatic and not intuitively explanatory self-learning mechanism.³⁵ While AI constantly does self-learning, the possible output is difficult to predict and explain. The current paper will define the legal status of AI taking into consideration the specified features of deep machine learning – the minimal level of human control and lack of transparency.

Besides features of AI, it is important to mention that the only **form of AI** that humanity has achieved so far is the **narrow AI**.³⁶ “In essence, narrow AI works within a limited context, and can't take on tasks beyond its field. For example, the AI making a transcription of audio and video files cannot order a pizza unless it is reprogrammed. That's the task of another AI.”³⁷ In other words, narrow AI cannot adapt dynamically to novel situations outside the scope of its programming.³⁸ Although using artificial neural networks algorithms and constantly doing self-learning, so far AI can do it only within the scope of its function programmed by the developer. “Even IBM's Watson, perhaps the most impressive demonstration of machine intelligence to date, does not come close to anything that my reasonably compared to human-alike intelligence.”³⁹

In contrast, the human-alike or **general intelligence** is the other type of AI and at the same time the next step of its development. “General AI is the type of AI that can understand and reason its whole environment as a human would.”⁴⁰ This type is not expected to be developed in the near-term future. “General human intelligence allows a person to react based on a situation, treat events with a logical and an emotional approach while machines can't do the same, at least for the next few decades.”⁴¹ Following that, the

³³ Cary Coglianese and David Lehr, ‘Regulating by Robot: Administrative Decision Making in the Machine-Learning Era’ (2017). Faculty Scholarship .1734. <https://scholarship.law.upenn.edu/faculty_scholarship/1734/> accessed 26 November, 2018

³⁴ Ibid

³⁵ Ibid

³⁶ See *Dickson*, above fn. 16

³⁷ Ibid

³⁸ Peter Voss, ‘From Narrow to general AI’ (Medium, 4 October 2017) < <https://medium.com/intuitionmachine/from-narrow-to-general-ai-e21b568155b9> > accessed 26 November, 2018

³⁹ Martin Ford, *The Rise of the Robots. Technology and Threat of Mass Unemployment* (Oneworld Publications 2016) 225-226

⁴⁰ See *Dickson*, above fn. 16

⁴¹ NeuroGadget, ‘Difference Between General AI and Narrow AI’ (Neurogadget, 08 March 2018)

< <https://neurogadget.net/2018/03/08/difference-general-ai-narrow-ai/56652> > accessed 26 November, 2018

emergence of **superintelligence**, “any intellect that greatly exceeds the cognitive performance of human in virtually all domains of interest,”⁴² is even more remote event in the human history.

Summarizing, the paper will define the current legal status of AI taking into consideration the level of AI technologies and focus on the narrow AI rather than a general one or superintelligence. This kind of AI is always limited to the scope of its programming and training.

2. *Current Legal Status of Artificial Intelligence*

Principally, AI is a creation of its developer’s mind. Namely, a programmer develops the AI’s algorithms. It is argued that the description of these algorithms is protected as software under existing copyright law. Software enjoys copyright protection as literary work under international treaties,⁴³ the US⁴⁴ and EU⁴⁵ legislations. The EU legislation, the Computer Programs Directive 2009/24/EC of 23 April 2009,⁴⁶ does not provide an explanatory definition of copyrightable software, but analysis of the CJEU case law in this regard⁴⁷ shows that any expression of a computer program is protected if this expression enables a computer to perform a task or carry out a function. Certainly, the only currently existing type of AI, narrow AI, falls into this category of protected work. Although the outcome is difficult to predict due to constant AI’s self-learning, it does not prevent from establishing the task or function of AI. In other words, AI’s function is not equal to AI’s outcome. Software developer creates a specific framework for AI, which transforms inputs to the desired outputs. While learning, this ‘framework’ does not change.⁴⁸ Therefore, narrow AI falls into the definition of a computer program under the EU law and thus shall enjoy copyright protection. This conclusion is also supported by the purposes of copyright law, which can be generally described as establishing the right balance between the society’s and authors’ interests. While the progress of AI industry is rather demanded and welcomed, AI’s developers should be economically and morally rewarded to be motivated for their creations.

