

Associate Professor Guido Noto La Diega's Comments on WIPO's 'Draft Issues Paper on Intellectual Property and Artificial Intelligence' (WIPO/IP/AI/2/GE/20/1)

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INTRODUCTION

1. WIPO's 'Draft Issues Paper on Intellectual Property and Artificial Intelligence' (WIPO/IP/AI/2/GE/20/1) is a commendable effort to start a well-evidenced conversation on a matter of the utmost importance. I believe that the following constructive feedback could contribute to further improve such conversation.

2. The draft paper does not adequately define Artificial Intelligence (AI). There is not a generally agreed definition of AI, but this renders all the more important that WIPO takes a leading role in this.¹ Moreover, it is impossible to properly assess the Intellectual Property (IP) issues in AI, if one has not clearly identified the scope of the inquiry. The paper refers to AI as "*a general-purpose technology with widespread applications throughout the economy and society.*" This is both too broad and too narrow. The reference to a "general purpose" betrays a focus on strong / general / full AI, as opposed to applied / narrow / weak AI. The first type of AI is epitomised by Artificial General Intelligence (AGI), which may finally replace humans because it seeks to "*engineer human-level general intelligence-based theoretical models.*"² In turn, narrow AI "*develops software to solve limited practical problems,*"³ hence it is intrinsically aimed not to replace humans, but to improve their life, for instance in the fields of predictive analytics, driverless cars, care robots, speech recognition, and data mining. While some seem to believe that AGI "*starts looking like an attainable goal*"⁴, the focus should be on narrow / applied / weak AI that is the AI that already exists and is already challenging IP and other laws.

¹ cf ISO/IEC CD 22989, currently under development.

² Ted Goertzel, 'The Path to More General Artificial Intelligence' (2014) 26 Journal of Experimental & Theoretical Artificial Intelligence 343.

³ *ibid.*

⁴ Marco Baroni and others, 'CommAI: Evaluating the First Steps towards a Useful General AI' [2017] arXiv preprint arXiv:1701.08954.

3. The draft paper's definition is, at the same time, over-reaching, in that traditional information technologies and new digital (non-AI) technologies may fall within its scope. It is crucial to agree on which are the main features of AI. In *Artificial Intelligence and Databases in the Age of Big Machine Data*, I defined AI as

An umbrella term encompassing a number of technologies that make machines (hardware and software) increasingly autonomous from the human beings (developers and users), the main of which are machine learning and deep learning.⁵

4. In whatever way WIPO will decide to define AI, it is pivotal that there is clarity as to the main underlying technical features and their consequences for IP. Methodologically, a good approach would be to distinguish the IP consequences based on the type of AI technology. This would also reflect the widespread criticism towards the phrase 'artificial intelligence', that could be seen as an anthropomorphic and inaccurate buzzword. My recommendation is, therefore, to focus on machine learning. Machine learning is a subset of AI that, existing at the intersection of statistics, AI, and computer science, aims at extracting knowledge from datasets.⁶ It enables automated learning, by having computers learning from input available to them, i.e. converting experience into expertise or knowledge.⁷ A key element of machine learning is the expectation that "*the accuracy of the computer algorithm will improve over time [...] as a result of feedback concerning previous accuracy.*"⁸ As an example, Facebook uses machine learning algorithms inter alia to rank feeds, ads, and search results.⁹

5. Once picked the AI technology, it is vital to appreciate the diversity of its models and applications. If machine learning is the chosen technology, one needs to distinguish supervised learning, semi-supervised learning, unsupervised learning, and

⁵ Guido Noto La Diega, 'Artificial Intelligence and Databases in the Age of Big Machine Data' (2019) 25 AIDA 2018 93.

⁶ Jeremy Davis, Joe Hoffert and Erik Vanlandingham, 'A Taxonomy of Artificial Intelligence Approaches for Adaptive Distributed Real-Time Embedded Systems' (IEEE 2016).

