A robot's right to copyright

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1. Introduction

1.1. Background

Copyright experts and professionals today are faced with an ever-changing landscape due to new technologies. The Internet, social media and artificial intelligence (AI) have raised some interesting questions about the future of our current copyright system. Innovative technologies challenge our present copyright regimes. Not only on the aspect of quality, but also, and maybe foremost, on the aspect of quantity; the ability to use and create works on a much greater scale than ever imagined to be possible.[1] Especially interesting questions arise when two seemingly opposite worlds collide. In this thesis the respective colliding worlds I want to focus on are fine art and AI, two fields that are seen as having nothing more in common than the same starting letter. However in this day and age the process of creating works of art gets more and more technological and vice versa; technology gets more and more creative every day. It is commonly accepted that computers are in many ways smarter, or at least have a greater capacity to calculate and base decisions on larger amounts of data, than humans and with this can perform cognitive tasks better and faster. However it is also widely believed that some human traits, as creativity, are an exclusive asset of the complexity of the human mind.[2] This believe is not only reserved for hardcore luddites, just ask your average Joe that uses and enjoys technology on a daily basis in every aspect of life and he will immediately react with the gut-feeling that traits like creativity or intuition cannot be programmed into a machine. Creativity is presumed to be something that makes us – humans - special and must be protected and promoted, one of the main reasons for the existence of the current copyright regimes.

The existing technologies already shifted from the "remix"-culture and aiding people in the producing of art, to producing art virtually all by itself. Artificial intelligent systems (AIS) are becoming more and more advanced everyday. The artificially intelligent systems are not only able to produce art, but can now even produce high art that has been made in the defining style and with the particular skill of the old master painter Rembrandt.[3] This is thrilling news for art lovers, but somewhat troubling for the copyright systems globally, how are these new works defined and labeled?

1.2. Research question

The problems that come forth from the situation stated above are plural and can be distinguished between upstream and downstream problems. Upstream problems are the legal issues that respectively cover copyright issues concerning the input that an AIS needs to access in order to be able to produce new works. Downstream problems are the legal issues that result from the output of the AIS.[4] In this thesis the focus will lie on the latter. AIS can be used to create art in various ways, from being used as a mere tool of a human creator to creating autonomously. How do the resulting works fit in the current copyright laws of the Netherlands? Is it possible to grant copyright

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[1] Grimmelman, 2016, p. 661.
[2] Clifford, 1997, p. 1676.
[3] Nudd, 2016.
[4] Schafer, Zatarain, Komuves, & Diver, 2015.

protection to works created by AIS under the current copyright regime? And should it be possible to grant protection to these works?

1.3. Thesis structure

This thesis will try and answer this research question in the following manner. In chapter 2 discussed will be AI and the current legal copyright regime. In regards to AI the definition used and the legal anatomy of AI will be discussed in order to clarify and confine the concept. After this the current copyright regime will be mapped out and the two main concepts of copyright will be discussed. This will be achieved by researching articles, legislation and relevant case law. The scope will be limited to Dutch Copyright law. However international legal instruments will also be researched, because of the international influence on the continuing development of Dutch Copyright law. Next, in chapter 3 the information of chapter 2 will be applied to different situations in which AIS are able to create works of art. This chapter should give an answer to the first research question and in doing so determine whether it is possible to grant copyright protection to works created by AIS. Applying and interpreting the current criteria for copyright protection according to Dutch Copyright law mentioned in chapter 2 will reach this conclusion. In chapter 4, the normative question of whether the copyright protection should be given and other practical concerns coupled with granting or not granting copyright to the works of art created by AIS will be addressed. The normative question will be answered by looking at the rationale for copyright given by Hugenholtz and subsequently analysing of this still justifies the granting of copyright protection to works created by AIS. Finally I will write a conclusion giving my final findings.

1.4. Intended outcome

The intended outcome of this thesis is to see whether based on the traditional copyright regime in the Netherlands it is possible to grant copyright protection to a work created by an AIS and to determine whether this should or should not be the case. In my view this outcome should be considered as the real starting point in the discussion of copyright and AI, instead of skipping the primary questions and starting with the discussion about the possible future ownership issues.

2. Artificial Intelligence

2.1. Introduction to AI

A system of artificial intelligence is nothing more than a software-algorithm, however this algorithm is able to make autonomous, rational, precise and unpredictable choices between given alternatives.[5] An AIS follows the same steps as humans when learning. Differentiated must be between strong AI; which requires innovative thinking and logical reasoning abilities and weak AI; which merely creates a program tailored to a narrow function that is required.

2.2. AI-author

The boundaries in deciding when a human is an author of a copyrighted work are not very difficult to distil; this difficulty increases in regards AIS. When is an AIS an author? One definition of an AI-author could be a "computational system, which by

[5] Lust & Vermaerke, 2017.

taking on particular responsibilities, exhibit[s] behaviours that unbiased observers would deem to be creative."[6] For the purpose of this thesis this definition of an AI-author will be used. Supplementary will be assumed that the AI-author outputs works that are novel and surprising, in the meaning that the work is not a copy of any existing work or a predictable transformation of an existing work.

2.3. Anatomy of artificial intelligence that creates art

Fjeld and Kortz have identified four key elements in AI that create art: Input, Learning Algorithm, Trained Algorithm and Output.[7] They all will be discussed shortly in the following.

2.3.1. Input

The input consists of the existing works of art and other relevant data that are made accessible to the algorithm in order to train it. What the input will be, how diverse or monotonous, extensive or limited, is decided by the humans involved in the development of the algorithm. One example of a monotonous input is the Next Rembrandt project, in which only paintings from the master-painter Rembrandt were analysed by the learning algorithm.[8]

2.3.2. Learning Algorithm

The learning algorithm is the algorithm that operates on the inputs that are given. This algorithm identifies the main characteristics and common factors of the input and transfers this into rules, which result in the trained algorithm. It is possible that the learning algorithm includes human feedback about the learning process, referred to as "active learning".[9]

2.3.3. Trained Algorithm

The trained algorithm is the rules that the learning algorithm has generated from the input. The trained algorithm is unique, in contrast to the learning algorithm, to the individual project. The trained algorithm generates the output by running the data generated about the input in reverse.[10]

2.3.4. Output

The output is the work of art that is generated by running the trained algorithm. The output is recognizable as the work of "art". The output can be created from a so-called "seed", which basically means a given starting point. The seed material could be handpicked by a human or selected by the AI itself.[11]

