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PATENT-ELIGIBLE INVENTION REQUIREMENT UNDER THE EUROPEAN PATENT CONVENTION AND ITS IMPLICATIONS ON CREATIONS INVOLVING ARTIFICIAL INTELLIGENCE

by

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Artificial Intelligence and its subfield, Machine Learning are areas of computer science; thus, they rely on algorithms, models, computer programs and software applicable in numerous areas. Since respective creations involve resources and shift from hardware to software, there is an incentive to protect them legally. Due to their dual nature, the algorithms, models, computer programs, and software might be too "technical" to avail copyright protection but not "technical" enough for a patent. Whereas trade secret protection might not be sufficient means of protection in all cases. The article explores the issues and, as its main argument, builds further on the academic proposals on the sui generis mechanism. It also suggests certification as the potential approach to avail the desired protection instead of diluting the existing protection frameworks. An alternative would be to lie on the complete availability or trade secret protection, none of which would be an adequate balance.

KEY WORDS

Artificial Intelligence, Invention, Patent, Certification

1. INTRODUCTION

Under the Convention on the Grant of European Patents [1] (hereinafter - the EPC), for the claimed subject to be deemed an "invention", it should

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1 *The Convention on the Grant of European Patents*, 5 October 1973.

relate to a "technical" field or "technology".[2] "Technology" is understood in its conventional meaning relating to industrial methods of production, preparation and trade,[3] also comprising areas that emerge from the established "technical" fields, such as biotechnology.[4]

Artificial Intelligence[5] (hereinafter – AI) and its subfield Machine Learning (hereinafter – ML), due to their specifics, have applications in numerous fields and facilitate the switch from hardware to software. AI and ML are also based on programming models and algorithms and are an area of computer science.[6] Besides, the core value of programming models and algorithms is their behaviour or functional effect that might involve considerable resources, including know-how, to be built from scratch.[7]

The European Parliament has stated that patent protection is a key mechanism for incentivizing innovation for creations involving ML and facilitating their interoperability.[8] The Boards of Appeal of the European Patent Office (hereinafter – EPO BA) have stipulated that treating creations involving ML differently than other computer-implemented inventions would require convincingly demonstrate their difference that has not been presented yet but is not excluded in the future.[9] In this regard, the article mainly focuses on the patentability of the outlined aspects of ML in their

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2 Nack, R. (2014) Inventions and their amenability to patent protection. In: Haedicke, M. W., Timmann, H. (eds.) *Patent Law: A Handbook on European and German Patent Law*, München: Beck, p. 81.

3 *Ibid*.

4 Decision of 9 December 2010, Broccoli/PLANT BIOSCIENCE, G0002/07, EP:BA:2010:G000207.20101209, paragraphs 6.4.1.-6.4.2.3.

5 There is no united definition of Artificial Intelligence; however, see, for instance: The Joint Institute for Innovation Policy, IViR – University of Amsterdam (2020) Trends and Developments in Artificial Intelligence. Challenges to the Intellectual Property Rights Framework. Final Report for the European Commission. Publication Office of the European Union. Available from: `https://op.europa.eu/en/publication-detail/-/publication/394345a1-2ecf-11eb-b27b-01aa75ed71a1/language-en` [Accessed 30 December 2022], pp. 21-27.

6 The European Patent Office. *Guidelines for Examination G-II, 3.3.1 Artificial intelligence and machine learning*. Available from: `https://www.epo.org/law-practice/legal-texts/html/guidelines/e/g_ii_3_3_1.htm` [Accessed 10 December 2022].

7 Samuelson, P. et al. (1994) A Manifesto Concerning Legal Protection of Computer Programs. *Columbia Law Review*, 94, Available from: `https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1783\&context=faculty_scholarship` [Accessed 30 December 2022], pp. 2316.-2326, 2333.

8 European Parliament (2020). *Motion for a European Parliament Resolution on intellectual property rights for the development of artificial intelligence technologies (2020/2015(INI))*. Available from: `https://www.europarl.europa.eu/doceo/document/A-9-2020-0176_EN.html` [Accessed 14 May 2023], paragraph 11.

9 Müller, M., EPO BA (2023). *EPO Boards of Appeal case law on AI-related inventions*. Presentation in: The European Patent Office. Conference on AI-related technologies: regulation, inventorship and patenting (JC01-2023). Available from: `https://www.epo.org/learning/training/details.html?eventid=16092` [Accessed 14 May 2023].

current capacity under the EPC and touches upon other intellectual property (hereinafter – IP) mechanisms to conclude on the comprehensiveness of the respective protection.

Creations and features that do not suffice the "technicality" requirement under Article 52 EPC are treated as abstract, analogous to mathematical methods rather than "technical". Furthermore, Article 52(2) and (3) EPC excludes algorithms "as such" from patentability. Creations involving ML that have applications in "non-technical" fields might also fall under the mentioned exceptions.

Algorithms that underlie ML are of dual nature, namely, entail both intellectual and functionality-facilitating aspects and may fall under exclusions stated in Article 52(2) and (3) EPC. The remaining IP mechanisms (copyright and related rights, database rights and trade secrets) might be used in some cases, but, at the same time, not provide sufficient protection in other occasions. Thus, the alternative is not to rely on IP protection, which might not be an incentive to innovate or to opt for protection as a trade secret, if possible, that would not incentivize technological progress.

The article explores these issues and follows the academic proposals of a *sui generis* mechanism as the potential approach to avail the desired protection.[10] Ideas expressed in those proposals are still relevant due to the rapid technological development and the existing IP framework. The article elaborates on the mentioned proposals and, as the main argument, with a preliminary overview, suggests the implementation of the certification, which would not require amending the EPC or copyright framework or diluting them. Instead, it would, in a technologically neutral manner, address an incentive to obtain the protection of the most valuable part of creation – behaviour or functional value – that reflects the intended effect and reason for building them. Additionally, it would protect creations involving ML in "non-technical" fields. Further preliminary details of the suggested certification mechanism are explored in the paper that is built upon this article.[11]

[10] Samuelson, P. et. al. (1994). A Manifesto Concerning Legal Protection of Computer Programs. *Columbia Law Review*, 94, Available from: `https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1783\&context=faculty_scholarship` [Accessed 15 December 2022]; Hughes, A. (2019) *The Patentability of Software. Software as Mathematics*. New York: Routledge, p.228; Norvig, P. (2020). Bridging AI's trust gaps, fireside chat 'Responsible AI'. Reuters Events Virtual Forum Momentum "Overcome Global Challenges and Build a Better Future through Technology". Available from: `https://www.dirse.es/events/momentum-virtual-forum/` [Accessed 14 May 2023] suggesting that certification, similarly to the electricity market, could be a solution for availing protection for creations involving ML.

[11] For further preliminary details of the proposed *sui generis* certification mechanism, see, Rudzite, L. (2023). Implications for the Inventive Step under the European Patent Convention

The article relies on descriptive, analytical and historical legal methods. The primary and secondary legal sources and case law are referred to evaluate the principal argument of the article. The paper is divided into six sections and sub-sections. The article starts with analyzing the specifics of ML in their current developmental stage to obtain an insight into technical aspects that might be seeking IP protection. The following sections observe the scope of the available protection under the current IP regimes, mainly focusing on the patent eligibility requirement under the EPC. Eventually, the article comes to the section where the proposed preliminary certification mechanism is analyzed as an alternative protection instrument.

The article, as its scope, addresses the patentability under the EPC. The analysis of copyright and trade secret regimes is limited to the law of the European Union (hereinafter - EU) that harmonizes them since the EU member states are parties to the EPC[12]. The article also does not elaborate on inventions created by AI, which falls into another analysis.[13]

2. MACHINE LEARNING

AI and its sub-field ML are a branch of computer science.[14] Because of the ability to process complex, large-scale, various data sets rapidly and due to the level of abstractness or generalization, ML have applications in numerous fields.[15] For instance, in economics,[16] linguistics[17] and others.

