TALLINN UNIVERSITY OF TECHNOLOGY
School of Business and Governance
Department of Law

Henrik Uustalo

A proposition for the protection of works generated by AI

Master's thesis
Ma Law and Technology

Supervisor: Pawan Kumar Dutt, PhD

Tallinn 2021

I hereby declare that I have compiled the thesis independently
and all works, important standpoints and data by other authors
have been properly referenced and the same paper
has not been previously presented for grading.
The document length is 19 881 words from the introduction to the end of conclusion.

Henrik Uustalo ……

(signature, date)

Student code: 183814HAJM

Student e-mail address: henrikuustalo@gmail.com

Supervisor: Pawan Kumar Dutt, PhD:

The paper conforms to requirements in force

……

(signature, date)

Chairman of the Defence Committee:

Permitted to the defence

……

(name, signature, date)

TABLE OF CONTENTS

ABSTRACT 5
INTRODUCTION 6
1. Should AI generated works be protected by intellectual property? 8
1.2. Philosophical justifications for protection of AI generated output 12
1.3. Practical justifications for acknowledging protection of AI generated output 17
1.4. Arguments against the protection of AI generated works 17
1.4.1. Should copyright be exclusive for natural persons 18
1.4.2. Trade secret laws adequacy for protection of AI generated output 20
1.5. Conclusion 21
2. Current overview for protection of works created by artificial intelligence 22
2.1. Protection of AI generated output in international law 22
2.1.1. AI generated output in the EU 23
2.2. Comparison of national legislations 25
2.2.2. The United States 27
2.2.3. China 28
2.2.4. Australia 29
2.2.5. Estonia 31
2.2.6. India 31
2.3. Joint authorship 33
Conclusion 34
3. How to protect AI generated works in EU? 34
3.1. Which subject matter of AI output should be protected by intellectual property rights? 35
3.2. Who should hold intellectual property rights for Artificial Intelligence generated output? 36
3.2.1. Users of AI systems as copyright holders 36
3.2.2. The subject making the arrangements for the underlying work with human creativity 38
3.2.3. Subject making the arrangements for the underlying work without human creativity 39
3.2.4. AI system as a copyright holder 41
3.2.5. Work made for hire doctrine 41

3.2.6. The subject making a substantial investment 42
3.3. Which rights should be implemented for the protection of AI generated output? 43
3.3.1. Moral rights 43
3.3.2. Economical rights 45
3.3.3. The term of copyright protection 47
3.3.4. Compulsory licenses for AI generated output 48
3.4. Neighbouring rights for AI generated output. 48
3.5. *Sui generis* protection of AI generated output in the EU 49
3.5.1. Background of *sui generis* protection in EU 49
3.5.2. Similarities of databases and AI generated outputs 51
3.5.3. Benefits of implementing a *sui generis* right for protection of AI generated output 51
Conclusion 52
List of referencs 54
Appendix 4. Non-exclusive licence 58

ABSTRACT

This master thesis was carried out, because the legal uncertainty in regard to AI generated works. AI generated works are being created in a greater extent every day and there are no specific solutions or principles laid out from the EU. Establishing protection of AI generated output would offer incentives for parties developing AI systems, which would in turn thrive innovation. Although some states have established protection of AI generated output. The most reasonable solution for acknowledging protection of AI generated output in the EU would be to implement a separate *sui generis* right, which would offer a similar regime to copyright, with a narrower scope of rights.

Keywords:
Artificial Intelligence, Copyright, Computer Generated Works,

INTRODUCTION

It can be claimed that innovation is one of the main causes for major regulatory innovation. Starting from the invention of automobiles, aircrafts or space crafts to the globalization of the internet. Over the last decades the pace of innovation in technology has accelerated vastly. A number of regulatory issues is related to algorithms and the sovereignty of computer programs decision making. Daren Tang, the Director General of the World Intellectual Property Office opened the third session of WIPO Conversation on Intellectual Property and Artificial Intelligence with referring to a McKinsey institutes study. [1]The study found that some 70 per cent of all companies might adopt at least one type of AI technology by 2030. A topical discussion has been going on the subject of how an artificial decision making has to be regulated in the sense of liability. But another relevant discussion yet to find conclusive answers is on the subject of copyright for works created solely by algorithms. Regulating copyright is in big part a matter of finding the right balance for the interests of authors, copyright holders and users. The distribution of rights and obligations related to the creation of works certainly needs to be re-evaluated for the reason that there is now a new type of creator entering the legal relationships. This master thesis proposes three research questions and three hypotheses. The first research question is whether works created by artificial intelligence should be protected by copyright or similar rights. The hypotheses for the first research question is that works created by artificial intelligence should be protected by copyright or similar rights. The second research question is aimed to find out in a comparative analysis, if there are legal regimes that protect AI generated works. The hypotheses establishes that there are no legal regimes that protect such works. The third research is, which legal regime would be the most appropriate regime for regulating copyright related to works created by AI in the European Union? The hypotheses answering this research question proposes that the most appropriate solution would be to establish a sui generis right based on substantial investment. Qualitative and comparative legal research methods have been used throughout the master thesis

[1] Bughin, Jacques, et al. "Notes from the AI frontier: Modeling the impact of AI on the world economy." McKinsey Global Institute (2018).

to analyse academic legal journal articles and books. Comparative analysis of different national copyright legislation will be carried out.

1. Should AI generated works be protected by intellectual property?

1.1. Definition of artificial intelligence in copyright

To analyse whether copyright protection of works created by artificial intelligence is necessary, it is imperative to define the scope of the definition of “AI generated works". John McCarthy is widely recognised as the “father” of artificial intelligence. He is also the person behind who coined the term. [2]The 1955 definition by John McCarthy read as: “For the present purpose the artificial intelligence problem is taken to be that of making a machine behave in ways that would be called intelligent if a human were so behaving.” A good example for an intelligent system could be the AlphaGo. Go is a 2500-year-old board game, which is regarded to be one of the most complex board games. If chess has approximately 20 possible moves per turn, then Go averages in over 200 possible moves per turn. The AlphaGo was teached by the developers to play Go and in 2016 went against one of the best players in the world, Lee Sedol. The system used neural network, which mimics the function of the human brain, distributing information processing capacity to receptors functioning as neurons to find and create connections and similarities in the data that they process. [3]In the second match against the 18-time world time champion of Go the AlphaGo system made an extraordinary move known as the 37nd move. Professionals commented that no human would make that move and that it would be regarded as a bad move. Even the system itself showed that 1 in 10 000 players would have made that move. At the end of the match, it was widely regarded as a really creative and a brilliant move. Since then, AlphaGo was succeeded by an even more powerful system AlphaGo Zero, which did not learn from human games and was completely self-learned. This program was in turn succeeded by a program called Muzero, which learns without even being taught the rules.

[2] McCarthy, John, et al. "A proposal for the dartmouth summer research project on artificial intelligence, august 31, 1955." AI magazine 27.4 (2006): 12-12.
[3] Metz, Cade. "In two moves, AlphaGo and Lee Sedol redefined the future." Wired. March 16 (2016).

The European Commission had set up an Independent High- Level Expert Group on Artificial Intelligence which on 2019 published a document named "A definition of AI: Main capabilities and disciplines". [4]By the definition of this expert group artificial intelligence can be defined as "systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals."

When taking into account this definition it could be argued that there would be many examples for artificial intelligence. One of the most talked examples in the context of artificial intelligence and copyright is a Dutch bank's advertisement campaign called "The Next Rembrandt", which consisted of scanning more than 300 of Rembrandts works to have the algorithm create a new original Rembrandt painting. The Next Rembrandt meets the definitions requirements of an artificial intelligence to as it was made to analyse the environment and take actions to achieve specific goals. [5]One example of AI generated works is related to the author who already in 2008 claimed to be "the most published author in the history of the planet." [6]Philip M. Parker has employed over 70 computers and 7 programmers to use AI on publicly available information to create books in different categories. [7]In 2013 Peter M. Parker claimed that he is the author of over one million books. Although in positive copyright law Peter M. Parker might not be the author of his books at all. Which means that his books are free to be shared over the internet or even sold by other publishers. Although, it is not clear in what extent is the human input involved in each book. In a case over protection of these works, Peter M. Parker may claim to have copyright based on human input made in conjunction with AI input. This could be the reason why each of these works is marked with his name. Even if there were no human input made, it is difficult to prove otherwise as copyright protection for a work is presumed in copyright law.

[8]Autonomy in the fields of artificial intelligence is generally used to mean the capacity of an artificial agent to operate independently of human guidance. The Society for Automotive Engineers have defined 6 levels of autonomy for autonomous vehicles, 0 for a vehicle requiring full human control and at level 5 the full autonomous vehicle. At the moment consumers have the possibility to buy level 2 cars. Level 2 means that the vehicle is able to control both acceleration and deceleration capabilities and steering. By the definition of the Independent High- Level Expert

[4] EU Commission. (2018) "A definition of Artificial Intelligence: main capabilities and scientific disciplines." Retrieved from: http://www.pcci.gr/evepimages/0101_F483.pdf
[5] Cohen, Noam. (2008) "He wrote 200,000 books (but computers did some of the work)." New York Times, 10.
[6] Ibid.
[7] Bosker, Bianca. (2013) "Philip Parker's trick for authoring over 1 million books: don't write." The Huffington Post 11.
[8] Totschnig, Wolfhart. (2020) "Fully autonomous AI." Science and Engineering Ethics 26.5: 2473-2485.

Group on Artificial Intelligence the level 2 vehicles can be considered as systems of artificial intelligence.

[9]The World International Property office has issued a paper named as "*Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence"*, where it makes a distinction between AI generated outputs and AI- assisted outputs. AI generated output referring to the generation of an output without any human intervention and AI assisted output referring to works which are generated with material human intervention and/or direction. It would be relevant to define where the line between AI generated and AI assisted outputs goes. One problem with this distinction could be that the amount of human interference is on a spectrum. One example would be that normally algorithms need human assistance for input data to "train", but as the system develops to a certain level, the amount of human input may become irrelevant. Therefore, the amount of "assistance" as the notion of autonomy is constantly changing in time.

Although autonomy in the context of copyright has to be looked at as a different notion. [10]To identify whether an AI output is an AI generated output or AI assisted output, it is necessary to view whether the person using an AI system foresaw the end creation. Therefore, whichever creativity cannot causally be assigned to a human must be assigned to the algorithm and it could be said that where intellectual creation of a person ends the autonomy of an AI system can be credited. [11]The "unforeseeability" in such cases breaks the causal link between the human triggering the process and the output created by the system. If the person uses an AI system to create something previously intended, the creativity cannot be assigned to the AI. In that case it should be regarded to as AI assisted output. Therefore, any work made by an AI system that does not consist of enough foreseeable creative input from a human author would be considered to be a product of an autonomous AI system. And only in cases where the AI is guided in a manner enough to achieve the foreseeable intellectual creation limit by a human it would not be considered to be autonomous. [12]Machine learning AI tools can for example learn what the output should be similar

[9] WIPO. (2020) Conversation on Intellectual Property (IP) and Artificial Intelligence (AI), Second Session. Retrieved from https://www.wipo.int/edocs/mdocs/mdocs/en/wipo_ip_ai_2_ge_20/wipo_ip_ai_2_ge_20_1_rev.pdf
[10] Gervais, Daniel J. (2020) The Machine as Author. Iowa Law Review, vol. 105, no. 5, p. 2053-2106. Retrieved from https://heinonline.org/HOL/P?h=hein.journals/ilr105&i=2103.
[11] B, Enrico, L. McDonagh. (2020) Artificial intelligence as producer and consumer of copyright works: evaluating the consequences of algorithmic creativity." Intellectual Property Quarterly 2: 112-137.
[12] Wiele, Bram Van. (2021) The human-machine synergy: boundaries of human authorship in AI-assisted creations. European Intellectual Property Review.

to and it that case and make the output unpredictable. Whereas in other areas of technology the notion of autonomous in the context of AI would need much more capacity from the system. As an analogy we could see the algorithm programmer as a teacher and the algorithm as a student and training data as materials of the class. Ideas are commonly not protected by copyright. A teacher could not be held as an author of the student's final work even if the teacher picked the materials, the topic and gave the student the methods of writing a work. In this thesis AI assisted output will be regarded to as works that reflect the authors own intellectual creation where an AI system is only a tool for creating the work. Similarly, as a camera is a tool for making photographs or a computer for writing novellas.

