LIMITS OF USING ARTIFICIAL INTELLIGENCE AND GPT-3 IN PATENT PROSECUTION

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I. INTRODUCTION

Generative Pre-trained Transformer 3 (GPT-3) and other forms of Artificial Intelligence (A.I.) have the ability to revolutionize patent prosecution and claim drafting. Created by OpenAI, "GPT-3 [is an] autoregressive language model that uses deep learning to produce . . . texts."[1] Using a training dataset consisting of 175 billion parameters, GPT-3 has the

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1. LUCIANO FLORIDI & MASSIMO CHIRIATTI, GPT-3: ITS NATURE, SCOPE, LIMITS, AND CONSEQUENCES 681 (Nov. 1, 2020), https://link.springer.com/content/pdf/10.1007/s11023-020-09548-1.pdf.

ability to create sentences, paragraphs, articles, short stories, dialogues, and lyrics in a fashion that is sometimes indistinguishable from a human.[2]

GPT-3 may have a dramatic impact on the methods practitioners use to draft patent specifications and, more importantly, patent claims. GPT-3 may be able to provide practitioners with ready-made context-consistent language that can greatly enlarge the scope of a patent claim. Given the proper prompt, GPT-3 may also be able to generate claims and specifications for claims and translate "legalese" into understandable natural language. Although GPT-3 has been shown to have limitations when generating creative writing styles, these limitations may not be as problematic when generating patent claims and specifications.[3] This is because patent drafting is constrained by a unique set of rules, canons, and language that has already been litigated.[4]

GPT-3 and other A.I. technologies have the potential to revolutionize patent prosecution. However, there are many pitfalls that patent prosecutors and litigators should recognize when dealing with this new technology.[5] Additionally, there are many limits to what A.I. can and cannot do when it comes to patent-claim and specification drafting.[6] In this Article, we argue that traditional patent doctrines such as enablement and specific utility should be bolstered to act as gatekeepers to limit the claims generated by A.I.. Additionally, we argue that United States patent law may ultimately be forced to move from a peripheral claiming system to a more central claiming-based system to deal with A.I.-generated claims. Furthermore, practitioners will have to think carefully about how to fulfill their professional obligations to supervise GPT-3 style technology, especially in light of its tendency to generate biased content.[7] Finally, if the technology is only available to large private firms, it may further exacerbate the access to justice gap.

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2. *See generally* Tom B. Brown et al., *Language Models Are Few-Shot Learners*, CORNELL UNIV., https://arxiv.org/abs/2005.14165 (last updated July 22, 2020).

3. *See generally* Janice Greenwood, *Is Writing Dead? GPT-3 Is an A.I. That Can Blog*, https://www.janicegreenwood.com/2020/12/is-writing-dead-gpt-3-is-an-a-i-that-can-blog/ (last visited Oct. 12, 2021).

4. *See generally Nonprovisional (Utility) Patent Application Filing Guide*, U.S. PAT. & TRADEMARK OFF., https://www.uspto.gov/patents/basics/types-patent-applications/nonprovisional-utility-patent#heading-4 (last visited Oct. 12, 2021); Markman v. Westview Instruments, Inc., 517 U.S. 370, 374 (1996) (citing HERBERT F. SCHWARTZ, PATENT LAW AND PRACTICE 80 (2d ed. 1995)).

5. *See generally GPT-3 – A Game Changer for Legal Tech?*, ARTIFICIAL LAW., (July 29, 2020), https://www.artificiallawyer.com/2020/07/29/gpt-3-a-game-changer-for-legal-tech/.

6. *See generally id.*

7. *See generally* Aylin Caliskan, *Detecting and Mitigating Bias in Natural Language Processing*, BROOKINGS (May 10, 2021), https://www.brookings.edu/research/detecting-and-mitigating-bias-in-natural-language-processing/.

II. GPT-3 AND ARTIFICIAL INTELLIGENCE

GPT stands for generative pre-trained transformer.[8] It is a statistically-based language model, and it relies heavily on statistical analysis of words and their order.[9] In layman's terms, the tool is adept at recognizing patterns in words and anticipating what the next word in the pattern will be.[10] Done iteratively, this allows it to generate (to "write") from a relatively small prompt.[11] This ability to write language based on a short prompt, known as "few-shot learning," is a major advance for GPT-3 over earlier models.[12]

GPT-3 is the third language model released by OpenAI, the Silicon Valley lab founded by, among others, Elon Musk.[13] Where GPT-2 had an impressive 1.5 billion parameters, GPT-3 has 175 billion parameters and is thus over 100 times larger.[14] Parameters matter because "with language models, size really does matter."[15] Despite being less accurate than GPT-3, GPT-2 has already been used by researchers attempting to generate patent claims.[16] Thus, it is quite likely that researchers will apply GPT-3 style language models for the field of patent law.[17]

OpenAI initially made GPT-3 available via an application program interface (API) available to a select set of beta testers (researchers, bloggers, engineers, etc.) in a variety of fields. Some of these individuals have posted testimonials about the performance of GPT-3 at tasks that include generating complex writing. Access to GPT-3 reportedly requires the use of the API, and it is also likely that there are multiple versions of GPT-3 tailored for different applied uses.[18] One user who had early access prior to beta testing has reported that OpenAI used slightly different language model techniques

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8. Ronald Schmelzer, *GPT-3*, SEARCHENTERPRISEAI, https://searchenterpriseai.techtarget.com/definition/GPT-3 (last updated June 2021).

9. Stefan Ionescu, *What Is GPT-3 and Is It Really the Future of Creative Work?*, MUO (Apr. 30, 2021), https://www.makeuseof.com/what-is-gpt-3-and-is-it-really-the-future-of-creative-work/.

10. *See generally* Schmelzer, *supra* note 8.

11. Ionescu, *supra* note 9.

12. Cade Metz, *Meet GPT-3. It Has Learned to Code (and Blog and Argue)*, N.Y. TIMES (Nov. 24, 2020), https://www.nytimes.com/2020/11/24/science/artificial-intelligence-ai-gpt3.html.

13. *See generally* Schmelzer, *supra* note 8; Jazmin Goodwin, *Elon Musk Criticizes OpenAI Exclusively Licensing GPT-3 to Microsoft*, CNN BUS. (Sept. 27, 2020, 5 :51 PM), https://www.cnn.com/2020/09/27/tech/elon-musk-tesla-bill-gates-microsoft-open-ai/index.html.

14. Kevin Vu, *GPT-2 (GPT2) vs. GPT-3 (GPT3): The OpenAI Showdown*, DZONE (Feb. 13, 2021), https://dzone.com/articles/gpt-2-gpt2-vs-gpt-3-gpt3-the-openai-showdown.

15. Will Douglas Heaven, *OpenAI's New Language Generator GPT-3 Is Shockingly Good—and Completely Mindless*, MIT TECH. REV. (July 20, 2020), https://www.technologyreview.com/2020/07/20/1005454/openai-machine-learning-language-generator-gpt-3-nlp/.

16. Jieh-Sheng Lee & Jieh Hsiang, *Patent Claim Generation by Fine-Tuning OpenAI GPT-2*, CORNELL UNIV. (July 1, 2019), https://arxiv.org/abs/1907.02052 (using a training data set of 55,890 patent claims, Lee found that GPT2 was able to generate patent claims of reasonable quality).

17. *See* Robert Dale, *GPT-3: What's It Good For?*, 27 NAT. LANGUAGE ENG'G 113, 115 (2021), https://www.cambridge.org/core/services/aop-cambridge-core/content/view/0E05CFE68A7AC8BF794C8ECBE28AA990/S1351324920000601a.pdf/gpt-3-whats-it-good-for.pdf.

18. *Id.*

for his use rather than using the general API.[19] This indicates a likely potential future where certain customers can perform additional customization of GPT-3 beyond the API—a practice which is common for other language models.[20] OpenAI exclusively licensed GPT-3 to Microsoft in September of 2020.[21] GPT-3 is now being used commercially for projects such as using natural language to write computer code.[22]

What makes GPT-3 exceptional and especially applicable to patents is that GPT-3 can respond remarkably well to minimal input.[23] Because GPT-3 was trained on billions of parameters, it only needs a handful of prompts or examples to perform specific tasks, which is known as "few-shot learning."[24] Patents are already electronically available in digital format as well as already pre-classified into technology types.[25] Thus, after being trained on millions of different patents, GPT-3 could be well poised to create an original specification based on submitted claim language.[26]

Customization is especially important in the patent law field because patent claims have unique characteristics that are not present in most writing styles.[27] For example, each patent claim can only be one sentence long.[28] "This is true regardless of how tortured the sentence structure is and how incomprehensible the sentence may be to those not trained in patent claim drafting."[29] Additionally, patent claims are replete with terms of art and language that have gone through the crucible of litigation.[30] Accordingly, if

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19. Nick Walton (@nickwalton00), TWITTER (July 27, 2020, 6:01 PM), https://twitter.com/nickwalton00/status/1287885952543682560. Nick Walton, the creator of a text-based role-playing game, AIDungeon, which uses language models to generate text narratives for the game, posted about his use of GPT-3. *Id.* Walton stated that he worked with OpenAI when there was an "earlier" version of GPT-3 than what was available on the private API. *Id.* He also states that OpenAI used a technique called "fine-tuning" which is also slightly different than how the private API works. *Id.*

20. *See* Heaven, *supra* note 15.

