Rogue AI Patents and the USPTO's Rejection of *Alice*

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AI inventions, from ChatGPT to self-driving taxis, have taken the world by storm. Many of these inventions are protected by patents, and the number of AI patents is rapidly growing. Yet a large number of AI patents are flawed, prone to invalidation in court. This Comment argues that many AI patents were granted on legally flawed grounds, pursuant to United States Patent and Trademark Office (USPTO) regulations that systematically departed from controlling case law. The existence of these flawed patents poses a growing problem. Courts may invalidate the patents, upsetting expectations of an important, nascent industry. On the other hand, courts may acquiesce to the USPTO's leniency, which could have the perverse effect of further unsettling the law, increasing examination uncertainty, and proliferating bad patents.

This Comment asks, in light of the policy of the patent system, which AI inventions ought to receive patents. It concludes that AI methods and models should be patent eligible because they are likely to be incentivized by patents and unlikely to chill follow-on innovation. This Comment further argues that both the USPTO's guidance and much of the Federal Circuit's recent eligibility case law are inconsistent with finding these inventions patent eligible. However, the Federal Circuit demonstrated an understanding of eligibility that would allow patents for many AI methods and models in its 2016 McRO, Inc. v. Bandai Namco Games America Inc. *decision. This Comment concludes by advocating that the Federal Circuit explicitly apply the holding of* Bandai *to hold that an AI invention is patent eligible at the first opportunity in order to settle the law while granting the benefits of patents only to deserving inventions.*

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INTRODUCTION

Artificial intelligence (AI) has broken into the mainstream in recent years to an unprecedented extent. For example, ChatGPT, an online AI chatbot which debuted in 2022, already has over one hundred million weekly users.[1] Publicly available AI tools are now increasingly familiar to internet searchers,[2] students,[3] finance professionals,[4] and lawyers.[5] To most consumers, it probably appears that AI has burst onto the scene in a moment of abrupt technological breakthrough. But behind this powerful new technology lie many patents, and they tell a different story—a

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1 Jon Porter, *ChatGPT Continues to Be One of the Fastest-Growing Services Ever*, THE VERGE (Nov. 6, 2023), https://perma.cc/T3LV-5C7H.

2 *E.g.*, Sundar Pichai, *An Important Next Step on Our AI Journey*, THE KEYWORD (Feb. 6, 2023), https://perma.cc/PAE4-9LYQ (debuting Google's Bard AI chatbot).

3 *E.g.*, Kelsey Matzinger, *The Rising Trend of Teens Using AI for Schoolwork*, JUNIOR ACHIEVEMENT USA (July 27, 2023), https://perma.cc/XT5X-RY97 (noting that nearly half of surveyed high schoolers plan to use AI to complete assignments).

4 *E.g.*, Jania Okwechime, *How Artificial Intelligence is Transforming the Financial Services Industry*, DELOITTE & TOUCHE, https://perma.cc/PTJ2-MYAQ (describing the use of AI for fraud detection, among other things).

5 *E.g.*, Benjamin Weiser & Jonah E. Bromwich, *Michael Cohen Used Artificial Intelligence in Feeding Lawyer Bogus Cases,* N.Y. TIMES (Dec. 29, 2023), https://www.nytimes.com/2023/12/29/nyregion/michael-cohen-ai-fake-cases.html (reporting on a lawyer who cited fake, AI-generated cases in court documents); Dan Mangan, *Judge Sanctions Lawyer for Brief Written by A.I. with Fake Citations*, CNBC (June 22, 2023), https://perma.cc/L95L-C2J5 (same).

story of incremental development stretching back decades, punctuated by some curious, abrupt legal changes.

At a high level, the concept of AI refers to thinking machines.[6] More concretely, AI, as used in this Comment, refers to machines that can learn to perform specific tasks without explicit instructions[7] by generalizing from relationships among a large volume of so-called training data.[8] Say, for example, that you want a computer to recognize pictures of dogs. You could provide every dog picture ever taken, but the sheer volume of dog pictures in existence renders this infeasible.[9] Thus, what you need is for the computer to do what humans do: generalize from past experience to create a concept of "dog" and then determine whether that concept is present in a new image. One way to approach the problem is by taking a few pictures of dogs and a few pictures of items that are not dogs (say, cats) and labeling them: this is your training set, organized as inputs (pictures) and outputs (dog or not dog). You would then feed the training set to the computer. Next, you would run a learning algorithm, which allows the computer to find features of the input data that predict the desired output. Put differently, it pares down the large volume of input data into just those features that are common among the dog pictures. Once it has identified those features, you could write a program that looks for them in image data: this program is your model. Finally, you can apply your model by asking it to identify dogs in images it has never seen.[10] If your AI dog recognizer is novel,[11] nonobvious,[12] and useful,[13] you might apply for a patent so that you can reap the fruits of your inventive labor. Of course, real AI inventions can be

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6 *See* A.M. Turing, *Computing Machinery and Intelligence*, 59 MIND 433, 433 (1950); *see also What is Artificial Intelligence (AI)?*, IBM, https://perma.cc/YYL5-G356.

7 *See* A.L. Samuel, *Some Studies in Machine Learning Using the Game of Checkers*, 3 IBM J. RSCH. & DEV. 210, 218–24 (1959).

8 *See id*. *See generally* CHRISTOPHER M. BISHOP, PATTERN RECOGNITION AND MACHINE LEARNING (2006). To be precise, I am describing machine learning (ML), which is an important subset of AI. The ongoing AI boom is largely a result of advances in deep learning, a type of ML. *See generally* IAN GOODFELLOW, YOSHUA BENGIO & AARON COURVILLE, DEEP LEARNING (2016).

9 More fundamentally, if you have a reasonable way of getting all pictures of dogs already, you do not need the machine.

10 What I describe here is supervised learning; there are other kinds of machine learning and many possible choices of learning algorithm. *See, e.g.*, Susmita Ray, *A Quick Review of Machine Learning Algorithms*, 2019 INT'L CONF. ON MACH. LEARNING, BIG DATA, CLOUD & PARALLEL COMPUTING 35, 35–39 (briefly describing eleven ML algorithms).

11 *See* 35 U.S.C. § 102.

12 *See id.* § 103.

13 *See id.* § 101.

deployed to less frivolous ends than dog recognition. Patented AI inventions exist for the generation of personalized messages,[14] self-driving cars,[15] and facial recognition,[16] to list just a few.

Patents to AI inventions date back to at least the 1990s,[17] but the numbers of both AI patent applications and issued patents have increased dramatically recently.[18] The rate at which the U.S. Patent and Trademark Office (USPTO or the Office) grants AI patents has sharply changed twice in the last decade.[19] The first change can be traced to the Supreme Court's 2014 decision in *Alice Corp. v. CLS Bank International*,[20] which announced a new, expanded test for excluding abstract ideas, including much software, from being patentable.[21] Following *Alice*, the AI patent application allowance rate (the rate at which patents are allowed, or granted, by the Office) fell by over 10% in a single year.[22] Then, in 2019, there was a marked increase in the AI patent grant rate.[23] This latter shift came just in time for the current wave of AI innovation.

What happened in 2019 to dramatically increase the grant rate for AI patents? Two potential causes—a legislative change to the Patent Act[24] or new Supreme Court precedent—cannot

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14 *See, e.g.*, U.S. Patent No. 11,321,736.

15 *See, e.g.*, U.S. Patent No. 9,791,861.

16 *See, e.g.*, U.S. Patent No. 11,443,553.

17 *See, e.g.*, U.S. Patent No. 5,819,007 (filed Mar. 15, 1996) (issued Oct. 6, 1998) (claiming a rudimentary machine learning algorithm for classifying electrocardiogram signals as arrhythmic or nonarrhythmic).

18 *See* Justin E. Pierce & Ryan T. Ward, *Artificial Intelligence Patent Trends*, VENABLE LLP (Nov. 17, 2023), https://perma.cc/6RCP-89N4 (describing a twentyfold increase in the term "artificial intelligence" in patent applications between 2011 and 2021); *see also* NICHOLAS A. PAIROLERO, U.S. PAT. & TRADEMARK OFF., ARTIFICIAL INTELLIGENCE (AI) TRENDS IN U.S. PATENTS 13 (2022) [hereinafter USPTO, TRENDS] (showing over forty thousand U.S. AI patents granted in 2020).

19 *See* USPTO, TRENDS, *supra* note 18, at 15.

20 573 U.S. 208 (2014).

21 *Id.* at 216; *see infra* Part II.B.

22 U.S. PAT. & TRADEMARK OFF., PATENT ELIGIBLE SUBJECT MATTER: PUBLIC VIEWS ON THE CURRENT JURISPRUDENCE IN THE UNITED STATES 13 (2022) [hereinafter USPTO, PUBLIC VIEWS].

23 *Id. See also* Andrew A. Toole & Nicholas A. Pairolero, U.S. PAT. & TRADEMARK OFF., ADJUSTING TO *ALICE* 5–6 (2020) [hereinafter USPTO, ADJUSTING TO *ALICE*] (demonstrating a commensurate decrease in eligibility rejection rate for *Alice*-affected technologies in 2019); Alexander V. Giczy, Nicholas A. Pairolero & Andrew A. Toole, *Identifying Artificial Intelligence (AI) Invention: A Novel AI Patent Dataset* 54–55 (U.S. Pat. & Trademark Off., Economic Working Paper No. 2021-2, 2021) (showing a roughly 10% increase in the number of granted AI patents between 2018 and 2019, following four years of little growth).

24 35 U.S.C. § 101 et seq.

explain the shift. The last major congressional action on patents took effect in 2012,[25] and the Court has not addressed patent subject matter eligibility since *Alice*.[26] Instead, the apparent explanation is a 2019 revision to the Manual of Patent Examining Procedure (MPEP), the USPTO's rules for patent examiners.[27] The 2019 revision significantly altered the guidance on evaluating patent subject matter eligibility—that is, the types of material that are categorically unpatentable.[28] And, by adopting a more permissive posture toward AI inventions at a critical time in the development of the technology, the USPTO's 2019 changes resulted in many thousands more patents for AI inventions today than would have been issued under the prior rules.[29]

This Comment argues that, while those patentees might be momentarily pleased with this result, they should not be. The USPTO has no substantive rulemaking authority, and its substantive legal interpretations are not entitled to deference in future lawsuits over AI patents.[30] Yet the 2019 changes to the eligibility guidance were undeniably substantive and fly in the face of governing Federal Circuit case law interpreting *Alice*.[31] When the AI patents currently being granted are challenged, patentees will be forced to confront the unfavorable precedents that the USPTO has declined to apply.

But those unfavorable precedents are not sacrosanct, and the Federal Circuit should amend eligibility doctrine to avoid dooming worthwhile AI inventions. Certain AI inventions serve patent law's policy of promoting innovation by disclosing useful information without chilling follow-on invention.[32] Judges and

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25 Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (codified as amended in scattered sections of 35 U.S.C.).

26 *See, e.g.*, Kevin E. Noonan, *Supreme Court Denies Cert in* American Axle, PAT. DOCS (June 30, 2022), https://perma.cc/6GKH-YA73 ("[T]he Court will not address the morass in patent subject matter eligibility[,] . . . this refusal being the latest . . . in an increasingly long line.").

27 *See* U.S. PAT. & TRADEMARK OFF., MANUAL OF PATENT EXAMINING PROCEDURE § 2106 (9th ed., rev. 2022) [hereinafter USPTO, MPEP].

28 *See* Daniel R. Cahoy, *Patently Uncertain*, 17 NW. J. TECH. & INTELL. PROP. 1, 49 (2019) (highlighting USPTO Director Andrei Iancu's statement that "the [US]PTO had crafted guidance that would eliminate [subject matter eligibility] considerations in many cases").

29 *Cf.* USPTO, TRENDS, *supra* note 18, at 7 (showing approximately fifteen thousand more AI patent applications in 2020 compared to 2018).

30 *See, e.g.*, Merck & Co. v. Kessler, 80 F.3d 1543, 1549–50 (Fed. Cir. 1996) (explaining that the USPTO is not authorized by Congress to issue substantive rules).

31 *See infra* Part II.C.

32 *See infra* Part III.B.

lawmakers should therefore refine eligibility doctrine to avoid categorically excluding these inventions from patentability. Congress or the Supreme Court could intervene to provide clear guidance, but neither has shown much appetite for doing so.[33] As a result, a more promising avenue for incremental reform would be for the Federal Circuit to revisit its cases interpreting *Alice*. Because the Federal Circuit takes appeals of all patent cases nationally,[34] it has the capacity to settle the issue of AI patent eligibility until the Supreme Court addresses the issue again. Specifically, the Federal Circuit can extend its holding in *McRO, Inc. v. Bandai Namco Games America Inc.*[35] to clarify that inventions that automate mental processes, but accomplish that automation through a series of steps that differs from the existing, human-performed process, are generally patent eligible because they improve the functioning of computers.[36] This formulation would dispel the cloud of uncertainty hanging over worthy AI inventions while leaving the most problematic patents out of bounds.

The stakes of this issue are high and growing because today's patent applications are tomorrow's products. These new patents are the vanguard of a $100 billion global industry projected to grow to nearly $2 *trillion* between 2023 and 2030.[37] Yet they stand on unstable footing. The recent rapid shifts in grant rates indicate that the current equilibrium could easily be upended again by adverse decisions at the Federal Circuit, and the effects of such a change will only become more profound as the AI industry grows. Conservatively, ten thousand "excess" AI patents are being granted each year due to the Office's 2019 changes.[38] That makes fifty thousand excess AI patents since 2019; if even 1% of these

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[33] This is despite criticism of the law of eligibility by various scholars, industry figures, and government officials. *See, e.g.*, Brief for the United States as Amicus Curiae at 20–21, Am. Axle & Mfg. Inc. v. Neapco Holdings LLC, 142 S. Ct. 2902 (No. 20-891) (cert. denied) (urging the Court to grant certiorari to revisit eligibility in view of "[o]ngoing uncertainty" and the need for "greater clarity"); Talha Syed, *Reconstructing Patent Eligibility*, 70 AM. U. L. REV. 1937, 1940 (2021) ("[T]he current law on ineligible subject matter is in a bad state of repair."); *infra* notes 172–79 and accompanying text.

