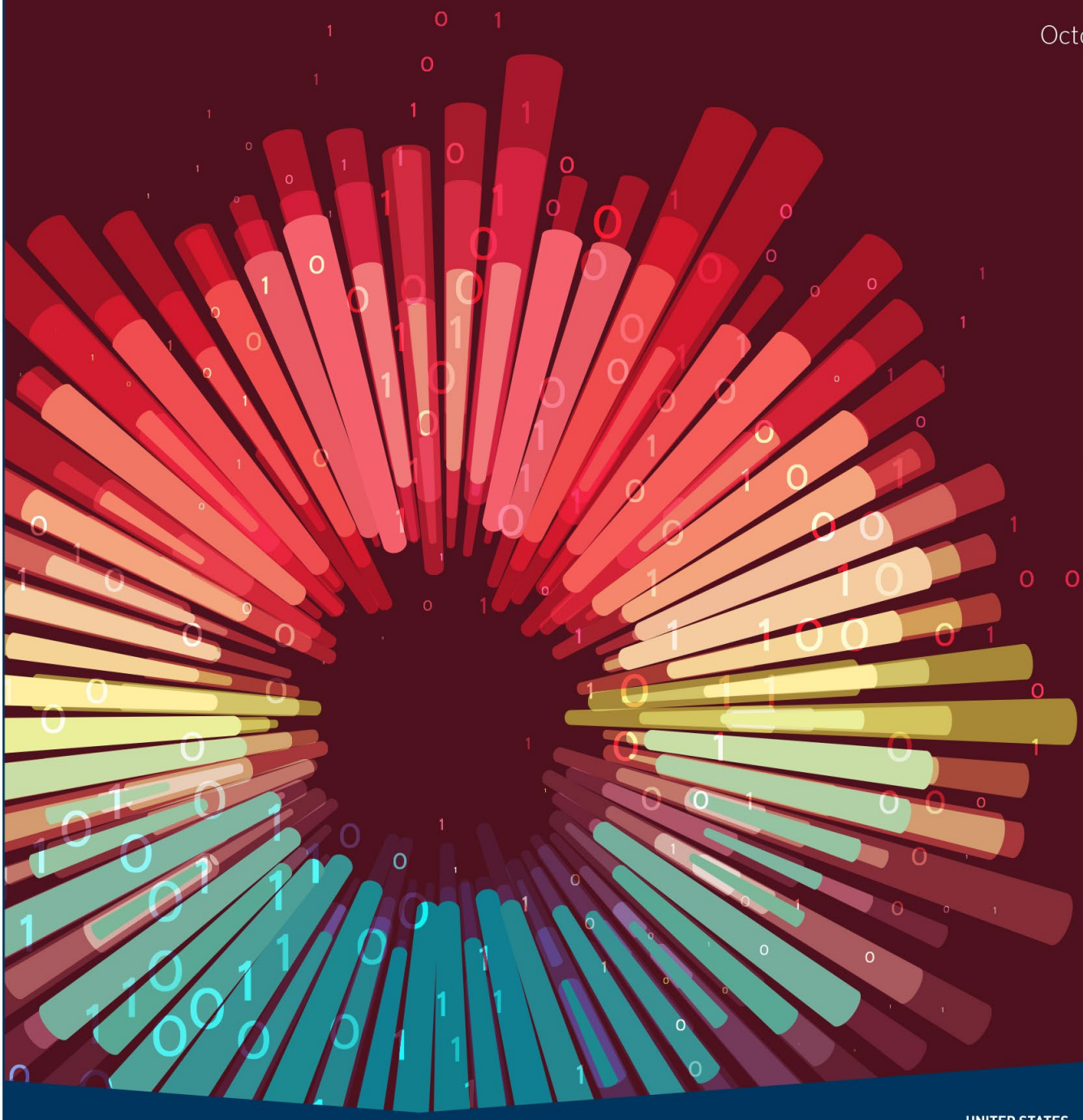
Public Views on Artificial Intelligence and Intellectual Property Policy

October 2020



UNITED STATES
PATENT AND TRADEMARK OFFICE

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Executive Summary

Background

A key priority of the United States Patent and Trademark Office (USPTO) is to maintain United States leadership in innovation, especially in emerging technologies, including artificial intelligence (AI). To further this goal, the USPTO has been actively engaging with the innovation community and experts in AI to promote the understanding and reliability of intellectual property (IP) rights in relation to AI technology. Additionally, the USPTO is working to ensure that appropriate IP incentives are in place to encourage further innovation in and around this critical area. To this end, in January 2019, the USPTO held an AI IP policy conference, one of the first of its kind. The conference featured IP specialists from around the world and included panel discussions on patents, trade secrets, copyrights, trademarks, IP enforcement, global perspectives, and the economics of IP protection of AI.[1]

Category of Responses to Aug. 27, 2019 RFC (Patents)	No. of submissions
Foreign patent offices	2
Bar associations	9
Trade associations/Advocacy groups	13
Companies	13
Academia	13
Law firms (submitted as firm)	2
Practitioners (other than firm or academia submissions)	14
Individuals (not in other categories)	33
Total	99

Table 1

Building on the momentum of those discussions, on August 27, 2019, the USPTO issued a request for comments (RFC) on patenting AI inventions. The RFC sought feedback from our stakeholders on a variety of patent policy issues, such as AI's impact on inventorship and ownership, eligibility, disclosure, and the level of ordinary skill in the art. The comment period closed on November 8, 2019. The USPTO received 99 comments from a wide range of stakeholders, including individuals, associations, corporations, and foreign IP offices. (See Table 1.)

[1] The full recordings of the conference may be viewed at: https://www.uspto.gov/about-us/events/artificial-intelligence-intellectual-property-policy-considerations.

On October 30, 2019, the USPTO issued a second RFC related to the impact of AI on other IP policy areas, including copyrights, trademarks, database protections, and trade secret law. The comment period for the second RFC closed on January 10, 2020. The USPTO received 98 comments from a wide range of stakeholders, including individuals, associations, and corporations. (See Table 2.)

Category of Responses to Oct. 30, 2019 RFC (other IP)	No. of submissions
Bar associations	3
Trade associations/Advocacy groups	28
Companies	15
Academia	12
Practitioners	9
Individuals (not in other categories)	31
Total	98

Table 2

Report and Public Comment Themes

Following the conclusion of the comment periods, a team of experts assembled from across the USPTO to examine the responses and generate the following report. The report is divided into two parts. Part I focuses on the first RFC solicitation dedicated to patenting of artificial intelligence technologies and provides AI context, legal background, and public comment synthesis, as appropriate, for each of the patent RFC questions. Part II follows a similar format for the second IP RFC solicitation dedicated to non-patent intellectual property protections for artificial intelligence technologies, such as trademark, copyright, and trade secret.

From the synthesis of the public comments, a number of themes emerged:

General Themes

- Many comments addressed the fact that AI has no universally recognized definition. Due to the wide-ranging definitions of the term, often comments urged caution with respect to specific IP policymaking in relation to AI.

- The majority of public commenters, while not offering definitions of AI, agreed that the current state of the art is limited to "narrow" AI. Narrow AI systems are those that perform individual tasks in well-defined domains (e.g., image recognition, translation, etc.). The majority viewed the concept of artificial general intelligence (AGI)—intelligence akin to that possessed by humankind and beyond—as merely a theoretical possibility that could arise in a distant future.

- Based on the majority view that AGI has not yet arrived, the majority of comments suggested that current AI could neither invent nor author without human intervention. The comments suggested that human beings remain integral to the

operation of AI, and this is an important consideration in evaluating whether IP law needs modification in view of the current state of AI technology.

- Across all IP topics, a majority of public commenters expressed a general sense that the existing U.S. intellectual property laws are calibrated correctly to address the evolution of AI. However, commenters appear split as to whether any new classes of IP rights would be beneficial to ensure a more robust IP system.

Patent Themes

- A majority of commenters agreed that AI is viewed best as a subset of computer-implemented inventions. Therefore, this majority felt that current USPTO guidance, especially on patent subject matter eligibility and disclosure of computer-implemented inventions, is equipped to handle advances in AI. However, some commenters stressed that it may be difficult to enable (i.e., teach the public to make and use) certain AI inventions, as required by 35 U.S.C. § 112(a), and offered the topic for further exploration by the USPTO.

- Most public commenters agreed that the growing ubiquity of AI would affect how the USPTO and courts would assess the legal hypothetical standard of a "person having ordinary skill in the art," this standard being critical to the determination of whether a patent right should issue.

- While no majority coalesced around AI's impact on prior art (i.e., the body of knowledge known at the time a patent application is filed), a number of issues were referred to the USPTO for further consideration, including that AI may generate a proliferation of prior art amounting to a never before seen volume and the ensuing difficulty in finding relevant prior art in view of the increased volume.

Other IP Themes

- Again, while a majority of commenters stated that current IP laws are calibrated correctly in the copyright, trademarks, trade secrets, and data fields, many agreed that existing commercial law principles might adequately fill any gaps left by IP law in the wake of advances in AI (e.g., contract law).

- Specifically on trademarks, most commenters agreed that AI would improve efficiency of examination of trademark applications. Although this sentiment was also generally shared in regard to patent examination.

- Many comments expressed that the use of copyrighted material to "train" AI may violate the reproduction right of a copyright owner under 17 U.S.C. §106(1), and that this use may or may not be a non-infringing fair use.

- Most commenters found that existing fair use law does not require modification, as fair use is a flexible doctrine and is capable of adapting to the use of copyrighted works in the context of AI.

- The topics of trade secrets and data issues generated an expansive range of comments, touching on issues of bias, transparency, privacy, and debates over whether advances in AI warrant a *sui generis* IP system for data rights.

The USPTO will use this report to focus issues for continued exploration of other measures it may take to bolster the understanding and reliability of IP rights for emerging technologies, such as AI. These steps may include further engagement with the public, additional guidance for stakeholders, and continued training for examiners on emerging technologies.

Corrigendum: *As originally published, footnote 29 relied on four public submissions. After initial report publication, one such submitter requested that their public submission not be relied on. This subsequent publication reflects that request.*

Disclaimer: *The USPTO appreciates the public's feedback and engagement on issues related to AI technology. The agency has considered all the comments and has included a summary of the comments in this report. The full comments may be viewed at* https://www.uspto.gov/initiatives/artificial-intelligence*. The views, thoughts, and opinions expressed in the comments do not necessarily state or reflect those of the USPTO, the administration, or any other federal government entity. Reference herein to a comment made by any specific entity does not constitute or imply its endorsement, recommendation, or favoring by the USPTO, the administration, or any other federal government entity.*

PART I—Responses to the RFC on Patenting Artificial Intelligence Inventions, issued on August 27, 2019

A summary of the comments received in response to the RFC on Patenting AI Inventions issued on August 27, 2019, is included below, organized by the question appearing in the RFC. Commenters included foreign patent offices, bar associations, industry associations, academia, and various stakeholders, both national and international. Representatives from electronics, software, automobile, medical, and pharmaceutical industries responded to the RFC.

1. ***What are elements of an AI invention? For example: The problem to be addressed (e.g., application of AI); the structure of the database on which the AI will be trained and will act; the training of the algorithm on the data; the algorithm itself; the results of the AI invention through an automated process; the policies/weights to be applied to the data that affects the outcome of the results; and/or other elements.***

This question sought to identify broadly the elements of an AI invention that may be subject to patentability.

Among the responses, four common answers arose:

(1) The various elements disclosed in the question constitute a non-exclusive list of elements of an AI invention.[2]

(2) AI can be understood as computer functionality that mimics cognitive functions associated with the human mind (e.g., the ability to learn).[3]

(3) AI inventions can be categorized (in no particular order) as follows:

(a) inventions that embody an advance in the field of AI (e.g., a new neural network structure of an improved machine learning (ML) model or algorithm)

(b) inventions that apply AI (to a field other than AI)[4]

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[2] Response from AIPPI, at 2; Response from EPSON, at 2; Response from IBM (Nov. 8, 2019), at 2; Response from JEITA, at 2.

[3] Response from IBM (Nov. 8, 2019), at 2; Response from Juniper Networks, at 1; Response from Schwegman Lundberg & Woessner, P. A., at 1.

[4] Response from CCIA (1st Response), at 1; Response from Ericsson, at 2; Response from Internet Association, High Tech Inventors Alliance, the Software and Information Industry Association, and ACT, at 9; Response from IPO (Nov. 11, 2019), at 3; Response from JPAA, at 1-2; Response from Siemens, at 1-2; Response from AIPPI Japan, at 1-2; Response from JPMA, at 1-2; Response from JPO, at 1; Response from Merck, at 2.

(c) inventions that may be produced by AI itself.[5]

(4) Undue effort should not be expended on defining AI, which is dynamic and will be subject to fundamental change in the coming years.[6]

2. ***What are the different ways that a natural person can contribute to conception of an AI invention and be eligible to be a named inventor? For example: Designing the algorithm and/or weighting adaptations; structuring the data on which the algorithm runs; running the AI algorithm on the data and obtaining the results.***

As with other fields of technology, the development of AI may present many opportunities for invention. For example, designing an AI algorithm, implementing particular hardware to enhance an AI algorithm, or applying methods of preparing inputs to an AI algorithm may present patent considerations. Many innovators may also be involved in the development of an AI system. Provided with the potential range of innovation and the possibility that more than one person may be involved in the development of an AI system, the law requires that a determination be made as to who has legally contributed to the conception of an AI invention and can be named as an inventor.

35 U.S.C. § 100 defines "inventor" as "the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention."[7] Moreover, 35 U.S.C. § 116 provides that an invention may be made by two or more persons jointly even though "(1) they did not physically work together or at the same time, (2) each did not make the same type or amount of contribution, or (3) each did not make a contribution to the subject matter of every claim of the patent."

The Federal Circuit has made clear that "conception" is the touchstone of inventorship.[8] Conception requires an inventor to have a specific solution to a problem rather than a general goal for success.[9] Conception is finished "only when the idea is so clearly defined in the inventor's mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation."[10] Similarly, to be a joint inventor, one must: "(1) contribute in some significant manner to the conception or reduction to practice of the invention, (2) make a contribution to the claimed invention that is not

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[5] 3a-3c: Response from CCIA (1st Response), at 1; Response from Ericsson, at 2; Response from FICPI, at 2-3; Response from Internet Association, High Tech Inventors Alliance, the Software and Information Industry Association, and ACT, at 9-10; Response from IPO (Nov. 11, 2019), at 3; Response from JPAA, at 1-2; Response from Siemens, at 1-2.
[6] Response from Ericsson, at 2; Response from EPSON, at 2; Response from Novartis, at 3; Response from NSIP Law, at 4; Response from Schwegman Lundberg & Woessner, at 3.
[7] 35 U.S.C. § 100 (2018).
[8] *Burroughs Wellcome Co. v. Barr Labs., Inc.*, 40 F.3d 1223, 1227-28 (Fed. Cir. 1994) (citations omitted); *see also In re Verhoef*, 888 F.3d 1362, 1366 (Fed. Cir. 2018).
[9] *Id.*
[10] *Id.*

insignificant in quality, when that contribution is measured against the dimension of the full invention, and (3) do more than merely explain to the real inventors well-known concepts and/or the current state of the art."[11]

The vast majority of public commenters asserted that current inventorship law is equipped to handle inventorship of AI technologies.[12] One commenter went as far as to state that "there is no urgency to revise the law with respect to inventorship."[13] Many of these commenters suggested that assessment of conception should be fact-specific, as in the analysis done today.[14] For example, one commenter stressed that there are different ways in which a natural person may contribute to the conception of an invention and that each contribution "should be evaluated on a case-by-case basis," as is the law today.[15] A related view was that a data scientist carrying out the task of building and testing a use of an AI technology invention is doing nothing more than reducing the invention to practice.[16] In the words of one commenter, "running [an] AI algorithm on the data and obtaining the results is unlikely to qualify as a contribution [to conception]."[17]

3. ***Do current patent laws and regulations regarding inventorship need to be revised to take into account inventions where an entity or entities other than a natural person contributed to the conception of an invention?***

AI provides unique policy considerations stemming from its potential for autonomous creation. Present AI technology appears to be within the realm of narrow, application-specific objectives, but the notion of artificial general intelligence (AGI)—intelligence akin to

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[11] *In re Verhoef*, 888 F.3d at 1366 (Fed. Cir. 2018).
[12] *See, e.g.*, Response from IPO (Nov. 11, 2019), at 4 ("[T]here is nothing unique about how a natural person contributes to the conception of an AI-related invention versus any other highly technical field."); Response from NAPP, at 1 ("an AI invention should be determined in the same way as for other kinds of inventions …").
[13] Response from IBM (Nov. 8, 2019), at 5; *see also* Response from SIIA (Nov. 8, 2019), at 5 (indicating that the USPTO has all the tools it needs under the current statutory framework).
[14] *See, e.g.*, Response from AAIH, at 3 (suggesting that current law is a fact-specific analysis); Response from BPLA, at 3-4 (noting that the use of AI in the inventive process does not negate inventorship by a natural person); Response from FICPI, at 3 (noting the fact-specific nature of the inquiry).
[15] Response from AIPLA (Nov. 8, 2019), at 3; *see also* Response from IEEE-USA, at 4 ("The ways that a natural person can contribute to conception of an AI invention are either the same as or analogous to the ways that a natural person can contribute to conception of an invention in computer-implemented technology"); Response from Novartis, at 4 (Whether AI inventions rise to conception "depend[s] on the facts of a given case and situation …").
[16] *See, e.g.*, Response from Maughan, at 2.
[17] Response from ABA IPL (Nov. 8, 2019), at 11; *see also* Response from Edward Ryan, at 2 ("one should not be able to simply push a button and be named an inventor."); Response from RF SUNY, at 1 ("simply running the AI algorithm on data and obtaining results may not constitute a meaningfully creative or inventive contribution …").

that possessed by humankind and beyond—is worthy of consideration. Thus, the instant question also contemplates a future state in which the capability of AI to invent approaches or exceeds that of human intelligence.

