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USPTO Provides Guidance on Patenting Inventions Developed Using Artificial Intelligence

SUMMARY

The United States Patent and Trademark Office (“USPTO”) published new Guidance, effective February 13, 2024, on issues arising from the use of artificial intelligence (“AI”) to develop inventions.¹ The Guidance provides clarity for USPTO stakeholders and personnel, including the Central Reexamination Unit and the Patent Trial and Appeal Board (“PTAB”), on how to analyze these issues. The Guidance:

- Explains that AI-assisted inventions—inventions “created by natural persons using one or more AI systems”—are not categorically unpatentable in the U.S.
- Explains the USPTO’s view that patentability depends on the involvement of a natural person in the conception and development of the claimed invention, such that a natural person must, for each claim, at least meet the standards for naming a joint inventor—*i.e.*, a natural person must significantly contribute to the claimed invention.
- Explains how the USPTO will analyze human inventorship claims as to AI-assisted inventions.
- Reiterates that the duties of inquiry and disclosure when prosecuting a patent application apply to the involvement of an AI system in creation of the claimed invention.
- Explains that a foreign priority application must name at least one common natural person inventor for the foreign application to be used for U.S. patenting.

The USPTO has requested public comments [through the Federal Register](#) on or before May 13, 2024.

BACKGROUND

The USPTO has been considering the impact of AI on the patent system since at least 2019.² In April 2020, the agency issued decisions denying petitions to name an AI system as an inventor on two patent applications, and those denials were upheld by the Federal Circuit.³ Pursuant to an Executive Order that is the subject of another [S&C memo](#), on February 13, 2024 the USPTO published its “Inventorship Guidance for AI-Assisted Inventions” (the “Inventorship Guidance” or “Guidance”) in the Federal Register.⁴ The

Inventorship Guidance applies to all U.S. patents and applications and provides guidelines for determining whether and when a natural person may be named as an inventor on an invention made in whole or part using AI.⁵

THE USPTO'S GUIDANCE

Inventors and Joint Inventors Must Be Natural Persons. The Guidance builds on the rule—upheld by the Federal Circuit—that although “AI-assisted inventions are not categorically unpatentable,” an AI system cannot be named as an inventor or joint inventor on a U.S. patent.⁶ Thus, “the inventorship analysis should focus on human contributions.”⁷ An invention developed using AI cannot be patented unless a natural person at least qualifies under the standard for a joint inventor of the claimed invention, among other requirements, and only natural persons should be identified inventors of the patent.

Inventorship Is Determined by Applying the *Pannu* Factors. In determining who should be listed as the inventor of an AI-assisted invention, the threshold question is similar to the joint inventorship inquiry—*i.e.*, whether a natural person made a “significant contribution” to the claimed invention.⁸ In making that determination the USPTO will apply the *Pannu* factors, which ask whether a potential joint inventor:⁹

1. “contribute[d] in some significant manner to conception or reduction to practice”;
2. made “a contribution to the claimed invention that is not insignificant in quality, when that contribution is measured against the dimension of the full invention”; and
3. did more than merely explain well-known concepts or the current state of the art.¹⁰

The Guidance identifies two other requirements regarding the conception of AI-assisted inventions. *First*, at least one natural person must have “recognition and appreciation” of the invention and where there is only a single human inventor of an AI-assisted invention, that natural person must have the necessary recognition and appreciation of the *entire* invention.¹¹ As a practical matter, this simply means that traditional notions of conception are required for AI-assisted inventions—whether the invention involved only one or multiple natural persons. *Second*, at least one natural person must significantly contribute to *each and every* patent claim.¹² Although generally there is no requirement for each named inventor to contribute to every claim in a patent, in the context of AI-assisted inventions, at least one natural person must have significantly contributed to each and every claim.¹³ As a practical matter, this means that a patent application cannot include claimed inventions developed only by an AI system.

Guiding Principles. To aid in applying the *Pannu* factors, the Guidance identified five principles:

- i. ***Use of an AI System as a Tool Does Not Necessarily Negate a Natural Person's Contributions.*** A natural person can be named as an inventor so long as that person *significantly contributes* to the claimed AI-assisted invention, provided, of course, that the other requirements for patentability are met.¹⁴
- ii. ***Mere Recognition of a Problem Does Not Rise to the Level of Conception.*** Recognizing and presenting a problem to an AI system is not itself sufficient to rise to the level of conception of the

claimed invention. However, “a significant contribution *could be* shown by the way the person constructs the prompt in view of a specific problem to elicit a particular solution from the AI system.”¹⁵