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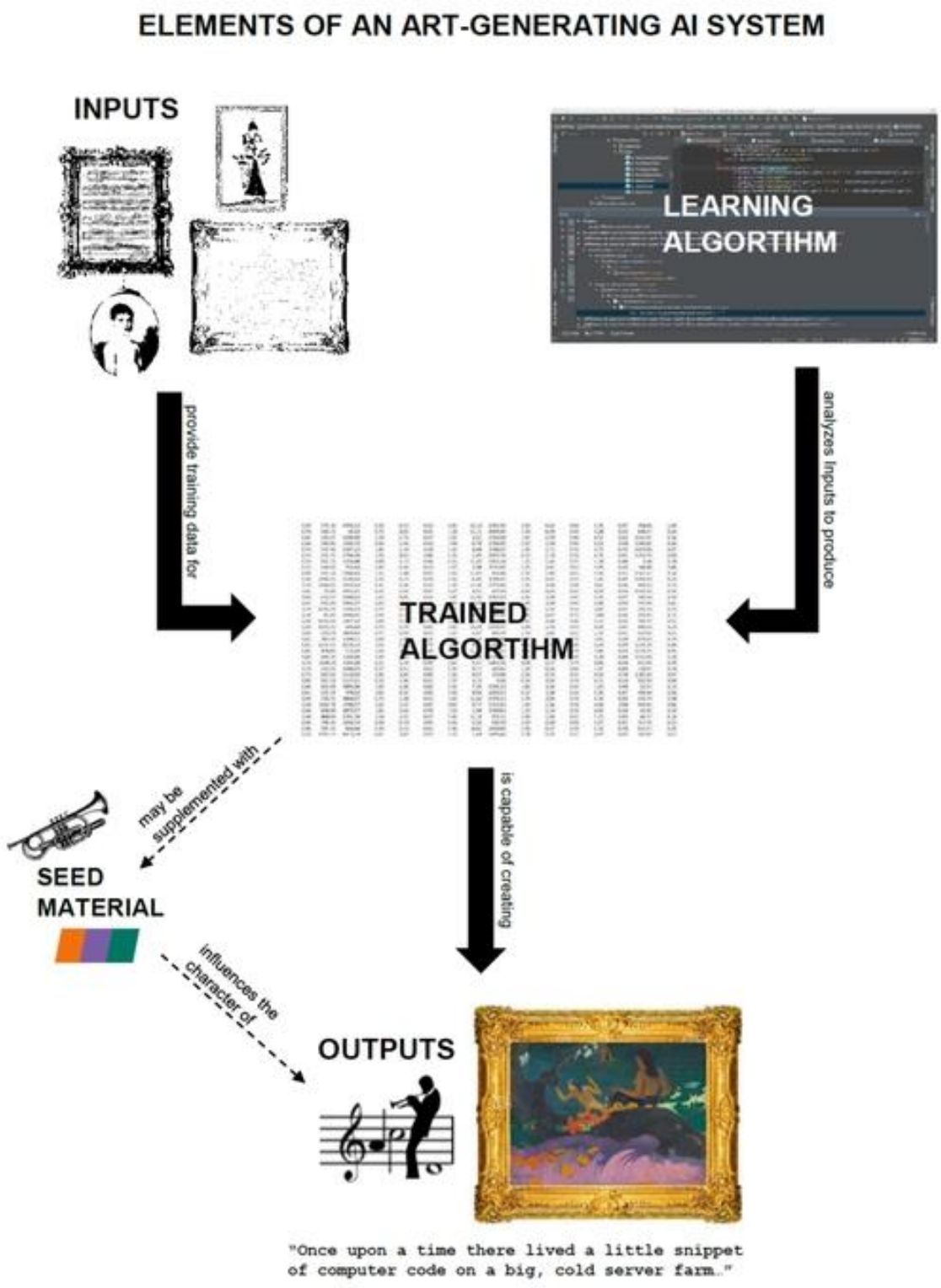
[6] Colton & Wiggins, 2012.
[7] Fjeld & Kortz, 2017.
[8] Nudd, 2016.
[9] Fjeld & Kortz, 2017.
[10] Fjeld & Kortz, 2017.
[11] Fjeld & Kortz, 2017.



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[12] Fjeld & Kortz, 2017.

3. Copyright

3.1. Introduction to copyright

Copyright is the exclusive right of the maker of a literary, scientific or artistic work to reproduce and make it public.[13] Copyright protects not only works of literature, music, drama, film, photography and art, but also computer programs, databases, industrial designs and works of applied art. These works will be protected regardless of their merit or purpose: a painting of a toddler is just as eligible for copyright protection as a creation from a famous artist. There is only one threshold in place that must be met in order for a work to receive copyright; the work must be an original expression of the author in the legal sense.[14]

3.2. Brief history of copyright

Copyright is a legal regime that has been around for quite some time, it all started with the granting of limited rights for publishers of books around the 16th century. In those days books were copied by hand, but could still be exploited on a large scale. The publishers were granted, usually for a short term of 5 or 10 years, the exclusive right to publish and bring the work onto the market.[15] This seems like a far cry from the copyright we know today, because of the assignment of the right to the publisher instead of the author, the lack of any requirement for originality and the short duration of the protection that was granted. Moreover the rationale behind this system was not aimed at the limitation of the copying of works, but especially as a means for the government to exercise control over the distribution of ideas.[16] This is in stark contrast with the current idea that our copyright regime is, partly, in place to protect the freedom of expression. From this first limited publishers right the development of our current copyright regime, influenced by technological innovation, started. The central thread through the development of copyright seems to be technological change, indeed the world's first copyright statute, the Statute of Anne, itself was a reaction to a new technology: the printing press. With the invention of the printing press published works could be copied in a manner that was less time-consuming and took less effort than copying by hand. The rationale behind this legislation that was created in 1710, still was more focused on the protection of the investment made by publishers of printed books than on the authors of the works.[17] The rationale towards copyright protection gradually shifted to the protection of the rights of the author as the creator of the work and the natural beneficiary. In the Netherlands the first act that granted rights to the author of a work came into force in 1817, this act was very limited and flawed. It took the entrance of the Netherlands to the Berne Convention to implement the current Dutch Copyright Act in 1912.[18] The Dutch Copyright Act of 1912 has proven to be well able to absorb most of the new technological developments for a long time, due to a broad use of terminology.[19] It can be concluded from this brief history of copyright that

[13] Dutch Copyright Act 1912, article 1.
[14] Gompel 2014, p. 95.
[15] Spoor, Verkade, & Visser, 2005, p. 17.
[16] Spoor, Verkade, & Visser, 2005, p. 18.
[17] Kur & Dreier, 2013, p. 241.
[18] Spoor, Verkade, & Visser, 2005, p. 20.
[19] Spoor, Verkade, & Visser, 2005, p. 21.

with the shifting in rights from publishers to authors of the works, the subject matter of protection shifted from the narrow range of printed works to a much broader spectrum.

3.3. Works of art under copyright

In the Dutch Copyright act a definition of a work of art is given; 'a work of graphic or plastic art such as pictures, collages, paintings, drawings, engravings, prints, lithographs, sculptures, tapestries, ceramics, glassware and photographs, in as far as it is made by the artist himself or under his authority.'[20]

3.4. Rationale of copyright

In the brief description of the history of copyright the rationale of the protection granted is mentioned. This rationale is not only important for the history and development of copyright, but also for the future of the system. It is vital to know what our current rationale for copyright is to determine whether we can justify granting copyright protection to works created with or by new technologies. The modern copyright regimes we know today are based, roughly, on two different approaches. The first is the copyright approach, which is often used in common law countries, such as the United Kingdom and the United States and the second approach is the droit d'auteur approach which is commonly used in copyright laws across continental Europe.[21] A good example of a utilitarian rationale used by the copyright approach is the argument mentioned by William Landes' and Richard Posner's. They argue that intellectual creations are characterised by their attribute to be easily replicated and that enjoyment of the creations by one person does not prevent others from enjoying it, and that this leads to a danger for the author to not be able to get a return on his or her investment, time and effort spend, because others can copy their creations by investing no more than the costs of production. This danger, when aware, will discourage authors from making/publishing intellectual creations that are, or at least could be, valuable to society. To avoid this the creators should be allocated the exclusive right to make and profit from the copies of their creations.[22] The means of copyright protection justify the goal of stimulating the creation of works of art, science and literature, according to the utilitarian theory used in the copyright approach. The droit d'auteur approach relies on the argument of natural law, which states the performance of intellectual labour, not other than manual labour, deserves a reward. This argument to justify the granting of copyright has been articulated more specific during the 18th and 19th century. Today there are seven common argumentations used for the legitimation of intellectual property in general, these are:

1. Personality argumentation: the intellectual achievement carries a personal imprint that provides the right to an exclusive right.
2. Fairness argumentation: the person that provides society with an intellectual achievement has the right to the exploitation of that performance.
3. Economical argumentation: rewarding intellectual achievements will foster the economy.

[20] Dutch Copyright Act, article 43(a)(1).
[21] Kur & Dreier, 2013, p. 242.
[22] Landes & Posner, 1989, p. 325.

4. Social argumentation: the person that provides an intellectual achievement will be incentivized to do it again when rewarded.
5. Cultural argumentation: without rewarding intellectual achievements, culture would grow poorer because of the decrease in intellectual achievements.
6. Freedom of expression argumentation: by rewarding intellectual achievements, it becomes possible for the producers to make a living from these achievements.
7. Pragmatic argumentation: when the legal system protects intellectual achievements, it pays to invest in the cultural and technological sectors of society.[23]

Author's right copyright regimes are far less likely than common law copyright regimes to allocate authorship in other authors than a natural person.[24]

3.5. Legal instruments of copyright

The Netherlands is a contracting party to the Berne Convention (Convention) and a member state of the European Union (EU).[25][26] Therefore the Convention and the EU Directives heavily influence the Copyright law of the Netherlands.

