DEADLOCK IN PROTECTION OF SOFTWARE DEVELOPED BY AI

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Abstract: *Software development by AI raises new problems for the protection of software. Recognising AI as a right-holder in relation to software could be troublesome. Compared to the subject-matter of other intellectual property, AI developed software is essentially the same as its suggested author. Therefore, there is a risk that the subject-matter of intellectual property rights would become a subject with the capacity to possess such rights. Thus, the proposed solution herein would be to treat AI merely as a tool rather than a subject with the capacity to possess intellectual property rights.*

1. Introduction

Software protection has developed over the past century; although initially there were discussions about *sui generis* protection, the overall approach is for the protection of software as a literary work or database by copyright or database rights.[1] The protection of software was formally established in Europe by the Directive 91/250/EEC[2] and in the United States by amendment of the Copyright Act in 1980. Nonetheless, software can also be protected by patent under certain circumstances. In common, these rights can only be awarded to either a natural person or legal entity. As a result, software is treated only as a subject-matter of these rights.

While the above-described solution of copyright protection has been widely accepted at the international level, whether such a solution is appropriate can still be subject to discussion. The fact of the matter is that software differs from other types of works (e.g. films, books, and cultural heritage). There is an innate functionality[3] to software which cannot be experienced the same way as reading a book or watching a film. It is this functionality that distinguishes software from other works; and yet, this functionality, the most valuable element of software, is not protected by copyright under EU law.[4] Nevertheless, challenges surrounding the functionality and very nature of software can be further highlighted by the development of artificial intelligence (here-after «AI»). Because of this, the collision of copyright and AI will be the central point of this paper, since the impact of AI on patent protection of software deserves separate consideration.

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1 Historical background of software protection is covered by joint WIPO and UNESCO meeting of the Group of Experts on the Copyright Aspects of the Protection of Computer Software (1985), available at http://www.wipo.int/edocs/pubdocs/en/copyright/120/wipo_pub_120_1985_04.pdf (all websites last accessed in January 2018).

2 Council Directive on the legal protection of computer programs (1991), OJ 2 122/0042.

3 The functionality of software as its eminent element has been recognised at the early stage of development of software. See Final Report of the National Commission on New Technology Uses of Copyrighted Works (CONTU Final Report) 1981, 3 Computer L.J. 53, p. 89, available at https://repository.jmls.edu/cgi/viewcontent.cgi?referer=https://www.google.cz/&httpsredir=1&article=1573&context=jitpl.

4 ECJU, Judgement of 2 May 2012, SAS Institute Inc. v. World Programming Ltd, C-406/10, ECLI:EU:C:2012:259, paragraphs 39–46.

2. Legal Personhood – the Need for Copyright Protection

The current legal framework of copyright developed through two different concepts, copyright as the right to copy, and author's moral right. Both concepts originated in Europe and spread across the world through colonization. The concept of copyright was developed in the common law system of the United Kingdom and was subsequently adopted throughout the British Dominions and the United States. The concept of author´s right expanded from France to the rest of continental Europe, and their colonies. In general, these two different legal systems were also one of the reasons of distinguished legal regimes of copyright since there is their characteristic legislation.[5]

The copyright system is characterized by a utilitarian approach where the purpose of copyright is to stimulate the production of the widest possible variety of creative goods at the lowest possible price[6]. Since copyright protects works that may be the simple result of investment and labour, there is no obstacle to vesting copyright not only in those natural persons, who create a work but also in others, including legal entities that make investment in context with works.[7] This differs from the conception of authorship under the author's right system. Under the author´s right system, the right of the author in his works stemmed from his personality.[8] This concept has been predominantly influenced by natural law theory and the personalist doctrine.[9]

The differences between copyright and author´s right have proved to be a major source of problems for initiating and adopting international agreements or even regional harmonization.[10] However, the Berne Convention[11], as well as other international treaties, helped to bridge the two traditions with minimum standards which dictate substantively similar rules for countries in both systems. It is noteworthy that the international treaties[12] and regional harmonisation[13] deals only with the terms of author and leaves the specific wording to their Member States. The necessary space for national rules, which vary on the question of the person who possess copyright, remains. However, copyright law always requires a legal person in common.