- iii. ***Reduction to Practice Alone Is Not Enough to Rise to the Level of Inventorship.*** A natural person that recognizes and appreciates the *output* of an AI system as an invention is not necessarily an inventor, even if that person reduces it to practice. But a natural person that makes a significant contribution to the production of the output “may be a proper inventor.”¹⁶
- iv. ***Developing an Essential Building Block May Be Sufficient to Show Significant Contribution.*** “A natural person who develops an essential building block from which the claimed invention is derived may be considered to have provided significant contribution to the conception of the claimed invention even though the person was not present for or a participant in each activity that led to the conception of the claimed invention.”¹⁷ In certain cases, individuals who design, construct, or train an AI system for addressing a specific issue and generating a targeted solution could qualify as inventors. This is applicable when their work in designing, building, or training the AI system constitutes a significant part of the process that leads to the creation of the invention using the AI system.¹⁸
- v. ***Ownership or Oversight of an AI System Alone Is Not Enough to Rise to the Level of Inventorship.*** Maintaining “intellectual domination” over an AI system is not sufficient to make a natural person an inventor of any inventions created through its use. The natural person must significantly contribute to the invention beyond mere ownership and/or oversight of the AI system.¹⁹

Illustrative Examples. The USPTO published two illustrative examples applying the *Pannu* factors and the five guiding principles, which are available [here](#). Each example analyzes whether a natural person made a “significant contribution” to an AI-assisted invention.

In the first example, two engineers tasked with developing a new remote control (“RC”) car recognize that the RC cars would benefit from a transaxle and use an AI system to create a preliminary design. The engineers input a general prompt into the AI system and the output is an original design with an associated schematic that the engineers review and agree would work for their RC car.²⁰

- ***Scenario 1: Not Proper Inventors If They Simply Applied the Output of the AI.*** The engineers are not proper inventors of a patent claim covering only the AI system’s design of the transaxle. The engineers recognized a problem in RC car design, but did not significantly contribute to the transaxle invention.²¹
- ***Scenario 2: Not Proper Inventors If They Only Reduce the AI Output to Practice.*** In this scenario, the engineers follow the AI system’s design exactly but also select a common and available manufacturing material for the casing of the transaxle. The engineers are not proper inventors of a dependent claim including a manufacturing material limitation because mere reduction to practice is not sufficient to establish inventorship.²²
- ***Scenario 3: Proper Inventors If They Substantially Modify the AI Output.*** Here, the engineers prompt the AI system to provide alternative transaxle designs, and conduct experiments which allow them to substantially modify the AI system’s output. The engineers are proper inventors of an independent claim covering the modified design because all of the *Pannu* factors are met.²³
- ***Scenario 4: Proper Inventors of Claim Modifying Their Design Using AI.*** The engineers ask the AI system to provide manufacturing suggestions based on the modified design developed in Scenario 3. The engineers are still proper inventors of a dependent claim covering the AI system’s suggestions because their contributions to the Scenario 3 design are still significant to the limitations of the dependent claim as a whole, measured against the full scope of the invention.²⁴

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- **Scenario 5: The Developer of the AI System Is Not a Proper Inventor.** The engineer who oversaw the creation and training of the AI system but was unaware of any specific problems related to transaxles in RC cars is not a proper inventor of any of the patent claims because he or she did not significantly contribute to the conception of the invention.²⁵

The second example is set in the pharmaceutical context. There, a professor and her postdoctoral fellow are working to develop a novel pharmaceutical to help treat prostate cancer. They work in conjunction with the university's AI expert and the university's data scientist to use the university's deep neural network-based prediction model that can predict the interaction strength of drug-target pairs. Like the first example, the second example provides a series of scenarios involving those four individuals to demonstrate application of the *Pannu* factors and the guiding principles described above.²⁶

Related Inventorship Issues. The USPTO's Guidance also addresses two related issues:

Disclosures to the USPTO. The Guidance highlights an applicant's duties of disclosure and of reasonable inquiry in the context of an AI-assisted invention, noting that improper inventorship is a ground for rejection under 35 U.S.C. §§ 101 and 115. Accordingly an applicant has "has a duty to disclose to the USPTO information that raises a prima facie case of unpatentability due to improper inventorship," including "evidence that demonstrates a named inventor did not significantly contribute to the invention because the person's purported invention was made by an AI system."²⁷ Similarly, applicants must investigate the use of AI in an invention because "[f]ailing to inquire when the circumstances warrant such an inquiry may jeopardize the validity of the application or document, or the validity or enforceability of any patent . . . and could result in sanctions or other actions."²⁸

Priority Claims to Foreign Applications Naming AI Inventors. Under the Patent Act, an application seeking to claim the benefit of a prior-filed foreign application must name the same inventor or have at least one joint inventor in common with the prior-filed application.²⁹ The Guidance explains that a foreign application that names an AI system as a sole inventor will not be accepted; the U.S. application and the foreign priority application both must name at least one common inventor who is a natural person.³⁰

IMPLICATIONS

The USPTO's Inventorship Guidance has a number of implications for patent prosecution and litigation.