⁷ Shai Shalev-Shwartz and Shai Ben-David, *Understanding Machine Learning: From Theory to Algorithms* (Cambridge university press 2014).

⁸ Graham Upton and Ian Cook (eds), *A Dictionary of Statistics* (3rd edn, OUP 2014) *ad vocem* 'machine learning.'

⁹ On the hardware and software infrastructure that supports Facebook's machine learning algorithms, see Kim Hazelwood and others, 'Applied Machine Learning at Facebook: A Datacenter Infrastructure Perspective' (IEEE 2018).

reinforcement learning. Machine learning is usually ‘supervised’, inasmuch as the learning happens as a result of the training of the algorithm with labelled datasets.¹⁰ For instance, Facebook image recognition is supervised,¹¹ which means that there is a human operator labelling a picture, say, of a cat as ‘cat.’ The importance of the involvement of humans in this type of machine learning made some say that machine learning is a myth.¹² In recent years, semi-supervised learning has emerged and gained popularity.¹³ Less labour-intensive than the supervised learning and more accurate¹⁴ than the unsupervised one, an example of it is Alexa, Amazon’s AI-powered virtual assistant, which learns how to decipher its users’ voice both with operators listening and labelling, as well as autonomously interpreting unlabelled data.¹⁵ An increasingly popular machine learning model that requires even less human involvement is unsupervised learning, where the algorithm is trained with unlabelled data, therefore it learns in a way which is similar to the human one, i.e. by experiencing the world, rather than by being told the name of every object.¹⁶ Finally, even less human input is required in reinforcement learning, since it does not work with datasets. With this approach, *“intelligent programs, known as agents, work in a known or unknown environment to constantly adapt and learn based on giving points. The feedback might be positive, also known as rewards, or negative, also called punishments.”*¹⁷ Understanding how much human involvement there is behind an AI is vital for IP lawyers and stakeholders,¹⁸ especially in the field of copyright where the author is presumed to be a human being.¹⁹

¹⁰ Yann LeCun, Yoshua Bengio and Geoffrey Hinton, ‘Deep Learning’ (2015) 521 *nature* 436.

¹¹ See Dhruv Mahajan and others, ‘Exploring the Limits of Weakly Supervised Pretraining’ (2018).

¹² Bradshaw, ‘Self-Driving Cars Prove to Be Labour-Intensive for Humans’ *Financial Times* (9 July 2017), who denounces the poor conditions of the relevant workers.

¹³ See, for instance, Jesus Rodriguez, ‘Google Expander and the Emergence of Semi-Supervised Learning’ (*Medium*, 20 November 2016) <medium.com/@jrodthoughts/google-expander-and-the-emergence-of-semi-supervised-learning-1919592bfc49> accessed 17 December 2019.

¹⁴ cf Percy Liang and Dan Klein, ‘Analyzing the Errors of Unsupervised Learning’ (2008).

¹⁵ George Anders, ‘Alexa Understand Me’ (2017) 120 *Technology Review* 26.

¹⁶ LeCun, Bengio and Hinton (n 10).

¹⁷ Abhishek Nandy and Manisha Biswas, *Reinforcement Learning* (Apress 2017) 1.

¹⁸ Noto La Diega, ‘Artificial Intelligence and Databases in the Age of Big Machine Data’ (n 5).

¹⁹ See Begoña González Otero and Joao Pedro Quintais, ‘Before the Singularity: Copyright and the Challenges of Artificial Intelligence’ [2018] *EU copyright, quo vadis?*

PATENTS

Issue 1: Inventorship and Ownership

6. *“Should the law exclude from the availability of patent protection any invention that has been generated autonomously by an AI application?”*