[34] *See* 28 U.S.C. § 1295.

[35] 837 F.3d 1299 (Fed. Cir. 2016).

[36] *See id.* at 1316.

[37] *Artificial Intelligence Market Size & Trends*, GRAND VIEW RSCH. (2023), https://perma.cc/W775-GDHN.

[38] *See* USPTO, TRENDS, *supra* note 18, at 13 (showing a persistent increase in AI patent grants of at least ten thousand per year after 2019).

patents are litigated,[39] at an average cost of $3 million per suit (before damages),[40] the AI industry is already looking at liability of nearly $2 billion *in attorneys' fees alone*. And because these patents are legally suspect,[41] likely to implicate valuable flagship technology products, and will involve damages, that $2 billion figure is certainly a gross underestimate. It is thus critical for patentees present and future to understand the Office's actions in 2019, their relation to controlling precedent, and the best path forward to reconcile the reality of AI technology with the state of the law.

This Comment addresses the uncertainties surrounding the patent eligibility of AI inventions in three Parts. Part I briefly discusses patentability requirements, especially subject matter eligibility. It further reviews case law affecting subject matter eligibility of software inventions at both the Supreme Court and the Federal Circuit, because this legal context is most pertinent to AI. Next, Part II introduces the MPEP's treatment of those judicial decisions both in 2014, immediately following *Alice*, and in 2019, when the grant rate of AI patents dramatically increased. Part II then discusses internal inconsistencies in the guidance to patent examiners as well as inconsistencies with binding law. Part III, recognizing that these inconsistencies are problematic, first analyzes how eligibility doctrine can advance the underlying policy of the patent system. Part III then concludes with a proposal that the Federal Circuit clarify that AI methods and models are generally patent eligible, while datasets and applications of models should generally be ineligible.

I. SUBJECT MATTER ELIGIBILITY AT THE FEDERAL CIRCUIT

A patent is a legal right created by the United States in the patentee to exclude others from making, using, and selling a particular invention for a limited time.[42] Congress's authority to issue patents is enumerated in the Patent and Copyright Clause,[43]

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[39] This is a conservative consumption, lower than the average patent litigation rate of 1.5%. Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSPS. 75, 79 (2005).

[40] This is consistent with average patent litigation costs. Gregory Day & Steven Udick, *Patent Law and the Emigration of Innovation*, 94 WASH. L. REV. 119, 142 (computing an average of $3 million of patent litigation costs per case, the bulk of which is fees).

[41] *See infra* Part II.C.

[42] 69 C.J.S. *Patents* § 1 (2023). As used in this piece, "patent" always refers to a utility patent.

[43] U.S. CONST. art. I, § 1, cl. 8.

which limits Congress's patent power to inventions that "promote the Progress of Science and useful Arts."[44] Patent rights are governed by the Patent Act, which provides that "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor."[45] This concise statement of patentability contains four requirements: novelty ("new"),[46] nonobviousness ("invents or discovers"),[47] utility ("useful"),[48] and subject matter eligibility ("process, machine," etc.).[49] This Part discusses the Supreme Court's subject matter eligibility case law, culminating in the *Alice* ruling in 2014. It then describes how the Federal Circuit has applied these precedents to software inventions in the decade since *Alice* and synthesizes the cases to present the current state of the law.

A. Pre-*Alice* Developments in Eligibility Doctrine

The process of obtaining a patent is straightforward. An inventor who believes their invention meets the requirements for patentability submits an application to the USPTO.[50] The application contains "specification," which is a "written description of the invention"[51] and "claims" that "point[ ] out and distinctly claim[ ] the subject matter" of the invention.[52] In the now-famous phrase of Chief Judge Giles Rich of the Federal Circuit, "the name

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[44] *Id.* ("[Congress shall have power t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.").

[45] 35 U.S.C. § 101.

[46] Novelty means that no single piece of prior art discloses *all* the elements of the claimed invention. *Id.* § 102; *see also* Hoover Grp., Inc. v. Custom Metalcraft, Inc., 66 F.3d 299, 302 (Fed. Cir. 1995).

[47] Obviousness means that a person of ordinary skill in the field of the invention (1) could have created the invention by combining two or more pieces of prior art and (2) would have been motivated to do so to obtain a foreseeable benefit. *See* 35 U.S.C. § 103; Graham v. John Deere Co., 383 U.S. 1, 17–18 (1966); *see also* KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 422 (2007).

[48] Utility means that the invention must have some beneficial use. *See* Juicy Whip, Inc. v. Orange Bang, Inc. 185 F.3d 1364, 1366 (Fed. Cir. 1999).

[49] *See, e.g.*, Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech., 543 F.3d 657, 661–62 (Fed. Cir. 2008); *see also* 35 U.S.C. §§ 101–103. Subject matter eligibility is discussed in detail below. For an excellent and thorough treatment of each requirement, see JONATHAN S. MASUR & LISA LARRIMORE OUELLETTE, PATENT LAW: CASES, PROBLEMS, AND MATERIALS chs. 2–4, 6 (3d ed. 2023).

[50] 35 U.S.C. § 111.

[51] *Id.* § 112(a).

[52] *Id.* § 112(b).

of the game is the claim."[53] The claims define the scope of the patent right and, accordingly, the scope of infringing activity.[54] A patent examiner reviews the claims in light of the specification to determine if the invention is novel, nonobvious, useful, and eligible.[55] If any claim fails to meet any of the requirements, the examiner rejects it, though the applicant can usually amend and resubmit.[56]

AI inventions, unlike most other types of invention, are frequently rejected on eligibility grounds, making subject matter eligibility the most important patentability criterion for these inventions.[57] Under the Patent Act, "any . . . process, machine, manufacture, or composition of matter," is patent-eligible subject matter.[58] From these broad terms, courts have discerned an intent to give patent law a "wide scope."[59] However, judge-made eligibility exceptions have narrowed the statute's expansive language to exclude three categories of material: "laws of nature, physical phenomena, and abstract ideas."[60] Unpatentable laws of nature include theoretical physicist Albert Einstein's "celebrated law," $E=mc^2$;[61] physical phenomena covering discoveries like "a new plant found in the wild;"[62] and abstract ideas referring to, for example, using steam to generate power.[63] Insofar as AI can be characterized as inferring relationships from data, the judicial exception to subject matter eligibility for abstract ideas presents difficulties for AI inventions.[64]

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53 Giles S. Rich, *Extent of the Protection and Interpretation of Claims—American Perspectives*, 21 INT'L REV. INDUS. PROP. & COPYRIGHT L., 497, 499 (1990) (emphasis omitted).

54 *See* SRI Int'l v. Matsushita Elec. Corp. of Am., 775 F.2d 1107, 1121 (Fed. Cir. 1985) (en banc). Infringement is the unauthorized use, sale, or making of a patented invention. 35 U.S.C. § 154.

55 USPTO, MPEP, *supra* note 27, § 2103 (describing the patent examination process).

56 *Id.* § 706 (describing claim rejection).

57 *See* Michael Borella, *On* Alice *Rejections per USPTO Technical Center*, PAT. DOCS (Mar. 7, 2023), https://perma.cc/E522-6BTE (comparing eligibility rejections across technologies).

58 35 U.S.C. § 101.

59 Diamond v. Chakrabarty, 447 U.S. 303, 308 (1980).

60 *Id.* at 309.

61 *Id.*; *cf.* Parker v. Flook, 437 U.S. 584, 593 n.15 (1978).

62 *Chakrabarty*, 447 U.S. at 309.

63 *See* O'Reilly v. Morse, 56 U.S. (15 How.) 62, 113 (1854); *see also* Le Roy v. Tatham, 55 U.S. (14 How.) 156, 174–75 (1853).

64 *See, e.g.*, USPTO, PUBLIC VIEWS, *supra* note 22, at 14 (describing a "substantial decrease in allowance rate for patent applications containing AI following the *Alice* decision").

The modern abstract ideas exception has its roots in decades-old Supreme Court precedent. In *Gottschalk v. Benson*,[65] a patent applicant challenged the Office's rejection of claims[66] to a computer algorithm that used a formula to convert decimal numbers to binary numbers.[67] The Court reasoned that, although the algorithm was a "process," a patent would preempt (that is, render infringing) practically all uses of the mathematical formula involved.[68] Because this would amount to a patent on the "idea of itself," the claims were directed to as ineligible subject matter.[69] In a subsequent case, *Parker v. Flook*,[70] the Court further held that an invention claiming an algorithm remained ineligible even when not totally preemptive if the claims added nothing but "conventional or obvious" activity to the abstract idea of the algorithm.[71] Following *Benson* and *Flook*, then, the abstract ideas eligibility exception precluded patents that would either preempt practically all applications of an idea or that applied an idea in an obvious way.

Yet these holdings explicitly left the door open for patenting some inventions involving algorithms.[72] The Federal Circuit would go on to find a wide array of patent-*eligible* applications of algorithms by the 1990s.[73] This development was fortuitous for pioneers of applied machine learning methods seeking patents: a patent involving machine learning was granted in 1998.[74] Machine learning techniques are, at bottom, just complex algorithms designed to ingest a large amount of data and draw statistical

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65 409 U.S. 63 (1972).

66 *See supra* text accompanying notes 50–56.

67 *Id.* at 65.

68 *See id.* at 71–72.

69 *Id.* at 67 (quoting Rubber-Tip Pencil Co. v. Howard, 87 U.S. (20 Wall.) 498, 507 (1874)). The *Benson* Court was somewhat coy about whether the claimed relationship was ineligible as a law of nature or an abstract idea. Later cases have usually cited it for the latter proposition. *See, e.g.*, Bilski v. Kappos, 561 U.S. 593, 609 (2010).

70 437 U.S. 584, 590 (1978).

71 *Id.*

72 *See id.* ("[I]t is [ ] clear that a process is not unpatentable simply because it contains . . . a mathematical algorithm."); *see also* Diamond v. Diehr, 450 U.S. 175, 187 (1981) (holding that claims were not categorically ineligible simply for reciting a formula).

73 *See, e.g.*, *In re* Alappat, 33 F.3d 1526, 1544 (Fed. Cir. 1994) (determining that a data transformation algorithm could be eligible for a patent); *see also* State St. Bank & Trust Co. v. Signature Fin. Grp., Inc., 149 F.3d 1368, 1373 (Fed. Cir. 1998) (affirming a patent for an asset-pooling facilitation algorithm). For a brief summary of the debate over software patentability, see Robert Plotkin, *Software Patentability and Practical Utility: What's the Use?*, 19 INT'L REV. L. COMPUTS. & TECH. 23, 24–27 (2005).

74 *See* U.S. Patent No. 5,819,007.

inferences about probable relationships between new data points.[75] Because these techniques are implemented as computer programs, every step involves binary data operations. If the Supreme Court had announced a categorical bar to eligibility for inventions using mathematical formulas, machine learning methods and software in general would be clearly ineligible. Instead, software patents proliferated.[76]

B. A New Test for Ineligible Abstract Ideas in *Alice*

Alongside the rise of software patenting, applicants increasingly sought patents to software-implemented methods of doing business electronically[77] but were confronted with judicial skepticism. Federal Circuit judges debated whether these "business method patents"[78] (which would encompass, for example, Amazon's "one-click" checkout technology) should be patent eligible at all.[79] Some argued that there was no statutory or principled basis on which to exclude business methods from eligibility.[80] Others worried that a permissive regime for business method patents would impose large transaction costs on business and stifle innovation.[81]

At the height of this dispute, the Supreme Court took two important cases in the 2010s in an attempt to clarify eligibility doctrine. The first of these,

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75 *See* Sara Brown, *Machine Learning, Explained*, MIT SLOAN SCH. MGMT.: IDEAS MADE TO MATTER (Apr. 21, 2021), https://perma.cc/MW9E-B9B2; *see also supra* notes 6–10 and accompanying text.

76 *See* James Bessen & Robert M. Hunt, *An Empirical Look at Software Patents*, 16 J. ECON. & MGMT. STRATEGY 157, 169 (2007) (noting an increase in software proportion of U.S. patents from 1% in 1976 to 15% in 2002).

77 *See* Bradley C. Wright, *Business Method Patents: Are There Any Limits?*, 2 JOHN MARSHALL REV. INTELL. PROP. L. 30, 32 (2002) (noting "thousands" of such patents and collecting examples); *see, e.g.*, U.S. Patent No. 5,960,411 (describing Amazon's one-click checkout tool); U.S. Patent No. 5,794,207 (describing Priceline's "name your price" feature).

78 Judges rarely attempt to define this term, but, when they do, they produce such unhelpful tautologies as "a general method of engaging in business transactions." *Bilski*, 561 U.S. at 614 (Stevens, J., concurring in the judgment).

79 *See, e.g.*, *In re* Schrader, 22 F.3d 290, 297 (Fed. Cir. 1994) (Newman, J., dissenting) (advocating for the eligibility of business methods patents based on the text of the Patent Act).

80 *See, e.g.*, *In re* Bilski, 545 F.3d 943, 990 (Fed. Cir. 2008) (en banc) (Newman, J., dissenting).

81 *See, e.g.*, WILLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW 13–15, 305–06 (2003); *Bilski*, 561 U.S. at 656 (Stevens, J., concurring in the judgment) (expressing concern that business methods patents "depress the dynamism of the marketplace").

