UNITED STATES PATENT AND TRADEMARK OFFICE

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte NOEL C. CODELLA, GANG HUA, and JOHN R. SMITH

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Appeal 2019-003264
Application 14/500,023
Technology Center 2100

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Before KARA L. SZPONDOWSKI, SCOTT B. HOWARD, and
STEVEN M. AMUNDSON, *Administrative Patent Judges*.

SZPONDOWSKI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant[1] appeals under 35 U.S.C. § 134(a) from the Examiner's

Final Rejection of claims 1–10 and 12–20, which constitute all of the claims

pending in this application. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] We use the word "Appellant" to refer to "applicant" as defined in
37 C.F.R. § 1.42. Appellant identifies the real party in interest as
International Business Machines Corporation. Appeal Br. 1.

STATEMENT OF THE CASE

Appellant's invention relates to "information technology, and more particularly, to machine learning technology." Spec. 1, ll. 4–5. Claim 1, reproduced below, is representative of the claimed subject matter:

1.   A method comprising the following steps:

identifying an anchor data point in a given class of data points, wherein the given class of data points is underrepresented among multiple classes in a data set of multiple data points, wherein each of the multiple data points represents a vector;

determining a given number of data points in the given class that neighbor the anchor data point, wherein the given number comprises two or more;

applying a weight to (i) each of the given number of data points in the given class that neighbor the anchor data point to create a given number of weighted neighboring data points, and (ii) the anchor data point to create a weighted anchor data point, wherein said weight applied to the anchor data point is equal to the number of data points in the given class that neighbor the anchor data point;

performing a vector summation by summing the given number of weighted neighboring data points and the weighted anchor data point; and

generating a synthetic data point to be associated with the given class of data points, wherein the synthetic data point represents the result of said vector summation;

wherein the steps are carried out by at least one computing device.

REJECTION

Claims 1–10 and 12–20 stand rejected under 35 U.S.C. § 101 as directed to patent-ineligible subject matter. Final Act. 2.

ANALYSIS

Section 101 Rejection

An invention is patent eligible if it claims a "new and useful process, machine, manufacture, or composition of matter." 35 U.S.C. § 101. However, the Supreme Court has long interpreted 35 U.S.C. § 101 to include implicit exceptions: "[l]aws of nature, natural phenomena, and abstract ideas" are not patentable. *E.g.*, *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014).

In determining whether a claim falls within an excluded category, we are guided by the Supreme Court's two-step framework, described in *Mayo* and *Alice*. *Id.* at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–77 (2012)). In accordance with that framework, we first determine what concept the claim is "directed to." *See Alice*, 573 U.S. at 219 ("On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.,* the use of a third party to mitigate settlement risk."); *see also Bilski v. Kappos*, 561 U.S. 593, 611 (2010) ("Claims 1 and 4 in petitioners' application explain the basic concept of hedging, or protecting against risk . . . .").

Concepts determined to be abstract ideas, and, thus, patent ineligible, include certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 561 at 611); mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 69 (1972)). Concepts determined to be patent eligible include physical and chemical processes, such as "molding rubber products" (*Diamond v. Diehr*, 450 U.S. 175, 191 (1981)); "tanning, dyeing, making water-proof cloth, vulcanizing India

rubber, smelting ores" (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S. 252, 267–68 (1854))); and manufacturing flour (*Benson*, 409 U.S. at 69 (citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

If the claim is "directed to" an abstract idea, we turn to the second step of the *Alice* and *Mayo* framework, where "we must examine the elements of the claim to determine whether it contains an 'inventive concept' sufficient to 'transform' the claimed abstract idea into a patent-eligible application." *Alice*, 573 U.S. at 221 (internal citation omitted). "A claim that recites an abstract idea must include 'additional features' to ensure 'that the [claim] is more than a drafting effort designed to monopolize the [abstract idea].'" *Id.* (quoting *Mayo*, 566 U.S. at 77). "[M]erely requir[ing] generic computer implementation[] fail[s] to transform that abstract idea into a patent-eligible invention." *Id.*

The PTO has published revised guidance on the application of § 101. USPTO's January 7, 2019 Memorandum, 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019) ("2019 Guidance"); October 2019 Update: Subject Matter Eligibility, 84 Fed. Reg. 55,942 (available at the USPTO's website) ("October 2019 PEG Update"). Under the 2019 Guidance, we first look to whether the claim recites:

> (1) any judicial exceptions, including certain groupings of
> abstract ideas (i.e., mathematical concepts, certain methods of
> organizing human activity such as a fundamental economic
> practice, or mental processes); and
>
> (2) additional elements that integrate the judicial exception into
> a practical application (*see* Manual of Patent Examining

Procedure (MPEP) § 2106.05(a)–(c), (e)–(h) (9th ed. rev.