Although, the provision of US Copyright Code might seem more favourable towards the possible adoption of a new concept of author, the US Copyright Office has expressly demonstrated[14] that copyright could be granted only to the works of a natural person. This opinion is also supported by analogy with animals. There is an interesting case regarding the authorship of the so called «monkey selfie», where the court refused to grant copyright to a female macaque.[15] This decision was appealed[16] by representative of plaintiff to the Court of

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5 Arnold, Comparison of Civil Law and Common Law. Common Law Review 8 (2007), p. 5.

6 Goldstein/Hugenholtz, International copyright: principles, law, and practice. 3rd ed. Oxford (2013), p. 14.

7 Ibid, p. 48.

8 Sterling, World copyright law: protection of authors' works, performances, phonograms, films, video, broadcasts, and published editions in national, international, and regional law. London (1998), p. 16.

9 Goldstein/Hugenholtz (note 6), p. 20.

10 Lewinski, International copyright law and policy. Oxford (2008), p. 33.

11 Berne Convention for the Protection of Literary and Artistic Works, as amended on September 28, 1979, (hereinafter the «Berne Convention») available at http://www.wipo.int/wipolex/en/treaties/text.jsp?file_id=283698.

12 The Berne Convention conjunct the term author in Articles 3 and 7 with his nationality and death, moreover, it declares also moral right to the author, so it is apparent that Berne Convention recognises as an author the natural person. Noteworthy, the Article 1 of TRIPS agreement expressly states that the nationals of other Member States shall be understood as those natural or legal persons that would meet the criteria for eligibility for protection.

13 Directive on the legal protection of computer programs (2009), OJ 2 111/16, Article 2.

14 U.S. Copyright Office, Compendium of U.S. Copyright Office Practices, §§ 306, 313.2, 3d ed. (2017), available at https://www.copyright.gov/comp3/: «*The U.S. Copyright Office will register an original work of authorship, provided that the work was created by a human being … the Office will not register works produced by a machine or mere me-chanical process that operates randomly or automatically without any creative input or intervention from a human author*».

15 Naruto, by and through his Next Friend, Plaintiff-Appellant, v. David J. Slater et al., Case No. 3:15-cv-04324 (Orrick, J.), 28 January 2016, available at https://law.justia.com/cases/federal/district-courts/california/candce/3:2015cv04324/291324/45/.

16 Opening brief of plaintiff-appellant in case Naruto v. Slater (note 15), available at https://www.scribd.com/document/319649363/Naruto-v-Slater-Appeal-Opening-Brief.

Appeal for the Ninth Circuit; however, the case was settled by the parties. The insistence on the requirement of human authorship could prevent the future adoption of copyright rules to the usage of AI technologies.

3. Clash of Traditional Copyright Protection and AI

Whereas as little as thirty years ago, interaction with AI technologies[17] would almost exclusively occur in high-tech laboratories or research facilities; today we can experience AI technologies in a multitude of ways (e.g. spam filters in email clients, or malware definitions in antivirus software). As such, society has begun to realise the significant impact AI can have on our lives, which can be evidenced by the debate that surrounds various aspects of AI worldwide.[18] Finally, the year 2017 is considered as a year of AI.[19]

The question of how AI may influence intellectual property has been raised multiple times by the World Intellectual Property Organization (WIPO).[20] In 1991, the WIPO Worldwide Symposium on the Intellectual Aspects of Artificial Intelligence[21] was held at Stanford University, California with the participation of experts from the field of computer science, law and business. The WIPO Symposium 1991 provided space for discussion of different aspects of AI and also suggested some possible approaches toward this new technology. During the WIPO Symposium 1991, an appealing idea was presented, that AI regulation should be considered from the point of view of software protection.[22] Such an idea should be kept in mind for the future adoption of any legal or non-legal framework for AI and its usage. Especially when considering the different approaches to AI and their possible impact on software protection, which are discussed below.