Mayo Collaborative Services v. Prometheus Laboratories, Inc.,[82] involved a "method of optimizing therapeutic efficacy" of a certain drug by "determining the level of" a metabolite in a person's bloodstream.[83] The Court held: (1) that the patent claimed a law of nature, namely the relationship between the metabolite level and drug dosage, and (2) that the ineligible law of nature could not be made eligible by "adding the words 'apply it' [to optimize therapeutic efficacy]," [84] nor by limiting the claimed invention "to a particular technological environment."[85] The holding was meant to ensure that inventors could not patent ineligible matter merely by boilerplate invocation of some application.[86] *Mayo*, however, caused immediate difficulty at the Federal Circuit.[87] In *CLS Bank International v. Alice Corp.*,[88] plaintiffs challenged, as abstract ideas, several claims in a patent to software for reducing settlement risk through use of an intermediary in currency exchange transactions.[89] An en banc panel of the Federal Circuit attempted to apply *Mayo*, but its efforts spawned a total of five different conclusions about which claims, if any, were eligible.[90]

The Supreme Court once again intervened to clarify its precedents by granting certiorari. A unanimous Court announced that the "driv[ing]" concern of the eligibility exceptions is preemption, the prospect that a patent would render too much activity infringing.[91] While the Justices recognized that all inventions involve and must partially preempt ideas,[92] they insisted that excessively broad preemption demands scrutiny because of the risk that the resulting patent monopoly "might tend to impede innovation more than it would tend to promote it," defeating the policy of the patent system.[93]

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82 566 U.S. 66 (2012).

83 *Id.* at 74.

84 *Id.* at 72. The *Mayo* patent did not literally say "apply it"; the Court was paraphrasing. *See id.* at 74.

85 *Id.* at 73 (quotation marks omitted) (quoting *Bilski*, 561 U.S. at 610–11).

86 *Mayo*, 566 U.S. at 77.

87 *See* CLS Bank Int'l v. Alice Corp. Pty. Ltd., 717 F.3d 1269, 1277 (Fed. Cir. 2013) (Lourie, J., concurring) (noting that the "patent-eligibility test has proven quite difficult to apply").

88 717 F.3d 1269 (Fed. Cir. 2013) (en banc).

89 *Id.* at 1275 (Lourie, J., concurring).

90 *See generally id.* (per curiam).

91 *Alice*, 573 U.S. at 216.

92 *Id.* at 217.

93 *Id.* at 216 (quotation marks omitted) (quoting *Mayo*, 566 U.S. at 71).

In view of the innovation-promoting ends of the patent power, the trick to determining eligibility is to "distinguish between patents that claim 'the buildin[g] block[s]' of human ingenuity and those that integrate the building blocks into something more."[94] To achieve this, the Court eschewed the (many) tests that had been proposed at the Federal Circuit, preferring to devise its own: Step one is to "determine whether the claims at issue are directed to . . . [a] patent-ineligible" abstract idea.[95] If they are not directed to an abstract idea, the invention is eligible. Only if the claims are directed to an abstract idea do courts proceed to step two and determine whether material beyond the abstract idea contains an "inventive concept" sufficient to "'transform the nature of the claim[s]' into a patent-eligible application."[96] If there is no inventive concept at step two, the invention is ineligible. This formulation has come to be known by the courts as the *Alice* (or *Alice*/*Mayo*) two-step test.

In *Alice* itself, which involved a patent to a computerized method for conducting financial transactions using a third-party intermediary, the Court held at step one that the invention in question was "drawn to the concept of intermediated settlement."[97] That concept is an abstract idea because it is a "fundamental economic practice long prevalent in our system of commerce."[98] The Court then determined at step two that the patent's "wholly generic computer implementation" was insufficient to supply an inventive concept, so the invention was ineligible.[99]

The *Alice* two-step test has not proven entirely straightforward. Each step includes a concept that is not self-defining. The first ambiguous term is step one's "directed to [abstract ideas]" language.[100] Clearly, "directed to" means more than "contains," as all claims in any patent will contain ideas.[101] But it remains unclear how central an abstract idea must be to an invention for the invention to be "directed to" that idea. Clarifying this language further has been left to lower courts.[102]

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94 *Alice*, 573 U.S. at 217 (alteration in original) (quoting *Mayo*, 566 U.S. at 89).
95 *Id.* (citing *Mayo*, 566 U.S. at 77).
96 *Id.* at 217–18 (quoting *Mayo*, 566 U.S. at 79, 78, 72–73).
97 *Id.* at 219.
98 *Id.* (quotation marks omitted) (quoting *Bilski*, 561 U.S. at 611).
99 *Alice*, 573 U.S. at 223–24 (citing *Mayo*, 566 U.S. at 77).
100 *Id.* at 217.
101 *See Mayo*, 566 U.S. at 71.
102 *See infra* text accompanying notes 107–12.

The second ambiguous term is "inventive concept," which courts must evaluate at step two.[103] Here the Court provided some elaboration: an inventive concept must "transform" the claims to an abstract idea such that the "patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself."[104] According to the *Alice* Court, a token invocation of generic computer parts or the words "apply it" (or both) will not supply an inventive concept; by contrast, a process that achieves something an "industry ha[s] not been able to obtain" by a technological improvement does contain an inventive concept.[105] Despite this elaboration, the test remains indefinite.

C. Software Eligibility at the Federal Circuit After *Alice*

Since 2014, the Federal Circuit has tried to clarify both ambiguities of the *Alice* two-step test. This Comment focuses on software invention case law because all AI is software and, as will be shown below, certain features of AI render such inventions particularly susceptible to eligibility rejections under the Federal Circuit's precedents.[106] The Federal Circuit has made clear that software patents are usually directed to abstract ideas at step one unless they improve the functioning of a computer, subject to exceptions described below. At *Alice* step two, various factors support a finding of an inventive concept, the most important of which is that the invention represent a technical solution to a technical problem.

1. Step one: "directed to" an abstract idea.

At *Alice* step one, a court asks "whether the claims at issue are directed to a patent-ineligible concept."[107] The "directed to"

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[103] *Alice*, 573 U.S. at 217.

[104] *Id.* at 217–18 (alteration in original) (quotation marks omitted) (quoting *Mayo*, 566 U.S. at 72–73).

[105] *See Alice*, 573 U.S. at 223 (quotation marks omitted) (quoting *Diehr*, 450 U.S. at 178 & n.3). The Court cited *Diehr* for an example of a patent directed to an abstract idea that contained an inventive concept. The invention in *Diehr* was a "computer-implemented process for curing rubber" using an equation; its sufficiently inventive concept improved on the state of the art by using a thermocouple to take continual temperature measurements during curing. *Id.* (citing *Diehr*, 450 U.S. at 177–78 & n.3).

[106] *See supra* notes 6–10 and accompanying text. While courts have not had much opportunity to differentiate AI patent eligibility from that of other software, there is reason to think that current case law will ensnare worthwhile AI inventions, perhaps motivating different treatment for AI. *See infra* Part III.B.

[107] *Alice*, 573 U.S. at 218.

inquiry, according to the Federal Circuit, involves "looking at the 'focus' of the claims."[108] Most importantly in the software context, the court has held that the step one analysis "often turns on whether the claims focus on '[a] specific asserted improvement in computer capabilities.'"[109] "If the focus of the claim is a specific . . . technological advance [like] an improvement to a technological process," the claim succeeds at *Alice* step one and is eligible.[110] If it fails, it moves to step two. An improvement to a technological process means that the invention has benefits to computers or a computer-related technology relative to the state of the art.[111] The improved efficiency inherent in computer automation is not a benefit *to* computers, because the computer itself is not improved. Rather, the use of computers "merely as a tool" to achieve a more efficient process is a benefit *from* computers, and that alone will not render claims eligible.[112]

An important step one precedent for AI inventions is *McRO, Inc. v. Bandai Namco Games America, Inc.*, which established that, even after *Alice*, software automation of previously manual processes may be patent eligible.[113] *Bandai* involved a method for "automatically animating lip synchronization and facial expression" of video game characters.[114] Prior to the invention, animating speech involved a human animator making aesthetic judgments and manual changes to make the animation look natural.[115] McRO, the patentee, had patent claims involving computer implementation of a certain algorithm, or rules, to achieve lifelike animation automatically.[116] Bandai, the accused infringer, argued that the invention was ineligible because it used a computer merely as a tool to automate conventional animation.[117] The panel of the Federal Circuit disagreed with Bandai for two reasons: First, the invention did not use computers merely as a tool because the improved efficiency of the animation process resulted

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[108] Elec. Power Grp., LLC v. Alstom S.A., 830 F.3d 1350, 1353 (Fed. Cir. 2016) (quoting Enfish, LLC v. Microsoft Corp., 822 F.3d 1327, 1335–36 (Fed. Cir. 2016)).

[109] Finjan, Inc. v. Blue Coat Sys., Inc., 879 F.3d 1299, 1303 (Fed. Cir. 2018) (quoting *Enfish*, 822 F.3d at 1335–36).

[110] Adasa Inc. v. Avery Dennison Corp., 55 F.4th 900, 908 (Fed. Cir. 2022).

[111] *See Enfish*, 822 F.3d at 1337–38 (describing an eligible database structure as having benefits of flexibility, speed, and memory efficiency over "conventional databases").

[112] *Id.* at 1336.

[113] *Bandai*, 837 F.3d at 1316.

[114] *Id.* at 1307 (quoting U.S. Patent No. 6,307,576).

[115] *Id.* at 1314.

[116] *Id.* at 1307.

[117] *Id.* at 1314.

from the use of the claimed rules and not the mere involvement of a computer.[118] Second, the rules set out a different process from the conventional, manual animation method that would not preempt all automatic animation, so they represented a specific technological improvement to animation.[119] Thus, the invention was eligible at *Alice* step one because it was not directed to the abstract idea of animation generally.[120]

Many other inventions instead fall on the abstract side of the line and must proceed to step two. In a case involving "computer virus screening in the telephone network," the Federal Circuit ruled that the invention was directed to an abstract idea because the patent did not "claim a new method of virus screening or improvements thereto."[121] And, similarly, claims to the generic computer automation of loan applications were held to be directed to an "abstract financial process" where the automated process involved the same steps as the known manual process.[122]

The Federal Circuit, perhaps recognizing ambiguity in the "directed-to" test at *Alice* step one, has over the years described three types of claims that almost always fail step one. Each involves broadly preemptive claims. First are claims that "simply demand[ ] the production of a desired result."[123] These claims pose maximum preemption concern because they encompass *all* means that produce the result.[124] Second, claims to "processes that can be performed in the human mind" are directed to abstract ideas.[125] Preemption of mental processes—or their automatic equivalents[126]—receives special solicitude because the Supreme Court has held that such "basic tools of scientific and technological

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118 *Bandai*, 837 F.3d at 1314.

119 *Id.* at 1315–16.

120 *Id.*

121 Intell. Ventures I LLC v. Symantec Corp., 838 F.3d 1307, 1312, 1319 (Fed. Cir. 2016).

122 Credit Acceptance Corp. v. Westlake Servs., 859 F.3d 1044, 1055–56 (Fed. Cir. 2017); *see also* TecSec, Inc. v. Adobe Inc., 978 F.3d 1278, 1294 (Fed. Cir. 2020) (collecting cases).

123 Interval Licensing LLC v. AOL, Inc., 896 F.3d 1335, 1345 (Fed. Cir. 2018).

124 *See, e.g.*, *Intell. Ventures*, 838 F.3d at 1316 (quoting Internet Pats. Corp. v. Active Network, Inc., 790 F.3d 1343, 1348 (Fed. Cir. 2015)) (finding such claims ineligible at step one because there is "no restriction on how the result is accomplished").

125 PersonalWeb Techs. LLC v. Google LLC, 8 F.4th 1310, 1316 (Fed. Cir. 2021) (quotation marks omitted) (quoting CyberSource Corp. v. Retail Decisions, Inc., 654 F.3d 1366, 1371–72 (Fed. Cir. 2011)) (holding that a claimed process for validating credit card transactions was directed to an abstract idea when all steps could be performed mentally).

126 *See CyberSource*, 654 F.3d at 1371.

work" should remain "open to all."[127] Third, "gathering and analyzing information of a specified content, then displaying the results" is abstract if done in a conventional way.[128] While the connection to preemption for this computerized, conventional data analysis is more tenuous, the Federal Circuit has implied that it views claims of this type as encroaching on "fundamental economic concepts."[129]

2. Step two: the inventive concept.

If a claim fails at *Alice* step one because it is directed to an abstract idea, the court must "search for an 'inventive concept,'" an element that ensures the patent "amounts to significantly more than a patent upon the [abstract idea] itself."[130] The focus at step two is on claim elements *other than* the abstract idea. Unless those other elements "transform" the claim into an eligible application, the claim fails and is not eligible for a patent.[131]

A sufficiently inventive concept is a high bar, and most inventions that reach step two fail, rendering the test murky and much of the relevant language in precedent dicta. Nevertheless, precedent indicates a nonexhaustive list of factors that support a finding of an inventive concept: use of nongeneric or specially adapted technology,[132] "non-conventional and non-generic arrangement of known, conventional pieces,"[133] the absence of total preemption,[134] the presence of a "technical improvement" in some

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127 *Id.* at 1371 (quoting *Benson*, 409 U.S. at 67).

128 *In re* Killian, 45 F.4th 1373, 1382 (Fed. Cir. 2022) (quotation marks omitted) (quoting *Elec. Power*, 830 F.3d at 1353–54) (holding that claimed methods for monitoring an electric power grid by collecting, analyzing, and displaying data was directed to an abstract idea).

129 OIP Techs., Inc. v. Amazon.com, Inc., 788 F.3d 1359, 1362 (Fed. Cir. 2015); *see also id.* at 1362–63 (citing *Alice*, 573 U.S. at 220) (collecting data-analysis cases involving fundamental economic practices).

130 *Alice*, 573 U.S. at 217–18 (quoting *Mayo*, 566 U.S. at 72–73). When courts look for "significantly more" than an abstract idea, they mean that the claims encompass significantly *less* than the entire idea.

131 *Id.* at 226.

132 *Intell. Ventures*, 838 F.3d at 1316, 1322 (contrasting "generic" computer implementation of a virus screening method with a hypothetical claim "model[ed] to match the recipient's computer architecture").

133 *Elec. Power*, 830 F.3d at 1355 (quotation marks omitted) (quoting BASCOM Global Internet Servs., Inc. v. AT&T Mobility LLC, 827 F.3d 1341, 1349–52 (Fed. Cir. 2016)) (noting, in a suit involving a patent for a method for monitoring an electric power grid, that the claims neither invoked unconventional technology nor arranged conventional technology in a new way).