08.2017 Jan. 2018)).

See 2019 Guidance, 84 Fed. Reg. at 52, 55–56. Only if a claim (1) recites a

judicial exception and (2) does not integrate that exception into a practical

application, do we then look to whether the claim:

> (3) adds a specific limitation beyond the judicial exception that
>
> is not "well-understood, routine, conventional" in the field (*see*
>
> MPEP § 2106.05(d)); or
>
> (4) simply appends well-understood, routine, conventional
>
> activities previously known to the industry, specified at a high
>
> level of generality, to the judicial exception.

See id. at 56.

2019 Guidance, Step 2A, Prong 1

Under the first step of the *Alice/Mayo* framework, the Examiner finds

that the claimed invention is "directed to a mathematical process for

generating synthetic data." Final Act. 2; Ans. 6. The Examiner compares

the claims to those found to be abstract ideas in *Digitech*, *Bilski*, and *Benson*.

Final Act. 3; *see* Ans. 6–7; *see Digitech Image Techs., LLC v. Elecs. for*

Imaging, Inc., 758 F.3d 1344 (Fed. Cir. 2014); *Bilski v. Kappos*, 561 U.S.

593 (2010); *Gottschalk v. Benson*, 409 U.S. 63 (1972). Specifically, the

Examiner finds that the "claimed mathematical process is basically an

algorithm comprising a couple of math steps (determining a number,

applying weights, summarizing the vector to generate a resulting data

point)." Ans. 6.

Appellant does not persuasively refute the Examiner's conclusion that

the claim is directed to mathematical concepts. Rather, Appellant merely

argues that the Examiner oversimplifies the claims and provides only "non-specific and conclusory characterizations" without "identify[ing] a particular basis for alleging that the claimed invention is directed to an abstract idea." Appeal Br. 7–8. According to Appellant, the claimed "'generating a synthetic data point' is clearly not a mathematical process." Reply Br. 3

We agree with the Examiner that the claims recite mathematical concepts. *See* Ans. 6–7; 84 Fed. Reg. at 52. In the Specification, Appellant describes "[i]mbalanced data sets [that] are prevalent in many practices . . . when training data are presented to a machine learning system." Spec. 1, ll. 8–10. This "imbalance . . . can have significant negative impacts on training classifiers," and current balancing approaches are "limited and encompass[] an insufficient amount and/or variety of data." Spec. 1, ll. 11–14. To solve this problem, the Specification describes "utilizing information from multiple neighboring data points simultaneously to represent the variety exhibited in a local neighborhood of data." Spec. 1, ll. 15–17.

For example, claim 1 recites a method that performs the following steps:

> *identifying an anchor data point in a given class of data points*, wherein the given class of data points is underrepresented among multiple classes in a data set of multiple data points, *wherein each of the multiple data points represents a vector*;

> *determining a given number of data points in the given class that neighbor the anchor data point*, wherein the given number comprises two or more;

> *applying a weight to (i) each of the given number of data points in the given class that neighbor the anchor data point to create a given number of weighted neighboring data points,*

and (ii) the anchor data point to create a weighted anchor data point, wherein said weight applied to the anchor data point is equal to the number of data points in the given class that neighbor the anchor data point;

performing a vector summation by summing the given number of weighted neighboring data points and the weighted anchor data point; and

generating a synthetic data point to be associated with the given class of data points, wherein the synthetic data point represents the result of said vector summation;

wherein the steps are carried out by at least one computing device.

Br. 11 (Claims App.) (emphasis added).

Appellant has not persuasively argued why the italicized claim limitations above are not directed to mathematical concepts—specifically, "mathematical relationships, mathematical formulas or equations, [and] mathematical calculations.'" *See* 2019 Guidance, 84 Fed. Reg. at 52. As described in the Specification, Appellant utilizes statistical models and "yield[s] a broader distribution of new synthetic data points" by implementing algorithms. *E.g.,* Spec. 4. ll. 3–5.

