

WIPO CONVERSATION ON INTELLECTUAL PROPERTY (IP) ARTIFICIAL INTELLIGENCE (AI)

Second Session July 7 to 9, 2020

Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence (WIPO/IP/AI/2/GE/20/1 REV.)

Comments by the European Patent Office (EPO)

The EPO appreciates the WIPO initiatives in furthering the dialogue on intellectual property (IP) and artificial intelligence (AI). The EPO has discussed patentability of AI with its contracting states¹ and the other IP5 offices,² gaining a shared understanding of critical issues important for the development in this technical area. The EPO has involved users in this process, e.g. by hosting a conference³ on patenting AI, as well as several “scoping workshops”. These initiatives contribute to increased legal certainty for the users of the patent system world-wide and have provided an excellent framework and basis for the discussions among various stakeholders. We are convinced that the international dialogue moderated by WIPO will further support a common understanding of AI patenting.

The EPO is pleased to give the following comments on issues relating to patents (Issues 2 – 6) and accountability for decisions in IP administration (Issue 16), based on the EPO practice and the applicable legal framework:

PATENTS

Issue 2: Inventorship and Ownership

17. In the case of AI-generated inventions:

(i) Do AI-generated-inventions require patent protection or a similar incentive system at all? See also Issue 3(i).

Considering the importance of patent protection for emerging technologies like AI, it seems that there is no need to exclude AI-generated inventions from patent protection. The exclusions in patent law do not prohibit protection of AI-generated inventions as such, provided that the specific requirements are fulfilled.

¹ See results of the consultation conducted in 2018 available on the EPO website:

[http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/\\$File/AI_inventorship_summary_of_answers_en.pdf](http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/$File/AI_inventorship_summary_of_answers_en.pdf).

² Report of the IP5 expert round table on artificial intelligence, EPO, Munich, 31 October 2018 available here: https://www.fiveipoffices.org/material/ai_roundtable_2018_report/ai_roundtable_2018_report; IP5 NET/AI Task Force, report from the first meeting available here: <https://www.fiveipoffices.org/news/20200117>.

³ Patenting Artificial Intelligence, 30 May 2018, <https://www.epo.org/learning-events/events/conferences/2018/ai2018.html>.

Under the EPC, patents are granted for any inventions in all fields of technology, provided that they meet the patentability requirements (novelty, inventive step, industrial application; Article 52(1) EPC).⁴ Exclusions from patentability laid down in Article 52(2)-(3) EPC and exceptions to patentability stipulated in Article 53 EPC relate to certain types of subject-matter (such as discoveries, mathematical methods, rules for performing mental acts, programs for computers claimed as such, plant or animal varieties, methods of treatment of human and animal body), or its exploitation (contrary to “ordre public” or morality). The EPC does not contain any provisions which would prevent patenting certain subject-matter based on how or by whom it was generated.

Artificial intelligence is a branch of computer science which is attempting to build machines exhibiting “intelligent behaviour”. The main enabler of AI is machine learning (ML). ML concerns algorithms allowing computers to self-improve at solving computational tasks, thereby involving mathematical methods. The EPO understands that AI and ML are based on computational models and algorithms for classification, clustering, regression and dimensionality reduction, such as neural networks, genetic algorithms and support vector machines. Such computational models and algorithms are per se of an abstract mathematical nature. However, depending on how they are implemented, they may have a technical character and thus be patentable inventions.

There appears to be no need for introduction of further exclusions from patentability, based on how or by whom the subject-matter of a patent application was generated. The patent system has proven sufficiently flexible to accommodate technical developments, e.g. in the areas of biotechnology, pharma and computer-implemented inventions (CII).

(ii) Should the law require that a human being be named as the inventor or should the law permit an AI application to be named as the inventor?

Any review of the principle that the inventor can only be a natural person or persons (in case of co-inventorship) would be linked to a policy debate about the role of the patent system, including the basic principle that patents are granted to natural persons in order to reward them for inventive contributions which benefit society. Such a policy discussion would need to take due account of the fact that patent law with its requirement of human inventorship is part of a system of protection of intellectual property which is based on principles shared globally and has been to a significant extent harmonised on the international level⁵. It would also need to recognise that the question of inventorship must be seen in a broader context of rights allocated to persons, not only by rights of intellectual property.