134 *See BASCOM*, 827 F.3d at 1352.

process,[135] and a "technical solution to a problem unique to [a particular technological context]."[136] Each of the few software claims to have succeeded at step two has involved several of these factors, but the most important appears to be the last—a technical solution to a technical problem.

Consider, for example, the inventive concept case *BASCOM Global Internet Services, Inc. v. AT&T Mobility LLC*,[137] which concerned claims the court found directed at step one to the abstract idea of "filtering content on the Internet."[138] BASCOM argued that they had invented a process for combining the benefits of an internet filter hosted on a user's computer with the benefits of a filter hosted on an internet service provider's server by associating users' IP addresses with custom filtering preferences.[139] BASCOM's purported inventive concept was to install a "filtering tool at a specific location, remote from the end-users, with customizable filtering features."[140] In holding that the claims were eligible at step two, the Federal Circuit cited an absence of total preemption of filtering over the internet, the invocation of more than an "apply it" instruction or generic computer components, and the alleged technical improvements in customizability of filters and hacking protection.[141] *BASCOM* remains the clearest statement of the step two analysis.

There is no *Alice* step three.[142] If an invention fails steps one and step two, it is ineligible for a patent; if it already got a patent, that patent is invalid. In summary, to determine eligibility, courts must first ask whether the claim at issue is directed to an abstract idea.[143] A claimed improvement to computers themselves or to some technological process is likely not directed to an abstract idea unless it attempts to claim a result; describes the automation of a process that can be performed mentally; or relates only to the collection, analysis, and display of data.[144] Claims that are directed to an abstract idea fail step one and move to step two,

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135 *Id.* at 1350.

136 *Id.* at 1351.

137 827 F.3d 1341 (Fed. Cir. 2016).

138 *Id.* at 1348.

139 *Id.* at 1345.

140 *Id.* at 1350.

141 *Id.* at 1350–51.

142 *But see infra* Part II.C.1 (demonstrating that, in effect, current USPTO guidance requires additional steps).

143 *See Alice*, 573 U.S. at 219.

144 *See supra* text accompanying notes 123–29.

where the court searches for an inventive concept that transforms the ineligible abstract idea into an eligible application.[145] An inventive concept is less likely to be found insofar as the claims only invoke generic technologies or conventional activities, and more likely to be found if they describe a technical solution to a technical problem.[146]

II. *ALICE* AND AI ON THE GROUND

The foregoing discussion describes how a court would rule on the patent eligibility of an invention. In the vast majority of cases, however, a patent will never come before a judge.[147] Instead, patent eligibility determinations are made in the first instance by patent examiners employed by the USPTO.[148] The Office has procedural rulemaking authority to fashion regulations for patent examination,[149] but the Patent Act "does NOT grant the [Office] the authority to issue substantive rules."[150] The regulations governing patent examinations are found in the Manual of Patent Examination and Procedure.[151] The MPEP contains detailed instructions for examiners on how to apply the requirements of the Patent Act and relevant case law during examination.[152] This manual is the unassuming source of the recent upheaval in the AI patenting landscape.

The following analysis proceeds in five Sections: It first describes the Office's changes to the MPEP implementing the *Alice* two-step test. Second, it discusses the dramatic results of those changes. Third, it describes several further changes to the guidance made in 2019, all of which tended to make it easier to find an invention eligible. Fourth, it critiques the Office's model of a patent-eligible AI invention, which conflicts with binding law.

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145 *Alice*, 573 U.S. at 221.

146 *See supra* text accompanying notes 130–36.

147 Lemley & Shapiro, *supra* note 39, at 79 (showing that only about 1.5% of patents are ever litigated).

148 *See* 35 U.S.C. §§ 3, 131. Patent denials are appealed to the Patent Trial and Appeal Board (PTAB), then to the Federal Circuit, and finally to the Supreme Court. *Id.* §§ 134, 141(a). Alternately, rather than going directly to the Federal Circuit, losing PTAB litigants may bring suit in the Eastern District of Virginia (with subsequent appeal to the Federal Circuit and so on). *Id.* § 145.

149 *Id.* § 2.

150 Merck & Co. v. Kessler, 80 F.3d 1543, 1550 (Fed. Cir. 1996) (capitals in original).

151 USPTO, MPEP, *supra* note 27, intro. at 1–2.

152 *Compare id.* § 2106 (containing eighty-three pages on subject matter eligibility), *with* 35 U.S.C. § 101 (containing one sentence).

Finally, it traces the recent explosive growth in AI patents, which is partially a result of the 2019 changes.

A. The 2014 USPTO Eligibility Guidance

Initially, the Office faithfully implemented the Supreme Court's instructions in *Alice* and the Federal Circuit's subsequent exposition of the doctrine. In 2014, it revised the examination guidance on subject matter eligibility to reflect the beefed-up doctrine, hewing closely to case law.[153] The revised guidance instructed examiners to first determine whether a claim was "directed to . . . an abstract idea" by assessing whether the claim "recited (i.e., set forth or described)" an abstract idea.[154] Examples of claims not directed to abstract ideas included those "clearly [ ] not seek[ing] to tie up the [abstract idea]."[155] The category of "abstract ideas" is further divided into "fundamental economic practices," "certain methods of organizing human activity," "an idea 'of itself,'" and "mathematical relationships/formulas," with several examples in each category drawn from judicial decisions.[156] If a claim was found directed to an abstract idea, the examiner was to then search for an inventive concept per *Alice* step two.[157] Rather helpfully, the Office additionally supplied thirty-six model eligibility analyses.[158] These examples involved stylized claim sets largely modeled on actual cases. Only some of these dealt with software, and none with AI, but one is particularly instructive.

In the fifth example, the invention relates to methods of digital image processing.[159] When a picture is transferred from, for example, a camera to a printer, there may be distortion in both the color and shape of the picture due to differences in how the devices encode information. The example claim is to an invention for maintaining image fidelity across devices. It recites a "method of generating a device profile" comprising the generation of two

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[153] 2014 Interim Guidance on Patent Subject Matter Eligibility, 79 Fed. Reg. 74,618 (Dec. 16, 2014).

[154] *Id.* at 74,622.

[155] *Id.* The Office often uses "tie up" to mean preempt, quoting *Mayo*. 566 U.S. at 86.

[156] 2014 Interim Guidance on Patent Subject Matter Eligibility, 79 Fed. Reg. at 74,622.

[157] *Id.*

[158] *Section 101: Examples 1 to 36*, U.S. PAT. & TRADEMARK OFF., (Dec. 15, 2016) [hereinafter USPTO, *Examples*], https://perma.cc/HTK8-566G.

[159] *Id.* at 13. This example was based on the invention eligibility discussion in *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344 (Fed. Cir. 2014).

sets of data and their combination.[160] The data generation steps involve certain "transformation[s]"—that is, mathematical operations—and their subsequent combination facilitates higher fidelity to the original image.[161]

The Office described the Example Five claim as directed to an abstract idea because it "recites a method of gathering [data] using mathematical techniques and combining" that data.[162] This recitation means the claim "set[s] forth or describe[s]" an abstract idea and therefore fails at *Alice* step one.[163] At step two, because the claim contains *no* additional elements beyond the abstract idea of data combination, the claim lacks an inventive concept and is ineligible.[164]

Notice that this invention is analogous to AI inventions.[165] A typical machine learning method to automate a task would involve collecting training data, performing algorithmic training comprising (lots of) mathematical operations, and then applying the resulting model to the task to be automated. One would expect the fortunes of AI patents to rise or fall with claims like those in Example Five, and, indeed, they fell.

B. The Worst of Times for Software Patents

The Office's approach to the previous example presaged a brief dark age for software patents, including AI inventions. In the aftermath of *Alice*, ineligibility rejections across all technology areas affected by the decision jumped 31%.[166] E-commerce patent applications, which were at the heart of the dispute over patentability of business methods,[167] were the most profoundly affected.[168] Such inventions frequently fail *Alice* step one as directed to abstract ideas because they describe automation of mental processes, and they also frequently fail *Alice* step two for invoking generic computers and not solving technical problems.[169]

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160 USPTO, *Examples*, *supra* note 158, at 14.

161 *Id.* at 13–14.

162 *Id.*

163 *See supra* text accompanying notes 95–96.

164 USPTO, *Examples*, *supra* note 158, at 13.

165 *See supra* text accompanying notes 6–10.

166 USPTO, PUBLIC VIEWS, *supra* note 22, at 12. For details on how the USPTO defined *Alice*-affected technologies, see USPTO, ADJUSTING TO *ALICE*, *supra* note 23, at 8.

167 *See supra* Part I.B.

168 Dennis Crouch, *What Is in the Final Rejections: Eligibility*, PATENTLY-O (June 26, 2023), https://perma.cc/3VKE-S9G5 (showing eligibility rejection rate surged to 90% following *Alice*).

169 *See supra* Part I.C.

Other data-processing applications did not see an immediate spike in eligibility rejections, but instead a steady increase—from 2015 to 2018, this figure rose from less than 10% of all rejections to nearly 60%.[170] This category of applications encompasses many AI inventions.[171] Had the trend of increasing rejections on eligibility grounds continued, many of the currently active AI patents would not have been granted.

The trend of eligibility rejections, the uncertainty in the application of *Alice* test,[172] and the *Alice* opinion itself provoked a backlash among practitioners and industry figures who demanded changes to the eligibility analysis.[173] When the USPTO solicited comments on eligibility from the public in 2017, representatives of the computing industry decried *Alice*'s effect on their ability to research and develop new technologies. They "emphasized how [then-]current eligibility analysis [was] biased and unworkable for computer innovations"[174] and that the "complete lack of protection for some innovations" was "impacting the research, growth, and development of critical areas of technology."[175] To be sure, public opinion was not entirely negative: some expressed support for the *Alice* result via public notice and comment, noting that a reversal would "impede innovation more than it would promote it" by tying up "the basic tools of technological work."[176] In a study commissioned by Congress, the USPTO reported that about two-thirds of comments expressed the view that eligibility jurisprudence was hindering innovation, while one-third thought the opposite.[177] And direct evidence of the impact on innovation in *Alice*-affected areas was mixed or nonexistent, despite the fact that patent rejections had already, at that point, risen dramatically.[178] Nevertheless, most commenters wanted changes, and

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170 Crouch, *supra* note 168.

171 *Id.* A different methodology used by the USPTO for measuring the allowance rate of AI applications specifically showed a more modest effect, with allowances decreasing by no more than 10% between 2013 and 2018. USPTO, PUBLIC VIEWS, *supra* note 22, at 13.

172 USPTO, ADJUSTING TO *ALICE*, *supra* note 23, at 12 ("The *Alice* decision increased uncertainty in patent examination."); *see also supra* Part I.C.

173 USPTO, PUBLIC VIEWS, *supra* note 22, at 31–40.

174 *Id.* at 37–38 (citing U.S. PAT. & TRADEMARK OFF., PATENT ELIGIBLE SUBJECT MATTER: REPORT ON VIEWS AND RECOMMENDATIONS FROM THE PUBLIC (2017)).

175 *Id.*

176 *Id.* at 21 (quotation marks omitted) (quoting Wikimedia Foundation, Comment Letter on Docket No. PTO-P-2021-0032: Patent Eligibility Jurisprudence Study (Oct. 14, 2021), https://perma.cc/Q7N9-BT8C).

177 Jason Rantanen, *Guest Post: Assessing Responses to the PTO's 2021 Patent Eligibility Study*, PATENTLY-O (Feb. 1, 2022), https://perma.cc/BZ7D-4CE6.

178 USPTO, PUBLIC VIEWS, *supra* note 22, at 38–40.

when asked to choose whether to pursue a legislative, judicial, or administrative solution, "a majority . . . recommended legislative changes aimed at reversing the recent trend in the law."[179]

C. The Current Eligibility Guidance

The Office decided to implement an administrative change rather than waiting for Congress to act.[180] In January 2019, it significantly revised its eligibility guidance, rendering it more permissive.[181] The revised MPEP (1) expands a streamlined procedure step that allows examiners to presume that inventions are eligible without analysis, (2) adds a second prong of step one that rescues some inventions that would otherwise fail, and (3) restricts the contexts in which examiners may find abstract ideas.

1. Streamlined analysis at step zero.

The USPTO expanded upon a "streamlined eligibility analysis" step that had been included in the 2014 guidance as an alternative to the full *Alice* two-step analysis.[182] Streamlined analysis is a fast track to eligibility, without an extensive inquiry into directed-to or inventive concept. In its original manifestation, the streamlined analysis was only for inventions which "clearly" did not preempt an idea,[183] mirroring the driving concern of *Alice*.[184] The examples provided as qualifying for streamlined eligibility analysis were things like a "complex manufactured industrial product or process."[185]

The 2019 update amended the streamlined analysis instructions in two significant ways. First, it extended this fast track to inventions that "clearly improve[ ] a technology or computer functionality."[186] And second, it cited *Bandai* and *Enfish, LLC v. Microsoft Corp.*[187] as

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[179] *Id.* at 11.

[180] As it turns out, they would have been waiting a long time. Congress has still not acted. *See* Kirk Hartung, *Recapping Eight Years of the Patent Eligibility Mess: Clearly, It's Past Time for the Supreme Court or Congress to Provide Clarity*, IPWATCHDOG (May 12, 2023), https://perma.cc/E6G2-QWMP (noting multiple failed attempts at legislative reform).

[181] *See* USPTO, MPEP, *supra* note 27, at ch. 2100.

[182] 2014 Interim Guidance on Patent Subject Matter Eligibility, 79 Fed. Reg. at 74,625.

[183] *Id.*

[184] *Alice*, 573 U.S. at 216.

[185] *Id.*

[186] USPTO, MPEP, *supra* note 27, § 2106.06(b).