3.5.1. Berne Convention

In order to reduce the confusion that existed between states regarding international copyright law, ten European states signed the Berne Convention for the Protection of Literary and Artistic Works in 1886. The Convention was the first international instrument for copyright protection. Since the establishment 165 more countries have joined, including the Netherlands in 1912, however there have been several revisions of the Convention and not all contracting parties ratified the most recent version. With the creation of the Convention three fundamental principles of copyright law were established. The first one is the principle of national treatment; which provides that contracting parties to the Convention must give the inhabitants of other contracting parties the same rights under their national copyright laws as they would their own. The second principle is the principle of independence of protection; this principle provides for contracting parties to give the same protection they give domestic works to foreign works, even when no protection is granted under the laws of the contracting party where the work originated. The third and last principle is the principle of automatic protection; this principle prohibits contracting parties to require formalities from creators of foreign works in order to receive copyright protection.[27] Next to these basic principles the Convention provides for a minimum term during which contracting parties should grant copyright protection and it also requires the recognition and enforcement of some moral rights.[28] It is however possible for the contracting parties to adopt some

[23] Grosheide, 2011, p. 20.
[24] Goldstein, 2001, p. 10.
[25] http://www.wipo.int/treaties/en/ShowResults.jsp?lang=en&treaty_id=15
[26] https://europa.eu/european-union/about-eu/countries_en#the_28_member_countries_of_the_eu
[27] https://cyber.harvard.edu/cx/The_International_Framework_of_Copyright_Law
[28] Berne Convention 1886, article 6bis and 7.

exceptions to the copyright protections required by the Convention and next to this provisions give the contracting parties discretion in the creation of more specific exceptions.[29]

3.5.2. EU Copyright law

Copyright in the EU is firmly based on the principle of territoriality and this remains the status quo to this day, even though Article 118 TFEU expressly empowers the EU legislator to create IP Rights for the community. Copyright within the EU is a bundle of the national laws of the member states and any harmonisation that does occur is mostly from case law provided by the Court of Justice of the EU (CJEU) by way of interpreting the Directives that do exist.[30] There are seven Directives regarding copyright adopted by the EU, the InfoSoc Directive is the main Directive for copyright protection within the framework of the internal market.[31]

3.5.3. Dutch copyright law

The Dutch Copyright Act regulates copyright in the Netherlands. Copyright is part of the legal area of intellectual property, an area that is, in the system of the law, a part of private law. However the Dutch Copyright Act also contains some penal provisions.[32]

3.6. Rights granted by copyright

The rights granted by copyright don't only constitute of the economic rights; the right to exploitation of the work, but also moral rights of the author.[33] With economic rights are meant the exclusive right to copy the work or to make the work public. An example of the moral rights given by copyright to the author is the right to object to the alteration/damaging of the work.[34]

3.7. The concepts of copyright

As can be derived from what's stated above, copyright law revolves around the two concepts: work and authorship. Therefore it is important to define these concepts in order to be able to decide if a work created by an AIS is indeed a copyrightable work and if the AIS can be categorized as the author. To do this both literature and legislation on the international and national level need to be analysed.

3.7.1. The concept of authorship

The author of a work is very decisive in the copyright system, authors are the first beneficiaries of copyright and the term of protection is often decided with the author's life taken as a reference point. However in the existing legislation no

[29] Berne Convention 1886, article 9(2).
[30] Kur & Dreier, 2013, p. 243 – 244.
[31] Directive 2001/29/EC.
[32] Spoor, Verkade, & Visser, 2005, p. 14.
[33] Frequin, 2015, p. 49.
[34] Frequin, 2015, p. 65.

definition of the concept of authorship can be found and the concept is also not clarified in any case law from the Dutch Supreme Court or the CJEU.[35]

3.7.1.1. Berne Convention

The Convention uses the term 'author' many times throughout the text, however it does not provide a clear definition. In the Guide to Berne Convention it is also stated that the author is not specified.[36] The issue of authorship is left up to the signatory states. Some legal scholars think that the Convention is based on the notion of a human – meaning a natural person - creator. [37] For example Ricketson writes that the notion of a human creator as basis for authorship in the Convention can be retrieved from particular articles of the Convention. Firstly, the text of article 1 states the need to grant protection to the "rights of authors in their literary and artistic works," seems to be a clear reference to personal rights, not corporate ones. Second is the term of protection given to the author in article 7(1) which is dependent on the author's life, a provision like this would not work for non-human entities seeing as they probably have an infinite existence. Third the protection of moral rights only makes sense in connection to a human author. And finally, the Convention explicitly gives a possibility for a non-human author in regards to a cinematographic work. Ricketson sees this as the exception that makes the rule.[38] Other scholars argue that the Berne Convention does not require human authorship for a work to be granted copyright protection.[39] My opinion supports the latter, seeing as the Convention does not exclude legal entities to be – legally – seen as the author in order to be granted copyright protection, and thus acknowledging more non-human authors than Ricketson states. As the exception[40] The Berne Convention has had an influence, as an instrument of international copyright law, on the Dutch Copyright Act. In the Netherlands, and other civil countries, a large emphasis was placed on the author as the creator of the work in the further development of the copyright regime.[41]

3.7.1.2. EU Copyright Law

The InfoSoc Directive uses the term 'author' and sets this apart from performers, phonogram producers, producers of the first fixations of films and broadcasting organisations.[42] It does not give any further definition of the term and a uniform definition by the CJEU has not yet been given and thus is the concept of 'authorship' has not been harmonised across the EU.[43]

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[35] Ginsburg, p. 1066.
[36] Guide to the Berne Convention for the Protection of Literary and Artistic Works (Paris Act, 1971).
[37] Ginsburg, 2003, p.1069.
[38] Ricketson, 1991-1992, p. 11.
[39] Huttunen & Ronkainen, 2012, p. 330
[40] Kur & Dreier, 2013, p. 16.
[41] Gompel, 2014, p. 128.
[42] Directive 2001/29/EC, article 2.
[43] Triaille et al., 2013, p. 82 .

3.7.1.3. Dutch Copyright Law

The Dutch legislator has based the copyright regime on the personality-based justification; this justifies the copyright protection largely on the premise that the author should enjoy exclusive rights as creator of the work.[44] In the Dutch Copyright Act the author of a work is called the 'maker of the work' and the legislator does not give a precise definition of what this entails, he only provides an article that regulates when a person is presumed to be the maker.[45] Next to this in article 1 of the Dutch Copyright Act, it is determined that the copyright owner is in principle the maker of the work. The Dutch Supreme Court states in it's case law that because the physical object is not of any importance, it is not decisive for the answer to the question of who the maker of the work is who actually created the physical object. The 'auctor intellectualis' of the work, the spiritual/mental creator, is the deciding factor.[46] This can also be seen in the multiple provisions that regulate the more complex cases of authorship.[47] In these articles the Dutch legislator chooses to explicitly allow employers or other parties to be granted the authorship status instead of mere ownership of the works' copyright and does not limit this category of authorship to humans, it is even granted to legal entities like corporations. This suggests that the Dutch legislator did not – solely- have the physical creator of the work in mind when picturing the author of a work. [48] However prominent Dutch IP scholars have explained a benchmark case in Dutch Copyright law, Van Dale/Romme,[49] to mean that human interference is a requirement for copyright protection.[50] However they have distilled this from the sentence "the personal vision of the maker", and to me this does not explicitly mean that a human must be involved. Once more the author is named but not defined.

In conclusion the assumption can be made that the Dutch legislator did not mean to give an instrumental role to the author of the work, as is usually the case in the droit d'auteur tradition, but rather used it as a pragmatic legal construct just like it is used in the common law tradition. Even though it seems that in the current legal copyright regime the "author" plays a pivotal role, the facts that no definition is given as to what criteria an author has to satisfy in order to be recognized in neither national nor international copyright cannot be overlooked and thus the conclusion that the author must be human cannot be drawn on the basis of the Dutch Copyright law.