Contrary to traditional programming, a program is formed in ML when an algorithm iterates input and underlying statistical correlations between input and output.[18] Respectively, data and output form the program. In this

Related to the Increasing Application of Artificial Intelligence and Certification as *Sui Generis* Protection Mechanism for Creations Involving Artificial Intelligence. *International Comparative Jurisprudence*, 9(1), pp. 145-150.

[12] The European Patent Office (2022). *Member states of the European Patent Organisation*. Available from: https://www.epo.org/about-us/foundation/member-states.html [Accessed 30 December 2022].

[13] See, for example, Rudzite, L. (2022) Certifications as a Remedy for Recognition of the Role of AI in the Inventive Process. *International Comparative Jurisprudence*, 8(1), pp. 112-128.

[14] The European Patent Office. (2022) *Artificial Intelligence*. Available from: https://www.epo.org/news-events/in-focus/ict/artificial-intelligence.html [Accessed 10 December 2022].

[15] Sevahula, R. K. et al. (2020) State-of-the-Art Machine Learning Techniques Aiming to Improve Patient Outcomes Pertaining to the Cardiovascular System. *Journal of the American Health Association*, 9 (4), pp. 3. Available from: doi: 10.1161/JAHA.119.013924 [Accessed 10 December 2022].

[16] Decision of 6 March 2013, Marketing simulations/SAP, T 1954/08, EP:BA:2013:T195408.20130306, paragraph 6.

[17] Decision of 21 November 2014, Classification/BDGB ENTERPRISE SOFYWARE, T 1358/09, EP:BA:2014:T135809.20141121, paragraph 5.2.

[18] Esteva, A., Robisquet, A., Ramsundar, B. (2019) A guide to deep learning in healthcare. *Nature Medicine*, 25 (1), p. 24. Available from: doi: https://doi.org/10.1038/s41591-018-0316-z [Accessed 10 December 2022].

regard, an effect of the intended program or its behaviour, particularly in ML, is a representation not solely of the code but instead reflects the correlation between the data and coded procedures of using data.[19] The more complex form of ML, such as neural networks and deep learning, the more abstract the effect of a program becomes, moving away from narrowly coded outcomes.[20]

Delineating, the basis of the ML or a "core"[21] is an algorithm.[22] An algorithm is a sequence of methodological, cognitive commands to reach the outcome.[23] In other words, an algorithm dictates an internal logic of operations.[24] In ML, algorithms serve as steps taken to enable learning from data and to perform a resulting model.[25] Types of ML algorithms are, for instance, logistic regression, artificial neural network, and others.[26] An algorithm might involve mathematical activities and can be expressed mathematically[27] and in a programming language.[28] In this regard, algorithms, including ML algorithms, are commonly referred to as "mathematical algorithms" or "computational models."[29] Nevertheless, the behaviour of a system lies in an algorithm, the essence of which exceeds

[19] Lee, J. A., Hilty, R. M., Liu, K.C. (eds.) (2021) *Artificial Intelligence & Intellectual Property*. Oxford: Oxford University Press, pp. 1, 26.

[20] Kuman, U. et al. (2019) Deep Learning for Healthcare Biometrics. In: Kisku, D. R., Gupta, P., Sing, J. K. *Design and Implementation of healthcare biometric systems*. Pennsylvania: IGI Global. Available from: doi: 10:4018/978-1-5225-7525-2.ch004 [Accessed 10 December 2022], pp. 79.

[21] The European Patent Office. (2018) *Patenting Artificial Intelligence*. Conference Summary, EPO Munich, 30 May, pp. 5-6. Available from: https://documents.epo.org/projects/babylon/acad.nsf/0/D9F20464038C0753C125829E0031B814/$FILE/summary_conference_artificial_intelligence_en.pdf [Accessed 10 December 2022].

[22] Luginbuehl, S. (2021) Patent Protection of Inventions Involving Artificial Intelligence. In: Niklas Bruun et al. (eds.) *Transition and Coherence in Intellectual Property Law. Essays in Honour of Annette Kur*. Cambridge: Cambridge University Press, p. 192.

[23] Chisum, D. S. (2013) The Patentability of Algorithms. In: Richard S. Gruner (ed.) *Intellectual Property and Digital Content. Critical Concepts in Intellectual Property Law*. Volume II. Northampton: Edward Elgar Publishing Ltd., p.43.

[24] Fisher, M. (2020) Software-related inventions. In: Tanya Aplin (ed.) *Research Handbook on Intellectual Property and Digital Technologies*. Northampton: Edward Elgar Publishing Ltd., p. 278.

[25] Sevahula, R. K. et. al. (2020). State-of-the-Art Machine Learning Techniques Aiming to Improve Patient Outcomes Pertaining to the Cardiovascular System. *Journal of the American Health Association*, 9(4), 18 February. Available from: doi: 10.1161/JAHA.119.013924 [Accessed 10 December 2022]. p. 1.

[26] *Ibid*.

[27] Maini, V., Sabri, S. (2017) *Machine Learning for Humans*. Available from: https://everythingcomputerscience.com/book/Machine\%20Learning\%20for\%20Humans.pdf

[28] Newell, A. (1986) Response: The Models are Broken, the Models are Broken. *University of Pittsburg Law Review*, 47 (1023), pp. 1029.

[29] Pilger, J., Gall, I. (2022) AI and CI simulations: prospects for patenting inventions in Europe. In Adam Jolly (ed.) *Winning with IP: Managing Intellectual Property Today. Value and Growths from Ideas and Improvements*, 2nd. ed. Coventry: Novaro Publishing, p. 65.

solely abstract mathematics.[30] Namely, non-numerical or non-mathematical elements or know-how might impact the behaviour of a system.[31]

The algorithm is incorporated into a computer program to enable algorithms to be run on a computer to execute specific commands.[32] Since algorithms are more abstract than computer programs,[33] a computer program might be formed from multiple algorithms, each of which serves its task.[34] Albeit an algorithm expressed in a source code is an integral aspect of a computer program, other components enable a physical medium (a computer) to execute a task, for example, files, compilers and others. Hence, a computer program implements the logic of an algorithm in a manner that a physical medium (hardware) can execute.[35]

The term "computer program" sometimes is interchangeably defined in literature as "software",[36] but they are not the same.[37] The software usually combines numerous computer programs. Hence, the software can be a single computer program but not *vice versa*.[38] Not all ML applications are *prima facie* related to technical sciences but also comprise other disciplines. Since ML algorithms might form part of a software or a computer program, they might be interchangeably associated with abstract mathematics.[39] However, not all aspects of a computer program or software, as previously mentioned,

[30] Turkevich, L. R. (1995) An end to the 'Mathematical Algorithm' Confusion. *European Intellectual Property Review*, 17 (2), p. 92.

[31] Hughes, A. (2019) *The Patentability of Software. Software as Mathematics*. New York: Routledge, p.23.

[32] Zeidman, B. (2011) *The Software IP Detective's Handbook. Measurement, Comparison and Infringement Detection*. Boston: Pearson Education Inc., p. 35.

[33] Newell, A. (1986) Response: The Models are Broken, the Models are Broken. *University of Pittsburg Law Review*, 47 (1023), p. 1029.

[34] Foss-Solbrekk, K. (2021) Three routes to protecting AI systems and their algorithms under IP laws: The good, the bad and the ugly. *Journal of Intellectual Property Law & Practice*, 16 (3), pp. 254.

[35] Zeidman, B. (2011) *The Software IP Detective's Handbook. Measurement, Comparison and Infringement Detection*. Boston: Pearson Education Inc., p.36., 43, 94.

