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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/489,803	09/18/2014	Kashyap Popat	IN920140119US1	1026

75739 7590 05/22/2019

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EXAMINER	
SAINT-VIL, EDDY	

ART UNIT	PAPER NUMBER
3715	

NOTIFICATION DATE	DELIVERY MODE
05/22/2019	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte KASHYAP POPAT, NIDHI RAJSHREE, BIKRAM SENGUPTA, and ASHAY TAMHANE[1]

Appeal 2018-006352
Application 14/489,803
Technology Center 3700

Before STEFAN STAICOVICI, WILLIAM A. CAPP, and LEE L. STEPINA, *Administrative Patent Judges*.

STEPINA, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134 from the Examiner's final decision rejecting claims 1–20. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] The Appeal Brief indicates that International Business Machines Corporation, Appellant, is the real party in interest. Appeal Br. 1.

CLAIMED SUBJECT MATTER

The claims are directed to a method of recommending a set of learning activities based on dynamic learning goal adaptation. Spec. 1. Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A method comprising the steps of:
>
> determining an initial set of multiple learning goals for a given student based on at least (i) an existing knowledge state of the given student and (ii) one or more identified interests of the given student;
>
> calculating a probability value of the given student succeeding in each of the multiple learning goals in the initial set, wherein said calculating is based on at least (i) the existing knowledge state of the given student and (ii) historical data pertaining to multiple additional students;
>
> selecting one or more learning goals from the initial set for the given student based on at least (i) the existing knowledge state of the given student, (ii) a determined learning style associated with the given student, (iii) historical data pertaining to the multiple additional students, (iv) the probability value of the given student succeeding in each of the multiple learning goals in the initial set and (v) an exploration threshold associated with the given student, wherein the exploration threshold represents a measure of autonomy for academic investigation afforded to the given student at a given time;
>
> outputting a first recommendation comprising a first sequence of multiple learning activities corresponding to said one or more selected learning goals;
>
> monitoring performance of the given student over the sequence of multiple learning activities;
>
> updating (i) the existing knowledge state of the given student, (ii) the determined learning style associated with the given student, (iii) the one or more identified interests of the given student, and (iv) the exploration threshold associated with the given student based on said monitoring;
>
> using the updated (i) knowledge state of the given student, (ii) learning style associated with the given student, (iii) one or more identified interests of the given student, and (iv)

exploration threshold associated with the given student to modify the one or more selected learning goals for the given student; and

outputting a second recommendation comprising a second sequence of multiple learning activities corresponding to said one or more modified learning goals;

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

REJECTION

Claims 1–20 are rejected under 35 U.S.C. § 101 as being directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more.

OPINION

Claims 1, 2, 5–11, and 14–16

Aside from arguments in support of claims 3, 4, 12, 13, and 17, Appellant makes arguments for the patent eligibility of claims 1–20 as a group. *See* Appeal Br. 9–15. We select claim 1 as the representative claim, and claims 2, 5–11, and 14–16 stand or fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv).

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*. *See Alice*, 573 U.S. 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." *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, 679 (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 (quotation marks 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.* ((alteration in the 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. *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (Jan. 7, 2019) (hereinafter "Memorandum"). Under Step 2A of 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 activity such as a fundamental economic practice, or mental processes); and
>
> (2) additional elements that integrate the judicial exception into a practical application (*see* MPEP[2] § 2106.05(a)–(c), (e)–(h)).

Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then look, in Step 2B, 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 Memorandum.

[2] Manual of Patent Examining Procedure.

Step 1 – Statutory Category

Claim 1 recites a series of steps, and, therefore, is a process. *See* Appeal Br. 19 (Claims App.).

Step 2A, Prong 1 – Recitation of Judicial Exception

In determining that claim 1 is directed to a judicial exception to patent eligibility, without significantly more, the Examiner takes the position that these claims are similar to the claims held ineligible in *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366 (Fed. Cir. 2011), *Classen Immunotherapies, Inc. v. Biogen IDEC*, 659 F.3d 1057 (Fed. Cir. 2011), *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016), and in *SmartGene, Inc. v. Advanced Biological Labs., SA*, 555 F.App'x 950 (Fed. Cir. 2014). Final Act. 3. Thus, the Examiner implicitly determines that these claims are directed to a *mental process*, for example, the process of "comparing new and stored information and using rules to identify options." *Id.* (emphasis omitted).

Appellant asserts that the Examiner erred by failing to consider "the collection of specific claim limitations as a whole." Appeal Br. 10. Appellant, citing *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016) and *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299 (Fed. Cir. 2016), contends that the Examiner oversimplified the claims when determining that they are directed to an abstract idea. *See* Appeal Br. 9–11.

As recited in claim 1, the method includes the steps of

> determining an initial set of multiple learning goals for a given student based on at least (i) an existing knowledge state of the given student and (ii) one or more identified interests of the given student;
>
> calculating a probability value of the given student succeeding in each of the multiple learning goals in the initial set,

> wherein said calculating is based on at least (i) the existing knowledge state of the given student and (ii) historical data pertaining to multiple additional students.

Appeal Br. 19 (Claims App.). Other than the function of data collection, such steps can be performed entirely in the human mind. Although Appellant states that the Examiner erred in characterizing the claims, Appellant provides no argument as to what the Examiner purportedly overlooked or omitted in making that characterization. Appellant's assertion on this point amounts to an introduction to an argument without providing any reasoning or explanation as to why the argument is correct.