3.8. The concept of work

When is a work deemed a work that is granted copyright protection? Earlier the low threshold for a work to be granted copyright was already mentioned, but even if the threshold is low it is still a threshold. What does this entail? In the next chapter the

[44] Gompel, 2014, p. 128.
[45] Dutch Copyright Act, article 4.
[46] HR 1 june 1990, ECLI:NL:HR:1990:ZC8537.
[47] Dutch Copyright Act, article 5, 6, 7 and 8
[48] Ginsburg, 2003, p.1071.
[49] HR 4 januari 1991, ECLI:BL:HR:1991:ZC0104 (*Van Dale/Romme).*
[50] Spoor, Verkade, & Visser, 2005, p. 73.

international and national legal instruments and case law will be consulted to answer these question.

3.8.1. Berne Convention

Article 2 §1 of the Convention clarifies what is to be understood as a copyrightable work: "every production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression". Furthermore the Convention grants the countries of the Union the freedom to prescribe whether or not a work shall be "fixed in some material form" in article 2 §2. This may seem as if ideas could be protected with copyright, but this not the case. A work in a fixed form is for example a book, an example of an unfixed work is a live performance of the story that this book describes. Ideas cannot be protected by copyright.

3.8.2. EU Copyright Law

In Directive 2001/29/EC (InfoSoc Directive) it is mentioned that the Member States need to provide the exclusive right for authors to reproduce their works. [51] No further clarification is given, for this we will have to look to the case law of the CJEU. A benchmark case is the Infopaq-case, in which the CJEU decided that copyright within the meaning of Article 2(a) of the InfoSoc Directive only applies to subject-matter which is original in the sense that it is its author's own intellectual creation.[52] With the Infopaq-case the concept of copyrightable work was highly harmonized across the EU member states. The definition of a copyrightable work given in this case still raises some questions regarding what this precisely entails. Fortunately the CJEU clarified its ruling in the Eva-Maria Painer case; we can speak of an author's own intellectual creation 'if the author was able to express his creative abilities in the production of the work by making free and creative choices'.[53] The CJEU reiterated and further clarified this in the Football Dataco case; for an intellectual creation to be original, the author must have stamped it with his 'personal touch' by making 'free and creative choices' during its creation.[54] The words chosen by the CJEU could give the impression that the originality test is not as easy to pass a previously mentioned, but this impression would be wrong. The 'creative abilities' do not have to be of a high standard and the 'free and creative choices' do not have to be good ones. This is perfectly illustrated by the Eva-Maria Painer case; in this case the CJEU decided that the subject matter in question – a simple school portrait photograph – involved sufficient 'free and creative choices'.[55] Even though the CJEU did acknowledge that some features of the work couldn't consist of 'free and creative choices', because they were the result of technical necessity or functionality the remaining features were creative and free enough to grant copyright protection to the work.[56] The requirement from the CJEU of a 'personal touch' can be some what problematic to interpret, seeing as it suggests the requirement of the ability

[51] Directive 2001/29/EC, article 2(a).
[52] C-5/08 Infopaq International, ELCI:EU:C:2009:465, para 37.p
[53] C-145/10 Painer ECLI:EU:C:2013:138, paras 88-89
[54] C-604/10 Footbal Dataco a.o. ECLI:EU:C:2012:115, para 38.
[55] C-145/10 Painer, ECLI:EU:C:2013:138, para 93.
[56] C-393/09 Bezpečnostní softwarová asociace, ECLI:EU:C:2010:816, paras 48-49.

of an audience to recognize the specific author of a work. The notion of 'personal touch' cannot be explained as some sort of obvious 'signature' or 'style' of the creator according to van Gompel, he defines the 'personal touch' as a requirement that the work must originate from the author in the sense of not being a copy.[57] This, obviously, makes the threshold of the 'personal touch' requirement very low.

3.8.3. Dutch Copyright Law

Even though the Infopaq-case highly harmonized the concept of work in the context of copyright law, it still pays to look at the Dutch copyright regime, as some nuances still exist in the case law of the Dutch Supreme Court.
The Dutch legislator has created a list of categories that constitute a literary, scientific or artistic work.[58] This seems to be a clear manner of deciding when a creation can be deemed to be a copyrightable work, but this is very deceiving. The list in article 10 is non-exhaustive, as can be read in article 10 paragraph 1 sub 12 of the Dutch Copyright Act: "… and generally any creation in the literary, scientific or artistic domain, …". Also the fact that a work is part of a category mentioned in the list of article 10 does not automatically mean that the creation can be deemed a work.[59] When and in which manner is decided if a work is protected by copyright is left to the interpretation of the national courts. [60] The criteria developed by the Dutch Supreme Court to clarify the national law do not differ much from the one the CJEU developed to determine whether a work is copyrightable.[61] According to the Dutch Supreme Court the work meets the minimum requirement for originality if it reflects an original expression and contains a personal imprint of the author.[62] Furthermore the originality of the work cannot only be the result of necessary choices to procure a technical effect.[63] When does a work reflect an original expression and when is it deemed to contain a personal imprint of the author according to the Dutch Supreme Court? Whether an original expression of the author is reflected in the work is decided by answering the question; is it imaginable that two authors, independent of each other, create exactly the same work? When this is reasonably out of the question than it can be justifiably said that an original expression is reflected in the creation.[64] This rule cannot be used in reverse; from the conclusion that it is possible that two authors could make the same work does not inevitably follow that the work does not reflect an 'original expression'.[65]

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[57] Gompel, 2014, p. 127.
[58] Dutch Copyright Act, article 10.
[59] Spoor, Verkade, & Visser, 2005, p. 57.
[60] Deltorn, 2017, p. 7.
[61] http://www.ie-forum.nl/backoffice/uploads/file/IE-Forum_nl%20P_G_F_A_%20Geerts,%20Noot%20onder%20HR12april2013,%20nr11-004447%20(Stokke-Fikszo),%20IER%202013-50_.pdf
[62] HR 4 januari 1991, ECLI:BL:HR:1991:ZC0104 (*Van Dale/Romme).*
[63] HR 16 juni 2006, ECLI:NL:HR:2006:AU8940 (*Lancôme/Kecofa).*
[64] Spoor, Verkade, & Visser, 2005, p. 66.
[65] Spoor, Verkade, & Visser, 2005, p. 66.

An example of a work deemed to reflect no original expression is a recent case in which a stock photo site claimed infringement of a close-up photo of a dashboard temperature meter. The court decided that even though variations in light, distance and angle are possible this is not enough to be able to speak of an original work. With almost every photo somebody has to changes these particular settings, in so far this is not done automatically by the camera, but with setting those variations the photo does not immediately carry the imprint of the author. The work carries the personal imprint of the author when the choices he made result in a work that has a distinction from other works in such a way that can be seen that the author has made personal choices. [66] The Dutch Supreme Court has specified when a work carries the personal imprint of the author in the Endstra-case. The requirement that the work must carry the personal imprint of the author means according to the Dutch Supreme Court that the work must be in a form that is the result of creative human labour and thus a result of creative choices which are the product of the human mind. Not included in this definition is in any case a form that is so trivial that no creative labour in any way, shape or form can be indicated. This requirement of the personal imprint of the author needs to be known from the work itself. This is why the requirement that the author must have had the intention to create the work and in creating must have made deliberate choices cannot be demanded, according to the Dutch Supreme Court.[67]

4. Eligibility of copyright protection

In the next chapter the aim will be to provide an answer to the question whether works created by AIS are eligible for copyright protection. This will be done by looking at the requirements of Dutch law for copyright protection given in the previous chapter. The requirements that will be applied on to works created by AIS are the requirement of reflecting an original expression and the carrying of a personal imprint.