The EPC requires that the applicant designates a natural person as inventor (Article 81, Rules 19, 21 EPC)⁶. It is seen as a basic principle of the patent system benefitting the human inventor who has the right to the patent in exchange for publishing the invention.

⁴ See also Article 27(1) TRIPS Agreement.

⁵ Articles 3 and 4ter of the Paris Convention for the Protection of Industrial Property; Article 27 TRIPS Agreement; Article 4(1)(v) Patent Cooperation Treaty; Patent Law Treaty in particular Article 15.

⁶ The laws of the EPC contracting states appear to contain the same requirement, see feedback from the EPC contracting states collected by the EPO in 2018, available here:

Designation of the inventor is a formal requirement, the EPO does not check the correctness or completeness of the designation of inventor (Rule 19(2) EPC).

The determination of the person of the inventor lies in the competence of the national courts (Article 61 EPC). It is noted that the person of the inventor is strictly connected with the determination of the claimed invention. Depending on where the invention lies, the inventor may e.g. be the software developer who set up an AI system, the person who trained the machine with data, the person who interpreted the output of an ML algorithm, the person who improved an AI algorithm to obtain a certain technical effect or the person who identified the technical application of an output of an AI system. For a broader analysis of these issues, we would like to refer to the academic study⁷ on AI inventorship which was commissioned by the EPO.

(iii) If a human inventor is required to be named, should AI-generated inventions fall within the public domain or should the law give indications of the way in which the human inventor should be determined? Should the decision how to determine the human inventor be left to private arrangements, such as corporate policy, with the possibility of judicial review by appeal in accordance with existing laws concerning disputes over inventorship?

See reply to Issue 2(ii) below.

From the perspective of inventorship, three groups of inventions using AI technologies can be identified:

- human-made inventions using AI for the verification of the outcome,
- inventions in which a human identifies a problem and uses AI to find a solution,
- AI-generated inventions, in which AI identifies a problem and proposes a solution without human intervention.

The state of technology suggests that the AI systems might reach the level of human ability not earlier than by ca 2075.⁸ Thus, it seems premature to conclude that inventions can be autonomously generated by AI. It appears that AI is currently and will for the foreseeable

[http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/\\$File/AI_inventorship_summary_of_answers_en.pdf](http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/$File/AI_inventorship_summary_of_answers_en.pdf).

⁷ Dr Noam Shemtov, A Study on Inventorship in Inventions Involving AI Activity, available here: [http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/\\$File/Concept_of_Inventorship_in_Inventions_involving_AI_Activity_en.pdf](http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/$File/Concept_of_Inventorship_in_Inventions_involving_AI_Activity_en.pdf).

⁸ V. Müller and N. Bostrom, "Future progress in artificial intelligence: A Survey of Expert Opinion, in V. Müller" (ed.), Fundamental Issues of Artificial Intelligence (Synthese Library; Berlin: Springer 2016), page 14, available at <https://nickbostrom.com/papers/survey.pdf>. See also K. Grace, J. Salvatier, A. Dafoe, B. Zhang, and O. Evans, "When Will AI Exceed Human Performance? Evidence from AI Experts" (Journal of Artificial Intelligence Research 62 (2018) 729-754), available at <https://arxiv.org/pdf/1705.08807.pdf>; T. Walsh, "Expert and non-expert opinion about technological unemployment" (International Journal of Automation and Computing 06/2018, 15(5): 637-642) available at: <https://link.springer.com/content/pdf/10.1007/s11633-018-1127-x.pdf>.

future remain a tool for a human inventor⁹, who may use various tools in their inventive process, ranging from simple mechanical tools such as a hammer, to refined software and AI machines.

(iv) If an AI application is permitted to be an inventor should the AI application be considered a sole inventor or should joint inventorship with a human be required?

See replies to (ii) and (iii) above. For the time being it does not seem that AI-generated inventions have reached a level comparable to human intelligence. The question whether an AI application should be permitted to be a sole inventor or whether joint inventorship with a human should be required is deemed premature. As explained, inventions in which AI identifies a problem on its own and proposes a solution without human intervention are not expected for several decades. Those inventions to which we refer today as AI (related) inventions are inventions driven by humans who use AI as a tool either for verification, problem identification or for the creation of possible solutions.

Inventorship is decided on the basis of national law. An answer to these questions might therefore be expected from the national law applicable most probably after a broad international consultation taking into account all areas of law which might be impacted by a modified understanding of an inventor.