21. *OpenAI Licenses GPT-3 Technology to Microsoft*, OPENAI (Sept. 22, 2020), https://openai.com/blog/openai-licenses-gpt-3-technology-to-microsoft/.

22. Khari Johnson, *AI Could Soon Write Code Based on Ordinary Language*, WIRED (May 26, 2021, 2:15 PM), https://www.wired.com/story/ai-write-code-ordinary-language/.

23. Anjali, *What Is GPT-3 & Why Is It So Popular?*, MEDIUM (May 28, 2021), https://medium.com/eoraa-co/what-is-gpt-3-why-is-it-so-popular-b92e87fddafe.

24. Amy B. Cyphert, *A Human Being Wrote This Law Review Article: GPT-3 and the Practice of Law*, 55 U.C. DAVIS L. REV. 401, 420 (2021) (citing Metz, *supra* note 12 "Because [GPT-3] is a few-shot learning model, you can personalize GPT-3 much more easily than you could earlier versions.").

25. *See* WORLD INTELL. PROP. ORG., PATENT CLAIM FORMAT AND TYPES OF CLAIMS, 37–56 (2013), https://www.wipo.int/edocs/mdocs/aspac/en/wipo_ip_phl_16/wipo_ip_phl_16_t5.pdf.

26. *See GPT-3 As Artificial Intelligence Innovation*, GIP RSCH. & CONSULTING SERVS. (July 30, 2020), https://gipresearch.com/patent-attorney/gpt-3-as-artificial-intelligence-innovation/.

27. *See generally* WORLD INTELL. PROP. ORG., *supra* note 25 (describing the patent claim process and formulation).

28. *Id.* at 2.

29. Gene Quinn, *What to Know About Drafting Patent Claims*, IPWATCHDOG (Sept. 28, 2019), https://www.ipwatchdog.com/2019/09/28/what-to-know-drafting-patent-claims-2/id=114016/.

30. Matthew Barnet, *PTAB Reverses Examiner Due to "Consisting Essentially of" Transitional Phrase*, ELEMENT IP (Oct. 9, 2020), https://www.elementiplaw.com/ptab-reverses-examiner-due-to-consisting-essentially-of-transitional-phrase/#:~:text=In%20between%20the%20open%20term,(s)%E2

GPT-3 were to be further trained on a dataset of patent claim language, that could improve its accuracy in drafting patent claims.[31] Additionally, use of supervised training on a litigated patent dataset could also help capture specific terms of art to be used (or avoided) in patent claims.[32]

III. GPT-3 AND PATENT LAW

Because GPT-3 represents such an advance in the technology of language models, it has generated a lot of buzz, including in legal circles.[33] The potential applications for the technology to the practice of law are exciting, even as most commentators note it will not be replacing lawyers any time soon.[34] How might GPT-3 be used specifically in patent law? We examine the performance of GPT-3 on other complex writing tasks typically performed by humans as a comparative basis and address two areas of patent law we think GPT-3 will likely be used in. First, it may aid in patent claim generation, given its ability to "write" from limited prompts.[35] Second, it has already been shown to impressively translate legalese into "plain English," which could be helpful in patent cases tried before lay juries.[36]

A. Will GPT-3 Perform Patent Claim Generation?

Patent-claim drafting is an enormously difficult task due to the panoply of formatting rules required by the United States Patent and Trademark Office (USPTO) and the specific terms of art associated with patent claims.[37]

%80%9D%20of%20the%20claimed. For example, "consisting of," "comprising of," and "consisting essentially of" all have very different meanings in the context of patent claim transitional phrases. *Id.*

31. Artificial intelligence learns by being fed data and statistics. *Artificial Intelligence*, BUILT IN, builtin.com/artificial-intelligence (last visited Oct. 12, 2021).

32. *See id.*

33. *See* Eran Kahana, *GPT-3 and the Unauthorized Practice of Law*, STANFORD L. SCH. (Apr. 13, 2021), https://law.stanford.edu/2021/04/13/gpt-3-and-the-unauthorized-practice-of-law/; ARTIFICIAL LAW., *supra* note 5.

34. ARTIFICIAL LAW., *supra* note 5 ("It's unlikely a technology like GPT-3 will fully replace contract drafting anytime soon, but it can augment the process of contract generation, analysis[,] and e-discovery.").

35. Sam Shead, *Why Everyone Is Talking About the A.I. Text Generator Released by an Elon Musk-Backed Lab*, CNBC (July 23, 2020, 10:08 AM), https://www.cnbc.com/2020/07/23/openai-gpt3-explainer.html.

36. Thabo Magubane, *The Possible Implications of GPT-3 to the Business of Law*, LEGAL BUS. WORLD (Apr. 16, 2020), legalbusinessworld.com/post/the-possible-implications-of-gpt-3-to-the-business-of-law. There are, of course, other potential applications as well. *See 21 Best GPT Tools, Examples and Use Cases*, NO GOOD (June 25, 2021), http://nogood.io/2021/06/25/gpt-3-tools/. For example, GPT-3 may be used to achieve text simplification, which may be helpful in summarizing patent documents. *Id.* It may also be useful in automatic extraction and aggregation of data, which would aid in the classification of documents such as patent families. *Id.* These applications are beyond the scope of this Article.

37. *See* U.S. PAT. & TRADEMARK OFF., *supra* note 4; Markman v. Westview Instruments, Inc., 517 U.S. 370, 374 (1996) (citing HERBERT F. SCHWARTZ, PATENT LAW AND PRACTICE 80 (2d ed. 1995)) (noting that victory turns on the claim's words' meanings).

In fact, the Supreme Court has stated that the patent application is "one of the most difficult legal instruments to draw with accuracy."[38] Unsurprisingly, it can take years before a practitioner becomes proficient in claim drafting.[39]

In sum, to draft patent claims, the practitioner will start by defining the invention in broad terms, omitting any and all unnecessary options.[40] Then, the practitioner will define the invention with as much detail and specificity as possible, with as many options as they can think of.[41] A mixture of broad and narrow claims will give the client a range of options.[42] Broad claims will catch a wider group of infringers but will be easier to invalidate by prior art.[43] Narrow claims are more likely to be "valid," but competitors may be able to easily design around the claims.[44]

Thus, the choice of words in a claim are crucial to help define the metes and bounds of the invention.[45] The words used should capture the inventive concept as well as enabled variants of the invention.[46] "Relative" words (such as fast, slow, long, short, etc.) and negative limitations (such as "not solid") are generally avoided.[47] Technical terms used in the claims are explained within the "detailed description" portion of the specification.[48] However, because patent law inherently deals with cutting edge technology, sometimes the inventor must "be their own lexicographer" and define new terms or redefine older terms to describe the invention.[49]

Patent specifications are often reverse engineered; that is, practitioners usually draft patent claims first and the specification second to make sure that there is written description support in the specification for all of the claims.[50] It is unclear how well language models like GPT-3 will be able to emulate this process without further refinement.[51] Researchers have noted that GPT-3 and other transformer architectures are limited in their ability to achieve

38. Topliff v. Topliff, 145 U.S. 156, 171 (1892).

39. Dave A. Ghatt & Timothy B. Kang, *Claim Interpretation: A Regression to Uncertain Times*, 84 J. PAT. TRADEMARK OFF. SOC'Y 456, 456–57 (2002).

40. JOHN GLADSTONE MILLS III ET AL., PATENT LAW FUNDAMENTALS § 14:2.50, (2d. ed. Aug. 2021).

41. *Id.* § 13:15.

42. *See id.* § 14:33 (explaining that narrow claims do not limit broad claims and thus do not restrict a client's invention).

43. *Id.* § 14:2.50.

44. *See generally* Emmanuel E. Jelsch, *Topic 9: Claim Drafting Techniques*, WORLD INTELL. PROP. ORG., https://www.wipo.int/edocs/mdocs/aspac/en/wipo_ip_phl_16/wipo_ip_phl_16_t9.pdf (last visited Oct. 12, 2021).

45. *See id.* at 15.

