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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/690,034	11/30/2012	Ligong Chen		1035

111099 7590 10/08/2019
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Rockville, MD 20852

EXAMINER

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ART UNIT	PAPER NUMBER
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2182

MAIL DATE	DELIVERY MODE
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10/08/2019

PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte LIGONG CHEN

Appeal 2018-002936
Application 13/690,034
Technology Center 2100

Before BRADLEY W. BAUMEISTER, SHARON FENICK, and
DAVID J. CUTITTA II, *Administrative Patent Judges*.

CUTITTA, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant¹ appeals under 35 U.S.C. § 134(a) from a final rejection of claims 1–16, all of the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b). An oral hearing was held September 9, 2019. A transcript of the proceeding will be added to the file in due course.

We AFFIRM.

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 the inventor, Ligong Chen. Appeal Br. 1–2.

STATEMENT OF THE CASE

Invention

Appellant's described invention generally relates to a new model for more accurate statistical analysis. Spec. ¶ 11. Instead of using a conventional statistical model, such as a normal distribution having a mean and standard deviation, Appellant's model applies self-weights (convex and concave) to describe a continuous random variable, resulting in more accurate estimates for the central tendency and the dispersive tendency for the continuous random variable's distribution. Spec. ¶¶ 33–40.

Exemplary Claim

Claims 1, 5, and 11 are independent claims. Claim 1 is exemplary of the claimed subject matter and is reproduced below:

1. The measurements of the two self-weights, convex self-weight (denoted by $C\{c_i\}$) and concave self-weight (denoted by $R\{r_i\}$), defined for each random sample point x_i of an original continuous random variable X to describe central tendency and dispersive tendency of the point x_i in a sampling distribution, as shown in the computation framework in Table 1 based on the formulas from (7) to (19).

Appeal Br. 30 (Claims Appendix).

REJECTION

Claims 1–16 stand rejected under 35 U.S.C. § 101 as directed to patent-ineligible subject matter. *See* Final Act. 2–3.

Claims 1–16 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. *See* Final Act. 3.

Our review in this appeal is limited to the above rejections and the issues raised by Appellant. Arguments not made are waived. *See* MPEP § 1205.02; 37 C.F.R. § 41.37(c)(1)(iv).

ANALYSIS

Rejection under 35 U.S.C. § 101

I. Principles of Law

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) (citation omitted).

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 id.* 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 U.S. at 611); mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 67–68 (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))).

In *Diehr*, the claim at issue recited a mathematical formula, but the Supreme Court held that “[a] claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula.” *Diehr*, 450 U.S. at 187; *see also id.* at 191 (“We view respondents’ claims as nothing more than a process for molding rubber products and not as an attempt to patent a mathematical formula.”). Having said that, the Supreme Court also indicated that a claim “seeking patent protection for that formula in the abstract . . . is not accorded the protection of our patent laws, . . . and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment.” *Id.* (citing *Benson* and *Flook*); *see, e.g., id.* at 187 (“It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.”).

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 (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.* (alterations in original) (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 recently published revised guidance on the application of § 101. *See* 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (USPTO Jan. 7, 2019) (“Guidance”). Under that 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 activities such as a fundamental economic practice, or mental processes); and
- (2) additional elements that integrate the judicial exception into a practical application (*see* MPEP §§ 2106.05(a)–(c), (e)–(h) (9th ed. Rev. 08.2017, Jan. 2018)).

Guidance, 84 Fed. Reg. 52–55.

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.

Guidance, 84 Fed. Reg. 56.

II. The Examiner's § 101 Rejection

The Examiner determines that exemplary² claim 1 is directed to a judicial exception: an abstract idea. Final Act. 2–3; Ans. 4. According to the Examiner, claim 1 is “directed to the abstract idea of computing two self-weights.” Final Act. 2. The Examiner also determines that “[v]iewed as a whole[,] the claim[] fail[s] to contain any element or elements that would provide meaningful limitations to transform the abstract idea into a patent eligible application of the abstract idea such that the claim[] amount[s] to significantly more than the abstract idea itself.” *Id.*

We analyze the exemplary claim and the Examiner's rejection in view of the Guidance, and we adopt the nomenclature for the steps used in the Guidance.