[36] Pilger, J., Gall, I. (2022). AI and CI simulations: prospects for patenting inventions in Europe. In Adam Jolly (ed.) *Winning with IP: Managing Intellectual Property Today. Value and Growths from Ideas and Improvements*, 2nd. ed. Coventry: Novaro Publishing, p. 63.

[37] Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs, *Official Journal of the European Union* (32009L0024) 5 May, Recital 10. Available from: `https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX\%3A32009L0024` [Accessed 12 December 2022].

[38] Hughes, A. (2019) *The Patentability of Software. Software as Mathematics*. New York: Routledge, p. 20-21.

[39] Hughes, A. (2019) *The Patentability of Software. Software as Mathematics*. New York: Routledge, p. 165-200.

are formed by numerical algorithms. Thus, the unique behaviour of the ML algorithm might also be related to non-mathematical aspects.[40]

It can be concluded that the application of ML is possible in various fields, not all of them being, *prima facie*, "technical". Additionally, building ML requires numerous steps that could involve mathematical, non-mathematical aspects, "technical" and "non-technical" steps. Nonetheless, they all form a ML algorithm. Application of ML in the resulting creation, for instance, building a computer program or software, forms their resulting behaviour (functional value). Due to the dual nature of algorithms, application of them in building an end product might accord difficulties in availing IP protection. Thus, having explored the essence of ML, the legal protection opportunities under the existing IP regimes have to be observed.

3. PROTECTION UNDER REGIMES OF COPYRIGHT AND ITS RELATED RIGHTS, AND *SUI GENERIS* DATABASE RIGHTS FOR CREATIONS INVOLVING ML

Copyright protection in the EU pertains to "literary and artistic works"[41] comprising computer programs but excluding algorithmic behaviour (functional value).[42] Copyright protection in the EU pertains to the form of expression of a computer program (a textual part or a source code, object code and an assembly code), not to the protection of a functionality of a computer program that would rather reflect an idea.[43] Besides, copyright protection accords only to own original creation by an author (a person),

[40] Newell, A. (1986) Response: The Models are Broken, the Models are Broken. *University of Pittsburg Law Review*, 47 (1023). pp. 1024, 1033.

[41] Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society, *Official Journal of the European Union* (32001L0029) 22 June. Available from: `https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex\%3A32001L0029` [Accessed 12 December 2022]; Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC, *Official Journal of the European Union* (32019L0790) 17 May. Available from: `https://eur-lex.europa.eu/eli/dir/2019/790/oj` [Accessed 12 December 2022]; *the Berne Convention for the Protection of Literary and Artistic Works*, 9 September 1886 (TRT/Berne/001). Available from: `https://www.wipo.int/wipolex/en/text/283693` [Accessed 12 December 2022], Article 2(1); Hugenholtz, B., Quintais, J., P. (2021) Copyright and Artificial Creations: Does EU Copyright Law Protect AI-Assisted Output? *IIC – International Review of Intellectual Property and Competition Work*, 52(01), pp. 5.

[42] Directive 2009/24/EC, Article 1, Recital 11.

[43] Judgement of 22 December 2010, Bezpečnostní softwarová asociace, C-393/09, EU:C:2010:816, paragraphs 28-42; Judgement of 2 May 2012, SAS Institute, C-406/10, EU:C:2012:259, paragraphs 38-46.

excluding mathematical concepts *per se*[44] and realizations directed solely by "technical" functionality without aesthetic and individual choices.[45]

Concluding, the "technicality" of the algorithm is a matter on a case-by-case basis. ML algorithms can be built not with aesthetic but "technical" considerations behind that, even though applied in a "non-technical" field. Furthermore, there might also be cases where some computer programs or software algorithms serve "technical" purposes, some do not, and the application is in a "non-technical" field. Hence, these algorithms might be too "technical" and lack copyright protection which could also influence the protection of a computer program or software. Clarity towards copyright protection of algorithms is essential since the decompilation of computer programs for interoperability purposes in the EU is allowed and deprives only building similar computer programs[46] but does not protect from building a similar expression (behaviour).

It is essential to protect not only the copying of a code, a computer program, or software but also the replication of their behaviour (building of which involves know-how or an actual value of creation) and used for commercial purposes. Namely, building the said creation from scratch involves resources. However, it is not arduous to clone the effect after it has been expressed.[47] The issue with ML algorithms and models, especially if generalizable, is the cloning of their functionality by other ML algorithms[48] and applications in non-protected areas.

Furthermore, *sui generis* database rights[49] protect only the compilation of data but not processing tools that are algorithms in the case of ML. In this regard, even though trained on data, the ML model might not accord the respective protection, even as a "work".[50] Nevertheless, in the case of the

[44] Judgement of 13 November 2018, Levola Hengelo, C-310/17, EU:C:2018:899, paragraph 39.

[45] Judgement of 11 June 2020, Brompton Bicycle, C-833/18, EU:C:2020:461, paragraphs 22-27.

[46] Directive 2009/24/EC, Article 6.

[47] Samuelson, P. et. al. (1994). A Manifesto Concerning Legal Protection of Computer Programs. *Columbia Law Review*, 94, Available from: `https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1783\&context=faculty_scholarship` [Accessed 15 December 2022], pp. 2316.-2326, 2333.

[48] Teitelman, D., Naeh, I., Mannor, S. (2020) Stealing Black-Box Functionality Using the Deep Neural Tree Architecture. ArXiv. Available from: `https://doi.org/10.48550/arXiv.2002.09864`[Accessed 30 December 2022].

[49] Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases, *Official Journal of the European Union* (31996L0009) 27 March. Available from: `https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX\%3A01996L0009-20190606` [Accessed 30 December 2022], Article 1(2), (3).

[50] Kelli, A. et al. (2020) Impact of Legal Status of Data on Development of Data-Intensive Products: Example of Language Technologies. In: Carlo Amatucci et. al. (eds.). Legal Science: Functions, Significance and Future in Legal Systems II, the 7th International Scientific

ML model, only the resulting composition when an algorithm iterates data is protected not its constituting parts as the algorithm *per se*.

Additionally, trade secret protection is also not a practical option for software, a computer program, or an algorithm because their behaviour (actual commercial value), when rendered public as a product or part of it, is visible; thus, mimicable.[51] Besides, there is no *consensus* of whether trade secret protection belongs to IP realm.[52] Thus, trade secret protection might not provide an adequate compensation mechanism in these cases. Furthermore, non-disclosure of software, a computer program, or an algorithm might hinder technological progress.

Hence, considering the resources involved in creations that apply ML, an adequate compensatory mechanism is necessary.[53] Since copyright and trade secret protection might not in all cases serve as an effective mechanism, protection opportunities under the patent protection of the EPC should be considered.

4. ELIGIBLE INVENTION UNDER THE EUROPEAN PATENT CONVENTION

4.1. ARTICLE 52 OF THE EPC

Under Article 52, the EPC does not *expressis verbis* define the term "invention" but states the list of exclusions. According to Travaux Préparatoires,[54] the term "computer program" was not defined *verbatim* but associated more with the "mathematical application of a series of logic" and not more than an exclusion of a mathematical method. Later a separate paragraph unequivocally excluding all of the listed exclusions "as such" (intellectual

Conference of the Faculty of Law of the University of Latvia, Riga, 16-18 October. Riga: University of Latvia Press, pp. 390.

51 Samuelson, P. et. al. (1994). A Manifesto Concerning Legal Protection of Computer Programs. *Columbia Law Review*, 94, Available from: https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1783\&context=faculty_scholarship [Accessed 15 December 2022], pp. 2333.

52 Foss-Solbrekk, K. (2021) Three routes to protecting AI systems and their algorithms under IP laws: The good, the bad and the ugly. *Journal of Intellectual Property Law & Practice*, 16 (3)., pp. 256-258.