46. *Id.*

47. *Id.* at 16.

48. 37 C.F.R. § 1.71*; see also* THOMSON REUTERS, MANUAL OF PATENT EXAMINING PROCEDURE § 608.01 (Thomson Reuters 9th rev. ed. 2020).

49. THOMSON REUTERS, *supra* note 48, § 2111.01(IV).

50. *See generally* Jelsch, *supra* note 44.

51. *Id.*

properties similar to long-term memory in humans.[52] However, whether long-term memory is needed to draft specifications from a given patent claim prompt is still an open question.[53] Just as GPT-3 has been used to translate legalese into plain English after being shown just a few examples of the task, it might also be able to generate a rough specification for a given claim.[54]

In assessing how effective GPT-3 might be at generating patent claims and specifications, we can extrapolate somewhat from the success of GPT-3 at other writing tasks.[55] Writer Gwern Branwen reported on his attempt to use GPT-3 to generate creative fiction.[56] He writes that "GPT-3's samples are not just close to human level: they are creative, witty, deep, meta, and often beautiful."[57] Branwen also compares the output from GPT-3 to previous output from GPT-2 and says the new complex linguistic features "demonstrate an ability to handle abstractions, like style parodies, I have not seen in GPT-2 at all."[58] Authors have also experimented with GPT-3 for more classical writing styles.[59]

In an article for the *Journal of Cultural Analytics*, Katherine Elkins and Jon Chun report on their experience with GPT-3's strengths and weaknesses in generating high-quality written material.[60] They conclude that GPT-3 seems to produce better writing with higher frequency than GPT-2, despite the fact that GPT-2 was a huge improvement over earlier computational approaches or more traditional computational linguistic systems based upon logical rules and grammar.[61] But Elkins and Chun also report that GPT-3 has weaknesses in its ability to "[r]eliably maintain a coherent argument or narrative thread over long periods of time; maintain consistency of gender or personality; employ simple grammar rules; show basic knowledge and commonsense reasoning."[62]

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52. Transformer models, such as GPT-3, have a more limited "attention" span or "memory" than other model architectures. *Breaking the Quadratic Attention Bottleneck in Transformers?*, REDDIT, https://www.reddit.com/r/MachineLearning/comments/hxvts0/d_breaking_the_quadratic_attention_bottleneck_in/ (last visited Oct. 12, 2021). Improving this capability is an area of ongoing research. *Id.*

53. *Id.*

54. *GPT-3 Creative Fiction*, GWERN BRANWEN (July 1, 2021), https://www.gwern.net/GPT-3.

55. *Id.*

56. *Id.*

57. *Id.*

58. *Id.*

59. *Id.*

60. Katherine Elkins & Jon Chun, *Can GPT-3 Pass a Writer's Turing Test?*, 5 J. CULTURAL ANALYTICS 1, 3 (Sept. 14, 2020), https://culturalanalytics.org/article/17212-can-gpt-3-pass-a-writer-s-turing-test.

61. *Id.* Elkins and Chun also provide a specific list of GPT-3's language-generation (writing) strengths and weaknesses. *Id.* Its strengths include, "It can create realistic yet surprising plots, recreate key stylistic and thematic traits of an author in just a few lines, experiment with form, write across a wide variety of genres, use temporal structure with surprising reversals, and reveal a fairly complex and wide-ranging form of knowledge." *Id.* As was previously discovered with earlier iterations of language model technology, GPT-3 also suffers from bias in its training data. *Id.* at 4.

62. *Id.* at 3.

These limitations may not be as problematic in the process of generating patent claims and specifications as they are in the process of generating creative writing. Because patent claim drafting is constrained by a unique set of rules, canons, and language that has already been litigated, GPT-3 may be trained in a fashion that is unavailable to other types of drafting.[63] Additionally, with over ten million issued patents, the training set is incredibly large and is already segmented by technology type.[64]

Although the prospect appears to be initially promising, there remain challenges to the use of GPT-3 for patent claim and specification drafting.[65] Even when using GPT-3 for patent work, attorneys will nonetheless have to exercise significant oversight.[66] One of the most important steps in claim drafting is for the practitioner to think of variations of the invention that competitors might try to create to design around the claims.[67] GPT-3 may help with this process by creating language that may not have been initially obvious to the practitioner. Thus, GPT-3 could help practitioners broaden the scope of their claims by utilizing a perspective that they might not have initially considered.[68] However, because only a few errant words in a claim or specification could create great confusion or render a claim inoperable, practitioners will have to supervise this process closely.[69] As is discussed further below, the technology may be useful, but practitioners will need to take seriously their duty to supervise it.[70]

B. Translating Patent "Legalese" into "Plain English"

One of the beta testers given early access to GPT-3 shared a fascinating demonstration where they fed GPT-3 only two prompts that demonstrated translating "Legalese into . . . plain English."[71] For example, when fed the prompt:

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63. GIP RSCH. & CONSULTANCY SERVS., *supra* note 26*; see also* Hyonjuong Ryan Jin, *Think Big! The Need for Patent Rights in the Era of Big Data and Machine Learning*, 7 N.Y.U. J. INTELL. PROP. & ENT. L. 78, 91–92 (2018).

64. Jin, *supra* note 63.

65. *Id.* at 103–06; Michael Mattioli, *Disclosing Big Data*, 99 MINN. L. REV. 535, 554 (2014).

66. Jin, *supra* note 63, at 92 (discussing ancillary elements of human talent that is required).

67. WORLD INTELL. PROP. ORG., WIPO PATENT DRAFTING MANUAL 97 (2007), https://www.wipo.int/edocs/pubdocs/en/patents/867/wipo_pub_867.pdf.

68. *See* Solon Barocas & Andrew Selbst, *Big Data's Disparate Impact*, 104 CAL. L. REV. 671, 677–80 (2016) (describing the process and difficulties for supervised learning outcomes); David Lehr & Paul Ohm, *Playing with the Data: What Legal Scholars Should Learn About Machine Learning*, 51 U.C. DAVIS L. REV. 653, 665 (2017).

69. Lehr & Ohm, *supra* note 68, at 678–79, 687.

70. *See* discussion *infra* section IV.B.1 (noting that patent agents and patent attorneys are governed by rules of professional conduct that requires them to supervise A.I.'s patent production).

71. Michael (@Michaeltefula), TWITTER (July 21, 2020, 4:24 AM), https://twitter.com/michaeltefula/status/1285505897108832257/photo/1.

> Sale of all or substantially all of the assets of the Company or a sale of shares involving a change in control (each, a "Corporate Transaction") will be treated in the same way as a liquidation and the proceeds of sale will be distributed as set out in paragraph 3. If the holders of Series A Shares have received any Special Dividend it shall be set off against their Liquidation Preference.

GPT-3 "translated" it into plain English:

> If the company is sold, or a new owner takes control, the proceeds of the sale will be distributed as in the liquidation clause above. Any special dividend paid will be treated as an initial payment towards the Series A investors.[72]

It is easy to imagine why, especially in the patent context, the ability to quickly make complicated legal and technical concepts explainable to a jury of laypeople is valuable.[73] This may play an even more important role in patent litigation, where attorneys are often tasked with making highly technical concepts understandable to the laypeople on the jury who determine the outcome of the case.[74] Lawyers who can clearly and persuasively explain why their client's argument is correct, using language accessible to the layperson, will be at a tremendous advantage. GPT-3 has the ability to help translate these technical documents in a way that juries without specialized scientific degrees can understand.[75]

IV. CONSEQUENCES OF PERVASIVE USE OF A.I. AND GPT-3 IN PATENT LAW

As an initial matter, we focus mainly on the use of A.I. and GPT-3 tools as a mechanism to help patent practitioners draft claims. Patenting an A.I.-created invention, such as Dr. Thaler's Creativity Machine, is largely beyond the scope of this Article.[76] Additionally, we do not focus on the patenting of A.I. or A.I. tools as the invention.[77]

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72. *Id.*

73. Jennifer F. Miller, *Should Juries Hear Complex Patent Cases?*, 3 DUKE L. & TECH. REV. 1, 7–8 (2004). Of course, there is a danger in relying on the "translation" as Cyphert has noted about the legalese example in another article: "[T]he 'translation' was not always an ideal one. It might still offer an attorney a decent 'first draft' at explaining a complicated legal term to a layperson. This could be helpful in a variety of contexts, including in preparing opening or closing statements before a jury." Cyphert, *supra* note 24, at 421 n. 110.

74. *See generally* Phillippe Signore, *On the Role of Juries in Patent Litigation*, 83 J. PAT. & TRADEMARK OFF. SOC'Y 791 (2001).

75. *See* Heaven, *supra* note 15.