[13]The International Association for the Protection of Intellectual Property, known as AIPPI concluded a study question which included AIPPI National groups from 30 different countries to establish if and under which conditions should artificially-generated works be protected by copyright and/or related rights. 17 of the 30 groups answered that their respective countries legislation could be improved to have greater certainty and clarity regarding the legal conditions of copyright protection for artificially generated works and only 30 per cent answered that the law should not be modified. Therefore, there is clear indication for the need of general legal clarity in most countries also stated by the specialists of respective countries. The report also quotes the group representing Switzerland, which stated that: "Irrespective of the sophistication of AI entities, such entities remain tools (like paint brushes), which may be used to produce copyrightable material when creatively leveraged by human person." It is unclear whether the group representing Switzerland regards works created by AI system, which creativity could not be attributed to a natural person and are unforeseeable, as AI assisted works and therefore favours the protection of AI generated output. Although positive copyright law of civil law countries requires human creativity and therefore a legal fiction for delegating AI systems creativity to the programmer would have to be set in the law. The Switzerland group added that "Thus, assuming that the current law or practice can adequately cope with works obtained via previous computerized techniques, the present group does not see a need for improvement for what specifically concerns artificially-generated works." The group of Switzerland therefore either favours the position to only allow copyright protection to AI assisted works and opposes the position to protect works created by artificial intelligence or does not understand that works created by AI systems that does not consist

[13] AIPPI. (2019) Study question, Copyright in artificially generated works. Retrieved from https://www.aippi.fr/upload/2019%20Londres/DROITS-DAUTEUR---Summary-report.pdf

of human creativity are not protected. 80 per cent of the groups answered that harmonization of regulation for copyright protection of artificially created works is necessary. 24 of the groups had an opinion that there is a need for human intervention to occur for the work to be protected by copyright. Therefore, a vast majority of the groups seem to be against the protection of AI generated output. Further research of public opinion, explanations of AI generated output in positive law and encouragement of public debate on this topic is therefore necessary in order to clarify the opinions of different interest groups and specialists.

1.2. Philosophical justifications for protection of AI generated output

[14]William Fisher has mapped 4 sources for justifying the granting of copyright protection for works as Fairness, Welfare, Personality and Culture. [15]Scholars have argued, that these justifications are not easily applicable for works created by AI systems. The theories for maximizing social welfare encompass three main theories. The theory of *Optimizing Patterns of Productivity* supports the extension of intellectual property protection to works which are in demand by the consumers. The supporters of this theory explain that licenses will ensure that the goods get into the hand of the customers who have interest in the works. Creation of works in different mediums by AI is likely less costly. This means that customers will likely have to pay less for some mediums of works and other intellectual property creators could benefit by licensing AI creations and making less expenses to create the end product.

The personality theory, mostly by the writings of Kant and Hegel, has strongly shaped civil law countries and requires the promotion of human flourishing by protecting fundamental human needs or interests. Justin Hughes interprets from the Hegelian theory for the justification of intellectual property that we should be more willing to protect works with higher level of personhood. This justification is fair, but the level of personhood could not be measured as it is impossible to know what the author was really thinking when creating a certain work and in what amount did the work consist of the author's personhood.

[14] Fisher, William. (2001) Theories of intellectual property. Cambridge
[15] Kop, Mauritz. (2019) AI & intellectual property: Towards an articulated public domain. Tex. Intell. Prop. LJ 28: 297.

The Labor- Desert theory falls under the source of fairness which is the basis of John Locke's justification to property rights. [16]Locke suggested that when applying physical labour to a plot of unowned land one should acquire a natural right to the crops. In relation to Locke's theory, data could be seen as the unowned plot of land and the labour to creating an algorithm itself should account to creating rights to the products of the labour. [17]The theory of fairness also incorporates the fairness of competition which relies on Locke's theory as it would be wrong for one to reap where he has not sown. In context of AI intellectual property protection, the unfair competition of competitors using the labour of AI created works is a real threat. [18]Some argue that the labour theory does not support the protection of works generated by AI by claiming that there is no intellectual labour involved in the development of content by AI. The creation of AI although certainly does involve intellectual labour. With machine learning functions the AI could develop itself to creating to such a form that was not predicted and a system used for creating AI assisted works could start creating AI generated works, but the underlying labour would still have to be accredited to the creator of the AI.

The incentive theory as a part of the welfare source should be more evidently taken into account as a justification for enabling protection for AI generated works. Although it is argued by some commentators that in some field's production of specific intellectual property products is not at all dependent of copyright of patent law protection. [19]The argument for that is that other rewards like prestige and the love for the art would be sufficient for sustaining the level of production even without intellectual property protection. W. Fisher explains that as we don't have enough empirical evidence, we cannot be sure who is right. [20]Some scholars have argued that on a general level AI innovation seems to be thriving and therefore there is no lack of motivation for innovation which makes the incentive theory not convincing for the justification of extending protection to AI generated works. There is no evidence suggesting that the current state of AI in the field of systems which are intended to create works in the same mediums as copyright protected works has levels of innovation reaching its full potential. It must be taken account to that a large part of innovation is done by corporations that have sufficient resources to employ multiple of teams necessary to

[16] Locke, John. (2016) Second treatise of government. The Floating Press.
[17] Fisher, William. (2017) Maps of Intellectual Property. http://ccb.ff6.mwp.accessdomain.com/Maps/IPTheories.html
[18] Mizrahi, Sarit K. (2019) Jack of All Trades, Master of None: Is Copyright Protection Justified for Robotic Faux-Originality?
[19] Fisher, William. Maps of Intellectual Property.
[20] Hilty, Reto, Jörg Hoffmann, and Stefan Scheuerer. (2020) Intellectual Property Justification for Artificial Intelligence. Max Planck Institute for Innovation & Competition Research Paper 20-02.

reach the goals of developing certain innovative products. And a corporation's main goal is to act in the interests of the investors which means to increase those resources. Therefore, one would have to assume that love for the art and prestige would not be enough to increase innovation. [21]Scholars have argued, that there has to be somebody motivated, if not to create the work, then to bring the work to the public and in cases where users have a part in AI generated output, the user would not have an incentive to bring the work to the public or could lie about the creation not being an AI generated output.

An example would be where a self-learning system is programmed to design houses in the way most energy efficient. One would assume that technological system of this kind would ordinarily require an investment and an incentive to make the investment profitable for the investor. In a case where the architectural plans would not be protected there is far less incentive to develop these types of systems. If the minimum human intervention for an AI assisted work to be protected would need the same requirement as the current legislation requires in the form of sufficient creative input from humans, it would limit the potential works that could be protected in the way that companies could lack the necessary protection for their output and competitors, if given the chance will use this unprotected output for their own benefits. This in turn may not favour motivation to produce such systems that will generate these types of works in the first place, even if these systems would have the potential to increase efficiency. The distinction of common law and civil law ideologies could be vital for future legislation improvements for output generated by AI or output that is AI assisted. [22]Mauritz Kop, [23]Pamela Samuelson and others argue against this, saying that an AI does not need an incentive nor recognition or reward for the endeavours. This argument suggests that AI would own itself and require the need for legal personhood. Although the current state implies that AI systems are the property of the creators of the algorithms. It is right that AI itself does not need an incentive, but the creators or owners of such systems definitely benefit from the works that would be created by the system. [24]The European Parliament resolution of 20 October 2020 on intellectual property rights for the development of artificial intelligence technologies took the view that "technical creations generated by AI technology must be protected under the IPR legal framework in order to encourage investment in this form of creation and improve legal certainty

[21] Samuelson, Pamela. (1985) Allocating ownership rights in computer-generated works. U. pitt. L. rev. 47: 1185.
[22] Kop, Mauritz
[23] Samuelson, Pamela.
[24] European Parliament resolution of 20 October 2020 on intellectual property rights for the development of artificial intelligence technologies (2020/2015(INI)

for citizens, businesses and, since they are among the main users of AI technologies for the time being, inventors." [25]Scholars like Yanisky-Ravid claim that recognising copyright for AI generated output hampers the public's ability to enjoy the work. [26]She argues that by acknowledging copyright for such works, the existing balance will be thrown off. [27]Her argument is that in case of AI generated output "there wouldn't be any risk of a lack of artistic creation even if copyright law did not exist to protect such creations." Although there is no possibility to obtain research data to analyse in what measure would the public miss in innovation of AI systems and the amount of works that would not be created when not acknowledging protection of AI generated output. It is clear that the investments made for innovation need incentives and it is baseless to claim that there are enough incentives for creating such works without any intellectual property protection.

When turning to justifications for intellectual property protection, the civil law countries attend mainly to the notions of natural rights. The common law countries such as the United States espouse more utilitarian approaches for the justifications of copyright legislation. The United States Constitution also expresses the need "to promote the progress of science and useful arts." For United States the position for not allowing copyright protection for AI assisted or AI generated works would arguably not follow the fundamental principles set in the constitution as it would not promote progress of science or useful arts as parties involved in innovative AI systems capable of useful output would not in that case have ownership for the creation of their investments.

Although it may be possible for parties in possession of systems having the ability to create works autonomously to incorporate business models which can return their investments through AI generated output even if copyright or similar rights are not acknowledged. They could for example in some cases restrict overall access to AI created output and allow access for a fee or offer custom AI creation on a subscription basis. [28]Today there exists an AI system that writes new compositions by using fragments of classical music and mutating these. As an example, in the future there could be an algorithm creating music for a song. Although by when the work is made available to the public there is no protection. When a hip-hop vocal artist uses this service for creation of a beat for the song, he could not prevent other people from using the work that he paid for as it is possible

[25] Yanisky-Ravid, Shlomit. (2017) Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability in the 3A Era: The Human-like Authors Are Already Here: A New Model. Mich. St. L. Rev: 659.
[26] Ibid.
[27] Ibid.
[28] Ball, P. (2014). Artificial music: The computers that create melodies. BBC, August, 8. Retrieved from https://www.bbc.com/future/article/20140808-music-like-never-heard-before

to remove the vocals and use only the music that is nor protected. The same would be the case where a web developer buys visuals created by AI or for example an architect's creation of architectural design has been built. This means that these business models have limited possibilities which do not offer similar incentives as protection of AI output by copyright or similar rights.

Some common law states have acknowledged the protection of works generated by AI. Although this does not give the states which have done so any real advantage. At this time intellectual property protection could not be regionally or locally applied. Companies would have little incentive to invest in systems capable of generating output that is only protected in a few states. For protection of AI generated output to be effective, the protection has to be acknowledged with harmonized legislation. The Infosociety directive recital 4 states as a reason for the directive that "a harmonized legal framework on copyright and related rights, through increased legal certainty and while providing for a high level of protection of intellectual property, will foster substantial investment in creativity and innovation, including network infrastructure, and lead in turn to growth and increased competitiveness of European industry". AI systems are capable of autonomous output of all the same mediums that are currently created by natural persons which is under copyright protection. As artificial intelligence systems have a potential capability to increase the speed and quantity of crating the same mediums of protectable works, it would need some kind of legal protection to be of use for the persons interested in creating these works, and not protecting their investments would hold back innovation. As if the developers have only economic interest and the works would not be under copyright protection, they would likely not have the incentive to create such works. [29]Marcus du Satoy has also impressed concern for limiting innovation of AI by saying "why would anyone invest in creating a complex algorithm that can compose new music or create art if the output could be used by anyone without cost?"

[30]P. Goldstein words are appropriate to describe the reality of copyright legislation: "Battles over what works qualify for protection and over the proper scope of rights in literary and artistic works are fought on economic, not philosophical terrain."

[29] Du Sautoy, Marcus. (2020) The creativity code: art and innovation in the Age of AI. Harvard University Press.
[30] Goldstein, P. & Hugenholtz, B. P. (2019) International Copyright: Principles, Law, and Practice, 4th ed. New York: Oxford University Press.

1.3. Practical justifications for acknowledging protection of AI generated output

Practical justifications in some part overlap the philosophical justifications. The most important justification for acknowledgin would be to allow economic incentives for the subjects responsible for creating AI systems. This will encourage innovation and will overall guarantee the creation of AI generated works in the rate of possible potential. Another pracitcal justification would be solving the problem where the AI generated output is claimed to be created by a person. [31]If AI generated works will not be acknowledged of protection by copyright or similar rights, the owners and users would likely start portraying themselves as the human authors of the work. Which will cause the persons in control of AI systems to keep the applications secret, which in turn hinders innovation.

1.4. Arguments against the protection of AI generated works

The main argument against protection of AI generated works is that although AI could create works in similar mediums, the general copyright protection *acqui*s establishes that only natural persons are capable of creating output protectable by copyright, as it is based on these persons intellectual creation as authors. Although there are examples for allowing similar intellectual property protection to copyright which is not granted based on the persons intellectual creation. Neighbouring rights act similarly to copyright but lack the necessary creativity to fall under copyright protection. Neighbouring rights for publishers, producers of sound recordings and producers of films are not aimed at protection of natural rights but for establishing incentives. For databases the right for database owners is given based on the investment made. *Sui generis* copyright protection is not justified by the natural right ideology. The justification reasons from the investments made by the person. The person making the investments could be a natural person or a legal person. And therefore the right holder could as well be a natural or a legal person. [32]One claim against the protection of AI generated works is that human beings would be economically superseded, since machines produce in greater numbers and faster. When photography arose, there

[31] Dornis, Tim W. (2020) Artificial Creativity: Emergent Works and the Void in Current Copyright Doctrine. Yale Journal of Law & Technology 22: 1.
[32] Zurth, Patrick. (2020) Artificial Creativity? A Case Against Copyright Protection for AI Generated Works. UCLA Journal of Law & Technology, Forthcoming.

were similar discussions about whether or not photographs should be protected by copyright. [33]Some opponents believed that by allowing protection to copyright, "new technology by the means of automation would instigate a chic indifference to painstakingly acquired human skill". These fears of automation have yet to come true. [34]Another argument made against protection is that if the main reason for deploying machines is that the speed of which AI is possible with creating the works of consumable media, then there are no incentives for protection. Although the benefits of AI systems could not be predicted, as many predictions have lacked successfully predicting the current state, it could not be stated that the main aim of these systems could be narrowed down to accelerating the creation of consumable media. In EU and most copyright legislations, copyright protects works in any tangible medium and most of the works protected by copyright cannot be described as belonging to a part of consumable media.