There are several well-known examples where AI has demonstrated its ability to create an output. Firstly, there is the «Next Rembrandt» project,[23] which used AI technology combined with a 3D printer to create a new portrait in the style of Rembrandt. The developers behind the project revealed that the main elements were to teach the software to capture Rembrandt's style (i.e. the use of geometry, materials, and techniques) as well as the development of a knowledge base[24] of Rembrandt works. Another example of AI output is a book which is based on the book series «A Song of Ice and Fire» written by G. R. R. Martin[25], which shared many of the same technological requirements as the next Rembrandt project. Finally, IBM has developed the question-answering AI system Watson, which has been implemented in several different ways (e.g. customer

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17 In a very general way, artificial intelligence can be described as a computer system which mimics human behaviour. Artificial intelligence is defined in various ways depending on perspective from which is viewed e.g. thought process, computational science, reasoning, etc. See Russell/Norvig, Artificial Intelligence: A Modern Approach, 3rd ed., New Jersey (2009), p. 2.

18 E.g. Report with recommendations to the Commission on Civil Law Rules on Robotics, Committee on Legal Affairs, Rapporteur Mady Delvaux, published on 27 January 2017, (here-after the «Report of CLA») available at http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A8-20170005+0+DOC+XML+V0//EN; Hall/Pesenti, Growing the Artificial Intelligence Industry in the UK (Review executed by initiative of the Business Secretary and Culture Secretary of British Government), available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/652097/Growing_the_artificial_intelligence_industry_in_the_UK.pdf; Conference «AI: Intelligent Machines, Smart Policies», held by OECD on 26–27 October 2017; etc.

19 E.g. Venkatachalam, 2017 is the year of artificial intelligence. Here's why, World Economic Forum (2017), available at https://www.weforum.org/agenda/2017/05/2017-is-the-year-of-artificial-intelligence-here-s-why/; Lashinsky, 2017 will be the year of AI, Fortune (2016), available at http://fortune.com/2016/12/30/the-year-of-artificial-intelligence/.

20 Recently, this article on artificial intelligence and copyright was published in the WIPO Magazine in October 2017. See Gaudamuz, Artificial Intelligence and Copyright, WIPO Magazine (2017), available at http://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html.

21 See World Intellectual Property Organization (WIPO), Worldwide Symposium on the Intellectual Property Aspects of Artificial Intelligence, Stanford University, Stanford (California), United States of America, 25–27 March 1991 (hereafter WIPO Symposium 1991), available at ftp://ftp.wipo.int/pub/library/ebooks/wipopublications/wipo_pub_698e.pdf.

22 See Davis, Intellectual Property and Software: the assumptions are broken, WIPO Symposium 1991, p. 102.

23 For more details visit webpage https://www.nextrembrandt.com/.

24 Roth/Waterman/Lenat, Building Expert Systems, Addison-Wesley (1983): «A knowledge-based system consists of a knowledge-base that represents facts about the world and an inference engine that can reason about those facts and use rules and other forms of logic to deduce new facts or highlight inconsistencies.»

25 Copyright (c) 2017 Zack Thoutt, available at https://github.com/zackthoutt/got-book-6/tree/master/generated-book-v1.

service systems, health diagnostic system, chatbot). One of the more interesting platforms is Chef Watson, which has the form of a web application that creates recipes while using AI technology[26]. According to the terms of usage, displayed on IBM's website[27], IBM claim ownership to all outputs generated by Watson without expressly declaring that IBM have copyright to them. It is disputable whether such a declaration is deliberately ambiguous in its wording, so as to avoid any relation to copyright. In the case that IBM declares ownership of copyright to Chef Watson's outputs, such an attitude might be subject to criticism by IP lawyers.

