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AI as a Creator

How do AI-generated creations challenge EU intellectual property law and how should the EU react?

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Abstract

AI technology is becoming more present in the area of innovation and creativity, an area that for so long has been reserved for humans. Intellectual property protection is a way to incentivise these innovations and creativity, but what happens to this incentive if we extend this protection to subject-matter that derives from AI-machines? Today, the legislation does not answer how such works should be treated and there are several complex intellectual property issues raised by AI-generated creations. The general public might believe that the answer is simple – when an AI-machine creates something, the owner of that creation ought to be the programmer of the AI. However, it is not that straightforward in intellectual property law since it is intended to award innovation and creativity, qualities that typically only humans can attain. Therefore, the intellectual property laws today are not sustainable and need to be adapted to the challenges posed by AI. This thesis examines the challenges of the implied human requirement, harmonisation issues, the risks of discouraging creation and creations derivative from other subject-matter. Different solutions have been discussed in the debate and in legislative initiatives in the EU. Inspiration can also be found also from other law regimes, such as the United Kingdom, United States of America and China, and recent case-law from Australia. Some of the solutions that are in the centre of the debate are giving AI-machines legal personhood, introducing a special computer-generated works regime and to create a *sui generis* protection. After a review of the different options in the analysis part of this thesis, the most suitable solution for the EU, in my opinion, appears to be introducing a special computer-generated works regime where the IP holder will be determined based on the involvement in the creating process and will always be a natural or legal person. This solution will guarantee legal certainty and is in line with current principles and the general goal to promote innovation and investment.

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Sofia Adolfsson

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Abbreviations

AI	Artificial Intelligence
CJEU	Court of Justice of the European Union
ECHR	European Convention of Human Rights
EPC	European Patent Convention
EPO	European Patent Office
EU	European Union
GAN	Generative adversarial network
IP	Intellectual Property
TRIPS	Agreement on Trade Related Aspects of Intellectual Property Rights
UKIPO	United Kingdom Patent Office
USPTO	United States Patent Office
WIPO	World Intellectual Property Organisation

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1 Introduction

1.1 Background – AI and IP law

Artificial intelligence (AI) is increasingly applied in different sectors with various areas of use. For example, in the healthcare sector AI has played a huge role by being able to diagnose diseases at an early stage and even treat diseases.¹ In the field of law, AI can similarly be an essential tool when analysing large amounts of data for a certain outcome,² or granting applications among other things. Along with its advantages, using AI in the law sector (as well as in any other sector) leads to many challenges such as unconscious bias in output, liability issues and – the topic of this paper – intellectual property (IP) issues.

AI-machines are progressively being programmed to generate intellectual creations that, in theory, could be eligible for IP protection. Such protection aims at incentivizing creativity and promote innovation in order to increase investments and reach technological and cultural development. The problem however is that the current IP framework of the European Union (EU) only allows persons as right holders for works that they have independently created. Many of the requirements to gain IP protection are thus challenged by AI and it is not yet clear which solution is suitable for the EU. In order to find the most suitable solution, it is vital to examine the different challenges at hand. The protection regimes for IP are legislated on an EU level and therefore the chosen solution needs to be appropriate for all Member States, while also taking in consideration the future technological advancements.

¹ Davenport, Thomas; Kalakota, Ravi, *The potential for artificial intelligence in healthcare*, Future healthcare journal, June 2019, Volume 6, Number 2, p. 94-98 and Yu, Kun-Hsing, Beam, Andrew, Kohane, Isaac, *Artificial intelligence in healthcare*, Nature biomedical engineering, October 2018, Volume 2, Number 10 p. 719-731.

² Also described as text and data mining, see Article 2(2) for the definition in Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC

1.2 Purpose

Since the start of protection of subject matter through IP regulation, human beings have been in focus. Nevertheless, it is becoming clear that machines are integrated in creating processes and sometimes even doing so more or less autonomously. This creates several regulation issues regarding IP protection. The purpose of this contribution is to analyse the challenges that AI creations present to the EU's IP framework, and to examine some possible solutions to these challenges. The goal is to find the most suitable solution for the EU that will maintain the balance between the central objectives of IP protection.³ This purpose will be reached by answering these three core questions;

1. How do the AI-generated intellectual creations challenge the IP framework in the EU?
2. What are the alternatives to solutions for the EU in order to tackle these challenges?
3. Which is the most appropriate solution for the EU without harming the core values of IP protection?

1.3 Method and Material

The method that will be used in order to explore the legislative challenges of AI in the current IP framework is an EU legal dogmatic method. The analysis will be executed by examining relevant sources of law, in this thesis mostly EU law sources, but also some international law and news articles from around the world.⁴ For example European and international conventions such will be included. The EU law sources will consist of EU directives and regulations, along with reports from the European Commission, Council and Parliament. When examining the

³ In Article 7 of the TRIPS-agreement (Agreement on Trade-Related Aspects of Intellectual Property Rights), one of the main documents on protection of IP, the objectives of IP laws are described as follows: “*The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations*”.

⁴ Lehrberg, Bert, *Praktisk Juridisk Metod*, Iusté, twelfth edition, Uppsala, 2020, s. 203 and forward.

challenges on the current framework (the first question in chapter 1.2 above), primary and secondary EU-law sources and to the extent possible EU case-law will be consulted.

Famously in EU law the method is to interpret and analyse teleologically, that is, regarding what the purpose that is to be achieved is.⁵ Typically the preparatory work for EU law is also relevant for the EU method and interpretation.⁶ Therefore, regarding the two latter core questions in chapter 1.2, the analysis will be guided by the purpose behind IP protection. Furthermore, when analysing the solutions a selection of case law that shows different possible solutions to the problems that I am analysing will be presented. The intention in this part of the contribution is to explore the alternative solutions that can be identified and analyse how they would suit in the EU context by applying the general principle of promotion of innovation. When reading the part on how other legal frameworks have handled the issue under chapter 5.6, keep in mind that the information that I will use as inspiration is retrieved from secondary sources, *i.e.*, other author's description of a certain phenomenon and is not my own expert knowledge. The reason for my selection of case law from the United Kingdom (the UK), the United States of America (the US), Australia and China, is to examine reasonings from large states and economies, comparable with the EU. The reports from EU organs that will be used are intended to inform on possible drafting solutions that the legislator might make as part of my legal analysis. The purpose of this is to reach my conclusion by drawing from EU legislative custom, in addition to speculation from the legislator as well as from myself.

As AI is still a rather undefined area that can change rapidly it is currently mainly discussed (outside of policy documents) in scientific articles, and strong case-law has not yet been developed. Where scientific literature cannot be found, news articles will be the main source of information.

⁵ Hettne, Jörgen and Eriksson, Ida, *EU-rättslig metod*, Norstedts Juridik, second edition, 2011, p. 158.

⁶ Case C-621/18 judgment of 10 December 2018, *Andy Wightman and Others v Secretary of State for Exiting the European Union* ECLI:EU:C:2018:999, para. 47.

1.4 Limitations

IP rights derive from a vast number of different frameworks and protection regimes. This thesis aims to only examine the EU frameworks and will restrain from examining national regimes (with the exception of chapter 5 where inspiration from foreign national regimes will be made). Due to limited space and in order to achieve a consistent analysis, a fair selection of protection regimes will be made to illustrate the challenges on the IP system. For this reason, the regimes in focus will be copyright, design, trade mark and patent. The emphasis of the discussion will furthermore concentrate on the two regimes, copyright and patent, since these have gained most attention in the debate.

1.5 Disposition

The disposition of this thesis will be the following. First, an introduction to the topic of this work will be made in chapter 2 where some practical examples of AI as a creator will be presented. Chapter 3 will present the current IP framework in the EU, what IP rights aim to protect and how the protection is attained for each individual right. The next part, chapter 4, will examine the challenges on the IP framework caused by AI as a creator of subject-matter. Different solutions to the challenges on the IP framework will be analysed in chapter 5 and finally, an attempt to find the most suitable solution will be made in chapter 6. The two last mentioned chapters will contain the main analysis in this thesis. The result will be presented in the final chapter as well as the answers to the questions posed in chapter 1.2. In the very last chapter, 7.2, my proposal on the way forward for the EU legislator will be presented.

2 AI as a creator

In order to analyse the challenges on the current IP framework it is vital to address the state of the art of technology, and the potential of AI as a creator. Firstly, the object of this thesis – what a creator in the AI context is – will be examined. Therefore, definitions of AI will be given, followed by some practical examples of AI-generated art and other works.