As previously discussed under question two, conception is the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention. As stated above, an "inventor" is defined in 35 U.S.C. § 100(a) as "the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention."[18] Title 35 of the United States Code is replete with language indicating that the inventor of a patent application must be a natural person. For example, 35 U.S.C. § 101 states, "***Whoever*** invents or discovers any new and useful process, machine, manufacture, or composition of matter … may obtain a patent therefore, subject to the conditions and requirements of this title" (emphasis added). "Whoever" denotes whatever person, a person being a human being—a natural person.[19] By the use of "whoever," § 101 limits patent protection to inventions and discoveries by natural persons.

35 U.S.C. § 115 provides additional clarification that the inventor must be a natural person. That is, § 115 uses pronouns specific to natural persons—"himself" and "herself"—when referring to the "individual" who believes himself or herself to be the original inventor or an original joint inventor of a claimed invention in the application,[20] and states that the inventor who executes an oath or declaration must be a "person."[21] In fact, there are numerous other patent statutes that refer to the inventor as a "person."[22] The USPTO's understanding of the patent statutes and the Federal Circuit case law concerning the concept that inventorship requires that an inventor must be a natural person is reflected in the numerous references to the inventor as a "person" in Title 37 of the Code of Federal Regulations.[23]

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[18] *See also* 35 U.S.C. § 115(a) ("each individual who is [an] inventor … shall execute an oath or declaration"); 35 U.S.C. § 100(g) ("The terms 'joint inventor' and 'coinventor' mean any 1 of the individuals who invented or discovered the subject matter of a joint invention … ").

[19] *Merriam-Webster.com*, https://www.merriam-webster.com/dictionary/whoever (last accessed Apr. 6, 2020).

[20] 35 U.S.C. § 115(b)(2) ("An oath or declaration under subsection (a) shall contain statements that … such individual believes himself or herself to be the original inventor or an original joint inventor of a claimed invention in the application.").

[21] 35 U.S.C. § 115(h)(1) ("Any person making a statement required under this section may withdraw, replace, or otherwise correct the statement at any time.").

[22] *See, e.g.*, 35 U.S.C. § 102(a) ("A person shall be entitled to a patent unless … "); 35 U.S.C. § 116(c) ("Whenever through error a person is named in an application for patent as the inventor … ."); 35 U.S.C. § 185 ("Notwithstanding any other provisions of law any person, and his successors, assigns, or legal representatives, shall not receive a United States patent for an invention if that person, or his … "); 35 U.S.C. § 256(a) ("Whenever through error a person is named in an issued patent as the inventor … .").

[23] *See, e.g.,* 37 CFR 1.27(a)(1) ("A person, as used in paragraph (c) of this section, means any inventor or other individual"); 37 CFR 1.41(d) (" . . . the name and residence of each person

The use of an AI system as a tool by a natural person(s) does not generally preclude a natural person(s) from qualifying as an inventor (or joint inventors) if the natural person(s) contributed to the conception of the claimed invention. That is, the activities by a natural person(s) that would ordinarily qualify as a contribution to the conception of an invention are unaffected by the fact that an AI system is used as a tool in the development of the invention. For example, depending on the specific facts of each case, activities such as designing the architecture of the AI system, choosing the specific data to provide to the AI system, developing the algorithm to permit the AI system to process that data, and other activities not expressly listed here may be adequate to qualify as a contribution to the conception of the invention.

The majority of commenters responding to this question reflected the view that there is no need for revising patent laws and regulations on inventorship to account for inventions in which an entity or entities other than a natural person contributed to the conception of an invention.[24] One commenter remarked that "conception is inherently a human activity … an entity or entities other than a natural person cannot contribute to the conception of an invention."[25] Many comments took issue with the question's premise that under the state of the art, a machine could conceive of an invention. As one commenter put it, "the current state of AI technology is not sufficiently advanced at this time and in the foreseeable future so as to completely exclude the role of a human inventor in the development of AI inventions."[26]

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believed to be an actual inventor should be provided when the application papers pursuant to § 1.53(b) or § 1.53(c) are filed."); 37 CFR 1.53(d)(4) ("accompanied by a statement requesting deletion of the name or names of the person or persons who are not inventors of the invention being claimed in the new application"); 37 CFR 1.63(a)(3) ("An oath or declaration under this section must: Include a statement that the person executing the oath or declaration believes . . . ."); 37 CFR 1.324(b)(1) ("A statement from each person who is being added as an inventor and each person who is currently named as an inventor . . . ."). Note, also, the requirement under 7 CFR 1.76(b)(1) that the inventor be identified by their "legal name."

[24] Response from Abadi, at 2; Response from ABA IPL (Nov. 8, 2019), at 12; Response from AIPLA (Nov. 8, 2019), at 4; Response from AIPPI Japan, at 4; Response from the BADC, at 4; Response from BPLA, at 3-4; Response from Ericsson, at 3; Response from Internet Association, High Tech Inventors Alliance, the Software and Information Industry Association, and ACT, at 10-11; Response from IBM, at 5; Response from JEITA, at 3-4; Response from JPAA, at 3; Response from Juniper Networks, at 3; Response from Gaudry, at 2; Response from Rubin, at 5; Response from Merck, at 3; Response from NAPP, at 2; Response from NSIP, at 4; Response from Kumar, at 2; Response from Davis, at 4-5; Response from R Street Institute (Nov. 8, 2019), at 2-3; Response from Zubek, at 1; Response from Naimpally, at 1; Response from Schwegman Lundberg & Woessner, at 5.

[25] Response from BADC, at 4.

[26] Response from AIPPI, at 5.

Others characterized modern-day AI as a tool to aid natural persons in the inventive process.[27]

Some commenters suggested that the USPTO should revisit the question when machines begin achieving AGI (i.e., when science agrees that machines can "think" on their own).[28] A minority of commenters suggested that AGI was a present reality that needed to be addressed today.[29] Others warned that if such a change was made to recognize non-natural person inventors, the USPTO should carefully consider the practical effects of such a change: How would a continuation be treated? How would a machine sign an oath or declaration? Would a flood of applications ensue? Would certain types of AI dominate technology development in the future?[30]

4. ***Should an entity or entities other than a natural person, or company to which a natural person assigns an invention, be able to own a patent on the AI invention? For example: Should a company who trains the artificial intelligence process that creates the invention be able to be an owner?***

Ownership of a patent entitles the patent owner the right to exclude others from making, using, offering for sale, selling, or importing into the United States the invention claimed in the patent.[31] For applications filed on or after September 16, 2012, the original applicant is

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[27] *See, e.g.*, Response from FICPI, at 3 ("the AI system being used should be considered a 'tool' in the inventing process."); Response from Brindisi, at 4 ("AIs of our era are still *tools* devised, applied and exploited by *humans*.") (emphasis in original); Response from Ford, at 1 ("AI-created inventions are the product of a tool that facilitates discovery by the true inventor … ").

[28] Response from Davis, at 5 ("Looking far (far!) ahead, programs someday may begin to learn on their own … Then we may have a deeper quandary."); Response from Gaudry, at 2 ("general [artificial] intelligence is a very long ways off, such that we need not worry about adjusting patent law now for this distant and remote possibility."); Response from Michael Murial and Andrew Noble, at 8 ("Unless and until the scientific community declares that AI has allowed computers to achieve 'consciousness' such that a computer is capable of 'conceiving' something, any question about what to do when an AI system 'invents' something is purely hypothetical.").

[29] Response from RF SUNY, at 2-3; Response from Sanker, at 1; Response from Siemens, at 2.

[30] Response from Askeladden, at 4 (questioning the Constitutional authority to recognize AI as an inventor); Response from JEITA, at 3-4 (explaining an influx of applications may result from recognizing AI as an inventor); Response from EPSON, at 2-3 (expressing concerns over an influx of applications, "chaos in the business community," and the broader legal personality of machine issues); Response from IPO (Nov. 11, 2019), at 6 (raising practical concerns, such as how one would depose a machine); Response from JIPA (Nov. 6, 2019), at 2-3 (expressing broad practical concerns, such as those about legal rights normally reserved for natural persons being vested in machines); Response from Tata Consultancy, at 2-3 (raising practical concerns, such as execution of documents by a machine, effects on continuing applications, and assignment of rights).

[31] 35 U.S.C. § 154(a)(1).

presumed to be the owner of an application for an original patent unless there is an assignment.[32] For applications filed before September 16, 2012, the ownership of the patent (or the application for the patent) initially vests in the named inventors of the invention on the patent.[33] A patent or patent application is assignable by an instrument in writing, and the assignment of the patent, or patent application, transfers to the assignee(s) an alienable (transferable) ownership interest in the patent or application.[34]

The vast majority of commenters stated that no changes should be necessary to the current U.S. law—that only a natural person or a company, via assignment, should be considered the owner of a patent or an invention.[35] However, a minority of responses stated that while inventorship and ownership rights should not be extended to machines, consideration should be given to expanding ownership to a natural person: (1) who trains an AI process,[36] or (2) who owns/controls an AI system.[37]

5. Are there any patent eligibility considerations unique to AI inventions?

In assessing the patent eligibility of AI inventions, all judicially created exceptions to the statutory categories are relevant (i.e., laws of nature, natural phenomena, and abstract ideas). In January 2019, the USPTO issued the 2019 Revised Patent Subject Matter Eligibility

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[32] *See* 37 C.F.R. § 3.73(a).
[33] *See Beech Aircraft Corp. v. Edo Corp.*, 990 F.2d 1237, 1248 (Fed. Cir. 1993).
[34] 35 U.S.C. § 261.
[35] Response from ABA IPL (Nov. 8, 2019), at 12-13; Response from AIPLA (Nov. 8, 2019), at 4 ("Ownership of patent rights should remain reserved for only natural or juridical persons at this time. Changing the ownership regime to allow an AI entity to own a patent would raise broad fundamental issues relating to incentives for inventing and 'AI personhood,' which go far beyond the scope of this discussion."); Response from AIPPI, at 5-6; Response from AIPPI Japan, at 4-5; Response from Askeladden, at 4; Response from BADC, at 5; Response from BPLA, at 4; Response from CCIA (1st Response), at 3; Response from EPSON, at 3; Response from Internet Association, High Tech Inventors Alliance, the Software and Information Industry Association, and ACT, at 11; Response from IBM (Nov. 8, 2019), at 5; Response from Wong, at 1; Response from Lori Pressman, at 2; Response from Zubek, at 2; Response from IEEE-USA, at 6; Response from Juniper Networks, at 3; Response from Merck, at 3; Response from R Street Institute (Nov. 8, 2019), at 3.
[36] Response from IPO (Nov. 11, 2019), at 6 ("Generally, a natural person who trains the AI process that creates an AI Generated invention should be able to be an owner.").
[37] Response from IBM (Nov. 8, 2019), at 4 ("Thus, at whatever point we deem machines capable of invention, their inventions and the corresponding patents should be owned by those that own them (e.g., those that own the machines)."); Response from Siemens, at 2 ("Attributing inventor or ownership rights to machines doesn't feel right. Therefore, we suggest expanding the right of the inventors to legal persons controlling the Al systems.").

Guidance (PEG), which extracts and synthesizes key concepts identified by the courts as abstract ideas to offer greater clarity in this area of the law.[38]

Many commenters asserted that there are no patent eligibility considerations unique to AI inventions.[39] That is, AI inventions should not be treated any differently than other computer-implemented inventions. This is consistent with how the USPTO examines AI inventions today. AI inventions are treated like all other inventions that come before the Office. In fact, the USPTO has been examining and issuing patents claiming AI inventions for years. Claims to an AI invention that fall within one of the four statutory categories and are patent-eligible under the *Alice*/*Mayo*[40] test will be patent subject matter eligible under 35 U.S.C. § 101.

Some commenters stated that many AI inventions are at risk under the subject matter eligibility analysis because they can be characterized as certain methods of organizing human activity, mental processes, or mathematical concepts.[41] However, as one commenter noted, the complex algorithms that underpin AI inventions have the ability to yield technological improvements.[42] In addition, claims directed to an abstract idea will still be patent-eligible if the additional claim elements, considered individually or as an ordered combination, amount to significantly more than the abstract idea so as to transform it into patent-eligible subject matter.

6. ***Are there any disclosure-related considerations unique to AI inventions? For example, under current practice, written description support for computer-implemented inventions generally require sufficient disclosure of an algorithm to perform a claimed function, such that a person of ordinary skill in the art can reasonably conclude that the inventor had possession of the claimed invention. Does there need to be a change in the level of detail an applicant must provide in order to comply with the written description requirement, particularly for deep-learning systems that may have a large number of hidden layers with weights that evolve during the learning/training process without human intervention or knowledge?***

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[38] This guidance was subsequently updated in October 2019; the substantive aspects of the January 2019 PEG were unchanged. The current guidance documents on subject matter eligibility, including the 2019 PEG and the examples, are available at www.uspto.gov/PatentEligibility.

[39] *See, e.g.,* Response from AIPLA (Nov. 8, 2019), at 4; Response from IPO (Nov. 11, 2019), at 7-8; Response from Ford, at 1.

[40] *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 221 (2014); *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012).

[41] *See, e.g.*, Response from ABA IPL (Nov. 8, 2019), at 13-14; Response from IBM (Nov. 8, 2019), at 5.

[42] Response from ABA IPL (Nov. 8, 2019), at 15.

35 U.S.C. § 112(a)[43] has three separate and distinct disclosure requirements: written description, enablement, and best mode.[44] These requirements apply to all applications examined before the USPTO, including those directed to AI inventions.

The Manual of Patent Examining Procedure[45] (MPEP) and examiner training[46] provide examination guidance regarding 35 U.S.C. § 112(a) that is consistent with the USPTO's understanding of the statute and legal precedent. In addition, in January 2019, the USPTO issued guidance (January 2019 § 112 Guidance) to assist examiners in the examination of claims in patent applications that contain functional language, particularly patent applications in which functional language is used to claim computer-implemented inventions.[47] The January 2019 § 112 Guidance may be especially helpful for evaluating AI inventions, considering that patent applications related to AI inventions often include computer-implemented inventions claimed, at least in part, with functional language.