[187] 822 F.3d 1327 (Fed. Cir. 2016).

fact patterns involving such clear technological improvements that the full *Alice* two-step analysis was not required.[188]

At the outset, even the 2014 guidance was erroneous in a subtle way. The suggestion was that when an invention "clearly" is not totally preemptive, it is eligible. Yet the Federal Circuit has repeatedly said that "absence of complete preemption does not demonstrate patent eligibility."[189]

The 2019 additions strayed further from precedent. The MPEP cites *Bandai*, which involved a lengthy and detailed step one analysis, to conclude that "[a]lthough the Federal Circuit held these [*Bandai*] claims eligible at [step one] as not being directed to abstract ideas, it would be reasonable for an examiner to have found these claims eligible" under the streamlined analysis "based on the clear improvement" to a computer-related technology.[190]

This is hard to swallow, as nothing in *Bandai* suggests that the analysis can be entirely avoided because the improvement is self-evidently eligible.[191] Instead, *Bandai* analyzed the extent to which the claims would preempt "all [rules-based] techniques for automating 3–D animation" and the degree to which the claims were limited to a process "specifically designed to achieve an improved technological result,"[192] concluding that the claims were sufficiently nonpreemptive to be eligible at step one. Indeed, the fact that the Federal Circuit and the district court disagreed at some length on whether the claims were directed to an abstract idea calls into serious doubt the Office's position that eligibility was obvious.[193] What is more, the idea that a "clear" improvement is automatically eligible is flatly wrong. Courts look for *specific* improvements, not clear ones: "[it] is not enough for eligibility" that the claimed invention is "[g]roundbreaking, innovative, or even brilliant."[194] That is to say, it could be clear as day that the invention was an improvement—that still would not render it

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188 *Id.*

189 *See, e.g.*, BSG Tech LLC v. BuySeasons, Inc., 899 F.3d 1281, 1291 (Fed. Cir. 2018); Intell. Ventures I LLC v. Symantec Corp., 838 F.3d 1307, 1321; Ariosa Diagnostics, Inc. v. Sequenom, Inc., 788 F.3d 1371, 1379 (Fed. Cir. 2015).

190 USPTO, MPEP, *supra* note 27, § 2106.06(b) (citing *Bandai*, 837 F.3d at 1316).

191 *See, e.g.*, *Bandai*, 837 F.3d at 1315 (noting that the defendant's contrary argument "has appeal").

192 *Id.* at 1315–16.

193 *See id.* at 1314–16.

194 Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 569 U.S. 576, 591 (2013)); *see also Bandai*, 837 F.3d at 1314 ("We therefore look to whether the claims in these patents focus on a specific means or method that improves the relevant technology.").

patent eligible under the controlling precedents if the claims excessively preempted the idea. Mathematical formulas illustrate the point nicely: a new proof might clearly be an advance over the state of the art and equally clearly always patent ineligible as an abstract idea.[195] The Office, by ignoring this distinction, appears to have adopted an *Alice* escape hatch for inventions that are not totally preemptive and that it regards as technologically meritorious, notwithstanding judicial instructions to the contrary on both points.

2. A second prong of step one.

Another change to the guidance is the addition of a step between *Alice* steps one and two. Here, the MPEP instructs examiners who have found that a claim recites a judicial exception to then consider whether "the claim recite[s] additional elements that integrate the [abstract idea] into a practical application."[196] Such integration is present when an improvement to computers or another technology is "apparent" from the specification and the claims also disclose the improvement.[197] If there is integration into a practical application, the claim is eligible and does not proceed to step two.[198]

Admittedly, the location of the search for technological improvements in the *Alice* two-step analysis is unsettled. Whether at step one or step two, courts' purpose in searching for technological improvements is always to determine whether there are any claim limitations present that alleviate preemption concerns. The Federal Circuit can look for improvements at step one (framed as technological "improvements"), step two (framed as "technological solution[s] to technical problem[s],"), or both, which the MPEP notes.[199] Dividing step one of *Alice* into two halves, consisting of a search for an abstract idea and a search for a specific improvement, is not an implausible reading of relevant case law, although a better characterization would probably track *Bandai*, which directs courts to "look to whether the claims . . . focus on a specific means or method that improves the relevant technology or *are instead* directed to a result or effect that itself

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195 *See Flook*, 437 U.S. at 590.

196 USPTO, MPEP, *supra* note 27, § 2106.04(II)(A)(2).

197 *Id.* § 2106.04(d)(1).

198 *Id.*

199 *See id.* § 2106.04(d)(1).

is the abstract idea."[200] This latter formulation makes clear that these are not separate inquiries, but opposite results of the same inquiry.

Yet even if the Office's bifurcated approach is plausible, it misses an important component: specificity. Courts usually discuss a "specific asserted improvement," not just an improvement.[201] Specificity matters because it reduces the preemptive effect of the claims.[202] The degree of improvement and the degree of specificity pull in opposite directions. The Office does note that a "conclusory" assertion of improvement does not suffice to pass its second step one prong.[203] Nevertheless, by emphasizing improvement while downplaying the preemption analysis inherent in specificity, it places a thumb on the scale for findings of eligibility.

3. Circumscribing abstract ideas.

A third relevant change to the MPEP reduced the number of categories of abstract ideas from four to three. Now, abstract ideas fall into "[m]athematical concepts," "[c]ertain methods of organizing human activity," and "[m]ental processes."[204] Ideas in and of themselves have been excluded. Further, the MPEP now strongly cautions examiners against finding an abstract idea that falls outside of these three categories.[205] Such "tentative" abstract ideas should be found only in "rare circumstances," and an examiner rejecting an application on these grounds requires the approval of a superior.[206] In sum, there is now a strong presumption against finding claims directed to abstract ideas outside the categories most firmly established in case law.

Yet again, the MPEP diverges from the doctrine. While courts do tend to group abstract ideas into these categories, no court has held that these are the *only* categories of abstract ideas. Indeed, the Federal Circuit has repeatedly implied the opposite. Any

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200 *Bandai*, 837 F.3d at 1314 (citing *Enfish*, 822 F.3d at 1336) (emphasis added).

201 *See, e.g.*, *In re* Killian, 45 F.4th, 1373, 1382 (Fed. Cir. 2022) (quotation marks omitted) (quoting Finjan v. Blue Coat Sys., Inc., 879 F.3d 1299, 1303 (Fed. Cir. 2018)).

202 *See id.* ("[C]laims that recite a specific, discrete implementation of the abstract idea rather than preempting all ways of achieving an abstract idea using a computer may include an inventive concept." (quotation marks and alterations omitted) (quoting *BASCOM*, 827 F.3d at 1350–51)).

203 USPTO, MPEP, *supra* note 27, § 2106.04(d)(1).

204 *Id.* § 2106.04(a).

205 *See id.* § 2106.04(a)(3).

206 *Id.* The only other circumstance in Chapter 2100's guidance that requires the approval of a Technology Center Director for a rejection is an "egregious case[ ] of unreasonable and unexplained delay in prosecution." *Id.* § 2190(I).

result-based claim is ineligible because it is totally preemptive irrespective of the subject matter.[207] "[A] principle is not patentable,"[208] not just a *mathematical* principle, but any principle. This may rarely matter—and almost all dubiously eligible applications might slot nicely into these categories—but, when considered alongside the Office's other changes, the crystallization of exclusive categories completes a pattern of the Office bending the relevant law in these changes to the MPEP, always in the direction of more permissive eligibility analysis.

The *Alice*-affected industries, to say nothing of the bar, appear to have prevailed. So far, this is not necessarily entirely a story of capture; the Office itself had reasons of procedural efficiency for pursuing the changes. Under the revised MPEP, USPTO examiners will spend less time on ambiguous and time-consuming eligibility analyses and more time in the familiar territory of the other patentability criteria. Between adverse external pressures and internal incentives,[209] it should not be entirely surprising that the Office has moved to cabin *Alice*.

D. An Eligible Neural Network?

The Office also made one significant change to its exemplary analyses that was specific to AI and cannot be justified by neutral, procedural motives. The USPTO issued a total of six additional examples demonstrating how to apply the new guidance.[210] One of these, Example Thirty-Nine, involves a neural network: a type of AI, so called because its internal structures mimic the organization of neurons in the human brain. The hypothetical invention was a method for training a neural network to detect faces.[211] The claim recites in relevant part:

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[207] *See Finjan*, 879 F.3d at 1305–06 (stating that "a result, even an innovative result, is not itself patentable" and collecting cases).

[208] Le Roy v. Tatham, 55 U.S. (14 How.) 156, 175 (1853).

[209] *See, e.g.*, USPTO, PUBLIC VIEWS, *supra* note 22, at 18, 35 (noting complaints from a broad array of stakeholders that patent eligibility jurisprudence was "unworkable"); George "Trey" Lyons, III, *Evaluating § 101 Case Law After* Alice*, U.S. Global IP Positioning, Improvements to PTAB Practice, and Other Key Takeaways from a Recent Fireside Chat with USPTO Director Iancu*, MBHB SNIPPETS (Winter 2019), https://perma.cc/HD74-5U9B (noting USPTO Director Iancu's comments about § 101 caselaw, including concerns that "[t]here are no guidelines" and that the Office was "twisting [itself] into a pretzel . . . [in] almost every case").

[210] *2019 Revised Patent Subject Matter Eligibility Guidance Examples 37 to 42,* U.S. PAT. & TRADEMARK OFF., (Jan. 7, 2019) [hereinafter USPTO, *New Examples*], https://perma.cc/4ZBS-8UCH.

[211] *Id.* at 8.

> A computer-implemented method of training a neural network for facial detection comprising:
> [1] collecting a set of digital facial images from a database;
> [2] applying one or more transformations to each digital facial image . . . ;
> [3] creating a first training set . . . ;
> [4] training the neural network in a first stage using the first training set;
> [5] creating a second training set . . . comprising the first training set and digital non-facial images that are incorrectly detected as facial images after the first stage of training; and
> [6] training the neural network in a second stage using the second training set.[212]

The Example proceeds to a model analysis. There is no explicit streamlined, step-zero analysis. However, proceeding to step one implies that the invention is not clearly eligible under a streamlined analysis.[213] At *Alice* step one, the Example first asks whether the claim recites a judicial exception (e.g., an abstract idea).[214] "No," the Example reads, because "the claim does not recite any mathematical relationships, formulas, or calculations."[215] The claim also "does not recite a mental process because the steps are not practically performed in the human mind."[216] Because there is no recitation of an abstract idea, the model analysis does not reach the step two inventive concept inquiry, and the claim is eligible.[217]

This result is suspect both on its own terms and on the grounds that it is inconsistent with relevant case law. Taking the analysis at face value, the assertion that the claims do not recite mathematical calculations is flatly incorrect. The example itself, in the sample specification,[218] describes the "transformations" recited in the claims as "mathematical transformation functions" and training as "a type of machine learning algorithm that uses the gradient of a mathematical loss function to adjust the weights

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212 *Id.*

213 *See* UPSTO, MPEP, *supra* note 27, § 2106.06(a).

214 USPTO, *New Examples*, *supra* note 210, at 9.

215 *Id.*

216 *Id.*

217 *See id.*; *see also* USPTO, MPEP, *supra* note 27, § 2106.04.

218 The specification contains a written description of the invention, usually at greater length and in more ordinary language than the claims. *See supra* text accompanying notes 51–52.

of the network."[219] The claim thus describes: collecting data, doing math, collecting more data, doing more math, collecting data a final time, and once again doing math. Recall that, under the 2019 guidance, a claim still recites an abstract idea even if it describes it in other terms.[220] If these claims do not recite mathematical computation, it is hard to see which claims would do so *without* explicitly mentioning a formula; that standard, in turn, unacceptably allows the § 101 analysis to be "deceived by the draftsman's art."[221]

Of course, the Office's result might be correct even if its analysis is wrong, since a claim may be rendered eligible (according to the MPEP) by disclosing a technological improvement or, at step two, by containing an inventive concept.[222] But that is not the case here. The MPEP instructs examiners to look for integration of the abstract idea into a practical application by examining elements other than the abstract idea.[223] The elements of this claim are transformations (math), training (math), and data collection.[224] Unless data collection on its own is sufficient to state a technological improvement, the claim must fail.[225] And there is a prudential reason to doubt that data collection constitutes a technological improvement, comparable to the concern about clever drafting above. If it did, anyone who wanted to patent a formula could evade eligibility analysis by including trivial data collection steps. Thus, the claim must fail the inventive concept analysis for the same reason it fails the abstract idea analysis: otherwise, eligibility becomes just a trick of drafting.

Does the MPEP's analysis, however misguided, reach the same conclusion that the case law would? *Alice* step one requires determining whether the focus of the claims is an abstract idea.[226] A "specific asserted improvement" in computer capabilities or a technological process weighs against a finding that the claims are directed to an abstract idea.[227] Here the claims allege an

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[219] USPTO, *New Examples*, *supra* note 210, at 8–9.

[220] *See supra* text accompanying notes 154–56. This aspect of the guidance did not change from 2014 to 2019.

[221] *Enfish*, 822 F.3d at 1339 (quoting *Alice*, 573 U.S. at 226).

[222] *See* USPTO, MPEP, *supra* note 27, § 2106.04–05.

[223] *Id.* § 2106.04(d)(1).

[224] *See* USPTO, *New Examples*, *supra* note 210, at 8–9.

[225] *Cf. BSG Tech.*, 899 F.3d at 1287 ("[W]e have never suggested that such minimal narrowing [as adding trivial limitations to data collection steps], by itself, satisfies *Alice*'s test.").

[226] *See, e.g.*, Internet Pats. Corp. v. Active Network, Inc., 790 F.3d 1343, 1346 (Fed. Cir. 2015).

[227] *Finjan*, 879 F.3d at 1303 (quoting *Enfish*, 822 F.3d at 1335–36).

improvement in the accuracy of facial recognition using a neural network. Assuming arguendo that this is specific and technological, it must be weighed against the risk of preemption by looking for result-based claims and claims that extend to even mental processes. A final red flag is "'gathering and analyzing information of a specified content' . . . without 'any particular assertedly inventive technology for performing those functions.'"[228] Focusing on this last factor, the Example Thirty-Nine claim is in trouble. It recites gathering information of a specified content—facial images.[229] It also recites training, which is a form of data analysis. It does not purport to have invented neural nets, the data, or mathematical transformations. For confirmation that this claim is thus abstract, we can look to recent circuit precedent: "a process that employs mathematical algorithms to manipulate existing information to generate additional information is not patent eligible."[230] Or, reaching for more venerable precedent, to *Flook*: "if a claim is directed essentially to a method of calculating, using a mathematical formula, even if the solution is for a specific purpose, the claimed method is [ineligible]."[231] In sum, the claim fails at step one because it is directed to the abstract idea of data collection and proceeds to step two.