1.4.1. Should copyright be exclusive for natural persons

In order to evaluate the importance of positive copyright law and the natural person being the creator of a work as the prerequisite for authorship, it is necessary to understand the origin and development of copyright. The birth of a system of rights we today know as copyright occurred alongside the invention of printing. During the 15th and 16th century, authorities of France and the UK started granting privileges for printing books to printers and publishers. In UK the Stationers Company was given the monopoly to control the right of their members to make copies from 1557. The only members of the guild were publishers. Therefore, the only subjects to hold copyright were stationers. It took 153 years until the situation changed in the UK with the incorporation of the Statute of Anne. [35]The Statute of Anne was not directed the authors of the books or copyright as a natural right thereof, but for restraining and breaking up the monopoly of the publishers. Copyright therefore, did not start out as a natural right, but a measure to protect the investments of the publisher. [36] The publishers initiated a series of strategic litigations for the pursuit to secure a

[33] Kogan, Terry S. (2015) The Enigma of Photography, Depiction, and Copyright Originality. Fordham Intellectual Property, Media & Entertainment Law Journal, vol. 25, no. 4, p. 869-938.
[34] Zurth, Patrick p. 15
[35] Khan, B. Zorina. (2008) An Economic History of Copyright in Europe and the United States. EH. Net Encyclopedia, edited by Robert Whaples.
[36] Millar v. Taylor, 4 Burr. 2303, 98 Eng. Rep. 201 (1769).; Donaldson v. Beckett, 1774 Eng. Rep. 1 837, 1774 E.R.1 837 (1774).

ruling that there were natural rights for authors under common law. [37]The publishers intended to establish case law for the common-law right to be held perpetual by arguing that the Statute of Anne was merely supplement to it. Their intentions were based on extending the period of protection to increase commercial benefits. [38]A similar development took place in the end on 17th century France, when the Parisian booksellers, holding the monopoly of French book trade, began to articulate authorship as a natural right and the author as a natural owner of the intellectual work. Their intentions as well derived from their personal need of market dominance and not for the sake of the authors. Therefore, the historical developments of copyright to a natural right have not been guided by justifications for a proprietary right by nature but mainly by the booksellers' personal business interests.

[39]Sarit Mizrahi has raised several points against the protection of machine- generated content for preserving social dialogue. She is concerned that by recognising copyright of machine- generated content, people might become disincentivized from developing their own skills and "our pursuit of knowledge as a species may very well diminish considerably." But by recognising the protection of machine- generated content, the potential creators of such systems are more incentivized to create innovative systems which itself manifests the most important pursuit of knowledge our species has encountered. [40]Mizrahi expresses concern that the need and desire to think critically may decline when algorithms which are capable of deciding if someone is eligible for healthcare of for insurance or being eligible to be released on bail are performing these tasks instead of human beings. The same concerns have been expressed by opponents of innovation at all times throughout the technological automation. [41]During the 19th century Luddites in Britain destroyed textile machinery because of it causing loss of their jobs, although new job categories arose from the development of technology.

[42]The "Revised Issues Paper On Intellectual Property Policy and Artificial Intelligence" published at the WIPO conversation on intellectual property and AI second session raised the main policy

[37] Rose, Mark. (2010) The Public Sphere and the Emergence of Copyright: Areopagitica, the Stationers' Company, and the Statute of Anne. Privilege and Property: 67.
[38] Pfister, Laurent. (2010) Author and work in the French print privileges system. Some milestones. Privilege and property. Essays on the history of copyright: 115-136.
[39] Mizrahi, Sarit K
[40] Ibid.
[41] Thompson, Clive. (2017) When Robots take all of our jobs, remember the luddites. Smithsonian Magazine.
[42] WIPO. (2020) Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence. Retrieved from https://www.wipo.int/edocs/mdocs/mdocs/en/wipo_ip_ai_2_ge_20/wipo_ip_ai_2_ge_20_1_rev.pdf

issue for granting protection for AI generated works as whether we see the copyright system as an instrument for encouraging and favouring the dignity of human creativity over machine creativity or as an instrument favouring the availability for the consumer of the largest number of creative works and of placing an equal value on human and machine creativity. Among different comments on the document Creative Commons released a statement, where they express resistance to the idea of allowing copyright protection for AI generated works. [43]Their main concern is that by extending copyright protection to AI-generated content we would be creating a further enclosure of the public domain which thereby impoverishes it and poses a serious threat to its vitality. Although this argument may not quite be valid as one could argue that if parties would intend to create AI systems that output works which are not under copyright protection, they may as likely not restrict the use of these works if they would be protected. If they would be as willing to create these works without the incentive of copyright protection in the first place, then they are likely not interested in earning through the licensing of such works. Another argument against this concern is that if there is no protection when creating these works, there may not be an incentive to invest in such innovation and these works will therefore never be created in the first place. [44]Public domain would only benefit from the AI generated works, when the unprotected works are disseminated, but dissemination also could not happen without an incentive to earn back the investments. Creative Commons also argues to the idea of *sui generis* protection of AI generated output, claiming that "other areas of law are perfectly suited for handling investments by organizations and individuals who have devoted resources in products they create that are not copyrightable." They include examples of trade secret laws and laws protecting against unfair competition for being perfectly suited. It is necessary to analyse this claim to see whether different areas of law will protect such investments instead of potential copyright protection. Another argument for limiting protection to only works created by human authors is that AI could be used to harmfully create output in masses in the intention of limiting other persons to create similar output.

1.4.2. Trade secret laws adequacy for protection of AI generated output

[43] Creative Commons. (2020) WIPO Consultation on Artificial Intelligence and Intellectual Property Policy Submission by Creative Commons. Retrieved from https://wiki.creativecommons.org/images/f/f3/CC_Submission_to_WIPO_Consultation_on_AI_and_IP_Policy.pdf
[44] Legner, Sarah. (2021) Are Works of Artificial Intelligence in Need for Further Protection? EIPR 43.2.

[45]In the EU it is regulated by a directive that information valuable to an entity which is not widely known can be protected as a trade secret if it is undisclosed and intended to remain confidential. [46]One of the requirements for information to qualify as a trade secret in the EU is that the information is secret, meaning that it is not generally known among or readily accessible to persons within the circles that normally deal with the kind of information. In the EU trade secret also has to have commercial value and the person in control of the information has made efforts to keep it undisclosed. Therefore, trade secret protection is appropriate for keeping information with commercial value undisclosed. Information is consisted of facts. Facts then again are commonly not under copyright protection. If a producer uses AI generated music, it could qualify as a trade secret in the EU. But as soon as it is published, it loses all potential to qualify as a trade secret. Most business models that different mediums of works protected by copyright are being monetised today, rely on publishing works to the public. [47]Trades secret laws also decrease the possibility for AI creators to benefit from the creation of the system. Therefore, trade secret laws are not appropriate to protect investments of companies creating output in similar mediums that of copyright protected works.

1.5. Conclusion

Current justifications as the labor theory of property can be seen as supportive for the protection of AI generated output. Although civil law states are mainly concerned with natural rights when discussing about philosophical justifications, the utilitarian approach must also be taken into account to. The master thesis concludes that the arguments against the protection of AI generated output with copyright or similar rights are mostly based on the preservation of general copyright legal *acqui* and are not concerned with the benefits that would result from establishing such incentives to the innovation of AI systems. Therefore the master thesis has reached to the conclusion for the first research question that the hypothesis has to be regarded as been proven and works created by artificial intelligence should be protected by copyright or similar rights.

[45] Directive (EU) 2016/943 of the European Parliament and of the Council of 8 June 2016 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure.
[46] Ibid.
[47] Gabison, Garry. (2019) Who Holds the Right to Exclude for Machine Work Products? Available at SSRN 3498941.

2. Current overview for protection of works created by artificial intelligence

2.1. Protection of AI generated output in international law

In order for intellectual property protection to be enforceable and effective, the intellectual property regulations in different jurisdictions have to be harmonized. Much of the global harmonization in copyright law is achieved through the Berne Convention for the Protection of Literary and Artistic Works. An incentive for states to belong to the Berne union comes from the Agreement on Trade-Related Aspects of Intellectual Property Rights or TRIPS, which in turn is compulsory for states to comply with for being a member of the World Trade Organization.

[48]The 1971 Paris Act of the Berne Convention does not regulate who is the author or to whom could copyright of a work belong after creation of a work and leaves it to national law to decide. The Berne convention for the Protection of Literary and Artistic Works also does not overall require originality to be a requirement for protection of copyright. [49]Commentaries on the subject propose that the reason for that may have been that the notion and requirement of the natural person as an author may have been clearly understood at the moment and was self- evident.
[50]Although usually copyright law in civil and common law describes that only a natural person could be an author and an original owner of a work, there are some exceptions. For example, there are many countries from both civil and common law systems that recognise the employer as the initial copyright owner if the work had been created in the course of performing tasks coming from the employment contract. [51]Copyright law in civil law countries has developed to be more of author oriented as it has been built upon the idea that copyright conferred on authors because their property is the most justified as it comes from their intellectual creation. [52]Whereas copyright clause of the U.S. Constitution makes the public interest as significant or even more significant. Even though there are significant ideological differences

[48] Berne Convention for the Protection of Literary and Artistic Works: Texts. Geneva: World Intellectual Property Organization, 1982.
[49] Ricketson, Sam. (1991) The 1992 Horace S. Manges Lecture - People or Machines: The Bern Convention and the Changing Concept of Authorship." Columbia-VLA Journal of Law & the Arts, vol. 16, no. 1, p. 1-38. HeinOnline
[50] Goldstein, P. & Hugenholtz, B. P.
[51]Ricketson, Sam.
[52] Ibid

As international law does not *expressis verbis* exclude works created by AI, in order to find out if AI generated output could be protected by copyright it is necessary to look at different national copyright regulating acts to see whether they only allow creations of natural persons to be protected and therefore exclude works made by artificial intelligence systems. European Parliament steps for legislation

In October 2020 the European Parliament issued three resolutions in regard to legislation concerning artificial intelligence. The resolutions include a proposal for an ethics framework for AI, regulating AI liability and intellectual property rights concerning AI. The resolution for intellectual property rights points out the difference for intellectual property rights of AI assisted and AI generated works, whereas when AI is used as a tool, the current intellectual property framework would remain applicable.

2.1.1. AI generated output in the EU

[53]The Court of Justice of the European Union in the landmark case of Infopaq International A/S v Danske Dagbaldes Forening stated that copyright is only applied to original works and that originality must reflect the authors own intellectual creation and therefore if a work is not created by reflecting the authors own intellectual creation, it will not be under copyright protection. In other cases, the CJEU has elaborated that "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." Although it would be impossible to determine whether the subject matter actually reflects the personality of the author.

Some artificial intelligence algorithms although imitate human thought processes. The test of originality in the United Kingdom is satisfied even if it is not an original thought. The only requirement is that the work must be created through the authors own skill, judgment and individual effort and it has not been copied from other works.

For the EU originality requirements, the CJEU have also said that "the realisation of a subject matter has been dictated by technical considerations, rules or other constraints, which have left no

[53] Infopaq International A/S v. Danske Dagblades Forening, Case C-5/08, 2009 E.C.D.R. 16 (2009).

room for creative freedom, that subject matter cannot be regarded as possessing the originality required for it to constitute a work." 1.1.1. Does sui generis database right protect effort made through AI systems?

Although the sui generis database right does not require a natural person's input as intellectual creativity in order to be protected and it can therefore be seen as an exception to the civil law natural right ideology. Nationals of EU member states, people having their habitual residence in a member state and companies or firms registered in a member state are included by the directive as beneficiaries of the right. The directive therefore does not exclude companies or persons that use artificial intelligence systems for obtaining, verification or presentation of the contents of a database. [54]The European Court of Justice has held that only investments for seeking out existing data will be taken in to account when evaluating the fulfilment of the "substantial investment" condition. The wide consensus derived from the cases is that AI generated data is excluded from the protection of sui generis database right for the reason that investments in machine-generated data constitute the "creation" and not the obtaining of "data". Although AI systems could be used in obtaining, verifying and presenting existing data. [55]For example, if an AI would compile data of DNA sequences or weather phenomenon, it would be protected by the Database Directive. The dominant view on the subject is contrary to this belief, but interpretation from the directive and case law does not preclude from applying database right in case of using AI systems. The "substantial investment" in cases where AI systems are used for obtaining, verifying and presenting existing data could be met by showing the financial cost of developing or using such AI technology. [56]It can be argued whether different types of works created by AI, such as movies or maps, can be protected under *sui generis* database right as compilations. There may be some cases where compilations created by AI could be protected under the database right, but even if the database right could be applied, the narrow scope of protection could not offer incentives compared to copyright protection. EU legislation, has allowed the protection of interest for database creators as a property right there are many states outside the EU that do not recognize the database right. Although, there has been extensive lobbying in the United States for the unfair treatment of databases in EU and USA but the bills have been prevented from interest groups benefiting the current situation.

[54] Fixtures Marketing Ltd v. Oy Veikkaus Ab, 2004 E.C.R. I. 10365 (2004).
[55] Lauber-Rönsberg, A., & Hetmank, S. (2019). The concept of authorship and inventorship under pressure: Does artificial intelligence shift paradigms?
[56] Ibid.

The selection for the comparison of legislations in copyright law was made to show different legal systems. The selection of the United Kingdom, United States of America and China, Australia, Estonia and India include a variety of common law and civil law states. Each of these states represent the core principles of the legal systems that they belong to.