2.1 Definition of AI

There have been various attempts to define AI.⁷ The World Intellectual Property Organisation (WIPO) defines AI in the context of IP as a “*discipline of computer science that is aimed at developing machines and systems that can carry out tasks considered to require human intelligence, with limited or no human intervention*”.⁸

The European Commission (the Commission) has in its proposal for a regulation on AI⁹ also attempted a uniform harmonised definition to provide legal certainty, although wide enough to include future technological developments.¹⁰ Article 3(1) of the proposal defines “artificial intelligence systems” as: “*software that is developed with one or more of the techniques and approaches listed in Annex I and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with*”. Annex I of the Act informs us that the techniques included in the definition are: machine learning approaches,¹¹ logic- and knowledge-based

⁷ Directorate-General for Communications Networks, Content and Technology (European Commission), *Trends and Developments in Artificial Intelligence - Challenges to the Intellectual Property Rights Framework*, Final report, Brussels, published 25 November 2020 (no document number).

⁸ WIPO Secretariat, *Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence*, (May 21, 2020) WIPO/IP/AI/2/GE/20/1 Rev. p. 3.

⁹ European Commission, *Proposal for a regulation of the European Parliament and of the Council laying down harmonized rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain union legislative acts*, Brussels, 21.4.2021 COM(2021) 206 final 2021/0106 (COD).

¹⁰ Para. 6 of the preamble.

¹¹ Including supervised, unsupervised and reinforcement learning, using a wide variety of methods including deep learning, see Annex I (a).

approaches,¹² and statistical approaches.¹³ The aim of AI research and development is in general terms to examine human intelligence and to apply this when programming machines to think and act in ways requiring cognitive ability typically only found in human intelligence.¹⁴

In this contribution, the Commission’s definition from the proposal will be used and the terms “AI” or “AI-machines” will refer to especially the machine learning and logic- and knowledge-based technologies.

2.2 AI as a creator

AI-generated creations become a problem when the AI is creating autonomously from the programmer, owner or the user of the AI. Thus, it is vital to distinguish between AI creations that are autonomously generated by the AI, and creations where the AI is only an assisting element in a human generated creation.¹⁵ In the sector of automatic programming, researchers, as well as the Commission, mean that truly autonomous machines are still in the far away future (if ever).¹⁶ In the legal and policy discussion however the term AI-generated creations seems to aim more at the lack of creative involvement from a human, rather than the autonomy of the AI-machine, leading to undeserved recognition if the human is named as holder of the IP rights.¹⁷ The difference between AI autonomously generated creations and creations where AI has been used only as a tool is rarely clarified in

¹² Including knowledge representation, inductive (logic) programming, knowledge bases, inference and deductive engines, (symbolic) reasoning and expert systems, see Annex I (b).

¹³ Bayesian estimation, search and optimization methods, see Annex I (c).

¹⁴ Jansen, Philip and others, Sienna D4.1 *State-of-the-art Review*, (WP4 – AI & Robotics) 741716, 13 April 2018, p. 12.

¹⁵ See European Parliament, *Intellectual property rights for the development of artificial intelligence technologies*, European parliament resolution of 20 October 2020 on intellectual property rights for the development of artificial intelligence technologies (2020/2015(INI)), p. 7.

¹⁶ European Commission, *Trends and Developments in Artificial Intelligence - Challenges to the Intellectual Property Rights Framework*, p. 8. See also Kim, Daria, ‘AI-Generated Inventions’: Time to Get the Record Straight? GRUR International, Volume 69, Issue 5, May 2020, Pages 443–456.

¹⁷ Abbott, Ryan, *Artificial intelligence, big data and intellectual property: protecting computer generated works in the United Kingdom*, Research Handbook on Intellectual Property and Digital Technologies, Edward Elgar Publishing Limited, January 2020, p. 322-337.

the literature.¹⁸ During the research of this thesis, I have not found a clear and useful explanation. If I were to attempt to explain it with my understanding of the subject I would say that a machine as a helping tool would be for example when a machine it is programmed to facilitate a process for the user, for example the autocorrect and suggestion functions in your phone when you write a message, while AI that is programmed to write a message or paper without the involvement of the person at all, would be an autonomous act.

Below follows some practical examples of AI-machines that have “autonomously” created subject-matter to provide an idea of the types of creations this thesis aims to analyse.

2.3 Practical examples

2.3.1 Paintings

A perfect example of AI as a creator is “the Next Rembrandt” painting. This was a research project¹⁹ to “revive” the famous 17th century painter Rembrandt van Rijn by analysing his entire art collection in order to recreate a new masterpiece with the typical Rembrandt technique and style. In other words, they built a vast database consisting of paintings and fed this input into an algorithm, with the Next Rembrandt painting as the output.²⁰

Another similar example is from 2018 where a painting drawn by an AI using a method called GAN (generative adversarial network) was created.²¹ The collective behind the experiment go by the name “Obvious”.²² The AI-generated portrait depicted the fictional French churchman Edmond Belamy. The paintings imperfection and interpretation of a human painted portrait of another human

¹⁸ Kim, Daria, ‘AI-Generated Inventions’: *Time to Get the Record Straight?* GRUR International, Volume 69, Issue 5, May 2020, Pages 443–456.

¹⁹ A collaboration project by ING, Microsoft, TU Delft and Mauritshuis.

²⁰ See the official website of the project, NextRembrandt.com, available at: <https://www.nextrembrandt.com/chapter01>, last consulted on 1 August 2021.

²¹ Christie’s, *Is artificial intelligence set to become art’s next medium?* Published 12 December 2018, (author unknown) available at: <https://www.christies.com/features/A-collaboration-between-two-artists-one-human-one-a-machine-9332-1.aspx>, last consulted on 23 February 2021.

²² Consisting of Hugo Caselles-Dupré, Pierre Fautrel and Gauthier Vernier and is based in Paris.

demonstrates, according to the researcher, that “algorithms are able to emulate creativity.”²³ Can it really be called *art* though? The fact that the painting was sold for \$ 432,500 at an auction indicates the creation’s worthiness of attention and the importance to take AI on the innovative market seriously.



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The AI-generated portrait of the fictional French churchman Edmond Belamy.

Moreover, an AI research conducted by Ahmed Elgammal²⁵ performed what he described as a visual Turing-test.²⁶ Art made by machines and art made by humans was randomly presented to (human) evaluators, followed by questions such as if the evaluators thought the art was made by a person or a machine, and how inspiring they considered it to be. The results showed that the human evaluators were sometimes even more inspired by machine-made art, than art made by

²³ Caselles-Dupré research, Christie’s, *Is artificial intelligence set to become art’s next medium?* 12 December 2018.

²⁴ Photo available at: <https://www.christies.com/lot/lot-edmond-de-belamy-from-la-famille-de-6166184/?from=salesummary&intObjectID=6166184&sid=18abf70b-239c-41f7-bf78-99c5a4370bc7>, last consulted 23 February 2021.

²⁵ The director of the Art and Artificial Intelligence Lab at Rutgers University in New Jersey.

²⁶ The Turing-test is the ultimate test where, to succeed, a human being who interacts with an AI is not certain whether it is an AI or another human being, see Copeland, Jack, *The Turing Test*, as part of the Studies in Cognitive Systems book series (COGS, volume 30) by Moor, James, *The Turing test: the elusive standard of artificial intelligence*, Springer, Kluwer Academic Publishers, 2003, p. 1-21.

humans. The system that was used is supposed to be more of a creative network, not a generative one.²⁷

The holder of authorship of these machine-generated paintings from an artistic point of view, is however not clear. The researchers mentioned above argue that if the creator of the *image* should be the author, this would be the machine. However, if the author should be seen as the “one that holds the vision and wants to share the message” it would be the creators of the *machine*, *i.e.*, the researchers.²⁸ Elgammal even goes as far as to suggest that the image is a product of the collaboration between two creators, one human and one machine.

Also, AI has been able to autonomously create music.²⁹

2.3.2 Inventions

Regarding the area of patent AI is starting to invent things more autonomously. For instance, a food container based on fractal geometry was recently created by the DABUS³⁰-machine. It has also invented devices, such as a type of flashlight, aimed to attract attention.³¹ The owner of the AI-machine, Stephen Thaler, applied for patent naming the machine as “inventor” to several patent offices around the world.³² This machine that has been programmed to autonomously invent has caused debate all around the world. Further details on this case and a new judgment from Australia will be discussed later under chapter 5.6.3.³³ There are also older examples of AI inventions such as the Nasa antenna.³⁴

²⁷ Christie's, *Is artificial intelligence set to become art's next medium?* 12 December 2018.

²⁸ Ibid.

²⁹ McQuarrie, Laura, *The 'Coditany of Timeness' is an Album Created by Artificial Intelligence*, 4 December 2017, Trendhunter. Available at <https://www.trendhunter.com/trends/coditany-of-timeness> last consulted 27th April 2021.

³⁰ Device for the Autonomous Bootstrapping of Unified Sentience, created by Stephen Thaler who is the CEO of Imagination Engines.

³¹ Kim, Daria, *'AI-Generated Inventions': Time to Get the Record Straight?* GRUR International, Volume 69, Issue 5, May 2020, Pages 443–456.

³² Engel, Andreas, *Can a Patent Be Granted for an AI-Generated Invention?* GRUR International, Volume 69, Issue 11, November 2020, Pages 1123–1129.