At *Alice* step two, the inventive concept analysis, we look for whether the claim includes elements other than the abstract idea that transform the nature of the claim into an eligible application, with an eye toward preemption.[232] The claim discloses a technical solution (iterative training) to a technical problem (high rate of facial recognition false positives), which can supply the inventive concept.[233] It also, however, is likely to totally preempt the idea of iterative training of a neural network for facial recognition. It is difficult to say how a court would weigh these two concerns, but we can break the tie. Again, at step two the relevant elements are those *other than* the abstract idea. If the abstract idea is iterative training of facial recognition neural networks, the other elements

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228 *Killian*, 45 F.4th at 1382 (quoting Elec. Power Grp., LLC v. Alstom S.A., 830 F.3d 1350, 1354 (Fed. Cir. 2016)).

229 USPTO, *New Examples*, *supra* note 210, at 8–9.

230 *Digitech*, 758 F.3d at 1351; *see also* SAP Am., Inc. v. Investpic, LLC, 898 F.3d 1161, 1163 (Fed. Cir. 2018) (holding claims ineligible because they were directed to the abstract idea of a "series of mathematical calculations based on selected information").

231 *Flook*, 437 U.S. at 595 (quotation marks omitted) (quoting *In re* Richman, 563 F.2d 1026, 1030 (1977)).

232 *Alice*, 573 U.S. at 217–18; *see supra* Part I.C.2.

233 *See, e.g.*, *BASCOM*, 827 F.3d at 1351.

relevant for eligibility are (1) the initial data set and (2) constructing the later data sets including false positives.[234] A court would be very concerned that allowing data operations to transform otherwise ineligible claims would preempt the "basic tools" of science and technology.[235] Consequently, the claims in Example Thirty-Nine are likely to fail at step two as well.

In fairness to the USPTO, the Office did not intend its neural net example to stand for the idea that the hypothetical claim was a practical application or that it contained an inventive concept; the Office intended it as a model for the step one analysis.[236] But therein lies the problem: whether AI inventions are patent eligible under either the Office's guidance or relevant case law will often be a close question. By refusing to perform the *Alice* two-step analysis, the Office appears to have blessed the eligibility of AI inventions without explaining why it is the correct legal result. Taken with the other MPEP changes in 2019, it is difficult to see anything other than a deliberate effort to reverse the effects of *Alice*'s more stringent eligibility test. That effort bore fruit immediately, as thousands of additional AI patents began to be granted.

E. AI Patents Proliferate

The Office appears to have succeeded in administratively circumventing *Alice*, at least in certain technology areas. Eligibility rejections for data processing inventions cratered from around 60% in 2018 to around 15% in 2020.[237] Across all *Alice*-affected technologies, the prevailing rejection rate of almost 30% under § 101 immediately fell to just below 20%.[238] Many inventors who work with AI are no doubt pleased with this development.[239]

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[234] "[D]igital non-facial images that are incorrectly detected as facial images" in the claim language means images the model thinks are faces, but are not, i.e., false positive results. USPTO, *New Examples*, *supra* note 210, at 8–9.

[235] *See, e.g.*, *Alice*, 573 U.S. at 216 (quotation marks omitted) (quoting *Myriad*, 569 U.S. at 589).

[236] *See, e.g.*, *id.* at 217–18.

[237] Crouch, *supra* note 168.

[238] USPTO, ADJUSTING TO *ALICE*, *supra* note 23, at 5.

[239] *See, e.g.*, USPTO, PUBLIC VIEWS, *supra* note 22, at 19 (noting that "several commenters expressed appreciation . . . for issuing and updating guidelines and examples," although caveating this by saying "however helpful the USPTO guidance had been to applicants and examiners, its overall impact had been largely negated because it is not binding on the courts" (quotation marks and alterations omitted) (quoting Innovation Alliance, Comment in Response to the USPTO's Request for Information on Patent Eligibility

But that satisfaction may be short-lived. If the Federal Circuit enforces its precedents, it could clear the way to invalidate these new patents. The status quo that has persisted for nearly five years since the new guidance is unstable, built upon an improvised legal foundation which is unstable in three separate ways. First, there is no congressional or Supreme Court action that justifies the sharp change in the USPTO's approach to eligibility, and the Office has no substantive rulemaking authority of its own.[240] Second, the Federal Circuit, which hears several eligibility cases a year, has demonstrated a consistent approach to eligibility. And third, the USPTO's eligibility determinations are not binding on courts.[241] Taken collectively, these facts should worry AI patent owners: as the number of AI patents balloons, some will inevitably be challenged in court. Those challenges will raise eligibility questions, which courts review de novo.[242] If the Federal Circuit adheres to its recent cases, it seems likely that the eligibility of many current AI patents will be thrown into doubt. It could be many more years until the Supreme Court definitively weighs in on the permissibility of the USPTO's approach. And even if patent owners catch a break because the Federal Circuit is inclined to avoid disruption to AI patents, such a ruling would simply exacerbate the current perception that the case law is incoherent or even arbitrary.[243]

These consequences, in the long run, increase costs to patent applicants. Uncertainty in examination outcomes means that more applicants will pay to prosecute doomed applications. Discrepancies between the USPTO's and courts' approaches mean that applicants who succeed at the USPTO may unexpectedly find themselves paying to defend their patents in later litigation. And the problem is worsening: a growing share, not just number, of patent applications involve some sort of AI technology.[244] In the worst-case scenario, a patentee who has an invalid earlier patent may be liable in infringement to someone with a

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Jurisprudence (Docket No. PTO–P–2021–0032) (Oct. 15, 2021), https://perma.cc/WCJ5-2KT7).

240 *See Merck*, 80 F.3d at 1549–50.

241 *See id.*

242 *See, e.g.*, DDR Holdings, LLC v. Hotels.com, L.P., 773 F.3d 1245, 1255 (Fed. Cir. 2014).

243 *See, e.g.*, USPTO, PUBLIC VIEWS, *supra* note 22, at 18–19.

244 *See* USPTO, TRENDS, *supra* note 18, at 7.

valid, later patent.[245] When the costs of applying for (and keeping) a patent increase, the net benefit to the patentee of the patent monopoly is reduced, and so is the incentive to innovate.

There is another, less obvious social harm. Patents are supposed to issue, in general, only inventions that benefit the public by promoting innovation.[246] Perhaps because this assumption of social benefit is baked into the system, patents are subject to precious little regulation after issuance.[247] Depending on how powerful an incentive the patent monopoly is, this effect could be quite significant—that is, if the patent incentive is well calibrated to producing socially beneficial inventions, it may obviate the need for much positive regulation of the technology. But otherwise, if the patent incentive were not well calibrated or poorly calibrated with respect to this large, rapidly developing technology that is already raising regulators' suspicions,[248] there would be a powerful argument for ex post regulatory intervention to rein in the technologies that were awarded faulty patents.

One might assume that courts would not knowingly disrupt such an important industry as AI by invalidating thousands of valuable patents. Nevertheless, a critical problem remains. One who supports letting the Office's 2019 changes stand must commit not only to whatever faulty patents have issued, but also to the ones that *will* issue. If one takes seriously the premise of the patent system that good patents are welfare enhancing and bad patents are not, letting those bad patents accrue in perpetuity harms society.[249] This only magnifies the problems associated with those patents as well as the urgency with which a fix is needed. However one sees it, then, an inconsistent approach to

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[245] Caveat "inventor": patent infringement is a strict liability tort. *See* Hilton Davis Chem. Co. v. Warner-Jenkinson Co., 62 F.3d 1512, 1527 (Fed. Cir. 1995) (en banc), *rev'd on other grounds*, 520 U.S. 17 (1997).

[246] *See* U.S. CONST. art. I, § 1, cl. 8.

[247] *Cf.* Jonathan S. Masur, *Regulating Patents*, 2010 SUP. CT. REV. 275, 304–07 (arguing that the USPTO should be given substantive authority to craft sector-specific patent regulations). *But see* Laura E. Dolbow, *Public Patent Powers*, 123 MICH. L. REV. (forthcoming 2024) (identifying several dozen grants of statutory authority to the executive to limit existing patent rights in various circumstances).

[248] *EU AI Act: First Regulation on Artificial Intelligence*, TOPICS: EUR. PARLIAMENT (Dec. 19, 2023), https://perma.cc/33ES-2HC5 (describing European AI regulations, including bans on certain biometric recognition and "[c]ognitive behavioral manipulation" technologies).

[249] The possibility remains that the Office's rule is *correct*, i.e., welfare enhancing. The principal motivations advanced above—capture and procedural efficiency—seem unlikely to have produced such a result. *See supra* text accompanying note 209. And evaluating the question directly, one reaches a different outcome as well. *See infra* Part III.B.

eligibility defeats the ends of patent law and demands a rapid solution.

III. RESOLVING THE AI ELIGIBILITY PROBLEM

This Comment has demonstrated that lower courts are in an unenviable position. It is unlikely that they will acquiesce to the USPTO's arrogation of substantive rulemaking power and let all existing AI patents stand. Yet if they take the most rigid position and hold, in effect, that the excess AI patents[250] since 2019 should never have been granted, they could expose worthwhile inventions to liability and depress innovation. Apart from solving that problem, an appropriate resolution of the discrepant approaches of the Office and the courts should meet several independent requirements. It should conform to Congress's expressed policy of patent legislation; it should come from an actor with the power to make binding law; and because the best evidence suggests that AI inventions are innovation positive,[251] it should result in patent eligibility for AI methods and models, but not for datasets used to create AI or mere applications of existing AI.

Such a resolution exists if courts follow the Federal Circuit's reasoning in *Bandai* to its natural conclusion that AI methods and models will often be eligible because they give computers new capabilities. This Part first briefly discusses the animating concerns of patent law, namely innovation incentives. It then analyzes the normative desirability of AI patents in view of those concerns. Finally, it examines a recent district court decision that attempted to strike a middle course between rejecting the Office's changes outright and hewing closely to precedent. In view of this decision, and the probability that other courts will take a similar tack, this Part concludes by arguing that the Federal Circuit ought to clarify that its holding in *Bandai*, consistent with the policy of patent law, instructs that many AI inventions should be patent eligible.

A. Eligibility Doctrine and Innovation

Recall that the *Alice* Court was motivated by a desire that "patent law not inhibit further discovery,"[252] stemming from

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[250] *See supra* text accompanying notes 237–38.

[251] *See infra* Part III.B.

[252] *Alice*, 573 U.S. at 216 (quotation marks omitted) (quoting *Mayo*, 566 U.S. at 85); *see also supra* notes 90–93 and accompanying text.

restrictions on the patent power in the Constitution.[253] The statutory requirements for patentability make good sense in view of this limitation. Novelty is a requirement because the "disclosure" of things already within public knowledge cannot promote innovation. Obviousness goes to incentivizing innovators: the costs of developing an obvious invention, all else being equal, are less than those of a nonobvious invention, because the latter will require more experimentation. Utility ensures that social welfare is not harmed by paying for a thing whose benefits are nil.

But all the Patent Act says about eligibility is that any "process, machine, manufacture, or composition of matter" qualifies.[254] It is easy to see that, up to a point, extending patent protections broadly promotes innovation. Fewer people would be willing to invest time and money in inventing new machines, for example, if they were not assured of a temporary monopoly that allowed them to profit from their investment if the invention turned out to be commercially successful. Conversely, categorical exceptions from eligibility—such as the abstract ideas exception—reflect a judgment that permitting monopolies over certain types of inventions would unduly impede innovation. It is not only that allowing a firstcomer to monopolize abstract ideas would preempt further inventions and stifle innovation. It is also that inventors are already incentivized to develop abstract ideas that they can use to create patent-eligible inventions.

Returning briefly to case law, one can see that concerns about effects on innovation explain the extremes of the *Alice* inquiry. At one end, inventions that almost always fail at step one are claims to results, automation of mental processes, and routine data operations. The Court has variously expressed its desire not to "tie up" or preempt these "basic tools" of science, technology, or the economy.[255] Clearly, the Court's concern is that granting monopolies on processes that are ubiquitous or very easily infringed would have a chilling effect on inventors.

At the other extreme, the Federal Circuit has been reluctant to invalidate software patents where they disclose a technological solution to a technological problem.[256] In *Bandai*, for example, the

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[253] *See* U.S. CONST. art. I, § 1, cl. 8.

[254] 35 U.S.C. § 101.

[255] *Mayo*, 566 U.S. at 86 (quotation marks omitted) (quoting *Benson*, 409 U.S. at 67); *see also* Bilski v. Kappos, 561 U.S. 593, 611 (2010).

[256] *See, e.g.*, DDR Holdings, LLC v. Hotels.com, L.P., 773 F.3d 1245, 1257 (Fed. Cir. 2014); *Bandai*, 837 F.3d at 1314.

court was convinced that software enabling a computer to perform a task previously only possible with human intervention should be eligible.[257] This seems to be the intuitively correct result if we ask whether allowing patents for such inventions will promote or hinder innovation, because it seems likely that others will be incentivized to design ways of augmenting the capabilities of computers as a result, whereas only those who would have otherwise augmented computers in precisely the same way are deterred.

B. Many AI Inventions Should Receive Patents to Promote Innovation

Keeping in mind that innovation is the goal of the patent system, we can return to AI inventions and reason from first principles whether they *should* be patent eligible. If patents for AI inventions would hinder innovation, then they should be ineligible, the Court and the Federal Circuit have mostly gotten it right, and the Office has mostly gotten it wrong. Immediately we encounter a difficulty, though, because "AI invention" could mean at least four things: the underlying dataset, the machine learning method, the model produced by the method, or an application of the model.