Inventions that are generated by AI should not be patentable. The patent system is already affected by issues such as the patent thicket and non-practicing entities (so-called patent trolls). Granting monopolies on inventions that can be done serially by an AI would lead to excessive monopolization to the detriment of free speech and would stifle innovation. Moreover, since the justification of patents to provide incentives to innovate, AI can invent without any incentives. Another argument against granting patents for AI-generated inventions is that they are in violation of *ordre public* or morality, for the aforementioned reasons. Under Article 27(2) TRIPs, *“Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect ordre public or morality.”*²⁰

7. This also answers questions 7(i) and (ii) of WIPO’s draft paper.

Issue 2: Patentable Subject Matter and Patentability Guidelines

8. *Should the law exclude from patent eligibility inventions that are autonomously generated by an AI application?* Yes, for the same reasons explained at paragraph 6.

9. *Should specific provisions be introduced for inventions assisted by AI or should such inventions be treated in the same way as other computer-assisted inventions?* No specific provisions should be introduced. The law should aspire to be technologically aware, but technologically neutral.²¹

²⁰ cf Guido Noto La Diega, ‘Can Artificial Intelligence and the Internet of Things Be Governed to Achieve the UN Sustainable Development Goals? An Intellectual Property Law Perspective’, *WTO Public Forum, AIPPI’s Working Session “New Digital Technologies: the protagonists of a change in perspective in the Global Supply Chain* (2019) <<https://papers.ssrn.com/abstract=3505247>> accessed 17 December 2019; Ana Ramalho, ‘Patentability of AI-Generated Inventions: Is a Reform of the Patent System Needed?’ (SSRN, 15 February 2018) <[ssrn.com/abstract=3168703](https://papers.ssrn.com/abstract=3168703)> accessed 17 December 2019.

²¹ Guido Noto La Diega, *Internet of Things and the Law* (Routledge 2020).

10. Do amendments need to be introduced in patent examination guidelines for AI-assisted inventions? If so, please identify which parts or provisions of patent examination guidelines need to be reviewed. As I argued in *Can Artificial Intelligence and the Internet of Things be Governed to Achieve the UN Sustainable Development Goals? An Intellectual Property Law Perspective*,²² the assessment of the inventive step or non-obviousness should be stricter. Most jurisdictions are bound by provisions that are along the lines of Article 56 of the European Patent Convention: “[a]n invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art.”

11. The more knowledgeable and capable of ingenuity this hypothetical person skilled in the art is, the harder it will be for the applicant to meet the ‘inventive step’ requirement, because it will be likely that such a person will consider the invention obvious and thus not patentable. As clarified by the Board of Appeal of the European Patent Office (EPO) in cases T 4/98, T 143/94, and T 426/88, the ‘person skilled in the art’ is presumed to be a skilled practitioner in the relevant field of technology, who possesses average knowledge and ability and is aware of what was common general knowledge in the art at the relevant date. This ‘person skilled in the art’, however, is not expected to know everything. For example, the EPO Board of Appeal held that a single publication (e.g. a patent document, but also the content of a technical journal) cannot normally be considered as common general knowledge.²³ This person is not a highly skilled expert or a Nobel prize winner, nor are they some form of lowest common denominator.²⁴ They do not have the skills to exercise inventive ingenuity or think laterally; in Jacob LJ’s words in *Rockwater v Technip*, the person skilled in the art, if real, would be very boring – a nerd.²⁵

12. If a notional person skilled in the art finds the invention non-obvious, it is likely that the applicant will be granted a patent. Since currently this person is seen as lacking ingenuity and equipped with limited knowledge, it follows that they will find the invention non-obvious and hence patentable with relative ease. This is where AI can play a role in rebalancing the patent system. AI increasingly powers innovative forms

²² Noto La Diega, ‘Can Artificial Intelligence and the Internet of Things Be Governed to Achieve the UN Sustainable Development Goals?’ (n 20).

²³ T 475/88.

²⁴ *General Tire & Rubber Co v Firestone Tyre & Rubber Co Ltd* [1976] RPC 197.