Nevertheless, since the end of the last century, scholars pose the question if AI can be deemed as a legal subject.⁴⁹ At the time, this argument was perceived as science fiction rather than a real concept. Nowadays, this future is here. The idea to provide AI with a legal personality is finding increasing support. It can be justified by AI’s autonomy and independence, and lack of control by humans. However, the most important reason of the popularity of this concept’s is the fast progress of AI technologies. AI is already able to recreate itself. For example, “Google’s automated machine learning system recently crafted

⁴² Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies* (Oxford University Press 2014) 21

⁴³ See: Agreement on Trade-Related Aspects of Intellectual Property Rights (April 15, 1994) <https://www.wto.org/english/docs_e/legal_e/27-trips.pdf> accessed 26 November, 2018 [“TRIPS Agreement”] art 10 and WIPO Copyright Treaty, (December 20, 1996), WIPO Doc. CRNRIDC/94 [“WIPO Copyright Treaty”] art 4

⁴⁴ US Copyright Act of 1976, 17 U.S.C. § 101

⁴⁵ Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs (Codified version) [2009] OJ L 111 [“Computer Programs Directive”]

⁴⁶ Ibid

⁴⁷ See *Computer Program Directive*, recitals 7 and 11; art. 1(2) and 1(3) and Case C-393/09 *Bezpečnostní Softwarová Asociace - Svaz Softwarové Ochrany v Ministerstvo Kultury* [2011] OJ C 63 paras 47 and 65

⁴⁸ Stuart Russel and Peter Norvig, *Artificial Intelligence A Modern Approach* (Pearson, 2014) 55-59

⁴⁹ Lawrence B. Solum, ‘Legal Personhood for Artificial Intelligences’ 70 N.C. L. Rev. 1231 (1992)

<<http://scholarship.law.unc.edu/nclr/vol70/iss4/4>> accessed 26 November, 2018

machine-learning codes more efficient than the codes that built its own system. The student has now become the teacher.”⁵⁰ Therefore, creation of general AI is just a matter of time, and probably not much time. Consequently, the European Parliament proposed to analyze and consider as a possible legal solution:

*“creating a specific legal status for robots in the long run, 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, and possibly applying electronic personality to cases where robots make autonomous decisions or otherwise interact with third parties independently.”*⁵¹

The proposal mentions the most sophisticated autonomous robots as those to be provided with legal personality. Following the distinctions provided in the first part of this paper, it can be assumed that the proposal deals with Artificially Intelligent Robots. Therefore, it covers a combination of two concepts: robot and AI. However, it is not clear whether this combination can be deemed as a legal subject. AI is a necessary part of robot’s autonomy and smartness, thus, it is undisputed that AI is an inevitable and crucial element of the proposed legal personality. “For the legal specification, as long as the robot is not an autonomous functioning system, the question of legal personality is not relevant.”⁵² On the other hand, the physical capsule of AI, robot, enables it to interact with the environment and to act independently. However, it is doubtful if this element is so crucial for AI’s legal personality. First, AI can have a difficult physical cover starting with humanoid-looking machines, ending with cars, houses, and any other material thing. Second, AI can act independently and create legal connections, without any physical cover. Therefore, it is questionable if the ‘robot’ element is necessary for this new legal category. However, for the current research it is enough to consider that, with or without physical cover, AI is the main element of the suggested new legal person. The more important question is what kind of AI should be included within the scope of the proposal: narrow, general or both. Arguably, the narrow AI shall be excluded from the mentioned scope.

In a very general way, “to be a legal person is to be a subject of rights and duties.”⁵³ The principal purpose of legal personality conferred on whomever or whatever, is to facilitate the regulation of human conduct by an organized society.⁵⁴ Therefore, the crucial question is whether providing AI with legal personality is inevitable and the only way of regulating a society permeated by AI technologies. This question is to be answered for a great deal based on AI’s autonomy.⁵⁵ “The freedom of decision is the ethical and legal background of the responsibility we have as natural beings. Individuals are sovereign in their decisions and

⁵⁰ Shelby Rogers, ‘Google’s AI Now Creates Code Better than its Creators’ (Interesting Engineering, 18 October 2017) < <https://interestingengineering.com/googles-ai-now-creates-code-better-than-its-creators> > accessed 26 November, 2018

⁵¹ See *Recommendations on Civil Law Rules on Robotics*, para 59 (f)

⁵² Robert van den Hoven van Genderen, ‘Robot as a Legal Entity, Legal Dream or Nightmare?’ in: Schweighofer et al., Tagungsband IRIS 2017, 161 – 170 (Vol. IRIS 2017). Salzburg: Amalthea Signum Verlag

⁵³ Bryant Smith, ‘Legal Personality’ (1928) Yale Law J 37(3):283–299

⁵⁴ S.M. Solaiman, ‘Legal Personality of Robots, Corporations, Idols and Chimpanzees: a Quest for Legitimacy’ Artif Intell Law (2017) 25:155–179, reference to Smith, above fn. 62

⁵⁵ See Robert van den Hoven van Genderen, above fn. 52

therefore legally responsible for their actions.”⁵⁶ Because of freedom in decision-making and its almost unlimited scope, the law establishes rights and obligations of legal subjects to regulate their behavior.