53 Op. cit., p. 258.

54 The European Patent Office. (1973) *Article 52 E Travaux Préparatoires*. Available from: http://webserv.epo.org/projects/babylon/tpepc73.nsf/0/719AC39AA49A7563C12574270049EB9E/$File/Art52eTPEPC1973.pdf [Accessed 15 December 2022], pp. 58-59.

creations) was proposed.[55] Overall, the process of including the negative definition and exclusions was rather political than legal.[56]

For a creation to be identified as an "invention", it has to have a "technical character" – 1) relates to a "technical" field; 2) is related to a "technical" problem; 3) has "technical" features that are intrinsically linked with the patent claims.[57] The same also applies to inventions involving ML.[58]

4.1.1 Technical Field

The "technical field" is attributable only to "technology". Namely, an "invention" has to present novel skills that evolve from the conventional "technical" fields related to industrial methods of production, preparation and trade, like biotechnology[59] that require craftsmanship instead of intellectual activity. Hence, "non-technical" fields (economics, social sciences and others) fall outside the EPC.[60] The aspect has been outlined, for instance, in the case T 0931/95,[61] where the claim of the innovative actuarial algorithm was rejected since it was related to the field of economics that is not a "technical" field under the EPC.

However, an invention only has to be "technical in character" regardless of the field of technology (even graphical design if it comprises "hardware" or other "technical" means). Thus, the criterion of the "technical" invention is rather formal in comparison to the "inventive step" (Article 56 EPC).[62]

As was outlined previously, ML have applications in "technical" fields and other areas. Thus, as also the EPO confirms,[63] regardless of whether a creation involving ML has inventive nature, despite the level of generalization and scope of applications, it will not be granted patent

[55] Decision of 5 October 1988, Document abstracting and retrieving, T 0022/85, EP:BA:1988:T002285.19881005, paragraph 2.

[56] Nack, R. Inventions and their amenability to patent protection. In: Haedicke, M. W., Timmann, H. (eds.) *Patent Law: A Handbook on European and German Patent Law*, pp. 124; Nägerl, J. S. H., Walder-Hartmann, L. Inventions and their amenability to patent protection. In: Haedicke, M. W., Timmann, H. (eds.) *Patent Law: A Handbook on European and German Patent Law*, pp 148.

[57] The European Patent Office. *Guidelines for Examination G-I, 2 (ii). Further requirements of an invention*. Available from: `https://www.epo.org/law-practice/legal-texts/html/guidelines/e/g_i_2.htm` [Accessed 15 December 2022].

[58] The European Patent Office. *Artificial Intelligence*.

[59] Nack, R. Inventions and their amenability to patent protection. In: Haedicke, M. W., Timmann, H. (eds.) *Patent Law: A Handbook on European and German Patent Law*, p. 81.

[60] *Op. cit.*, pp. 102.-103.

[61] Decision of 8 September 2000, Control of a Pension System/PBS Partnership, T 0931/95, EP:BA:2000:T093195.20000908, paragraph 8.

[62] Nack, R. Inventions and their amenability to patent protection. In: Haedicke, M. W., Timmann, H. (eds.) *Patent Law: A Handbook on European and German Patent Law*, pp. 73.

[63] The European Patent Office. *Artificial Intelligence*.

protection if an application of the said creation pertains to the field that is not "technical".[64] Namely, the patent claim cannot be too general. The claim should be narrow and specific enough to fulfil another patentability requirement - sufficient disclosure according to Article 83, 84 of the EPC.[65] In other words, even if a creation involves, for instance, the processing of data in a "technical" field, but the application of creation is not specific enough, patent protection might be denied as falling in the ambit of an algorithm, computer program or software "as such".[66]

4.1.2 Technical Problem

Inventions solving a "technical" problem result from a task given by a creator that can be solved by "technical" means.[67] Namely, decisive are distinguishing features of an invention that are deemed to be new, inventive in a "technical" field.[68] Besides, only the presence of an "improvement of teaching technique" is not considered "technical" under the EPC.[69] Furthermore, the distinction should be made between the "commercial application of an invention" and an underlying solvable problem since one of them might not be "technical".[70]

To evaluate the "technicality" of the claimed invention, the EPO follows the "achievement-related approach" (contribution to the art in a "technical" field).[71] It means that, for instance, in the computer-related field, the invention presents an effect that goes beyond the basic interaction between software and hardware on which it is run in cases where control over

[64] In contrast, Decision of 15 July 1986, Computer-related invention/VICOM, T 0208/84, EP:BA:1986:T020884.19860715, paragraphs 5-6; Decision of 5 September 1988, Computer-related invention/IBM, T 0115/85, EP:BA:1988:T011585.19880905, paragraphs 9-11.

[65] Decision of 19 January 2017, T 0625/11, EP:BA:2017:T062511.20170119, paragraphs 7.2.6., 8.1.

[66] Decision of 21 September 2012, Classification method/COMPTEL, T 1784/06, EP:BA:2012:T178406.20120921, paragraphs 4-6.

[67] Nack, R. Inventions and their amenability to patent protection. In: Haedicke, M. W., Timmann, H. (eds.) *Patent Law: A Handbook on European and German Patent Law*, pp. 77.

[68] The European Patent Office. *Guidelines for Examination G VII 5.4.1. Formulation of the objective technical problem for claims comprising technical and non-technical features*. Available from: `https://www.epo.org/law-practice/legal-texts/html/guidelines/e/g_vii_5_4_1.htm` [Accessed 5 August 2023]; Decision of 25 April 1989, Coloured disk jacket, T 0119/88, EP:BA:1989:T011988.19890425, paragraph 4.

[69] Decision of 3 July 1990, Marker, T 0603/89, EP:BA:1990:T060389.19900703, paragraph 2.8.

[70] EPO BA T 0119/88, paragraph 4.2. B.

[71] Nack, R. Inventions and their amenability to patent protection. In: Haedicke, M. W., Timmann, H. (eds.) *Patent Law: A Handbook on European and German Patent Law*, pp. 72-73; Decision of 10 March 2021, Pedestrian Simulation, G0001/19, EP:BA:2021:G000119.20210310, paragraph 125.

the computer is claimed.[72] In other words, "any device", including the computer, has a "technical character"; thus, without a further achievement or "further technical effect", all respective creations would be deemed as patent eligible under the EPC.[73] However, this "further technical effect" might be fulfilled by adding, for example, another physicality element (like a storage medium) that, substance-wise, is not necessarily novel or improving an inner functioning of the computer.[74]

In this regard, it is deemed that the "further technical effect" aspect is not cumbersome for computer programs to comply with because the reference to the involvement of any physical item apart from the computer in the claim is sufficient.[75] Hence, it might be concluded that difficulty for computer programs appears in the further aspect (second hurdle) of patentability, such as an "inventive step".[76] However, the EPO, in its latest landmark case that is also relevant to computer-implemented inventions, has identified an intermediary step, the purpose of which is to determine the existence of "technical teaching" of a claimed creation and prevent them from the further evaluation (state of the art).[77] Nevertheless, the approach entails the mentioned contributions to a "technical" field; hence, only those claims that relate to specific fields might reach the stage where their inventiveness will be evaluated.[78]

Additionally, the claimed invention should comprise a "technical" problem that is solved by innovative "technical" means.[79] There must be a causal link between an inventive solution by "technical" means and a previously existing problem in a related field. In other words, claimed "technical" means cannot only solve a "non-technical" issue.[80] Nonetheless, "non-technical" means such as mathematical algorithms might be involved to solve a "technical" problem to yield a "technical character".[81] Besides, even

[72] Decision of 12 May 2010, Programs for computers, G 0003/08, EP:BA:2010:G000308.20100512, paragraph 10.2.4-10.4.

[73] Decision of 19 March 2021, Natural language to machine language translator/RAVENFLOW, T 2825/19, EP:BA:2021:T282519.20210319, paragraphs 5.1-5.4.