2.2. Comparison of national legislations

2.2.1. The United Kingdom

The United Kingdom copyright law has regulated computer- generated works from 1988. [57]The United Kingdom Copyright, Designs and Patents Act section 9(3) as a *lex specialis* to the p 1 which defines the author to be the person who created the work, states that "In the case of a literary, dramatic, musical or artistic work which is computer-generated, the author shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken." The definition and the minimum limit of the arrangements that has to be undertaken in order for the person to be undertaken as an author is not specified. By the definition of the WIPO "*Paper on Intellectual Property Policy and Artificial Intelligence*" the works of AI assisted would be protected by the United Kingdom Copyright, Designs and Patents Act. Although it is unclear whether the arrangements necessary include the developing of artificial intelligence systems. If the arrangements would include the development of an artificial system then it would pose several legal issues. As in that case the persons related to making arrangements necessary for the creation could be extremely extensive. [58]For a single artificial intelligence system there could be many parties providing the underlying software and training the algorithms. The United Kingdom inherently seems to deal with AI systems as a tool for creating works. Although as the Copyright act of 1988 includes in the Minor definitions section a definition for computer generated works as works that are generated by a computer in circumstances such that there is no human author of the work. The definition seems to be in contrary to the Infopaq decision of CJEU which only allows copyright to works created by natural persons as the author's own skill, labour, judgment and effort

[57] Copyright, Designs and Patents Act 1988
[58] Bond, T., & Blair, S. (2019). Artificial Intelligence & copyright: Section 9 (3) or authorship without an author.Retrieved from https://academic.oup.com/jiplp/article-pdf/14/6/423/28652212/jpz056.pdf

are essential. Although the relationship between section 9(3) and the requirement of is unclear and academics have three schools of thought on the topic. [59]The first acknowledges the creative efforts of the person making the arrangements, the second that there is no requirement of originality for computer-generated works and the third one looks at the requirement of originality objectively, as the work should be protected only if the same work would be protected if it have been created by a human. It is possible that the courts of UK would interpret the law by taking into account the creative efforts of the person making the arrangements and at the same time applying the originality requirement as if the same outcome of work had been created by a human, would that have granted copyright protection. Although the House of Lords have expressed that there is no prerequisite for human creativity for a work to apply for protection. Lord Beaverbrook explanation is that "the person by whom the arrangements necessary for the creation of a computer-generated work are undertaken will not himself have made any personal, creative effort". It is rather unlikely that the courts of UK would interpret the copyright law for computer generated works with no requirement for originality as there would be no limit to mediums of works and protection would be wider than for works created by natural persons. In consequence for allowing copyright to works created by something that is not a natural person, no moral rights are applied to such works and the term of copyright protection is set to 50 years from the creation of the work. These exclusions from regular authorship emphasize the fact that the work under copyright protection does not have a human creator. It could be therefore understood that AI generated output could be under copyright protection in United Kingdom. [60]Some scholars argue that the UK legislation is not compatible with the EU general *acquis*, although after Brexit, the UK legislation does not have to comply with the EU general *aquis*. There has been one case in the UK about computer generated content before the implementation of the regulation for computer generated works. [61]In the case of Express Newspapers v Liverpool Daily Post & Echo in 1985 the defendant was accused of publishing lottery numbers without the permission of the plaintiff. The defendants claimed that the numbers they were subject to have been infringing were not protected by copyright because they were computer generated and the man employed could not have been the author. The court found that: "The computer was no more than the tool by which the varying grids of five-letter sequences were produced to the instructions, via the computer programmes, of Mr Ertel. It is as unrealistic as it would be to suggest that, if you write your work with a pen, it is the pen which is the author

[59] Ibid.
[60] Bently, L. (2018) "The UK's provisions on computer generated works: a solution for AI creations?'." 2019-11-02]. Rerieved from https://europeancopyrightsocietydotorg.files.wordpress.com/2018/06/lionel-the-uk-provisions-on-computer-generated-works.Pdf
[61] Express Newspapers v. Liverpool Daily Post, 1985 W.L.R.1 1089, 1985 F.S.R. 306 (1985).

of the work rather than the person who drives the pen." In this case the algorithm was therefore found to have been acted as a tool and would in the context of this thesis be regarded to as AI assisted output.

From the explanation of the House of Lords it could be understood that the UK legislation does not require any human creativity for a work to be protected as a computer-generated work. And the UK legislation does not set any additional requirements that would connect the person making the arrangement and the generated output. It can be therefore claimed that copyright also applies in cases where machine learning algorithms generate works which the person making the arrangements necessary for the creation of the work did not foresee. This means that AI assisted output and AI generated output are both under copyright protection in the UK.

2.2.2. The United States

The history of copyright for software generated content in the United States goes back to the early days of digital computers. [62]In 1956, a pair of mathematicians named Martin Klein and Douglas Bolitho programmed a computer to create songs at the bush of a button. The program called Datatron could write four thousand songs an hour. They tried to register copyright for one of the songs created by Datatron and failed doing so. The Copyright Office refused registration on the fact that the work was not created by a natural person. The United States Copyright Office as the federal entity in charge of administrating copyright law in the United States, was concerned with the limit of computer generated and human in starting from the 1960s. [63]The Copyright Office addressed in the annual report of 1965 on the concern: “the crucial question appears to be whether the "work" is basically one of human authorship, with the computer merely being an assisting instrument, or whether the traditional elements of authorship in the work (literary, artistic, or musical expression or elements of selection, arrangement, etc.) were actually conceived and executed not by man but by a machine.” [64]Section 102 of the US copyright act sets that “in original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device." Section 102 makes copyright protection possible for AI assisted

[62] Klein, M. L. (1957) Syncopation in Automation. Radio-Electronics: 36-38.
[63] Copyright Office (1966) Sixty-Eighth Annual Report of the register of copyright. Retrieved from https://www.copyright.gov/reports/annual/archive/ar-1965.pdf
[64] 17 U.S.C. § 102

output. The Copyright act does not define the notion of an "author" or "authorship". [65]The Copyright Office has established the Human Authorship Requirement which requires the work to be created by a human being to be qualified for "authorship" which means that it will refuse claims trying to register works not involving human creation. There has only been one publicly known court case in the US about non-human authorship. In 2018 the last decision among several disputes was made concerning a case of authorship for a photo not taken by a human called "the monkey selfie copyright dispute". The case was filed by an American animal rights organization PETA, in the hope of establishing a legal precedent. The court ruled that a monkey cannot own copyright under United States copyright law. In 2018 the appeals court confirmed the decision of the lower court. For AI systems there are several subjects that have a part for the final AI generated work output. Such as programmers

In 1974 due to the development of computer technology the National Commission on New Technological Uses of Copyrighted Works was created by the Congress. Which concluded four years later that no amendments to the Copyright Act were necessary in regard to works created with human assistance. It reasoned that in the process of creating new works, computers were merely tools, that there is no reason to believe that computers are contributing to the authorship of a work and that the creation of AI at the time was too speculative. To the question of who should be regarded as the author for a work produced through the use of a computer the report concluded that the author of the work is the person who employs the computer and that authorship of the program or the final work is irrelevant.[66] This contradicts to the Copyright Offices standing on Datatron.

2.2.3. China

People's Republic of China has different legal systems. With the mainland China largely a civil system, Macau's system as based on the civil law of Portugal and Hong Kong as a former British colony retaining the common law system.

[65] Palace, Victor M. (2019)What If Artificial Intelligence Wrote This: Artificial Intelligence and Copyright Law. Fla. L. Rev. 71: 217.
[66] National Commission on New Technological Uses of Copyrighted Works. (1978) Final Report of the National Commission on New Technological Uses of Copyrighted Works. Washington, DC.

On December 24 in 2019 the Shenzhen Nanshan People's Court heard a case known as the "Dreamwriter case". The case was about a financial reporting article that the Plaintiff had published on its website and which the Defendant reprinted on its own website without the Plaintiffs permission. The article was automatically written by a computer software called Dreamwriter that had been licensed by the plaintiff from another company. The case was concerned with two main issues. Firstly, whether an AI-generated work can become a work protected by the applicable Copyright Law and secondly the ownership of copyright for a work created by an AI. For the first question, the court did not establish a precedent to allow AI generated work to be protected by a copyright, it instead found that the work is an AI- assisted work. The court found that the article was generated by the Plaintiffs team using the Dreamwriter's software. The court stated that: "the arrangement and selection of the creative team in terms of data input, trigger condition setting, template and corpus style choices are intellectual activities that have a direct connection with the specific expression of the article involved." By the Copyright law of China when a work is created according to the will and under the sponsorship and the responsibility of a legal entity or an entity without legal personality, such legal person or entity without legal personality shall be deemed to be the author of the work. It is not clear whether a legal entity in that case can be an author or just own the copyright**.** The court believed that the work was created by multiple teams of the Plaintiff and therefore the Plaintiff enjoyed copyright for the work. Therefore, there was no reason to debate whether a work created by an AI autonomously could be protected by copyright it was said that a definite answer cannot be given yet.

Copyright law of Hong Kong unlike the legislation of mainland China has incorporated United Kingdom copyright legislation. Therefore, like the Copyright, Designs and Patents Act 1988, the Copyright Ordinance sets that in case of computer-generated works, the person by whom the arrangements necessary for the creation of the work are undertaken shall be taken as the author.

2.2.4. Australia

[67]In 2010 the full federal court of Australia discussed the case of Telstra Corporation Limited v Phone Directories Company Pty Ltd. Telstra is a telecommunications company that collects a wide range of data from its clients. It then publishes the White Pages Directories (WPD) and the Yellow Pages Directories (YPD), which lists the names, addresses, telephone numbers and other

[67] Telstra Corporation Limited v. Phone Directories Company Pty Ltd, 2010 F.C.A. 44, 2010 F.C.A.F.C. 149 (2010).

information in relation to residential or business customers for a particular geographic area that are collected from its subscribers. For each directory, the listing information is obtained from a variety of sources. The information is entered into the database through a computer system. About 85 per cent of the data is entered automatically. The system carries out checks for identifying any errors in the listings. Necessary corrections are made manually. The proceedings were started in 2007, when Telstra and Sensis commenced proceedings against Phone Directories Company for alleged copyright infringement of both of these directories. The main discussion of the case revolved around whether the works published were under copyright protection. The court established early in the case, that the terms of the Copyright Act of Australia reflect the intention of the Berne Convention for the Protection of Literary and Artistic Works to "protect the rights of authors, copyright subsists in a literary work only by virtue of the authorship of that work by an individual or individuals" and therefore copyright cannot subsist in a work if it does not originate from an individual. The Applicants tendered 91 affidavits from individuals who were said to be "authors" of one or more of the Works. The primary judge found that some of these individuals had a limited or a non- existent role in contributing to the directories and that of those who did contribute, "the contribution certainly not of a nature to be described as independent intellectual effort or sufficient effort of a literary nature." Therefore, the court held that none of these individuals can be identified as authors. In a similar case of the directories could, by the definition of the WIPO paper be defined as falling under AI assisted output as the system needs some human intervention to function. Therefore, the Federal Court of Australia interprets the Copyright Act of Australia as it would therefore not protect AI assisted works. It can be understood that the United Kingdom legislation could presumably award copyright for these types of directories for the legal person by whom the arrangements necessary for the creation of the work that was undertaken only if other conditions for protection are met. As discussed, the UK courts may allow protection for computer generated works by objectively comparing if the same work would be protected if it was created by natural persons. In the case of Telstra Corporation Limited v Phone Directories Company, it is not stated whether the contents of the work would have been protected if the effort of the individuals would have been greater. [68]Although in an earlier case of Telstra Corporation Limited v. Desktop Marketing Systems the court found that the use of the contents of White Pages and Yellow Pages telephone directories constituted copyright infringement. If the makers or right holders of the database would have been nationals an EU member state or had their habitual residence in EU or was a registered company in EU the protection of *sui generis* database right

[68] Telstra Corporation Limited v. Desktop Marketing Systems Pty Ltd, 2001 F.C.A. 612 (2001).

would have been applicable as the requirement of substantial investment in the form of obtaining, verification or presentation of the contents would likely have been met.

2.2.5. Estonia

[69]By the Estonian copyright act, a "work" that is protected by the act means any original results in the literary, artistic or scientific domain which are expressed in an objective form and can be perceived and reproduced in this form either directly or by means of technical devices. A work is original if it is the author's own intellectual creation. By the Estonian copyright act an author can only be a natural person. Therefore, an artificial intelligence computer system itself cannot create output that would be under copyright protection. Even when an autonomous system is in an assisting role and a natural person has made arrangements necessary to create an original result that is in an objective form in literary, artistic or scientific domain which is expressed in an objective form and can be perceived and reproduced in this form, it is not under copyright protection by the copyright act of Estonia as the creation would be the output of the AI system. Only in cases where AI is in an assistive role or only partly responsible for the creation of the work and a natural person is responsible for some part of the intellectual creation, could copyright protection apply to works related to AI output. It would pose a risk that interested objects would incorrectly state that a work is at least in part a natural person's intellectual creation even when it is not, in order to obtain copyright protection for that work.