When it comes to AI, the level of AI’s autonomy will define its legal status. Although narrow AI can generate a lot of fascinating results due to a self-learning mechanism, this type of AI is always limited to the programmed scope. Narrow AI embeds the programmer’s solution to the (perceived) narrow problem that they are designed to solve.⁵⁷ “Typically, in order to change or expand functionality requires either additional programming or retraining (and testing) with a new dataset.”⁵⁸ Whatever capabilities narrow AI has, they are pretty much frozen in time.⁵⁹ Therefore, although narrow AI can have some autonomy, it is always limited to the scope of its function or purpose. Consequently, narrow AI is nearly always controlled by its developer (through programming) or user (through assisting in AI’s learning). With this limited scope of autonomy and decision-making, narrow AI itself or as a part of robot system cannot be considered as a legal person.

Whether the general AI, once created, can be potentially be granted legal personality is the issue for separate research. Yet this question is fundamental and needs to be resolved taking into consideration social, economic, ethical and legal grounds. The most important conclusion for the purposes of this paper is the that AI’s legal personality depends on the level of its autonomy. While the existing type of AI, narrow AI, is always limited to the scope of its programming and thus dependent from human, it cannot be deemed as a legal subject.

3. AI’s Legal Status and Copyright

While narrow AI – the only type that currently exists – does not have legal personality, it cannot be deemed as a copyright holder of works it generates. However, besides AI itself, there are many subjects involved in AI projects and that make them possible: AI’s developer, AI’s user, holder of AI’s dataset. Although all these subjects form part of AI’s system, none of them are independently or jointly deemed as independent creators of AI’s generated works.⁶⁰ Due to AI’s autonomy and lack of transparency, the subjects involved do not fully control and predict the outcome of AI’s functioning. The only true creator is therefore the AI. Thus, until AI is provided with legal personality, there is no author of AI’s generated work. What are the consequences of this conclusion?

⁵⁶ Ibid

⁵⁷ See Voss, above fn. 38

⁵⁸ Ibid

⁵⁹ Ibid

⁶⁰ While the focus of this paper is AI’s nature and legal status and their influence on copyright, it does not provide a detailed analysis of the roles of subjects involved into AI projects. However, since the end of the last century scholars analyze different approaches to allocate authorship and ownership of works generated by AI: AI’s developer, AI’s operator, joint authorship of AI’s developer and operator, AI itself, commissioner of works generated by AI, owner of dataset provided to AI and no one.

First, lack of authorship and the human creator does not necessarily lead to the lack of protection.⁶¹ While society has an interest in the creation and dissemination of works generated by AI, existing laws should be amended to provide protection for such works. The main argument to support ‘copyrightability’ of AI’s generated work is providing incentives for its creation. AI’s generated work is the result of inputs, efforts, and resources provided by AI’s developer, operator, data’s owner and most probably of entity commissioned the whole project. If the society can “free ride” on it’s creations and easily have access to work generated by AI without any payment, it disincentivises investment in developing creative AI. To avoid this, AI’s generated works should be protected. The European Parliament already admitted that existing copyright system should be adapted for AI’s generated works: “*the elaboration of criteria for "own intellectual creation" for copyrightable works produced by computers or robots is demanded.*”⁶²

Second, the rules of ownership allocation should be revised given the challenges posed by AI. Historically, the initial ownership of copyrightable works is vested to their authors. Indeed, providing authors with ownership is reasonable under copyright justifications such as personality, fairness, welfare, and culture.⁶³ Creating works is important due to many reasons: society’s flourishing, labor reward, protection of a person’s natural rights, culture development. For securing these interests, the copyright system provides an effective instrument – exclusive rights (personality theory adds moral rights to this). Without creators and their intellectual efforts, development of new objects would not be possible. Therefore, creator is a central figure who shall be provided with exclusive rights and thus secure the mentioned interests. However, AI challenges this assumption.