[74] EPO BA G 0003/08, paragraph 10.4.

[75] The European Patent Office. *Guidelines for Examination, G-II, 3.6. Programs for Computers*. Available from: `https://www.epo.org/law-practice/legal-texts/html/guidelines/e/g_ii_3_6.htm` [Accessed 14 May 2023].

[76] Nack, R. Inventions and their amenability to patent protection. In: Haedicke, M. W., Timmann, H. (eds.) *Patent Law: A Handbook on European and German Patent Law*, pp. 73; EPO BA G 0001/19, paragraph 38, 125.

[77] EPO BA G 0001/19, paragraphs 38-39.

[78] EPO BA T 0931/95, paragraph 7.

[79] Decision of 26 September 2002, Two identities/COMVIK, T 0641/00, EP:BA:2002:T064100.20020926, paragraph 5.

[80] *Ibid.*, paragraph 5.

[81] EPO BA T 1784/06, paragraphs 2.3., 3.3.

if features that can be deemed "technical" *per se* may still not contribute to an inventive step if they do not add to the solution of a "technical" problem.[82] Moreover, the prerequisite is not met if the claimed feature contributes to the "technical character" only for certain specific embodiments of the claimed invention.[83]

"Technical effects" can occur within the computer-implemented process (for instance, by specific adaptations of the computer or data transfer) and at the input and output stages. Input and output may appear at the beginning and end of a computer-implemented process and during its execution (namely, by receiving measurement data and sending control signals to a "technical" system).[84] Also, permissible is a "potential technical effect" unrelated to physical reality.[85]

"Technical contribution" is evaluated in each case separately since the EPO is not willing to concretize the term "technical" to leave room for future development.[86] In this regard, an invention might have "non-technical" features that are excluded from patentability under the EPC "as such" like algorithms, computer simulations (pure numerical input and output), without real or potential effect on the physical world and others.[87] However, these seemingly "non-technical" features might also contribute to the "technicality" of the invention that has to be evaluated in relation to the entire claimed invention (estimated "technical effect" impacted by each feature individually).[88] An invention might presumably have "technical" features that contribute or do not contribute to the "technical teaching" of the invention ("technical" solution for a "technical" problem).[89] Thus, only those "technical" and "non-technical" features are deemed "technical" that bring added value to creating the claimed invention.[90] The EPO does not relate to purely formal wording of a claim of "technical" and "non-technical" but evaluates their contribution in a substantive manner.[91]

[82] EPO BA G 0001/19, paragraph 80.
[83] *Ibid*., paragraph 84.
[84] Decision of 14 March 1989, Colour television signal, T 0163/85, EP:BA:1989:T016385.19890314, paragraph 2.
[85] EPO BA G 0001/19, paragraph 85, 88.
[86] *Ibid*., paragraphs 75, 141.
[87] EPO BA G 0003/08, paragraph 10.13.1; EPO BA T 1358/09, paragraph 5.5; EPO BA T 0163/85, paragraph 2.
[88] EPO BA G 0001/19, paragraph 33.
[89] *Ibid*., paragraph 61.
[90] *Ibid*., paragraphs 140, 142.
[91] The European Patent Office. *Guidelines for Examination G VII 5.4.1. Formulation of the objective technical problem for claims comprising technical and non-technical features*.

4.2. IMPLICATIONS FOR ML

From the previously mentioned derives that the creations involving ML, although inventive, may not be patent eligible. Thus, those creations fall outside the scope of the EPC. As further demonstrated, another issue for creations involving ML might be compliance with the "invention" and "technicality" requirements since they involve algorithms.

The terms "invention" and "technical" has not been implemented as explicitly explanatory within the EPC. The same pertains to standards such as the "technical" problem and the "further technical effect" that have been developed in case law.[92] As mentioned previously, the "technicality" of each feature, including algorithms, is evaluated on a case-by-case basis concerning the entire claimed invention because it not feasible to provide an exhaustive list of conditions under which "technicality" of the computer-implemented creation might solve "technical" problem.[93] For example, "improving reliability and predictability of data" is not a "technical effect".[94] Similarly, establishing a model *per se* is a mental act or a mathematical equation.[95] Novel structure of ML algorithm does not serve "technical" purpose.[96] In contrast, models and algorithms might produce a "technical effect" if, for instance, they are responsible for aiding to adapt the computer or its *modus operandi*, or on the "technical effect" of the produced results as well as on the accuracy of the model.[97] Besides, algorithms and software might be deemed contributing to "technical teaching" if there are "technical" considerations behind their design - they serve a "technical" purpose for the claimed invention.[98] An example would be an algorithm and software features contributing to the internal working of the computer, adapted to the internal functioning of a computer or its network.[99]

Albeit the EPO requires that the "technicality" of features is assessed in the context of the entire claimed invention[100], as the case law[101] of the EPO BA demonstrates, there might not be a *consensus* on the "technical" contribution of features, including algorithms. For instance, in case T 697/17,

[92] EPO BA G 0001/19, paragraphs 33, 65, 75.
[93] *Ibid*., paragraphs 33, 61, 67, 85, 140-142.
[94] Decision of 25 May 2020, Forecasting the value of a structured financial support/SWISS, T 1798/13, EP:BA:2020:T179813.20200525, paragraphs 2.10-2.11.
[95] EPO BA G 0001/19, paragraphs 105-106.
[96] Decision of 7 November 2022, Sparsely connected neural network/MITSUBISHI, T 0702/2020, EP:BA:2022:T070220.20221107, paragraphs 12., 12.1.
[97] EPO BA G 0001/19, paragraphs 110-111.
[98] *Op. cit*., paragraphs 112-113.
[99] Decision of 17 October 2019, SQL extension/MICROSOFT TECHNOLOGY LICENCING, T 0697/17, EP:BA:2019:T069717.20191017, paragraph 5.3.4.
[100] EPO BA G 0001/19, paragraph 33.
[101] EPO BA T 0697/17, paragraphs 5.3.3.-5.3.4

initially, the algorithm was evaluated as to be "non-technical" concerning the logical structure of the data in the database without physical implementation. However, afterwards, the "technicality" of the algorithm was admitted as adding value to the overall "technical teaching" of the claimed invention.

The "technicality" was also lacking for the classification algorithms due to the absence of "technical" implementation regardless of their individual properties.[102] The same applies to the pure calculation of the behaviour of a "technical" system. If the "technical effect" is claimed as numerical output, the distinguishing aspect is not the type of data[103] but their further application.[104]

Thus, functional (technical) aspects of a claimed invention should be explicitly described. "Non-technical" features *per se* do not contribute to the "technical teaching" of an invention.[105] In this regard, another or the "functionality approach", is suggested, according to which the "technicality" of each feature should be evaluated not in isolation but as a functional, sequential chain of steps that all lead towards the claimed invention. The approach is suggested as how the issue with "non-technical" aspects should be viewed and, probably, resolved.[106]

The EPO has stipulated that the already established and long-standing "contribution" or "problem-solution approach" should be applied to assess the "technicality" of features constituting a claimed invention.[107] Besides, the "technicality" of each element, as previously stated, should be evaluated concerning the invention as a whole.[108] Thus, the approach by the EPO already considers the evaluation of elements towards invention as a whole and already corresponds to the "functionality approach".