²⁵ *Rockwater v Technip* [2004] EWCA Civ 381 [7].

of data mining and other automated research tools. Scientists and researchers can enhance their own ingenuity and knowledge through a myriad of AI applications. Hence the question whether we should abandon the traditional idea of 'person skilled in the art' and assess the inventive step of future inventions from the viewpoint of the AI-enhanced researcher.²⁶ I believe that such a shift would make the patent system fitter for AI. This new standard would make it harder to meet the inventive step requirement, which would in turn partly offset the ease with which it is possible to invent in a world of AI and would ultimately contribute to preventing an excessive monopolization of intangible assets.

Issue 3: Inventive Step or Non-Obviousness

13. *In the context of AI inventions, what art does the standard of the person skilled in the art refer to? Should the art be the field of technology of the product or service that emerges as the invention from the AI application?* Reiterating the non-patentability of inventions autonomously generated by an AI, AI-aided inventions should be considered inventive if non-obvious to the AI-enhanced researcher, that has access to resources and capabilities that are by far superior to the notional person skilled in the art. The art should not be limited to the field of technology of the product or service that emerges from the invention but should include also the fields that are related to it and may be affected by it.

14. *Should the standard of a person skilled in the art be maintained where the invention is autonomously generated by an AI application or should consideration be given to replacing the person by an algorithm trained with data from a designated field of art?* The standard should be replaced by the AI-enhanced researcher, as detailed at paras [10]-[13] above.

15. *What implications will having an AI replacing a person skilled in the art have on the determination of the prior art base?* The prior art will be more comprehensive, and rightly so.

²⁶ See William Samore, 'Artificial Intelligence and the Patent System: Can a New Tool Render a Once Patentable Idea Obvious?', *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar Publishing 2018); Shlomit Yanisky-Ravid and Xiaoqiong Jackie Liu, 'When Artificial Intelligence Systems Produce Inventions: The 3A Era and an Alternative Model for Patent Law'.

16. *Should AI-generated content qualify as prior art?* Most definitely. The majority of patent laws provide an absolute concept of prior art, for the purposes of the assessment of the inventive step. For example, under Article 54(2) of the European Patent Convention, “*The state of the art shall be held to comprise everything made available to the public by means of a written or oral description, by use, or in any other way, before the date of filing of the European patent application.*” Even the content of patent applications filed before the invention and published after that date are included in the prior art (Article 54(3)). The date of filing means date of priority where appropriate.²⁷ As decided by the EPO Board of Appeal in T 939/92, prior art may reside also in the relevant common general knowledge, which need not necessarily be in writing and needs substantiation only if challenged. Such a comprehensive concept of prior art must be interpreted as including any AI-generated content made available to the public before the date of filing (or the priority date where appropriate) or included in a patent application filed before but published after that date.

Issue 4: Disclosure

17. *In the case of machine learning, where the algorithm changes over time with access to data, is the disclosure of the initial algorithm sufficient?* A condition of the renewal of a patent should be the renewed disclosure of the machine learning algorithm as is at the date of the request of renewal. Otherwise, there would be a breach of the sufficiency requirement. Indeed, a disclosure that were limited to the initial algorithm would not disclose the invention in a manner which is clear and complete enough for the invention to be performed by a person skilled in the art, as elucidated in *Novartis v Johnson & Johnson*.²⁸ A system of deposit for algorithms, similar to the deposit of microorganisms, would be useful. Moreover, the data used to train the algorithm should be included in the disclosure.

Issue 5: General Policy Considerations for the Patent System

18. The advent of inventions that are autonomously generated by AI calls for a re-assessment of the relevance of the patent incentive to AI-generated inventions. There is no justification to grant a patent to AI-generated inventions, since AI applications do not need incentives to innovate and can invent at a pace that would

²⁷ European Patent Office, *Guidelines for Examination* (EPO 2019) G.VII.2.

