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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE APPEALS REVIEW PANEL OF THE
PATENT TRIAL AND APPEAL BOARD

Ex parte GUILLAUME DESJARDINS, RAZVAN PASCANU, RAIA THAIS HADSELL, JAMES KIRKPATRICK, JOEL WILLIAM VENESS, and NEIL CHARLES RABINOWITZ

Appeal 2024-000567
Application 16/319,040
Technology Center 2100

Before JOHN A. SQUIRES, *Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office*, VALENCIA MARTIN WALLACE, *Acting Commissioner for Patents*, and MICHAEL W. KIM, *Vice Chief Administrative Patent Judge*.

SQUIRES, *Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office*.

DECISION ON REQUEST FOR REHEARING

I. INTRODUCTION

This Appeals Review Panel ("ARP") was convened to review the Board's Decision on Appeal ("Dec.") and Decision on Request for Rehearing ("Reh'g Dec."), with particular focus on the Board's new ground of rejection of claims 1–6 and 8–20 under 35 U.S.C. § 101. We have jurisdiction under 35 U.S.C. § 6(b).

On review, we vacate the Board's new ground of rejection. We do not disturb the Board's previous decisions in any other respects.

II. BACKGROUND

A. Claimed Invention

Application No. 16/319,040 relates to training machine learning models. Specification ("Spec.") ¶ 2. Independent claim 1 reads:

> 1. A computer-implemented method of training a machine learning model,
>
> wherein the machine learning model has at least a plurality of parameters and has been trained on a first machine learning task using first training data to determine first values of the plurality of parameters of the machine learning model, and
>
> wherein the method comprises:
>
> determining, for each of the plurality of parameters, a respective measure of an importance of the parameter to the first machine learning task, comprising:
>
> computing, based on the first values of the plurality of parameters determined by training the machine learning model on the first machine learning task, an approximation of a posterior distribution over possible values of the plurality of parameters,
>
> assigning, using the approximation, a value to each of the plurality of parameters, the value being the respective measure of the importance of the parameter to the first machine learning task and approximating a probability that the first value of the parameter after the training on the first machine learning task is a correct value of the parameter given the first training data used to train the machine learning model on the first machine learning task;
>
> obtaining second training data for training the machine learning model on a second, different machine learning task; and

> training the machine learning model on the second machine learning task by training the machine learning model on the second training data to adjust the first values of the plurality of parameters to optimize performance of the machine learning model on the second machine learning task while protecting performance of the machine learning model on the first machine learning task,
>
> wherein adjusting the first values of the plurality of parameters comprises adjusting the first values of the plurality of parameters to optimize an objective function that depends in part on a penalty term that is based on the determined measures of importance of the plurality of parameters to the first machine learning task.

Appeal Br. 16 (Claims Appendix).

The Specification discloses:

> Particular embodiments of the subject matter described in this specification can be implemented so as to realize one or more of the following advantages. By training the same machine learning model on multiple tasks as described in this specification, once the model has been trained, the model can be used for each of the multiple tasks with an acceptable level of performance. As a result, systems that need to be able to achieve acceptable performance on multiple tasks can do so while using less of their storage capacity and having reduced system complexity. For example, by maintaining a single instance of a model rather than multiple different instances of a model each having different parameter values, only one set of parameters needs to be stored rather than multiple different parameter sets, reducing the amount of storage space required while maintaining acceptable performance on each task. In addition, by training the model on a new task by adjusting values of parameters of the model to optimize an objective function that depends in part on how important the parameters are to previously learned task(s), the model can effectively learn new tasks in succession whilst protecting knowledge about previous tasks.

Spec. ¶ 21.

B. Procedural History

On March 4, 2025, a Board panel issued a Decision on Appeal (1) affirming the rejection of all pending claims 1–6 and 8–20 under 35 U.S.C. § 103 (one judge entered an opinion concurring-in-part, and would have reversed this rejection), and (2) entering a new ground of rejection of claims 1–6 and 8–20 under 35 U.S.C. § 101. On May 5, 2025, the Appellant[1] filed a Request for Rehearing ("Req."), and addressed the new ground of rejection. Req. 7–10. On July 14, 2025, the Board panel issued a Decision on Request for Rehearing denying the Request in all respects.

C. Principles of Law and the Manual of Patent Examining Procedure ("MPEP")

35 U.S.C. § 101 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." Section 101, however, "contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable." *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014) (quoting *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589 (2013)). *Alice* identifies a framework for determining whether claimed subject matter is directed to an abstract idea. *Id.* at 217. According to *Alice*, "[w]e must first determine whether the claims at issue are *directed to* a patent-ineligible concept." *Id.* at 218 (emphasis added).