Through these examples, it is shown that AI technologies have started to mimic human activities which were for a long period exclusive to humanity, by its very nature. As stated above, copyright is granted only for a legal person and originally flows from the personhood of the author. But if AI is capable of creative output then questions need to be answered regarding the legal status of AI's outputs. These answers could provide users the necessary guidance on the possible usage of AI outputs. Without this guidance, users do not have a legal certainty whether they are possibly infringing someone's copyright or from whom they should seek a license agreement. In the beginning, it remains to be answered, whether such outputs of AI meet the requirements of copyright protection; and regarding that question, there are persistent doubts if AI is capable of creativity or not[28]. However, this contribution does not aim to answer this question.

4. Re-think of Copyright to Fit the Age of AI

Recently, several approaches to AI outputs have been proposed.[29] These approaches are based on present copyright legislation where authors use existing copyright principles to outputs of AI technology. Some of the more common approaches are discussed below; however, this does not represent an exhaustive list on this issue.

The **hire doctrine** has previously been discussed in the legal literature in the US;[30] where it was suggested that the present hire doctrine could be used also in the case of AI creation. Provisions § 101 in conjunction with § 201 (b) of US Copyright Code[31] deal this doctrine. Nonetheless, it could be used only as a legal fiction and under circumstances that the terms employer and employee would be interpreted very broadly. This approach could lead to a situation where AI would be treated as an employee and the AI developer would be deemed as an employer. The application of the hire doctrine on the relations between AI and AI developer would avoid a situation where copyright is granted to a non-human author. An advantage of the application of the hire doctrine is that similar concepts can be found in the national legislation of other states.[32] If such an approach were to be accepted as a solution to AI outputs, it could be adopted with significant ease at the international level and without the need for seeking international consent by a majority of states. However, such an approach could prove problematic, mainly because the aforementioned terms (employee and employer) would always

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26 Chef Watson was described by IBM as follows: «Cognitive cooking is computational creativity applied to cooking. We´ve created a system that has ingested thousands of recipes, understands what ingredients go well together, what ingredients are used in what cuisines, what ingredient types are required to make a certain kind of dish…Using that data, the system can create never-seen-before recipes based on your outputs.», available at https://www.reddit.com/r/IAmA/comments/3id842/we_are_the_ibm_chef_watson_team_along_with_our/.

27 https://www.ibmchefwatson.com/community.

28 The author realises the importance of this issue, however, the limited space of this contribution does not allow discussion of this topic in further length.

29 See generally Hristov, Artificial Intelligence and the Copyright Dilemma, 57 IDEA 431 (2017); Denicola, Ex Machina: Copyright Protection for Computer Generated Works, 69 Rutgers U.L. Rev. 251 (2016).

30 Bridy, Coding Creativity: Copyright and the Artificial Intelligent Author, STAN. TECH. L. REV. 5 (2012), p. 26.

31 United States of America. U.S. Copyright Act, 17 U.S.C. §§ 101 et seq. Year of Version: 2016, available at https://www.copyright.gov/title17/title17.pdf.

32 Eg. section 58 of Act No. 121/2000 Coll., on Copyright and Rights Related to Copyright and on Amendment to Certain Acts, as amended; section 90 of Act No. 185/2015 Coll. on Copyright and Related Rights, as amended; section 35 of the Australian Copyright Act of 1986; section 43 of German Act on Copyright and Related Rights, as amended, etc.

be also a part of labour law. In the case of acceptance of this approach, it would be necessary to use a broad interpretation *stricto sensu* for the purpose of copyright law.

Alternatively, **computer-aided works** has been suggested as a solution, which is based on the present copyright legislation of the UK, Ireland, New Zealand and Hong-Kong. As such legislation is not widespread; firstly, it would be necessary to adopt such rules on a larger scale, whether EU legislation or worldwide[33]. However, it is the difficulty of reaching a worldwide consensus that makes this approach difficult to adopt. This approach is based on the argument that AI is a mere tool which is used by a human. At the time of amendment of specific provisions, there is the question of whether such a doctrine was considering future development and usage of AI. As an example, the British Copyright Act[34] deals with computer-aided works in its provision 9 (3). In this way, the author of such work would be the person who uses the AI. However, there may be hesitation whether a described provision would apply also to the case of AI technology that can create its outputs in a more independent and autonomous way.[35] In such a scenario, human input would be limited to the extent that a developer just makes an AI tool without determination and setting defaults for the desired output. This approach can be used as a cornerstone for forthcoming adaptation of copyright rules or provide the court with possible guidance on the matter of AI-generated works. Nonetheless, there is also the opinion that discussed approaches could be found very problematic and should be refused.[36]