(v) The inventorship issue also raises the question of who should be recorded as the owner of a patent involving an AI application. Do specific legal provisions need to be introduced to govern the ownership of AI-generated inventions, or should ownership follow from inventorship and any relevant private arrangements, such as corporate policy, concerning attribution of inventorship and ownership?

The right to a European patent belongs to the inventor or their successor in title (Article 60(1) EPC) and rights to inventions and patents are transferable (cf. Rules 22, 85 EPC). Under the EPC, applicants are deemed to be entitled to exercise inventors' property rights (Article 60(3) EPC). In case of a dispute, the national courts determine the person of the inventor (Articles 60(1), second sentence, and 61 EPC). The judgments of the national courts are binding on the EPO (Article 61(1) EPC and Rule 20(2) EPC).

Accordingly, if the natural person who trains the AI system is the inventor, that person may have the right to file a patent application. If the person filing an application is not the inventor, they may obtain the right to the invention from the inventor by assignment or by another type of succession. If a person who trains the AI system creates a new invention using an earlier invention, they may be able to obtain patent protection for a dependent invention.

Further elaborations on this issue are available in the Study on Inventorship in Inventions Involving AI Activity¹⁰.

⁹ See e.g. Dr Noam Shemtov, A Study on Inventorship in Inventions Involving AI Activity, available here: [http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/\\$File/Concept_of_Inventorship_in_Inventions_involving_AI_Activity_en.pdf](http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/$File/Concept_of_Inventorship_in_Inventions_involving_AI_Activity_en.pdf), p. 9-10, with further references.

¹⁰ [http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/\\$File/Concept_of_Inventorship_in_Inventions_involving_AI_Activity_en.pdf](http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/$File/Concept_of_Inventorship_in_Inventions_involving_AI_Activity_en.pdf)

(vi) If AI-generated inventions are excluded from patent protection, what alternative protection mechanisms are available for such inventions? Would the lack of patent protection for AI inventions lead to the increase in the use of trade secrets and decrease of flow of information and technological advancement? If so, should policy address this and how?

All three groups of inventions relating to AI (see (iii) above) are considered computer-implemented inventions and are therefore not excluded from patent protection. Consequently, no decrease of flow of information is expected. The question who the inventor of such inventions is, is a different topic.

If, hypothetically, AI-generated inventions were excluded, it is understood that the mechanisms as present on computer software “as such” would set in – here, over the past decades (i.e. ever since computer software gained economic relevance) no detrimental effects on information flow or technological advancement could be seen, in fact the contrary has clearly been the case.

Policy may assess the possibilities for patent protection and the corresponding requirements which develop following case law.

(vii) If AI-generated inventions do not benefit from patent protection, will this incentivize concealment of the involvement of AI? Should there be a system to prevent such behaviour? How could such behaviour be detected? Should each invention have a log of acts of the creation process leading to a protectable work and transparently identify the acts of each participant? In order to prevent circumvention of the rules, should each invention involving an AI application have a declaration as to the involvement of the AI application?

Inventions involving AI can benefit from patent protection. Should there be fully AI-generated inventions in the future, the question of inventorship will have to be regulated by the national legislative authorities.

(viii) What ramifications would the question of inventorship and ownership have on related issues, such as, infringement, liability and dispute resolution?

These topics are not within the scope of the EPC.

Issue 3: Patentable Subject Matter and Patentability Guidelines

19. In the case of AI-generated or AI-assisted inventions:

(i) Should the law exclude from patent eligibility AI-generated inventions? See also Issue 2(i).

See reply to Issue 2(i) above.

(ii) Should AI-generated and AI-assisted inventions be treated in the same way as other computer-implemented inventions? Alternatively, should specific provisions be introduced for AI-assisted inventions, in particular to harmonize the legal approach?

In our view, the current legal framework is fit for purpose but also adaptable. Therefore, no specific provisions are needed. AI inventions belong to the area of computer-implemented inventions and are patentable according to the criteria developed by the case law of the EPO boards of appeal and reflected in the Guidelines for examination in the EPO.

The EPC offers patents for “any inventions, in all fields of technology” (Article 52(1) EPC). Article 52(2) EPC defines inventions as having technical character by excluding matter from patent protection that is exclusively non-technical. Given that the exclusions only apply to non-technical matter claimed “as such” (Article 52(3) EPC), the EPO practice based on the established case law of the EPO boards of appeal requires examination of the claimed subject-matter as a whole for technical character. In determining the technical character, all features of the invention are taken into account that contribute to solving, alone or in combination, a technical problem, i.e. a problem in a field recognised as technical.¹¹

In practice, technical character is acknowledged, if the claimed subject-matter requires the presence of any technical means, e.g. a computer or indeed any other device. It follows that any computer-implemented method and any device constitute patentable inventions.