³³ Jones, Alexandra, ABC news, *Artificial intelligence can now be recognised as an inventor after historic Australian court decision*, 31 July 2021, available at: <https://www.abc.net.au/news/2021-08-01/historic-decision-allows-ai-to-be-recognised-as-an-inventor/100339264> last consulted on 4 August 2021.

³⁴ Kim, Daria, *'AI-Generated Inventions': Time to Get the Record Straight?* Pages 443–456.

2.3.3 *Design furniture and trade mark*

As mentioned above, the focus of the debate on AI as a creator for now revolves around copyright and patent. However, it is not hard to imagine that also design rights and trade mark for AI-creations could become just as relevant. To prove this, there are already examples of AI designing furniture³⁵ and especially in the graphic design field, AI could come to be a huge threat to human graphic designers.³⁶

Concerning AI generated subject-matter eligible for trade mark there are not yet any examples. Nevertheless, AI could generate distinctive know-how, confidential information or good-will internationally recognised as one trade mark, just as possibly as it can create a painting. Also, AI-inventions might be referred to as a trade mark and therefore also trade mark protection is relevant to AI-generated inventions.³⁷ Thus, issues regarding design rights and trademark for AI-generated subject-matter might be just around the corner.³⁸

2.3.4 *Summary*

These practical examples introduce us to the challenges AI-generated works poses on the IP framework because there is no longer one apparent human to name as rights holder. Before analysing the challenges, an overview of the IP rights framework till be made.

³⁵ Duong, Amy, *Philippe Starck Explores Tech Design With The A.I Chairs*, 17 April 2019, Trendhunter, available at: <https://www.trendhunter.com/trends/ai-chairs> last consulted 27 April 2021.

³⁶ Wu, Shan, *Development of Graphic Design Based on Artificial Intelligence*, Journal of Physics: Conference Series, April 2020, Volume 1533, number 3.

³⁷ Scarfield, Ben and Nurton, James, *AI's threat to trade mark rights*, Kilburn & Strode, 13 December 2018, available at: <https://www.kilburnstrode.com/knowledge/technology/ai-s-threat-to-trade-mark-rights> last consulted 20 August 2021.

³⁸ See Nakazato, Shohei and Squicciarini, Mariagrazia, *Artificial intelligence companies, goods and services: A trademark-based analysis*, May 2021, OECD Science, Technology and Industry Working Papers, Number 2021/06, p. 20.

3 Intellectual Property Rights

3.1 Introduction

IP rights are one part of the fundamental right to your own property. The right to property can be found in the Charter of the Fundamental Rights of the EU (the Charter) Article 17 as well as in Article 1 of the first protocol to the European Convention on Human Rights (the ECHR). Protection of IP is guaranteed by Article 17(2) of the Charter and the subject of protection is the holder of rights, *i.e.* the person who has gained protection for an intellectual creation. The right to protection is supposed to incentivise creation and innovation in the sense that other authors or inventors cannot copy or “steal” your creation without making the creative effort and process (that sometimes can take several years to achieve), also known as “free riding”.³⁹ Consequently, Article 17(2) is often balanced against the rights of the users’ and the public’s right to information guaranteed in Article 11 of the Charter.⁴⁰ Article 17(2) can thus be restricted by other general interest of the public according to Article 52(1) of the Charter, if the limitation is clearly provided by law and proportional to the aim pursued.⁴¹

The specific IP rights are protected through secondary legislative act, meaning directives and regulations. The purpose of IP protection is to promote innovation by providing incentive to the creators in the form of exclusive rights in order to increase investment and technological and cultural development.⁴²

³⁹ Abbott, Ryan, *Artificial intelligence, big data and intellectual property: protecting computer generated works in the United Kingdom*, p. 322-337.

⁴⁰ See for example case C-161/17 judgment of the 7 August 2018, *Land Nordrhein-Westfalen v Dirk Renckhoff* ECLI:EU:C:2018:634, para. 41 and case C-476/17 judgment of 29 July 2019, *Pelham GmbH and Others v Ralf Hütter and Florian Schneider-Esleben* ECLI:EU:C:2019:624, para 32.

⁴¹ See C-265/19 judgment of 8 September 2020, *Recorded Artists Actors Performers Ltd v Phonographic Performance (Ireland) Ltd and Others* ECLI:EU:C:2020:677 para. 85-86.

⁴² See the European Commission, Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the regions, *Making the most of the EU’s innovative potential*, An intellectual property action plan to support the EU’s recovery and resilience (IP Action Plan), Brussels, 25 November 2020 COM(2020) 760 final p. 1.

The protection of IP can consist of copyright, patent, trade mark, design rights and other related rights. It also encompasses *sui generis* rights, which protect a specific category of creations. As a starting point, an overview of the most relevant IP frameworks will be presented below along with the conditions for receiving protection and the subject that is entitled to it. This is vital as it provides a solid base to what will be discussed and analysed in the following chapters. There are several more related rights than the ones mentioned in this chapter that unfortunately, due to lack of room, will be left out of this thesis.

3.2 Copyright

Copyright aims to protect original expressions such as music, literature and paintings.⁴³ Copyright is regulated through several EU directives and regulations,⁴⁴ that primarily reflect what is stated in international frameworks such as the Berne Convention,⁴⁵ the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS)⁴⁶ and the Rome Convention⁴⁷ towards which the EU Member States are committed and have obligations.⁴⁸

EU copyright protection is harmonised in four categories of subject-matter. These are databases, computer programs, photographs and works of visual art.⁴⁹

⁴³ European Commission, *Trends and Developments in Artificial Intelligence*, p. 68.

⁴⁴ See for example Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society, Directive 2004/48/EC of the European Parliament and of the Council of 29 April 2004 on the enforcement of intellectual property rights,

⁴⁵ Berne Convention for the Protection of Literary and Artistic Works (as amended on September 28, 1979).

⁴⁶ Agreement on Trade-Related Aspects of Intellectual Property Rights as Amended by the 2005 Protocol Amending the TRIPS Agreement, The TRIPS agreement also concerns other IP rights.

⁴⁷ International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations (as amended on October 26 1961)

⁴⁸ European Commission website, available at: <https://digital-strategy.ec.europa.eu/en/policies/copyright-legislation> last consulted on 16 August 2021.

⁴⁹ Article 1(3) Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs (Computer Programs Directive), Article 3(1) of Directive (96/9/EC) on the legal protection of databases and Article 6 Directive 2006/116/EC of the European Parliament and of the Council of 12 December 2006 on the term of protection of copyright and certain related rights (Term Directive).

Whether “works of art” is to be considered as a separate category can be disputed, see European Commission, *Trends and Developments in Artificial Intelligence* p. 69.

However, the protection regimes as such are legislated on national level. Even though the area of copyright protection is widely harmonised, it is still not completely clear regarding the concept of the author and the subject-matter.⁵⁰ Although copyright is regulated in several different directives, there is no official definition in the EU framework. The closest to a general description to be found is in the Term Directive⁵¹ Article 1 where it is indicated that copyright is meant to protect “a literary or artistic work within the meaning of the Berne Convention”.⁵² This refers to Article 2 of named Convention which clarifies that:

“(1) The expression "literary and artistic works" shall include every production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression, such as books, pamphlets and other writings; lectures, addresses, sermons and other works of the same nature; dramatic or dramatico-musical works; choreographic works and entertainments in dumb show; musical compositions with or without words; cinematographic works to which are assimilated works expressed by a process analogous to cinematography; works of drawing, painting, architecture, sculpture, engraving and lithography; photographic works to which are assimilated works expressed by a process analogous to photography; works of applied art; illustrations, maps, plans, sketches and three-dimensional works relative to geography, topography, architecture or science.”

Hence, copyright protection can include a vast spectrum of subject-matter. However, for a subject-matter to be protected by copyright it needs to be *original*. This term was introduced in EU law in 1996 when the directive (96/9/EC) on the legal protection of databases (the Database Directive) was enforced. The directive was drafted already in 1992 following a ruling by the US Supreme Court in the case *Feist Publications, Inc., v Rural Telephone Service Co.*⁵³ where the Court for the first time introduced the prerequisite that information needs to have at least a

⁵⁰ European Commission, *Trends and Developments in Artificial Intelligence*, p. 68.

⁵¹ Directive 2006/116/EC of the European Parliament and of the Council of 12 December 2006 on the term of protection of copyright and certain related rights.

⁵² The Berne Convention for the Protection of Literary and Artistic Works (Paris Act of 24 July 1971), as amended on 28 September 1979.