It is argued that the existing strong bond between authorship and ownership has to be reevaluated, in order to prepare copyright law for data-driven and AI era. Instead of trying to allocate authorship of works generated by AI, policymakers should focus on a system to economically reward of subjects who make possible AI-generate creative outcome. In case of AI’s application, the subject who enabled AI to function in a specific way is the one who enabled the work to be created. That subject had the intention to make AI generate copyrightable works and, most importantly, invested money and time to that aim. Thus, providing copyright ownership to this subject would maximize social benefit and cultural dissemination.

AI projects are highly complex and risky. To enable AI to generate an outcome at least three main elements are required: AI itself, data pool and training of AI with data. What is more important, however, is that the desired outcome of AI’s use cannot be accidental; it requires preliminary planning and preparation. Narrow AI is limited to the scope of its programming, it is not universal and cannot be applied for any outcome. To make AI generate the desired outcome, AI’s function has to be developed in a specific way, data pool has to

⁶¹ The main issue with copyrightability of AI’s generated works is the originality requirement. Under the EU legislature in respect of computer programs and databases (see *Computer Programs Directive*, art 1(3) and *Database Directive*, art 3(1)) and under the CJEU case law in respect of other objects (see Case C-5/08 *Infopaq International v. DanskeDagblades Forening* [2009] OJ C 220, para 36) to be original a work should be the ‘author’s own intellectual creation’. While for traditional copyrightable works this requirement is easily fulfilled, for works generated by AI it poses a problem.

⁶² See *Recommendations on Civil Law Rules on Robotics*, explanatory statement

⁶³ See here: CopyrightX, ‘Theories of IP Law. Mind Maps For US Copyright Law Course’ (Harvard Law School, 12 December 2017) < <http://ccb.ff6.mwp.accessdomain.com/Maps/IPTheories.html> > accessed 26 November 2018

be chosen carefully and AI's training has to be directed to make AI generate expected results. Thus, generating works by AI require an intention to engender the specific result and gather all the necessary resources for that task. In other words, the subject who takes the initiative and the risk of investing is the one who makes the outcome of AI's use possible.

The idea to provide investors with exclusive rights is not new. "The need to reward those who bring innovations to the market has always been part of the realities of the intellectual property system, even if not part of the sentimental ideology that pervades public thinking about intellectual property."⁶⁴ Copyright law also provides incentives for those who invested and/or commissioned the creation of works. Providing initial copyright to the person who ordered copyrightable work under the 'work-made-for-hire' doctrine is the best examples of it. Another example is the database 'sui generis' right. This right is granted in order to reward substantial investments to database production rather than its creation. The other example is the protection of neighboring rights provided to so-called "auxiliaries" (the performers, producers of phonograms and broadcasting organizations).⁶⁵ Protection of these types of rights is explained by several reasons.

The first argument is to provide incentives to works' dissemination. "Perhaps the best reason to allocate ownership interests to someone, however, is that someone must be motivated, if not to create the work, then to bring it into public circulation."⁶⁶ "Works of the mind are created in order to be disseminated among as many people as possible. This cannot be done generally by the author himself, it requires intermediaries whose professional capability gives to the works those forms of presentation that are appropriate to make them accessible to a wide public."⁶⁷ "Bringing a product to market often requires risk and financial investment, as marketing and product production can be costly. If there is no financial upside to bringing the product to market or to the public, then the product will likely never find its way to the world. This result is problematic from the perspective that society generally has an interest in works being made available to the public."⁶⁸

The second reason is to enable the production of works. For example, the object of database 'sui generis' right is to ensure the protection of any investment in obtaining, verifying or presenting the contents of a database, in other words, its producing, because such investment may consist in the deployment of financial resources and/or the expending of time, effort, and energy.⁶⁹ 'Work-made-for-hire' doctrine is the other illustration of rewarding investments into works' production. Employers or commissioners plan a creation of new works, provide material resources and incentives to authors and invest in it by other means. Often

⁶⁴ Pamela Samuelson, 'Allocating Ownership Rights in Computer-Generated Works' (1985) 47 U. Pitt. L. Rev. 1185
< <https://scholarship.law.berkeley.edu/facpubs/1067/>> accessed 26 November, 2018

⁶⁵ WIPO Intellectual Property Handbook (WIPO Publications, 2004, 2nd edition, reprinted 2008) [*"WIPO IP Handbook"*] 41

⁶⁶ See Samuelson, above fn. 64

⁶⁷ See *WIPO IP Handbook* 46

⁶⁸ Böhler, Helene Margrethe, 'EU Copyright Protection of Works Created by Artificial Intelligence Systems' (The University of Bergen, Master's Thesis, 2017)

⁶⁹ See Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases [1996] JO L 77 [*"Database Directive"*], recital 40

works would not be created without providing to authors financial stability and rewards. The investments of employer or commissioner are even more important in long lasting and global projects, which require the involvement of efforts of different teams, financing the project from the beginning and taking relevant risks.