2.2.6. India

[70]Copyright law in India is regulated by the Copyright Act 1957. The notion of the "author" in the Copyright Act does not *expressis verbis* require a natural person for copyright protection. The Copyright Act sets that "in relation to any literary, dramatic, musical or artistic work which is computer-generated, the person who causes the work to be created shall be the author." The Copyright Act of India does not elaborate on what is regarded as "causing the work to be created". But it can be understood that it could have a similar meaning to the notion of the person making the arrangements necessary for the creation of the work. [71]Although compared to the UK

[69] Copyright Act RT I 1992, 49, 615.
[70] Copyright Act 1957 India.
[71] Agarwal, Saakshi, and Chintan Bhardwaj. (2021) The Dilemma of Copyright Law and Artificial Intelligence in India. Available at SSRN 3818280.

legislation, where the person making the arrangements is regarded to as a natural person, the copyright law of India does not limit authorship to natural persons, when acknowledging copyright for AI created works and legal persons could also be the subjects. It is unclear, whether the notion of "causing the work to be created" would need to include intellectual creativity. There is no precedents for legal clarity and the copyright law of India is rather ambiguous in allowing copyright protection to AI generated output.

2.3. Joint authorship

For most states the creativity of an AI system is not acknowledged with copyright protection as respective national law or case law sets that copyright subsists only for the intellectual creativity of a natural person. As previously analysed in a situation where the intellectual creativity of an output could only be assigned to the actions of an AI system, for these legal systems, there are no natural persons to be acknowledged for and the output is not protected by copyright. Although, there may be cases where the creation of on AI output is created out of collaboration with an AI system. In these cases a natural person expressing intellectual creativity would be acknowledged of gaining copyright protection, even when the AI generated output itself would not gain such protection in the legal system. Such collaboration could mainly be done by the programmers of the AI system or the user of such a system. In cases where a collaboration is the work of the programmer in the form of narrow selection of commands or a narrow selection of input which allow the programmer to foresee and predict the outcome, the output has to be regarded as AI assisted output. Similarly the output has to be regarded as AI assisted output in situations where the user could provide such input that he or she could foresee the output. Joint authorship could occur in situations where a person makes a selection of suitable output, based on the wider output given by the AI. Joint authorship could also occur in situations where AI generated output is used on AI assisted systems to make AI assisted output. AI generated output could as well be used with software or any other method, which allows the natural person to process and modify AI generated output while expressing intellectual creativity in doing so. National legislations commonly establish an economic right for the author to restrict making adaptations, modifications and other alterations of the work. Although ideas are not protected and therefore it is possible to take works as inspiration and create similar works to some extent. If this resemblance is too close to the work it would mean that the second work will infringe the copyright of the work firstly created. The successful development of an AI system is dependent of the amount of training data used for the creation. Regulatory amendments in Japan and the European Union, with the Digital Single Market Directive, have made exceptions to copyright protection in the purpose of text and data mining. The directive elaborates that text and data mining means “any automated analytical technique aimed at analysing text and data in digital form in order to generate information which includes but is not limited to patterns, trends and correlations.” As an AI system capability and quality is largely linked to the training data it is necessary to use as much data as possible. In certain cases where the training data is not as diverse, the works created based on the training data are more likely not to embody new works but adaptations of the training data. An example would be where

an algorithm uses Rembrandt's artwork to create a new painting. Although Rembrandts work is not under copyright protection as the term of copyright protection has ended, if it would still be protected it would come under question if Rembrandt's rights were infringed. Another problem would be whether Rembrandt would own copyright to such works. The US copyright law incorporates the doctrine of substantial similarity. By the substantial similarity doctrine, a work will be found infringing the copyright if the similarity of two works is so substantial that it could have only been caused by copying.

Conclusion

There are some legal systems that allow copyright protection even in cases when no intellectual creativity of a human being is present. Several of these legal systems could still acknowledge protection of AI generated output if a joint output is created in collaboration with a natural person. Therefore, the answer for the second research question is that there are several legal systems which protect works generated by AI systems. The second hypotheses raised in the master thesis, which stated that there is no such legal system which protects AI generated works is proved wrong.

3. How to protect AI generated works in EU?

As the master thesis has reached a position that it is beneficial and necessary to protect AI generated output with copyright or similar rights, it is necessary to propose a suitable solution how to establish such protection. In order to suggest a suitable legal system for intellectual property protection of AI generated output in the EU it is first necessary to define the output that should be protected and then it is possible to determine the subjects that should hold intellectual property

rights for an AI generated work and which rights would have to be implemented. [72]These potential subjects are not only entitled to intellectual property rights, but have to accept responsibility also. [73]This responsibility may amount to copyright infringement, libel and other bases for liability. There are several subjects who could participate in the process of making AI generated output possible. Such as subjects that provide training data, programmers, architects or other physical persons responsible for developing the AI system. In some cases, users of such systems could also be participant in creating AI generated content.

3.1. Which subject matter of AI output should be protected by intellectual property rights?

One requirement for acknowledging protection of AI generated output could be to make a substantial investment, but in order to establish protection for AI generated output, it is necessary to define the scope of the subject matter that would be protected. The Berne Convention for the Protection of Literary and Artistic Works defines works that are protected by copyright. The Berne Convention Article 1 sets that the parties of the convention constitute a Union for the protection of the rights of authors in their literary and artistic works. Article 2 sets that the expression "literary and artistic works" includes every production in the literary, scientific and artistic domain and proceeds to conclude a list of examples of protectable subject matter. [74]The Berne Convention does not set a limit to protecting subject matter, but establishes a minimum requirement for member states. [75]For neighbouring rights, the Berne Convention simultaneously accommodates the expansive notions of common law countries while leaving room for other treaties to set international norms for civil law countries. The fundamental prerequisites for copyright protection to occur are that the work has to be original and in a tangible form. For a work to be original it has to be the natural persons own intellectual creation. Although this prerequisite cannot be applied for defining protectable subject matter for protecting AI generated output, as AI does not consist of natural person's intellectual creation. It could be possible to establish the types of output that should be acknowledged of protection. For example Software is in civil and common law countries protected as a literary work. When physical persons create software that is machine learning, then

[72] Senftleben, Martin, and Laurens Buijtelaar. (2020) Robot Creativity: An Incentive-Based Neighboring Rights Approach. Available at SSRN.
[73] Ibid.
[74] Goldstein, P. & Hugenholtz, B. P.
[75] Ibid.

the software too would be regarded as AI generated output. Without enabling protection for machine learning software, the software as well as the output generated by the software could be used by competition. For this reason, protection of AI generated output should also encompass machine learning software. But it would may prove to encompass almost unlimited subject matter as for example, any visual work could be classified as an artistic work. The question of how to distinguish subject matter that deserves protection has caused much discussion. [76]Scholars have suggested that solution could be that the prerequisite for protection of AI generated output could be established based on the requirement that if the same work would have been created by a human being. In this way there would remain a common limit to public domain and the AI generated output would be treated equal to a natural persons creation.

3.2. Who should hold intellectual property rights for Artificial Intelligence generated output?

3.2.1. Users of AI systems as copyright holders

One interested party as the subjects for holding rights to the AI generated output are the users of these AI systems. The users may use AI systems to create AI generated output for their own use as end users, but they could also use the AI system to license the work to third parties. For both situations they could be interested in making profits by the use of AI generated output. Although the term users could also mean consumers of the AI generated output, it should be understood by restricting it to the subjects who directly use the AI system for creating output. In addition to just using the AI system to create the work, it is possible that users with their joint creative activity together with the AI system could qualify for joint authorship. [77]In 2007 Her Majesty's Court of Appeal in England in a case about copyright infringement of a game. The court among other things had to decide about the authorship for user input made in the game. In this case the court found that the user input was not artistic in nature and that he has not contributed skill or labour of artistic kind. In this case the court did not regard the user to be an author. User generated content has since

[76] Bond, T., & Blair, S
[77] Nova Productions Ltd v. Mazooma Games Ltd, 2007 E.W.C.A. Civ 219 (2007).

become more and more common in video games. [78]Copyright protection of player generated content is less likely in cases where the choices of the player are tightly constrained by game mechanics. The copyright protection of a joint authorship work would even be possible when AI generated works in general are not protected. In most legal systems the user could also be held as an author in cases where the user makes a combination out of a selection of works. By making a combination of a selection of works the person creates a compilation of works. The selection of works could thereof be protected if creating the compilation consisted of intellectual creativity from the user. The person making the selection by including intellectual creativity could be held the author of the compilation even when the parts which the compilation is consisted of are not protected by copyright. A part from making a compilation of a series of output a user may in theory be also acknowledged of being the author based on the selection of one output out of several outputs or by accepting an outcome that was not created by their direct actions. An example for that would be where a bulk number of photographs would be taken by one person and the choice for selection of which photo to use is made by another person. If there is a vast number of photos to choose from, then it could be that the person making the selection is also acknowledged as an author for his or her intellectual creativity. Although in cases where there is only a limited choice, then the creativity of the person making the selection would also decrease and eventually could not be acknowledged. In cases where the users does not contribute intellectual creativity but where he or she has only inserted basic instructions for the creation of a work, it would likely not qualify for joint authorship. The more precise these instructions change the more the person could foresee the final output and therefore the actions could more likely be regarded to as intellectual creativity and the output to an AI assisted output. It would have to be analysed whether it would be justified for users to be held copyright holders of AI generated works where the users do not show intellectual creativity in the form of selection of the compilation, selection of the output from bulk numbers of output or deciding of such criteria. [79]Pamela Samuelson argues that if anyone, it is the user who needs copyright incentives to take the raw outputs and adapt them for commercial dissemination. She makes the point that the users have already paid the owner of the AI software to generate the output. However, it may not be the case for every type of software. For example, some business practices could involve the use of such software for free and some may only require payment after the work is created. Payment after the created output is available for review is

[78] Wilson, Jason. (2015) Copyrighting Player-Generated Content in Video Games | VentureBeat. VentureBeat, VentureBeat. Retrieved from https://venturebeat.com/2015/01/07/copyrighting-player-generated-content-in-video-games/.
[79] Samuelson, Pamela. (2020) AI authorship?. Communications of the ACM 63.7: 20-22.

beneficiary for the user because it would protect the customer from spending money on a result which is not what was expected. This practice is also good for the provider of the service as clients have more trust and are more encouraged to use such services. If the users have a right for the output deriving from copyright law, then it would not be possible to use such business practices as the users would have the right for the output at the moment it becomes possible to review it. [80]In the most part users do not need an incentive in the form of intellectual property protection when their input does not involve creativity. A user could also become the owner of the rights for an output on a contractual basis with the right holder who could be the person who possesses the AI system. In cases where joint authorship is in question, the right holder for which the base work is based on would have to give a licence to the person making the joint work. Otherwise the person making the joint work would not be allowed to do so. End user license agreements are in practice commonly used and could be applied to AI systems as well. Therefore based on the objectives of the most common business practices this thesis proposes that it is not reasonable to acknowledge copyright protection directly for the user in cases where the user has not made input which could be seen as intellectual creativity. There are multiple other ways to regulate how the subject in control of the AI system gains these rights.

3.2.2. The subject making the arrangements for the underlying work with human creativity

[81]Some scholars have praised the UK system of granting copyright to the person who made the operation of the AI system possible. This is justified as the person who contributed the system to work is anticipating a return of investment. As discussed, one school of thought for the UK computer generated works regulation is that it could acknowledge the creative efforts of the person making the arrangements. This school of thought excludes copyright protection based on investments and acknowledges the labour of physical persons. In this case, the programmers and other subjects creating the AI software can be seen as the subjects whose work would be acknowledged. Although as discussed earlier, by the House of Lords commentary, it is not the case for UK copyright law. It could then again be proposed to be applied for the EU copyright law. [82]When acknowledging the creative efforts of the persons who are responsible for the creation of

[80] Perry, Mark, and Thomas Margoni. (2010) From music tracks to Google maps: Who owns computer-generated works?. Computer Law & Security Review 26.6: 621-629.
[81] Guadamuz, Andres. (2017) Artificial intelligence and copyright. WIPO Magazine 5: 14-19.
[82] Brown, Nina I. 2018 Artificial Authors: A Case for Copyright in Computer-Generated Works. Columbia Science and Technology Law Review, vol. 20, no. 1, p. 1-41. HeinOnline.

the system, then for the most part software developers exercise the most control in determining the parameters for creative input. An argument made against this theory is that the connection of the person making the arrangements that constitute in itself the creative efforts necessary for protection is no longer linked to the output of the AI system if machine learning has developed the algorithm in unpredictable ways. [83]This is because AI systems learning process may not involve the creators of the initial code or other natural persons. But this argument is debatable. It would also be possible to acknowledge the creativity vested in the creation of such an algorithm that has developed itself in unpredictable ways. The programmers making the underlying work would still be the persons responsible for the AI system created and the output of that AI as if there would not have been the programmer's input or other human beings, the output of the AI system would not have been created at all. The same question would be applicable if an artist would start rolling a snowball that would create itself by inertia eventually. The creator of the software that has developed itself could be recognised as the author of the output, because of the authors own intellectual creation vested in the software is the human action that caused the creation of the final output and is therefore also included in the machine learning version of that software and the output created thereof.