²⁸ *Novartis AG and another v Johnson & Johnson Medical Ltd and others* [2010] EWCA Civ 1039.

lead to a fast appropriation of ideas that would hinder human innovation. However, to make sure that AI is increasingly adopted, a sui generis system of IP rights for AI-generated inventions should be explored. As I argued in *Artificial Intelligence and Databases in the Age of Big Machine Data*,²⁹ the sui generis right introduced by the EU Database Directive is fit for Big Machine Data, that includes AI inventions. The sui generis right is the right to prevent extraction or re-utilisation of the whole or a substantial part of the contents of a database. ‘Database’ is defined broadly and therefore could be used to protect AI inventions or many aspects of them. Indeed, the EU Directive defines databases as a collection of independent works, data or other materials, that are systematically or methodically arranged, and individually retrievable.³⁰ The only requirement for protection is a substantial investments in obtaining, verifying, or presenting the contents of the database.³¹ This means a substantial investment in terms of human, technical and/or financial resources in the setting up and operation of a database.³² This is particularly easy to meet because the required investment has been interpreted as not having to be actually ‘substantial’. As noted by the world expert in the field,³³ ‘investment’ should be defined broadly. The threshold of substantiality should be set at a low level.³⁴ The main reason why the sui generis right has not been successful in Europe is that it has been sterilised by an excessively restrictive jurisprudence of the Court of Justice in *British Horseracing* and *Fixtures Marketing*.³⁵ In those cases, the EU Supreme Court decided that only the investment in obtaining, verification, or presentation of existing independent materials counts towards the sui generis protection; the resources used to create data are not covered. In other words, if one invests in creating something new (e.g. inventions, new data, etc.), the relevant investment does not qualify for sui generis protection. This

²⁹ Noto La Diega, ‘Artificial Intelligence and Databases in the Age of Big Machine Data’ (n 5).

³⁰ EU Database Directive, art 1(2).

³¹ EU Database Directive, art 7(1).

³² Court of Justice 19 December 2013, *Innoweb*, case C-202/12, in *JIPLP* 2014, 458, with comment of Bonadio and Rosati, *Use of dedicated meta-search engine infringes database right: the CJEU’s stance in Innoweb v Wegener*.

³³ Estelle Derclaye, *The Legal Protection of Databases: A Comparative Analysis* (Edward Elgar 2008).

³⁴ For instance, in France, see *Cour de Cassation* 23 March 2010, in *RIDA* 2010, 273 and, in Italy, Court of Rome 10 December 2009 as cited by European Commission, *Commission Staff Working Document ‘Evaluation of Directive 96/9/EC on the legal protection of databases’ {SWD(2018) 147 final}*27.

³⁵ Court of Justice 9 November 2004, *British Horseracing Board v William Hill Organization*, case C-203/02, in ECR, 2004, I, 10415; Court of Justice 9 November 2004, *Fixtures Marketing v Svenska Spel*, case C-338/02, in ECR, 2004, I, 10497; *Court of Justice 9 November 2004, Fixtures Marketing v OPAP*, case C-444/02, paras. 29 and 33, in *AIDA* 2005, 407; Court of Justice 9 November 2004, *Fixtures Marketing v Oy Veikkaus Ab*, case C-46/02, in ECR, 2004, I, 10365

jurisprudence is open to criticism and should be overcome, especially in world of AI. Indeed, AI shows that the Court of Justice's dichotomy between creating data and obtaining data is untenable.³⁶ Many AI applications crunch big data to create inferences from and spot patterns in existing data. Are these inferences and patterns 'created' data or 'obtained' data? One could hardly answer in definitive terms. The untenability of this dichotomy is confirmed by case law in the field of live football data. This data is deemed to be 'obtained' in the UK,³⁷ and 'created' in Germany.³⁸ This runs counter the Database Directive's objective to bring legal certainty in this field.³⁹ The mentioned restrictive jurisprudence of the Court of Justice in *British Horseracing* and *Fixtures Marketing* can also be criticised because its reasoning is focused on the misunderstanding of certain recitals⁴⁰ of the EU Database Directive. For example, Recital 9 recognises that “[d]atabases are a vital tool in the development of an information market.” However, protecting only databases where there is an investment in obtained, rather than created, data, risks killing such vital tool. Indeed, as noted by the European Commission,⁴¹ the majority of the investments made by the database owners regards data collection, rather than the setting up of the database itself. Second, under Recital 10 the exponential growth in the amount of “*information generated and processed*” calls for investment in advanced information processing systems. The reference to ‘generated’ means that also the generation of new information (‘created’ data) should be incentivised, for example through a sui generis right.