Remember the dog-recognizer AI above.[258] AI invention might mean a *dataset* collected for the purpose of training machine learning models (the photos of dogs and cats).[259] It might mean the machine learning *method* itself (the optimization to discover the data features that correspond to "dog").[260] Another possibility is the output of a machine learning algorithm, the trained *model* (the dog-recognizer program, ready to evaluate new pictures). Or, last, the AI invention could be the *application* of an existing model in a particular context (say, a method for using the dog recognizer in a veterinarian's office to facilitate offering canine products to customers when checking out). Conceptually, AI datasets, methods, models, and applications are different types of

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257 *Bandai*, 837 F.3d at 1307.

258 *See supra* notes 6–10 and accompanying text.

259 *See, e.g.*, *Data Sets and Catalogs*, MACGENCE, https://perma.cc/RVC6-NPTJ (advertising various commercial datasets for machine learning).

260 *See, e.g.*, Sören Sonnenburg et al., *The Need for Open Source Software in Machine Learning*, 8 J. MACH. LEARNING RSCH. 2443, 2444 (2007) (noting that the "large body of powerful learning algorithms" is in general "not openly shared"); *see also supra* Part II.D (claiming an iterative machine learning method).

invention, and might reasonably be treated differently with respect to patent eligibility.

A caveat is warranted. A patent application could plausibly include two or more of the types of AI invention just described. An application for a patent including claims to the dog-recognizer program itself, a model, might also include claims to the use of the model in providing veterinary services, an application. This Comment does not suggest that these different claims in the same application should be categorically treated differently. Rather, categorizing an AI invention as a dataset, method, model, or application should be an exercise in evaluating what is *assertedly inventive* about the invention. Continuing the example, if the dog-recognizer patent application purports to have invented the dog-recognizer program, the asserted invention is an AI model. If the inventor does not purport to have invented the model,[261] but only the method of using the model to provide veterinary services, then the invention is an application of AI.

There are two ways one can imagine patents to any of these types of AI invention hindering innovation: either AI inventions are not incentivized by patent grants, or patents for AI preempt too much and chill future innovation. This Section argues that datasets and applications should be patent ineligible, while methods and models should often be patent eligible.

1. Datasets should be patent ineligible because they stymie innovation.

Dataset patents are suspect because dataset collection probably does not need to be incentivized. Datasets are already protected both by trade secret and copyright law.[262] Trade secret protection is indefinite; copyright protection is functionally indefinite in the context of a quickly evolving technology.[263] Aside from patents being redundant, dataset owners might be actively dissuaded from seeking patents by the disclosure requirements because of how difficult it would be to prove infringement.

Furthermore, courts would and should worry that patents to datasets would preempt too much fundamental scientific and economic activity. Routine data collection and analysis is unlikely to

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[261] In this case, the claims to the model should be denied.

[262] Experian Info. Sols., Inc. v. Nationwide Mktg. Servs. Inc., 893 F.3d 1176, 1189 (9th Cir. 2018) (holding that a large commercial database of consumer information was entitled to "thin" copyright protection).

[263] *See* 17 U.S.C. § 302.

be patent eligible—for good reason[264] Those justifications are even stronger for data collection alone; to wit, anyone who aggregates data, perhaps even mentally, would have to be looking over their shoulder for dataset patents that render their activities infringing. There is also an eligibility problem separate from the judicial exceptions because datasets themselves are certainly not processes, nor plausibly compositions of matter.[265] And aside from eligibility, dataset patents would often be invalid for obviousness, because a skilled programmer would have a clear motivation to combine extant pieces of data to obtain the benefit of an appropriate training set.[266] Clearly, datasets are rightly excluded from patentability.

2. Applications of AI should be patent ineligible.

If the asserted invention of a patent application is merely the application of existing AI technology to some new context, it should be treated as an abstract idea and denied a patent. Consider the two mechanisms of patent law's effect on innovation in this context. First, to the capacity of patents to incentivize this innovation, it is easy to see that the costs of invention will very often be low or nonexistent. Oftentimes, those costs would be no greater than the (trivial) costs of conceiving a novel situation for which AI might be useful. (The example application above, providing veterinary services using the dog recognizer, is one of these—it took a few seconds to conceive, so it cost basically nothing.) When costs of invention are very low, in expectation someone will invent to reap whatever nonmonopoly profits are available, so there is no need of a patent monopoly. As to the second mechanism, chilling innovation, AI-application patents present clear dangers. It is likely, for example, that new contexts for applications of AI present opportunities to improve the technology to fit the context. The dog recognizer at the veterinarian's office might benefit from context-specific retraining to improve accuracy, or there might be a need for the ability to recognize *specific* dogs. With no blocking AI-application patent in the way, an inventor is free to pursue these improvements and then seek a patent for a method or model. But if an AI-application patentee already has

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[264] *See supra* Part I.C.1.

[265] *See* 35 U.S.C. § 101. They certainly are not machines. *See id.*

[266] *See id.* § 103; *see also* KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 420 (2007); MASUR & OUELLETTE, *supra* note 49, at 133–52.

the right to exclude an inventor from use of dog recognizers in the veterinary context, that potential innovation is chilled by the would-be inventor's need to seek a license from the patentee. Because AI-application patents both clearly have a great potential to chill innovation and often such inventions need not be further incentivized, AI applications should be patent ineligible.

3. AI methods and models should usually be patent eligible.

That leaves methods (how to train a computer to do a task) and models (the programs that perform the learned tasks), which have a much stronger theoretical justification for eligibility because they are probably incentivized by patents and do not unduly chill other innovation.

First, there is significant evidence that AI inventions are incentivized by patents. Public commenters affiliated with various industries have broadly, though not universally, criticized *Alice* for depressing innovation and investment and increasing the costs of obtaining patents.[267] "Many commenters" associated with computer technologies criticized the current eligibility framework as "unworkable and detrimental to innovation."[268] Some scholarship agrees: Professor Clark Asay has concluded that "the lack of effective patent protection in the AI space may disincentivize at least some AI innovators."[269] Academics are not the only ones who have been persuaded—in 2021, the Federal Court of Australia, in ruling that AI could be an inventor, cited the likelihood that the ruling would incentivize the development of AI models as support.[270] Lastly, bear in mind that the legal default is to assume that inventions are capable of incentivization by patents,[271] so

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267 *See* USPTO, PUBLIC VIEWS, *supra* note 22, at 20–29.

268 *Id.* at 35. *But see id.* (noting that another "group of stakeholders indicated that the current jurisprudence is promoting . . . innovation").

269 *See* Clark D. Asay, *Artificial Stupidity,* 61 WM. & MARY L. REV. 1187, 1207 (2020) (noting, further, that "even for those parties that could patent their AI-related innovations, doing so may not be worth it due to the likely narrowness of the resulting patent claims" caused by *Alice*). *But see, e.g.*, Robert E. Thomas, *Debugging Software Patents: Increasing Innovation and Reducing Uncertainty in the Judicial Reform of Software Patent Law*, 25 SANTA CLARA COMPUT. & HIGH TECH. L.J. 191, 217–24 (2008) (arguing that software in general should not be patentable because research and development costs for software are low and the technology is often difficult to reverse engineer).

270 *Thaler v Comm'r of Pats.* (2021) FCA 879, *overruled by Thaler v Comm'r of Pats.* (2022) FCA 62.

271 *See* Diamond v. Chakrabarty, 447 U.S. 303, 308 (1980) (describing the Patent Act as intending to give eligibility a "wide scope").

common law eligibility exclusions should be expanded only for good reasons to suspect that AI is different from most inventions.

There are, in fact, some good reasons to think that AI (or perhaps all software) might be different. First, software inventions are often open-source.[272] The reality that many inventors are willing to largely forgo the copyright and trade secret protections already available to them suggests that they do not desire to maintain a monopoly, and so would not be incentivized by the patent monopoly.[273] Furthermore, the existence of a large body of open-source software may make it more difficult for inventors who *do* want patents to clear the nonobviousness bar, such that changes to eligibility may not result in much improvement in the prospects of securing an AI patent.[274] Second, methods and models might be unusually protectable (compared to nonsoftware) through copyright and trade secret law. It has been argued, for example, that trade secret protection may be preferable to patents for AI inventions because of the disadvantages of patent disclosure.[275]

Ultimately, however, these reasons to think that AI inventions are not incentivized by patents are not persuasive. To the open-source point, while software is often open-source, few of the most popular AI products today are open-source, robbing those rationales of force in the AI context.[276] To the second, it is true that methods and models are more easily protectable through copyright than other inventions are. This proves too much, however: on this basis, practically all software could be denied patent eligibility, a question addressed and foreclosed by courts.[277] Moreover, copyright is not a perfect substitute for a patent. It protects only the particular expression of the program rather than the idea

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[272] SYNOPSYS, 2024 OPEN SOURCE SECURITY AND RISK ANALYSIS REPORT 4 (2024) (showing that 96% of a sample of 1,067 commercial codebases included at least some open-source software).

[273] *See, e.g.*, Google LLC v. Oracle Am., Inc., 141 S. Ct. 1183, 1216 (2021) (Thomas. J., dissenting) (discussing Oracle's and Google's demonstrated desire to control a certain open-source software platform to capture a larger share of software developer market).

[274] Asay, *supra* note 269, at 1212.

[275] *See id.* at 1217.

[276] *See, e.g.*, Michael Nolan, *Llama and ChatGPT Are Not Open-Source*, IEEE SPECTRUM (July 27, 2023), https://perma.cc/CJD5-XWSX.

[277] *See supra* notes 72–73 and accompanying text; *see also, e.g.*, Finjan, Inc. v. Blue Coat Sys., Inc., 879 F.3d 1299, 1305 (Fed. Cir. 2018).

behind it, which may not adequately incentivize programmers.[278] Furthermore, industry stakeholders have publicly cautioned against overreliance on trade secret protection.[279] Patents to AI methods and models are not exceptionally prone to chilling follow-on innovation. The increasingly vast array of applications of AI, and the speed with which the technology has penetrated widely varied sectors, makes it seem implausible that AI inventions are having a net chilling effect on innovation.[280] (And, lest one forget, this is happening in a context in which many of these inventions, and a greater proportion than pre-2019, are patented.)[281] Theoretically, software patent disclosures also should promote innovation more than disclosures of some other types of inventions. One reason for this is that, in view of the body of open-source prior art software, granted patents are likely to be narrower whatever the state of eligibility doctrine, resulting in greater general freedom to operate.[282] Another is that software disclosures are more easily used and innovated upon than are many other inventions. The chemical and pharmaceutical contexts present high barriers to entry.[283] On the other hand, startups are prevalent in, and have outsized influence on, the software industry. By one measure, over a quarter of *all* startups are in the AI and related spaces, indicative of low barriers to entry.[284] That, in turn, will tend to mean that market entrants will actually take advantage of the information in software patent disclosures, increasing innovation.[285]

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[278] *See, e.g.*, *Oracle*, 141 S. Ct. at 1205–06 (holding that Oracle's software copyright was not infringed despite near identicality of structure, sequence, and organization of Google's similar code).

[279] U.S. PAT. & TRADEMARK OFF., PUBLIC VIEWS ON ARTIFICIAL INTELLIGENCE AND INTELLECTUAL PROPERTY POLICY 41 (2020).

[280] *See supra* notes 1–5 and accompanying text.

[281] *See supra* Part II.E.

[282] *See* Asay, *supra* note 269, at 1211–12.

[283] Consider, for example, a patent on a hydrogenation catalyst. *See, e.g.*, U.S. Patent No. 5,560,592. No one but a chemist with millions of dollars in equipment on hand could make that invention, let alone improve upon it. Similarly, no one will make an improved semaglutide in their garage. *See* U.S. Patent No. 10,888,605.

[284] *See The Global Startup Ecosystem Report 2021: Global Startup Sub-Sector Analysis*, STARTUP GENOME (2021), https://perma.cc/RT87-CFSR.

[285] *Cf.* USPTO, PUBLIC VIEWS, *supra* note 22, at 23 ("[C]urrent jurisprudence is actually stifling competition by making it harder for startups and [small- and medium-sized enterprises] to attract much-needed investment, which has led to increased concentration of key technologies in the hands of a few large, well-resourced incumbents."); *id.* at 38 (noting that in the period from 2014 to 2018, when the USPTO was denying AI patent applications at a higher rate, investment in AI in the US fell dramatically compared to other countries, with the likely effect of reduced innovation). For a more ambivalent view,

To be sure, there is no conceptual reason we must treat methods and models on perfectly equal footing. They are both types of software, which suggests similar treatment, but one can imagine that methods present a stronger case for eligibility. Machine learning methods comprise specific algorithms with (presumably) discrete benefits over other possible methods; therefore, they are most clearly minimally preemptive and facially innovative.[286] Models, on the other hand, present a risk analogous to that presented by business methods patents[287]: that an alleged innovator will perform a "generic" machine learning method and get an undeserved and unnecessary patent to the resulting model.

There are two reasons to nevertheless think that models should be eligible. First, to find that methods are patentable but models are not would be analogous to finding that coding languages are patent eligible but software written in those languages is not. That is, the basic building blocks of the inventions would be eligible for patent protection while the result of assembling the blocks would not be. If the concern is preemption of "basic tools," that seems precisely backwards.[288] Second, even if models present a greater threat of "bad" patents, that is not a reason to think they are *categorically* harmful to innovation. The patent system still has the other patentability requirements at hand to address individual innovation-negative models on a case-by-case basis.[289] There is good reason to think that patents for both methods and models would usually promote innovation, and so each should be eligible.

C. Toward AI Eligibility

If one accepts the premise that methods and models *should* be patent eligible, it is tempting to say that the status quo since the Office's 2019 guidance is satisfactory.[290] But we should scrutinize this result a bit further: even if the Office got to

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see Nikola L. Datzov, *The Role of Patent (In)Eligibility in Promoting Artificial Intelligence Innovation*, 92 UMKC L.R. 1 (2023) ("[N]arrower patent eligibility may reduce some investment in this space . . . [but] the existing restrictions . . . offer meaningful opportunities for open innovation.").