3.2.3. Subject making the arrangements for the underlying work without human creativity

By the House of Lords commentary, there is no requirement for creativity in the UK copyright law for the protection of AI generated content. As discussed, this is regarded as not complying with the general EU *acquis*. For this reason, it would require a fundamental swift in the EU copyright law to be applicable in the EU copyright system. [84]A human- centred approach for establishing protection could likely close the door to AI generated output. This favours other possibilities for intellectual property protection for AI generated output. Establishing a *sui generis* right or a neighbouring right, that does not require human creativity, could also acknowledge the physical persons creating the underlying work if the intellectual creation of each person could not be identified. Although the development of AI systems is mainly carried out by large corporations, it

[83] Elgammal, Ahmed, et al. (2017) Can: Creative adversarial networks, generating" art by learning about styles and deviating from style norms" arXiv preprint arXiv:1706.07068.
[84] Dias Pereira, Alexandre L. (2021) A copyright 'human-centred approach' to AI?. GRUR International: GRUR Journal of European and International IP Law (Formerly: Gewerblicher Rechtsschutz und Urheberrecht, Internationaler Teil)" Advance Article: 1-1.

could be that some physical persons have individual programs not involving legal entities but it is not common but can be regarded to be an exception. [85]For employment contracts, national law in civil law countries usually identifies the creator of the work as the author and if not stated otherwise in the contract the copyright ownership is transferred to the employer. [86]For common law countries national law usually provides that the employer is the first owner of copyright if there is no agreement to the contrary. UK regulation for computer generated works sets that the physical person who undertook the arrangements necessary can be seen as the author of the work. A legal person can be a first owner for computer-generated works only when they were created in the course of employment. In cases of machine learning algorithms, it may be difficult to identify the persons who made the necessary arrangements. It would likely not pose such a problem if the arrangements were undertaken entirely in the course of employment contract. For civil law countries, the dualistic regime applied to AI generated output in this context may also create legal uncertainty. The moral rights of an author are inseparable from the author's person and non-transferable. For creation of AI systems there could be a vast number of developers who would remain in control of their moral rights even after their employment contract has concluded. For some states moral rights include the right decide when the work is ready to be performed to the public, make or permit other persons to make any changes to the work and to request that the use of the work shall be terminated. Although the right to withdraw the work is set to be exercised at the expense of the author and the author is therefore required to compensate the damages, there are no compensation measures when the author exercises the right of integrity of the work by restricting other people to make changes to it or when the author is not willing to decide when the work is to be disclosed. [87]Some scholars argue that in the case of more sophisticated machine learning algorithms, it would eventually be hard to view the person who originally created the AI system as the person who undertook the arrangements necessary for the creation. Although the link to the final output would decrease, the machine learning algorithm is still only linked with the persons who originally created the algorithm. It is also possible to establish a requirement of a "substantial investment" to enable protection of AI generated output based on the labour performed or the financial investments.

[85] Goldstein, P. & Hugenholtz, B. P.
[86] Ibid.
[87] Dickenson, Julia, Alex Morgan, and Birgit Clark. (2017) Creative machines: ownership of copyright in content created by artificial intelligence applications. European Intellectual Property Review 39.8: 457-460.

3.2.4. AI system as a copyright holder

In cases where machine learning leads to the self- development of an AI system where the output is no longer predicted, the natural persons responsible for creation of the system are no longer as directly connected to the final output. In such cases the AI system is responsible for the creation. Suggestions for the attribution of legal personality to AI have been made by scholars. [88]At the moment such suggestion seems premature, as AI has not reached the levels of intelligence to require legal personality and therefore it is better to rely on existing categories until a superintelligence has been created. Even if superintelligence would be created it can be argued that it could still be unreasonable to recognise an artificial system as a person. For common law countries, reinterpretations of the "made for hire" doctrine have also been proposed for recognising the protection of AI generated output. In this way the AI system would be in a similar situation to an employee creating the work under employment contract.

3.2.5. Work made for hire doctrine

[89]For U.S copyright regime, AI machines could be interpreted as employees as its generative services are employed by the programmer or the owner of the system. [90]Legal scholars have also suggested the work made for hire doctrine for recognising AI authorship for the reason that when treating the programmer as an employer it would avoid the problem of vesting rights in a machine and ascribing to a machine the ability to respond to copyright's incentives. [91]Another problem that could be avoided with implementing the work made for hire doctrine is to not treat the programmer as an author even if the work is created by the program. The same could be applied in the EU as copyright law for works made during employment acts similarly. The work made for hire doctrine would make the explicit connection between the AI generated output and the programmer. The weak point for applying work made for hire doctrine for AI generated output is that there are many subjects related to the creation of an AI system. In addition to the programmers' creative input the AI system needs investments for the rights for using training data and developing the system in

[88] Chesterman, Simon. (2020) Artificial Intelligence and the Limits of Legal Personality. International & Comparative Law Quarterly 69.4: 819-844.
[89] Hristov, Kalin. (2017) Artificial Intelligence and the Copyright Dilemma. IDEA: The Journal of the Franklin Pierce Center for Intellectual Property, vol. 57, no. 3,, p. 431-454. Retrieved from HeinOnline.
[90] Bridy, Annemarie. (2012) Coding creativity: copyright and the artificially intelligent author. Stan. Tech. L. Rev.: 5.
[91] Bridy, Annemarie. (2016) The Evolution of Authorship: Work Made by Code. Columbia Journal of Law & the Arts, vol. 39, no. 3, p. 395-402. Retrieved from HeinOnline.

various ways. The problem of vesting rights in the machine could also be avoided through other ways of regulatory amendment.

3.2.6. The subject making a substantial investment

It can be claimed that the main subjects that are interested in developing AI systems and who have the resources for developing innovative AI system which are capable of AI generated output are corporations. As any other business, such corporations exist mainly for the purpose of earning profits. The recognition of intellectual property protection for output created by AI systems would create incentives for these companies to develop AI systems which in turn benefits innovation. Therefore, these companies are the main subjects who should be acknowledged of holding intellectual property rights for the output generated by the AI that they possess in order to thrive innovation. The same reasoning is applied for acknowledging *sui* generis database protection based on the substantial investment of a legal or natural person. There are no substantial arguments why AI generated output could not be protected the same way as *sui generis* database right is protected in the EU. *Sui generis* database right and protection of AI generated output in general serve similar purposes. Legal persons are predominantly the main beneficiaries for both. Protection of intellectual property based on the investments made is directly linked to the incentives of developing AI systems capable of generating output. Making a substantial investment should also be applicable for protection where a company which has invested in creating an AI system sells the same system on to several different companies. These companies should be acknowledged of being the right holders for AI generated content that was generated by the software that they have bought. Substantial investment could be in the form of monetary investment or labour. The notion of substantial investment could also allow natural persons to be right holders for AI generated output. The substantial investments could be in the form of labour or monetary investments. The benefits for recognising the protection of AI generated output based on the substantial investment made, is that the rights would be directly acknowledged as belonging to the subject who is most interested in such incentives. Another benefit of such recognition of protection of AI generated output is that users who would also have the interest of holding rights for AI generated output could obtain licenses for the rights which are necessary for them.

3.3. Which rights should be implemented for the protection of AI generated output?

In order to offer a suitable solution for the protection of AI generated output, it is necessary to determine the rights that would have to be implemented. The master thesis has brought out that in certain situations users and programmers could be acknowledged of having rights based on joint authorship. Joint authorship could be acknowledged only in cases where the natural person has expressed intellectual creativity in a tangible form when the output was created. In these cases it would not be necessary to implement a set of rights, as it would duplicate the rights deriving from joint authorship. Therefore it would have to be analysed, which rights should be acknowledged for output that was created merely by the AI system, without the intellectual creativity of a natural person. In most countries economic rights and moral rights are separate.

3.3.1. Moral rights

Moral rights are related to the natural person that expressed intellectual creativity to create the work. In civil law countries, natural rights are inalienable and in some cases related to the author indefinitely. As previously analysed, the AI system itself could not be subjected to having rights as at the current state of the technology, legal personality of an AI system is not possible or necessary. The Berne Union members have been required to acknowledge two kinds of moral rights. These rights are the authors' right to paternity of the work, otherwise known as the right of authorship and the author's right to the integrity of the work. The authors' right to integrity is applied in different measures by different states. [92]For the UK regulation on machine-generated works, the acknowledgment of moral rights is excluded. The UK regulation for computer generated works is therefore departing from the requirements for moral rights set in the Berne convention. The exclusion of moral rights in the UK regulation is reasoned through the argument, that moral rights are concerned with the personal nature of the creative effort and the person making the arrangements necessary for the creation of the works would not have made any personal creative effort. If programmers would be acknowledged of having the right of integrity for the AI generated output, then it could cause problems in cases where the systems are machine learning or where the systems have had numerous other programmers developing the same work. When the right for integrity of the work is acknowledged for the programmer without other preconditions, then the programmer could claim to have the right to limit the processing of the AI

[92] Bonadio, Enrico, and Luke, McDonagh.

generated output in ways that were not the original intention, even when the causality between the programmers labour and the final output may not anymore be in a direct causal link. The right of authorship allows the author to claim recognition of the fact of creating of the work and relating the authors name to it. The right for the integrity of the work and the right to authorship are inherently related to the personality of the author. In case when users would be acknowledged of copyright for AI generated output, that does not involve intellectual creativity of the user, but is related to the user's actions the acknowledgment of moral rights, then it would as well not derive from the connection of the person and the output and would similarly as for the programmers be unnecessary. When establishing a right of authorship for users in a similar situation, it could allow users using different AI systems to appear as an author for the AI generated output. As there is a line for when joint authorship could appear, then uses outside the line would not need to be separately acknowledged. As discussed earlier, the main incentive for the acknowledgement of copyright or similar rights would be to encourage innovation in a way of establishing a possibility to earn profit for AI generated output. This incentive does not require for establishing any moral rights for users or programmers. This master thesis proposed as the subjects most interested in incentives of intellectual property protection to be the legal bodies investing in the creation of such AI systems. If the subjects making the investments, users of programmers would be acknowledged of having intellectual property rights or similar rights for AI generated output and if no right of authorship or similar right is existent, then anybody could claim to have authorship for such output without infringing rights. This means that maleficent claims of persons claiming to be the authors of an AI generated output could appear and there would be no legal tools to prohibit such claims. If a *sui generis* right would be acknowledged based on the substantial investments of the subject, then a similar right to the right of authorship, which would prohibit such claims of authorship, could be implemented. This could be implemented in a way to entitle the subject making the investment with a right to prohibit other parties for claiming authorship of an AI generated output. In this way the right holder would not benefit from the right to authorship directly, but it would offer a tool in order to prohibit and limit baseless claims of authorship. [93]Some states also recognize other moral rights such as the right of disclosure and the right to withdrawal. [94]The right of disclosure gives the author the right to choose, when to divulge his work. For AI generated output, the recognition of the moral right of disclosure would not have clear benefits in cases where users, programmers or subjects making the substantial investment would be acknowledged of copyright

[93] Goldstein, P. & Hugenholtz, B. P.
[94] Ibid.

or similar rights. The economic rights as the right to distribution and right communication to the public, enable right holders to control the disclosure of the output. [95]The right of withdrawal is recognised only in a small number of civil law countries. The purpose of the right of withdrawal is mainly aimed to offer the author the possibility to withdraw the work where the author feels that he does not want the public to have access to his work, as the work does not any more accurately reflect the authors' views or the author wants to hide his views. For AI generated output, the views of the subjects creating or using the system are not as directly expressed. Although the views of these subjects could be included in the output, the extent of these views in the output would likely not justify the recognition of such a right for AI generated output.

3.3.2. Economical rights

As opposed to moral rights, economical rights are alienable. Economic rights generally in most countries last as long as moral rights. Economic rights are aimed for enabling authors or right holders to earn profits from the work which they own the rights for. The most fundamental and earliest economic right is the right to reproduction. The right to reproduction is common amongst civil and common law countries. [96]For EU states, the right to reproduction is established in the 2001 E.C. Copyright in the Information Society Directive. The E.C. Copyright in the Information Society Directive has harmonized basic economic rights for all EU member states. [97]The Information Society Directive sets that "Member States shall provide for the exclusive right to authorise or prohibit direct or indirect, temporary or permanent reproduction by any means and in any form." The right to reproduction therefore enables right holders to use business practices, where the work is made available to the user of the work, so they could copy the work to start using it when purchasing a license containing the right to reproduction. Such business practices are common, and allow copyright holders to easily monetize the use of the work. The right to reproduction also allows the right holders to prohibit unauthorized exploitation of such works. Therefore, in order to enable potential copyright holders to incentivise the investments and thrive innovation, it is necessary to acknowledge the right to reproduction for AI generated output. The Information Society Directive also sets an exhaustive enumeration of exceptions and limitations to the reproduction right, such as reproductions made by natural persons for private use and

[95] Ibid.
[96] 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.
[97] Ibid.

temporary acts of reproductions. These exceptions are balancing the interests of the public and right holders and should therefore be also applied to the right to reproduction for AI generated output. The right to distribution is also set in the Information Society Directive. The Information Society Directive states that "Member States shall provide for authors, in respect of the original of their works or of copies thereof, the exclusive right to authorise or prohibit any form of distribution to the public by sale or otherwise." The right to distribution enables the right holders to use a wide range of business practices in order to earn from the distribution of the work. Therefore, in order to enable right holders of AI generated output the incentives to develop such AI systems, it is also necessary to recognise the right to distribution. The Information Society directive also includes the right of communication to the public. The right of communication the work to the public allows the right holder to authorise or prohibit any communication to the public of their works, by wire or wireless means, including such ways that the members of the public have access to the work from a place and time freely chosen by them individually. When the right to distribution is directed to the works in physical mediums, the right to communication to the public is subjected to the use of works online or by other technical measures. The right to communication to the public therefore establishes use of works by intangible means publicly, meaning outside the circle of family or friends. This includes the making available of works online through the internet. These uses include common business practices that offer right holders incentives for creating works and which would offer the same incentives for creating AI systems that are capable of creating output. There are also other economic rights such as the right to make translations and the right to make adaptations of the work. In EU the only harmonizing regulation for making adaptations and translations of works is set in the E.C Software Directive. The Software Directive recognises the right holder's right to prohibit making translations, adaptations, arrangements and any other alterations of computer programs. There are no harmonized regulations from the EU for other mediums of works except computer programs. When establishing economic rights for AI generated output the harmonized legislation of EU should also recognise the economic right of the subject that holds rights for the AI generated output to prohibit making translations, adaptations, arrangements or other alterations of the work.