19. The introduction of a sui generis right in the EU has been criticised as anti-competitive and unjustified⁴² and such views are not without merit. However, there are two good reasons why a sui generis right could be a good thing for Big Machine Data, including AI inventions. Under the EU Database Directive, the author or producer of the database is obliged to safeguard a minimal level of free use of the database contents including for commercial purposes. This means that, as ruled in *Ryanair v*

³⁶ Noto La Diega, ‘Artificial Intelligence and Databases in the Age of Big Machine Data’ (n 5).

³⁷ *Football Dataco Ltd v Stan James Ltd* (No 2) [2013] EWCA Civ 27-

³⁸ European Commission (n 34) 25.

³⁹ EU Database Directive, recitals 1-2.

⁴⁰ Recitals are the preamble of EU legal acts; they are not binding but they are important to interpret the meanings of the binding provisions.

⁴¹ European Commission (n 34) 36.

⁴² See e.g. Hugenholtz, *Abuse of Database Right Sole-source information banks under the EU Database Directive*, in Lévêque and Shelanski (eds), *Antitrust, patents and copyright: EU and US perspectives*, Edward Elgar, Cheltenham, 2005, 203.

PR Aviation,⁴³ if a database is outside the Directive, these ‘free use’ guarantees will not apply, and companies can use contracts and technical protection measures to monopolise information without any limitations.⁴⁴ The other benefit is that companies would be incentivised to create (at least partly) openly accessible databases of AI inventions, training data, etc., so as to attract the sui generis protection. In this sense, a sui generis right for AI inventions would be a victory for free speech and the right to access information. In revitalising the sui generis right and exporting the model at an international level, however, it is pivotal that free or fair uses are built in such right in a clear, binding, and non-contractually waivable way. Therefore, similarly to WIPO’s recommendation CRNR/DC/100 of 23 December 1996, a WIPO diplomatic conference should recommend the convocation of an extraordinary session of the competent WIPO Governing Bodies to decide on the schedule of further preparatory work on a Treaty on Intellectual Property in Respect of Big Machine Data, including AI inventions. The Basic Proposal for the Substantive Provisions of the Treaty on Intellectual Property in Respect of Databases to be Considered by the Diplomatic Conference⁴⁵ is not up to date and not sufficiently comprehensive, but could be a starting point for new conversations on the topic. Eighteen years ago, the WIPO Secretariat commissioned many studies⁴⁶ on the economic impact of international database protection on developing countries and countries in transition, and prepared a summary on existing legislation concerning IP in non-original databases.⁴⁷ I

⁴³ Court of Justice 15 January 2015, *Ryanair*, case C-30/14, in *Computer Law Review International* 2015, 83 with a comment by Elteste, *EU: Contractual Limitations for Database Use - Screen Scraping*. See also Vousden, *Autonomy, comparison websites, and Ryanair*, in *IPQ* 2015, 386; Castets-Renard, *La liberté contractuelle et la réservation de l’information des bases de données non protégées devant la CJUE*, in *Droit de l’immatériel* 2015, 8; Gupta and Devaiah, *Databases: The Database Directive “contracting out” bar: does it apply to unprotected databases?*, in *JIPLP* 2015, 669; Ross, *“Not Getting into a Scrape”: Dispute over “Screen Scrape” Data*, in *Computer and Telecommunications Law Review* 2015, 103; Synodinou, *Databases and screen scraping: lawful user’s rights and contractual restrictions do not fly together*, in *EIPR* 2016, V, 312.