4.1. Original expression

Can an AI system create a work that reflects an original expression? The requirement of an original expression, as is previously mentioned, is fulfilled fairly easy, seeing as in first glance it is not imaginable that another AIS would create the exact same work. And even if it is theoretically possible that an exact copy of the learning algorithm gets the exact same input and generates the same trained algorithm, independent of one another, and results in the same output, it is not very probable. It is not very probable, because the learning algorithm and the input are factors that are provided for by humans. Another argument why an AI system is able to create a work that reflects an original expression is that the original reflection does not have to be based on the personal interference of the author in all the parts of the work. [68] This prevents that works created by automatic means are deemed to do not reflect an original expression by default.

[66] Ktr. Rb. Noord-Holland 6 april 2017, IEF 17306 (*Masterfile tegen X*).
[67] HR 30 mei 2008, ECLI:NL:HR:2008:BC2153 (*Endstra*).
[68] Spoor, Verkade, & Visser, 2005, p. 74.

4.2. Personal imprint

The following question that needs to be answered is; can a work created by an AIS carry the personal imprint of the author? In chapter 2 the Endstra-case of the Dutch Supreme Court was briefly discussed, in which the Supreme Court formulated a requirement that can result in an ambiguous interpretation. The Dutch Supreme Court stated that the work must be a result of creative human labour, this could be interpreted to mean that no work created by an AIS will ever be granted copyright protection even if all the other requirements previously formulated are met. However in answering the question of this subchapter a distinction must be made based on the way AI is involved in the creation of the work and how much human interference has taken place. The first situation is the use of AI by a human author as a mere tool, the second is co-authorship between a human author and an AI author, the third is human selection of autonomously created work by AI, the fourth is creation by use of brute force and the last situation is autonomously created work by an AIS.

4.2.1. AI as a tool

If AI has been used as a tool by a human-author it stands to reason that the personal imprint of the human-author can be carried by the work, just as it would when the author uses other tools. Copyright laws should not treat the author differently in this case, just because of a more advanced tool.[69] However is it possible for AI to be defined as a mere tool? There are many technologies that are seen as just that, for example a text-editor on a computer, but also a photo camera. These technologies are seen as something that is only used to translate the idea of an author into an expression.[70] The text-editor does not change the structure of words or storyline of the novel, it is a more convenient and slightly different manner of writing the story. The photo camera does not only translate the idea of the author into an expression; the photo camera has created a new art form.[71] Without the photo camera as a tool, a photograph – the expression – would not exist as a copyrightable work. However it is still seen as a mere tool, because the author makes free and creative choices by choosing the object, the lighting, the angle etc. However the work created by a digital camera is nearly automatic these days and it is surely possible to compare the creation of a photograph with the creation of a work of art using an AIS. Some argue that, just like a camera, AI is a mere tool used by an author to express an idea in a tangible form.[72] Grimmelman comes to the same conclusion by reasoning that the creativity of the author is expressed in the selection of rules that need to be followed by the AIS. This is true especially when looking at the definition given in article 43 of the Dutch Copyright Act for works of art. In this article it specifically states; “made by the artist himself or under his authority”. The selection of a certain learning algorithm, the restriction of certain input and choosing the seed-material could still be seen as free and creative choices of the author and as the creation of the work under the authority of the author. Although the author cannot exactly predict the final version of the generated work, the author has

[69] Grimmelman, 2016, p. 408.
[70] Schafer, Zatarain, Komuves & Diver, 2015, p. 223.
[71] Grimmelman, 2016, p. 408.
[72] Hristov, 2017, p. 436.

some expectations of what it will look like and has directly contributed to the creation of the work by setting the rules the AIS has to adhere to.[73] If an author decides to automate a part of the creative process for his convenience, this does not take away the free and creative choices he is able to make in the creation of a work.[74] Important to note is that to use AI as a tool, the author of the work must have had influence on the development of the AIS itself. In case the author buys an AI system and uses this, without having had any influence on the developing of the trained algorithm this cannot be defined as using a tool and creating a work under the authority of the author.
An interesting case of using AI as a tool is the project 'The Next Rembrandt'; the AIS that by analysing all the works of the old master can create a new painting in the exact manner Rembrandt would have painted it. Many would say this AIS cannot possibly be called a mere tool. However when we use the same line of reasoning as above and start with the question who made the free and creative choices in a work and who set the rules to which the creation of a work of art must adhere to, the conclusion must be drawn that Rembrandt was the one to do this, especially when those choices do not have to be made deliberately and intentionally. This creates a strange reality in which the author of a work is long gone and can still create copyrightable works. However when looking at the old practice of apprentices who paint under the authority of a master painter, the question of assignment of the copyright is never even uttered. In the case of master-apprentice the authorship would lie firmly with the master and the work would be as able to be granted copyright protection as if he would have painted it himself. In my opinion this should be the same in the case of using an AIS as a tool in the creation of a work of art.

4.2.2. Co-authors

How about the personal imprint in a work when an AIS is not used as a mere tool, but fits more in the role of a co-author to the human-author? The Dutch Copyright Act gives a joint-copyright to works created by co-authors.[75] From this particular article can be derived that the personal imprint of both authors should be carried by the created work, or at least a personal imprint as result of the combined authorship. A well-known example of co-authorship between a human-author and an AI-author is the robot Asibot that co-wrote a story with the bestselling author Ronald Giphart. In this case Giphart had to enter in some words in order to get a couple of optional sentences from Asibot, than Giphart chose the best of those suggestions and could make some alterations, if he would deem this desirable.[76] The requirement for a work to carry a personal imprint of the author that can be found in the Endstra-case, can be applied in this situation. The finished work is a result of the creative labour of Giphart and the free and creative choices that are a product of his mind. The fact that Asibot has co-authored does not take away from this, just as working together with a human

[73] Hristov, 2017, p. 435.
[74] Grimmelman, 2016, p. 408.
[75] Dutch Copyright Act, Article 26.
[76] http://www.bibliotheekblad.nl/nieuws/nieuwsarchief/bericht/1000007985/ronald_giphart_schrijft_samen_met_robot_verhaal_voor_nederland_leest

co-author would not take away from the personal imprint of Giphart in the resulting work. It seems that a work created by a human author in collaboration with an AI-author can be protected by copyright. Possible problems in this situation lie with the defining of Asibot as a co-author, but this does not have to be a problem because of the Endstra-case. In this case the Dutch Supreme Court stated that the personal imprint should be evident from the work itself, which means that the fulfilment of the personal imprint criteria of Giphart should be enough for the work to be granted copyright. The example of Asibot is a literary one, but co-authorship can also be applied to the creation of a work of art, the AI could for example be responsible for giving the outline of a painting and the human author for the further adapting and finishing of the work.

4.2.3. Human selection

Different then the example of Asibot is when a human does not contribute to the creation of the work itself, but contributes by selecting which work is valuable and worthy of preserving. The question in this situation is whether the mere selection by a human is enough to give a personal imprint to the work. For the informed citizen the case of Naruto v Slater, better know as the "Monkey Selfie", probably comes to mind immediately.[77] In this case from 2011 a crested macaque monkey in Indonesia made some pictures, including self-portraits, with the camera belonging to British photographer David Slater. One of the self-portraits made by the macaque was uploaded to Wikipedia without the permission of Slater, who consequently send a request to take down the photo to Wikimedia Commons. Wikimedia refused to do so, claiming that the photo was in the public domain because the photographer was an animal, which – in the opinion of Wikimedia - cannot own the copyright to the work. Slater was of the opinion that while the monkey pressed the button, Slater made the selection and created the circumstances for the picture and therefor is entitled to the copyright of the photo. The facts established were that Naruto was highly intelligent, capable of advanced reasoning and learning from experience. Naruto also has stereoscopic colour vision with depth perception and he uses his hands intentional and in a concentrated action, not by mere happenstance. Furthermore was Naruto prior to the creation of the Monkey Selfie, already used to seeing cameras and experiencing cameras being used by humans. Lastly Slater did not assist Naruto in the authorship of the Monkey Selfie. Both the judge and the defendant decided to regard these facts of the case as true. The judge however dismisses the complaint because animals cannot sue for copyright, as they do not have standing in a court of law. Parallels can be drawn from this case to the situation where robots create works and subsequently from those works a couple are selected by a human for distribution. The Naruto v. Slater case was tried conform U.S. Copyright law and therefore it could possibly have a different outcome when tried conform European/Dutch Copyright Law. The outcome can differ, because European law places less emphasis on who pressed the button and focuses on whether the work reflects the personality of the author,[78] and if the author made free and creative choices about aperture, lighting, camera settings, and even in

[77] Naturo v Slater, Dkt. Nos. 24, 28. (2016).
[78] C-5/08 *Infopaq International* ECLI:EU:C:2009:465, para 37.

the placing of the camera.[79] It is not contested that Slater had control in the setting of the conditions that made it possible for Naruto to take the photo, and Slater selected the photo out of hundreds of photos made by Naruto. These actions could be enough to result in sufficient free and creative choices by the author to have his personal imprint carried by the work. So when we replace Naruto by an AIS, it stands to reason that when a human-author sets the conditions and makes the final selection the resulting work can also carry the personal imprint of that human-author and thus is the work able to be granted copyright protection.