Under current USPTO examination guidance, a determination of whether the disclosure requirements are satisfied will depend on the facts of each application, including the subject matter being claimed. To satisfy the written description requirement of 35 U.S.C. § 112(a), applications for AI inventions that include claims to computer-implemented inventions that recite functional language should provide sufficient detail in the specification regarding the hardware, as well as software, to show that the inventor had possession of the full scope of the claimed invention. In particular, the specification should disclose the computer and the algorithm (e.g., detailed steps or procedures, formulas, diagrams, and/or flowcharts) that perform the claimed function in sufficient detail such that one of ordinary skill can reasonably conclude that the inventor possessed the claimed subject matter.

The majority of commenters shared the sentiment that there are no unique disclosure considerations for AI inventions. One commenter stated that the principles set forth in the

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[43] Section 4 of the Leahy-Smith America Invents Act (AIA) designated pre-AIA 35 U.S.C. § 112, ¶¶ 1 through 6, as 35 U.S.C. § 112(a) through (f), effective as to applications filed on or after September 16, 2012; *see* Public Law 112-29, 4(c), 125 Stat. 284, 296 (2011). AIA 35 U.S.C. § 112(a) and pre-AIA 35 U.S.C. § 112, ¶ 1 are collectively referred to in this paper as 35 U.S.C. § 112(a); AIA 35 U.S.C. § 112(b) and pre-AIA 35 U.S.C. § 112, ¶ 2 are collectively referred to in this paper as 35 U.S.C. § 112(b).

[44] Although this paper is limited to analyzing AI issues related to 35 U.S.C. § 112(a), issues related to indefiniteness under 35 U.S.C. § 112(b) may arise for 35 U.S.C. § 112(f) functional claim limitations where the specification does not provide sufficient corresponding structure.

[45] See MPEP §§ 2161-65, particularly § 2161.01, § 2181(IV), and § 2185.

[46] *See* https://www.uspto.gov/patent/laws-and-regulations/examination-policy/examination-guidance-and-training-materials. Note that examiners were recently trained on examining computer-implemented functional claim limitations for compliance with 35 U.S.C. § 112 (training completed March 14, 2019).

[47] Examining Computer-Implemented Functional Claim Limitations for Compliance With 35 U.S.C. § 112, 84 Fed. Reg. 57 (Jan. 7, 2019).

USPTO's examiner training materials regarding computer-implemented inventions "are similarly applicable to AI-related inventions as to conventional algorithmic solutions."[48] However, some commenters indicated that there are significant and unique challenges to satisfying the disclosure requirements for an AI invention. One commenter noted that "AI inventions can be difficult to fully disclose because even though the input and output may be known by the inventor, the logic in between is in some respects unknown."[49] These characteristics of AI learning systems thus may drive further discussion regarding enablement (see discussion regarding enablement below).

Several commenters noted that proper enforcement of the description requirement is imperative for patent quality. For example, one commenter explained that it is "critical for the USPTO to aggressively police the § 112 disclosure standards."[50]

7. ***How can patent applications for AI inventions best comply with the enablement requirement, particularly given the degree of unpredictability of certain AI systems?***

According to current USPTO examination guidelines, the enablement requirement of 35 U.S.C. § 112(a) can be satisfied when the specification teaches one of ordinary skill in the art how to make and use the full scope of the claimed invention without undue experimentation.[51] When determining whether the specification satisfies the enablement requirement and whether any necessary experimentation is undue, examiners are expected to consider various factors called the "Wands factors."[52] The Wands factors include: breadth of claims, nature of the invention, state of the prior art, level of one of ordinary skill, level of predictability in the art, amount of direction provided by the inventor, existence of working examples, and quantity of experimentation necessary to make or use the invention based on the content of the disclosure.[53]

Generally, the amount of guidance or direction needed in the specification to enable the invention is inversely related to the amount of knowledge in the state of the art, as well as the predictability in the art.[54] The more that is known in the prior art regarding the nature of the invention and the more predictable the art is, the less information is required to be explicitly stated in the specification. Conversely, if less is known in the prior art about the nature of the invention and the art is unpredictable, the specification should include more

[48] Response from IPO (Nov. 11, 2019), at 14.
[49] Response from IBM (Nov. 8, 2019), at 6.
[50] Response from ABA IPL (Nov. 8, 2019), at 17.
[51] *See* 84 Fed. Reg. 62; *see also* MPEP § 2164.01.
[52] *See* 84 Fed. Reg. 62; *see also* MPEP § 2164.01(a).
[53] *Id*.
[54] *See* MPEP § 2164.03.

information as to how to make and use the invention in order to be enabling.[55] Thus, whether a specification provides enabling support for the claimed invention is intensely fact-specific.

The commenters suggest that there are differing views on the predictability of AI systems. One commenter stated that "most current AI systems behave in a predictable manner and that predictability is often the basis for the commercial value of practical applications of these technologies."[56] Similarly, another commenter explained that "AI inventions are inherently no more unpredictable than the underlying ML algorithm on which they rely."[57]

On the other hand, one commenter noted that some AI inventions may operate in a black box because there is an "inherent randomness in AI algorithms."[58] Some commenters suggested that the principles applied in life sciences technology may be helpful when analyzing the disclosure requirement for AI inventions. For example, one commenter explained that "the greater degree of unpredictability associated with AI-based inventions makes it appropriate to apply the written description requirement and the enablement factors from *In re Wands*."[59]

8. ***Does AI impact the level of a person of ordinary skill in the art? If so, how? For example: Should assessment of the level of ordinary skill in the art reflect the capability possessed by AI?***

AI is capable of being applied to various disciplines, from the life sciences and robotic systems to agriculture and manufacturing processes. The ubiquitous nature of AI requires an assessment of how it is affecting seemingly disparate fields of innovation. That is, AI may have the potential to alter the skill level of the hypothetical "ordinary skilled artisan," thereby affecting the bar for nonobviousness.[60]

An invention that would have been obvious to a person of ordinary skill before the effective filing date of the claimed invention is not patentable.[61] As reiterated by the Supreme Court in *KSR International Co. v. Teleflex Inc.*, obviousness is a question of law based on underlying factual inquiries.[62] These factual inquiries include the scope and content of the prior art, the differences between the claimed invention and the prior art, and the level of ordinary skill in the art.[63]

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[55] *Id.*
[56] Response from AIPLA (Nov. 8, 2019), at 8.
[57] Response from Schwegman Lundberg & Woessner, at 9.
[58] Response from IBM (Nov. 8, 2019), at 6.
[59] Response from Genentech (Nov. 8, 2019), at 9.
[60] While the "person of ordinary skill in the art" also has an impact on disclosure requirements, with the instant question, the USPTO sought to hear from the public as to how AI is impacting the level of ordinary skill in the art in assessing nonobviousness.
[61] 35 U.S.C. § 103 (2018).
[62] 550 U.S. 398, 406 (2007).
[63] *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

The person of ordinary skill in the art is a legal fiction, a person presumed to know the relevant prior art.[64] Factors considered in determining the level of ordinary skill in the art may include the type of problems encountered in the art, prior art solutions to those problems, the rapidity with which innovations are made, the sophistication of the technology, and the educational level of active workers in the field.[65] Each case may vary, not every one of the aforementioned factors may be present, and one or more factors may predominate the analysis.[66]

Many commenters asserted that AI has the potential to affect the level of ordinary skill in an art.[67] Furthermore, numerous commenters suggested that the present legal framework for assessing the person of ordinary skill in the art is "adequate to determine the impact of AI-based tools in a given field."[68] Some commenters elaborated that the level of skill in any art has traditionally grown over time based on the introduction of new technologies and that "once conventional AI systems become widely available … such accessibility would be expected to enhance the abilities of a person of ordinary skill in [an] art."[69] In the words of one commenter:

> Just as the existence of test tubes impacts the level of a person of ordinary skill in the chemical arts, and just as the existence of general purpose computers impacts the level of a person of ordinary skill in the software arts (and many

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[64] *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986).
[65] *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995).
[66] *Id.*
[67] Response from Abadi, at 3; Response from AIPPI, at 8; Response from CCIA (1st Response), at 6; Response from Edward Ryan, at 4; Response from EPO, at 5; Response from Ericsson, at 4; Response from Genentech (Nov. 8, 2019), at 10; Response from Internet Association, High Tech Inventors Alliance, the Software and Information Industry Association, and ACT, at 16; Response from IBM (Nov. 8, 2019), at 7; Response from IEEE-USA, at 8; Response from Glucoft, at 2; Response from JIPA (Nov. 6, 2019), at 6; Response from JPAA, at 5; Response from JPO, at 4; Response from KINPA, at 3; Response from NAPP, at 3; Response from R Street Institute (Nov. 8, 2019), at 5; Response from Abbott, at 11; Response from Siemens, at 3.
[68] Response from Novartis, at 11; *see also* Response from Juniper Networks, at 5 ("AI inventions do not require any changes to the current legal requirements of the level of a person [of] ordinary skill in the art"); Response from Merck, at 4 ("The 'person of ordinary skill in the art' standard … should not change …").
[69] Response from BADC, at 6-7; *see also* Response from AIPPI Japan, at 8 ("advances in AI technologies should be reflected in the determination of inventive step in the form of improvement of level of technology used by a person skilled in the art"); Response from Novartis, at 10 ("We believe AI must ultimately impact the definition and skill level of a person of ordinary skill in the art, just as microscopes, calculators, and more conventional software applications have in the past.").

> others), so [too] would AI affect the level of skill in the arts where it can be made useful.[70]

However, some commenters cautioned that such wide prevalence of AI systems has not yet permeated all fields and counseled against declaring that all fields of innovation are now subject to the application of "conventional AI."[71] Others interpreted the question to assume a future state in which AGI exists and machines have intelligence comparable to humans or beyond. Those interpreting the question in this manner suggested that such machines are not persons and, therefore, would not affect the legal standard of a "person" of ordinary skill in the art.

9. Are there any prior art considerations unique to AI inventions?

The existence of prior art or the lack thereof has fundamental implications for determining the fate of a filed U.S. patent application. The impact of AI on what can be considered prior art, the quantity of prior art, and its accessibility are topics well worth considering.

35 U.S.C. § 102(a) states: "a person shall be entitled to a patent unless—(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention; or (2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b) … "[72] "The categories of prior art documents and activities are set forth in AIA 35 U.S.C. 102(a)(1) and the categories of prior art patent documents are set forth in AIA 35 U.S.C. 102(a)(2). These documents and activities are used to determine whether a claimed invention is novel or nonobvious."[73]

The majority of commenters stated that there were no prior art considerations unique to AI inventions—that current standards were sufficient.[74] A minority of commenters indicated

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[70] Response from Edward Ryan, at 4.

[71] *See, e.g.*, Response from FICPI, at 5 (cautioning that AI's impact on a field is "highly fact-specific"); Response from Genentech (Nov. 8, 2019), at 10 ("the USPTO must be very cautious in assessing which uses of [AI] are considered merely the exercise of ordinary skill in the art"); Response from Internet Association, High Tech Inventors Alliance, the Software and Information Industry Association, and ACT, at 17 (recognizing that "in some cases, applying an existing ML model may not be simple, and hurdles overcome in order to achieve that application may render application claims non-obvious … ").

[72] 35 U.S.C. § 102(a).

[73] MPEP § 2152.

[74] Response from ABA IPL (Nov. 8, 2019), at 18; Response from AIPPI, at 8; Response from Askeladden, at 6; Response from University of MD Center for Advanced Life Cycle Engineering, at 3; Response from EPSON, at 5 ("We believe that the same prior art standards that are applied to computer-implemented inventions should be applied to AI inventions."); Response from Ericsson, at 5; Response from International Federation of Intellectual Property Attorneys, at 5-6; Response from Genentech, at 11; Response from Internet

that there were prior art considerations unique to AI inventions,[75] many of which focused on the proliferation of prior art, such as the generation of prior art by AI,[76] and the difficulty in finding prior art, such as source code related to AI.[77] A minority of commenters indicated that while no prior art considerations unique to AI inventions currently existed, depending on how sophisticated AI becomes in the future, unique AI prior art could become relevant.[78] Among all the responses, a common theme was the importance of examiner training and providing examiners with additional resources for identifying and finding AI-related prior art.[79]

Association, High Tech Inventors Alliance, the Software and Information Industry Association, and ACT, at 17; Response from IEEE-USA, at 8 ("The rules and procedures governing prior art considerations for computer-implemented technology inventions and broadly applicable enabling technology inventions should govern the prior art considerations for AI inventions."); Response from IPO (Nov. 11, 2019), at 17; Response from Juniper Networks, at 5; Response from Rubin, at 10; Response from Lori Pressman, at 4; Response from NAPP, at 3; Response from NSIP, at 10; Response from Maughan, at 3; Response from Kumar, at 3; Response from Davis, at 7; Response from Schwegman Lundberg & Woessner, at 10; Response from Naimpally, at 2; Response from Siemens, at 3; Response from RF SUNY, at 5; Response from Edward Ryan, at 4.

[75] Response from BADC, at 8; Response from Cardozo Intellectual Property Law Society, at 5 ("Already, some companies … have been using AI to generate patents in an attempt to prevent adjacent patent claims. It is foreseeable that a company could use this technique to generate massive amounts of prior art for the express purpose of rendering potential future inventions unpatentable."); Response from CCIA (1st Response), at 7; Response from IBM (Nov. 8, 2019), at 8; Response from JEITA, at 7; Response from JIPA (Nov. 6, 2019), at 6; Response from JPPA, at 5; Response from JPO, at 4; Response from Novartis, at 11; Response from Prevencio, at 2; Response from Tata Consultancy, at 5.

[76] *See, e.g.*, Response from IBM (Nov. 8, 2019), at 8 ("AI will dramatically expand the scope of prior art available. First and foremost, AI has the capability of generating a tremendous amount of prior art.").

[77] *See, e.g.*, Response from CCIA (1st Response), at 7 ("While standard AI techniques are more likely to be described in the literature than is the case in software, there is still a significant proportion of AI technology that is undocumented except in source code. This source code may or may not be available and is generally considered difficult to search for.").

[78] Response from AIPLA (Nov. 8, 2019), at 8-9 ("In the event that an AI entity is considered an inventor, the definition of 'analogous' may have to be significantly expanded, depending on the capabilities of the inventive AI."); Response from AIPPI Japan, at 9.

[79] Response from BADC, at 8; Response from Internet Association, High Tech Inventors Alliance, the Software and Information Industry Association, and ACT, at 17 ("Consistent with the suggestions above that the USPTO provide a more proactive approach to examiner technical training, the Associations recommend that the USPTO become more proactive when it comes to providing prior art to examiners."); Response from IPO (Nov. 11, 2019), at 17; Response from Juniper Networks, at 5 ("While examiners have been examining AI

10. Are there any new forms of intellectual property protections that are needed for AI inventions, such as data protection?

Data is a foundational component of AI. Access to data for initial development and ongoing training is necessary for AI development. This means that data and datasets, including their collection and compiling, have value, particularly "big data" (i.e. extremely large data sets that may be analyzed computationally to reveal patterns, trends, and associations). Data protection under current U.S. law is limited in scope, and the U.S. does not currently have intellectual property rights protections solely focused on data for AI algorithms.

Commenters were nearly equally divided between the view that new intellectual property rights were necessary to address AI inventions and the belief that the current U.S. IP framework was adequate to address AI inventions. Generally, however, commenters who did not see the need for new forms of IP rights suggested that developments in AI technology should be monitored to ensure needs were keeping pace with AI technology developments.