III. Appellant's Arguments

We summarize Appellant's arguments in favor of eligibility, as best understood, as follows: (1) “a statistical formula is a statistical measurement tool, just like any other physical measurement tools,” and, thus, is different from a non-statistical mathematical formula; (2) “although all statistical formulas can be considered as a kind of mathematical formulas . . . , not all mathematical formulas can be considered as statistical formulas”; (3) Appellant's “new methodology is designed in complete details to be used by any statisticians under any applied situations without any unclear issues[, so] the claims as a whole definitely amount to significantly more than an

² Appellant argues the claims as a group. *See* Appeal Br. 12. We, thus, select independent claim 1 as representative of claims 2–16. *See* 37 C.F.R. § 41.37(c)(1)(iv).

abstract idea”; (4) “The Examiner did not recognize and acknowledge that the Claims 1 ~ 16 are only for the subjects that [Appellant] created and improved” and the claims will never hurt or sabotage any others’ rights”; (5) Appellant’s “new methodology can be made into an independent software product or integrated into an existing software product for commercial purpose”; (6) “The Examiner did not recognize and acknowledge that whether I, the inventor, should have some natural personal rights that must be statutory and protected by the patent law for my creative works on this subject matter”; (7) “The Examiner only recognize[d] and acknowledged that there are a lot of ‘mathematical formulas’ in this new statistical methodology, and this is only the reason that the Examiner made the rejections according to the 35 U.S.C § 101”; (8) “I am applying [for] patent protection for a newly designed statistical methodology . . . [t]herefore, this new statistical methodology must fall onto the category of ‘process’, which is one of the four statutory categories of acceptable subject matter” (emphasis omitted); (9) the claims are not directed to an abstract idea because they “provide clear, useful, concrete and tangible result as long as a real sample is given to be measured with the new methodology[,] just like [how] a patient comes to a doctor to be measured [for] blood pressure with a sphygmomanometer”; (10) the claims are “not directed to non-statutory subject matter because the methodology has been designed completely for specific purposes in a statistical analysis, and the methodology can be applied to a given sample without any unclear issue, and thus the claims as a whole amount to significantly more than an abstract idea”; (11) “several statistical software companies” can use the invention “without [Appellant’s] authorization if [Appellant’s] methodology is not

protected by the patent law” and this is not “fair to the inventor”; and (12) “so far none of statistical methods has ever been patented in the USA or anywhere in the world, because it was considered as a mathematical approach” and “[t]his is a serious mistake” because “[n]one of statistical formula is a theorem or law of nature” — “[t]hey are just a special kind of measurement tools.” Appeal Br. 12–25.

IV. Our Review, Guidance, Step 1

Analyzing the Examiner’s rejection in view of the Guidance, we must first determine whether the claim is directed to a statutory class of invention. Section 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, subject to the conditions and requirements of this title.” 35 U.S.C. § 101. As discussed below in the section relating to the Examiner’s 35 U.S.C. § 112, second paragraph rejection, it is unclear whether independent claim 1 recites a process or a result of the process. *See* Appeal Br. 30. For the purpose of our 35 U.S.C. § 101 analysis, however, we will assume the claim is directed to a process. Processes are a statutory class of invention. 35 U.S.C. § 101.

V. Guidance Step 2A—Prong 1, (Alice/Mayo—Step 1)

We next determine whether the claim, being directed to a statutory class of invention, nonetheless falls within a judicial exception. *See* Guidance, 84 Fed. Reg. 51. The PTO has synthesized the key concepts identified by the courts as abstract ideas into three primary subject-matter groupings: (1) mathematical concepts, (2) certain methods of organizing

human activities (e.g., a fundamental economic practice), and (3) mental processes. *Id.* at 52.

Claim 1 incorporates by reference, formulas that are contained in Appellant’s Specification. For example, claim 1 recites measuring self-weights $C\{c_i\}$ and $R\{r_i\}$ “of an original continuous random variable X . . . based on formulas (7) to (19).” Formula (7)–(9), for example, read, in relevant part, as follows:

$$D_j\{d_{ij}\} = |X\{x_i\} - x_j|/R_X$$

$$S_j\{s_{ij}\} = 1 - D_j\{d_{ij}\}$$

where $j=1,2,\dots, n$; R_X is the range of X over x_i , and

$$R_X = \max(X\{x_i\}) - \min(X\{x_i\}).$$

Spec. ¶ 54.

Accordingly, we conclude that claim 1 recites a mathematical concept, which the Guidance recognizes as constituting an abstract idea. Guidance, 84 Fed. Reg. 52, n. 12.