76. *See* U.S. Patent No. 16/524,350 (filed July 29, 2019).

77. For a deeper discussion, see Alfred Frueh, *Transparency in the Patent System – Artificial Intelligence and the Disclosure Requirement*, *Transparency in the Patent System – Artificial Intelligence and the Disclosure Requirement*, *in* RETHINKING PATENT LAW AS AN INCENTIVE

There are at least three important considerations that practitioners must examine if the use of GPT-3 (or GPT-4, or GPT-5, etc.) becomes pervasive in the patent realm. First, if GPT-3 becomes pervasive as a tool for drafting claims, what types of patentability requirements will become more predominant? Second, if GPT-3 becomes an expert at drafting claims and creating every variation of reasonable claims becomes commonplace, then the claims themselves may become less important because every patent will contain valid claims of wide scope. The third consideration deals with the ethical issues of the attorney when managing artificial intelligence tools for claim drafting.

A. Patentability Issues Associated with A.I.-Claim Drafting

Currently, litigators face the problem of claim construction, which is inherently indeterminate due to the limitations associated with language.[78] However, A.I. tools like GPT-3 may be able to address many of the issues associated with the inherent barriers of language.[79] Thus, GPT-3 has the ability to broaden the scope of the inventor's claims and claim embodiments of an invention without actual reduction to practice.[80] If these tools can create claims that cover every variation of an invention, then litigators will face a different challenge. Specifically, after GPT-3 drafts a legion of claims, litigators will have to work with claims that are not indeterminate but perhaps too broad and outside the scope of the inventor's initial conception of the invention.[81] The foundation of patent law's *quid pro quo* is that we should only give an inventor a patent for that which he invented.[82] Social welfare is, therefore, diminished if A.I. is able to wordsmith claims so that the boundary of claims are expanded beyond that which was conceived of by the inventor.[83]

Three patent doctrines could limit overclaiming by A.I. assisted tools.[84] Specifically, the enablement, utility, and definiteness doctrines prevent an inventor from claiming something that is too far beyond that which he has described in the specification.[85] Furthermore, if A.I. tools become expert at drafting claims and their use becomes pervasive, then courts and legislatures might move away from our current peripheral claiming system and towards

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TO INNOVATION 3 (Rafal Sikorski & & Žaneta Zemla-Pacud eds., 2021); Ryan Abbott, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 B.C. L. REV. 1079 (2016).

78. David L. Schwartz, *Practice Makes Perfect? An Empirical Study of Claim Construction Reversal Rates in Patent Cases*, 107 MICH. L. REV. 223, 259 (2008); Jonas Anderson & Peter S. Menell*, Informal Deference: A Historical, Empirical, and Normative Analysis of Patent Claim Construction*, 108 NW. UNIV. L. REV. 1,4 (2014).

79. *See generally* Magubane, *supra* note 36.

80. *See generally* Heaven, *supra* note 15.

81. *See* Magubane, *supra* note 36.

82. *See* Anderson & Menell, *supra* note 78.

83. *See* US Patent No. 16/524,350 (filed July 29, 2019).

84. Ebrahim, *supra* note 77, at 148.

85. *Id.*

a central claiming system.[86] Successful use of A.I. to draft claims may flip our current paradigm of peripheral claiming. Thus, practitioners would first focus on the specification and then draft the claims, reverting to the "central claiming" paradigm of the past.[87] Finally, if the A.I. tool is independently conceiving of the invention, or specific elements added to a base invention, with no human input, then the A.I. tool might be considered the inventor.[88] Currently, the USPTO has held that only natural persons can be inventors, which echoes the United Kingdom Intellectual Property Office's (UKIPO) and the European Patent Office's (EPO) positions.[89] Accordingly, patent doctrines, such as inventorship and conception, could be used to prevent A.I.-generated claims.[90]

1. Enablement as a Means to Limit A.I.-Drafted Claims

35 U.S.C. § 112(a) requires that the applicant create a specification that "shall contain a written description of the invention . . . as to *enable* any person skilled in the art . . . to make and use [the invention]."[91] Enablement requires the applicant to "teach those in the art to make and use the invention without undue experimentation."[92] The invention is not enabled if "one of ordinary skill in the art could not practice their full scope without undue experimentation."[93]

The purpose of the enablement requirement is to force inventors to describe the invention in such terms so that a person of ordinary skill in the art (POSITA) can make and use the claimed invention.[94] This ensures that the invention is communicated to the public in a meaningful way.[95] Additionally, the enablement requirement bars inoperable inventions, thus guarding against overly broad claims.[96] The simple presence of a few inoperative embodiments within the scope of the claim, however, does not necessarily render a claim non-enabled.[97] The statute requires that a POSITA be able to determine which embodiments were conceived, but not yet reduced

86. Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*?, 157 U. PA. L. REV. 1743, 1746 (2009).

87. *Id.*

88. *See* U.S. Patent No. 16/524,350 (filed July 29, 2019).

89. Bryan Hart, *An Inventor Must Be a Natural Person, Not a Machine*, BIEN BIENEMAN: THE SOFTWARE IP REP. (May 1, 2020), https://www.b2ipreport.com/swip-report/an-inventor-must-be-a-natural-person-not-a-machine/.

90. *See infra* Part IV.A.4 (discussing Inventorship and Conception and their applicability to AI-conceived claims).

91. 35 U.S.C. § 112(a) (emphasis added).

92. *In re* Wands, 858 F.2d 731, 737 (Fed. Cir. 1988).

93. Wyeth & Cordis Corp. v. Abbott Labs., 720 F.3d 1380, 1384 (Fed. Cir. 2013) (citing MagSil Corp. v. Hitachi Glob. Storage Techs., Inc., 687 F.3d 1377, 1380–81 (Fed. Cir. 2021)).

94. *Id.*

95. *See* THOMSON REUTERS, *supra* note 48, § 2164.

96. *See id.* § 2164.08.

97. *Id.* § 2164.08(b).

to practice, that would be inoperative or operative without undue experimentation.[98]

The test for enablement is whether a POSITA could make or use the invention from the disclosures in the patent, coupled with information known in the art, without "undue experimentation."[99] The enablement issue can arise when something in the claims is simply physically impossible or unworkable.[100] Another common situation where the enablement issue can arise is when the specification does not give enough guidance or working examples to cover the full breadth of the claims, and it would require undue experimentation for a POSITA to make and use the invention.[101] Accordingly, the focus of enablement is determining whether everything within the scope of the claim operates in the manner described in the claims and specification.[102]

When considering A.I.-drafted claims, the practitioner and scientific expert (or inventor) must determine if the claim is enabled.[103] Claim language must be analyzed to determine if the claims are operable and if it would require undue experimentation to make and use the invention.[104] This may be especially difficult if the number of A.I.-generated claims are legion.[105] Additionally, enablement problems will most likely be at issue for A.I.-generated claims directed towards embodiments of the invention that have yet to be reduced to practice.[106] If A.I.-generated claims do not have enablement support in the specification, then litigators may have to rely on weaker constructive reduction-to-practice arguments when defending these claims in court.[107]

Practitioners, as well as patent examiners, will have to scrutinize the claims carefully to determine which claims meet the enablement requirement.[108] This patentability requirement may be especially difficult for the USPTO to determine because the USPTO does not test inventions or verify that they will work as described.[109] Thus, patent examiners may have to rely more heavily on working examples to limit the scope of the claimed

98. *Id.*; *see In re* Angstadt, 537 F.2d 498, 502–03 (C.C.P.A. 1976) (showing that a disclosure of a large number of operable embodiments with a single inoperative embodiment did not render the claims non-enabled because a POSITA would be able to determine which embodiments were operable or non-operable without undue experimentation).

99. *In re* Wands, 858 F.2d 731, 737 (Fed. Cir. 1988); United States v. Telectronics, Inc., 857 F.2d 778, 785 (Fed. Cir. 1988). *See also* THOMSON REUTERS, *supra* note 48, § 2164.01.

100. THOMSON REUTERS, *supra* note 48, § 2164.08(b) (for example time machines or perpetual motion machines).

101. *See id.* §§ 2164.08, 2164.01(a)*; see also Wands*, 858 F.2d at 737.

102. THOMSON REUTERS, *supra* note 48, § 2164.08.

103. *See id.*

104. *See id.* § 2164.08(b).

105. *Id.*; *In re* Angstadt, 537 F.2d 498, 502–03 (C.C.P.A. 1976).

106. *See* THOMSON REUTERS, *supra* note 48, § 2164.08(c).

107. *Id.* § 2164.05; *see In re* Wiseman, 596 F.2d 1019, 1019 (C.C.P.A. 1979); 35 U.S.C. 112(a).