⁴⁴ Noto La Diega, ‘Artificial Intelligence and Databases in the Age of Big Machine Data’ (n 5).

⁴⁵ WIPO Proposal CRNR/DC/6 of 30 August 1996.

⁴⁶ Yale M. Braunstein, *Economic Impact of Database Protection in Developing Countries and Countries in Transition* (WIPO 2002); Sherif El-Kassas, *Study on the Protection of Unoriginal Databases* (WIPO 2002); Thomas Riis, *Economic Impact of the Protection of Unoriginal Databases in Developing Countries and Countries in Transition* (WIPO 2002); Phiroz Vandrevala, *A Study on the Impact of Protection of Unoriginal Databases on Developing Countries: Indian Experience* (WIPO 2002); Zheng Shengli, *The Economic Impact of the Protection of Database in China* (WIPO 2002); Andrés López, *The Impact of Protection of Non-Original Databases on the Countries of Latin America and the Caribbean* (WIPO 2002).

⁴⁷ WIPO, ‘Summary on Existing Legislation Concerning Intellectual Property in Non-Original Databases’ (2002) SCCR/8/3.

recommend that the Standing Committee on Copyright and Related Rights requests WIPO to commission new economic and legal studies on existing laws and the impact of a sui generis right for AI inventions and big machine data.

COPYRIGHT AND RELATED RIGHTS

Issue 6: Authorship and Ownership

20. For very good reasons, the copyright system has always been intimately associated with the human creative spirit and with respect and reward for, and the encouragement of, the expression of human creativity. Purely AI-generated works must be excluded from eligibility for copyright protection, if the copyright system wants to be an instrument for encouraging and favoring the dignity of human creativity over machine creativity. Therefore, as confirmed by most studies in the field,⁴⁸ no copyright should be attributed to “original” literary and artistic works that are autonomously generated by AI. The fact that a human creator is required stems from many factors that change from jurisdiction to jurisdiction; they nonetheless have many aspects in common. For example, in the EU copyright’s requirement of originality means that a work is original and hence copyrightable only if it is *the author’s own intellectual creation*.⁴⁹ To be the author’s own intellectual creation, one must be able to see the author’s personal touch in the work.⁵⁰ In *Football Dataco*,⁵¹ then, originality was defined as the author’s creative ability to make free and creative choice in the selection or arrangement of the contents, thus stamping their personal touch on the database. By definition, an AI-generated work is not its author’s own intellectual creation, it does not carry their personal touch, and is not the result of free and creative choices.

⁴⁸ See, e.g., Ihalainen, *Computer creativity: artificial intelligence and copyright*, in *JIPLP* 2018, IX, 724; Ramalho, *Will Robots Rule the (Artistic) World? A Proposed Model for the Legal Status of Creations by Artificial Intelligence Systems* (13 June 2017), available at <https://ssrn.com/abstract=2987757>; Bridy, *Coding Creativity: Copyright and the Artificially Intelligent Author*, in *Stan Tech L Rev* 2012, V, 1; Guadamuz, *Do androids dream of electric copyright? Comparative analysis of originality in artificial intelligence generated works*, in *IPQ* 2017, II, 169.

⁴⁹ Court of Justice 16 July 2009, *Infopaq*, case C-5/08, in *European Court Reports* 2009, I, 6569, para. 36. See Valenti’s comment in *AIDA* 2009, 428 ff., Derclaye, *Wonderful or Worrisome? The Impact of the ECJ ruling in Infopaq on UK Copyright Law*, in *EIPR* 2010, V, 247 ff., and Trabuco, *Com onze palavrinhas apenas ...: a reprodução temporária de obras e a actividade de press clipping*, in *Cadernos de Direito Privado* 2009, 38 ff..