Lastly, there is the suggestion that the person who discovered a work first, would be granted relevant rights. Even though such a principle was discussed related to inventions created by AI[37], this is also applicable to the situation when AI output will have features of work and then could be copyrightable. Since the work has to be expressed and perceived by a human, it would make this suggestion applicable to copyright. In this text, this approach will be described as the «**discovery rule».** The discovery rule is a minor opinion suggested within literature. This rule would lead to the state when the author of a work would be the user of AI or AI owner, in most scenarios. The most challenging aspect of this rule would be to prove priority of individual who will claim authorship of an output. Also, it can be viewed as somewhat unfair for the different parties involved in the process of development of AI and those using AI. Moreover, such an approach may not reflect the real contribution of the author who was granted the rights.[38] Thus far, such an approach would not be the most appropriate for granted authorship to AI outputs. Anyway, possible application of this rule would require an amendment to present copyright legislation.

All of the described approaches have one significant element in common; they help to track back to a possible human author of AI outputs. Notwithstanding, all suggestions are governed by different rules and based on slightly different principles, eventually, their usage would lead to only one solution, a human author. As it is stated above, a person, in who would be vested copyright, could have been recognised as the AI developer, AI user or even AI owner, based on the application of the suggested approaches. The AI would not be deemed as an author of its generated works but as a mere tool for the creation of outputs. It is noteworthy that the AI generated works would not fall into the public domain in case these approaches were applied to them.

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33 Gaudamuz, Do androids dream of electric copyright? Comparative analysis of originality in artificial intelligence generated works, I. P. Q. (2017), p. 13.

34 UK Copyright, Designs and Patent Act 1988, online version available at https://www.legislation.gov.uk/ukpga/1988/48/contents.

35 Generally see Lambert, Computer-generated works and copyright: selfies, traps, robots, AI and machine learning, E. I. P. R. (2017), 39(1).

36 See Grimmelmann, There's No Such Thing as a Computer-Authored Work – And It's a Good Thing, Too, 39 Columbia Journal of Law & the Arts (2016).

37 Abbott, I think, Therefore I invent: Creative Computers and the Future of Patent Law, 57 B.C.L., Rev. (2016), p. 1098, available at https://ssrn.com/abstract=2727884 or http://dx.doi.org/10.2139/ssrn.2727884

38 Abbott, Hal the Inventor: Big Data and Its Use by Artificial Intelligence. in Big Data Is Not a Monolith, MIT Press (2016), available at https://ssrn.com/abstract=2565950.

5. AI as an author

Finally, one can suggest as a possible solution to vest copyright into AI technology itself. While, this solution may sound ludicrous, it is necessary to pay attention to its consideration. Moreover, the necessity of discussion of this approach is apparent, since it has already been debated in the literature.[39]

One suggestion is that an AI could be embodied in a machine as a corporate body[40] whereby AI would be granted legal personality solely for the purpose of authorship of its generated works.[41] Support of legal personality for AI[42] derives from analogy with a corporation[43]; however, a corporation is made up of assets and maintains a personal aspect. This concept presumes that without limited personality, it would not be possible to be granted copyright to AI at all because it will not be possible to attribute AI with rights. Yet, there remain doubts whether such limited scope of legal personality, would not still be problematic for further legal regulation on AI.[44]

At the EU level, the question of AI personhood is dealt with by a Report of CLA.[45] The Committee of Legal Affairs in relation to robots states in its recommendations (point 59 f. of Motion for European Parliament Resolution) that the Commission should consider an option of creation of specific status of electronic person in connection with usage of autonomous robots with its possible implication on civil liability[46]. Thus far, robots cannot be held liable for acts and omission that caused damage to third party based on existing rules. In the civil liability, the foundations to AI personality is basically the same as in relation to copyright, the personality is necessary for attribution of duties to AI, in other words to establish a liability of AI. Nonetheless, the Report of CLA discusses the possible specific AI status also in relation to autonomous means of transport, autonomous vehicles. Thus, if the AI should be attributed rights or duties, the special status of AI has to be established.