⁵³ 499 U.S. 340 (1991)

minimum of originality to be protected by copyright. This ruling changed the up until then doctrine of “sweat of the brow” that was based on the creator’s *efforts* in creating a work. However, the new requirement failed in the US but succeeded in Europe and came to incuse the Database Directive. According to the directive, a database is to be protected by copyright if it is original *i.e.* if the content is the *author's own intellectual creation*.⁵⁴ This requirement has furthermore been developed through case-law.⁵⁵ This is also the wording regarding protected photographic works.⁵⁶ This leads us to the questions, in the context of AI-generated creations, if they can truly be an *intellectual* creation, if the AI can in fact be an *author* and if the creation can be the AI’s *own*. According to Article 4(1) of the Database directive, the author can be either a natural person or a legal person.⁵⁷ This suggests that the author then, according to the current regulation, could not be an AI (unless AI could be given a legal personality, which I will return to further down). To conclude there are many factors contradicting the concept of AI as an IP holder regarding copyright.

In 2019 a new directive, the Digital Single Market Directive (the DSM-directive) was introduced with the purpose of modernising the EU’s copyright framework and adapting it to technological developments.⁵⁸ It is noteworthy that the new directive does not address AI-issues at all. Seeing as it is a new Directive, the issues of AI and copyright where already heavily debated when it was drafted and the fact that it is not at all mentioned or considered therein is surprising. However, the directive is merely a complement to other directives on the area and aims at facilitating licensing and in extension access to knowledge due to the

⁵⁴ Para. 15 and 16 of the preamble. See also Article 3(1).

⁵⁵ Case C-5/08 *Infopaq International A/S v Danske Dagblades Forening* ECLI:EU:C:2009:465 and C-145/10 *Eva-Maria Painer v Standard VerlagsGmbH and Others* ECLI:EU:C:2009:465.

⁵⁶ Article 6 of the Term Directive.

⁵⁷ If the legislation of the Member State permits the author to be a legal person.

⁵⁸ Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC. See in particular para. 83 of the preamble.

consumers new behaviour in the new digital age. Therefore, it is not aimed at issues such as copyright for AI creations.⁵⁹

3.3 Design rights

Design protection protects distinctive identities in a physical sense. Protection for designs is regulated in the Directive 98/71/EC of the European Parliament and of the Council of 13 October 1998 on the legal protection of designs and in the Council Regulation (EC) No 6/2002 of 12 December 2001 on Community designs. For a design to be protected it needs to be “new” and have “individual character”.⁶⁰ The novelty criterion is further defined as meaning that the design is new if there is no identical already existing design.⁶¹ Here, there is no apparent issue with AI as the creator of the design. The individual character criterion is defined as requiring the “the overall impression” on the “informed user” to differ from that of other designs.⁶² When it comes to the assessment of the individual character, “the degree of freedom of the designer in developing the design shall be taken into consideration”.⁶³ Freedom generally seems to include a sort of creativity that most likely cannot be programmed. Usually how it works when AI is creating a design, it is first exposed to thousands or millions of images to then analyse the concept of design, and through this inspiration draw its own designs.

The legislation mentions a “successor in title” of the designer.⁶⁴ Unfortunately, no definition of either designer or successor in title can be found in the directive.

In 2020 the Commission launched an initiative to review the Design Directive and the Community Design Regulation after an evaluation of the legislation.⁶⁵ The goal is to modernize the Directive to better be adapted to the digital age and to

⁵⁹ Para. 4 of the preamble.

⁶⁰ Article 3(2), see Article 4(1) of the Regulation.

⁶¹ Article 4 of the Directive and Article 5 of the Regulation.

⁶² Article 5(1) of the Directive and Article 6 of the Regulation.

⁶³ Article 5(2) and para. 13 of the preamble of the Directive and Article 6(2) of the Regulation.

⁶⁴ For example in Article 6(2)(a), 6(3) of the Directive and Article 7(2)(a), 7(3), 14 and para. 20 of the preamble of the Regulation.

⁶⁵ See The European Commission, *IP Action Plan*, p. 3.

decrease the fragmentation between Member States.⁶⁶ A proposal has not yet been presented but perhaps, unlike the DSM-directive, the challenges regarding AI as a creator will be addressed in this modernisation.

3.4 Trade mark

Trade mark protects distinctive identities in an abstract, non-physical sense. The trade mark protection is legislated through a regulation,⁶⁷ meaning the rules therein are directly applicable in the Member States.

The proprietor of a trade mark protection can according to the Regulation be any “natural or legal person, including authorities established under public law”.⁶⁸ The definition of a legal person is given under Article 3 of the Regulation. It is stated that “companies or firms and other legal bodies shall be regarded as legal persons if, under the terms of the law governing them, they have the capacity in their own name to have rights and obligations of all kinds, to make contracts or accomplish other legal acts, and to sue and be sued.” For the time being, this rules out machines as legal persons.

The requirement for a subject-matter to be under the application of trade mark protection is that it is new, or rather as is written in Article 4 that the sign is capable of “distinguishing the goods or services of one undertaking from those of other undertakings”. The subject-matter also needs to be registerable to gain trade mark protection.⁶⁹

3.5 Patent

Patent is used to protect useful and creative ideas such as technological inventions. The patent framework differs from the other IP protections as it is still nationally

⁶⁶ Commission Inception Impact Assessment, Ares(2020)7065286, 24 November 2020.

⁶⁷ Regulation 2017/1001 of the European Parliament and of the Council of 14 June 2017 on the European Union trade mark.

⁶⁸ Article 5.

⁶⁹ Article 4(b).

regulated. However, there is an EU Regulation⁷⁰ on the cooperation of creating a unitary patent protection in the EU as well as the European Patent Convention (EPC) drafted by the European Patent Office (EPO). Unfortunately, not all EU Member States take part in this cooperation. For example, Spain has decided not to participate in this specific cooperation and therefore it is not completely unitary.⁷¹

Article 52(1) provides the grounds for granting a European patent to an invention. The invention needs to be *new*, involve an *inventive step* and be susceptible of *industrial application*. Article 54, 56 and 57 then goes on to indicate what is considered to be new, an inventive step and industrial application. Article 58 defines who is entitled to file a patent, stating that: “A European patent application may be filed by any natural or legal person, or anybody equivalent to a legal person by virtue of the law governing it.”

3.6 Recent EU proposals and reports

After having presented the current IP framework of relevance to the further discussion, and before I start examining the different challenges in creating a framework, it is important to mention that the Commission has published a proposal⁷² for a regulation harmonising rules on AI as a part of the agenda to make Europe ready for the digital age.⁷³ However, just like the DSM-directive mentioned above, IP is left out of the proposal. This could be viewed as a statement if the Commission purposely left IP out of the regulation. It could also be interpreted as

⁷⁰ Regulation 1257/2012 of the European Parliament and of the Council of 17 December 2012 implementing enhanced cooperation in the area of the creation of unitary patent protection.

⁷¹ (3) of preamble of Regulation 1257/2012.

⁷² European Commission, *Proposal for a regulation of the European Parliament and of the Council laying down harmonized rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain union legislative acts*, Brussels, 21.4.2021 COM(2021) 206 final 2021/0106 (COD).

⁷³ Commission Staff Working Document Impact Assessment - accompanying the Proposal for a Regulation of the European Parliament and of the Council laying down harmonized rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain union legislative acts, SWD(2021) 84 final, Brussels, 21 April, 2021, p. 1. See also the preparatory work behind the proposal in the European Commission White Paper - *On Artificial Intelligence - A European approach to excellence and trust*, Brussels, 19 February 2020 COM(2020) 65 final.

a sign that the Commission is unprepared for such legislation. Or it could simply be an indication that the Commission finds the current IP frameworks sufficient to deal with the AI challenges. Also, it is most likely not the right platform. Looking at the preparatory work it seems that the initiative aimed at addressing other AI-challenges such as fundamental rights and safety risks, liability issues and revision of sectoral safety legislation.⁷⁴

On the other hand, the European Parliament has made efforts to address IP protection in the context of AI as well through a report published in October 2020.⁷⁵ The European Commission, although without concrete instructions on the way forward, have acknowledged the challenges of AI-generated creations and that these issues need to be addressed in the so called “IP Action Plan” published in November 2020. There, the Commission has taken the view not to treat AI systems as authors or inventors considering the position taken by the EPO in the DABUS-case. The Commission sees the current framework well suited to answer the challenges, although, admits room for improvement. The Commission seems however to primarily consider creations where AI is not completely autonomous, and whether the framework would be suitable for such creations remains unanswered.⁷⁶

Furthermore, because of recent technological developments, the European Commission has initiated a review of the Database Directive as part of a European Data Strategy. The review will focus on issues such as the protection of automated machine-generated databases and whether the protection regime of the sui generis right in Article 7 in the Directive needs to be altered.⁷⁷ In this review initiative, the Commission has already put forward different options for legislation. The options were either to make no legislative changes (which would be very unsatisfactory),

⁷⁴ Commission Staff Working Document Impact Assessment, SWD(2021) 84 final, 21 April 2021, p. 1.

⁷⁵ European Parliament, *Report on intellectual property rights for the development of artificial intelligence technologies* (rapporteur Stéphane Séjourné, Renew, France), 2020/2015(INI), 2 October 2020, p. 13.