286 *Cf. Bandai*, 837 F.3d at 1314–15 (finding claims directed to a particular algorithm for automating speech animation patent eligible).

287 *See supra* Part I.B.

288 *Benson*, 409 U.S. at 67.

289 Obviousness seems the likely candidate for knocking out patents for generic or conventional models. *See* 35 U.S.C. § 103.

290 *See supra* Part II.E.

(directionally) the right result, was the Office the right actor to change the law? And regardless, did it make the correct changes to the law?

The answers are doubly "no." The USPTO was plainly the wrong actor to make changes to AI eligibility. Although industry has gotten the immediate result it wanted, lawmakers (and the public) should be dissatisfied because the status quo involves a significant innovation-chilling effect: innovators report uncertainty in their investments in AI technology because examination "guidance remain[s] open to challenge and invalidation in the courts."[291] Indeed, in late 2023 an iterative machine learning patent that looks eerily like the Office's neural net example was invalidated on summary judgment, with the district court holding that there was no genuine factual dispute as to eligibility.[292] Furthermore, the 2019 changes to the guidance have predictably created confusion at the level of individual applications and examiners, as applicants charge that examiners are "not applying the guidance consistently."[293]

Similarly, the changes (while, again, directionally correct) were inconsistent, both internally and with binding law.[294] The Office is not entirely to blame. They were faced with the difficult task of reconciling a doctrine that forbids patents for things that look like mere data operations[295] and automation of mental processes[296] with (innovation-positive) inventions comprising data operations to automate mental processes.[297] Nevertheless, their solution of adding steps to *Alice* to approve more inventions is unsatisfactory and untenable in the long term.

An appropriate solution must come from an actor with the authority to make binding law and should keep in mind the probable innovation-positive effect of AI methods and models.[298]

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[291] USPTO, PUBLIC VIEWS, *supra* note 22, at 19 (quoting Intellectual Property Owners Association, Comment on Patent Eligibility Jurisprudence Study (Docket Number PTO-P-2021-0032 (Oct. 15, 2021), https://perma.cc/9JB8-QE5E.

[292] *See* Recentive Analytics, Inc. v. Fox Corp., 692 F. Supp. 3d 438, 448–49 (D. Del. 2023) (distinguishing the USPTO's example as involving specific improvement), *appeal docketed*, No. 23-2437 (Fed. Cir. Sept. 29, 2023).

[293] USPTO, PUBLIC VIEWS, *supra* note 22, at 20.

[294] *See supra* Part II.D.

[295] *Cf.* BSG Tech LLC v. BuySeasons, Inc., 899 F.3d 1281, 1285 (Fed. Cir. 2018).

[296] *Cf.* CyberSource Corp. v. Retail Decisions, Inc., 654 F.3d 1366, 1371 (Fed. Cir. 2011).

[297] This is a model, in the way I am using the term.

[298] *See supra* Part III.B.3.

Congress could do the job, although that appears unlikely.[299] The Supreme Court, too, could easily revise its precedents, were it inclined to grant certiorari.[300] But if neither acts, the Federal Circuit still has the ability to harmonize the constitutional command to promote science and the useful arts with its own precedents and with *Alice*.

The court showed the way in *Bandai*, where it held patent-eligible a computer-implemented method that "use[d] a combined order of specific rules that renders information into a specific format" to yield an improvement over known methods, automation that was previously impossible.[301] The court distinguished *Flook* and *Alice* by noting that the "claimed computer-automated process and the prior [human-performed] method" were carried out in different ways.[302] Recall the three reasons that the Federal Circuit provided for finding the *Bandai* invention eligible: (1) an improvement to computer capabilities, (2) automation of a process different from the manual prior art process, and (3) absence of total preemption of all such automated processes.[303]

That holding proved prescient in that it applies easily to AI models: AI algorithms do essentially represent data relationships, which argues against eligibility.[304] But like the automated process in *Bandai,* AI methods and models rely on rules to put that information in a specific format to achieve a specific improvement over the state of the art, often a new capability for computers.[305] And like the algorithm in *Bandai*, but unlike the ineligible software in cases like *Alice*, AI models achieve a result that looks like human intelligence without simulating the *mechanism* of human intelligence. Finally, if patent claims to an AI method or model are drafted in a way that accurately describes the particular AI process, they presumably would not preempt other, different ways of reaching the same result. AI applications, in contrast, which would tend to broadly preempt using AI in a certain context, are more suspect in this analysis, consistent with the arguments from first principles above.

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[299] *See* Hartung, *supra* note 180 (noting multiple failed attempts at legislative reform).

[300] *See* Burman York Mathis III, *Supreme Court Denies 43rd Petition for Cert on 101 Grounds in* Villena v. Iancu, IPWATCHDOG (June 16, 2019), https://perma.cc/Q73F-2D9F.

[301] 837 F.3d at 1315.

[302] *Id.* at 1314.

[303] *See id.* at 1311–16; *see also supra* Part I.C.1.

[304] *See* Elec. Power Grp., LLC v. Alstom S.A., 830 F.3d 1350, 1353 (Fed. Cir. 2016).

[305] *See supra* Part I.C.1.

Bandai thus contains a promising framework for evaluating the eligibility of AI methods and models, while excluding applications. Both the viability of the USPTO's eligible neural network example and the theory of *Bandai*'s applicability to AI inventions have recently been tested in district court. In *Recentive Analytics, Inc. v. Fox Corp.*,[306] patentee Recentive held two challenged patents regarding the creation of television scheduling network maps involving machine learning. In relevant part, the claims at issue recited "using a machine learning technique to optimize an overall television rating" (which is an AI-*application* claim) and "iteratively training the [machine learning] model to identify relationships" (which is, confusingly, an AI *method* claim because it recites details of the training steps).[307] That latter claim should sound familiar.

A very similar invention is described in Part II.D, the allegedly patent-eligible iteratively trained neural network that the Office assures us is not directed to an abstract idea.[308] Recall that, according to the Office, that invention did not recite an abstract idea, despite the claimed process reciting essentially data collection and application of mathematical formulas, so it passed the *Alice* two-step analysis at step one and was eligible.[309]

Recentive's invention thus provided a real-world test of the Office's reasoning. Unsurprisingly, the court was more inclined to follow the Federal Circuit than the MPEP. Recentive argued, as it should have, that its claims were analogous to the Office's neural net example.[310] The court rejected the argument tersely, holding that Recentive's patents "*apply* generic machine learning techniques to a pre-existing process," implicitly referencing *Alice*.[311] It did not go as far as to say that the Office's neural network example was ineligible, preferring to distinguish the example as involving a specific asserted improvement to an AI method, whereas Recentive's invention did not.[312] Recentive further argued that its claims were distinguishable from mental processes and that the invention was analogous to that in *Bandai*.[313] The

306 692 F. Supp. 3d 438 (D. Del. 2023).

307 *Id.* at 445 (quoting U.S. Patent No. 10,911,811).

308 *See supra* Part II.D.

309 *See supra* Part II.D.

310 *Recentive*, 692 F. Supp. 3d at 449–50.

311 *Id.* at 450 (emphasis added); *see also supra* Part I.C.1; Credit Acceptance Corp. v. Westlake Servs., 859 F.3d 1044, 1055–56 (Fed. Cir. 2017).

312 *Recentive*, 692 F. Supp. 3d at 449–50.

313 *Id.* at 452–53.

court rejected these arguments on two grounds. First, it argued from conventional data operations that "[b]ecause machine learning is algorithmic in nature," the patents were directed to an abstract idea.[314] Second, it distinguished *Bandai* as nonabstract because it involved the production of a "tangible result (the sequence of animated characters)."[315]

The district court was correct that Recentive's invention was not (and should not be) patent eligible. Recentive's claims contain trite recitations of applying "machine learning" that raise precisely the concerns about generic software patenting as those in *Alice* itself. Further, because there was nothing assertedly inventive about the model, the invention here was an AI application, and should be ineligible for the reasons discussed above.[316] There is much to be said for reaching the right result to invalidate an innovation-negative patent, and the court's ruling was right in that respect.

Yet the rest of the court's reasoning is incorrect. Its distinction from the USPTO's example neural network is unsatisfying. To be sure, the court is right not to strive to say that the example neural net is ineligible, since that was not at issue in *Recentive*. But its reasoning does not comport with the Office's own reasons that the example neural net is eligible or with the best reading of the case law. The Office said that the example was not directed to an abstract idea because it does not recite mathematical relationships.[317] In contrast, the court appears to distinguish the hypothetical Example Thirty-Nine invention as eligible for claiming a specific asserted improvement.[318] This is only half the analysis, and should fail in the face of the preemptive effect of the example claims, as described above.[319] The decision further errs in implying inventions "algorithmic in nature" are categorically ineligible; *Benson* and *Flook* left a path open for patents to software, all of which are algorithmic by definition.[320] And *Bandai*, contrary to the court's characterization, did not hold the animation software at issue patentable because it produced a tangible result. Rather,

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314 *Id.* at 453.

315 *Id.* at 454 (citing *Bandai*, 837 F.3d at 1315).

316 *See supra* Part III.B.2.

317 USPTO, *New Examples*, *supra* note 210, at 8–9.

318 *See Recentive*, 692 F. Supp. 3d at 449–50; *cf. supra* Part II.D.

319 *Recentive*, 692 F. Supp. 3d at 449–50.

320 *See supra* notes 65–72 and accompanying text.

the Federal Circuit explicitly said the invention was eligible *despite not* producing a tangible result.[321]

Nevertheless, analyzing Recentive's invention under the *Bandai* framework discussed above likely produces the same result (though for more defensible reasons). Perhaps most importantly, the Recentive patent claims were exceedingly broad, covering techniques such as "'regression' and 'decision tree[s]'" that do not really constitute machine learning.[322] Totally preempting all uses of machine learning to generate network maps, a characteristic of AI-application inventions,[323] would be bad enough; totally preempting all automation of network map generation, as the Recentive patent threatened to do, strikes at the core rationale of *Alice*. Granted, Recentive asserted that its automated process was qualitatively different from the manual prior art process, which would weigh for eligibility in this framework.[324] That leaves new computer capabilities, and how that factor comes out depends on whom one believes. Recentive argued that they had automated a previously "entirely manual" process.[325] The court took this at face value. Even if true, however, in some highly specific sense, it is certainly not true that computers could not previously generate network maps.[326] Two factors, then, are against Recentive, and applying *Bandai* in what I argue is the correct way still results in the ineligibility of the invention.

Recentive encapsulates the AI eligibility problem in miniature: right result, wrong way. Eventually, someone will get unlucky, and the wrong way will produce the wrong result for an otherwise innovation-positive patent. *Recentive* also illustrates how vulnerable AI inventions are to the application of the quasi-categorical abstract idea rules whether supported by recent cases (conventional data operations) or otherwise (tangible result test).[327]

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321 *Bandai*, 837 F.3d at 1315.

322 *Recentive*, 692 F. Supp. 3d at 454 (alteration in original).

323 *See supra* Part III.B.2.

324 *Recentive*, 692 F. Supp. 3d at 448–49. Although this is being generous to Recentive. Given the extremely broad array of types of automation they claimed, one could argue that the only common qualitative difference of their automated process from the manual process is the tautological one: the fact that the process is automatic. *Id.*

325 *Id.* at 449.

326 *See, e.g.*, Glenn Mansfield, M. Ouchi, K. Jayanthi, Y. Kimua, Kohei Ohta & Yoshiaki Nemoto, *Techniques for Automated Network Map Generation Using SNMP*, 2 PROC. IEEE INFOCOM '96: CONF. ON COMPUT. COMMC'NS 473, 473 (1996).

327 *Recentive*, 692 F. Supp. 3d at 454.

Those categorical rules are the creatures of Federal Circuit precedent. They are not commanded by *Alice*; they are glosses on what an "abstract idea" is. The Federal Circuit can choose among its precedents when they come into conflict. It should recognize that its intuition in *Bandai* was correct and that inventions that give machines new capabilities promote innovation so long as they are not preemptive of all such automated processes or derivative of the manual prior art. It should also recognize that the weight of precedent behind the categorical exclusions of certain allegedly abstract ideas is driving the Office astray,[328] and may have begun to mislead lower courts as well.[329] When given the opportunity, the Federal Circuit should choose *Bandai*, and ground the law of eligibility in innovation once more.

CONCLUSION

Tens of thousands of patents to AI inventions are being granted in the United States each year. A sizable portion of these patents are the product of the USPTO's 2019 subject matter eligibility guidance, which departs from the controlling case law in significant ways. This Comment has discussed the history of recent developments in patent eligibility doctrine at the Supreme Court, at the Federal Circuit, and as applied at the USPTO. It has analyzed how the Office examines AI inventions through the lens of the official guidance and concluded that the Office is not applying the same standard that courts are. This situation must eventually result either in the invalidation of many AI patents, a change to eligibility doctrine, or both.

Which of those outcomes is normatively desirable depends on whether the AI patents at issue promote the ends of patent law by incentivizing innovation. This Comment has analyzed the policy concerns that motivate the eligibility requirements and argued that AI methods and models are likely to be incentivized by patents while not inordinately likely to chill follow-on innovation. Those determinations lead to the conclusion that AI methods and models ought to be patent eligible.

Recentive demonstrates that courts may not find the Office's approach to AI patent eligibility persuasive. Moreover, while *Recentive* involved an arguably meritless invention, the Federal Circuit's precedents can too easily be applied to

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328 *See supra* Part II.C.3.

329 *See supra* notes 310–21 and accompanying text.

invalidate patents to worthwhile AI inventions. To ensure that worthwhile AI methods and models can be patented, refinements to the doctrine of eligibility are required. This Comment proposes that at the first opportunity, the Federal Circuit clarify that AI methods and models will in general be patent eligible, consistent with *Alice*, in light of *Bandai*'s holding that an invention that gave a new capability to machines without preempting all such automation was patent eligible. By doing so, that court can resolve the recent divergence between the law and practice, minimally disrupt the body of precedent, and, perhaps most importantly, serve the ends of patent law by facilitating patents to innovation-positive AI methods and models.