The majority of opinions requesting new IP rights focused on the need to protect the data associated with AI, particularly ML. For example, one opinion stated that "companies that collect large amounts of data have a competitive advantage relative to new entrants to the market. There could be a mechanism to provide access to the repositories of data collected by large technology companies such that proprietary rights to the data are protected but new market entrants and others can use such data to train and develop their AI."[80]

Similarly, another commenter stated that "there may be gaps in IP protection for AI, and specifically gaps in IP protection for the trained model and its associated coefficients."[81] In contrast, another opinion shared that training data is currently "protectable as a trade secret or, in the event that the training data provides some new and useful outcome, then as a patent."[82] One commenter's opinion was that the U.S. should not adopt the "European database protection" scheme[83], largely because it is "compromised by the fact that the protection is tied to the investment expended to collect and/or verify the data."[84]

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inventions for decades, Examiner training to identify relevant prior art would be beneficial."); Response from NSIP, at 10.

[80] Response from AIPLA (Nov. 8, 2019), at 9.

[81] Response from IBM (Nov. 8, 2019), at 8.

[82] Response from Edward Ryan, at 4-5; *see also* Response from Schwegman Lundberg & Woessner, at 11 (arguing that data used to train an ML algorithm is protectable under trade secret or copyright law); Response from ABA IPL (Nov. 8, 2019), at 19 (arguing that training technologies are protected under existing legal frameworks).

[83] The USPTO has interpreted this as a reference to the Directive of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases. Council Directive 96/9, 1996 O.J. (L 077) 20-28 (EC) available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31996L0009.

[84] Response from Gaudry, at 5.

In addition to data protection rights, one commenter suggested that if the patent system fails to protect certain types of data, such as bioinformatics, "some alternative, *sui generis* form of protection might be required to ensure that bioinformatics and other practical applications of AI in biotechnology are protected forms of intellectual property."[85] Another commenter similarly stated that while it was currently "undecided as to whether new IP rights are needed for AI inventions," "should current systems prove unable to provide adequate incentives to sufficiently effectuate the promise of AI, or should important gaps arise in those systems, we believe it would be appropriate to consider new forms of IP," including "an IP right for trained models, and an IP right for nonpublic data where its generation required substantial effort and investment (similar to the regulatory data protection (RDP) rights available in [the] industry for proprietary clinical and other data submitted to FDA and other regulatory authorities)."[86]

Commenters did not provide concrete proposals on how any newly created IP rights should function, and many, from both sides of the divide, called on the USPTO to further consult the public on the issue.

11. Are there any other issues pertinent to patenting AI inventions that we should examine?

The USPTO recognizes that the implications of AI-related issues on intellectual property rights may be far-reaching. The agency has attempted to be comprehensive in posing questions to the public on all related aspects of IP protection. Despite its best efforts, however, the USPTO recognizes that there may be other issues that the public might wish to bring to light. With this question, the USPTO intended to capture any issues not previously addressed.

Speaking only to issues not dealt with elsewhere in the August 27, 2019 RFC (e.g., those pursuant to 35 U.S.C. §§ 101, 103, 112),[87] a major theme the commenters stressed was the need for examiner technical training and a call for memorializing guidance specific to AI for patent examiners.[88] One commenter advised the USPTO to "invite and request industry trade groups to adopt formal recommendations for patent applications and patent examination"

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[85] Response from Genentech (Nov. 8, 2019), at 11.

[86] Response from Novartis, at 11.

[87] Some responses used this question to reiterate the importance of subject matter eligibility, obviousness, and disclosure requirements relative to AI inventions.

[88] *See, e.g.*, Response from CCIA (1st Response), at 8; Response from Internet Association, High Tech Inventors Alliance, the Software and Information Industry Association, and ACT, at 17-18; Response from Baysinger, at 3 (suggesting that the USPTO hire attorneys "versed in data science with computer science backgrounds to form a think tank as the office continues to receive AI patents" because "a case by case analysis and approach watching the examinations would assist in setting standards and clarity for both examiners and inventors.").

on "questions relating to [the person of ordinary skill] in the art of AI, including training, reference material, and benchmarks for improved performance."[89]

One commenter stated that "extending legal protection to AI [created] inventions may require substantial changes in traditional legal approaches and frameworks, including notions of property, ownership, and other non-IP legal principles akin to the development of corporate law as we know it today."[90] Another commenter stressed the importance of an "open ecosystem of research" to U.S. economic and scientific leadership in the field of AI and stated that the USPTO should "consider the economic and scientific risks of granting patents to AI algorithm inventions and basic research that may have the potential to become foundational."[91] One commenter asked whether, given the dynamic nature of AI systems (i.e., "some systems constantly incorporate (i.e., learn from) additional examples/experience while in operation"), the claims to such inventions need to be constantly updated as well.[92] Another commenter stated that "unexpected results should be weighed as heavily as they are in evaluating biotechnology and pharmacological inventions."[93]

Other commenters called for further consideration of issues outside of patentability, such as patent infringement and patent enforcement.[94]

12. Are there any relevant policies or practices from other major patent agencies that may help inform USPTO's policies and practices regarding patenting of AI inventions?

The USPTO participates in numerous global activities. On a multilateral level, the USPTO represents the U.S. government on AI-related activities at the World Intellectual Property (WIPO) and, the Organization for Economic Cooperation and Development. Additionally the USPTO engages in cooperation directly with other intellectual property offices, both one-on-one, for example through bilateral exchanges on the patentability of AI inventions, and multilaterally in groups like the IP5 Taskforce on New Emerging Technologies and AI

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[89] Response from Rubin, at 14-15. Note: "POSITA" is a reference to "a person of ordinary skill in the art."

[90] Response from AIPLA (Nov. 8, 2019), at 9; *see also* Response from EPO, at 5 ("The impact of the development of AI technology on society, including changes in the right holders' position, employment market and ethical challenges that AI poses are also areas which may need to be addressed as the technological development progresses."); Response from JPO, at 4 ("When a claim is made for a substance (compound, composition, pharmaceutical, etc.) whose physical properties are predicted by AI, it might be helpful if the details on what is required to be patentable (i.e., whether only calculation results are sufficient or chemical experiments are additionally required) are described in Specification.").

[91] Response from Menart, at 2.

[92] Response from Davis, at 7.

[93] Response from NAPP, at 4.

[94] *See, e.g.*, Response from Genentech (Nov. 8, 2019), at 11-12; Response from IBM (Nov. 8, 2020), at 9.

(NET/AI). Through these channels, the USPTO is able to share its policies and be informed of relevant policies and practices from other major patent agencies.

Commenters highlighted the respective work at other patent offices, particularly at the European Patent Office (EPO) and Japan Patent Office (JPO). Commenters cited the reports, guidelines, and patent examination examples on AI issued by these offices, all of which were suggested to be informative to the USPTO.[95] One commenter noted that "the JPO and more recently, KIPO (Korean Patent Office), have established separate and specific 'AI examination groups' that can focus on only AI matters, so such could be adopted in the USPTO as well."[96] Commenters also called attention to the Intellectual Property Office of Singapore (IPOS), which reportedly created an expedited examination path for AI technologies.[97] Others generally sought to have the USPTO continue its multilateral engagements on AI through WIPO and the IP5.[98] One commenter specifically stated that "it is our desire as an organization of international scope to see that the respective laws and administrative practices of IP5 are evolving in a common direction."[99] On the other hand, one commenter "caution[ed] against further attempts to harmonize patent laws and procedures, especially as it relates to patenting AI" because "U.S. patent law has long been the gold standard for patent protection and a major driver in the success of the U.S. innovation economy."[100]

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[95] *See* Response from AIPPI Japan, at 10 (suggesting that the USPTO provide criteria in guidelines with many examples, like the EPO and JPO); *see also* Response from BADC, at 9-10 (noting examination guidelines of other patent offices); Response from BPLA, at 5; Response from FICIPI, at 6; Response from JPAA, at 6; Response from Abbott, at 11; Response from Alliance for AI in Healthcare, at 5; Response from JEITA, at 8; Response from JIPA (Nov. 6, 2019), at 8.

[96] Response from KINPA, at 4.

[97] *See, e.g.*, Response from NSIP Law, at 11.

[98] *See, e.g.*, Response from Novartis, at 13 ("consult [with other patent offices] and share learnings and best practices as appropriate and consistent with the U.S. system's Constitutional goals"); Response from Ericsson, at 5; Response from Merck, at 5.

[99] Response from AIPPI, at 10; *see also* Response from IBM (Nov. 8, 2019), at 9 ("IBM asks the Office to continue to monitor the development of IP policy surrounding AI in other jurisdictions and ensure that the IP policies in the U.S. do not comparatively disadvantage AI inventions in the U.S.").

[100] Response from IEEE-USA, at 10.

PART II—Responses to the RFC on Intellectual Property Protection for Artificial Intelligence Innovation, issued on October 30, 2019

A summary of the comments received in response to the RFC on the impact of AI on IP policy areas other than patent law, including copyrights, trademarks, database protections, and trade secret law, issued on October 30, 2019, is included below, organized by the question appearing in the RFC. Commenters included bar associations, industry associations, academia, and various stakeholders, both national and international. Representatives from electronics, software, media, and pharmaceutical industries responded to the RFC.

1. ***Should a work produced by an AI algorithm or process, without the involvement of a natural person contributing expression to the resulting work, qualify as a work of authorship protectable under U.S. copyright law? Why or why not?***

Under current U.S. law, a work created without human involvement would not qualify for copyright protection. However, a work created by a human with the involvement of machines would qualify for copyright protection if other conditions are met. The Supreme Court has long recognized copyright protection for creative works,[101] even when an author is assisted by a machine.[102]

The U.S. Copyright Office, in its Compendium of Practices (Third Edition), has addressed the question of human contribution to creative works. It notes that:

> [T]he Copyright Act protects "original works of *authorship*." 17 U.S.C. § 102(a). **To qualify as a work of "authorship," a work must be created by a human being**. …. Works that do not satisfy this requirement are not copyrightable. …. Similarly, the Office will not register works produced by a machine or mere mechanical process

[101] See *Feist Publ'ns, Inc., v. Rural Tel. Serv. Co.*, 499 U.S. 340 (1991), a case establishing that information alone, without a minimum of original creativity, cannot be protected by copyright.

[102] See *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53 (1884), a case that upheld the power of Congress to extend copyright protection to photography when the photographer demonstrates creativity by posing a subject; selecting and arranging the costume, draperies, and other various accessories; and arranging and disposing the light and shade. The court described copyright as "as the exclusive right *of a man* to the production of his own genius or intellect." *Id.* at 58 (emphasis added). See also *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239 (1903), a case in which advertisements for a circus were held to be protected by copyright. The court noted that the "copy"—i.e., the work that is protected by copyright—"is the personal reaction of an individual upon nature. Personality always contains something unique. It expresses its singularity even in handwriting, and a very modest grade of art has in it something irreducible which is one man's alone. That something he may copyright unless there is a restriction in the words of the act." *Id.* at 250.

> that operates randomly or automatically without any creative input or intervention from a human author. [103]

Accordingly, the U.S. Copyright Office will not grant a copyright registration unless the author is a human being.[104] A draft update to the Compendium further specifies that works "produced by a machine or mere mechanical process that operates randomly or automatically without any creative input or intervention from a human author" will not be granted copyright registration.[105]

The United States is a member of the Berne Convention, the leading multilateral agreement establishing the framework for international copyright protection, which has been incorporated in large part in the TRIPs Agreement and subsequent U.S. free trade agreements.[106] The Berne Convention has been interpreted to require protection only for works that are original and created with human involvement.[107]

The vast majority of commenters acknowledged that existing law does not permit a non-human to be an author (outside of the work-for-hire doctrine, which creates a legal fiction

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[103] U.S. Copyright Office, *Compendium of U.S. Copyright Office Practices*, (3d ed. 2017) § 313.2 ("*Compendium 3*") (emphasis added).

[104] *Compendium 3* at § 306.

[105] A draft Compendium proposing updates that reiterated this principle specifically with respect to machine-generated works was published for public comment on March 15, 2019, and states:

> Similarly, the Office will not register works produced by a machine or mere mechanical process that operates randomly or automatically without any creative input or intervention from a human author. The crucial question is "whether the 'work' is basically one of human authorship, with the computer [or other device] merely being an assisting instrument, or whether the traditional elements of authorship in the work (literary, artistic, or musical expression or elements of selection, arrangement, etc.) were actually conceived and executed not by man but by a machine."

See U.S. Copyright Office, *Public Draft Compendium of U.S. Copyright Office Practices*, § 313.2 (March 15, 2019), https://www.copyright.gov/comp3/chap300/chap300-draft-3-15-19.pdf (quoting U.S. Copyright Office, *Report to the Librarian of Congress by the Register of Copyrights* 5 (1966)).

[106] Berne Convention for the Protection of Literary and Artistic Works (Paris Act, 1971).

[107] *See* Sam Ricketson, *People, or Machines: The Berne Convention and the Changing Concept of Authorship, Horace S. Manges Lecture*, 16 Colum. -VLA J. L. & Arts 1 (1991-1992). Ricketson puts forth that although the Berne Convention did not define authorship, there was nonetheless a basic agreement among the contracting states that the meaning of the term referenced human beings, and because of this, it was thought unnecessary to define the term. *Id*.

for non-human employers to be authors under certain circumstances);[108] they also responded that this should remain the law. One comment stated: "A work produced by an AI algorithm or process, without intervention of a natural person contributing expression to the resulting works, does not, *and should not* qualify as a work of authorship protectable under U.S. copyright law."[109] Multiple commenters noted that the rationale for this position is to support legal incentives for humans to create new works.[110] Other commenters noted that AI is a tool, similar to other tools that have been used in the past to create works: "Artificial intelligence is a tool, just as much as Photoshop, Garage Band, or any other consumer software in wide use today … the current debate over whether a non-human object or process can be 'creative' is not new; the government has long resisted calls to extend authorship to corporations or entities that are not natural humans ."[111]

A minority of commenters suggested that a sufficiently creative work made by AI without human intervention should be copyrightable and that copyright law should allow authorship to inhere either in the owner/controller of the AI system or in the person/user who fixes the work in its final form.[112]

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[108] The Copyright Act provides that "[i]n the case of a work made for hire, the employer or other person for whom the work was prepared is considered the author for purposes of this title, and, unless the parties have expressly agreed otherwise in a written instrument signed by them, owns all of the rights comprised in the copyright." 17 U.S.C. §201(b). The doctrine applies whether the employer is a human being or a corporation but the *actual creator* of any work protected by copyright has always needed to be human.

[109] Response from ABAB IPL (Jan. 9, 2020), at 4 (emphasis added). Other commenters highlight some of the potentially unforeseen and deleterious consequences of changing the law: "The result will not just be one more disruption in the work force; we will be a much poorer society because those AI-created works, no matter their superficial similarity to works of human provenance, will lack the experience and emotion of the human artist… [Human] experience makes the arts so fundamentally important to every human society. AI generated works rehash, mash-up, and rework what they are fed; they do not tell or emote." Response from the Authors Guild, Inc., at 5.

[110] Response from ABA IPL (Jan. 9, 2020), at 4-5; Response from IPO (Jan. 10, 2020), at 2.

[111] Response from Public Knowledge, at 1.

[112] *See, e.g.*, Response from the ITIF, at 4. Another commenter analogized AI to a player piano: "Someone has created the roll that will tell the player piano which sounds or notes to produce. This is analogous to choosing which data to use in training the algorithm. . . . The imperfection in the analogy is that the human's actions in designing and 'training' a player piano are perfectly determinative. . . . This will not necessarily be true for an algorithm. . . . All of this is to say that an AI algorithm is a machine built through human effort. Any works that result from that machine should be considered works of authorship attributable to the humans who constructed that machine, just as they would be for other types of machines." Response from Feamster, at 2; *see also* Response from Professor Nina Brown, Syracuse University, at 7. "My recommendation is not to vest ownership in the algorithm/computer itself, as it is a piece of chattel rendering it incapable of owning anything. Rather, I

2. ***Assuming involvement by a natural person is or should be required, what kind of involvement would or should be sufficient so that the work qualifies for copyright protection? For example, should it be sufficient if a person (i) designed the AI algorithm or process that created the work; (ii) contributed to the design of the algorithm or process; (iii) chose data used by the algorithm for training or otherwise; (iv) caused the AI algorithm or process to be used to yield the work; or (v) engaged in some specific combination of the foregoing activities? Are there other contributions a person could make in a potentially copyrightable AI-generated work in order to be considered an "author"?***

U.S. law requires a minimum threshold of human creativity to qualify for copyright protection. A work's copyrightability depends on whether creative expression, contributed by someone who can reasonably be described as an author of the work, is evident in the resultant work.