⁷⁶ The European Commission, *IP Action Plan*, p. 7.

⁷⁷ The European Commission, *IP Action Plan*, p. 14.

to repeal the sui generis right completely, to expressively include or exclude IoT generated data from the current protection regime or, lastly, to introduce a specific access regime independently or in combination with the two latter options.⁷⁸ My hypothesis is that similar legislative options will be introduced for other IP protection regimes in an inevitable review. It is possible that more satisfying legislative options will be put forward after consultations and communication with stakeholders and Member States delegations, which will take place during the summer 2021.

⁷⁸ *Study in support of the evaluation of Directive 96/9/EC on the legal protection of databases*, Final Report, A study prepared for the European Commission DG Communications Networks, 25 April 2018, p.121.

4 Challenges

4.1 Introductory remarks

IP as a fundamental right is becoming problematic since the introduction of AI in creating processes. The AI is regarded as someone's property, and the subject matter that the AI creates would then reasonably be that person's property too, just like if someone owns a tomato plant, and the plant produces tomatoes, the tomatoes will belong to the owner. However, the production result generated by an AI is for obvious reasons vastly different from what you can expect from a tomato plant, and the level of variety of that creative outcome is not comparable. Therefore, it is not as simple as to give property rights to the owner of the AI, for this would contradict the core requirement of protecting the intellectual property of the creator of that property, nor is it possible to give them to the AI, for this could harm the core value to incentivise creativity.

As mentioned earlier, there are several challenges posed by introducing AI as a player on the field of creators and inventors. The general debate typically centralises around the implied human requirement in order to be a rights holder, but also other challenges such as reaching a harmonised regulation and the risk of discouraging creativity is widely discussed in articles and media. Below, a selection of the debated challenges will be explored.

4.2 Challenge 1 – Human requirement for protection

Arguably, the most significant challenge is the implied requirement of a human being behind a creation. For instance, to gain copyright the subject-matter must be the “author's own intellectual creation”, which implies a *human* authorship.⁷⁹ This is also the undertone in the recent judgment in the *Cofemel*⁸⁰ case where the Court

⁷⁹ European Commission, *Trends and Developments in Artificial Intelligence*, p. 69.

⁸⁰ Case C-683/17 of 12 September 2019, *Cofemel – Sociedade de Vestuário SA v G-Star Raw CV* ECLI:EU:C2019:721.

of Justice of the European Union (CJEU) confirms the taken view in *Panier*⁸¹ by stating:

*“If a subject matter is to be capable of being regarded as original, it is both necessary and sufficient that the subject matter reflects the personality of its author, as an expression of his free and creative choices.”*⁸²

The *Cofemel* case concerned the issue whether clothing could be regarded as works in the meaning of the copyright protection, an issue that is of no further relevance in this thesis. Nevertheless, the conclusions drawn regarding originality are relevant here. A personality would typically require a human intelligence, excluding artificial ones. However, according to the Design Directive, “a design shall be protected by a design right to the extent that it is new and has individual character”.⁸³ The directive sets no apparent requirement regarding the designer or the holder of the protection. As long as an AI creation is new and has individual character according to Articles 3–5, which in reality should not be very hard to achieve, it should be able to be protected as a design, and therefore have the AI as a designer. Although, the individual character assessment takes into consideration the “freedom of the designer” when developing the protected design. It is unclear if the AI can be considered to have freedom in the way that is intended here.

More concretely regarding trade mark protection on the other hand, the regulation explicitly states that the holder of the trade mark must be a natural or legal person. Even though the “new” criterion does not seem too complex to achieve by a machine that is programmed to create new subject-matter, it will fail the criteria of being a natural or legal person. As stated above the same goes for filing patent applications. However, the other criteria for granting such an application do not seem very problematic for AI-creations.

⁸¹ Case C-145/10 of 7 March 2013, *Eva-Maria Painer v Standard VerlagsGmbH and Others* para. 88, 89 and 94.

⁸² C-683/17 (*Cofemel*) para. 30.

⁸³ Article 3 Design Directive.

4.3 Challenge 2 - Harmonised regulation

One dimension to the harmonisation challenge for the EU is the fact that international law, such as the Berne Convention, already requires the EU Member States to treat creations from nationals of all parties to the Convention.⁸⁴ Thus, there IP rights are harmonised in the sense that they prohibit discrimination. However, the Convention is silent regarding whether computer-generated creations should be protected by IP rights or not. This can lead to further issues if one Member State decides to accept computer-generated creations and not the another, because then they are obliged to accept other nationals computer-generated creations meanwhile the Member State's creations are not acknowledged in the territories that do not allow protection for such creations.⁸⁵

Consequently, a harmonised framework for all Member States deciding how to manage IP rights for computer-generated creations needs to be established. However, the EU consists of many different cultures, traditions and political opinions and finding a framework that suits all Member States on such a controversial subject seems impossible. Cultural and political differences is a challenge in most harmonisation initiatives of course, but when the discussion is on machines potentially being granted rights or new statuses, it is bound to be extremely sensitive. Especially rules on copyright and authorship are today weakly harmonised and would need a large overview.⁸⁶

4.4 Challenge 3 – Discouraging creation and monopolising

AI can produce subject matter like music, art, computer programs, designs inventions etc. in a much faster pace than human beings. Therefore, granting IP protection to AI-creations and giving monopoly to whoever becomes the holder might be undesirable given the decreasing possibility for humans and legal persons to compete on the market, leading to also a decrease of incentive. IP rights are

⁸⁴ Article 5(3) Berne Convention.

⁸⁵ Abbott, Ryan, *Artificial intelligence, big data and intellectual property: protecting computer generated works in the United Kingdom*, p. 322-337.

⁸⁶ The European Commission, *IP Action Plan*, p. 7.

supposed to encourage creativity. As already mentioned under chapter 4.2, denying AI-generated creations protection because they do not fulfil the implied human requirement would harm the incentive to innovate which would result in less creations, competition and a decrease of investment in the market in general.⁸⁷ Such a situation contradicts the very core of IP protection laws aims and objectives. From this perspective, denying protection with the consequence that for instance the creations and information would be available to the public could be the way to go. However, once again increased competition, even if humans are excluded from the competition, will lead to continued technological development which is the core aim of IP rights. Nevertheless, as already mentioned, this might decrease incentive for human intellectual creations.

4.5 Challenge 4 - Derivative output

A further layer to the challenges is how the legislation is supposed to deal with derivative work, such as the New Rembrandt, where the output is entirely based on a person's creative input. It is unclear if either the process or the result can be regarded as creative worthy of protection when it consists of majorly automatic procedures. There has in fact been no independent elements and the personality that is reflected (using the wording of the *Cofemel* case) is neither the programmer of the AI, the AI itself or the user, but Rembrandt van Rijn. Let us play with the thought that a similar project would be construed today where the painter is still alive, authorisation would be needed from that painter, almost like a sort of licensing but not to use a painting in itself, but to create new output by using the painter's style and personality. It would be undesirable to deem the licensee copyright protection for such an output.

The same applies for AI-generated designs. Generally, when AI generates a design, it is first exposed to thousands or millions of images to then analyse the concept of design, and through this inspiration draw its own designs. The creation

⁸⁷ Hristov, Kalin, *Artificial intelligence and the copyright dilemma*, IDEA: The Journal of the Franklin Pierce Center for Intellectual Property 57, 2017, Volume 57, Number 3 p. 431-454.

is derivative of already existing designs and it can therefore most likely not be “free” in the sense that is required by the Design legislation, even though it is new.

This challenge concerns AI-machines that can in a sense “copy” a person’s type of work in a way that a human would not be able to without leaving its own intellectual touch.

5 Possible solutions

5.1 Introductory remarks

There are different alternatives of solving the issue of who should be deemed the owner of the IP right of an AI-generated creation. The typical options under discussion are the creator/programmer, the user/owner, the AI-machine itself or, no one.⁸⁸

To begin with, let us have a look at the creator/programmer. The creator probably already has another IP protection, such as computer program protection, on the software. Also awarding the protection of the generated work to the creator could have unjust consequences since the programmer has essentially no influence on what the software does when being used by the owner (if the owner and the creator is not the same person). This would be like giving the inventor of a carving-knife the authorship of whatever is carved with this knife by someone else. The creative input from the creator stops whenever he or she sells his or her software.

So then how about if we give the IP protection to the user, *i.e.*, the carver in my example above. The issue here is that in most cases the creative input is limited to pushing a button and waiting while the machine does the rest, the user might not be sufficiently involved in the creative process to be rightfully granted protection.

Now the issues of giving the authorship protection to the machine itself are more obvious. Even though the machine does most of the work in the creation of AI-generated subject-matter, we are not yet at a stage where we have sufficiently sophisticated AI that we can say it is autonomous from either the programmer or the user. And additionally, in contrast to my example above, an AI is tremendously more complex than a carving-knife.