The detailed criteria for patentability of AI inventions are reflected in the Guidelines for Examination in the EPO (G-II, 3.3.1).

(iii) Do amendments need to be introduced in patent examination guidelines for AI-generated and AI-assisted inventions? If so, please identify which parts or provisions of patent examination guidelines need to be reviewed.

The Guidelines for Examination in the EPO are updated regularly to reflect changes in the case-law and practice and to inform the applicants, thus allowing them to apply best practices in drafting and prosecuting patent applications. It is further noted that clear guidance and information must be available in order to guarantee harmonised treatment of the patent applications.

(iv) Should AI applications or algorithms be considered computer programs or software and the question whether they represent patentable subject matter be left to national legislation?

In our view no. Inventions involving AI applications or algorithms regularly comprise aspects of e.g. computer programs and mathematical methods, but also technical aspects. Each individual invention is to be analysed and examined individually, in line with the EPOs current examination practise set out in the Guidelines. (See also (ii) and (iii) above).

¹¹ T 641/00 COMVIK.

The issue cannot and will not be left to national legislation, since the international patent systems (e.g. PCT, EPC) have to remain fully operative.

(v) If AI applications or algorithms fall within exclusions from patentability would that incentivize AI applications and algorithms to be kept as secrets and exacerbate the so-called black box problem? Should a harmonized approach be considered?

In our view no. In any technical field, any applicant or inventor always has to decide between patent protection and trade secret. Depending on the individual situation, either could have better financial benefits.

Issue 4: Inventive Step or Non-Obviousness

20. A condition of patentability is that the invention involves an inventive step or be non-obvious. The standard applied for assessing non-obviousness is whether the invention would be obvious to a person skilled in the relevant art to which the invention belongs.

(i) In the context of AI-assisted or AI-generated inventions, is it necessary to retain the traditional requirements of inventive step or non-obviousness, which are fundamentally associated with human acts of invention? If so, what art does the standard refer to? Should the art be the field of technology of the product or process that emerges as the invention from the AI application?

The "person skilled in the art" is presumed to be a skilled practitioner in the relevant field of technology, who is possessed of average knowledge and ability and is aware of what was common general knowledge in the art at the relevant date (see Guidelines for Examination in the EPO, G-VII, 3).

The relevant field of technology is determined by the invention claimed in the patent application. It can e.g. refer to the AI algorithm, to the emerging product or process, or to both. Accordingly, the knowledge of the skilled person depends on the invention claimed. AI inventions usually encompass various technical fields, and correspondingly the skilled person may be a group of persons, e.g. an interdisciplinary research or production team.

(ii) Should the standard of a person skilled in the art be maintained in the case of AI-generated inventions or should consideration be given to replacing the person by an AI application trained with specific data from a designated field of art?

The notion of the skilled person is explained in detail in the Guidelines for Examination in the EPO (G-VII, 3). It is a theoretical concept which is sufficiently flexible to allow assessing patentability of inventions in the AI area and does not need to be changed in view of the current technical developments.

In particular, it is noted that the skilled person has at their disposal the means and capacity for routine work and experimentation which are normal for the field of technology in question.

Accordingly, if AI is used in the relevant field of technology, it will be used by the skilled person and their skills will raise accordingly.

(iii) What implications will having an AI application replacing a person skilled in the art have on the determination of the prior art base?

The considerations made when determining prior art for the assessment of novelty and inventive step are the same for AI inventions as for other types of inventions. The concept of state of the art encompasses 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 (Article 54(2) EPC) and is explained in detail in the Guidelines for Examination in the EPO ([G-IV](#)).

In view of the breadth and flexibility of the concepts of prior art and person skilled in the art, they do not need to be changed to accommodate AI inventions (see also reply to Issue 3(ii) above).

(iv) Should AI-generated content qualify as prior art?

As explained above (reply to Issue3(iii)), the concept of prior art is defined broadly. There are no restrictions whatever as to the origin, geographical location where or the language or manner in which the relevant information was made available to the public (Guidelines for Examination in the EPO, [G-IV, 1](#)). Therefore, content generated by AI qualifies as prior art, as long as it was made available to the public.