The economical rights recognised by the Information Society Directive will also be subjected to the exceptions and limitations set in the Digital Single Market Directive of 2019. These exceptions include making reproductions for the means of text- and data mining and making available such works by cultural heritage institutions that are out of commerce. AI generated output should be

treated equally to existing works protected by positive copyright law and therefore these exceptions and limitations should also be applied to economic rights for AI generated output.

There are also other reasons, why AI generated output should be acknowledged of limited protection compared to positive copyright for natural persons. AI systems could ideally create output incomparably faster and in greater masses than human beings. Such methods could be used by the possessors of AI systems to restrict free expression for human beings for some types of works. It is possible to create works in such numbers that human beings have limited possibilities to create similar works as it would infringe the AI generated works intellectual property rights. Therefore, it would be necessary to exclude ill-mannered intentions for using AI generated output only in the purpose of limiting free expression of competition. Such exclusion could for example be set based on the basis of the fact that if a person has reached the same result without access to the original work it would not be regarded as copyright infringement.

3.3.3. The term of copyright protection

There is no universal term of copyright protection, but the Berne Convention sets that a minimum term should last for the author's life and for fifty years after his death. The term of copyright protection in EU is also regulated by the Copyright Term Directive. The Copyright Term Directive establishes a harmonized term for economic rights in the EU and sets that the rights of an author of a literary or artistic work should last for the life of the author and for 70 years after his death, irrespective of the date when the work is made available. The Directive also establishes situations where the term of protection runs from the time when the work was lawfully made available to the public. The term of copyright runs for 70 years after the work is lawfully made available to the public in cases where the work is published as an anonymous or a pseudonymous work or where the Member State provides separate provisions on copyright in respect of collective works or where a legal person is to be designated as the right holder. The term of protection of AI generated output could not be calculated from the death of the author as in cases where the AI is the sole creator, there is no natural person as the author. Therefore the term of protection of AI generated output could be established similarly as in situations where legal persons are designated as right holders. For benefiting the public domain, the term could also be established to run for a smaller amount of time. The term could for example be established to run the same amount of time as related rights, which run for 50 years after the event which sets the term running. Another possibility for benefiting the public domain could be to establish that the term would run from not the date when the work was made publicly available, but from the creation of the work.

3.3.4. Compulsory licenses for AI generated output

For the similar benefits of public domain, there have also been suggestions from scholars to apply a compulsory license by law to all AI generated outputs. [98]Some suggest that a non-commercial Creative Commons license or a similar model to enable licensees for non-commercial purposes to use the AI generated output to copy it, distribute it, display it and perform the output and make derivative works and remixes based on it. This solution is proposed on the claim that it would boost innovation by making the AI generated output available to the public. Compulsory licensing can also be seen as granting limited rights for AI generated output. In practice, it would restrict the use of some business models. Distribution of works, when allowed for a non-commerce license, limits the opportunities for a right holder to license works for economic purposes. There are no substantive justifications for limiting the right holders' possibilities in such a way. The consequence of applying compulsory licenses for AI generated output may limit the incentives for creation of some AI systems and therefore restrict innovation.

3.4. Neighbouring rights for AI generated output.

Although performances, broadcasts and phonograms may include creative input of natural persons, these mediums are not protected the same way as works are protected by copyright. Although creativity may vest in performances, broadcasts and phonograms, it is not taken into account to in regard to acknowledging neighbouring rights. Neighbouring rights are however often acting similarly to copyright and consisting of similar rights. This means, that the ideological prerequisite of a natural person's intellectual creativity to appear in order for acknowledging copyright or a similar right is overemphasized. If intellectual property protection can be acknowledged for actions related to works protected by copyright which does not consist of human creativity, then the lack of human creativity could not be an excuse for denying to acknowledge protection of output which is the result of the creativity of programmers, but where this creativity has made the work to develop in unpredictable ways and thus create new unpredictable works. Intellectual

[98] Pratap Devarapalli,(2018). Machine Learning to Machine Owning: Redefining the Copyright Ownership from the perspective of Australian, US, UK and EU law, European Intellectual Property Review 40.11: 722-728.

property protection of AI generated output could be acknowledged in a similar way to neighbouring rights.

3.5. *Sui generis* protection of AI generated output in the EU

One concern around the idea of implementing a similar regulation in the EU alike the United Kingdom's computer-generated works is that the possible requirement of originality in the necessary arrangements made is not compatible with the civil law countries fundamental copyright principles. In this case some scholars claim that the AI system could only be regarded to as a tool. If protection of AI generated output in the EU would depend on the creativity of the person making the underlying arrangements, a substantial proportion of works would be left out of protection unfairly compared to others. It could be that in cases where AI systems are self-learning, the system could develop without human interference to an outcome that has not been foreseeable. Therefore, it could be argued that there is no human author who undertook the arrangements necessary for the creation of the work. In cases where the outcome had been foreseen, the plurality of possible authors may become a problem. The protection of *sui generis* database right has a similar aim of protection of investments and thereby the criteria protection could be defined also by substantial investment.[99]One advantage of a *sui generis* right for AI systems is that it would allow the EU legislator to attribute only these rights that would be necessary.

3.5.1. Background of *sui generis* protection in EU

[100]The proposition of a database right in the European Union has its roots in *the Green Paper on Copyright and the Challenge of Technology* which was published by the European commission in 1988. Besides covering propositions protection for computer programs and the database right, the paper also discussed the problem of computer-generated programs. The Commission raised the issue that computer programs will itself be in the future programmed to create other programs and

[99] De Cock Buning, Madeleine. (2016) Autonomous intelligent systems as creative agents under the eu framework for intellectual property. Eur. J. Risk Reg. 7: 310.
[100] European Commission. (1988). Green Paper on Copyright and the Challenge of Technology. Copyright Issues Requiring Immediate Action. Retrieved from http://aei.pitt.edu/1209/1/COM_(88)_172_final.pdf

the issue of "to who if anybody would copyright belong to in such cases." The paper proposed that "those who use the programmed computer, which is essentially a tool, who should be regarded as entitled to protection." The Commission's decision in the paper was that the issue of computer-generated programs, should be left to national laws having to establish who, in the absence of contractual arrangements is to be considered the author. The Commission

The principle that copyrights protection can only be acknowledged for creations of natural persons is fundamental for both civil and common law states. But as seen from some of the examples in this thesis, although for common law countries it may be ideologically more feasible to enable copyright protection in cases where the author is not a natural person. Civil law countries would likely stand more for their "deep rooted" principles of copyright being an inherent right aimed to protect the property of the creator of the work. Although examples of exceptions, such as enabling protection for databases through establishing *sui generis* right, are seen to have been implemented for acknowledging intellectual property rights. Therefore for civil law countries the better approach could be to implement a separate *sui generis* right for the protection of AI generated output.

[101]The *sui generis* database right is set in the EU legislation since the 1996 database directive.[102]The need for *sui generis* database protection came from the inability of database creators to protect their investments as copyrights intention has been only to cover the creative expressions of natural persons. Although databases which by reason of the selection or arrangement of their contents, constitute the author's own intellectual creation are protected by copyright the database right acts without prejudice to existing rights. The database right therefore can be seen as an extension to copyright to protect the part of the databases which are not under copyright protection. The EU database directive sets that for acknowledging *sui generis* protection for a database, a qualitative or quantitative substantial investment has to be made in either obtaining, verification or presentation of the contents.

[101] Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases.

[102] Rungrojtanakul, C. (2005). Legal Protection of Sui Generis Databases. Retrieved from https://digitalcommons.law.ggu.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1015&context=theses

3.5.2. Similarities of databases and AI generated outputs

The incentive provided by the adoption of the *sui generis* right to protect database extraction in addition to copyright is the protection of investments of the database creators. [103]Recital 8 of the database directive refer to the unauthorized use of databases as acts which can have serious economic and technical consequences. These economical and technical consequences can be seen as the potential unwillingness to create databases or the loss of investments where there would be no protection of competition for benefiting from the creator's investments. These issues can be similar for creators of AI systems and would cause also similar economical and technical consequences. Copyright protection for databases apply to the expression of the arrangement and does not extend to the contents of the database right. Whereas *sui generis* database right protects the contents of the database. Database right is applicable based on the investment made by the database creator and has therefore relation to the notion of originality. Another reason for establishing an EU wide database right was to promote the free circulation of information goods and services in the single internal market as various forms of legal protection of databases in different member states that existed at the time would have had the opposite effect. The situation for AI generated output is much like with database contents. In the situation where member states would start imposing their own regulations and there would be no harmonized legislation for AI assisted and AI generated works, could pose significant issues for the operation single market.

3.5.3. Benefits of implementing a *sui generis* right for protection of AI generated output

[104]The main benefit of acknowledging protection of AI generated output through a *sui generis* regime would be the possibility of recognising a thinner scope of protection compared to copyright. This Master thesis has concluded that AI generated output should be protected by implementing a limited protection, where moral rights are not acknowledged for the right holder. By recognising protection of AI generated output through establishing a sui generis right, it is possible to exclude the acknowledgement of moral rights for AI generated output. Although moral rights still exist in situations where the work is made in a joint authorship where the natural person is creating the work in collaboration with the AI system. The justifications for the protection

[104] B, Enrico, L. McDonagh.

databases through the *sui generis* database right are similar to the justifications for acknowledging protection of intellectual property rights to AI generated output. A harmonized protection of AI generated output established by the means of a *sui generis* right through EU directive, similarly as the *sui generis* database right is established, would be the most appropriate way for acknowledging intellectual property protection for AI generated output. In this way it would be possible for legislators to establish an intellectual property right with some differences to copyright. As moral rights are concerned with the connection of a natural person and the work in the sense of protecting the author's reputation, it is impossible to recognise moral rights in a situation where there is no human author. Establishing a separate harmonized legislation by implementing a *sui generis* right means that legislators could also prevent malicious claims of authorship by creating a separate right of limited authorship which makes right holders able to restrict claims of authorship by third persons. A *sui generis* right could balance the collusion of interests in the sense that it offers legal tools to incentivise investments in development of AI systems while at the same time, it could protect public domain by offering a more limited protection compared to copyright. The master thesis concludes, that the third research question could therefore be answered that the most appropriate regime for implementing protection of AI generated output in the EU would be through a *sui generis* right.

Conclusion

The aim of this thesis was to clarify the current state of protection of AI generated work. The main subject matter for scholars in discussion of acknowledging protection of AI generated output is whether AI generated output should be protected in the first place. The first research question therefore was, whether works created by artificial intelligence should be protected by copyright or similar rights? The hypothesis for the first research question proposed that works created by artificial intelligence should be protected by copyright or similar right. The first research question was proven in the master thesis based on different philosophical and practical justifications. The second research question was aimed to find out whether there are legal regimes that protect artificial intelligence or computer-generated works. The master thesis compared different legislations in regard to copyright protection of AI generated output. The master thesis found that some legislations, like the UK for example that allow copyright protection of AI generated output.

This concluded the second hypothesis, which presumed, that there are no legal regimes that protect AI generated output to be wrong. The third research question was aimed to offer a solution for the most appropriate legal regime for regulating copyright related to works created by AI in the European Union. The hypothesis for the third research question proposed, that the most appropriate solution would be to establish a sui generis right based on substantial investment. In order to find the answer to the third research question, it was necessary to analyse which subjects should be incentivised and which rights should be acknowledged. Based on the analysis, the master thesis concluded that the hypothesis for the third research question has to be regarded to as been proven and the most appropriate solution to acknowledge protection of AI generated output in EU would be by implementing a *sui generis* right based on substantial investment.

List of referencs

BOOKS

1. Du Sautoy, Marcus. (2020) The creativity code: art and innovation in the Age of AI. Harvard University Press.
2. Paul Goldstein & P. Berndt Hugenholtz, (2019) International Copyright: Principles, Law, and Practice, 4th ed. New York: Oxford University Press.
3. Locke, John. (2016) Second treatise of government. The Floating Press.