First, inventors should consider whether and how the Guidance creates an opportunity to expand their patent filings to include AI-assisted inventions, in light of the potential for AI systems to substantially increase the pace of innovation.

Second, inventors using AI systems should keep detailed records and document their inventive process to help establish conception and their significant contribution to an invention. This could include the natural person's specific prompts to the AI system, the AI system's specific output, and any changes

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made by the inventor to the output, on a claim-by-claim basis. This will be particularly important to ensuring the validity of U.S. patent filings (including the filings of any related patent applications) and to defending against potential claims of inequitable conduct in litigation. Additionally, prosecution counsel should ensure that patent claims are drafted in a way that maintains as significant the natural person's contribution(s) to the claimed AI-assisted invention.

Third, although the Guidance does not alter the existing duties of disclosure and reasonable inquiry, prosecution counsel must consider whether they need to collect additional information from their clients or disclose additional information to the USPTO when prosecuting applications for AI-assisted inventions. As noted above, prosecution counsel should take care to ensure that they are complying with these duties to prevent any claims of inequitable conduct in litigation.

Fourth, improper inventorship will present a new front for challenging the validity of patents claiming AI-assisted inventions before the PTAB and in district court litigation, so this issue should be evaluated on both sides of an adversarial proceeding.

Fifth, innovators should consider the impact of this Guidance on their global patent filing strategy, including inventorship of foreign applications to which U.S. applications may claim priority.

Sixth, although this most recent guidance is limited to inventorship, the USPTO has recognized that AI will affect the patent system in other ways, too, such as determining subject-matter eligibility, obviousness, and enablement.³¹ The Guidance states that the USPTO is continuing to explore those issues and will issue additional guidance "as appropriate."³²

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ENDNOTES

- 1 89 Fed. Reg. 10043, 10043-44 (Feb. 13, 2024); *see also* USPTO, *Transaxle for Remote Control Car* [Example 1] (Feb. 13, 2024), <https://www.uspto.gov/sites/default/files/documents/ai-inventorship-guidance-mechanical.pdf>; USPTO, *Developing a Therapeutic Compound for Treating Cancer* [Example 2] (Feb. 13, 2024), <https://www.uspto.gov/sites/default/files/documents/ai-inventorship-guidance-chemical.pdf>.
- 2 89 Fed. Reg. 10044.
- 3 *Id.* at 10045; *see also* *Thaler v. Hirshfeld*, 558 F. Supp. 3d 238 (E.D. Va. 2021); *Thaler v. Vidal*, 43 F.4th 1207 (Fed. Cir. 2022), *cert denied*, 143 S. Ct. 1783 (2023). On review, the Federal Circuit held that “only a natural person can be an inventor, so AI cannot be.” *Thaler v. Vidal*, 43 F.4th at 1211-13.
- 4 *See* 89 Fed. Reg. at 10043-44; *see also* “Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence” (Oct. 30, 2023).
- 5 89 Fed. Reg. at 10044-45.
- 6 *Id.* at 10044.
- 7 *Id.* at 10045.
- 8 *Id.* at 10046-47.
- 9 *Id.*
- 10 89 Fed. Reg. at 10047; *see also* *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1351 (Fed. Cir. 1998).
- 11 89 Fed. Reg. at 10047.
- 12 *Id.* at 10047-48.
- 13 *Id.* at 10048.
- 14 *Id.*
- 15 *Id.* (emphasis added).
- 16 *Id.*
- 17 *Id.* at 10049.
- 18 *Id.*
- 19 *Id.*
- 20 Example 1 at pp. 1-2, *supra* note 1.
- 21 *Id.* at pp. 2-3.
- 22 *Id.* at pp. 4-5.
- 23 *Id.* at pp. 5-7.
- 24 *Id.* at pp. 7-8.
- 25 *Id.* at pp. 8-9.
- 26 Example 2, *supra* note 1.
- 27 89 Fed. Reg. at 10049.
- 28 *Id.* at 10050.
- 29 *Id.* at 10051.
- 30 *Id.*

ENDNOTES (CONTINUED)

³¹ 89 Fed. Reg. at 10045.

³² *Id.*

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