This leaves us with the last option, giving the authorship protection to no one. No protection would mean freely available output to the public with all the positive consequences therein. However, the incentive to create and the promotion of

⁸⁸ Hristov, Kalin, *Artificial intelligence and the copyright dilemma*, p. 431-454.

innovation would be harmed, investment would be discouraged and the legal certainty for users, businesses and inventors would be damaged, contradicting the core of IP protection.⁸⁹

Clearly, there is no obvious choice between these alternatives and further investigation and consultation need to be made. Below follows an analysis of some possible solutions alternatives, taking inspiration from other specially regulated areas of IP law, new phenomenons under discussion, and from countries who have already attempted to address these issues.

5.2 Keep current framework unchanged

One option is always to do nothing. However, it remains unclear if it can be called a solution in this case. Although it is the easiest and maybe the least risky option, it does not solve the inevitable issues already existing and ahead. It might be a possible answer right now, but most likely the technological development will sooner or later require the EU to take action. On the other hand, waiting to take legal action before we know what developments will be made is not inappropriate. It is possible that the legislative changes the EU makes now will be irrelevant due to the unpredictable nature of these developments and that the legal challenges will start over. However, in the meantime business, investors, users and inventors need to know what to do with regard to new works and clarification through adapted legislation could safeguard this legal certainty.

5.3 Legal personhood

There is no definition of a “human” in the ECHR or in other EU legislation. For instance, Article 2 of the ECHR states that “(e)veryone’s right to life shall be protected by law”. However, we are not informed of what is included in “everyone” or what is meant by “life”.⁹⁰ The reason why animals haven’t been

⁸⁹ European Parliament resolution of 20 October 2020 *on intellectual property rights for the development of artificial intelligence technologies* (2020/2015(INI)) p. 7.

⁹⁰ See however, regarding the scope of “everyone” in Article 2, *Vo v France* (Grand Chamber), judgment of 8 July 2004, no. 53924/00, especially para. 79-80, 82, 86. The court makes some

granted human rights protection is because they are not subjects of societal duties etc. and therefore should not be entitled to protection.⁹¹ The same should reasonably apply also to AI-machines.

Biological and philosophical personhood typically involves a high-status moral element.⁹² Legal personhood is rather a claim of certain rights that are entitled to persons.⁹³ Legal personhood for AI has been under discussion for about two decades and is not really a new phenomenon.⁹⁴ In the early debate the focus was not yet on AI as a creator, but rather on liability issues and AI as a carrier of rights and duties. The idea of legal personhood for AI has however been reviewed today in light of new technological developments and is often brought up in the discussion of AI as a creator. However, the European Parliament strongly discourages the option to give AI technologies a legal personality. The argument is that this would have a harmful impact on the incentive to create for humans.⁹⁵ However the European Parliament also means that it is vital that the AI-generated creations are protected by IP, in some way, to encourage innovation and investment.⁹⁶

As mentioned above under challenges, there are also legislative difficulties in creating an EU framework giving legal personality to AI. Given the political and cultural differences and the fact that legal personhood for AI is a controversial issue, harmonising such a framework would be nearly impossible at the moment.⁹⁷

reasonings about “life” from an ethical point of view, but the case was about a foetus and not AI-machines and is therefore not of strong relevance here.

⁹¹ See *Naruto v Slater*, United States Court of Appeals for the ninth circuit, Case No. 16-15469 (9th Cir. 2018) opinion.

⁹² Foster Charles, Herring Jonathan, *Identity, Personhood and the Law*, SpringerBriefs in Law, 2017 p.21-22.

⁹³ Ibid p. 22.

⁹⁴ Solum, Lawrence, *Legal Personhood for Artificial Intelligences*, 70 N.C. L. Rev. 1231 (1992).

⁹⁵ European parliament resolution of 20 October 2020 on intellectual property rights for the development of artificial intelligence technologies (2020/2015(INI)) p. 13.

⁹⁶ Ibid p. 15.

⁹⁷ Delcker, Janosch, *Europe divided over robot ‘personhood’*, Politico, 11 April 2018. Available at: <https://www.politico.eu/article/europe-divided-over-robot-ai-artificial-intelligence-personhood/> last consulted on 7 August 2021.

5.4 Special computer-generated works regime

Certain common law countries such as New Zealand, UK, Ireland, Hong Kong, South Africa and India have a regime specifically for computer-generated works where a *human* author is not required or presumed.⁹⁸ However, the authorship is still handed to a human, or in the case of the UK, the author is specifically “taken to be the person by whom the arrangements necessary for the creation of the work are undertaken”⁹⁹ and, in India’s case, “to the person who causes the work to be created”.¹⁰⁰ This seems like a solid solution to some of the issues. Although, as AI is becoming more advanced the creations will become more autonomous and it will most likely become harder to distinguish who (if anyone) made the necessary arrangements for the creation. It is unclear if a legislation where humans can claim the creations made by AI even though they might not really participate in the process is justified by the aims and core values of IP protection.

The European Parliament has however not excluded AI-generated creations from the protection of copyright. In the report from October 2020 mentioned above the European Parliament stated that:

“As regards copyright, the condition of originality, which imprints on the work the personality of its author, could constitute an obstacle to the protection of AI-generated creations. However, the general trend with regard to that condition is towards an objective concept of relative novelty, making it possible to distinguish a protected work from works already created. AI-generated creation and ‘traditional’ creation still have in common the aim of expanding cultural heritage, even if the creation takes place by means of a different act. At a time when artistic creation by AI is becoming more common (one example being the ‘Next Rembrandt’ painting generated after 346 works by the painter were digitised so that they could be processed using AI), we seem to be moving

⁹⁸ Abbott, Ryan, *Artificial intelligence, big data and intellectual property: protecting computer generated works in the United Kingdom*, p. 322-337.

⁹⁹ Section 9(3) of the Copyright, Designs and Patent Act 1988.

¹⁰⁰ Ramalho, Ana, *Will robots rule the (artistic) world? A Proposed Model for the Legal Status of Creations by Artificial Intelligence Systems*, *Journal of Internet Law*. July 2017, Vol. 21 Issue 1, p. 1-25. See legislations: section 9(3) CDPA (for the UK), and the Indian Copyright Act section 2(d)(vi) (for India).

towards an acknowledgement that an AI-generated creation could be deemed to constitute a work of art on the basis of the creative result rather than the creative process. It should also be noted that a failure to protect AI-generated creations could leave the interpreters of such creations without rights, as the protection afforded by the system of related rights implies the existence of copyright on the work being interpreted.”¹⁰¹

Thus, the European Parliament seems to believe that AI-generated creations are becoming more common and increasingly viewed as “works of art” that could and maybe even should be protected by the IP system. The European Parliament then indicates a potential assessment to evaluate if a regime that would grant copyright of such creations to “the natural person who prepares and publishes it lawfully, provided that the designer(s) of the underlying technology has/have not opposed such use” would be appropriate.¹⁰² This proposal resembles that of the other legal frameworks, such as the one in the UK and India. However, the European Commission, as mentioned above, seems to assume that completely autonomous creations by AI won’t exist “for the foreseeable future” and that AI-machines still are regarded as a human helping tool.¹⁰³

Additionally, the European Parliament called on the Commission in October 2020 to “support a horizontal, evidence-based and technologically neutral approach to common, uniform copyright provisions applicable to AI-generated works in the Union”.¹⁰⁴ However the Parliament also stated that it is not sure if such works should be eligible for protection. Furthermore, this statement was focused on copyright, but the reasoning would likely be the same for other IP rights.

¹⁰¹ European Parliament, *Report on intellectual property rights for the development of artificial intelligence technologies*, 2 October 2020, p. 13.

¹⁰² *Ibid* p. 13.

¹⁰³ European Commission, *Trends and Developments in Artificial Intelligence* p. 8.

¹⁰⁴ See European parliament resolution of 20 October 2020 *on intellectual property rights for the development of artificial intelligence technologies* (2020/2015(INI)) p. 15.

5.5 Sui generis authorship

First, to avoid any confusion, the difference between a sui generis protection and a special computer-generated works regime is that a special computer-generated works regimes does not necessarily include a new, different type of protection. Such a regime would simply lay down how the already existing protections should be handled and who should be granted them in which situations, regarding AI-creations.