In this regard, components of a claimed computer-implemented invention (also comprises ML) that cannot be tied with the arrogated "technical teaching" will not be subject to patent. An example are the features relating to excluded subject matters under the EPC, like algorithms *per se*. There is a stand that the creation of an algorithm always involves "technical"

[102] EPO BA T 1784/06, paragraph 3.1.4.
[103] Decision of 31 May 1994, General purpose management system, T 0769/92, EP:BA:1994:T076992.19940531, paragraphs 3.2-3.3., 3.7-3.8, 3.10.
[104] EPO BA G 0001/19, paragraphs 120, 124, 137.
[105] *Op. cit.*, paragraph 30.
[106] Baldus, O. (2019) A practical guide on how to patent artificial intelligence (AI) inventions and computer programs within the German and European patent system: much ado about little. *European Intellectual Property Review*, 41(12), pp. 752.
[107] EPO BA G 0001/19, paragraph 61.
[108] *Op. cit.*, paragraph 32.

considerations.[109] However, the EPO has stated that "technical" concerns behind underlying algorithms and models are deemed "technical" only to the extent they facilitate a "technical contribution" to the particular (claimed) "technical" invention.[110]

The case law shows[111] that the EPO has developed the third approach, "mathematical equation", at least for computer-implemented inventions that consider the possibility of expressing the creation in mathematical formulations. Nonetheless, the mechanism appears to be self-opposing. Firstly, in T 1326/06, the EPO BA stated that even though the process is purely mathematical, there is a "technical effect" because it ensures a secure exchange of documents or is related to the specific use case; thus, renders the underlying mathematical algorithm "non-ordinary".[112]

Whereas, in T 702/2020, the EPO BA rejected the argument that the model differs from the prior structures and *per se* is a "technical effect" because it reduces the needed storage space and deemed that the claimed creations were "non-inventive". The EPO BA also stated that the behaviour of the modified model would be different and less generalizable than that of the fully-connected neural network.[113] The argument, however, does not follow the stand by the EPO that ML algorithms currently are hardly ever generalizable;[114] thus, the conclusion derives that currently there is almost always a specific purpose for that algorithm. Hence, it appears that the decisive factor is the "technicality" of the end product, not the algorithm, since the final claimed use case might change the perception of the algorithm.[115] The EPO BA did not accept the argument that the ML model "as such" fulfils the "technical" purpose because it facilitates the automation of tasks.[116] On the one hand, it appears that the issue was rather related to

[109] Foss-Solbrekk, K. (2021) Three routes to protecting AI systems and their algorithms under IP laws: The good, the bad and the ugly. *Journal of Intellectual Property Law & Practice*, 16 (3), pp. 252.

[110] EPO BA G 0001/19, paragraphs 63-64.

[111] For instance, EPO BA T 0702/2020, paragraph 14; Decision of 30 November 2010, RSA Schlüsselpaarberechnung/GIESECKE & DEVRIENT, T 1326/06, EP:BA:2010:T132606.20101130, paragraph 6.1.; Decision of 17 October 2007, Software distribution/FUJITSU, T 0953/04, EP:BA:2007:T095304.20071017, paragraph 3.3.; Decision of 30 May 2000, Crypthographie à clés publiques/FRANCE TELECOM, T 0027/97, EP:BA:2000:T002797.20000530, paragraph 3.

[112] EPO BA, T 1326/06, paragraphs 6.3., 7.2., 8.1., 9.1., 9.2.

[113] EPO BA, T 0702/2020, paragraph 14.1.

[114] Klenner-Bajaja, A., EPO (2023). What is AI and how does it work. Presentation in: The European Patent Office. Conference on AI-related technologies: regulation, inventorship and patenting (JC01-2023). Available from: `https://www.epo.org/learning/training/details.html?eventid=16092` [Accessed 14 May 2023].

[115] EPO BA, T 1326/06, paragraphs 9.1., 9.2.

[116] EPO BA, T 0702/2020, paragraphs 3-6.3., 12., 18.

the description of claims, not the inventiveness since the EPO BA was not persuaded by the information provided in a case at hand not that there might be general "technicality" of neural networks.[117] On the other hand, the EPO BA did not support that ML algorithms belong to "technical" field *per se* and indicated that a concrete "technical" implementation was necessary.

Secondly, there has yet to be a *consensus* on whether an ML model has been created with artistic, mathematical or technical/functional considerations behind that.[118] It might depend on each case. For instance, if the main goal is to build an esthetically pleasing, non-functioning model, it would rather be artistic. If the task is not to draw but to express the model on its mathematical functions, then mathematical considerations are behind. Even so, aesthetics might play a minor part if the purpose is functionality. Additionally, just because the model might be expressed in various ways – by drawing, mathematical formula, or described by functions cannot be the decisive factor of classification.

The opposite conclusion would be contrary to the general perception of things. For example, the chair might be an invention based on the problem it solves – relieves sitting and other. Just because the chair might be depicted in various ways – as a drawing, by the function or even by a mathematical formula, does not automatically classify it as a mathematical function. Analogous goes for the computer-implemented invention where creation involves ML, but inventiveness is present, for instance, due to the final product. The end product could also be expressed in mathematical formula but does not change the fact that an invention is present.

It has been stated that only the execution of software in the end product does not reflect its true nature (symbolic aspect).[119] In other words, nowadays, the software is no longer limited to or built for concrete hardware but is created with a high level of abstraction.[120] On the one hand, as mentioned before, the EPC legal framework protects concrete inventions that have to involve "technicality"; hence, not addressing trivial creations or too general claims. On the other hand, since software nowadays entails a level of abstraction, obtaining a patent for a concrete use case does not protect from mimicking its behaviour or functional value in another expression.

The case law[121] of the EPO BA demonstrates that the EPO does not support suggestions to alter the scope of the EPC and comprise protection for

[117] *Op. cit.*, paragraphs 13.1., 16.2.-18.
[118] Hughes, A. (2019) *The Patentability of Software. Software as Mathematics*. New York: Routledge, p. 184, 199.-201.
[119] *Op. cit.*, p. 199.
[120] *Op. cit.*, p. 200.
[121] For instance, EPO BA G 0001/19.

algorithms[122] "as such" or to treat algorithms from the perspective of mental acts.[123] Additionally, the EPO BA has stipulated that applying creations involving ML differently than other computer-implemented inventions would require to convincingly demonstrate their distinction that has not been presented yet but is not excluded in the future.[124] Probably, this could be the use case if ML algorithm reaches the level of generalization; hence, embody "technicality" *per se*. Nonetheless, until then, as the analysis mentioned above demonstrates, creations involving ML can only obtain patent protection under the EPC if they comply with the "invention" and, consequently, "technicality" requirements. As a result, creations that cannot suffice those conditions (for instance, algorithms) fall outside the scope of the EPC. Albeit not "technical" enough for patent protection, creations, for example, algorithms, as mentioned before, might be too "technical" to avail copyright protection.

The EPO has stated that even a software process could be associated with or result in a "design".[125] In this regard, the visual design of software might be considered for protection. Nonetheless, as the EPO has stated, only the patent provides the protective framework for the respective behaviour.[126] The same applies to the "technicality" of designing programs (to attain functional results efficiently).[127] Hence, even if creations involving ML that cannot qualify for the patent protection, might avail protection under, for instance, copyright, their true value (behaviour or functional effect) would not be protected. Nonetheless, amending the said regimes would require fundamental changes in the core of the EPC, especially regarding "technical" fields and "technicality" of the invention that might not be preferred.

There is an incentive by creators to gain patent protection for computer-implemented inventions.[128] Besides, another vital aspect of algorithms, computer programs, and software is their "openness" as a

[122] EPO. *Patenting Artificial Intelligence*. Conference Summary, p. 6.

[123] Koorndijk, J. (2021) Adapting to innovations in artificial intelligence: AI as mental steps under the EPO. *European Intellectual Property Review*, 43(12), pp. 773.

[124] Müller, M., EPO BA (2023). *EPO Boards of Appeal case law on AI-related inventions*. Presentation in: The European Patent Office. Conference on AI-related technologies: regulation, inventorship and patenting (JC01-2023). Available from: `https://www.epo.org/learning/training/details.html?eventid=16092` [Accessed 14 May 2023].

[125] EPO BA G 0001/19, paragraphs 138, 143-144.