In *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53 (1884), the U.S. Supreme Court recognized the way in which the photographer posed his subject, selected and arranged the costume and lighting, and otherwise demonstrated creative authorship in his choices. The court also recognized the possibility that many photographs would not qualify for copyright protection in instances when a photographer did not exhibit the requisite level of creativity. Thus, according to current case law, some level of authorial creativity would be necessary for copyright protection.

More broadly speaking, commenters' response to this question either referred back to their response to the first question without comment (stating that human involvement is necessary for copyright protection) or referred back and made some further observations or clarifications, often pointing out that each scenario will require fact-specific, case-by-case consideration. Several commenters raised or reiterated their view that natural persons, for the foreseeable future, will be heavily involved in the use of AI, such as when designing models and algorithms, identifying useful training data and standards, determining how technology will be used, guiding or overriding choices made by algorithms, and selecting which outputs are useful or desirable in some way. The commenters thus predicted that the outputs of AI will be heavily reliant on human creativity.

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recommend that ownership is vested with the person/entity responsible for fixing the work …" *Id*.

3. ***To the extent an AI algorithm or process learns its function(s) by ingesting large volumes of copyrighted material, does the existing statutory language (e.g., the fair use doctrine) and related case law adequately address the legality of making such use? Should authors be recognized for this type of use of their works? If so, how?***

Existing statutory and case law should adequately address the legality of machine "ingestion" in AI scenarios. Mass digitization and text and data mining (TDM), as relevant examples of other activities with copyright implications, may be considered copyright infringement or fair use, depending on the facts and circumstances at issue. Copyright law in its current form appears to be adaptable to new technologies and circumstances, including those raised by AI.

Copying substantial portions of expressive (copyrighted) works, even for non-expressive purposes implicates the reproduction right and, absent an applicable exception, is an act of copyright infringement.[113] Depending on the copyrighted work and the activity taking place, it may or may not be eligible for an exception to the reproduction right.[114]

Regardless of whether an "ingestion" use is determined to be an infringement or not in a given situation, there is a separate issue of whether authors of ingested works should be remunerated for these types of uses. Many publishers now include TDM terms in their contracts and expressly set a licensing fee for for-profit entities or permit licensing at no additional cost for researchers and public research organizations, while ensuring that the licensed content is machine-readable and searchable.[115] Advocates for authors have suggested that when copyrighted works are used as inputs into AI systems to train the AI to create works of authorship or engage in other activities that result in remuneration, the

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[113] Copyright infringement is a strict liability offense. 17 U.S.C. § 106; *see, e.g.*, *Brammer v. Violent Hues Prods., LLC*, 922 F.3d 255, 265 (4th Cir. 2019) ("As a basic matter, copyright infringement is a strict liability offense, in which a violation does not require a culpable state of mind"); *EMI Christian Music Grp., Inc. v. MP3tunes, LLC*, 844 F.3d 79, 89 (2d Cir. 2016) ("Copyright infringement is a strict liability offense in the sense that a plaintiff is not required to prove unlawful intent or culpability, and a user does not have to share copyrighted works in order to infringe a copyright") (internal citations omitted).

[114] One scenario is TDM, which is commonly understood to mean an automated process of selecting and analyzing large amounts of text or data resources for purposes such as identifying patterns or finding relationships. Another scenario is mass digitization of a certain body of work or a certain medium of work (e.g., Google Books digitizing the world's non-digitized books to make them searchable).

[115] STM, Text and Data Mining: Building a healthy and sustainable knowledge ecosystem for Europe, Dec. 2017, https://www.stm-assoc.org/2017_12_20_2017_12_STM_Text_and_Data_Mining_Summary.pdf.

authors should be entitled to a share of the revenues generated by the AI. The recognition sought is not attribution but rather remuneration.[116]

The ingestion of copyrighted works for purposes of machine learning will almost by definition involve the reproduction of entire works or substantial portions thereof. Accordingly, whether this constitutes copyright infringement will generally be determined by considering the applicability of the fair use doctrine, an exception set forth in section 107 of the Copyright Act, 17 U.S.C. § 107. Fair use is applied on a case-by-case basis, requiring courts to weigh several statutory factors, and is highly fact-dependent.[117]

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[116] *See* USPTO AI: Intellectual Property Policy Considerations event (Jan. 31, 2019), at minute 43, available at https://rev-vbrick.uspto.gov/#/videos/d6e591c3-64cf-4d74-ab35-9f387a2da4b2, highlighting the views of Mary Rasenberger, Executive Director of the Authors Guild. Rasenberger asserts that companies "should not get a pass at paying royalties to use copyrighted works en masse to train their computers." She highlights that computers read and consume expressive works and, indeed, are changing the ways in which people are consuming creative works. She concludes that "we want AI to be able to use existing works and learn from them, but it doesn't have to be free. AI reading involves copying; it extracts huge value from copying … . The solution, I think, is fairly simple—we've done it before in copyright—is to create a collective licensing system, which copyright has done when the transaction costs are too high … . We have to figure out a way to pay for computer reading."

[117] "Notwithstanding the provisions of sections 106 and 106A, the fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright.

In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include:

(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
(2) the nature of the copyrighted work;
(3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
(4) the effect of the use upon the potential market for or value of the copyrighted work.

The fact that a work is unpublished shall not itself bar a finding of fair use if such finding is made upon consideration of all the above factors." 17 U.S.C. § 107.

Fair use is a legal doctrine that promotes freedom of expression by permitting the unlicensed use of copyright-protected works in certain circumstances. Section 107 provides the statutory framework for determining whether something is a fair use and identifies certain types of uses—such as criticism, comment, news reporting, teaching, scholarship, and research—as examples of activities that may qualify as fair use. Section 107 calls for

When AI algorithms or processes "learn" their functions by ingesting copyrighted works, reproductions of those works are made in the process as the works are digitized and/or "read" by the AI algorithms or processes. Some mass digitization scenarios may be a fair use,[118] whereas others may be infringements.[119] Although mass digitization for purposes of machine learning (ML) "ingestion" processes —and large-scale ingestion of already-digitized works—has not yet been tested by the courts, some rights holders argue that AI trainers should be required to compensate the authors and rights holders whose copyrighted works their machines are ingesting as a simple matter of doing business.[120]

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consideration of four factors in evaluating a question of fair use. Courts evaluate fair use claims on a case-by-case basis, and the outcome of any given case depends on a fact-specific inquiry. This means there is no formula to ensure that a predetermined percentage or amount of a work—or a specific number of words, lines, pages, or copies—may be used without permission.

[118] *See Authors Guild, Inc. v. HathiTrust*, 755 F.3d 87 (2d Cir. 2014) (search and accessibility uses of digitized books were found to be fair use); *see also Authors Guild v. Google, Inc.*, 804 F.3d 202 (2d Cir. 2015) (Google's unauthorized digitizing of tens of millions of copyright-protected books, Google's creation of a search functionality, and Google's display of snippets from those books were found to be non-infringing fair uses); *A.V. ex rel. Vanderhye v. iParadigms, L.L.C.*, 562 F.3d 630 (4th Cir. 2009)(unauthorized digital archiving of student papers for purposes of preventing plagiarism constituted fair use because the activity was unrelated to the works' expressive content).

[119]*See Fox News Network, LLC v. TVEyes, Inc.*, 883 F.3d 169 (2d Cir. 2018), involving a comprehensive database of television programs downloaded without authorization by a monitoring service that was found to infringe the distribution right in those programs by making them available for downloading by subscribers who conducted searches for videos of interest. The court rejected the defendant's fair use defense, but the defendant's initial copying of the programs was not an issue before the court.

[120]*See, e.g.*, Response from the AAP, at 2; Response from the Authors Guild, at 10; Response from STM, at 4. STM further explained that the deployment of AI tools and mining tools is becoming more commonplace and that publishers make works and datasets available in ways that facilitate machine reading and learning. *Id*. Another commenter made a more granular suggestion about establishing collecting societies to ensure that micropayments be made to individual copyright owners. *See* Response from Getty Images, at 3. Also note that, to address the challenge of mass digitization generally, including whether and how to compensate the authors whose works are being digitized, some countries provide for collective rights management under which the exercise of copyright for individual works by collective rights management organizations (CMOs) facilitates the dissemination of works, at lower transaction costs than with individual licensing, by administering the remuneration collected from the users and distributing it to the appropriate rights holders. Under this approach, known as extended collective licensing, after determining that rights holders and users want to participate in a collective licensing arrangement, the government authorizes a CMO to negotiate licenses for a particular class of works (e.g., textbooks, newspapers, or magazines) or a particular class of uses (e.g., reproduction of published works for

Most commenters referred to the existing statute and its interpretation by the courts and noted that the use of copyrighted material to "train" AI processes (constituting ML) may violate the reproduction right of a copyright owner under 17 U.S.C. §106(1), and that this use may or may not be a non-infringing fair use. Most commenters found that existing law does not require modification, as fair use is a flexible doctrine and is capable of adapting to the use of copyrighted works in an AI context. Many commenters included hypotheticals or specifically walked through the fair use factors, citing well-known fair use cases, including *Authors Guild v. Google, Inc.*, (the "Google Books" case) (finding that Google's digitizing of copyright-protected works were non-infringing fair uses) and *Fox News Network, LLC v. TVEyes, Inc.*, (finding that TVEyes' use of Fox's copyrighted content in order to allow a customer to find material of interest to them was not fair use).

Some commenters were explicit in their view that the use of copyrighted works for ML should be permissible and compensated;[121] one commenter suggested an opt-in or opt-out mechanism for rights holders in the event some form of blanket licensing was implemented.[122] Another commenter noted that any perception that the Google Books case

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educational or scientific purposes). When the CMO negotiates a license with a particular user, that license is automatically extended—by operation of law—to works in the specified class owned by all the rights owners, regardless of whether they belong to the collective organization or not. All copyright owners are entitled to receive a share of the royalties that the collective receives for that work from its licensees. In some countries, copyright owners may be allowed to opt out of some uses of their works or demand individual remuneration if they believe they are entitled to a larger share of the royalties for the use of their works. As mentioned above, this model is potentially relevant for those who believe that "mass ingestion" should provide remuneration to authors whose works are digitized. There has not yet been a sustained conversation among experts as to whether this model would be practical or desirable in the United States.

[121] *See, e.g.*, Response from the AAP, at 2; Response from the Authors Guild, at 10; Response from STM, at 4. STM further explained that the deployment of AI tools and mining tools is becoming more commonplace and that STM publishers "increasingly publish copyright works and associated datasets with AI ingestion technologies in mind. In other words, copyright content of 'look-up' type information will increasingly be published in ways that facilitate machine reading, learning, etc. It follows that licensing…should in most instances be the method of choice for enabling access to copyright works." *Id.* Another commenter made a more granular suggestion about establishing collecting societies to ensure that micropayments be made to individual copyright owners: "New statutory guardrails are needed to ensure existing law is sensibly and fairly adapted to consider unique attributes associated with the use of large volumes of copyright work. In this regard, it is essential that the ingestion of any volume of copyrighted material in connection with AI learning is not considered a 'transformative' fair use by default." *See* Response from Getty Images, at 3.

[122] Response of Lori Pressman, at 2. "Rather than have to have an argument that the mass use of copyrighted works is 'fair' because of the character of the output, it would be better to allow creators to opt in, or out of such use. Thus, I advocate using technology, such as an electronic watermark, to accord copyright holders control over the use of their copyrighted

provides "carte blanche for copying entire works into databases misapprehends the limits of that decision."[123] Another commenter considered unlicensed use of copyrighted material by search engines as copyright infringement and stated: "Tech platforms that appropriate vast quantities of news content for this purpose should pay for the privilege of doing so, no less than they should pay for the electricity that powers their computers or motorists for the fuel that powers their cars."[124] Commenters did not specifically take up the question of recognition of the source materials, although several noted, as mentioned above, that compensation would be necessary or appropriate.

Another, smaller subset of commenters expressed their view that using content to train, tune, and/or test an AI system should automatically be presumed a fair use. But among most of these comments, there were some qualifiers and an acknowledgment that "the legality of these kinds of uses will be a fact-specific decision that augurs against the development of bright-line rules."[125] A subtheme of this set of comments suggested that allowing AI systems to ingest content and be trained free from copyrightability will promote innovation.

4. ***Are current laws for assigning liability for copyright infringement adequate to address a situation in which an AI process creates a work that infringes a copyrighted work?***

While an AI machine cannot currently own intellectual property rights, it may be able to infringe others' rights. Federal copyright law sets forth a straightforward standard for copyright infringement: "Anyone who violates any of the exclusive rights of the copyright owner" is liable for copyright infringement.[126] If the AI's owner takes sufficient action to cause the AI's infringement—through programming, data inputs, or otherwise—the owner could directly or contributorily infringe. Alternatively, if AI becomes more autonomous, it is conceivable that an AI owner might be vicariously liable for the AI's copyright infringement

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works. The watermark would allow copyright holders to place restrictions on how their work is used." *Id*.

[123] Response from Kernochan Center, Columbia Law School, at 5.

[124] Response from the News Media Alliance, at 5.

[125] Response from SIIA (Jan. 10, 2020), at 7; *see also* Response from BSA, at 4-5 (It is impossible to draw a generalized conclusion that all applications of AI involving the reproduction of copyrighted works will be a fair use. But the case law suggests strongly that the use of copyrighted works for the training of AI systems will be a fair use when the reproductions are used to generate new insights whose value is unrelated to the expression in the underlying works."). *See also* Response from the Berkman Klein Center for Internet and Society, at 1. ("This section of my comments divides relevant AI applications into two categories: 'non-expressive' uses and 'market-encroaching' uses. It then explains why the former are clearly fair use and the latter are not.").

[126] 17 U.S.C. § 501(a).

when the owner possesses the right and ability to supervise the infringing conduct and a financial interest in the infringement.[127]

Most commenters noted that existing laws are sufficient and can be applied to situations involving AI,[128] while also acknowledging that a natural or legal person will need to be held responsible.[129] Some commenters took a more skeptical approach: "Current laws may rely on certain general law doctrines. Existing laws governing liability for copyright infringement and the fair use defense are probably not clear with respect to AI generated works."[130] Another commenter noted that "enforcement under theories of contributory and vicarious infringement will require the courts to consider novel issues regarding, among other things, agent[sic], control, and foreseeability of the AI device's acts. And, as AI becomes increasingly autonomous, changes to the law may prove necessary."[131] Another commenter noted that current rules on damages are not appropriate, since "knowing" infringement will be harder to define.[132]

5. ***Should an entity or entities other than a natural person, or company to which a natural person assigns a copyrighted work, be able to own the copyright on the AI work? For example: Should a company who trains the artificial intelligence process that creates the work be able to be an owner?***

Copyright law does not preclude ownership by entities other than natural persons, and it outlines a finite set of scenarios giving rise to copyright ownership. Under the copyright law, one can own a copyright by: (1) being the author or a joint author, (2) being deemed to be the author under the work-made-for-hire doctrine, or (3) obtaining an assignment of the copyright.[133]

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[127] *See A&M Records, Inc. v. Napster, Inc.*, 239 F.3d 1004 (9th Cir. 2001).
[128] *See, e.g.*, Response from IPO (Jan. 10, 2020), at 4 (citing *Sony Corp. of Am. v. Universal City Studios, Inc.*, 464 U.S. 417 (1984) as guidance concerning how the courts should assess the potential liability of creators and users of technology that might be used to infringe copyrights).
[129] Response from the Copyright Clearance Center, at 4.
[130] Response from AIPLA (Jan. 10, 2020), at 7.
[131] Response from NYIPLA, at 7; *see also* Response from RIAA, at 7. ("There will be a continuum of human contribution associated with various AI outputs, and the difficult issue will be determining where on that continuum of human involvement is sufficient to justify copyright protection or liability … [T]his will necessarily be a highly fact-dependent inquiry that can only be resolved on a case-by-case basis.").
[132] Response from KEI, at 2. We take this terminology to be responsive to the "knowing" standard described in the Nimmer treatise: "Basically, there are three levels of awards: a basic award, an increased measure, and a decreased measure. In brief, willfulness warrants the increase, innocence the decrease, and all other cases are computed according to the standard measure. For ease of terminology, intermediate between willful and innocent conduct lies the domain of 'knowing infringement.'" 4 *Nimmer on Copyright* § 14. 04 (2019).
[133] *See* 17 U.S.C. §§ 201-205.