Accordingly, we conclude claim 1 recites mathematical concepts as identified in the 2019 Guidance, and thus an abstract idea.

2019 Guidance, Step 2A, Prong 2

In determining whether the claims are "directed to" the identified abstract idea, we next consider whether the claims recite additional elements that integrate the judicial exception into a practical application. For the reasons set forth below, we discern no additional element (or combination of elements) recited in the claims that integrate the judicial exception into a practical application. *See* 2019 Guidance, 84 Fed. Reg. at 54–55.

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Appellant argues that the claims "reflect an improvement in the functioning of a computer, or an improvement to other technology or technical field." Reply Br. 5. Specifically, Appellant argues that "the claimed embodiments improve computerized methods for intelligently generating synthetic data points to balance class distribution in a given data set." *Id.* Appellant also characterizes the claims as "overcom[ing] problems associated [with] imbalanced data sets (particularly, challenges arising from insufficient amounts and/or varieties of data)." *Id.*

We are not persuaded by Appellant's arguments and agree with the Examiner's findings and conclusions. *See* Ans. 8–9. Appellant has not sufficiently shown that the claims are directed to an improvement to the computer system or technological process. Rather, we agree with the Examiner's conclusion that the claimed "use of computing devices merely facilitates more effective implementation of the process without achieving substantively different results." Final Act. 3; *see also* Ans. 9 (citing *Versata Development Grp., Inc. v. SAP Am., Inc.*, 793 F.3d 1306 (Fed. Cir. 2015)). As the Examiner properly reasons, there is "no indication that the additional elements improve . . . technology." Ans. 9. Furthermore, Appellant has not shown that the alleged improvement to generating synthetic data points and balancing class distribution changes the manner in which the computer operates or changes the functionality of the computer itself. Instead, Appellant's alleged improvement is directed to the abstract idea.

Here, the claimed invention merely uses generic computer components to analyze data (i.e., "wherein the steps are carried out by *at least one computing device*"). *See SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1167–68 (Fed. Cir. 2018) (distinguishing *McRO, Inc. v. Bandai*

Namco Games Am., Inc., 837 F.3d 1299 (Fed. Cir. 2016). This is in contrast to, for instance, *McRO*, where the claims recited a "specific . . . improvement in computer animation" using "unconventional rules" that related "sub-sequences of phonemes, timings, and morph weight sets" to automatically animate lip synchronization and facial expressions for three-dimensional characters that only human animators could previously produce. *McRO*, 837 F.3d at 1302–03, 1307–08, 1313–15. There, the recited process automatically animated characters using particular information and techniques, which was an improvement over manual 3-D animation techniques and, therefore, not abstract. *Id*. at 1316. Unlike the claims in *McRO* that improved how the physical display operated to produce better quality images, the present claims merely "carry out" the abstract idea using "computing devices."

Moreover, Appellant does not direct our attention to any disclosure in the Specification that indicates the claimed computer components used to perform the limitations in the claim, such as the "at least one computing device," are anything other than generic computer components. For example, the Specification explains that the "present invention can make use of software running on a general purpose computer or workstation." Spec. 7, ll. 21–22. The Specification also explains that a "'processor' . . . include[s] any processing device." Spec. 7, ll. 24–26. Simply implementing an abstract idea using conventional machines or devices adds nothing of substance. *See Alice*, 573 U.S. at 223 ("Stating an abstract idea 'while adding the words 'apply it'' is not enough for patent eligibility."); *see also Mayo*, 566 U.S. at 84–85 (explaining that "simply implementing a

mathematical principle on a physical machine" does not suffice for patent eligibility (citing *Gottschalk v. Benson*, 409 U.S. 63, 64–65, 71 (1972))).

Accordingly, for the foregoing reasons, the claims fail to integrate the abstract idea into a practical application.

2019 Guidance, Step 2B

Turning to step 2 of the *Alice/Mayo* framework, we look to whether the claims (a) add a specific limitation or combination of limitations that are not well-understood, routine, conventional activity in the field, or (b) simply append well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception. 2019 Guidance, 84 Fed. Reg. at 56.

The Examiner determines that the claims "apply[] the computing device or processors to perform the claimed process," and that the Specification "describes generic processors and memories" and "the claimed process running on a general purpose computer." Ans. 8–9 (citing Spec. 7, l. 24–8, l. 3; 7, ll. 21–22; 8, ll. 13–14).