4.2.4. Creation by use of brute force

Another interesting manner of creating works with AI can be illustrated by a claim of a Russian company, called Qentis. This company claimed to have invented software that was able to create every possible text of ten to 400 words and consequently was able to generate 97,42% of all texts of the given length. This approach can result, by using "brute force" computing power, in the production of every meaningful text there could be within the given range of words. Allegedly the business model behind this software was to become the world's largest copyright holder. Qentis eventually turned out to be a satirical artwork,[80] however the legal question raised by this still remains; is it possible to have a personal imprint of the author in works created by the use of AI's capability of brute force without a subsequent selection. The free and creative choices necessary for the personal imprint of the author do not have to be deliberate and intentional, but this type of "creative" process seems to be the opposite of the creative process the copyright regime aims to protect. Does this way of creating lack the free and creative choices that are necessary for a work to carry the personal imprint of the author? The choices made by the Ai in this situation are purely based on the calculation of each possibility and would hardly be defined as creative or free. The AI is not free to choose a word it thinks is the best fit or is the best option according to the combination of the trained algorithm; it simply must make all the imaginable combinations possible.

4.2.5. Creation without any human interference

The recent developments in strong AI technology mean that AIS now are able to create and select a work without any interference of a human. With no human interference is meant that no human contribution existed beyond the initial development of the AIS itself. The autonomous AI-author needs to be developed with the possibility of autonomous creation of works of art in mind. The input must be substantial and in no defining manner be restricted and the learning algorithm also cannot have substantial restrictions in order to speak of an autonomous AIS. This means that the human influence in the development cannot have had any significant impact on how the output will turn out. In the creation of the work of art can the AIS make free and creative choices, which are necessary for the work to carry the personal imprint of the AI-author? And is the criterion 'creative labour of the human mind' of the Endstra-case a problem for the personal imprint requirement? The manner in which an autonomous AIS makes

[79] C-145/10 *Painer* ECLI:EU:C:2013:138, paras 88-89.
[80] Schafer, Zatarain, Komuves, & Diver, 2015, p. 225.

choices cannot be called random any longer, the AI is trained to analyse all kinds of input and make a decision based on this analysis. Human creators may not have to be trained to make this analysis, but everything they see in their lifetime is also input and the choices they make in creating art are also based on those analyses. So whether or not the Dutch Supreme Court meant to exclude all other authors except human authors, a model of the human mind could fit the criterion. Further more it is my opinion that the use of the term 'human mind' by the Supreme Court is meant to make sure that the trivial forms of works are not protected, works that are created by pure accident by for example a natural force like a storm or lightening on sand. The fact that AI is modelled after the learning and creative process of that of a human is a huge factor in defining the choices made by an AI, especially when they do not have to be intentional or deliberate, as free and creative.

4.3. Conclusion

Works created by AI are, in certain situations, eligible for copyright protection. The requirement of an original expression is fulfilled fairly easy, especially when factoring in the fact that humans are responsible for the input and learning algorithm that eventually becomes the trained algorithm that influences the output. Another reason why an AI system is able to create a work that reflects an original expression is that the original reflection does not have to be based on the personal interference of the author in all the parts of the work. [81] This prevents that works created by automatic means are deemed to do not reflect an original expression by default and results in the fact that the mere involvement of AI in the creation of the work does not mean that a work cannot be an original expression. The fulfilment of the requirement of the personal imprint can differ based on the manner AI is involved of the creation of a work.

The first situation is the use of AI by a human author as a mere tool, If AI is used as a tool by a human-author it is reasonable to assume that the personal imprint of the author is present in the work. The creativity of the author can also be expressed in the selection of the rules that need to be followed by a tool and thus can works created by AI used as a mere tool be protected by copyright under Dutch Copyright law. The second is co-authorship between a human author and an AI author. For the human author a co-authorship with an AI system seems to result in the same rights as a co-authorship with a human author. Possible problems in this situation lie with the defining of Asibot as a co-author, but these do not stand in the way of the possibility for copyright protection of the work. The third is human selection of autonomously created work by AI. The action of selecting the work and setting the conditions in which the work is created seems enough to result in sufficient free and creative choices by the human author to have his personal imprint carried by the work. The fourth is creation by use of the brute force of AI computing power.

The choices made by the AI when using brute force are purely based on the putting together of each possibility in a certain framework. The AI is not free to choose or select the best option according to the trained algorithm. The last situation to have been discussed is the autonomously created work by AI and the fact that AI is modelled after the learning and creative process of that of a human is a huge factor in defining the choices made by an AI as free and creative.

[81] Spoor, Verkade, & Visser, 2005, p. 74.

This means that under the current copyright regime in the Netherlands it is possible to grant copyright protection to a work created by an AI system as long as the brute force of computing power of an AI system is not the origin of the choices, which are made.

5. Normative analysis and practical factors

Even if it is possible to grant copyright protection under Dutch law to works created by AI, the normative question remains if it should be granted, in other words is it the right thing to do? Moreover is it practical to grant copyright protection to works created by AI under the current copyright regime? In the next chapter this will be examined by looking at the current rationale of copyright stated by Hugenholtz that have been described in chapter 2 and the practical implications will be discussed after this.

5.1. Normative analysis

The current rationale for copyright is created with human creators in mind, however can this rationale also justify the granting of copyright protection to works created by AI? It is important to note that the rationale for copyright as stated by Hugenholtz will be, for the purpose of this thesis, assumed to be correct and true, therefore no discussion will take place about the validity of the different arguments.

5.1.1. Personality argumentation

The personality argumentation has been said to be of particular importance for literary works and works of art.[82] The personality argumentation states that the intellectual achievement carries a personal imprint, and this imprint provides the right to an exclusive right. Peter Drahos takes the right to intellectual property even further by stating: "intellectual property rights are fundamental human rights, because they protect the personality of the creator."[83] So the reflection of the creator's personality is the main focus of the personality argumentation. For an AI creator this reflection of personality could be a starting point for a long discussion. First of all what does a personal imprint constitute? Legally the work carries the personal imprint of the author when the choices the author made result in a work that has a distinction from other works in such a way that it can be seen that the author has made personal choices.[84] When using the legal definition of the personal imprint it seems reasonable to define the personal choices in the work created by an AI in the same manner as we do with a work created by a human author, which is by looking at the output only. This seems to be a view supported by Radin, who points out that personality theory focuses on the result of the work not on the process and origin of the work. Therefor the theory is not based on the objective arrangement that was made in order to produce the work, but rather on the subjective relationship between the holder and the work.[85] When following this line of reasoning, it should not be a deciding factor that the author of the work was an AI system when applying the personality theory. An argument against following this line of reasoning could be

[82] Priya, 2008, p. 363.
[83] Drahos, 1999, p. 367.
[84] Ktr. Rb. Noord-Holland 6 april 2017, IEF 17306 (*Masterfile tegen X*).
[85] Radin, 1982, p. 987.

that the AI system has no subjective relationship, a personal interest, with the work. For this subjective relationship to exist the creation of the work with AI has to be influenced by a human in so far that the human has expressed his will to realize his personal motives and express an individual creative idea.[86] In the case of co-authorship between AI and a human or the use of AI as a tool by a human-author, the personality theory still justifies the granting of copyright protection, however with an autonomous AI creator this is not the case.