Commenters generally felt ownership of copyrights in the AI context can be dealt with by commercial negotiations.[134] However, answers to this question demonstrated a mixed understanding of what was being asked.[135] One response, for example, said, "No. Ownership should vest in the author (or employer of the author, in the case of works made for hire) and may then be assigned to another natural or juridical person." [136] A similar response did not answer in the negative but noted:

> There is nothing under U.S. law to prevent an entity from being an owner of copyrightable works that are part of AI systems or are created by persons using AI as a tool. Copyrights in AI related works are assignable to entities just as any other copyrights are under Section 201(d) of the Copyright Act.[137]

In general, responses to this question referred back to the commenters' answers from questions 1 and 2, which acknowledged that a non-human cannot be an author and noted that the use of AI is reliant on human creativity.

6. ***Are there other copyright issues that need to be addressed to promote the goals of copyright law in connection with the use of AI?***

As referenced above, the term "AI" can comprise a range of meanings. For example, generative algorithms (i.e., algorithms that possess the ability to create data) are responsible for producing unique works of varying complexity. These works can result from collaborative efforts between a human creator and an AI program, or they can result from an independent AI process or algorithm. Therefore, no bright-line rule about "AI and authorship" or "AI and copyrightability" can be made; rather, it depends on a human being's role in tandem with AI in generating a creative output that is potentially copyrightable.

A frequent response was that it is too soon to answer this question. "Generally, AI technologies are still in their infancy and there is no known instance of a machine-generated creative output without some human intervention and/or direction, and so it is difficult to answer, in a useful way, some of the ... inquiries, which contemplate circumstances that have not yet come to pass."[138] And: "[T]he scenario envisioned by [question 1] assumes a degree of autonomy by a 'general AI system' that is more of an aspiration than a present reality in

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[134] Response from ITIF, at 11; Response from Boomy Corp., at 13 ("These relationships are governed by contracts, and it's working."). Boomy is a music and artificial intelligence business. It uses a variety of algorithms, some assisted by machine learning, to generate musical compositions with user input.

[135] *See, e.g.*, Response from SIIA (Jan. 10, 2020), at 8 ("SIIA finds the question a little confusing.").

[136] Response from AIPLA, at 7.

[137] Response from ABA IPL (Jan. 9, 2020), at 10.

[138] Response from the Entertainment Software Association, at 3. One outlier response is from Getty Images, which supports taking action now as opposed to a wait-and-see approach. Response from Getty Images, at 1.

our field."[139] There were both general statements and detailed examples of how "AI" as we know it today cannot produce copyrightable works without human input in the following areas: the level of design, identification of useful training data and standards, determination of how technologies will be used in commerce and research, guidance or override of choices made by algorithms, and selection of outputs that are useful or desirable.[140]

Relatedly, many commenters noted that there is no standard working definition of AI that would allow them to make pointed, consistent responses to the questions. One commenter noted that AI "is mostly a colloquial stand-in for 'algorithms' and 'automation,' or perhaps more specifically 'algorithms created with ML,' however, there is no static definition of 'ML' either."[141]

Another theme identified by some commenters is the issue of bias. These commenters found that the ambiguous state of copyright enforcement with respect to ML drives developers to use "low-quality data that exists in the public domain," thereby inadvertently biasing the many AI applications that are built on that data.[142] Finally, a handful of commenters raised the issue of "deep fakes" (in which a person in an existing image or video is replaced with someone else's likeness) and the legitimate uses of AI-based technology for creative purposes, suggesting that rights of publicity and other related laws may need to be tweaked to take into account cases in which a "deep fake" is derived from copyright-protected material.[143]

7. ***Would the use of AI in trademark searching impact the registrability of trademarks? If so, how?***

To search for confusingly similar designs, global trademark offices index all incoming mark drawings through human-assigned design codes. But different humans may perceive the same design element differently, and some may not identify hidden elements in certain design marks because of optical illusions, such as hidden designs created by letters or other visual phenomena, even though others might. Properly trained AI software could be used to supplement the human process of assigning design codes by identifying all perceptible design elements in a mark. If the design codes assigned to images are more comprehensive, any image search results will be likewise more comprehensive.

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[139] Response from Genentech (Jan. 10, 2020), at 6.
[140] *See, e.g.*, Response from the Copyright Clearance Center, at 4; *see also* Response from IPO, at 3.
[141] Response from Boomy, at 3.
[142] Response from the R Street Institute (Jan. 10, 2020), at 1; *see also* Response from Adobe, at 6; Response from Wikimedia Foundation, at 7 ("When selecting training data, developers of AI/ML systems will often select public domain or freely licensed works, both for ease of access and to avoid potential infringement liability exposure.").
[143] *See, e.g.*, Response from ITIF, at 14-15; *see also* Response from the Authors Guild, at 12.

However, assembling the data sets that would serve as the raw materials to train the AI software for image search or design coding raises potential impacts on registrability. Globally, trademark law focuses on consumer perception, but different populations and cultures may perceive the same stimuli differently. If the data is shared amongst national offices, AI image searching could produce results that, while accurately reflecting an aggregate global perception, may not accurately reflect consumer perception in the relevant territory as to what could be a confusing element. Relatedly, one commenter noted that the sharing of likelihood of confusion determination data between national offices is potentially problematic due to the fact that many countries' likelihood of confusion tests are "perceptibly different" from others'.[144]

Use of AI software by the USPTO

Most commenters agreed that AI software will improve USPTO examination searching efficiency. A few commenters predicted that customers may face more likelihood of confusion refusals as a result. One commenter noted that "AI would not itself change the legal standard for registrability. However, the AI software may change the way the legal standard is applied to analyze the availability of a particular mark."[145]

A majority of commenters insisted that AI software should be used only to supplement human examiners' searches, not to replace their searches or make registrability decisions. The examination and infringement test of likelihood of confusion is based on human perception. Humans are necessary for evaluating search results because "humans inherently incorporate practical considerations into their arguments and decisions."[146] The use of AI without human involvement to "determine the outcome of an evaluation of a likelihood of confusion may be too rigid and not allow for the subjective relative weights of different factors that play a role in the outcome," observed another commenter.[147]

Additionally, humans remain necessary to evaluate trademark distinctiveness and determine whether confusion is likely because, as a few commenters noted, existing AI software is not good enough to accurately assess confusion. One commenter noted that "AI at its current level of accuracy does not always make suitable decisions, and there is also the risk of an AI malfunction resulting in an incorrect conclusion."[148]

A few commenters raised concerns that AI algorithms can be unintentionally biased, leading to less accurate search results. One commenter noted that "the inherent biases of the algorithm(s) should be well known and accounted for, and addressed prior to the trademark granting decision-making process."[149] One commenter went on to note that human feedback

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[144] *See, e.g.*, Response from Dr. Dev S. Gangjee (Nov. 8, 2019), at 1.
[145] Response from Intel, at 9-10.
[146] Response from AIPLA (Jan. 10, 2020), at 8.
[147] Response from ABA IPL (Jan. 9, 2020), at 12.
[148] Response from JIPA (Jan. 8, 2020), at 1-2.
[149] Response from David Branca, at 2.

in developing the AI algorithm(s) is necessary to improve accuracy and avoid bias and that "human feedback remains important in the implementation phase to ensure that AI search tools continue to be effective, consistent and accurate."[150]

Moving beyond the USPTO's use of AI software in searching, one commenter suggested that the USPTO could use AI software as a training tool to improve consistency in examination by identifying how similar cases were handled by different examining attorneys.[151] Another noted that AI software could be useful for assisting USPTO examining attorneys in identifying altered or fraudulent specimen images submitted to the USPTO in trademark applications.[152]

One commenter observed that there is already positive engagement among global trademark offices in discussions about the use of AI software for examination and administration.[153] Another commenter believed that AI tools (including search tools) should be shared among global trademark offices to promote consistency and defray costs of the tools for smaller national offices.[154] That commenter urged that national trademark offices should be transparent with their customers when they use specific AI tools in trademark examination and other official proceedings.

Use of AI software by trademark owners

A few commenters believed that AI software would improve the accuracy of trademark clearance and searching when used by trademark owners and would improve business decisions by better predicting the risk of registration refusals and third-party objections. One commenter noted that "AI could be used to more objectively evaluate the risks of adoption of a mark and in particular the risks of refusal by the USPTO" and that the impact of this risk assessment could be fewer applications filed.[155]

However, one commenter observed that the use of AI trademark tools by large, multinational companies could diminish the ability of small and medium-sized businesses to protect their IP, presumably because small and medium-sized businesses do not have the same access to these predictive tools for making business decisions.[156] Another commenter expressed concern about small and medium-sized businesses relying on AI software to create a trademark or to "recommend a certain market to them based on certain parameters that may not be in there [sic] best interest or not fully informing them of a risk in that market."[157]

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[150] Response from INTA, at 2.
[151] Response from ABA IPL (Jan. 9, 2020), at 12.
[152] *Id.*
[153] Response from INTA, at 1-2.
[154] Response from IPO (Jan. 10, 2020), at 6.
[155] Response from ABA IPL (Jan. 9, 2020), at 11.
[156] Response from Alève Mine, at 2.
[157] Response from A-CAPP at Michigan State University, at 1.

8. *How, if at all, does AI impact trademark law? Is the existing statutory language in the Lanham Act adequate to address the use of AI in the marketplace?*

Section 32 of the Lanham Act, 15 U.S.C. § 1114, provides a civil action for trademark infringement against "any person" who uses an infringing registered mark without the consent of the registrant. AI software used in connection with trademark infringement cannot itself be held liable for an infringing act, as it is not a "person." But the people who create or employ AI software in commercial transactions are "persons," and as such, they can be indirectly liable for infringement perpetuated through the use of AI software. Over the last 30 years, courts have demonstrated flexibility in interpreting the U.S. trademark statutes that assign liability to various actors and intermediaries as the context for infringement has expanded beyond brick-and-mortar operations to online infringement and counterfeiting, including, e.g., the use of such tactics as unauthorized use of others' trademarks, both in software coding and more visible ways, in efforts to manipulate web search results to influence human consumer behavior in commercial transactions. The use of AI in commercial transactions is yet another of those evolving business models.

Most commenters addressing this question noted that either the use of AI software would have no impact on trademark law or, alternatively, that the existing statutory and common law framework for trademarks in the United States is sufficiently flexible to address any such impact. One commenter noted that the focus on voice-activated AI assistants that provide product suggestions to consumers or order goods for consumers could put more emphasis on phonetic similarities between marks and correspondingly less emphasis on visual or connotative similarities.[158] The commenter noted that no change to the statute would be needed to accommodate this shift toward phonetics; "however, this [shift] could affect the fact finders' balancing scale when assessing likelihood of confusion."[159]

Human involvement

In responding to question 8, commenters also noted the need for continued human involvement in the use of AI software in connection with trademark issues. One commenter suggested that the Lanham Act should be amended to require that a trademark be "distinctive to natural people" to be eligible for protection.[160] Another commenter noted that if an owner used AI software to select a mark, the Lanham Act should expressly require that the applicant who is using the mark in commerce be a natural or juridical person.[161]

In the criminal and civil enforcement arena, one commenter noted that AI software is currently being used to identify online counterfeit goods and issue automated takedown notices.[162] This commenter urged that, in these circumstances, the human brand owner be

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[158] Response from Intel, at 11.
[159] *Id.*
[160] Response from Lori Pressman, at 3.
[161] Response from IPO (Jan. 10, 2020), at 7.
[162] Response from A-CAPP, at 2.

required to review and verify the AI recommendations before sending any AI-recommended takedown notices.

Transparency as to the use of AI

As to the roles and responsibilities of those creating and using AI software in commercial transactions, one commenter insisted that online platforms using AI software to assist consumers should have a responsibility to avoid deceiving consumers.[163] This commenter cautioned that "the use of AI can add complication through its shift of the retail experience, making it more predictive, meaning that consumers are shown a preselected grouping of products based on a variety of set factors," but that the consumer may be unaware of that preselection, resulting in potential deception.[164] To alleviate this deception and create transparency about the use of AI, this commenter suggested that platforms should cobrand with the AI creator to encourage a relationship between the AI creator and the end consumer, who is experiencing the results from an AI algorithm.

Liability under trademark law

Several commenters noted that the use of AI software in consumer transactions raises questions about who will be legally liable for infringement facilitated by the AI software. One commenter noted that if AI acts on its own and infringes another's trademark, "it may be difficult to identify who is the infringing or violating entity or what the infringement or violation is."[165] One commenter believes that it should be incumbent on the creator of the AI to ensure that it is not violating another's trademark or other intellectual property.[166]

One commenter noted directly importing liability standards developed for internet service providers may not provide a perfect fit because the creation and use of AI algorithms to offer consumer products raises a number of novel issues.[167] Some commenters thought it currently unclear how AI could affect the likelihood of confusion test for infringement and the role of the "average consumer" in that test. If the test of the average consumer loses relevance for evaluating likelihood of confusion as consumers rely more on AI to make their purchases, one commenter noted that "brand owners and trademark practitioners may need to re-evaluate the strength of infringement theories that rely principally on initial interest and point of sale confusion and instead explore theories of infringement that place greater emphasis on the harm caused by post purchase confusion."[168]

Other commenters opined that while the AI technology is not a legal person for purposes of infringement liability, the creator or platform could be liable for purchases of counterfeit goods facilitated by the AI. One commenter observed that "'intent' of the defendant is an

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[163] *Id.* at 2-3.
[164] Response from A-CAPP, at 2.
[165] Response from JIPA (Jan. 8, 2020), at 2.
[166] Response from A-CAPP, at 2.
[167] Response from INTA, at 2-3.
[168] *Id.* at 3.

important element in question when looking at the Lanham Act" and queried how AI could affect the intent element of a counterfeiting claim.[169] The commenter asks, "Can AI intend for something to happen? Is the onus on the user of the AI or the creator of the AI to not 'intend' for a counterfeit mark to be used?"[170] To address this uncertainty, this commenter suggested that the law should impose a rebuttable presumption of willful intent if a person knowingly provides or feeds false or infringing data into an AI consumer purchasing recommendation algorithm or withholds information that would preclude the AI from recommending infringing goods.[171]

Another commenter suggested that platforms using AI to recommend consumer purchasing choices may have a corresponding responsibility to inform consumers of potentially suspicious (e.g., counterfeit) goods reflected in such recommendations.[172] This commenter also raised the question as to whether there should be some responsibility for the AI creator or the platform to achieve some level of "appropriate" accuracy of the predictions that the AI algorithm makes, either via legal regulation or industry standard(s).[173]

AI-generated works

One commenter identified an issue at the intersection of copyright and trademark law that exists in the non-AI context but that could also arise in the AI environment. Namely, if a person instructs or uses AI to create works "in the style of" a well-known copyright creator, and that copyright creator's name has been used as a source identifier for the copyrighted works but is now being used to identify the new work, would the Lanham Act, general unfair competition laws, or right of publicity laws adequately address potential misappropriation of the source identifier in that situation?[174]

Resulting services provided by AI

One commenter observed that AI cannot qualify as an "applicant" for trademark registration because the Lanham Act contemplates that only legal entities may qualify as applicants.[175] Nonetheless, one commenter noted the AI "may provide services in connection with a mark."[176] Other commenters, however, expressed uncertainty about contemplating AI as a good or a service and expressed a desire for clarification on how, for purposes of Nice Classification (the international classification of goods and services applied in the registration of marks by WIPO), the USPTO would classify the underlying service performed by AI—would it be classified as the underlying service itself or as computer software?