In practice, the more AI is used by researchers, industry and general public, the more anticipatory prior art it will produce. Further, AI can also assist in finding and categorising the relevant prior art.

Issue 5: Disclosure

21. A fundamental goal of the patent system is to disclose technology so that, in the course of time, the public domain may be enriched and a systematic record of humanity's technology is available and accessible. Patent laws require that the disclosure of an invention be sufficient to enable a person skilled in the relevant art to reproduce the invention.

(i) How do the current rules on disclosure apply to AI-generated and AI-assisted inventions and are they sufficient to meet the underlying policy rationale?

A patent application must disclose the invention in a manner sufficiently clear and complete for it to be carried out by a skilled person (Article 83 EPC). This requirement ensures that a patent is only granted in return for the applicant making the invention available to society.

The description must disclose any feature essential for carrying out the invention in sufficient detail to render it apparent to the skilled person how to put the invention into

practice. The EPC requirement of sufficiency of disclosure applies equally to all inventions, including AI inventions. Applying different rules to AI inventions would be against the basic principles of the system.

(ii) What are the issues that AI-assisted or AI-generated inventions present for the disclosure requirement?

It is sometimes suggested that it is difficult to disclose AI inventions. However, the assessment of sufficiency of disclosure is fact-dependent and may involve different considerations for inventions involving improvements of e.g. algorithms, training steps or classifiers. It is generally possible to enable the skilled person to reproduce the results of an AI algorithm by e.g. disclosing the underlying algorithm and/or the training steps involved (e.g. in the training of the classifier). EPO practice in assessing sufficiency of disclosure is explained in detail in the Guidelines for Examination in the EPO ([F-III](#)).

Another aspect, related to sufficiency of disclosure, is the clarity requirement. The EPC prescribes that the claims shall define the matter for which protection is sought in a clear and concise manner (Article 84 EPC). Some applications use very general terms, buzzwords or marketing terms which may lead to the application being considered deficient as regards clarity. While the person skilled in the art is aware of terminology and concepts used in the relevant field of science or technology, best practices in claims drafting require using precise and unambiguous terminology in order to meet the clarity requirement. EPO practice in this respect is explained in detail in the Guidelines for Examination in the EPO ([F-IV, 4](#)).

(iii) In the case of machine learning, where outcomes may change depending on the input data and the algorithm adjusts the weights associated with neuron connections to reconcile the differences in actual and predicted outcome, is the disclosure of the initial algorithm sufficient?

The extent of disclosure necessary to meet the requirement of sufficiency of disclosure hinges on the claimed invention. The applicant must provide enough information about the claimed invention so that the skilled person can carry it out.

If the claimed invention depends on how the algorithm change occurs, it is necessary that the adaptation method of how said initial algorithm changes is also disclosed. If this is not possible, the full set of parameters that govern said adaption should be disclosed in addition to the initial algorithm.

Accordingly, to meet the requirements of the EPC, the disclosure of the initial algorithm may be sufficient in some cases, and in other cases – not.

(iv) Would a system of deposit for AI applications or training data, similar to the deposit of microorganisms, be useful?

Such a system does not appear suitable in the case of algorithms. Depending on the subject-matter and the scope of protection, it is not always necessary to disclose the whole

algorithm. The rationale for the deposit of microorganisms under the Budapest Treaty¹² is that a disclosure of a microorganism is not possible in writing but can only be effected by the deposit of a sample of the microorganism with a specialised institution. Algorithms, on the other hand, can be disclosed in the written description of a patent and therefore an external repository of algorithms does not seem to present any added value.

Furthermore, introduction of such a deposit system might not gain international acceptance. Also, administration of the system may prove complicated.

(v) How should data used to train an algorithm be treated for the purposes of disclosure? Should the data used to train an algorithm be disclosed or described in the patent application?

As with any invention involving a mathematical method, the application for an AI invention should elaborate on how a certain AI system and/or AI algorithm is being adapted to a specific technical implementation or how it is applied to a recognised field of technology.