VI. Guidance Step 2A, Prong Two (Integration into a Practical Application)

Because claim 1 recites at least one abstract idea, we now determine whether the claim integrates the abstract idea into a practical application, i.e., whether the claim is directed to an improvement to the underlying technology. *See, e.g., Alice*, 573 U.S. at 223, discussing *Diehr*, 450 U.S. at 175. Under prong two of revised step 2A, we determine whether the recited judicial exception is integrated into a practical application by:

(a) identifying whether there are any additional elements recited in the claim beyond the judicial exception; and (b) evaluating those additional elements individually and in combination to determine whether they integrate the

exception into a practical application. We use the term “additional elements” to refer to features, limitations, or steps that the claim recites beyond the abstract idea itself. Guidance, 84 Fed. Reg. 55 n.24.

The Examiner determines, and we agree, that claim 1 “fail[s] to recite any physical structure.” Ans. 4. Moreover, the claim does not recite any additional elements beyond the abstract idea of computing two self-weights.

Appellant argues that the claimed statistical formula is not abstract because it is “just a special kind of [physical] measurement tool[]” like a “sphygmomanometer” used by a doctor to measure blood pressure. Appeal Br. ¶¶ 59, 74. This argument is unpersuasive because, as noted by the Examiner, unlike a sphygmomanometer, Appellant’s claim 1 does not recite physical structure. *See* Ans. 4.

Appellant argues that method claim 1 recites a practical application because the claimed subject matter could “be made into a commercial software product to help people in statistical data analysis,” and “were I to write the methodology I invented into a software product, the current patent law would not deem this product as merely an abstract idea.” Appeal Br. ¶¶ 49, 87 (emphasis omitted).

These arguments are unpersuasive because, as discussed directly above, claim 1 does not recite a software product, a computer, or any other machine performing the claimed abstract idea. It is well established that features not appearing in the claim cannot be relied upon for patentability. *See In re Self*, 671 F.2d 1344, 1348 (CCPA 1982).

Furthermore, even if claim 1 had recited a computer, the claim still would not integrate the recited abstract idea into a practical application because the incidental use of a computer or other generic hardware does not

make a claim otherwise directed to an abstract process patent eligible. *See CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1375, (Fed. Cir. 2011) (“That purely mental processes can be unpatentable, even when performed by a computer, was precisely the holding of the Supreme Court in *Gottschalk v. Benson.*”).

We, therefore, determine claim 1 is not directed to a specific asserted improvement in technology (MPEP § 2106.05(a), does not recite a particular machine or transformation (MPEP § 2106.05(b),(c)), or add other meaningful limitations (MPEP § 2106.05(e). As such, Appellant has not demonstrated that claim integrates the recited abstract idea into a practical application. 84 Fed. Reg. 52–55. Thus, we are not persuaded the claim is integrated into a practical application and we determine that claim 1 is directed to a judicial exception.

VII. Guidance Step 2B, Alice/Mayo—Step 2 (Inventive Concept)

Next, we determine whether the claim includes additional elements that provide significantly more than the recited judicial exception, thereby providing an inventive concept. *Alice*, 573 U.S. at 221 (quoting *Mayo*, 566 U.S. at 72–73). To determine whether the claim provides an inventive concept, the additional elements are considered—individually and in combination—to determine whether they (1) add a specific limitation beyond the judicial exception that is not “well-understood, routine, conventional” in the field or (2) simply append well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception. Guidance, 84 Fed. Reg. 56.

The Examiner finds, and we agree, that claim 1 does not recite any additional elements beyond “the abstract idea of computing two self-weights” using formulas. Final Act. 2. Nor does Appellant identify an ordered combination in the claim that allegedly adds significantly more to the abstract idea to provide an inventive concept.

Appellant argues his “new methodology is designed in complete details to be used by any statisticians under any applied situations without any unclear issues. So, the claims as a whole definitely amount to significantly more than an abstract idea.” Appeal Brief ¶ 61.

This argument is unpersuasive because neither clarity nor detail is sufficient to render a claim directed to an abstract idea patentable. Instead, there must be some practical application or the claim must add a specific limitation beyond the mathematical formula that is not well-understood, routine, conventional in the field.