The Commission has earlier tended to create category-specific protection rights for areas that are (most likely) found difficult to legislate. An example of existing sui generis protection is in Article 7 of the Database Directive where a Database receives protection if it involves a qualitatively or quantitatively “substantial investment”, hence no creative process is necessary. Legislating a whole new *sui generis* EU protection of IP specifically for AI creations could be a possible solution to the challenges caused by AI-generated work. However, sui generis IP protection for certain categories can lead to injustice on the IP market and undesirable consequences. It would be an advantage for the holder of the sui generis right, which is the aim of IP rights, but such a protection might be easier to gain than copyright, design protection, trade mark or patent, leaving other IP rights holders at a disadvantage and contradicting that same aim. There will always be stakeholders feeling at a disadvantage and creating new protection exclusively for certain categories comes with a risk.¹⁰⁵

5.6 Aspects and inspiration from case-law outside the EU

The case-law from the CJEU is practically non-existent and therefore in this part inspiration will be drawn from how courts outside of the EU have reasoned in famous cases where creations were not man-made. Two recent cases from China will be discussed, followed by an American case regarding IP rights for animals,

¹⁰⁵ Commission Staff Working Document, *Evaluation of Directive 96/9/EC on the legal protection of databases*, p. 26 and forward.

and finally the DABUS-machine cases will be examined especially paying attention to a new ground-breaking judgment by the Australian national court.

5.6.1 *Copyright to creations that are made partly by a human and partly by a machine*

In 2019 the Beijing Internet Court in China published a decision in the case *Feilin v Baidu*,¹⁰⁶ wherein one of the questions was whether copyright protection can be admitted to a (partly) AI-generated work. The work/subject-matter at issue was a report about the judicial analysis in the film and entertainment industry. It consisted of words and drawings, that were created by a software and by humans together. In this particular case the court found the disputed report to be a work done by the humans and being sufficiently original for protection, but they also discussed the potential protection for the software-generated part.

According to the existing Chinese copyright law, a literal work needs to be created by a natural person to be protected, even though computer-generated work can be very alike when it comes to substance, structure and expression. However, it was stated that it was not imaginable to change the law and the fundamental principles of authorship.¹⁰⁷

The court further stated that the automatic functions of the software when developing a report cannot consist of sufficient originality neither for the software developer or the user and therefore neither could be regarded as an author. The court meant by this that neither of them should be able to imprint their names on the report as the author but instead inform that it was automatically generated by a software. Even though the report might be original, it could not be considered and protected as “work”. The lack of protection however does not mean that the public would be free to use the report, since this would demotivate both the developers and the users. The solution was for the developer to charge for use of the software,

¹⁰⁶ Case number not found.

¹⁰⁷ 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 IPK, 9th of November 2019, Available at: <https://ipkitten.blogspot.com/2019/11/feilin-v-baidu-beijing-internet-court.html> , last consulted 8 April 2021.

and for the user there needs to be some sort of protection to motivate the use and distribution of this. The court did not however indicate what type of protection this could be. This last part leaves us with a bit of confusion because it is stated that the conditions for copyright protection are not fulfilled, but it should still be protected to encourage use of this type of software.

In conclusion the judgment decided that copyright could not be given to an AI-generated production, and not either to the user or the developer since it was not completely made by these. The judgment also informs us that a creation made by an AI-machine should inform of this.

In 2020 another case, *Shenzhen Tencent v Yinxun*,¹⁰⁸ was heard before the Nanshan District Court of Guangzhou Province. In contrast to the case above, the court decided that an AI-generated work could be protected by copyright. The work was considered to be the result of the activities carried out *on behalf* of the applicant, and the applicant would then be regarded as the legal author of the work, holding the protection.¹⁰⁹

Thus, what the latter case tells us, is that a person can receive copyright for an AI-generated creation, as long as the process is carried out on behalf of the human applicant. Although, should not an AI that is programmed to achieve certain results always be seen as carrying out the necessary activities on behalf of the human that programmed it? The court's reasoning seems uncertain and further research on what is actually meant by the Chinese court and a comparison with the first case above would have to be done.

5.6.2 Copyright for other non-humans, like animals?

In the US there was a case of an animal who was denied authorship.¹¹⁰ In *Naruto v Slater* the District Court for the Northern District of California dismissed claims

¹⁰⁸ Case number not found.

¹⁰⁹ Kan He, *Another decision on AI-generated work in China: Is it a Work of Legal Entities?* The IPKat, 29 January 2020, Available at: https://ipkitten.blogspot.com/2020/01/another-decision-on-ai-generated-work.html?m=1&fbclid=IwAR2moEyGrvf5nFKbnCRV5M18442mEb5sr15DGruwx2_Ak6a0PXZ99TfPQug last consulted on 8 April 2021.

¹¹⁰ United States Court of Appeals for the ninth circuit, Case No. 16-15469 (9th Cir. 2018) opinion.

of copyright infringement on behalf of a monkey. The monkey, Naruto, had curiously grabbed the camera of a wildlife photographer and taken photos of itself (“selfies”) in the forest, which were then published in a book. PETA filed claims on behalf of Naruto claiming that Naruto, having taken the photograph, was the owner of the photo and holder of the copyright. The Court dismissed the claims on the ground that only humans could be the holder of a copyright. It was concluded that “this monkey—and all animals, since they are not human—lacks statutory standing under the Copyright Act.”¹¹¹ In the end, both claims of copyright were denied and the photograph was released to the public domain. The wording “since they are not human” appears to exclude all that is not human from receiving copyright protection in the US, AI-machines therein. However, in *Naruto v Slater* the monkey was not aware of the fact that it was making an intellectual creation that could be subject of protection. If you would describe AI as being *aware* that it is creating, then AI might be more “worthy” of intellectual protection than the monkey, because the purpose of its actions, although programmed, is to create (in comparison to the monkey). However, the monkey, in contrast to AI, is a conscious living being and has capability of being sophisticated and original in creating.

Thus, just because someone is the creator of something, does not mean that someone is responsible and owns the creation.

5.6.3 *Patent for machines - DABUS*

The DABUS-machine is a recent example of how AI is entering the inventor’s field. DABUS is programmed to invent autonomously. The applicant and owner of the machine, Stephen Thaler, named the AI machine as inventor of a creation in patent applications around the globe, and himself as the owner of the patent. The application was for a food container based on fractal geometry. The application was denied in the United Kingdom patent office (UKIPO), the United States Patent

¹¹¹ p. 4 and again 18 of the case.

Office (USPTO) and the EPO.¹¹² The main problem was that there was no human inventor. The applicant had several arguments that highlighted the problems of AI being a creator. The fundamental argument was the interest to identify the actual deviser of the invention. The applicant further noted that neither the EPO nor the UKIPO expressively prohibited granting inventorship of a patent to a machine. The legislation does however, as stated above, require the applicant to be a person (*human* in the USA, *person* in Europe). The applicant also argued that if an invention made by a machine could not be patented, the public would be denied profiting from inventions made available by machines. In the UKIPO they say that you can protect otherwise, by trade secret protection for example. Dr. Thaler expressed that he was not going to make the argument that as owner of the machine he was entitled the patent of the machine. Furthermore, the judge declared that the judgment should not be seen as a prejudice of this question. Whilst the DABUS-machine application failed, if you can point to a human involved in a case like this, you may very well be granted patent as the only person involved.¹¹³

However, recently on the 30th of July 2021, the Federal Court of Australia stated that the inventor given in a patent application can be non-human.¹¹⁴ The judgment ordered to set aside a decision by the Deputy Commissioner that had denied the DABUS-machine as inventor of a patent and to remit the case for a new decision according with the reasons stated in the Federal Court judgment. This judgment came only two days after the South African patent office also allowed the DABUS-machine as inventor. However, in South Africa there was not a formal decision but

¹¹² Engel, Andreas, *Can a Patent Be Granted for an AI-Generated Invention?* GRUR International, Volume 69, Issue 11, November 2020, Pages 1123–1129. See also, Leupold, Andreas, *Are AI-generated Inventions Patentable?* Sifted, 25 March 2021, available at: <https://sifted.eu/articles/ai-generated-inventions-patentable/> last consulted on August 1, 2021.

¹¹³ Tech talks podcast series, *IP Rights and AI Generated Works*, 8 January 2021, available at: <https://www.youtube.com/watch?v=5eBd5ysUwZk> last consulted 28 February 2021.

¹¹⁴ *Thaler v Commissioner of Patents* (2021), 30 July 2021, FCA 879, Judgment of the Honourable Justice Beach, available at: <https://www.judgments.fedcourt.gov.au/judgments/Judgments/fca/single/2021/2021fca0879> last consulted 2 August 2021.

the application was rather granted by the standard administrative procedure.¹¹⁵ It is vital to note that the Australian judgement stated that in contrast to copyright law, patent law does not explicitly require a human creator.¹¹⁶ It was indicated that the word “inventor” is not defined in the laws and is generally an “agent noun” that can be both a person or a machine.¹¹⁷ Also, the owner of the patent is a human, Dr. Thaler, and therefore no property rights would actually be given to DABUS nor were they asked for. The judgment does not state that the applicant or grantee, the receiver of property rights, could be other than human.¹¹⁸ Another argument for the decision was that it was in line with the objectives of the relevant Australian Act and that it might generally incentivise the development of creative technology leading to scientific advantages.¹¹⁹

Even though this is a historic ground-breaking decision by opening the possibility to state an AI as inventor it is not necessarily the start of a new trend. It is made very clear that this judgement is limited to inventorship for patent and not for other IP areas and protections. It is not either the gateway for AI to receive legal personality or rights as such. A consequence however might be the influence this case will have on other legal orders, especially those of common law. What comes to mind however is that the same type of reasoning as could be made for Design protection that also does not explicitly require a person as designer for a subject-matter. The Australian case might become a gateway in to a new type of interpretation of current law.