Whether the data used to train the algorithm needs to be disclosed in the patent application and the detail in which it needs to be described depends on the nature of the claimed invention. It is recalled that the description must disclose any feature essential for carrying out the invention in sufficient detail to render it apparent to the skilled person how to put the invention into practice. In some cases this might require the disclosure of the specific training data, in others, describing the type of data used for training might be sufficient (e.g. "images of human faces"). In yet other cases, where the invention lies in the algorithm itself, disclosing the training data might not be necessary to meet the requirement of sufficiency of disclosure. For example if the invention relates to the AI structure, this structure is normally sufficiently disclosed if the skilled person can build it and reproduce its indicated result (output). To obtain such reproducibility, it is typically required that the application describes the correlation of input and output in detail. Such a description would explain why a certain technical effect is achieved.

(vi) Should the human expertise used to select data and to train the algorithm be required to be disclosed?

The purpose of disclosure is to enable the person skilled in the art to carry out the invention. The skilled person is presumed to be a skilled practitioner in the relevant field of technology (Guidelines for examination in the EPO, G-VII, 3). The skilled person's knowledge continuously develops, in line with the development of the given field of technology. Accordingly, the "person skilled in the art" is a theoretical concept, determined on a case-by-case basis in an objective manner.

The field of technology must be given in the application and the objective technical problem must be directly derivable from the application documents. This information allows the determination of the level of knowledge of the skilled person. Since the determination of the skilled person is objective and based on the field of technology and the technical problem,

¹² Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure (1977).

it is generally not required to disclose any additional and explicit (human) expertise in the application. If, nevertheless, some applicants might find it helpful to specify the skilled person in further detail, it could support efficient examination.

Issue 6: General Policy Considerations for the Patent System

22. A fundamental objective of the patent system is to encourage the investment of human and financial resources and the taking of risk in generating inventions that may contribute positively to the welfare of society. As such, the patent system is a fundamental component of innovation policy more generally. Does the advent of AI-generated inventions call for a reassessment of the relevance of the patent incentive to such inventions? Specifically,

(i) Should AI-generated inventions benefit from patent protection? If so, would it be enough to incorporate AI-generated inventions in the current legal system or should consideration be given to a sui generis system of IP rights for such inventions in order to adjust innovation incentives for AI? What evidence would be required to justify the need of a new system?

The European patent system provides a comprehensive framework for protecting AI inventions. It has witnessed many technical developments, notably in the areas of biotechnology, pharma and CII. The legal framework provided by the EPC has proved to be flexible and adaptable, thus enabling accommodation of technical developments into the framework of patent protection, including AI and ML. As explained above (reply to Issue 2(iii)), in the foreseeable future, creativity will be limited to human beings. The European patent system is well-prepared to accommodate the advent of AI technology.

(ii) Is it too early to consider these questions because the impact of AI on both science and technology is still unfolding at a rapid rate and there is, at this stage, insufficient understanding of that impact or of what policy measures, if any, might be appropriate in the circumstances?

The EPO appreciates the ongoing discussion on AI patenting. The patent system has been to a large extent harmonised internationally¹³ and the users of the patent system are filing applications world-wide. Continuous monitoring of the technical developments and exchange of policies and practices between the patent offices and beyond contribute to aligning practices and increase legal certainty for the users of the patent system. The initiatives taken by the EPO,¹⁴ by the other patent offices¹⁵ and by WIPO contribute to

¹³ Articles 3 and 4ter of the Paris Convention for the Protection of Industrial Property; Article 27 TRIPS Agreement; Article 4(1)(v) Patent Cooperation Treaty; Patent Law Treaty in particular Article 15.

¹⁴ See the introductory part of this document.

¹⁵ Request for Comments on Intellectual Property Protection for Artificial Intelligence Innovation by the United States Patent and Trademark Office, available here: <https://www.federalregister.gov/documents/2019/10/30/2019-23638/request-for-comments-on-intellectual-property-protection-for-artificial-intelligence-innovation>; International Symposium on Patent Examination

developing a shared understanding of the issues surrounding development of AI and to legal certainty for the users of the patent system around the world.

ACCOUNTABILITY FOR IP ADMINISTRATIVE DECISIONS

Issue 16: Accountability for Decisions in IP Administration

(i) Should AI be allowed for decisions in the prosecution of IP applications? What are the legal questions raised by using AI applications for decisions in the IP prosecution process?

In our understanding, final decisions against which legal remedies are available remain the domain of humans. They may use AI as a tool, however, a person remains part of the decision-making process¹⁶.

(ii) Which types of decisions can be determined by AI in IP offices? Are there additional areas that IP offices should explore for the deployment of AI tools IP prosecution and registration?