5.1.2. Fairness argumentation

The fairness argumentation touches on the need for a fair reward for services rendered. This does not only mean the hours spend creating the work, but also rewarding the struggles of the creative process and the intellectual achievement of an author. This fairness argumentation seems to be retrieved from the Lockean justification of intellectual property, this theory claims that individuals are entitled to control the fruits of their labour. Individuals who labour, produce, think and persevere are entitled to the production this results in. This conclusion starts from John Locke's famous argument that individuals are the owners of their own bodies and thus the labour these bodies do.[87] In the case of AI creators we cannot start the argumentation at the same starting point, as the ownership of the AI system does not lie with the AI system itself. Maybe this will change one day, but for the purpose of this thesis we will not go into this possibility. Analogical it is possible to conclude that due to the fact that the AI system is not the owner of itself it is also not the owner of the labour it carries out. Another argument is not the ownership but the difference between the effort and nature of the labour carried out by a human creator and an AI creator. Authors often invest considerably in the development of their creative abilities, before they create a work that can be monetized. Because of the intangible nature of copyrightable works it is easy for others to be able to profit from the authors investment without the same effort, for example by copying the work. This is seen as unfair for the original author. In the case of an AI author, even though the learning algorithm learned from the input provided, the same effort has not been invested. In this argumentation we purely look at the effort the AI has to invest to create an output, not at the effort invested in the creation of the AI itself. The AI is not familiar with the creative struggle a human author can endure such as writers-block. A human author cannot just "push a button" to create, inspiration, motivation and concentration can play a huge role in the creation of an artwork. Of course art is subjective and even a human author can make multiple works in a short period of time when not concerned about the quality, but even when we look at the fairness argumentation in this situation the effort and labour is considerably higher than that of an AI system. Moreover, the argument against this argumentation of Hettinger; that the value of intellectual products is not entirely due to the labour and effort of the creation and can not be attributed to the work of a single labourer, seems to ring even clearer in the context of works created by AI. In Hettinger's view intellectual products are social products and therefor should not be property of a single party.[88] Looking at how works created

[86] Bakhariev, 2015, p. 15.
[87] https://plato.stanford.edu/archives/win2014/entries/intellectual-property/
[88] Martin, 1996, p. 39.

by AI originate, this seems truer than in the case of works created by humans. In conclusion the fairness argumentation cannot justify the granting of copyright to a work created by AI, because of the difference in ownership in the labour, the difference in the nature and effort of the labour and in the fact than more than ever the creation of a work by AI is a social product and the property right should not lie with one party.

5.1.3. Economical argumentation

The economical argumentation is based on the belief that rewarding intellectual achievements with exclusive rights will foster the economy and that not doing so will have the opposite effect. Because of the intangible and copiable nature of intellectual property the fear exists that competitors can easily and for a fraction of the cost copy the unprotected creations, which will lead to the undermining of the incentive to create new intellectual property.[89] Therefor intellectual property is seen as a legal instrument that is needed to maximize this incentive to let the economy benefit from it. [90] It is believed that creations lead to innovation and innovation leads to wealth, however for the goal of works of art this is less important than for example inventions and other industrial property.

5.1.4. Social argumentation

The person that provides an intellectual achievement will be incentivized to do it again when rewarded. The social argumentation has some similarities with the economical argumentation, especially regarding the need for an incentive to create. This argumentation is distilled from the incentive-based and utilitarian justification for intellectual property in general. This justification views the granting of exclusive rights to authors as a necessary condition to promote the creation of intellectual works.[91] The social argumentation thinks that for creators to repeat the process of creating a work of art, there has to be an incentive in the form of a reward, which is received for their earlier work. In the cases of a human creator that uses AI as a tool or co-author this argumentation will remain valid. In the case of an autonomous AI system this is different. When no copyright protection is granted to works created by autonomous AI systems and therefor there is no human author of the work, how can any human be motivated to create it? The autonomous AI system itself does not need an incentive to create, but a human still needs to use the AI system in order for it to create works of art. To give create, purchase and use the autonomous AI system more than once, humans would most probably need an incentive in the form of a reward once the novelty of the AI wears off.

5.1.5. Cultural argumentation

Without rewarding intellectual achievements, culture would grow poorer because of the decrease in intellectual achievements. This argumentation is also based on the assumption that human creators would stop creating if they are not rewarded and this would consequently result in a poorer culture. For AI creators this problem does not have to exist. If the government or society places a large

[89] Landes & Posner2009, p. 11.
[90] Guibault, 2006, p. 37.
[91] https://plato.stanford.edu/archives/win2014/entries/intellectual-property/

importance on culture they can easily put the AI creator to work even without any incentive for the AI system to do so. Only the costs of creation of the AI system have to be carried by society or the government. The creation of works of art in order to add to culture does not have to be reached by incentivizing "fickle" artists anymore. In fact not granting copyright to the works that are created by AI systems could even be better for cultural development, by making more works publicly available. As Northrop Frey wrote once: "Poetry can only be made out of other poems; novels out of other novels." If freely available works of art are created by AI systems, human creators and other AI systems could benefit from more input, could improve on or be inspired by these works.

5.1.6. Freedom of expression argumentation

By rewarding intellectual achievements, it becomes possible for the authors to make a living from these achievements. This argumentation is a practical one, if authors cannot make a living of their achievements; they have to resort to other means to survive, like having a patron in the old days. This could affect the freedom of the author to express himself in the way he wants to, this is disastrous for the freedom of expression for the authors and the right to information of society. In the case of AI systems this will not be a problem, the AI systems do not need means to survive and will not have an interest in the expressing of a radical opinion. This argumentation remains valid for the situations where AI is used as a tool or co-author. Seeing as the human-author using this needs to be able to make a living and does have an interest in the freedom to express his own opinion.

5.1.7. Pragmatic argumentation

When the legal system protects intellectual achievements, it pays to invest in the cultural and technological sectors of society. This argumentation touches upon the reasonable trust investors need to have in the return of an investment. As is stated in the preamble of the InfoSoc Directive, the investment that is required to produces creative services are considerable and adequate legal protection is necessary in order to guarantee the availability of a reward and opportunity for returns on this investment.[92] When works created by AI are not granted copyright protection, there is no concrete incentive for developers of AI systems to continue developing, using and improving their technology. This could lead to dissuading developers and companies from investing in AI research. Which could ultimately result in the decline of the development of AI not only in the cultural sector, but also across a number of other sectors.[93] This argumentation seems to be just as applicable to works created by AI as works created by humans.

5.2. Practical factors

Next to the normative reasons for (not) granting copyright to works created by AI, there also exist practical reasons to grant them or not.

[92] Dirctive 2001/29/EC, preamble 10.
[93] Hristov, 2017, p. 438.

5.2.1. Formalities

One of the most obvious practical concerns when deciding whether to grant copyright to works of art created by AI is the ban on formalities of article 5(2) of the Berne Convention. Authors enjoy the Berne Convention's minimum rights completely automatically and do not need to observe any formality.[94] In practice this ban on formalities means that the copyright of a work are not registered and when considering granting no copyright to works crated by AI this could have some confusing consequences. A consequence can be that, because it is not possible to determine by looking at a work whether a human has created it or AI, uncertainty can arise about reusing, copying or adapting certain works that are actually free of a copyright. Another consequence is that when more and more works created by AI enter the market without any right to copyright, the ambiguity can be harmful for the protection of the human authors copyright and copyright can devalue. When the market is saturated with high quality works of art created by AI that are free of copyright, who still needs to use the works of art of human authors which are protected?

5.2.2. Moral right's

The copyright consist not only of rights to exploit a work but also rights that protect the work on moral grounds, these rights constitute of naming rights, rights to oppose against any alteration made to the work and a right to oppose to any distortion, mutilation or other impairment of the work that could impact the reputation or dignity of the maker.[95] When copyright would not be granted to works created by AI, this would pose a problem for works created with AI as a tool. The human-author would not be granted personality rights, while his personal imprint is in the work and his reputation could be damaged. Moreover these rights are also problematic for works created autonomously by AI, seeing as ethical problems can arise by coupling moral rights to the labour of a machine.