Eventually, providing financial incentives to subjects who take initiative and risks of investments in AI projects is arguably the ultimate goal of assigning copyright ownership to them. The policy solution should be reasonable not only in terms of doctrine but also in terms of realities it is supposed to regulate. AI projects are complex and consist of several elements: AI program, AI dataset and AI training. The quality of all these elements individually and in combination would define the success of the whole project. In turn, this quality depends on substantial material expenses, human, digital and other resources involved and ability to organize them all together to receive the expected result. Therefore, copyright law should provide incentives to those who succeed in this difficult task. Providing these subjects with exclusive rights would encourage the progress of AI industry. It would also develop culture through the dissemination of AI generated works and producing other forms of creativity. Overall, this would maximize the social benefit and enrich a cultural heritage.

Conclusion

AI, with or already without assistance of humans, is creating a new reality. Policymakers apply two approaches to adjust the law to a new phenomenon: they either employ existing concepts to it or develop new regulations. This paper demonstrates that revising current law is a preferable solution for AI invading into the area of creativity.

AI challenges the very essence of copyright law. Achievements of AI's industry made possible creation of potentially copyrightable works without any real creator. While all the existing approaches try to imbed creative AI into existing copyright rules, the copyright system should be revised instead. The law should be as innovative as technologies it is supposed to regulate.

BIBLIOGRAPHY

LEGISLATION

Treaties

- Agreement on Trade-Related Aspects of Intellectual Property Rights (15 April 1994)
- WIPO Copyright Treaty (December 20, 1996)

Directives

- Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs (Codified version) [2009] OJ L 111
- Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases [1996] JO L 77

CJEU Cases

- Case C-5/08 *Infopaq International v. DanskeDagblades Forening* [2009] OJ C 220
- Case C-393/09 *Bezpečnostní Softwarová Asociace - Svaz Softwarové Ochrany v Ministerstvo Kultury* [2011] OJ C 63

US Law

- US Copyright Act of 1976, 17 U.S.C.

BOOK AND ARTICLES

- Alex Owen-Hill, 'What's the Difference Between Robotics and Artificial Intelligence?' (Robotiq, 19 July 2017) < <https://blog.robotiq.com/whats-the-difference-between-robotics-and-artificial-intelligence> >
- Ben Dickson, 'What is Narrow, General and Super Artificial Intelligence' (Tech Talks, 12 May 2017) < <https://bdtechtalks.com/2017/05/12/what-is-narrow-general-and-super-artificial-intelligence/> >
- Benedict Dellot and Fabian Wallace-Stephens, 'What is the Difference Between AI&Robotics?' (Medium, 17 September 2017) < <https://medium.com/@thersa/what-is-the-difference-between-ai-robotics-d93715b4ba7f> >
- Bernard Marr, 'What is the Difference Between Artificial Intelligence and Machine Learning?' (Forbes, 6 December 2016) < <https://www.forbes.com/sites/bernardmarr/2016/12/06/what-is-the-difference-between-artificial-intelligence-and-machine-learning/#5a2307522742> >