[126] The European Patent Office (2019). *Hardware and software*. Available from: `https://www.epo.org/news-events/in-focus/ict/hardware-and-software.html` [Accessed 14 May 2023].

[127] Samuelson, P. et. al. (1994). A Manifesto Concerning Legal Protection of Computer Programs. *Columbia Law Review*, 94, Available from: `https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1783\&context=faculty_scholarship` [Accessed 15 December 2022], pp. 2328-2329.

[128] EPO BA G 0001/19, paragraphs 63-64.

catalyst for scientific development, which is the opposite incentive of trade-secret protection or an overprotective patent regime.[129] Thus, a *sui generis* regime could be favoured.[130]

5. CERTIFICATION AS AN ALTERNATIVE APPROACH

Scholars have proposed building a *sui generis* mechanism to protect program behaviour[131] and AI systems.[132] The article builds on the suggested mechanisms and preliminarily develops them further. The author calls the proposed system "certification" since the term is known in other areas, as further explained, and it captures the essence of the approach.

The following should be considered as an initial and potential point of departure to address the problems described. As an intellectual endeavour, the author suggests that certification could be implemented as an alternative self-standing "patent-like" approach and provide enforceable rights paralleled with existing IP mechanisms similar to, for example, the utility models.[133] Namely, the certification depending on the aim to undergo this mechanism could provide the exclusive right to deter others from exploiting the protected creation commercially or, if chosen, serve as an only non-binding opinion that aids in proof-reviewing the creation (particularly, for intended patent claim under the EPC).

It could be conducted by an independent centralized or decentralized body or even rendered united with the proposed mechanism for AI in the EU.[134] From the procedural perspective, the proposed certification could be integrated into the existing IP mechanisms or, most likely, by an international agreement (covering Member States of the EPC) recognized as separate IP rights with its framework or as a hybrid approach combing both the

[129] Hughes, A. (2019) *The Patentability of Software. Software as Mathematics*. New York: Routledge, p.226.

[130] Samuelson, P. et. al. (1994). A Manifesto Concerning Legal Protection of Computer Programs. *Columbia Law Review*, 94, Available from: https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1783\&context=faculty_scholarship [Accessed 15 December 2022], pp. 2421.

[131] *Op. cit.*, pp. 2426-2431.

[132] For example, Picht, G., Thouvenin, P. (2022) AI&IP: Theory to Policy and Back Again Policy and Research Recommendations at the Intersection of Artificial Intelligence and Intellectual Property. *SSRN*, 16 November. Available from: http://dx.doi.org/10.2139/ssrn.4278819 [Accessed 16 December 2022].

[133] The World Intellectual Property Organization. *Utility models*. Available from: https://www.wipo.int/patents/en/topics/utility_models.html [Accessed 16 December 2022].

[134] European Commission. (2021) Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts. COM(2021)206 final (52021PC0206). Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX\%3A52021PC0206 [Accessed 14 May 2023].

previously mentioned. Certification could be introduced in parallel with the EPC, like utility models, and copyright, like *sui generis* database rights, but in a hybrid form for protection in the desired region. The procedure for evaluating creation could be built upon the respective mechanism for the utility models with necessary individualization for the needs of the respective certification framework.

Namely, the certification could be a procedure that, in a non-binding manner, evaluates a creation for potential patentability (similarly to *mutatis mutandis* utility models) that, at the same time, also considers the possibility of protection under copyright and its related rights, *sui generis* database rights (whether creation (particularly an algorithm based on "technical" considerations) can be adjusted to attain such rights). In this regard, certification could have two approaches: 1) serve, if desired, purely as an impartial, expert opinion for protection purposes under the existing regimes (like Article 83 EPC[135]); 2) as an alternative protection mechanism if none of the existing ones could be an opportunity (EPC, copyright and its related rights, *sui generis* database rights). As a result, the respective transferable certificate could be issued. Rights arising from the certification would be granted after the evaluation and registration, which is different from copyright protection (which exists from the creation of the work).[136] Enforcement of the certifications could be most preferably based on the existing mechanism in the EU to avoid repetition.[137]

Considering that developments in computer science are rapid,[138] certification should not be lengthy. This would facilitate technological progress since it would, in a quick manner, allow obtaining protection against cloning. Trusting the certification for the EPO could be too cumbersome. In other words, the proposed certification foresees considering the necessity to

[135] For a more detail, see Rudzite, L. Certifications as a Remedy for Recognition of the Role of AI in the Inventive Process, pp. 132-135.

[136] Samuelson, P. et. al. (1994). A Manifesto Concerning Legal Protection of Computer Programs. *Columbia Law Review*, 94, Available from: `https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1783\&context=faculty_scholarship` [Accessed 15 December 2022], pp. 2426.

[137] Rudzite, L. (2022) Certifications as a Remedy for Recognition of the Role of AI in the Inventive Process. *International Comparative Jurisprudence*, 8(1), pp. 124. For a more detailed insight into procedural aspects of the proposed preliminary *sui generis* certification mechanism, see, Rudzite, L. (2023). Implications for the Inventive Step under the European Patent Convention Related to the Increasing Application of Artificial Intelligence and Certification as *Sui Generis* Protection Mechanism for Creations Involving Artificial Intelligence, *International Comparative Jurisprudence*, 9(1), pp. 147-148.

[138] Samuelson, P. et. al. (1994). A Manifesto Concerning Legal Protection of Computer Programs. *Columbia Law Review*, 94, Available from: `https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1783\&context=faculty_scholarship` [Accessed 15 December 2022], pp. 2376.

evaluate a creation quicker than used for a patent and determine, amongst others, whether other protection mechanisms exist. Thus, authorizing an independent body would be preferred.

Outlining the certification preliminarily, it would serve numerous independent purposes that could be opted for as exclusive or mutual upon the choice of the applicant:

1) It would allow the evaluation of the "technicality" of features of a creation confidentially. Namely, the certification would not require the deposit of an algorithm and underlying data. Instead, the certification would be based on the system of registration in a database and allow choosing between the protection under the said mechanism or serving as an opportunity to, in a non-binding manner, verify the creation. Depending on the chosen aim of the certification, the entry would be made public or kept non-disclosed.[139] The approach would enable obtaining beforehand information on the necessity to adjust the proposed patent application (also the sufficiency of description) or even involved elements if desired (in other words, to aid in proof-reviewing the already drafted application). Hence, it could facilitate both provisional patent protection and the patent granting (that gives long-term IP rights upon deciding on approving the application) under the EPC that otherwise could be lengthy if alterations in the patent application turned out as needed. The speed of granting a patent, especially in the framework of computer-implemented inventions, is essential since the technological progress is rapid and outperforms the period of the patent granting process.[140] The certification could also provide an impartial, written (expert) non-binding statement that the EPC allows on the workability (realizability) of the invention for sufficient disclosure purposes.[141] That might be particularly important for claims with "potential" or even "virtual technical effect".[142] The result of certification, undergone with the mentioned aim, will only be disclosed to the applicant. If, based on the evaluation, the applicant

[139] For a more detail, see Rudzite, L. (2023). Implications for the Inventive Step under the European Patent Convention Related to the Increasing Application of Artificial Intelligence and Certification as *Sui Generis* Protection Mechanism for Creations Involving Artificial Intelligence, *International Comparative Jurisprudence*, 9(1), pp. 148-150.

[140] Samuelson, P. et. al. (1994). A Manifesto Concerning Legal Protection of Computer Programs. *Columbia Law Review*, 94, Available from: `https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1783\&context=faculty_scholarship` [Accessed 15 December 2022], pp. 2376.

[141] Decision of 4 April 2012, Trace data/ SAP, T 1336/08, EP:BA:2012:T133608.20120404, paragraph 3.16.