5.2.3. Allocating ownership

The allocation of ownership in the case of copyright on works created by AI has been extensively discussed by scholars, but is not yet resolved.[96] In the current Dutch Copyright regime and following the reasoning of this thesis the allocation of the ownership rights would lie with the one that can be considered to have made the personal imprint in the work. This can become a problem in the case of the co-authorship of AI systems and autonomous AI systems. Without the existence of a legal personality for AI or robots, the allocation of ownership will have to be decided on between the programmer, the end-user and nobody. This is problematic because all parties cannot be justified in the traditional copyright system where authorship equals ownership.

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[94] Guide to the Berne Convention for the Protection of Literary and Artistic Works (Paris Act, 1971), p. 5.
[95] Dutch Copyright Act, article 25(1).
[96] Samuelson, 1985-1986.

6. Conclusion

First the question whether it is possible to grant copyright protection to works of art created by artificially intelligent systems under the current Dutch copyright regime will be answered. By analysing the current copyright regime that applies to the Netherlands the conclusion has been reached that the concept of the author was not intended to be given an instrumental role in determining the possibility to grant copyright to a work, but rather fulfils a pragmatic legal function to determine ownership of that work. Next to this no definition is given of the criteria an author has to satisfy in order to be recognized in neither national nor international copyright and from this cannot be drawn the conclusion that the author has to be human on the basis of Dutch Copyright law in order for a work to receive copyright protection. This leaves the concept of work to be analysed in order to be able to determine whether the creation of a work by AI can be protected by copyright. There are two criteria that factor into this; requirement of reflecting an original expression and the carrying of a personal imprint. The requirement of reflecting an original expression can be fulfilled by an AI author, because of the fact that the learning algorithm and the input are essential factors in the creation of the output, which are factors that are provided for by humans. It is not very probable that another AI system has been developed with the exact same essential factors and that this will result in the exact same output. Next to this it is of importance that the reflection of the original expression does not have to be based on the personal interference of the author in all the parts of the work. This prevents that works created by automatic means are deemed to not reflect an original expression by default. The next requirement of the personal imprint must be answered by distinguishing in the involvement of human authors in the process of the creation of works by AI systems. The first situation is the use of AI by a human author as a mere tool. In this situation the question to be answered is if it is possible for AI to be defined as a mere tool? The selection of a certain learning algorithm and the restriction of certain input could still be seen as free and creative choices of the author and can be done under the authority of the author who will use the resulting AI system as a tool. The author can have some expectations of what the work will eventually look like by defining a certain framework in which the work has to be created. If an author decides to automate a part of the creative process for convenience, this does not take away the free and creative choices he is able to make in the creation and use of the AI. The second situation is co-authorship between a human author and an AI author. Co-authorship exists when the author cooperates with the AI system, instead of setting rules for the AI system. The resulting work of the co-authorship is a result of the creative labour of the human author and the free and creative choices that are made are a product of the mind of the human author. The co-authorship of the AI system does not take away from the human author's personal imprint in the work. From this follows that a work created by a human author in collaboration with an AI author can be protected by copyright. The third situation is human selection of autonomously created work by AI. In this situation a human does not contribute to the creation of the work itself, but contributes by selecting a work that is valuable and worthy of preserving among a high volume of output that is generated by the AI system. The question in this situation is whether the mere selection by a human is enough to give a personal imprint to the work. When a human author sets the conditions and makes the final selection, it seems to fulfil the requirements of

making free and creative choices and thus the resulting work can carry the personal imprint of that human author. The resulting work can be granted copyright. The fourth situation is creation by use of brute force. AI systems often have a large computing power and can generate huge quantities of output when ordered to do so. Is it possible to have the personal imprint of the author in works created by the use of AI's capability of brute force without a subsequent selection by a human-author? The choices made by the AI in this situation are purely based on the calculation of each possibility and cannot be defined as creative or free choices. The AI system is simply ordered to make all the imaginable combinations possible. The resulting work cannot be protected by copyright, due to a lack of personal imprint. The last situation is autonomously created work by AI. In this situation a important question is whether the criterion 'creative labour of the human mind' formulated in the Endstra-case poses a problem for the personal imprint requirement? As an AI system is modelled to learn and perform tasks in the way a human mind would, this may very well also fulfil the criterion. Further more the use of the term 'human mind' by the Supreme Court is meant to make sure that the trivial forms of works are not protected, works that are created by pure accident by for example a natural force like a storm or lightening on sand. The works of art created by AI systems cannot be called trivial in any way, shape or form. In conclusion it is possible under the current copyright regime in the Netherlands to grant copyright protection to a work created by an AI system as long as the brute force of computing power of an AI system is not the origin of the choices that are made in the creation of the work.
Second question to be answered is if copyright protection should be granted to works created by AI systems. This is analyzed by looking at the normative arguments, rationale for copyright, and some practical factors. The current rationale for copyright was created with human creators in mind and has been formulated by Hugenholtz. Some of the argumentations are just as true for human authors as for AI authors, while others are not valid when applied to AI authors. The first argumentation of the current rationale is the personality argumentation. When applying the personality theory to works created by AI systems the argumentation still justifies granting copyright to works created by a human author with the help or in collaboration with an AI system, however when the AI system creates a work autonomous the personality argumentation seizes to be true due to the lack of the existence of personal interest between the author and the work. The second argumentation is the fairness argumentation. The fairness argumentation touches on the need for a fair reward for services rendered. This argumentation cannot justify the granting of copyright to a work created by AI, because of the difference in ownership in the labour, the difference in the nature and effort of the labour and in the fact than more than ever the creation of a work by AI is a social product and the property right should not lie with one party. The third argumentation is the economical argumentation that is based on the belief that rewarding intellectual achievements with exclusive rights will foster the economy. This argumentation is more applicable to industrial property, than it is to copyright on works of art. The fourth argumentation is the social argumentation. This argumentation remains valid for human authors that use AI systems as a tool or as a co-author, but also for autonomous AI systems because in all the different situations humans still remain the party that needs to start the creation of a work. The fifth argumentation is the cultural argumentation this argumentation becomes invalid when applied to works created by AI systems and can even be countered by arguing that no copyright

protection on works of art created by AI systems could even be better for cultural development. The sixth argumentation is the freedom of expression argumentation. This argumentation is invalid for autonomous AI systems, as they do not need means to survive. It remains valid however for the situations where AI is used as a tool or as a co-author. The last argumentation of the current rational for copyright is the pragmatic argumentation. This argumentation is just as true for works created by AI authors as it is for works created by human authors. When works created by AI are not granted copyright protection, there is no concrete incentive for developers of AI systems to continue developing, using and improving their technology. Overall the current rationale remains valid. This is logical seeing as the AI systems themselves have to be produced and used by humans, so many of the incentives for human authors are transferred to other parties but can still be seen as necessary to enforce the copyright system. Next the practical factors that can play a role in deciding whether or not copyright should be granted to works created by AI systems were discussed. The ban on formalities in copyright law is one of the most obvious and important practical concerns for granting copyright to works created by AI systems. The value of a copyright could diminish by the saturation of the art-market and by not being able to decide based on a work if it is copyrighted or not a high level of uncertainty could arise. A practical concern against granting copyright to works created by AI systems, is the ethical problems that are coupled with giving copyright and with that the moral right's of a work to a creation by an algorithm or machine. The last discussed practical concern against granting copyright is the allocating of ownership which cannot be justified in the manner it was justified in the traditional copyright system where authorship equalled ownership. Although it is two practical concerns against granting copyright protection against one for granting protection to works created by AI systems, the practical concern of the ban on formalities should be clued as a more important one. The copyright system needs to be clear in order to properly work, art is often presumed to have copyright on it until it is proven otherwise. The practical concerns of ethical problems coupled with the granting of moral rights and the justification of the allocating of ownership rights can probably be solved by creating a sui generis right for works created by AI systems or by adding some exceptions for these cases in the Copyright Act.

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