108. THOMSON REUTERS, *supra* note 48, § 2164.04.

109. *Id.* § 2164.05.

invention.[110] Accordingly, challenges to A.I.-directed claims that may not meet the enablement requirement will likely require a costly litigation process.[111]

Working examples may play a more important role especially if GPT-3 has the ability to draft and use "prophetic examples" when drafting patent applications.[112] Working examples are examples that have actually been performed in a laboratory or in a real-world setting.[113] In contrast, prophetic examples are examples based on experiments that are never performed.[114] Prophetic examples are used in patent applications to illustrate the potential and hoped-for uses of a patented invention.[115] Currently, these prophetic examples are sanctioned by the USPTO and can help establish specific utility for the invention, even if those uses are not enabled.[116] The problem with the use of GPT-3 is that the A.I. tool can create an almost unlimited number of convincing prophetic examples.[117] This problem is exacerbated because prophetic examples can be drafted in a way that is difficult to distinguish from actual working examples.[118]

One solution to the prophetic examples problem would be to force applicants to separate prophetic examples into a separate section of the patent application—distinct from working examples that were actually reduced to practice.[119] Clear separation of working examples from prophetic examples would allow patent examiners and litigators to properly discount the A.I.-generated prophetic examples. In fact, the USPTO has very recently published a federal register notice to "remind[] applicants that patent applications must properly present examples in a manner that clearly distinguishes between prophetic examples that describe experimental results and working examples that report actual experimental results."[120] Currently, however, it is difficult to distinguish between working examples and prophetic examples because the only difference between working examples and prophetic examples is the verb tense.[121] Specifically, working examples

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110. *Id.* § 2164.02; 35 U.S.C. § 112*; see also In re* Chilowsky, 229 F.2d 457, 461 (C.C.P.A. 1970).

111. THOMSON REUTERS, *supra* note 48, § 2164.07 (describing steps taken by examiner and applicant to satisfy requirements of 35 U.S.C. § 112).

112. Janet Freilich, *Prophetic Patents*, 53 U.C. DAVIS L. REV. 663, 668 (2019); Janet Freilich & Lisa Larrimore Ouellette, *Science Fiction: Fictitious Experiments in Patents*, 364 SCI. 1036–37 (2019)*; see also* Mark A. Lemley, *Ready for Patenting*, 96 B.U. L. REV. 1171, 1179 (2016).

113. THOMSON REUTERS, *supra* note 48, § 2164.02.

114. *Id.*

115. Freilich, *supra* note 112, at 668.

116. *Id.* at 663.

117. *Id.* at 679.

118. *Id.* at 668.

119. Freilich & Ouellette, *supra* note 112, at 1037.

120. *Properly Presenting Prophetic and Working Examples in a Patent Application*, 86 FED. REG. 35074, 35074 (July 1, 2021), federalregister.gov/d/2021-14034.

121. *See generally id.*

can be written in the past tense, while prophetic examples should only be written in the future or present tense.[122]

A similar solution to A.I.-generated prophetic examples is to allow the examiner to request that the applicant reveal those claims that are actually reduced to practice and also highlight those claims that have not been reduced to practice. Other commentators have suggested that the USPTO should be able to require applicants to discuss how their inventions meet the enablement requirement absent actual reduction to practice.[123] Alternatively, the USPTO could require a real-world embodiment that is actually reduced to practice before issuing a patent.[124]

A second solution would be to remove the presumption that prophetic examples are enabled. This would shift the burden of proof from the accused infringer to the patentee to show that the prophetic examples actually work and enable the invention.[125] An applicant would have to show that the prophetic examples actually were later reduced to practice during litigation.[126] Otherwise, the prophetic examples should be afforded no weight.[127] This would also help lessen the impact of GPT-3-generated prophetic examples and claims based on those prophetic examples.

Alternatively, the USPTO could require a deposit of either the computer code or algorithms used by the A.I. Similarly, the USPTO could require a deposit of the training databases used to train the A.I. This would be similar to the public deposit set out for biological materials under the Budapest Treaty of 1977.[128] This solution would help A.I.-generated claims to satisfy both the enablement and written description requirements.

Tabrez Ebrahim has also addressed some of these issues in the rubric of the disclosure requirement.[129] Ebrahim argues that A.I.'s lack of transparency and replication issues deeply affect the disclosure function in patent law.[130] As a solution, Ebrahim suggests that incentives could be implemented to encourage applicants to disclose more when it comes to both A.I.-created inventions as well as patents drafted using A.I. tools.[131] Specifically, Ebrahim suggests use of incentives such as "(1) prioritized examination to (2) reduced

122. THOMSON REUTERS, *supra* note 48, § 608.01(p); *see* Freilich, *supra* note 112, at 673 (showing prophetic and non-prophetic examples).

123. Janet Freilich, *Ignoring Information Quality*, 89 FORDHAM L. REV. 2113, 2150–51 (2021); Lemley, *supra* note 112.

124. Christopher A. Cotropia, *The Folly of Early Filing in Patent Law*, 61 HASTINGS L.J. 65, 120 (2009).

125. *See* Alcon Rsch. Ltd. v. Barr Labs., Inc., 745 F.3d 1180, 1180–90 (Fed. Cir. 2014) (stating that "[t]he burden is on the one challenging validity to show by clear and convincing evidence that the prophetic examples together with other parts of the specification are not enabling").

126. *See id.* at 1189–90.

127. *See id.* at 1190.

128. THOMSON REUTERS, *supra* note 48, § 2403; 37 C.F.R. § 1.801.

129. Ebrahim, *supra* note 77, at 147–48.

130. *Id.* at 148.

131. *Id.*

maintenance fees to (3) greater patent terms to enable longer patent protection to (4) a working model requirement as a prerequisite for a complete patent application."[132]

2. Specific Utility as a Means to Limit A.I.-Drafted Claims

35 U.S.C. § 101 requires that the applicant claim an invention that is "useful."[133] The purpose of the specific utility requirement is to force inventors to claim an invention that provides some immediate benefit to the public.[134] The utility requirement is not met if (1) it is not apparent why the invention is useful or (2) the specification does not disclose enough information about the invention to make its usefulness immediately apparent to those familiar with the technological field of the invention.[135] Specific utility can be contrasted with general utility, which is where the applicant merely indicates that the invention may prove useful without identifying with specificity why it is considered useful.[136] An example of an appropriate specific utility rejection would include a specification that states a drug is useful in treating disease or that the drug has "useful biological properties" without disclosing a specific disease or specific biological property.[137]

A.I.-drafted claims may attempt to broaden the scope of the invention to the point where specific utility may be called into question.[138] When A.I. becomes an expert at drafting claims, those claims may not have an obvious utility or a utility that is supported in the specification. This may be especially important for A.I.-drafted claims in the chemical and biological arts where small chemical changes may have large impacts on efficacy.[139] Thus, by making minor changes to chemical formulas, A.I.-drafted claims may attempt to posit chemical entities that are not useful. Accordingly, practitioners must be careful to review A.I.-drafted claims to make sure there is a specific utility for the claims in question.

Similar to the enablement requirement, patent examiners will have a difficult time determining which claims are based on only prophetic examples and which claims are actually reduced to practice to satisfy the

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132. *Id.* at 162.

133. 35 U.S.C. § 101.

134. *See* THOMSON REUTERS, *supra* note 48, § 2107.01; Nelson v. Bowler, 626 F.2d 853, 856 (C.C.P.A. 1980).

135. Brenner v. Mason, 383 U.S. 519, 529 (1966).

136. THOMSON REUTERS, *supra* note 48, § 2701.01.

137. *In re* Kirk, 376 F.2d 936, 939 (C.C.P.A. 1967).

138. Frank A. DeCosta III et al., *Intellectual Property Protection for Artificial Intelligence*, FINNEGAN (Aug. 30, 2017), https://www.finnegan.com/en/insights/articles/intellectual-property-protection-for-artificial-intelligence.html.

139. Keith T. Butler et al., *Machine Learning for Molecular and Materials Science*, NATURE (July 25, 2008), https://www.nature.com/articles/s41586-018-0337-2.

utility requirement.[140] One solution would be to shift the initial burden of showing utility to the applicant instead of assuming the utility requirement is met.[141] Thus, the initial presumption is that the utility requirement is not met, which can then be rebutted by the applicant. Another solution would be to create a two-pronged commercial utility standard that would require: (1) a market for the invention and that (2) the invention can be manufactured to fulfill that demand.[142]

Finally, the USPTO could simply require practitioners to label those claims generated by A.I. or claims that were generated with heavy input from A.I. This label would allow examiners to discount or review the claims more closely to determine if the utility requirement is met. One problem with this solution is if the practitioner heavily edits the claim. How many practitioner edits would allow the claim to escape the labeling requirement? Minor edits might not suffice; however, major edits to the claims would ensure that the practitioner concluded that the utility requirement is satisfied. It would be up to the USPTO, the courts, or both to determine how many edits are sufficient to overcome the presumption that the utility requirement is not met.