ARTICLES

4. Agarwal, Saakshi, and Chintan Bhardwaj. (2021) The Dilemma of Copyright Law and Artificial Intelligence in India. Available at SSRN 3818280.
5. Bonadio, Enrico, and Luke, McDonagh. (2020) Artificial intelligence as producer and consumer of copyright works: evaluating the consequences of algorithmic creativity. Intellectual Property Quarterly 2: 112-137.
6. Bond, T., & Blair, S. (2019). Artificial Intelligence & copyright: Section 9 (3) or authorship without an author.Retrieved from https://academic.oup.com/jiplp/article-pdf/14/6/423/28652212/jpz056.pdf
7. Bughin, Jacques, et al. (2018) Notes from the AI frontier: Modeling the impact of AI on the world economy. McKinsey Global Institute.
8. Bridy, Annemarie. (2012) Coding creativity: copyright and the artificially intelligent author. Stan. Tech. L. Rev: 5.
9. Bridy, Annemarie. (2016) The Evolution of Authorship: Work Made by Code. Columbia Journal of Law & the Arts, vol. 39, no. 3, p. 395-402. Retrieved from HeinOnline.
10. Brown, Nina I. (2018) Artificial Authors: A Case for Copyright in Computer-Generated Works. Columbia Science and Technology Law Review, vol. 20, no. 1, p. 1-41. Retrieved from HeinOnline.
11. Chesterman, Simon. (2020) Artificial Intelligence and the Limits of Legal Personality. International & Comparative Law Quarterly 69.4: 819-844.
12. De Cock Buning, Madeleine. (2016) "Autonomous intelligent systems as creative agents under the eu framework for intellectual property." Eur. J. Risk Reg. 7: 310.
13. Devarapalli, Pratap. (2018). Machine Learning to Machine Owning: Redefining the Copyright Ownership from the perspective of Australian, US, UK and EU law, European Intellectual Property Review 40.11: 722-728.
14. Dias Pereira, Alexandre L. (2021) A copyright 'human-centred approach' to AI?. GRUR International: GRUR Journal of European and International IP Law (Formerly: Gewerblicher Rechtsschutz und Urheberrecht, Internationaler Teil)" Advance Article: 1-1.
15. Dickenson, Julia, Alex Morgan, and Birgit Clark. (2017) Creative machines: ownership of copyright in content created by artificial intelligence applications. European Intellectual Property Review 39.8: 457-460.
16. Dornis, Tim W. (2020) "Artificial Creativity: Emergent Works and the Void in Current Copyright Doctrine." Yale Journal of Law & Technology 22: 1.
17. Dorotheou, Emily. (2015) Reap the benefits and avoid the legal uncertainty: who owns the creations of artificial intelligence. Computer and Telecommunications Law Review 21.4: 85-93.
18. Fisher, William. (2001) Theories of intellectual property. Cambridge.
19. Gabison, Garry. (2019) Who Holds the Right to Exclude for Machine Work Products? Available at SSRN 3498941.
20. Gervais, Daniel J. (2020) The Machine as Author." Iowa Law Review, vol. 105, no. 5, p. 2053-2106. Retrieved from https://heinonline.org/HOL/P?h=hein.journals/ilr105&i=2103.

21. Hilty, Reto, Jörg Hoffmann, and Stefan Scheuerer. (2020) Intellectual Property Justification for Artificial Intelligence. Max Planck Institute for Innovation & Competition Research Paper 20-02.
22. Hristov, Kalin. (2017) Artificial Intelligence and the Copyright Dilemma. IDEA: The Journal of the Franklin Pierce Center for Intellectual Property, vol. 57, no. 3,, p. 431-454. Retrieved from HeinOnline.
23. Khan, B. Zorina. (2008) An Economic History of Copyright in Europe and the United States. EH. Net Encyclopedia, edited by Robert Whaples.
24. Kogan, Terry S. (2015) The Enigma of Photography, Depiction, and Copyright Originality. Fordham Intellectual Property, Media & Entertainment Law Journal, vol. 25, no. 4, p. 869-938.
25. Kop, Mauritz. (2019) AI & intellectual property: Towards an articulated public domain. Tex. Intell. Prop. LJ 28: 297.
26. Legner, Sarah. (2021) Are Works of Artificial Intelligence in Need for Further Protection? EIPR 43.2.
27. Leistner, Matthias. (2018) Big Data and the EU Database Directive 96/9/EC: current law and potential for reform. Available at SSRN 3245937.
28. McCarthy, John, et al. (2006) A proposal for the dartmouth summer research project on artificial intelligence, august 31, 1955. AI magazine 27.4: 12-12.
29. Mizrahi, Sarit K. (2019) Jack of All Trades, Master of None: Is Copyright Protection Justified for Robotic Faux-Originality?
30. Noto La Diega, Guido. (2019) Artificial Intelligence and databases in the age of big machine data.
31. Palace, Victor M. (2019) What If Artificial Intelligence Wrote This: Artificial Intelligence and Copyright Law. Fla. L. Rev. 71: 217.
32. Pfister, Laurent. (2010) Author and work in the French print privileges system. Some milestones. Privilege and property. Essays on the history of copyright: 115-136.
33. Perry, Mark, and Thomas Margoni. (2010) From music tracks to Google maps: Who owns computer-generated works?. Computer Law & Security Review 26.6: 621-629.
34. Ricketson, Sam. (1991) The 1992 Horace S. Manges Lecture - People or Machines: The Bern Convention and the Changing Concept of Authorship." Columbia-VLA Journal of Law & the Arts, vol. 16, no. 1, p. 1-38. HeinOnline
35. Rose, Mark. (2010) The Public Sphere and the Emergence of Copyright: Areopagitica, the Stationers' Company, and the Statute of Anne. Privilege and Property: 67.
36. Rungrojtanakul, C. (2005). Legal Protection of Sui Generis Databases. Retrieved from https://digitalcommons.law.ggu.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1015&context=theses
37. Samuelson, Pamela. (1985) Allocating ownership rights in computer-generated works. U. pitt. L. rev. 47: 1185.
38. Samuelson, Pamela. (2020) AI authorship?. Communications of the ACM 63.7: 20-22.
39. Senftleben, Martin, and Laurens Buijtelaar. (2020) Robot Creativity: An Incentive-Based Neighboring Rights Approach. Available at SSRN.
40. Zurth, Patrick. (2020) Artificial Creativity? A Case Against Copyright Protection for AI Generated Works. UCLA Journal of Law & Technology, Forthcoming.
41. Totschnig, Wolfhart. (2020) Fully autonomous AI. Science and Engineering Ethics 26.5: 2473-2485.
42. Wiele, Bram Van. (2021) The human-machine synergy: boundaries of human authorship in AI-assisted creations. European Intellectual Property Review.
43. Yanisky-Ravid, Shlomit. (2017) Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability in the 3A Era: The Human-like Authors Are Already Here: A New Model. Mich. St. L. Rev: 659.

ESTONIAN LEGISLATION
44. Copyright Act RT I 1992, 49, 615.

EU AND INTERNATIONAL LEGISLATION
45. Berne Convention for the Protection of Literary and Artistic Works: Texts. Geneva: World Intellectual Property Organization, 1982.
46. Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases.
47. 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
48. Directive (EU) 2016/943 of the European Parliament and of the Council of 8 June 2016 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure.

OTHER COUNTRIES LEGISLATION
49. 17 U.S.C. § 102
50. Copyright Act 1957 India.

OTHER COURT DECISIONS
51. 1 December 2011, Painer, C-145/10, EU:C:2011:798
52. 7 August 2018, Renckhoff, C-161/17, EU:C:2018:634
53. 12 September 2019 Cofemel v G-Star, C-683/17
54. British Horseracing Board v William Hill Organization Ltd Case, 2004 E.C.R. I. 10415 (2004)
55. Express Newspapers v. Liverpool Daily Post, 1985 W.L.R.1 1089, 1985 F.S.R. 306 (1985).
56. Fixtures Marketing Ltd v. Oy Veikkaus Ab, 2004 E.C.R. I. 10365 (2004).
57. Donaldson v. Beckett, 1774 Eng. Rep. 1 837, 1774 E.R.1 837 (1774)
58. Millar v. Taylor, 4 Burr. 2303, 98 Eng. Rep. 201 (1769)
59. Nova Productions Ltd v. Mazooma Games Ltd, 2007 E.W.C.A. Civ 219 (2007).
60. Telstra Corporation Limited v. Desktop Marketing Systems Pty Ltd, 2001 F.C.A. 612 (2001).
61. Telstra Corporation Limited v. Phone Directories Company Pty Ltd, 2010 F.C.A. 44, 2010 F.C.A.F.C. 149 (2010).

OTHER SOURCES
62. AIPPI. (2019) Study question, Copyright in artificially generated works. Retrieved from https://www.aippi.fr/upload/2019%20Londres/DROITS-DAUTEUR---Summary-report.pdf
63. Ball, P. (2014). Artificial music: The computers that create melodies. BBC, August, 8. Retrieved from https://www.bbc.com/future/article/20140808-music-like-never-heard-before
64. Bently, L. (2018) "The UK's provisions on computer generated works: a solution for AI creations?'." 2019-11-02]. Rerieved from https://europeancopyrightsocietydotorg.files.wordpress.com/2018/06/lionel-the-uk-provisions-on-computer-generated-works.Pdf
65. Bosker, Bianca. (2013) Philip Parker's trick for authoring over 1 million books: don't write. The Huffington Post 11.
66. Cohen, Noam. (2008) He wrote 200,000 books (but computers did some of the work). New York Times 10.
67. Copyright Office (1966) Sixty-Eighth Annual Report of the register of copyright. Retrieved from https://www.copyright.gov/reports/annual/archive/ar-1965.pdf

68. Creative Commons. (2020) WIPO Consultation on Artificial Intelligence and Intellectual Property Policy Submission by Creative Commons. Retrieved from https://wiki.creativecommons.org/images/f/f3/CC_Submission_to_WIPO_Consultation_on_AI_and_IP_Policy.pdf
69. Elgammal, Ahmed, et al. (2017) Can: Creative adversarial networks, generating" art" by learning about styles and deviating from style norms" arXiv preprint arXiv:1706.07068.
70. EU Commission. (2018) A definition of Artificial Intelligence: main capabilities and scientific disciplines. Retrieved from: http://www.pcci.gr/evepimages/0101_F483.pdf
71. European Commission. (1988). Green Paper on Copyright and the Challenge of Technology. Copyright Issues Requiring Immediate Action. Retrieved from http://aei.pitt.edu/1209/1/COM_(88)_172_final.pdf
72. European parliament. (2020) Parliament leads the way on first set of EU rules for Artificial Intelligence. Retrieved from https://www.europarl.europa.eu/news/en/press-room/20201016IPR89544/parliament-leads-the-way-on-first-set-of-eu-rules-for-artificial-intelligence
73. European Parliament resolution of 20 October 2020 on intellectual property rights for the development of artificial intelligence technologies (2020/2015(INI)
74. Fisher, William. (2017) Maps of Intellectual Property. http://ccb.ff6.mwp.accessdomain.com/Maps/IPTheories.html
75. Guadamuz, Andres. (2017) Artificial intelligence and copyright. WIPO Magazine 5: 14-19
76. Klein, M. L. (1957) Syncopation in Automation. Radio-Electronics: 36-38.
77. Metz, Cade. (2016) March 16. "In two moves, AlphaGo and Lee Sedol redefined the future." Wired.
78. National Commission on New Technological Uses of Copyrighted Works. (1978) Final Report of the National Commission on New Technological Uses of Copyrighted Works. Washington, DC.
79. Thompson, Clive. (2017) When Robots take all of our jobs, remember the luddites. Smithsonian Magazine.
80. Wilson, Jason. (2015) Copyrighting Player-Generated Content in Video Games | VentureBeat. VentureBeat, VentureBeat, Retrieved from https://venturebeat.com/2015/01/07/copyrighting-player-generated-content-in-video-games/.
81. WIPO. (2020) Conversation on Intellectual Property (IP) and Artificial Intelligence (AI), Second Session. Retrieved from https://www.wipo.int/edocs/mdocs/mdocs/en/wipo_ip_ai_2_ge_20/wipo_ip_ai_2_ge_20_1_rev.pdf
82. WIPO. (2020) Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence. Retrieved from https://www.wipo.int/edocs/mdocs/mdocs/en/wipo_ip_ai_2_ge_20/wipo_ip_ai_2_ge_20_1_rev.pdf

Appendix 4. Non-exclusive licence

A non-exclusive licence for reproduction and publication of a graduation thesis[1105]

I Henrik Uustalo (*author's name*)

1. Grant Tallinn University of Technology free licence (non-exclusive licence) for my thesis
A proposition for the protection of works generated by AI,
(*title of the graduation thesis*)

supervised by , Pawan Kumar Dutt
(*supervisor's name*)

1.1 to be reproduced for the purposes of preservation and electronic publication of the graduation thesis, incl. to be entered in the digital collection of the library of Tallinn University of Technology until expiry of the term of copyright;

1.2 to be published via the web of Tallinn University of Technology, incl. to be entered in the digital collection of the library of Tallinn University of Technology until expiry of the term of copyright.

2. I am aware that the author also retains the rights specified in clause 1 of the non-exclusive licence.

3. I confirm that granting the non-exclusive licence does not infringe other persons' intellectual property rights, the rights arising from the Personal Data Protection Act or rights arising from other legislation.

11.05.21 (date)

[105] *The non-exclusive licence is not valid during the validity of access restriction indicated in the student's application for restriction on access to the graduation thesis that has been signed by the school's dean, except in case of the university's right to reproduce the thesis for preservation purposes only. If a graduation thesis is based on the joint creative activity of two or more persons and the co-author(s) has/have not granted, by the set deadline, the student defending his/her graduation thesis consent to reproduce and publish the graduation thesis in compliance with clauses 1.1 and 1.2 of the non-exclusive licence, the non-exclusive license shall not be valid for the period.*