[1] The "Appellant" refers to the "applicant" as defined in 37 C.F.R. § 1.42(a) (2022). The Appellant identifies DeepMind Technologies Limited as the real party in interest. Appeal Br. 1.

> Under *Alice* step one, we consider whether the claims at issue are directed to patent-ineligible subject matter, here, an abstract idea. This "directed to" inquiry does more than "simply ask whether the claims *involve* a patent-ineligible concept." *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016) (emphasis in original). Instead, we must look to the character of the claims as a whole to determine whether they are "directed to" patent-ineligible subject matter. *Id.*

AI Visualize, Inc. v. Nuance Commc'ns, Inc., 97 F.4th 1371, 1378 (Fed. Cir. 2024). If so, the next step is "a search for an 'inventive concept'—*i.e.*, an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.'" *Alice*, 573 U.S. at 217–18 (quoting M*ayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72–73 (2012)) (alteration in original).

The MPEP describes the process the Office follows in evaluating whether a claim is drawn to patent-eligible subject matter under § 101. *See* MPEP § 2106. Consistent with the statute, the process entails, at Step 1, determining whether the claimed subject matter falls within one of the four statutory categories of invention (i.e., process, machine, manufacture, or composition of matter). *See* MPEP § 2106.03. Consistent with *Alice*'s two-part framework, Step 2 of the process is a two-part test to identify whether claims are directed to a judicial exception, i.e., an abstract idea, law of nature, or natural phenomenon (Step 2A; *see* MPEP § 2106.04), and then to evaluate if additional elements of the claim provide an inventive concept; that is, whether they provide "significantly more" than the recited judicial exception (Step 2B; *see* MPEP § 2106.05).

Step 2A is a two-pronged inquiry. "Prong One asks does the claim recite an abstract idea, law of nature, or natural phenomenon?" MPEP

§ 2106.04(II)(A)(1). "Prong Two asks does the claim recite additional elements that integrate the judicial exception into a practical application?" MPEP § 2106.04(II)(A)(2). Only after a determination is made that the claim recites a judicial exception under the Prong One inquiry do we proceed to the Prong Two inquiry, and then to Step 2B. "The Step 2A Prong One analysis articulated in MPEP § 2106.04 . . . requir[es] a claim to recite (*i.e.*, set forth or describe) an abstract idea in Prong One before proceeding to the Prong Two inquiry . . . ." MPEP § 2106.04(a)(1). If, at Prong Two, the claim as a whole is not directed to a judicial exception, the eligibility analysis is concluded. MPEP § 2106.04(II)(A)(2).

III. ANALYSIS

The Board's decisions and the Appellant's arguments focus on MPEP Step 2A (*Alice* Step One). *See* Dec. 20–23; Req. 7–9; Reh'g Dec. 5–7. Accordingly, we confine our discussion to Step 2A, as that resolves our review.

A. Alice Step One; MPEP Step 2A, Prong One

Independent claim 1 recites "computing . . . , an approximation of a posterior distribution over possible values of the plurality of parameters." Independent claims 18 and 19 recite similar limitations. Appeal Br. 20–21 (Claims App.). In entering the new ground of rejection, the Board determined that at least this limitation recites a mathematical calculation, which is a mathematical concept, and, thus, an abstract idea. Dec. 20–21. For this limitation, the Appellant neither disputed that the limitation recites an abstract idea, nor identified the limitation as reciting features that confer technical improvements. Req. 7–8. We see no reason to disturb this

undisputed finding, and so because independent claims 1, 18, and 19 each recite at least one abstract idea, we proceed to the next part of our analysis—MPEP Step 2A, Prong Two.

B. Alice Step One; MPEP Step 2A, Prong Two

The Board determined next that "we discern no additional element (or combination of elements) recited in Appellant's claims 1, 18, and 19 that may have integrated the judicial exception into a practical application." Dec. 22. The Appellant disagrees, asserting that "the claims recite additional elements that reflect '[a]n improvement in the functioning of a computer, or an improvement to other technology or technical field,' as discussed in MPEP §§ 2106.04(d)(1) and 2106.05(a)." Req. 7. In particular, the Appellant identifies certain limitations of independent claim 1 and asserts that "the claimed subject matter provides technical improvements over conventional systems by addressing challenges in continual learning and model efficiency by reducing storage requirements and preserving task performance across sequential training," citing paragraph 21 of the Specification for support. *Id.* at 7–9; *see also id.* at 8 ("This training strategy allows the model to preserve performance on earlier tasks even as it learns new ones, directly addressing the technical problem of 'catastrophic forgetting' in continual learning systems."). We agree with the Appellant.