- Bøhler, Helene Margrethe, 'EU Copyright Protection of Works Created by Artificial Intelligence Systems' (The University of Bergen, Master's Thesis, 2017)
- Brandom Russell, 'Google's Art Machine Just Wrote Its First Song' (The Verge, 1 June 2016) <<https://www.theverge.com/2016/6/1/11829678/google-magenta-melody-art-generative-artificial-intelligence>>
- Bryant Smith, 'Legal Personality' (1928) Yale Law J 37(3):283–299
- Cary Coglianese and David Lehr, 'Regulating by Robot: Administrative Decision Making in the Machine-Learning Era' (University of Pennsylvania Law School, 2017) Faculty Scholarship.1734. <https://scholarship.law.upenn.edu/faculty_scholarship/1734/>
- Chris Woodford, 'Neural Networks' (ExplainThatStuff, 14 March 2018) <<https://www.explainthatstuff.com/introduction-to-neural-networks.html>>
- Dell Technologies, 'The Difference Between AI, Machine Learning and Robots' <<https://www.delltechnologies.com/en-us/perspectives/the-difference-between-ai-machine-learning-and-robotics/>>
- Gautam Narula, 'Everyday Examples of Artificial Intelligence and Machine Learning' (TechEmergence, 22 July 2018) <<https://www.techemergence.com/everyday-examples-of-ai/>>
- Jade Boyd-Rice, 'New A.I. Application Can Write Its Own Code' 25 (Futurity, 25 April 2018) <<https://www.futurity.org/artificial-intelligence-bayou-coding-1740702/>>
- Jane Wakefield, 'Intelligent Machines: AI Art is Taking On the Experts' (BBC News, 18 September 2015) <<https://www.bbc.com/news/technology-33677271>>
- John Pavlus, 'Stop Pretending You Really Know What AI is and Read This Instead' (Quartz Media, 6 September 2017) <<https://qz.com/1067123/stop-pretending-you-really-know-what-ai-is-and-read-this-instead/>>
- Lawrence B. Solum, 'Legal Personhood for Artificial Intelligences' 70 N.C. L. Rev. 1231 (1992) <<http://scholarship.law.unc.edu/nclr/vol70/iss4/4>>
- Mark Brown, 'World's First Computer-generated Musical to Debut in London' (The Guardian, 1 December 2015) <<https://www.theguardian.com/stage/2015/dec/01/beyond-the-fence-computer-generated-musical-greenham-common>>
- Martin Ford, *The Rise of the Robots. Technology and Threat of Mass Unemployment* (Oneworld Publications 2016)
- Michael Copeland, 'The Difference Between Artificial Intelligence, Machine Learning, and Deep Learning' (NVIDIA blog, 29 July, 2016) <<https://blogs.nvidia.com/blog/2016/07/29/whats-difference-artificial-intelligence-machine-learning-deep-learning-ai/>>
- Mike Colagrossi, 'What's the Difference Between A.I., Machine Learning, and Robotics?' (BigThink, 28 May 2018) <<https://bigthink.com/mike-colagrossi/whats-the-difference-between-ai-machine-learning-and-robotics>>
- NeuroGadget, 'Difference Between General AI and Narrow AI' (Neurogadget, 08 March 2018) <<https://neurogadget.net/2018/03/08/difference-general-ai-narrow-ai/56652>>
- Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies* (Oxford University Press 2014)
- Olewitz Chloe, 'A Japanese AI Program Just Wrote a Short Novel, and It Almost Won a Literary Prize' (Digital Trends, 23 March 2016) <<https://www.digitaltrends.com/cool-tech/japanese-ai-writes-novel-passes-first-round-national-literary-prize/>>

- Pamela Samuelson, 'Allocating Ownership Rights in Computer-Generated Works' (1985) 47 U. Pitt. L. Rev. 1185 < <https://scholarship.law.berkeley.edu/facpubs/1067/>>
- Peter Voss, 'From Narrow to general AI' (Medium, 4 October 2017) < <https://medium.com/intuitionmachine/from-narrow-to-general-ai-e21b568155b9> >
- Robert van den Hoven van Genderen, 'Robot as a Legal Entity, Legal Dream or Nightmare?' in: Schweighofer et al., Tagungsband IRIS 2017, 161 – 170 (Vol. IRIS 2017). Salzburg: Amalthea Signum Verlag
- Shelby Rogers, 'Google's AI Now Creates Code Better than its Creators' (Interesting Engineering, 18 October 2017) < <https://interestingengineering.com/googles-ai-now-creates-code-better-than-its-creators> >
- S.M. Solaiman, 'Legal Personality of Robots, Corporations, Idols and Chimpanzees: a Quest for Legitimacy' Artif Intell Law (2017) 25:155–179
- Stuart Russel and Peter Norvig, *Artificial Intelligence A Modern Approach* (Pearson, 2014)
- WIPO Intellectual Property Handbook (WIPO Publications, 2004, 2nd edition, reprinted 2008)

OTHER SOURCES

- CopyrightX, 'Theories of IP Law. Mind Maps For US Copyright Law Course' (Harvard Law School, 12 December 2017) < <http://ccb.ff6.mwp.accessdomain.com/Maps/IPTheories.html> >
- European Parliament Report with recommendations on Civil Law Rules on Robotics as of 27 January 2017 <<http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A8-2017-0005+0+DOC+XML+V0//EN>>