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[169] Response from A-CAPP, at 3.
[170] *Id.*
[171] *Id.* at 4.
[172] *Id.* at 3.
[173] *Id.*
[174] Response from RIAA, at 7.
[175] Response from IPO (Jan. 10, 2020), at 7.
[176] *Id.*

Another commenter noted that this question implicates the Federal Circuit's holding in *In re JobDiva, Inc.*, which held that even though a service may be performed by a company's software, the company itself may well be rendering the service.[177] A few commenters observed that mark owners that use AI to provide services could encounter unreliable examination results from examiners, who may encounter difficulty when determining whether the mark was actually in use in commerce by the owner for the underlying services.

9. ***How, if at all, does AI impact the need to protect databases and data sets? Are existing laws adequate to protect such data?***

As noted above, data is the foundation for AI.[178] It is in this context that the question of whether data or datasets should have protection, or already do have protection, is important to consider. However, it should also be considered that access to datasets, or the lack thereof, could impact the development of AI.

Databases and datasets are afforded some protection under copyright law, although copyright law requires originality to exist in the works it protects, and"raw" data is not copyrightable[179]. That said, the databases or datasets containing the data may be protected as compilations to the extent their selection and arrangement demonstrate the requisite level of originality.[180]

Of course, databases and datasets used to train an algorithm can be protected as trade secrets with criminal remedies under the Economic Espionage Act and civil remedies under the Defend Trade Secrets Act. To be a protectable trade secret, the dataset must derive independent economic value from not being generally known or readily ascertainable through proper means. Unlike copyright protection, trade secret protection can extend to the underlying facts in a dataset.

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[177] *Id.*

[178] See discussion regarding Question 10 in Part I.

[179] Raw" data is used here in its traditional sense to refer to "individual facts, statistics, or items of information," *see* Random House Webster's College Dictionary 346 (1991), in which in which copyright does not subsist. *Feist Publ'ns,* 499 U.S. at 345. (defining 'raw data" as "wholly factual information not accompanied by any original written expression ") The term "data" can be ambiguous and can sometimes refer more broadly to "electronic information" or recorded information," potentially encompassing material protected by copyright. See, e.g. 44 U.S.C. § 3502(16) (defining "data" as "recorded information, regardless of form or the media on which the data is recorded" for purposes of the Open Government Data Act). "Data" is not defined in the copyright statute. See also responses from AAP, at 6; and Adobe, at 2.

[180] *See Feist Publ'ns*, 499 U.S. at 349; 17 U.S.C. § 101 (definition of "compilation"). This is recognized internationally under WTO TRIPS Article 10(2) ("compilations of data or other material, whether in machine readable or other form, which by reason of the selection or arrangement of their contents constitute intellectual creations shall be protected as such.")

Contract law also can be used to protect collected data and restrict access to the dataset unless the user agrees not to copy or exploit the data commercially. Technical measures,[181] such as password protection on the website housing the database, can be used, and if the database has any protection by copyright, the Digital Millennium Copyright Act[182] is available for unauthorized uses. There are also state causes of action in tort. Lastly, some commenters proposed that open data licenses may be an appropriate vehicle to facilitate the sharing of certain data,[183] while other data may be more appropriately controlled by its owners by traditional licensing methods.[184] These stakeholders can improve the quality of the datasets before they are used to train the algorithm.

Commenters who answered this question mostly found that existing laws are adequate to continue to protect AI-related databases and datasets and that there is no need for reconsidering a *sui generis* database protection law, such as exists in Europe. Furthermore, one commenter cautioned "that AI technology is developing rapidly and that any laws proposed now could be obsolete by the time they are enacted."[185]

One commenter noted that "because databases and data sets may enjoy copyright protections as compilations, it is likely that existing laws adequately protect them."[186] Another commenter noted that "ingestion of the database to train the AI must be permissioned and/or compensated, or otherwise compliant with copyright law."[187]

Many commenters felt that contractual arrangements and trade secrets offer appropriate protection for databases and datasets under current law. One commenter noted that, as to data, its members were "satisfied with reliance on licenses and other comparable mechanisms for authorized access to such contents and data, with emphasis on contractual freedom to design the terms of access that work best for the parties."[188] However, another commenter stated that a contract is only binding as to the two parties "and cannot be enforceable against a third party, who has improperly acquired the data outside of the contract."[189] As for trade secret protection for datasets, one commenter observed that "trade secret protection could be impractical or impossible for many business models, for example where the AI-based data is distributed in a product, or where the results produced by the AI will be made public."[190] Another commenter noted similarly that with the use and

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[181] *See* 17 U.S.C. § 1201 (providing legal protection against circumvention of technological protection measures).
[182] 35 U.S.C. § 512.
[183] Response from CDT at 5; IBM at 8; ITIF at 9-10.
[184] Response from AAP at 6; Response from STM at 1, 4, 6.
[185] Response from IPO (Jan. 10, 2020), at 7.
[186] Response from ACT, at 6.
[187] Response from Association of American Publishers, at 5.
[188] Response from the Entertainment Software Association, at 3.
[189] Response from JIPA (Jan. 8, 2020), at 3.
[190] Response from IPO (Jan. 10, 2020), at 7.

development of AI, "a lot of data will [be] shared between multiple business operators, where such data will fall outside the category of trade secrets."[191]

Because copyright protection will not cover the data values in a compilation and a rearrangement of the data would not necessarily be considered a derivative work,[192] one commenter believed this might drive the need for consideration of *sui generis* IP rights. However, this commenter advised caution in creating new IP rights noted that "providing sui generis database rights similar to those that exist in Europe might not necessarily promote innovation.".[193] Other commenters remembered past debates in the United States on the issue of database protection, one noting that "Congress considered, and rejected, adoption of a *sui generis* form of protection for nonoriginal databases modeled on the EU Database Directive."[194] Another commenter noted that since that debate in 1996, it "is not aware of any significant reason for movement toward a general database protection provision on a *sui generis* basis."[195]

A smaller number of commenters did suggest a reconsideration of whether additional protection of datasets and databases could be useful to spur investment in high-quality data of vetted/assured provenance. One commenter noted an interest in exploring the possible creation "of *sui generis* property rights to curated datasets in view of the: 1) reported increasing efforts toward data curation, 2) fact that curation may not, in some circumstances, meet the criteria required for copyright protection, 3) benefits of sharing, improving, and incentivizing the creation of such datasets, including in the context of public-private partnerships, 4) disadvantages of trade secrets, particularly in an academic environment, and 5) different infringement protections needed for proprietary data sets that are used in a 'once and done' manner to train AI algorithms."[196] Another commenter suggested that the United States consider the Japanese model regarding "Protected Data" in the Unfair Competition Prevention Act, May 2018, which promotes protection for data used for exchange.[197]

Some commenters went outside the IP framework entirely, noting that privacy, product safety, and anti-discrimination laws could be implicated, and "it may be that access must be

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[191] Response from JIPA (Jan. 8, 2020), at 3.

[192] A compilation is copyrightable only if the preexisting material that is compiled exhibits originality in its selection, coordination, or arrangement. A derivative work consists of revisions, annotations, elaborations or other modifications which, as a whole, represent an original work of authorship. 17 U.S.C. § 101 (definitions of "compilation" and "derivative work"). A rearrangement of data will not necessarily exhibit sufficient originality to qualify.

[193] Response from IPO (Jan. 10, 2020), at 7. The reference to "the EU's type of protection" was an allusion to the European Union's Directive 96/9/EC on the legal protection of databases, which is also addressed below in the discussion of Question 13.

[194] Response from CCIA (Jan. 10, 2020), at 11.

[195] Response from CTA, at 5.

[196] Response from AUTM (Jan. 10, 2020), at 5-6.

[197] Response from JIPA (Jan. 8, 2020), at 3.

given to the public (or a proxy) for review and possible testing (for example of training data that is suspected of wrongful bias)."[198]

10. How, if at all, does AI impact trade secret law? Is the Defend Trade Secrets Act (DTSA) 18 U.S.C. 1836 et seq., adequate to address the use of AI in the marketplace?

Businesses and innovators have long used trade secret law as a means of protecting their valuable IP. Trade secret law is often chosen for protection for IP for a variety of reasons. For example, trade secrets do not require that the innovator pay what can be considerable up-front expenses (e.g., filing and legal fees for obtaining patent grants) that might be too burdensome for small business and individuals. Trade secrets can also be used for information that would qualify for a patent, but the innovator does not want to disclose the information. Trade secret law can also protect information that does not qualify for patent protection at all, such as customer lists. Additionally, trade secrets have no expiration date so long as the qualifying factors continue to be in force, which has resulted in many iconic and long-term trade secrets seen in daily life.

Civil trade secret protection and enforcement have three sources in the United States. First, trade secret law, which developed from our common law tradition of torts. Second, trade secret protection is available in 49 states (except New York), the District of Columbia, Puerto Rico, and the U.S. Virgin Islands, through enactment of variations on the Uniform Trade Secrets Act (UTSA). The UTSA is essentially a statutory enactment of the common law principles that preceded it and is supported by a considerable body of case law. The third avenue of protection is fairly recent: the Defend Trade Secrets Act of 2016 (DTSA). The DTSA codifies additional provisions, at the core of which is the establishment of the first federal private civil cause of action for trade secret misappropriation. The DTSA does not supersede the state statutes but rather provides a victim of misappropriation the choice of its venue—state or federal.

One core principle of trade secret law, as codified in the DTSA, states that:

> The term "**owner**," with respect to a trade secret, means the person or entity in whom or in which rightful legal or equitable title to, or license in, the trade secret is reposed.[199]

Trade secret law does not address how the trade secret is created or by whom, instead providing for the rights of the owner.

Commenters acknowledged the importance of trade secret law for the protection of IP, with one stating that "trade secret law may be the only viable protection available to ensure that bioinformatics and other practical applications of AI in biotechnology are protected forms of

[198] Response from ABA IPL (Jan. 9, 2020), at 13-14.
[199] 18 U.S.C. § 1839(4).

intellectual property."[200] Another succinctly stated: "Use of AI in the marketplace presents a variety of considerations for application of trade secret law as other information technologies but does not by itself warrant change to trade secret law."[201] Some commenters were concerned that application of current trade secret protections would have a negative effect on human due process rights where AI is making decisions that have a legal or significant effect on an individual.[202] Other commenters addressed issues that might arise in the future. For example, one commenter observed that "trade secret protection over AI systems may be imperfect if and/or when transparency is too robustly required to secure regulatory approval in the life sciences."[203] Commenting on the risk of forced data sharing, another reflected: "While any IP system for data should probably tilt toward encouraging data sharing … this does not mean a data-related IP system should default to no IP rights or even forced sharing."[204] Commenters suggested that, in the future, a *sui generis* form of protection might be required.[205]

Commenters also raised the issue that in the future, AI might make it easier to ascertain a trade secret without breaking security measures. Specifically, one observed that a practical effect of using AI technology may be that information (including know-how and insights) may be more readily discoverable without defeating secrecy measures.[206] There was no

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[200] Response from Genentech (Jan. 10, 2020), at 8; *see also* Response from Intel, at 12 ("Trade secret law is very important for AI technologies, particularly for protecting certain aspects of AI that are difficult to protect using patents, such as training datasets and computational architectures of AI systems. Trade secret law may also be important to protect the implementations of AI technologies …."); Response from ACT, at 6 ("Should changes to the DTSA be considered, it is important that trade secret protections are not weakened.").

[201] Response from ABA IPL (Jan. 9, 2020), at 14; *see also* Response from IPO (Jan. 10, 2020), at 8 ("An important means for protecting AI innovation will be trade secrets. If properly enforced, the current trade secret laws in the U.S. (DTSA and various state statutes) suffice to protect AI-related trade secrets."); Response from CCIA (Jan. 10, 2020), at 11 ("The existing framework of trade secrecy laws, consisting of the federal Defend Trade Secrets Act, the Economic Espionage Act, and state trade secret law, is adequate to address the use of AI in the marketplace.").

[202] *See, e.g.*, Response from Wikimedia Foundation, at 8 ("concern about the application of IP laws to prevent oversight into algorithmic decision-making, particularly where that decision making will have a substantial effect on people's lives …").

[203] Response from Genentech (Jan. 10, 2020), at 8-9.

[204] Response from ITIF, at 13.

[205] *See, e.g.*, Response from Genentech (Jan. 10, 2020), at 9 ("If trade secret protection is too difficult to maintain over AI systems for our industry, the Defend Trade Secrets Act would, of course, be inadequate to address the use of AI in the marketplace. If trade secret protection is insufficient, some alternative, *sui generis* form of protection might be required …").

[206] Response from IBM (Jan. 10, 2019), at 6.

consensus on whether a change to the law would be required to address this issue in the future.[207]

11. Do any laws, policies, or practices need to change in order to ensure an appropriate balance between maintaining trade secrets on the one hand and obtaining patents, copyrights, or other forms of intellectual property protection related to AI on the other?

Very few commenters responded directly to this question. The consensus of the responses was that the current balance is correct and that no changes are necessary.[208] One urged the USPTO to proceed cautiously and deliberately.[209] Another questioned whether a *sui generis* form of data protection might be needed in the future if the balance tipped "too much" in the direction of trade secrets.[210] One commenter argued against trade secret protection for AI because such protection does not align with the university culture of collaboration and scientific publication.[211]

12. Are there any other AI-related issues pertinent to intellectual property rights (other than those related to patent rights) that the USPTO should examine?

As was the case with Question 11 in Part I, this question was intended to capture any issues not previously addressed. A prevalent theme in the responses to this question centered on

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[207] *See, e.g.*, Response from ABA IPL (Jan. 9, 2020), at 14 ("Application of AI to deconstruct a public-facing (or other legitimately accessed) model or output data would not be actionable under the DTSA or UTSA."); Response from Intel, at 12 ("There is …. . . a non-negligible risk that, in the future, AI itself would weaken the protection of trade secret law because AI may be used to reverse engineer, or make public, what would have been traditionally protected by trade secret law.").

[208] *See, e.g.*, Response from CCIA (Jan. 10, 2020), at 11 ("No changes to laws, policies, or practices are needed in order to maintain the balance between these different forms of protection. AI does not present unique challenges to the IP system."); Response from Intel, at 12 ("Intel is not aware of any laws, policies, or practices that warrant change at this time in order to ensure an appropriate balance between trade secret protection and other forms of IP protection."); Response from ABA IPL (Jan. 9, 2020), at 15 ("The Section has not identified changes necessary for 'an appropriate balance' between maintaining trade secrets and other intellectual property protection related to AI.").

[209] Response from Genentech (Jan. 10, 2020), at 9 ("We urge the USPTO and the Copyright Office to proceed cautiously and deliberately so that innovation in AI, including exploration of AI in the life sciences field is incentivized, and not inadvertently left unprotected.").

[210] Response from AIPLA (Jan. 10, 2020), at 16 ("Relying solely on trade secret protection could tip the balance too far away from disclosure and thereby stifle innovation. The increasing importance of AI technology highlights the need to further analyze whether and how to protect data, including a *sui generis* form of data protection is warranted.").