AI can be used to determine questions and to assist in decision-making but the final judgement is left human beings. The use of AI in patent administration may take various forms. The most promising areas appear to be machine translations as well as machine-assisted pre-classification and search. The EPO, as a public authority responsible for granting patents remains fully accountable for its decisions, whether they are made with assistance of AI tools or not. In developing its patent administration tools, the EPO puts the highest priority on ensuring their reliability, security and user-friendliness.

(iii) Should any policy or practical measures be taken to ensure accountability for decisions made in the prosecution and administration of IP applications where those decisions are taken by AI applications? Which principles should AI applications used in the prosecution and administration of IP applications follow (for example, the encouragement of transparency with respect to the use of AI and in relation to the technology used)?

To date, no decisions are taken by AI applications. Even if this were the case, the organ on behalf of which the decision is taken would remain responsible for it. The EPO as a public authority is responsible for its decisions, irrespective of the tools used in the decision making process. As long as the responsibility stays unamended, the EPO does not see a need to disclose the tools potentially used in decision-making.

(iv) Do any legislative or regulatory changes need to be envisaged to facilitate or to address the consequences of decision-making by AI applications (for example,

Practices on AI-related Inventions hosted by the Japan Patent Office on 20 November 2019, see: https://www.jpo.go.jp/e/news/kokusai/seminar/shinsa_jitsumu_2019.html.

¹⁶ See Study of the European parliament on European Civil Law Rules on Robotics, available at [https://www.europarl.europa.eu/RegData/etudes/STUD/2016/571379/IPOL_STU\(2016\)571379_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2016/571379/IPOL_STU(2016)571379_EN.pdf)

reviewing legislative provisions on powers and discretions of certain designated officials)?

In view of the state of technological development and the fact that the EPO takes responsibility of its decisions, it appears premature to consider such changes (see reply to Issue 2(iii) above).

(v) Are current appeal mechanisms equipped to deal with appeals due to decisions made by AI?

See replies to Issue 16 (iii) and (iv) above. The EPO remains responsible for its decisions.

The EPO would like to thank WIPO for providing this further opportunity for exchange of views and engaging the user community on the topic of the impact of the present, rapid development of AI technology on the patent system. We are always prepared to support such projects and to share our experiences.

WIPO CONVERSATION ON INTELLECTUAL PROPERTY (IP) ARTIFICIAL INTELLIGENCE (AI)

Second Session July 7 to 9, 2020

Oral submissions by the European Patent Office (EPO)

Introduction

The EPO would like to thank the WIPO for providing this opportunity for an exchange of views on the impact of the present development of artificial intelligence (AI) technology on the patent system. The impressive number of comments made on the WIPO Issues Paper on Intellectual Property (IP) and AI shows how important this topic is for organisations, IP offices, legislators and the creative community world-wide.

The EPO actively encourages the dialogue on IP and AI. In recent months we had the opportunity to take a close look at some of the issues which will be discussed here at WIPO in the coming days.

Earlier this year, as one of the first patent offices in the world, the EPO issued a decision confirming that under the current legal framework the inventor must be a human being. We have discussed patentability of AI with our contracting states and the other IP5 offices, gaining a shared understanding of critical issues important for the development of the legal framework in this technical area. We have involved users in this process, e.g. by hosting in 2018 one of the first conferences on patenting AI. A further conference is planned later this year. In pursuit of a more efficient and more user-friendly patent grant process, the EPO is exploring the ways in which AI may be used to achieve these goals. This is complemented by the regularly updated EPO Guidelines for examination which contain sections dedicated to AI, guiding our users on how to obtain strong patents for their AI inventions.

Just like the present discussion, these EPO initiatives contribute to increased legal certainty for the users of the patent system world-wide and provide an excellent framework for addressing new developments with various stakeholders. We are convinced that the international dialogue moderated by WIPO will further support a common understanding of AI patenting.

The EPO is pleased to give comments on issues relating to patents (Issues 2 – 6) and accountability for decisions in IP administration (Issue 16) posed in the WIPO Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence. These comments reflect the EPO practice based on the case law of the boards of appeal, and the extensive exchanges with the users of the European patent system throughout the years.

Issue 2 Inventorship and ownership (Session 1, 07.07.2020)

The state of technology suggests that inventions in which AI identifies a problem on its own and proposes a solution without human intervention are not expected for several decades. Thus, it seems premature to conclude that inventions can be autonomously generated by AI.