In any case, it is unclear whether the EU will be affected by this reasoning since it is not part of the common law. Nevertheless, if the UK and USA change their up-until-now view from their latest decisions to align with the Australian

¹¹⁵ Martins, Roberto, Lloyds Consultoria, *DABUS: South Africa issues first-ever patent with AI inventor*, 29 July 2021, available at: <https://www.lloydsconsultoria.com/dabus-south-africa-issues-first-ever-patent-with-ai-inventor/>

¹¹⁶ Para. 119.

¹¹⁷ Para. 120.

¹¹⁸ Para. 226.

¹¹⁹ Para. 122 and 125.

judgment, EU might have to adapt as well as this is a global issue. The near future will reveal what we can expect as reaction from the EU.

5.7 Some ending comments

As demonstrated in this part of the analysis, there are many different aspects on the solutions to the challenges posed by AI-generated creations. If AI is not assigned a legal personality the holder of rights would be either no one, the owner or the creator. Unless these are the same person it needs to be evaluated who deserves protection of the IP that the AI has created. At first glance you might say that the creator should be the holder of rights, as it is the one who has intellectually and freely created the work (the AI) that then has created the subject-matter in question. However, it is unclear if the same reasoning would be made about machine such as a lathe and not AI. If the owner of a lathe produces an object that later is granted design rights for its novelty and individual character, it would appear as obvious that the owner of the lathe should be the holder of protection, not the creator who had nothing to do with the object. Of course, you can argue that AI cannot be compared with an unintellectual lathe, but in theory the concept of protection is the same. Moreover, it is highly unlikely that an AI would have created the exact same subject-matter had it never left the creators hands.

Recalling the visual Turing-test performed by the Art and Artificial Intelligence Lab at Rutgers University in New Jersey, evaluators were not able to differentiate machine-made creations from man-made and were not either consistent in which they experienced as more creatively inspiring. This suggests that even though AI might never become sophisticated enough to pass as human beings, subject-matter still pass as intellectual creations, in need of protection. In the next part, I will find the most appropriate solution out of the ones discussed above.

6 Analysis

6.1 Which is the most suitable solution for the EU framework on IP rights?

In this part an attempt will be made to find the most appropriate solution for the EU framework at hand according to the analysis above.

6.1.1 Unitary framework

The first statement that needs to be made here is that a uniform legislation would be desirable. National regulations for such a worldwide phenomenon as AI and IP would be an inappropriate solution since it causes fragmentation, legal uncertainty and could also leave Member States who decide to introduce certain regimes at disadvantage compared to those who do not.¹²⁰ Thus, unitary rules in the larger economies, such as the EU, should be strived for. This is also demonstrated by the fact that the Commission's new proposal for harmonisation of AI (even though it does not address IP issues) is drawn in a regulation, so that in contrast to a directive the rules will be directly and equally applicable and binding in all Member States.¹²¹ Additionally, it is important that the EU has a solid and powerful framework to be regarded as a strong competitor in the area of AI worldwide.¹²² With a functioning, transparent, clear, fair and harmonised IP regulation on AI the EU would attract business and investors, contributing and promoting the economy leading to added value for the EU as a whole.

6.1.2 Discussion between the presented solutions

When choosing an appropriate solution, it is important to recall the subject that is intended to be protected by the EU Charter, *i.e.*, the creator of the intellectual creation.

¹²⁰ Abbott, Ryan, *Artificial intelligence, big data and intellectual property: protecting computer generated works in the United Kingdom*, p. 322-337.

¹²¹ In accordance with Article 288 TFEU, see European Commission, *Proposal for a regulation of the European Parliament and of the Council laying down harmonized rules on Artificial Intelligence*.

¹²² European Parliament, *Report on intellectual property rights for the development of artificial intelligence technologies*, 2 October 2020, p. 12.

Regarding legal personhood for AI, the decision has been made not only by the dismissal by the European Parliament and judgments by foreign courts who have already addressed this issue in trials, but also considering the legislative and cultural issues that would come with such a solution. Unless strong,¹²³ sophisticated AI comes along in the nearest future, this solution is premature and should be avoided at all costs in order to preserve the concept of creativity and the balance in the IP field. However, we still need some sort of protection for AI-generated creations to encourage innovation and gain investments. It also needs to happen quite rapidly, as the technological developments are increasing violently. According to the European Parliament, the most urgent IP area to legislate is patent. This is the area where there is the most increase in applications to the EPO involving the use of AI, which has been proven also through the DABUS-cases.¹²⁴

Thus, the options that we have left is to either do nothing, which, as already stated above, is largely unsatisfactory and will lead to legal uncertainty. *Sui generis* legislation is, as mentioned, an option that has been used before and is short-term quite effective. However, long-term, such category-specific legislation can harm the balance between the IP rights. Therefore, the most appropriate solution for the EU to secure future clarity and transparency is, in my opinion and in alliance with what has been said in this thesis, to create a special computer-generated works regime where AI-creations are specifically regulated. This would help avoid future issues while also securing the legal clarity for the users, programmers, and the general public by clearly stating who will be deemed rights holder in the different types of situations. This type of regime might be the most effective and appropriate one at least in the copyright, design and trade mark sectors, while the patent sector, as we have seen from the Australian judgment, might need a different approach. The most realistic solution for the EU would be to use interpretation in court

¹²³ Strong AI is a term to describe AI that can execute any human intellectual tasks in a successful way and also resembles humans cognitively. Some even mean these AI have (artificial) consciousness. See Jansen, Philip and others, Sienna D4.1 *State-of-the-art Review*, p. 13 and again 17.

¹²⁴ European Parliament, *Report on intellectual property rights for the development of artificial intelligence technologies*, 2 October 2020, p. 12.

decisions to decide who should actually be considered as an inventor and not. Seeing as the CJEU most often uses teleological interpretation, the result might be different from the one of the Australian court. Of course, the Australian court also looked at the aim of the regulations, but majorly what gave the judgment its direction was the literal interpretation by focusing on the meaning of the noun “inventor”. In any case, because of the Australian judgment there will most likely be an interesting time ahead if other states will take the same turn.

6.2 Final remarks

To clarify the result of my analysis, it is not necessary to have the same solution for all IP rights. Considering the new Australian judgment, patent protection considering AI-generated inventions might take one direction, and copyright, design and trade mark might take another. Regarding the latter the most suitable solution according to the investigation of this thesis, is to introduce special rules for computer-generated works that are based on the core values in principles of IP such as the promotion of innovation and incentivising creativity. This would ensure that the subject for protection remains in line with the aim of Article 17.2 of the EU Charter, while also adapting to the challenges AI-generated creations bring. For the EU legal framework, this would mean making appropriate amendments to the different protection regimes, by introducing rules on how to determine the rightful owner of the subject-matter in accordance with the objectives of each specific regulations and directives. The details of such a regime would be for the European Parliament and Commission to decide.

7 Concluding statements

7.1 Result

The challenges on the current IP frameworks consist of the current human requirement for protection, difficulties in presenting a harmonised regulation, risks of discouraging creativity and the issues of creativity regarding derivative output. AI-machines stepping into the IP area is complicated and unpredictable but also inevitable and needs to be addressed by the EU. In order to remain a strong competitor, the EU needs to follow the other large economies of the world and adjust the IP legislation. This is particularly relevant now that other territories such as the UK and Australia, who are parties to the same Conventions and agreements that are binding for EU Member States, are choosing the direction of allowing protection for computer-generated creations and even allowing AI-machines to be inventors. Even though the Commission believes completely autonomous AI is still far away in the future, the legislative solutions the EU chooses now must be appropriate also for the challenges ahead. If not, the technological developments of AI risks advancing in a faster pace than the legal development in this specific policy area, leaving us with confusion, legal uncertainty, and an undesirable and unfit protection regime.

7.2 The way forward

What is clear for the way forward for the EU is that not granting any IP protection to AI-generated creations is not sustainable. Seeing as the situation is unpredictable, the most appropriate solution in my opinion is to fall back on the fundamental principles of IP law, incentivising creativity and innovation, by introducing a regime specifically for computer-generated works, much like what we already see in other places of the world where authorship for AI-generated creations is given to the *natural* person who made the arrangements necessary for the creation to exist. The negative impacts of such legislation would be proportionate to the positive, where to a large extent this would ensure the

continuity of innovation and investments. This would furthermore help maintain IP offices core perception of rights holders as humans. Details and interpretation issues would have to be determined from case to case by the CJEU, following the guidelines of IP principles and values to safeguard the fundamental objective of IP rights – to protect intellectual creation.

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