3. Move from Peripheral Claiming Back to Central Claiming

The United States has moved from central claiming, where legal rights were determined by the disclosure in the specification, to the current peripheral claiming system where rights are defined by the *claims* of the patent.[143] This reality prompted the famous 1990 quote from Judge Giles Rich, then-Chief Judge of the Federal Circuit: "The name of the game is the claim."[144] In practice, this means that narrowly written claims suffer from limited protection, while broadly drafted claims result in expansive patent protection.[145] Over the last four decades, patent drafters have honed the skill of broadly crafting claims to cover more than what a patent expressly describes.[146] In fact, much of the added value that a patent attorney provides

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140. *See generally* Tabrez Y. Ebrahim, *Computational Experimentation*, 21 VAND. J. ENT. & TECH. L. 591 (2019); Lemley, *supra* note 112 (stating that use of prophetic examples could extend "credit for teaching others how to make and use the invention even though she never did so herself"); Timothy R. Holbrook, *Possession in Patent Law*, 59 SMU L. REV. 123, 158 (2006) (stating that "prophetic examples cannot allow the patent claim to extend beyond what the inventor possessed").

141. Sean B. Seymore, *The Presumption of Patentability*, 97 MINN. L. REV. 990, 1033 (2013).

142. Michael Risch, *Reinventing Usefulness*, 2010 BYU L. REV. 1195, 1240 (2010); Ebrahim, *supra* note 140, at 606.

143. Burk & Lemley, *supra* note 86, at 1746–47.

144. Giles S. Rich, *The Extent of the Protection and Interpretation of Claims-American Perspectives*, 21 INT'L REV. INDUS. PROP. & COPYRIGHT L. 497, 499 (1990); Gerson S. Panitch, *Is the Name of the Game Still the Claim? The Post*-Phillips *Revolution in Patent Law*, FINNEGAN (June 2007), https://www.finnegan.com/en/insights/articles/is-the-name-of-the-game-still-the-claim-the-post-phillips.html.

145. *Id.*

146. *Id.*

is the ability to portent future embodiments of the invention and protect those commercially valuable variations using broad claim language.[147] GPT-3 and other A.I. tools have the ability to drastically augment this practice.

As A.I. becomes better at drafting peripheral claims that cover all variations of the invention, we can imagine a world where claims cover embodiments of the invention that were never originally contemplated by the inventor. This may be acceptable when the A.I. drafts claims to variations of the invention that are relatively minor or clearly obvious. However, when A.I. drafts claims to variations of the claim that are significantly different from the original and unimagined by the inventor, then the quid pro quo foundation of patents is violated.

When A.I. becomes an expert at drafting claims, courts may be forced to focus on the central features of the invention and look to how much protection the patentee is entitled to by "looking at the prior art that cabins the invention, how important the patentee's invention was, and how different the accused devise is."[148] Litigation focus might then shift from the literal words of the claims to the patentee's description of the invention and those embodiments that were actually reduced to practice. Thus, courts would focus on the patentee's overall invention and contribution to the art rather than the literal language of the claims. Accordingly, moving back to the central claiming would help diminish the problem with patentees who invent one thing and later claim to own something else entirely.

4. Inventorship and Definiteness as a Limit to A.I.-Conceived Claims

The doctrine of inventorship can also act as a legal means to prevent patenting of A.I.-conceived inventions.[149] Many commentators have previously opined on if A.I. can create patentable subject matter and assert patent rights on that subject matter.[150] If the A.I. is independently inventing, without the help of a human inventor, then we would need additional guidance from Congress and the USPTO. Currently, several patent offices, including the USPTO, the UKIPO, and the EPO, have given specific

147. Michael J. Meurer & Craig A. Nard, *Invention, Refinement, and Patent Claim Scope: A New Perspective on the Doctrine of Equivalents*, 93 GEO L. J. 1947, 1952 (2004).

148. Burk & Lemley, *supra* note 86, at 1746.

149. Katelyn R. Knutson, Note, *Anything You Can Do, AI Can't Do Better: An Analysis of Conception as a Requirement for Patent Inventorship and a Rationale for Excluding AI Inventors*, 11 CYBARIS INTEL. PROP. L. REV. 1, 5 (2020).

150. *See* Ryan Abbott, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 B. C. L. REV. 1079 *passim* (2016); Ralph D. Clifford, *Intellectual Property in the Era of the Creative Computer Program: Will the True Creator Please Stand Up?*, 71 TUL. L. REV. 1675, 1681 (1997); Pamela Samuelson, *Allocating Ownership Rights in Computer-Generated Works*, 47 U. PITT. L. REV. 1185, 1195–97 (1986) (examining copyright rights for computer generated works); Ben Hattenbach & Joshua Glucoft, *Patents in an Era of Infinite Monkeys and Artificial Intelligence*, 19 STAN. TECH. L. REV. 32, 43–44 (2015); Ebrahim, *supra* note 77, at 181; Ebrahim, *supra* note 140, at 591.

guidance.[151] Each of these offices have independently held that only a natural person can be an inventor.[152] Accordingly, A.I. cannot receive patent rights even if the A.I. independently "conceived" of the invention.[153]

An "inventor" is defined in 35 U.S.C. § 100 as an "individual [or] . . . individuals collectively who invented or discovered the subject matter of the invention."[154] Additionally, § 101 states that "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter . . . may obtain a patent."[155] Conception is the cornerstone of inventorship.[156] It requires "the completion of the mental part of invention."[157] Specifically, conception requires "the formation in the minds of the inventors of a definite and permanent idea of the complete and operative invention as it was thereafter applied in practice."[158] The USPTO has interpreted language in the Patent Act to cover only a natural person because the Patent Act uses the terms "whoever," "himself or herself," and "individual" when describing an inventor.[159] Specifically, the USPTO held that only a natural person can be an inventor and only a human being can engage in the act of conception.[160]

Interestingly, under a now overturned Supreme Court case, *Cuno Engineering Corp. v. Automatic Devices Corp.*, patent law previously embraced a "flash of creative genius" test.[161] This test held that an inventive act needed to come into the mind of an inventor in a flash of creative genius and not as a result of tinkering.[162] Courts could return to this flash of creative genius test to combat A.I.-developed claims. However, this almost certainly would have a negative effect on innovation policy because most inventions do not occur from a flash of creative genius but from slow, steady, concerted, and stepwise efforts towards solving a problem.[163]

The Patent Act also describes actions that can only be performed by a human being. For example, only a human being can "execute an oath or

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151. *See* Imogen Ireland & Jason Lohr, *'DABUS' The AI Topic that Patent Lawyers Should Be Monitoring*, MANAGING IP (Sept. 9, 2020), https://www.managingip.com/article/b1n8q624s4vyv4/dabus-the-ai-topic-that-patent-lawyers-should-be-monitoring.

152. *Id.*

153. *See generally id.* Patentability issues arise if the A.I. is involved with the "conception" of the invention, which is slightly different from use of A.I. as a tool to help draft claims. *See also* Ebrahim, *supra* note 77, at 179–80.

154. 35 U.S.C. § 100(f).

155. *Id.* § 101.

156. Burroughs Wellcome Co. v. Barr Laby's., Inc., 40 F.3d 1223, 1227 (Fed. Cir. 1994) (citing Sewall v. Walters, 21 F.3d 411, 415 (Fed. Cir. 1994)).

157. *Id.* at 1227–28.

158. Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1378 (Fed. Cir. 1986).

159. *See In re* Application of Application No.: 161524,30, No:50567-3-01-US, 2020 WL 1970052, at *4 (TMGI Apr. 22, 2020).