Those inventions to which we refer today as AI inventions are driven by humans who use AI as a tool either for verification, problem identification or for the creation of possible solutions. The law requires that, as a formal requirement of the patent application, the applicant indicates the natural person who devised the invention.

Inventorship is decided on the basis of national law. Any review of the principle that the inventor can only be a natural person would be linked to a policy debate about the role of the patent system, including the basic principle that patents are granted to natural persons in order to reward them for inventive contributions which benefit society. Such a policy discussion would need to take due account of the fact that patent law with its requirement of human inventorship is part of a system of protection of intellectual property which is based on principles shared globally and has been to a significant extent harmonised on the international level. It would also need to recognise that the question of inventorship must be seen in a broader context of rights allocated to natural persons. In this regard we note that various governmental and policy bodies, notably the European Union, stress the importance of a human-centric approach to AI.

Issue 6 General policy considerations for the Patent System (Session 1, 07.07.2020)

The European patent system provides a comprehensive framework for protecting AI inventions. Throughout the years, it has proved to be flexible and adaptable. It has enabled accommodation of technical developments into the framework of patent protection, notably in the areas of biotechnology, pharma and computer-implemented inventions (CII) and it is well-prepared to accommodate the advent of AI technology.

The patent system has, to a large extent, been harmonised internationally and the users of the patent system are filing applications world-wide. We welcome the WIPO initiative to discuss IP and AI because continuous monitoring of the technical developments and exchange of policies and practices between the patent offices and beyond, contributes to aligning practices and increases legal certainty for the users of the patent system.

Issue 3 Patentable Subject Matter and Patentability Guidelines (Session 2, 08.07.2020)

AI inventions belong to the area of computer-implemented inventions and are patentable according to the criteria laid down in law, developed by the case law of the EPO boards of appeal and reflected in the Guidelines for examination in the EPO.

In our view, the current legal framework under the EPC is adaptable and fit for purpose. With its well established practice on assessing patentability, the European patent system has proven sufficiently flexible to accommodate various technical developments and is ready to accommodate AI technologies. No specific provisions are needed for AI.

Issue 4 Inventive Step or Non-Obviousness (Session 2, 08.07.2020)

The standard of inventive step is measured by reference to a notional person skilled in the art. It is a theoretical concept which is sufficiently flexible to allow the assessment of patentability of inventions in the AI area and does not need to be changed in view of the current technical developments. In particular, it is noted that the skilled person may be an interdisciplinary team which uses AI if AI is used in the relevant field of technology.

Even though the information generated in large amounts by AI qualifies as prior art, as long as it was made available to the public, AI can also assist with finding and categorising the relevant prior art. Therefore, we do not perceive content generated by AI as a threat to the patent system.

Issue 5 Disclosure (Session 2, 08.07.2020)

The EPC requirement of sufficiency of disclosure applies equally to all inventions, including AI inventions and ensures that patents are granted only in return for making innovative information available to the public.

The assessment of sufficiency of disclosure is fact-dependent and may involve different considerations for inventions involving improvements of e.g. algorithms, training steps or classifiers. Whether the data used to train the algorithm needs to be disclosed in the patent application and the detail in which it needs to be described depends on the nature of the claimed invention.

Another aspect, related to sufficiency of disclosure, is the clarity requirement. While patent applications in the AI field often contain buzzwords and marketing terms, best practices in claims drafting require the use of precise and unambiguous terminology in order to meet the clarity requirement.

As regards creation of a system of deposit for AI applications or training data, similar to the deposit of microorganisms, in our opinion such a system does not appear suitable in the case of algorithms. First, depending on the subject-matter and the scope of protection, it is not always necessary to disclose the whole algorithm. Second, unlike microorganisms, algorithms can be described in writing. Thus, the rationale for the deposit of microorganisms under the Budapest Treaty (to safeguard disclosure of microorganisms which require special handling) does not apply to algorithms. It would not provide any added value. Third, the introduction of such a deposit system would need international acceptance and the administration of the system may prove complicated.

Issue 16 Accountability for Decisions in IP Administration (not on the agenda)

AI can be used to determine questions and to assist in decision-making but the final judgement is left to human beings. The use of AI in patent administration may take various forms. The most promising areas appear to be machine translations as well as machine-assisted pre-classification and search. The EPO, as a public authority responsible for granting patents, remains fully accountable for its decisions, whether they are made with the assistance of AI tools or not.