Appellant argues that the additional limitations of the claims "constitute limitations other than what is well-understood, routine and conventional in the field." Appeal Br. 9. Appellant also argues that the Examiner has not provided any "support [for] a determination that the limitations in question are well-understood, routine, and conventional." *Id.* at 12 (citing USPTO Memorandum, *Changes in Examination Procedure Pertaining to Subject Matter Eligibility, Recent Subject Matter Eligibility Decision (Berkheimer v. HP, Inc.)* (April 19, 2018)).

We are not persuaded by Appellant's argument. As discussed above, the Specification describes the claimed computer-system components

generically and evidences their conventional nature. *See*, *e.g.*, Spec. 7–8.

For example, the Specification explains that the "present invention can make

use of software running on a general purpose computer." Spec. 7, ll. 21–22.

Appellant does not direct our attention to anything in the Specification that

indicates the claimed computer components perform anything other than the

well-understood, routine, and conventional function of manipulating data.

See Elec. Power Grp., LLC v. Alstom S.A., 830 F.3d 1350, 1355 (Fed. Cir.

2016) ("Nothing in the claims, understood in light of the specification,

requires anything other than off-the-shelf, conventional computer, network,

and display technology for gathering, sending, and presenting the desired

information."); *buySAFE, Inc. v. Google, Inc.*, 765 F.3d 1350, 1355 (Fed.

Cir. 2014) ("That a computer receives and sends the information over a

network—with no further specification—is not even arguably inventive.");

In re TLI Commc'ns LLC Patent Litig., 823 F.3d 607, 614 (Fed. Cir. 2016)

(server that receives data, extracts classification information from the

received data, and stores the digital images insufficient to add an inventive

concept); *Alice*, 573 U.S. at 225–26 (receiving, storing, sending information

over networks insufficient to add an inventive concept).

When viewed as a whole, nothing in the claims adds significantly

more (i.e., an inventive concept) to the abstract idea. The claimed

"computing device" amounts to no more than mere instructions to apply the

abstract idea using generic computer components, which is insufficient to

provide an inventive concept. Furthermore, we are unable discern anything

in the claims, even when the recitations are considered in combination, that

represents something more than the performance of routine, conventional

functions of a generic computer. That is, the claims at issue do not require

any nonconventional computer components, or even a "non-conventional and non-generic arrangement of known, conventional pieces," but merely call for performance of the method "on a set of generic computer components." *Bascom Glob. Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1350 (Fed. Cir. 2016).

Appellant argues that the claims are "novel and non-obvious" and "cannot plausibly be simultaneously argued as being 'well-understood, routine and conventional in the field.'" Appeal Br. 11; *see* Appeal Br. 13–14). However, Appellant's argument is not persuasive because it improperly conflates the requirements for eligible subject matter (§ 101) with the independent requirements of novelty (§ 102) and nonobviousness (§ 103). Although the second step in the *Alice* framework is termed a search for an "inventive concept," the analysis is not an evaluation of novelty or nonobviousness. *Alice*, 573 U.S. at 217–18. A novel and nonobvious claim directed to a purely abstract idea is, nonetheless, patent ineligible. *See Mayo*, 566 U.S. at 78–79. Further, "under the *Mayo/Alice* framework, a claim directed to a newly discovered law of nature (or natural phenomenon or abstract idea) cannot rely on the novelty of that discovery for the inventive concept necessary for patent eligibility." *Genetic Techs. Ltd. v. Merial L.L.C.*, 818 F.3d 1369, 1376 (Fed. Cir. 2016).

Given the claimed generic computer components performing generic computer functions, we conclude that the combination of limitations in each independent claim does not supply an "inventive concept" that renders the claim "significantly more" than an abstract idea. Thus, the claims do not satisfy § 101 under *Mayo/Alice* step two.

For at least the above reasons, we sustain the Examiner's rejection of

independent claims 1, 19, and 20 as being directed to patent-ineligible

subject matter, as well as dependent claims 2–10 and 12–18, which were not

separately argued.

CONCLUSION

We affirm the Examiner's rejection of claims 1–10 and 12–20 under

35 U.S.C. § 101.

In summary:

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
1–10, 12–20	101	Eligibility	1–10, 12–20	

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)(1)(iv). *See*

37 C.F.R. § 41.50(f).

AFFIRMED