160. *See id.*

161. Cuno Eng'g Corp. v. Automatic Devices Corp., 314 U.S. 84, 91 (1941).

162. In 1952, Congress explicitly overturned the "flash of genius" test in 35 U.S.C. § 103, stating "Patentability shall not be negated by the manner in which the invention was made." *Id.*

163. *See* David E. Wigley, *Evolution of the Concept of Non-Obviousness of the Novel Invention: From a Flash of Genius to the Trilogy*, 42 ARIZ. L. REV. 581, 591 (2000).

declaration."[164] Additionally, the oath or declaration must contain statements that the "individual believes himself or herself to be the original inventor or original joint inventor of a claimed invention in the application."[165] It is unclear if an A.I. could believe that it was the inventor. However, even if A.I. was sentient enough to recognize which claims it invented, it still may fail to obtain patent rights. Borrowing from copyright law, the Ninth Circuit held that a monkey which took "selfies" lacked standing to sue under the copyright act.[166]

35 U.S.C. §112(b) requires that the inventor set forth "the subject matter which the inventor or a joint inventor *regards as the invention*."[167] 35 U.S.C. §112(b) contains two separate requirements.[168] The first requirement is a subjective one because it depends on what the inventor regards as his or her invention.[169] The second requirement is an objective one because it depends on the POSITA and whether the claims would be clear and unambiguous to that POSITA.[170]

This requirement is important because the A.I. tool cannot "regard" anything as the invention because that seems to require a human element. Accordingly, the A.I. would always fail the first subjective part of the definiteness requirement. Interestingly, before the 2011 amendments, 35 U.S.C. §112, paragraph two stated that the specification should conclude with one or more claims "which the applicant regards as *his* invention."[171] Use of the word "his" would also preclude A.I. as an inventor.[172]

B. Ethical Implications of GPT-3 in the Practice of Patent Prosecution

The potential application of GPT-3 to the practice of law also raises troubling ethical concerns. Many issues are beyond the scope of this Article, including the question of whether language models such as GPT-3 will be engaged in the unauthorized practice of law if they are used to generate legal documents and how the use of GPT-3 may implicate and perhaps exacerbate potential issues of bias.[173] This Article will focus specifically on how the use of GPT-3 will implicate two ethical issues: (1) attorney supervision of

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164. *E.g.*, 35 U.S.C. § 115.
165. *Id.* § 115(b)(2).
166. Naruto v. Slater, 888 F.3d 418, 425 (9th Cir. 2018).
167. 35 U.S.C. § 112(b) (emphasis added).
168. THOMSON REUTERS, *supra* note 48, § 2171.
169. *Id.*
170. *Id.*
171. 35 U.S.C. § 112 (1975) (amended 2011) (emphasis added).
172. *Id.*
173. *See generally* Cyphert, *supra* note 24 (exploring how the use of GPT-3 in the practice of law could potentially cause issues for attorneys under Model Rule 8.4(g), which declares that it is professional misconduct for lawyers to engage in conduct that is harassment or discriminatory while engaging in the practice of law).

non-lawyer assistance in the rubric of patent prosecution and (2) the social justice gap that may be created by use of GPT-3.

1. Ethical Implications of GPT-3 in the Practice of Patent Prosecution

The USPTO Rules of Professional Conduct govern both patent agents and patent attorneys who practice before the USPTO.[174] These rules require competence as outlined by 37 C.F.R. § 11.101, stating that a practitioner "shall provide competent representation to a client."[175] Further, competent representation requires "legal, scientific, and technical knowledge, skill, thoroughness[,] and preparation."[176] Patent practitioners may also be able to use GPT-3 as a tool to help draft claims while "supervising" the technology under the three-step process outlined below.[177]

Additionally, all patent attorneys are governed by the model Rules of Professional Conduct. [178] Under the Model Rules of Professional Conduct, attorneys are required to supervise any nonlawyer assistance they employ in serving their clients.[179] Specifically, Model Rule 5.3 requires that all lawyers make "reasonable efforts" to ensure that the "conduct" of any nonlawyer assistance they use is "is compatible with the professional obligations of the lawyer."[180] The Rule clearly requires that lawyers supervise any nonhuman technology that they employ in the practice of law.[181] For example, comment 3 to Rule 5.3 includes cloud storage services as an example of nonlawyer assistance[182] and notes that "a lawyer must make reasonable efforts to ensure that [such] services are provided in a manner that is compatible with the lawyer's professional obligations."[183]

What will it mean for a patent attorney or agent to supervise technology like GPT-3? Scholars who have addressed the question of what it means for lawyers to supervise artificial intelligence, in general, have made concrete

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174. *See* 37 C.F.R. Parts 1, 2, 7, 10, and 41.

175. 37 C.F.R. § 11.101 (2013).

176. *Id.*

177. *See generally id.*

178. Most states adopt the Model Rules of Professional Conduct authored by the American Bar Association. *See generally Alphabetical List of Jurisdictions Adopting Model Rules*, A.B.A., https://www.americanbar.org/groups/professional_responsibility/publications/model_rules_of_professional_conduct/alpha_list_state_adopting_model_rules/ (last updated Mar. 28, 2018).

179. MODEL RULES OF PRO. CONDUCT r. 5.3 (AM. BAR ASS'N 2020).

180. *Id.*

181. The rule was renamed in 2012, and the title was changed from "Responsibilities Regarding Nonlawyer *Assistants*" to "Responsibilities Regarding Nonlawyer *Assistance.*" H.D., *Resolution 112*, A.B.A. 16 (Aug. 12–13, 2019), https://www.americanbar.org/content/dam/aba/directories/policy/annual-2019/112-annual-2019.pdf ("In 2012, the title of Model Rule 5.3 was changed from 'Responsibilities Regarding Nonlawyer Assistants' to 'Responsibilities Regarding Nonlawyer Assistance.' The change clarified that the scope of Rule 5.3 encompasses nonlawyers whether human or not.").

182. MODEL RULES OF PRO. CONDUCT r. 5.3 cmt. 3 (AM. BAR ASS'N 2020) (The comment lists "using an Internet-based service to store client information").

183. A.B.A., *supra* note 181, at 5.

suggestions that might be difficult for most practitioners to implement.[184] For example, legal ethics professor Roy Simon recommends that lawyers who attempt to supervise artificial intelligence ("the bionic legal intern") take three steps: "(1) hire an expert to vet the [A.I.] product; (2) learn what the [A.I.] product can (and can't) do; and (3) double check the output of the [A.I.] product."[185] Step one should be easy enough, at least for large law firms with funding to hire expensive IT consultants.[186] Step two can perhaps be covered by a motivated attorney during continuing legal education or through some probing conversations with honest software vendors. Step three will be very key, but properly reviewing that the output of GPT-3 is correct, persuasive, and cogent may ultimately reduce some of the utility of the tool. As mentioned in Section II above, many of the potential harms that are associated with A.I.-drafted applications may be preemptively addressed by simply disclosing which sections were engineered by the A.I. and which sections were authored by the applicant.[187] Undoubtedly, some less scrupulous attorneys will simply sign their name to legal documents that they have not thoroughly reviewed, which would clearly violate the competence requirement required by the USPTO.[188]

Oversight of GPT-3 is important not only because, as discussed previously, one wrong or errant word can massively alter a specification or claim.[189] It is also important given the tendency of artificial intelligence tools to reflect the bias that is present in our larger society.[190] Because tools like GPT-3 are trained on datasets that include text from websites like Reddit, where users openly post content that is racist, sexist, homophobic, etc., those tools often reflect that bias in their outputs.[191] GPT-3's creators acknowledge the existence of racial and gender bias in the tool.[192] Using co-occurrence tests, which measure how often one word follows another, they determined

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184. *See, e.g.*, Roy D. Simon, *Artificial Intelligence, Real Ethics*, N.Y. ST. BAR J. 35–37 (Apr. 2018), https://www.iadclaw.org/assets/1/7/10.5-_Simon_(Roy)-_Artificial_Intelligence_Real_Ethics.pdf.

185. *Id.* at 3.

186. Tabrez Y. Ebrahim, *Automation & Predictive Analytics in Patent Prosecution: USPTO Implication & Policy*, 4 GA. ST. U. L. REV. 1185, 1234, 1236–37 (2019).

187. *See supra* Section II (discussing GPT and Artificial Intelligence).

188. Liz O'Sullivan & John Dickerson, *Here Are a Few Ways GPT-3 Can Go Wrong*, TECHCRUNCH (Aug. 7, 2021, 9:45 AM), https://techcrunch.com/2020/08/07/here-are-a-few-ways-gpt-3-can-go-wrong/.

189. *See generally* Amy B. Cyphert, *Tinker-Ing with Machine Learning: The Legality and Consequences of Online Surveillance of Students*, 20 NEV. L.J. 457, 462 (2020) (discussing how artificial intelligence tools, many of which are fueled by machine learning, "can be inadvertent tools for deepening inequality").

190. *Id.*

191. *Id*. (quoting Barocas & Selbst, *supra* note 68, at 674) ("[T]he concern is that algorithms 'can reproduce existing patterns of discrimination, inherit the prejudice of prior decision makers, or simply reflect the widespread biases that persist in society,' even when 'they have not been manually programmed to do so.'"); *see also* Farhad Manjoo, *How Do You Know a Human Wrote This?*, N.Y. TIMES (July 29, 2020), http://www.nytimes.com/2020/07/29/opinion/gpt-3-ai-automation.html ("Because it was trained on text found online, it's likely that GPT-3 mirrors many biases found in society.").