Appellant provides several policy-based arguments. For example, Appellant argues “a statistical formula is a statistical measurement tool, just like any other physical measurement tools,” and thus is different from a non-statistical mathematical formula. Appeal Br. ¶ 59. Appellant further argues no statistical method “has ever been patented in the USA or anywhere in the world, because it was considered as a mathematical approach” and “[t]his is a serious mistake” because “[n]one of [the] statistical formula[e] is a theorem or law of nature.” *Id.* at ¶ 99. Appellant also pointed out in the oral hearing that he worked 22 to years to “find this methodology” and without patent protection, larger companies “can put my methodology into their software product and sell it on the market and earn money. I cannot.” Hearing transcript 13, 16–17; *see* Appeal Br. ¶¶ 92–95, 99.

Although we sympathize with Appellant’s arguments, our ability to consider the Examiner’s rejection is constrained by the relevant statute on patentable subject matter, as enacted into law, and as interpreted by our reviewing courts. The “Constitution vests in Congress complete law-making authority over [] particular area[s].” *See Seminole Tribe of Florida v. Florida*, 517 U.S. 44, 72 (1996).

We, thus, are constrained to conclude that when viewing the claim elements alone, or in combination, claim 1 lacks additional elements that amount to significantly more than the above-identified judicial exception (the abstract idea) and that claim 1 does not recite patent-eligible subject matter.

Because claim 1 is argued as representative of the other claims, we also conclude that claims 2–16 do not recite patent-eligible subject matter. Therefore, we sustain the rejection of claims 1–16 under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter.

Rejection Under 35 U.S.C. § 112, second paragraph

The Examiner rejects claims 1–16 under 35 U.S.C. § 112, second paragraph, as indefinite. Final Act. 3. Exemplary claim 1 recites, in part, “[t]he measurements of the two self-weights.” Appeal Br. 30. The Examiner finds “[i]t appears that the claims are intended to be method claims[,] but method claims are basically a sequence of actively [per]formed steps that[,] when implemented[,] results in that which is recited in the preamble.” Final Act. 3. The Examiner determines claim 1 recites no such steps. *Id.*

In response, Appellant states “I had been trying to rigorously restrict my claims in different contexts on each of the formulas. So, I cannot accept the Examiner’s statement that ‘. . . , as being indefinite for failing to particularly point out and distinctly claim the subject matter[.]’” Appeal Br. 26.

“The legal standard for definiteness is whether a claim reasonably apprises those of skill in the art of its scope.” *In re Warmerdam*, 33 F.3d 1354, 1361 (Fed. Cir. 1994) (citation omitted). “[A] claim is indefinite when it contains words or phrases whose meaning is unclear.” *In re Packard*, 751 F.3d 1307, 1310, 1314–15 (Fed. Cir. 2014) (citing Manual of Patent Examining Procedure (MPEP) § 2173.05(e)).

We agree with the Examiner that claim 1 contains words or phrases whose meaning is unclear because the claim is reasonably susceptible to at least two interpretations. Under one potential interpretation, Appellant may have intended to claim the act of measuring two self-weights. But it is not reasonably clear whether this interpretation actually is intended because claim 1 does not recite any affirmative method steps. For example, claim 1 does not affirmatively recite method steps of gathering or measuring data.

Under an alternative potential interpretation, Appellant may have intended to claim only the final measurements that result from an algorithm that uses Appellant’s formulas. This distinction matters because if Appellant intended to claim the final measurements, the scope of the claims would have to be analyzed in accordance with the product-by-process legal doctrine. The scope of claim protection being sought under such an interpretation would differ from the scope of protection being sought for a method.

To summarize, it is not reasonably clear whether claim 1 is intended to set forth a method claim or, alternatively, to set forth a product claim that is directed to a measurement or calculation that results from Appellant’s methodology. “[I]f a claim is amenable to two or more plausible claim constructions, the USPTO is justified in requiring the applicant to more precisely define the metes and bounds of the claimed invention by holding the claim unpatentable under 35 U.S.C. § 112, second paragraph, as indefinite.” *Ex parte Miyazaki*, 89 USPQ2d 1207, 1211 (BPAI 2008) (precedential); *see also Ex parte McAward*, Appeal No. 2015-006416, 2017 WL 3669566 (PTAB Aug. 25, 2017) (precedential).

Accordingly, we affirm the Examiner’s indefiniteness rejection under 35 U.S.C. § 112, second paragraph.

CONCLUSION

In summary:

Claims Rejected	Basis	Affirmed	Reversed
1–16	§ 101	1–16	
1–16	§ 112, second paragraph	1–16	
Overall Outcome		1–16	

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 41.50(f).

AFFIRMED