The argument for granting AI authorship is mainly supported by the desire to avoid a situation where AI outputs fall into the public domain. The need of copyright for AI outputs can be linked with the utilitarian philosophy and reimbursement of investment in the development of AI technology.

Moreover, the argument for this approach could also be articulated in contrast to the previous part, arguing to grant copyright to a human author may lead to unfairness. *Ad absurdum*, one could argue that parents do not possess copyright to all of their children works, so we should not grant copyright to a human author based solely on their initial input in creating the AI.[47]

The problem of recognising AI as an author in relation to software is obvious. Compared to other work, AI developed software can be fundamentally the same as its suggested author. The dividing line, between software as a product of a creative process and software as an author of such a process could be problematic to establish; especially, if the result of AI development would turn out to be very sophisticated software or even

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39 See above, note 29.

40 Davis, An evolutionary step in intellectual property rights – Artificial Intelligence and intellectual property, Computer Law and Security Review 27 (2011), pp. 601–609.

41 See generally Solum, Legal Personhood for Artificial Intelligences, 70 N. C. L. Rev. (1992), 1231, 1288.

42 See generally, Solaiman, Legal personality of robots, corporations, idols and chimpanzees: a quest for legitimacy, Artif Intell Law (2017), pp. 155–179; Černa/Grigienė/Sirbikytė, Is it possible to grant legal personality to artificial intelligence software systems?, Computer Law and Security Review (2017), pp. 685–699.

43 For further discussion generally see Schafer/Fraser, Self-Made (Machine) Men – IP Implications of Inventions by Robots, in: Schweighofer/Kummer/Hötzendorfer/Sorge (eds.), 20 Years of IRIS: Trends and Communities of Legal Informatics – Proceedings of the International Legal Informatics Symposium IRIS 2017. pp. 171–178.

44 Different aspects of AI personhood has been discussed in the legal literature whether some authors refuse to establish a legal personality of AI. See generally Smith, Robot Slaves, Robot Masters, and the Agency Costs of Artificial Government, 1 Criterion J. on Innovation 1 (2016).

45 See above, note 18.

46 Report of CLA, Motion for European Parliament Resolution, Liability, AB: «whereas the more autonomous robots are, the less they can be considered to be simple tools in the hands of other actors (such as the manufacturer, the operator, the owner, the user, etc.).»

47 Abbott (note 37), pp. 1094–1095.

AI itself. The crucial question that needs to be answered is whether AI which would be an author could be at the same time in the regime of software protected by someone´s copyright. As described above, the situation of development of AI by itself would lead to the situation that AI could be the subject of copyright protection and simultaneously have copyright to different AIs. The conflict of potential legislation with existing software protection would be unavoidable. This hypothetical scenario may cause a collapse of software protection. Whether it would be possible to preserve software protection of AI, which holds the copyright, does not seem clear.

The potential hassle which could arise from granting copyright to AI can be demonstrated by consideration of license agreements in the case of continuous development of AI. At the beginning, the AI developed by an AI engineer («original AI») would most commonly be the subject of copyright vested in its developer. In the case of entering into a license agreement («Licence agreement 1») between the AI developer and a third party, the parties may decide that in the situation that the original AI would create another AI («second AI»), the copyright of original AI would be transferred to the third party of the license agreement. Whether such a transfer of copyright would be legally valid is disputable. However, in case we would apply the doctrine that AI is an author of its outputs, the original AI would also be entitled to copyright of the second AI. In this situation, where the interested party would like to enter into a license agreement («License agreement 2»), which subject was the second AI, it would be inevitable that the original AI would be a party of that agreement. The question is whether a subject of the License agreement 1 can be at the same time party of the License agreement 2 and would not make the whole License agreement 2 invalid. Should the second AI go on to develop future AI itself, then the situation will become very messy indeed. There is no analogy in law when party to an agreement would become also a subject of another agreement. Such a concept is expressly forbidden by laws where the discussed party/subject would be a natural person[48]; furthermore, such concept is not allowed by law also in case of legal entities.