⁵⁰ Court of Justice, 1 December 2011, *Painer*, case C-145/10, paras. 89 and 92, in *AIDA* 2012, 486.

⁵¹ Court of Justice 1 March 2012, *Football Dataco v Yahoo! UK*, case C-604/10, in *Diritto comunitario e degli scambi internazionali* 2012, 269 [38], with comment by Adobati, *La Corte di giustizia interpreta la direttiva n. 96/9/CE sulla tutela giuridica delle banche dati*.

21. In the undesirable event that copyright were to be attributed to AI-generated works, it should vest on the person having responsibility for the creation. Usually this will be the human operator of the AI application, but in some circumstances may be the developer and the AI owner. No consideration should be given to according a legal personality to an AI application neither in general nor where it creates original works autonomously. Whilst this might resolve the problem of ownership of AI works, it would create more problems than it would solve. For example, if an AI works infringes third parties' copyright, it would be problematic to bring infringement proceedings against an AI (e.g. who would be condemned to 10 years imprisonment for committing a criminal offence under the Copyright, Designs and Patents Act 1988?).⁵² More generally, giving legal personality to AI could be used to create a shield that human beings in breach of the law could try and use to escape liability. Fortunately, despite the European Parliament's call to consider an electronic personality for robots and AI,⁵³ more recently the EU Expert Group on Liability for New Technologies rejected such idea.⁵⁴

22. For the reasons stated in paras [18]-[19] above and as better substantiated in *Artificial Intelligence and Databases in the Age of Big Machine Data*,⁵⁵ a sui generis protection, with a reduced term of protection and mandatory and binding fair use provisions, should be explored for original literary and artistic works autonomously generated by AI. Arguably, the EU Database Directive is fit for such works and could be used as a model to build upon.

23. In conclusion, these are my recommendations:

A. The scope of WIPO's policies and documents regarding AI should be better defined by both defining AI and, given that AI is a controversial and fuzzy umbrella term, the focus should be on the main AI technologies, starting with machine learning.

B. The law should exclude from the availability of patent protection any invention that has been generated autonomously by an AI application.

⁵² Cf Intellectual Property Office, *Guidance 'Intellectual property offences'* (IPO 2017).

⁵³ See Guido Noto La Diega, 'The European Strategy on Robotics and Artificial Intelligence: Too Much Ethics, Too Little Security' (2017) 3 European Cybersecurity Journal <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3091563>.

⁵⁴ Expert Group on Liability and New Technologies – New Technologies Formation, *Liability for Artificial Intelligence and other emerging digital technologies* (European Union 2019).

⁵⁵ Noto La Diega, 'Artificial Intelligence and Databases in the Age of Big Machine Data' (n 5).

C. As for AI-aided inventions, their examination should be stricter and the main means to achieve this end would a shift from the 'person skilled in the art' to the AI-enhanced researcher.

D. Prior art should not be limited to the field of technology of the product or service that emerges from the invention; it should include also the fields that are related to it and may be affected by it. AI-generated content should qualify as prior art.

E. A condition of the renewal of a patent should be the renewed disclosure of the machine learning algorithm as is at the date of the request of renewal. A system of deposit for algorithms, similar to the deposit of microorganisms, would be useful. The data used to train the algorithm should be included in the disclosure.

F. A sui generis right should be considered as an option both for AI inventions and AI works (collectively 'big machine data'). Such sui generis right should be accompanied by binding and mandatory fair use provisions; contracts and technological protection measures should not be allowed to sidestep or run counter the sui generis fair use. WIPO should commission legal and economic studies to assess the viability and impact of such a proposal.

G. AI works fall outside the scope of copyright law. They are not their author's own intellectual creation, they do not carry their personal touch, nor are they the result of free and creative choices.

H. AI should not be given legal personality. Such a personality would not cope well with copyright rules and principles and could be used by human infringers to attempt to escape liability.

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