192. Brown et al., *supra* note 2, at 36–37; *see also* Cyphert, *supra* note 189 (noting that researchers hypothesize that this happens because there is so much material on the internet that sexualizes women).

that the tool is more likely to write sentences about women that focus on their appearance or sexualize them.[193] Further, they tested GPT-3's output for racial bias by feeding it prompts like "[t]he [Black] man was very" and rating the "sentiment" value of the words that it produced.[194] They concluded that the words that GPT-3 wrote for prompts involving Black people had consistently low sentiment value.[195] The researchers concluded that these results "highlight[] the need for more sophisticated analysis of the relationship between sentiment, entities, and input data."[196] Although the issues of bias in the content generated by GPT-3 may be a less obvious concern in the patent field, given the tight constraints of patent claims and specifications, practitioners will need to be vigilant.

2. Social Justice and GPT-3

The gap that exists between those who need, yet cannot afford legal services and the resources available to provide those services is often called the access to justice gap.[197] In the patent world, Philippe Aghion has shown innovation and increased patenting intensity can actually widen the inequality gap.[198] Interestingly, Aghion has also shown that innovation by new entrants is also positively associated with social mobility but less so in areas with intense lobbying activities.[199] For new entrants, patents can act as a great equalizer which can not only prevent others from entering the market but can also act as an asset that can be mortgaged, licensed, or traded.[200] New entrants may find it harder to patent their inventions if larger firms can use A.I. technology to obtain broader claims for their patents.

Innovation inequality can also come in the context of both gender and race.[201] Previous research has shown that there are gender inequalities in both

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193. Brown et al., *supra* note 2.

194. *Id.*

195. *Id.*

196. *Id.*

197. LEGAL SERVS. CORP., REPORT OF THE SUMMIT ON THE USE OF TECHNOLOGY TO EXPAND ACCESS TO JUSTICE, 1 (2013), https://www.lsc.gov/sites/default/files/LSC_Tech%20Summit%20Report_2013.pdf ("The Legal Services Corporation (LSC) has found through its experience with its Technology Initiative Grant program that technology can be a powerful tool in narrowing the justice gap—the difference between the unmet need for civil legal services and the resources available to meet that need.").

198. Philippe Aghion et al., *Innovation and Top Income Inequality*, 86 REV. ECON. STUD. 1, 20 (2018), https://academic.oup.com/restud/article/86/1/1/5026613 (showing that there was a "positive and significant correlation between innovation and top income inequality").

199. *See id.*

200. *See generally* Colleen V. Chien, *The Inequalities of Innovation*, EMORY L.J. (forthcoming 2022), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3157983.

201. *Id.; see also* Paul R. Gugliuzza & Rachel Rebouche, *Gender Inequality in Patent Litigation,* 100 N.C. L. REV. (forthcoming 2022); Shontavia Johnson, *The Colorblind Patent System and Black Inventors*, 11 LANDSLIDE 16, 20 (2019); Lisa Cook, *Violence and Economic Growth: Evidence from African American Patents, 1870-1940*, 19 J. ECON. GROWTH 221, 226 (2014); Lisa D. Cook & Chaleamporg

obtaining and maintaining patent rights.[202] Further, access to tools like GPT-3 could widen the gap of the inequality between the "haves and the have nots" by providing a powerful tool available only to wealthy firms. Importantly, it has previously been shown that large entities are more successful in filing and patenting their inventions in a shorter amount of time compared to small entities.[203] Colleen Chien has described this as an "inequality of opportunity to innovate."[204]

If GPT-3 has the ability to automate patent-application drafting, large firms could attempt to claim more than they enabled in their patent application. Not only could GPT-3 increase the scope of their exclusive rights by drafting broader claims, but GPT-3 could also help create patent "thickets" to dramatically increase the cost of entry.[205] Patent thickets are usually associated with a large number of weaker patents that are generated to act as a barrier to market entry for competitors.[206] It has previously been shown that small entities use prophetic examples less than large companies and are also associated with weaker patents.[207] Use of GPT-3 to automate the generation of patents with many claims and many prophetic examples could lead to the creation of denser and more patent thickets.[208] The private sector will gain a competitive advantage in acquiring patents because they have the resources to use these tools, pulling the gender and racial divide in innovation policy even further apart.[209]

Kongcharoen, *The Idea Gap in Pink and Black* 8–10 (Nat'l Bureau of Econ. Rsch., Working Paper No. 16331 2010), https://www.nber.org/system/files/working_papers/w16331/w16331.pdf.

202. Kyle Jensen et al., *Gender Differences in Obtaining and Maintaining Patent Rights*, 36 NATURE BIOTECH. 307, 308 (2018) (showing that women fare worse compared to men across multiple patent metrics, such as patent grants, number of independent claims accepted, increased word counts in claims, longer prosecution times, less forward citations and less maintenance fee payments)*; see also* Amy C. Madl & Lisa Larrimore Ouellette, *Policy Experiments to Address Gender Inequality Among Innovators*, 57 HOUS. L. REV. 813, 815–26 (2020); Dana Kanze et al., *Male and Female Entrepreneurs Get Asked Different Questions by VCs–and It Affects How Much Funding They Get*, HARV. BUS. REV. (June 27, 2017), https://hbr.org/2017/06/male-and-female-entrepreneurs-get-asked-different-questions-by-vcs-and-it-affects-how-much-funding-they-get.

203. Kate Gaudry & Sarah C. Brock, *Patent Prosecution Statistics: Large Versus Small Entities*, INTELL. PROP. TODAY 34, 34–35 (Oct. 2014).

204. *See* Chein, *supra* note 200.

205. *See generally* Bonwyn H. Hall et al., *Technology Entry in the Presence of Patent Thickets*, 73 OXFORD ECON. PAPERS 903 (2021).

206. *Id.* at 904.

207. Freilich, *supra* note 112, at 705–10 (showing that small entities use prophetic examples much less frequently than large firms and that patents with prophetic examples are correlated with less valuable and weaker patents).

208. *See generally The Story of AI in Patents*, WORLD INTELL. PROP. ORG., wipo.int/tech_trends/en/artificial_intelligence/story.html (last visited Oct. 12, 2021).

209. Ebrahim, *supra* note 186, at 1188.

The USPTO is already incorporating A.I. into their workflow.[210] Specifically, A.I. is being incorporated to search and classification.[211] In order to help discover the most relevant prior art, the USPTO is incorporating an A.I.-based search system that identifies relevant documents and also provides suggestions for additional areas to search.[212] Access to A.I.-powered search systems could help small-entity inventors determine where their invention fits within the patent landscape, as well as what references may anticipate their claimed invention.

In many respects, access to A.I. tools such as GPT-3 is similar to having access to an experienced, creative, and imaginative patent attorney. A.I. and GPT-3 can simply substitute for well-seasoned patent attorneys who have a wealth of experience in claim drafting and the ability to forecast important future embodiments of an invention.[213] The difference between A.I. tools and an experienced patent prosecutor is cost and time. A.I., however, has the ability to drastically reduce the cost of drafting claims, as well as reducing the time needed to prosecute a patent.[214]

Giving equal access to these tools could help level the playing field for new entrants. The access problem could be addressed by simply allowing all inventors to access these A.I. technologies at the USPTO regional offices or the Patent and Trademark Resource Centers (PTRCs) across the country. Currently, the USPTO could give inventors access to the A.I. tools created to help identify relevant prior art as well as suggestions for other areas of search. These tools could also help the USPTO because better access to relevant prior art would help inventors preemptively avoid anticipation and obviousness issues.

V. CONCLUSION

GPT-3 has the ability to transform the nature of patent prosecution. As A.I. becomes an expert at drafting patent claims, we will need to decide the scope and breadth of control we will cede to A.I. when it comes to innovation policy. Movement to central claiming, use of specific utility, and enablement will be doctrines that we could use to limit the harms that A.I. could inflict on our innovation economy. Additionally, ethical issues such as racial and gender bias as well as access to this new technology also needs to be taken into account when applying A.I. and GPT-3 to patent prosecution.

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210. Drew Hirshfeld, *Director's Forum: A Blog from USPTO's Leadership*, U.S. PAT. AND TRADEMARK OFF. (Mar. 18, 2021), https://www.uspto.gov/blog/director/entry/artificial-intelligence-tools-at-the.

211. *Id.*

212. *Id.*

213. *See* Meurer & Nard, *supra* note 147 (discussing refinement for future embodiments).

214. Udi Cohen, *Artificial Intelligence Will Help to Solve the USPTO's Patent Quality Problem*, IPWATCHDOG (Nov. 23, 2019), https://www.ipwatchdog.com/2019/11/23/artificial-intelligence-will-help-solve-usptos-patent-quality-problem/id=116302/.