[142] EPO BA G 0001/19, paragraph 97.

chooses not to seek protection under other IP mechanisms but opts only for certification as a self-standing right, the certified creation will be rendered public.[143]

2) It would protect features of a creation that cannot be subject to the existing regimes in the EU (copyright, *sui generis* database rights) and patent protection under the EPC (evaluated under the previous point or chosen in the certification application). These would primarily address creations involving ML in areas that *per se* are "non-technical", according to the understanding under the EPC. Secondly, the approach would allow obtaining protection for features of ML that could not be protected under copyright in the EU or patent under the EPC, such as the design of a computer program involving "technical" concerns. The protection could also relate to components that would be an invention *per se* (if claimed differently) but not to the claimed invention in the patent application, like algorithms as embedded tools[144] and others. Additionally, creators could opt only for protection by the certification as self-standing rights instead, for instance, a patent, if they desire so.[145]

3) Protection under the EPC covers only a concrete invention but does not deter cloning its behaviour (functionality) by applying a different methodology.[146] Moreover, there has been a proposal to establish an analogous regime for using ML models in inventions as is in second medical use cases.[147] Certification could address an incentive against cloning the actual value of creation or its resulting behaviour. This is particularly important if ML algorithms are generalizable or explainable[148] and could only partially avail the patent protection under the EPC.

[143] For a more detail, see Rudzite, L. (2023). Implications for the Inventive Step under the European Patent Convention Related to the Increasing Application of Artificial Intelligence and Certification as *Sui Generis* Protection Mechanism for Creations Involving Artificial Intelligence, *International Comparative Jurisprudence*, 9(1), pp. 148-150.

[144] EPO. *Patenting Artificial Intelligence*. Conference Summary, p. 6.

[145] For more detail see Rudzite, L. (2023). Implications for the Inventive Step under the European Patent Convention Related to the Increasing Application of Artificial Intelligence and Certification as *Sui Generis* Protection Mechanism for Creations Involving Artificial Intelligence, *International Comparative Jurisprudence*, 9(1), pp. 148-150.

[146] EPO. *Hardware and software*.

[147] EPO. *Patenting Artificial Intelligence*. Conference Summary, p. 6.

[148] Hashiguchi, M. (2017) The Global Artificial Intelligence Revolution Challenges Patent Eligibility Laws. *Journal of Business& Technology Law*, 13(1), 1 February, pp. 30-31.

Certificates would be registered and kept in the public registry. Namely, instead of storing algorithms as suggested in the repository[149] that, on the contrary, might disrupt the market,[150] the registration could be established building upon the certification in the electricity market (certificate acknowledges generation and ownership of a certain amount of electricity)[151] or approving the existence of creation, its creator, owner and other aspects. It could be combined with some sort of catalogue system (a database with documentation concerning the addressed creations) like under the EPC. Hence, if chosen, the certificate will confirm public disclosure in a protected form. Namely, once certified, creation will become prior knowledge. Thus, due to lack of novelty, the creation could not be, for instance, patented. The certified creation could be used only with a previous license (for a fee or gratuitous) from the certificate owner. Besides, certification could aid in keeping track of respective developments, like the resulting behaviour of the addressed creations.

Additionally, the current patent term is too long for computer-implement inventions because it is disrupting the developmental process.[152] Hence, in order not to affect the progress of the industry and to provide adequate protection, the certification term would be shorter than for patent under the EPC or utility models. There has been a suggestion of a term of three years or less for program compilations.[153] It should be noted that the significant aspect of building software and its components of it (that determine behaviour) is that most creations are incremental and result from the necessity to ensure interoperability.[154] Thus, provisionally, the multi-term (ranges of protection

[149] Samuelson, P. et. al. (1994). A Manifesto Concerning Legal Protection of Computer Programs. *Columbia Law Review*, 94, Available from: https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1783\&context=faculty_scholarship [Accessed 15 December 2022], pp. 2427-2428.

[150] *Mutatis mutandis*, for example, Rudzite, L. (2022) Algorithmic Explainability and Sufficient Disclosure Requirement Under the European Patent Convention. *Juridica International*, 31/2022, pp. 130.

[151] Karakosta, Q., Petropoulou, D. (2021) The Electricity market: renewables targets, Tradeable Green Certificates and electricity trade. *SSRN*. Available from: http://dx.doi.org/10.2139/ssrn.3828184 [Accessed 30 December 2022], p.2. For more detail, see Rudzite, L. (2023). Implications for the Inventive Step under the European Patent Convention Related to the Increasing Application of Artificial Intelligence and Certification as *Sui Generis* Protection Mechanism for Creations Involving Artificial Intelligence, *International Comparative Jurisprudence*, 9(1), pp. 146, 148-150.

[152] Bainbridge, D. (2019). *Information Technology and Intellectual Property Law*. 7th ed. London: Bloomsbury Publishing, p. 534.

[153] Samuelson, P. et. al. (1994). A Manifesto Concerning Legal Protection of Computer Programs. *Columbia Law Review*, 94, Available from: https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1783\&context=faculty_scholarship [Accessed 15 December 2022], pp. 2423.

[154] *Op. cit.*, pp. 2401-2405.

terms depending on the category of a creation) approach could rather be the possible direction. This would allow creators to acquire the fruits of their labour (competitive advantage) in the desired region.

The certification would not require legal amendments for the patent or copyright frameworks but rather legal adjustments to implement the certification. Besides, since the proposed certification would be a voluntary option as opposed to other mandatory systems, no additional, undesired administrative burden would be posed on the industry.[155] Those desiring to maintain the principle of the non-legal protection of their work would not be obliged to undergo the certification. In this regard, the certification would facilitate legal certainty and be technologically neutral and coherent. It would also promote disclosure and enrich general knowledge instead of forcing trade secret protection. It would not be under-protective (like a copyright that protects only limited parts of computer-related works) or overprotective (like a patent under the EPC that grants protection for twenty years, hindering further development, especially in fast-advancing fields like computer science) and aid in attracting investment.

6. CONCLUSION

Algorithms, models, computer programs and software have dual nature. They constitute a carrier of information and a machine *per se*. It places them at the intersection of copyright, trade secrecy in the EU, patent protection under the EPC and incentives for technological progress.

The current regimes under-protect the actual value – behaviour (why they are being built) – of algorithms, models, computer programs and software. In other words, only a patent (not copyright) protects the said behaviour but to the extent of the claimed invention. The stand by the EPO regarding the evaluation of differences between creations involving ML and computer-implemented inventions might change upon reaching generalizability for ML algorithms that, as a result, may embody "technicality" *per se*.

The patent limits protection only to "technology" fields. Thus, without protection, applications in "non-technical" fields, regardless of whether the underlying algorithms, models, computer programs and software otherwise, would aid in forming an invention and accord behavioural (functional value) protection. Furthermore, even application for "technical' fields does not guarantee the said protection.

[155] Rudzite, L. Rudzite, L. (2022) Certifications as a Remedy for Recognition of the Role of AI in the Inventive Process. *International Comparative Jurisprudence*, 8(1), pp. 124.

Besides, the functionality of ML algorithms and models, as well as computer programs and software that incorporate them, might be cloned by other ML algorithms and applications in areas not protected by IP rights. Consequently, protection for the respective behaviour (functional value) might not be availed under the current IP regimes.

Since widening the EPC scope and granting patent protection for algorithms "as such" would require the fundamental changes of the EPC that the EPO has not supported yet, the article preliminarily develops further on the proposed *sui generis* mechanism suggesting the implementation of certification as a self-standing instrument. The certification would allow confidentially and voluntarily to prematurely evaluate the patent eligibility of the creation under the EPC and adjust it accordingly if necessary. Besides, the certification would also avail protection similar to the case with the utility models for those features and creations that might not obtain a patent under the EPC, copyright or other IP mechanism. Thus, the certification would not overprotect the said creations or dilute the existing legal regime but, instead, would provide the mechanism to balance the involved interests.

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