One potential solution that has not received much previous attention is that the License agreement 1 could include a clause which would transfer copyright vested into all possible outputs to a third party. Such an open ended clause would have to be written in the way that it would cover transfer of possible copyright of outputs, independently, if there are outputs of the original AI, (i.e. second AI, third AI or any other future AI). The question of the validity and compliance of such a clause with the law is uncertain at this stage and should be the matter of further analysis. No matter, how far-fetched the described scenario could seem, there has already been proof that AI has ability to develop itself.[49] This example also demonstrates that such a situation will never occur in regards to other works, because a book simply cannot write another book.

As has been demonstrated above, AI development by AI is very problematic from a legal point of view, especially in relation to copyright law. In the case, that such a solution should be adopted, it is necessary to evaluate its impact on software protection. Of course, to avoid a conflict of different regime of an individual AI, it would be better to always modify software copyright rules in case that AI was granted an authorship.

6. Conclusion

This paper discusses a possible implication of AI on present copyright legislation, especially with regards to software protection. In spite of the fact that legal literature has already discussed possible approaches to authorship of AI outputs, their application can have a potential side effect on copyright protection of software

[48] This can be demonstrated by considering slavery where a natural person(s) can be subject to someone's property rights; yet, there is no possibility to be simultaneously slave and slave owner (See generally to slavery, Brace, The Politics of Property: Labour, Freedom and Belonging, Edinburgh [2004], pp. 162 onwards). Nowadays, slavery is forbidden by several international treaties (eg. Convention to Supress the Slave Trade and Slavery, 25 September 1926), so slavery is illegal and sanctioned by law. Nonetheless, in the case of AI and copyright, AI can be both, the output of AI development and AI developer at the same time.

[49] Le/Zoph, Using Machine Learning to Explore Neural Network Architecture, Google Research Blog (2017), available at https://research.googleblog.com/2017/05/using-machine-learning-to-explore.html.

above all in cases where the AI could be recognized as an author. The support of an approach whereby AI is recognized as an author could be found only from the perspective of authorship to other subject of copyright protection than software. If there were to be demand for application of copyright protection to AI outputs, it would be more practical to accept an approach which would treat AI merely as a tool and track back to a human author.

In accordance, with the discussion, there is also the opportunity to enact *sui generis* rules for AI and its outputs where the need for specific software rules will not be necessary anymore. Also, the complex rules for AI and its usage could emerge from the refusal of protection of AI and its outputs.[50] Hence, AI would not be protected by copyright itself as well as its outputs, but there would be rules which would deal with different usage of AI.

Of course, a *sui generis* approach presents both pros and cons. However, the new rules for AI and its usage would provide space for coherency and complexity that is a desired goal, especially in the case that AI is not in conflict with copyright protection only but, other existing institutes, e.g. civil liability, as well. Such an approach would definitely decrease the possible ambiguity of different rules while increasing legal certainty. In the case that adoption of AI met the preciously stated aims, it would lead to the clarification of the status of AI while avoiding conflicts with different legal institutes. Although, the adoption of new *sui generis* rules possess a risk that such rules would not be drafted in absolutely perfect way, the opportunity to adopt more or less complex rules, prevails. Besides, with the future development of AI and its influence on further aspects of people lives, such an option may become inevitable.

[50] Goldberg/Carson, Copyright Protection for Artificial Intelligent Systems, 39 J. Copyright Soc´y U.S.A. 57 (1991).