The determination requires us to "evaluate the significance of the additional elements relative to the invention," while being mindful that "the ultimate question" is "whether the exception is integrated into a practical application." MPEP § 2106.04(d)(II). On the one hand, claims "[g]enerally linking the use of a judicial exception to a particular technological environment or field of use" are not patent eligible. *See* MPEP § 2106.05(h)

(citing *Affinity Labs of Tex. v. DirecTV, LLC*, 838 F.3d 1253 (Fed. Cir. 2016) and *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1354 (Fed. Cir. 2016)). On the other, claims directed to an improvement in the functioning of a computer, or an improvement to other technology or technical field are patent eligible. *See* MPEP §§ 2106.04(d)(1) and 2106.05(a) (citing *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1339 (Fed. Cir. 2016) and *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1315 (Fed. Cir. 2016)).

Enfish ranks among the Federal Circuit's leading cases on the eligibility of technological improvements. In particular, *Enfish* recognized that "[m]uch of the advancement made in computer technology consists of improvements to software that, by their very nature, may not be defined by particular physical features but rather by logical structures and processes." 822 F.3d at 1339. Moreover, because "[s]oftware can make non-abstract improvements to computer technology, just as hardware improvements can," the Federal Circuit held that the eligibility determination should turn on whether "the claims are directed to an improvement to computer functionality versus being directed to an abstract idea." *Id.* at 1336.

Paragraph 21 of the Specification, which the Appellant cites, identifies improvements in training the machine learning model itself. Of course, such an assertion in the Specification alone is insufficient to support a patent eligibility determination, absent a subsequent determination that the claim itself reflects the disclosed improvement. *See* MPEP § 2106.05(a) (citing *Intellectual Ventures I LLC v. Symantec Corp.*, 838 F.3d 1307, 1316 (Fed. Cir. 2016)). Here, however, we are persuaded that the claims reflect such an improvement. For example, one improvement identified in the

Specification is to "effectively learn new tasks in succession whilst protecting knowledge about previous tasks." Spec. ¶ 21. The Specification also recites that the claimed improvement allows artificial intelligence (AI) systems to "us[e] less of their storage capacity" and enables "reduced system complexity." *Id.* When evaluating the claim as a whole, we discern at least the following limitation of independent claim 1 that reflects the improvement: "adjust the first values of the plurality of parameters to optimize performance of the machine learning model on the second machine learning task while protecting performance of the machine learning model on the first machine learning task." We are persuaded that constitutes an improvement to how the machine learning model itself operates, and not, for example, the identified mathematical calculation.

Under a charitable view, the overbroad reasoning of the original panel below is perhaps understandable given the confusing nature of existing § 101 jurisprudence, but troubling, because this case highlights what is at stake. Categorically excluding AI innovations from patent protection in the United States jeopardizes America's leadership in this critical emerging technology. Yet, under the panel's reasoning, many AI innovations are potentially unpatentable—even if they are adequately described and nonobvious—because the panel essentially equated any machine learning with an unpatentable "algorithm" and the remaining additional elements as "generic computer components," without adequate explanation. Dec. 24. Examiners and panels should not evaluate claims at such a high level of generality.

However, it is with this view that the panel's *sua sponte* action is most troubling, as it eschewed the clear teachings of *Enfish*, and instead

substituted only a cursory analysis that ignored this well-settled precedent. Panels should treat such precedent with more care, especially when acting *sua sponte*.

At the same time, the claims at issue stand rejected under § 103. This case demonstrates that §§ 102, 103 and 112 are the traditional and appropriate tools to limit patent protection to its proper scope. These statutory provisions should be the focus of examination.

For these reasons, we determine that although independent claim 1 may recite an abstract idea, it is not directed to an abstract idea. Instead, we determine that independent claim 1, when considered as a whole, integrates an abstract idea into a practical application. Our analysis is also applicable to independent claims 18 and 19, and all pending dependent claims 2–6, 8–17, and 20.

IV. CONCLUSION

In sum, we vacate the Board's New Ground of Rejection. We do not disturb the Board's previous decisions in any other respects.

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(l)(iv).