[211] Response from AUTM (Jan. 10, 2020), at 2 ("Protecting AI innovations using trade secret strategies does not align with the ethos of university culture.").

data-related issues.[212] One commenter encouraged the continuation of the USPTO's long-standing support for sharing government data with the public.[213] Relatedly, another highlighted a desire that the "USPTO should examine how 'data' is defined in various government instruments, including trade agreements."[214] That commenter believed that doing so could ensure consistent data policies across the U.S. government.[215] Another expanded the idea of data governance to the global level, pointing to the security of personal data and the accountability of controllers of such data around the world as an area for future work.[216]

Others raised a concern about the potential for AI to "rapidly generate huge volumes of IP."[217] The USPTO should "examine whether the Lanham Act … [is] adequate to guard against" AI producing "sound alike" works.[218] A separate commenter "strongly encourage[d] USPTO … to provide mandatory training to staff on AI and its capabilities."[219] Others raised ethical issues that the USPTO should explore, such as the impact of deep fakes[220] and of bias on AI systems[221] and the ramifications should AI be granted personhood.[222]

13. Are there any relevant policies or practices from intellectual property IP agencies or legal systems in other countries that may help inform USPTO's policies and practices regarding intellectual property rights (other than those related to patent rights)?

Commenters pointed to work being done with respect to IP protection for AI technologies in the European Commission of the EU, at WIPO, in the Organisation for Economic Co-operation and Development (OECD), at international IP stakeholder associations, and by foreign governments. Commenters encouraged coordination with foreign government agencies that are assessing the impact of AI on IP, and with multilateral organizations. One noted that "there is a need for countries to enact broadly similar (or at least not conflicting) rules and

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[212] *See, e.g.*, Response from Starrett, at 17 (raising issues of data collection in military operations that later become available for public use).
[213] Response from IBM (Jan. 10, 2019), at 8.
[214] Response from AAP, at 6.
[215] *Id*.
[216] Response from AIPLA (Jan. 10, 2020), at 16; *see also* Response from IPO (Jan. 10, 2020), at 9 ("it would be worth paying careful attention to data privacy as it relates to AI."); Response from Pressman, at 4 (advocating for the federal government ensuring data privacy).
[217] Response from Obeebo, at 4; Response from KEI, at 3 ("The potential volume of AI-generated IP claims is something that should be evaluated very carefully …").
[218] Response from RIAA, at 7.
[219] Response from ACT, at 6.
[220] Response from ITIF, at 13-15.
[221] Response from Aimonetti, at 3.
[222] Response from Shore, at 2.

criteria around many IP issues raised by AI and its use of data."[223] However, another advised that engagement "should prioritize alignment with U.S. law and precedent to the maximum extent possible."[224]

One commenter pointed to the "AI Copyright Primer," created by the commenter's organization, the Association Internationale pour la Protection de la Propriété Intellectuelle (AIPPI) and the International Federation of Intellectual Property Attorneys (FICPI).[225] Another commenter called attention to the Toronto Declaration, "which outlines a human rights framework to be applied to the use of AI/ML systems."[226] Another commenter noted the five OECD AI Principles.[227]

With respect to the EU, commenters noted the 2019 Directive on Copyright in the Digital Single Market. Under article 3 of the directive, non-commercial scientific research using licensed content for text and data mining is a permitted exception. Other lawfully accessible online content is also available for short-term mining or extraction under article 4 of the directive, if the rights holder has not reserved its rights. One commenter observed that "these provisions provide for a 'copyright exception'-based approach to the use of content ingested for AI purposes, and contemplate a viable market for licensing content for commercial AI use …".[228] Commenters were mixed as to whether this was a wise approach. One commenter cautioned generally about text and data mining carve outs because "frameworks that provide too broad a carve out for un-permissioned and uncompensated uses, even where such use is of a commercial nature, may result in an eroding of rights accorded to rights holders that curate and own copyrighted works or compilations of copyrighted works."[229]

Commenters also pointed to the EU Directive 96/9/EC of the European Parliament and the council of March 11, 1996 on the legal protection of databases.[230] Other commenters noted problems with that model and its rejection by the U.S. Congress in the mid-1990s.[231] Another commenter observed that the Database Directive "has had no tangible impact on the production of databases or the competitiveness of the industry."[232]

Another commenter pointed out the European approach to trade secret protection, which "provides a broad enough definition of trade secrets such that artificial intelligence

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[223] Response from ITIF, at 15.
[224] Response from ACT, at 7.
[225] Response from AIPLA (Jan. 10, 2020), at 17.
[226] Response from Wikimedia, at 9 (citing the Toronto Declaration at https://www.amnesty.org/download/Documents/POL3084472018ENGLISH.PDF).
[227] Response from KEI, at 4 (citing https://www.oecd.org/going-digital/ai/principles/).
[228] Response from Copyright Clearance Center, at 7.
[229] Response from AAP, at 7.
[230] Response from IBM (Jan. 10, 2019), at 8.
[231] *See, e.g.*, Response from IPO (Jan. 10, 2020), at 7.
[232] Response from AUTM (Jan. 10, 2020), at 4.

algorithms and processes can be protected."[233] This approach, according to this commenter, should "serve as informing future USPTO's policies and practices regarding Intellectual Property Rights specific to AI innovation where at the present time employee job hopping is common."[234]

One commenter also "recommend[ed] the EU's Report on Liability for Artificial Intelligence which provides a deep analysis of the liability issues of AI."[235]

Commenters also referenced existing legislation in the United Kingdom, Singapore, Australia, China, Thailand, Mexico, South Korea, and Japan.

Specifically in the United Kingdom, the Copyrights, Designs and Patents Act of 1988, section 9(3), addresses computer-generated works. Similar provisions exist in Ireland and New Zealand, according to one commenter.[236] Another noted similar provisions in Hong Kong (SAR) and India.[237] Similar to specific references to the recent EU directive, commenters' views were mixed as to whether any of these laws are a useful template for the United States.

Multiple commenters noted the "2018 amendment to the Japanese copyright statute provides an example of a well-considered legislative definition of a TDM exception under the copyright laws."[238] A few commenters suggested that the United States consider the Japanese model regarding "Protected Data" in the Unfair Competition Prevention Act, May 2018, which promotes protection for data used for exchange.[239]

South Korea's relaxation of its definition of trade secret law in the Unfair Competition Prevention and Trade Secret Protection Act, which made it no longer necessary to take reasonable efforts to maintain the secrecy of the information, was acknowledged. However, one commenter noted that "this approach is unlikely to be implemented in the US."[240] The same commenter pointed to South Korea as providing "protection of databases defined as

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[233] Response from AIPLA (Jan. 10, 2020), at 24.
[234] *Id.*
[235] Response from Kernochan Center, at 7 (citing Rep. of the Expert Group on Liability and New Technologies—New Technologies Formation, Liability for Artificial Intelligence and Other Emerging Digital Technologies (2019)).
[236] Response from IBM (Jan. 10, 2019), at 8, noting Copyright, Designs and Patents Act, 1988, c. 48, § 9(3) (U.K.);
Copyright Act of 1994, § 5 (N.Z.); Copyright and Related Rights Act 2000, part I, § 2 (Act. No. 28/2000) (Ire.).
[237] Response from KEI, at 5.
[238] *See, e.g.*, Response from IBM (Jan. 10, 2019), at 8. The database directive covers databases in which there has been a substantial investment, qualitatively or quantitatively, in obtaining, verifying, or presenting the contents and makes it unlawful to extract or reutilize the whole or a substantial part of those contents. Directive 96/9/EC, Art. 7(1).
[239] Response from AIPLA (Jan. 10, 2020), at 24-25; Response from JIPA (Jan. 8, 2020), at 3.
[240] Response from AIPLA (Jan. 10, 2020), at 25.

compiled matters whose subject matters are systematically arranged or composed, so that they may be individually approached or retrieved."[241]

One commenter noted that certain aspects of U.S. copyright law are unique to the United States, and references to other countries' laws may not be appropriate at this time. For example, with respect to sound recordings, there are differences in the basic requirements for copyrightability that could lead to differences in how AI-generated sound recordings are protected.[242] Overall, the majority of the commenters expressed that the existing copyright, trademark, and trade secret law framework is sufficiently robust and flexible to adequately address issues raised by AI.

[241] *Id.* at 20.

[242] Therefore, RIAA, for example, believes it is "premature to consider incorporation of foreign practices at this time, especially with respect to exceptions or limitations to copyright." Response from RIAA, at 8.

Appendix I—Patenting Artificial Intelligence Inventions RFC Response Summary

Category	No. of submissions
Foreign patent offices	2
Bar associations	9
Trade associations/Advocacy groups	13
Companies	13
Academia	13
Law firms (submitted as firm)	2
Practitioners (other than firm or academia submissions)	14
Individuals (not in other categories)[243]	33
Total	99

Foreign patent offices:

- EPO (Qs 1-12)
- JPO (Qs 1-12)

Bar associations:

- American Bar Association Intellectual Property Law Section (ABA IPL) (Qs 1-12)
- American Intellectual Property Law Association (AIPLA) (Qs 1-12)
- Boston Patent Law Association (BPLA) (Qs 1-7, 12)
- Intellectual Property Committee of the Bar Association of the District of Columbia (BADC) (Qs 1-12)
- International Association for the Protection of Intellectual Property (AIPPI) (Qs 1-12)
- International Association for the Protection of Intellectual Property Japan (AIPPI Japan) (Qs 1-12)
- International Federation of Intellectual Property Attorneys (FICPI) (Qs 1-12)
- Japan Patent Attorneys Association (JPAA) (Qs 1-12)
- National Association of Patent Practitioners (NAPP) (Qs 1-12)

Trade associations/Advocacy groups:

- Alliance for AI in Healthcare (AAIH) (Qs 1, 2, 4-8, 10, 12)
- Askeladden (Qs 1-10)

[243] Individuals are not listed by name in the appendix; however, all comments are available at https://www.uspto.gov/initiatives/artificial-intelligence/notices-artificial-intelligence.

- Computer and Communications Industry Association (CCIA) (Qs 1-11)
- Engine Advocacy and the Electronic Frontier Foundation (joint submission) (Qs 5-7, 11)
- IEEE USA (Qs 1-12)
- Intellectual Property Owners Association (IPO) (Qs 1-12)
- Internet Association, High Tech Inventors Alliance, the Software and Information Industry Association, and ACT | The APP Association (joint submission) (Qs 1-12)
- Japan Electronics and Information Technology Industries Association (JEITA) (Qs 1-12)
- Japan Intellectual Property Association (JIPA) (Qs 1-12)
- Japan Pharmaceutical Manufacturers Association (JPMA) (Qs 1-12)
- Korea Intellectual Property Association (KINPA) (Qs 1-12)
- R Street Institute (Qs 2-9)
- Software and Information Industry Association (SIIA) (Q 2)

Companies:

- Ericsson (Qs 1-12)
- Ford Motor Company (Qs 3, 4, 5, 7)
- Genentech (Qs 1-12)
- IBM (Qs 1-12)
- Juniper Networks (Qs 1-9)
- Merck (Qs 1-8, 10, 12)
- Novartis (Qs 1-12)
- Prevencio (Qs 1-9)
- Protofect (Qs 1-4, 6-8, 11, 12)
- Roche Diabetes Care (Qs 1-12)
- Seiko Epson (Qs 1-12)
- Siemens (Qs 1-12)
- Tata Consultancy Services (Qs 1-12)
- TruMedicines (Qs 1-12)

Academia:

- Organizations:
    - Cardozo School of Law's Intellectual Property Law Society (Qs 2, 9)
    - SUNY Research Foundation (Qs 1-12)
    - University of Maryland Center for Advanced Life Cycle Engineering (Qs 1-9)
    - Association of University Technology Managers Inc. (AUTM) (Qs 5-7, 10, 11)
- Professors from:
    - Baylor University
    - Colorado State University
    - Florida State University
    - Technische Universität Berlin (Germany)
    - Massachusetts Institute of Technology (Qs 1-9, 11)
    - North Carolina State University (Qs 2, 4-7)

    - University of Surrey (Qs 1-8, 12)
- Individual from:
    - University of Beira Interior

Law firms:

- NSIP Law (Qs 1-12)
- Schwegman Lundberg & Woessner (Qs 1-12)

Appendix II—Intellectual Property Protection for Artificial Intelligence Innovation RFC Response Summary

Category	No. of submissions
Bar associations	3
Trade associations/Advocacy groups	28
Companies	15
Academia	12
Practitioners	9
Individuals (not in other categories)[244]	31
Total	98

Bar associations:

- American Bar Association Section of Intellectual Property Law (ABA IPL) (Qs 1-13)
- American Intellectual Property Law Association (AIPLA) (Qs 1-13)
- New York Intellectual Property Law Association (NYIPLA) (Qs 1-5)

Trade associations/Advocacy groups:

- American Association of Law Libraries (AALL) (Qs 1-3)
- Association of American Publishers (AAP) (Qs 1-6, 9, 12, 13)
- Association of University Technology Managers Inc. (AUTM) (Qs 4, 9-11)
- Center for Democracy and Technology (Qs 3, 9)
- Computer and Communications Industry Association (CCIA) (Qs 1-13)
- Consumer Technology Association (CTA) (Qs 3, 9)
- Copyright Alliance (CA) (Qs 1-5, 13)
- Electronic Frontier Foundation (Qs 1-4)
- Electronic Privacy Information Center (EPIC) (Q 9)
- Entertainment Software Association (Q 6)
- Engine Advocacy (Q 3)
- Information Technology and Innovation Foundation (ITIF) (Qs 1-3, 5, 9, 10, 12, 13)
- Initiative for Net Freedom (Qs 1-5, 9)
- Internet Association (IA) (Qs 1-13)

[244] Individuals are not listed by name in the appendix; however, all comments are available at https://www.uspto.gov/initiatives/artificial-intelligence/notices-artificial-intelligence-non-patent-related.

- Intellectual Property Owners Association (IPO) (Qs 1-13)
- International Association of Scientific, Technical, and Medical Publishers (STM) (Qs 1-6, 9, 11, 12)
- International Trademark Association (INTA) (Qs 7, 8)
- Japan Intellectual Property Association (JIPA) (Qs 7-9)
- Knowledge Ecology International (KEI) (Qs 1-5, 9-13)
- Library Copyright Alliance (Q 3)
- Motion Picture Association Inc. (Qs 1-4)
- National Music Publishers Association (NMPA) (Qs 1-6, 8, 12, 13)
- News Media Alliance (Q 3)
- Public Knowledge (Qs 1-3, 5)
- R Street Institute (Q 3)
- Recording Industry Association of America (RIAA) (Qs 1-6, 8, 12, 13)
- Software and Information Industry Association (SIIA) (Qs 1-5)
- The App Association (ACT) (Qs 1-13)
- The Authors Guild (Qs 1-6)
- The Software Alliance (BSA) (Qs 2, 3)

Companies:

- Adobe (Qs 3, 9)
- Boomy Corp. (Qs 1-5)
- CLAIMS IP (Qs 1, 2)
- Copyright Clearance Center (Qs 1-4, 13)
- Council Exchange Board of Trade (Q 5)
- Genentech (Qs 1-6, 9-11)
- Getty Images (Qs 1-6, 9, 13)
- IBM (Qs 1-13)
- Intel Corp. (Qs 1-13)
- OpenAI LP (Q 3)
- Obeebo Inc. (Qs 1-13)
- Parsound (Qs 1, 2)
- Roche Diabetes Care (Qs 1-6, 9-11)
- Roche Molecular Diagnostics (Qs 1-6, 9-11)
- SO REAL (Qs 1, 5, 7)
- Wikimedia Foundation (Qs 1-4, 6, 10, 13)

Academia:

- Organizations:
    - Center for Anti-Counterfeiting and Product Protection (A-CAPP) at Michigan State University (Qs 7-9)
- Professors from:

    - Brooklyn Law School (Qs 1-3, 5)
    - Columbia Law School (Qs 1-6, 12, 13)Syracuse University (Qs 1, 2, 4, 5)
    - University of Oxford (Qs 7-8)
    - University of Surrey (Qs 1, 5, 13)
    - Universidad de las Américas Puebla (UDLAP) (Mexico) (Qs 1, 2, 6)
    - University of Chicago (Kernochan Center) (Qs 1-3, 10, 11)
    - Vanderbilt University (Qs 1, 2)
- Individuals from:
    - Columbia Law School (Qs 1, 2)
    - Harvard University Berkman Klein Center for Internet & Society (Qs 3, 13)