Claim 1 next recites the steps of

> selecting one or more learning goals from the initial set for the given student based on at least (i) the existing knowledge state of the given student, (ii) a determined learning style associated with the given student, (iii) historical data pertaining to the multiple additional students, (iv) the probability value of the given student succeeding in each of the multiple learning goals in the initial set and (v) an exploration threshold associated with the given student, wherein the exploration threshold represents a measure of autonomy for academic investigation afforded to the given student at a given time; [and]
>
> outputting a first recommendation comprising a first sequence of multiple learning activities corresponding to said one or more selected learning goals;
>
> monitoring performance of the given student over the sequence of multiple learning activities;

Id. As is the case with the previous two steps, the step of "selecting one or more learning goals from the initial set" can be performed in the mind. Forming a recommendation is likewise performable in the human mind, but the steps of "outputting" this recommendation and monitoring performance of the student are not, and we address these steps under *Prong 2*.

Claim 1 next recites

> updating (i) the existing knowledge state of the given student, (ii) the determined learning style associated with the given student, (iii) the one or more identified interests of the given student, and (iv) the exploration threshold associated with the given student based on said monitoring;
>
> using the updated (i) knowledge state of the given student, (ii) learning style associated with the given student, (iii) one or more identified interests of the given student, and (iv) exploration threshold associated with the given student *to modify the one or more selected learning goals* for the given student; and
>
> outputting a second recommendation comprising a second sequence of multiple learning activities corresponding to said one or more modified learning goals;
>
> wherein the steps are carried out by at least one computing device.

Id. at 19–20 (emphasis added). Here, the "modifying" function is similar to the initial step of "determining," which, in this context, is a mental process of evaluating and forming an opinion. *See In re BRCA1- & BRCA2-Based Heredity Cancer Test Patent Litig.*, 774 F.3d 755, 763 (Fed. Cir. 2014); *see also* Memorandum at 52 (defining mental processes as "concepts performed in the human mind (including an observation, evaluation, judgment, opinion)" (footnote omitted)). We agree with the Examiner that claim 1 recites a mental process, which is one of the three categories of abstract ideas set forth in the Memorandum.

We address the "outputting a second recommendation," monitoring performance of the student, and carrying out the steps "by at least one computing device" under Step 2A, Prong 2 and Step 2B.

Step 2A, Prong 2 – Integrated Into a Practical Application

If a claim recites a judicial exception, then, in *Prong 2*, we determine whether the recited judicial exception is integrated into a practical application of that exception by: (a) identifying whether there are any additional elements recited in the claim *beyond the judicial exception*(s); and (b) evaluating those additional elements individually and in combination to determine whether they integrate the exception into a practical application. *See* Memorandum. This evaluation requires an additional element or a combination of additional elements in the claim to apply, rely on, or use the judicial exception in a manner that imposes a meaningful limit on the judicial exception, such that the claim is more than a drafting effort designed to monopolize the exception. *See id.*

The Examiner finds that process of "outputting" and "monitoring" as well as the step of carrying out the recited functions by at least one computing device is merely the recitation of "generic computer functions routinely used in computer applications" and "typical components of a generic computer." Final Act. 5–6.

Appellant contends that the Examiner has ignored and overgeneralized stated claim limitations. Appeal Br. 12–13.

The Examiner has the better position on this point. Specifically, the above-noted functions are merely extra-solution activity, such as data gathering and providing an output. *See* Memorandum at 55 n.31. We see no technological improvement, improvement in the functioning of a computer, particular machine, or transformation recited by claim 1, and Appellant does not contend that any of these is recited.

Step 2B – Well-Understood, Routine, Conventional Activity

In Step 2B, we determine whether the claim adds a specific limitation beyond the judicial exception that is not "well-understood, routine, conventional" in the field. *See* Memorandum.

Although Appellant argues extensively that there is no outstanding rejection based on anticipation or obviousness and that the claims are significantly more than an abstract idea, Appellant does not identify any purported additional elements that adequately support these arguments. *See* Appeal Br. 11–13, Reply Br. 2–4. For example, Appellant

> strongly asserts that if a set of "specific limitations" has been deemed not anticipated, taught, or even suggested by a field of available art, (as is the case with the instant claims) then the same set of "specific limitations" cannot plausibly be simultaneously argued as being "well-understood, routine and conventional in the field."

Appeal Br. 13. We disagree, because, although Step 2B (step 2 in the *Alice/Mayo* framework) is termed as a search for an "inventive concept," the analysis is not an evaluation of novelty or non-obviousness, but rather, a search for "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 (alteration in original). A novel and nonobvious claim directed to a purely abstract idea is, nonetheless, patent-ineligible. *See Mayo*, 566 U.S. at 90–91).

We have considered all of Appellant's arguments in support of the patent eligibility of claim 1, but find them unpersuasive. Accordingly, we sustain the rejection of claims 1, 2, 5–11, and 14–16 under 35 U.S.C. § 101.

Dependent claims 3, 4, 12, 13, and 17–20

In support of claims 3, 4, 12, 13, and 17, Appellant states

> Appellant respectfully submits that the Examiner's vague and non-specific allusion to the "remaining limitations," whichever limitations those might be, in clearly insufficient to establish a rejection under 35 U.S.C. §132 with respect to multiple ones of the dependent claims. For example, the Examiner fails to specifically discuss the limitations of claims 3, 4, 12, 13, 17, 18, 19, and 20.

Appeal Br. 17. Appellant provides no substantive explanation as to why any of these claims recites something significantly more than the mental process recited in its respective independent claim. *See id.* We address these claims below.

Step 2A, Prong 1

Because they are dependent claims, claims 3, 4, 12, 13, and 17–20 all recite the same abstract idea recited by their respective independent claims.

Step 2A, Prong 2 and *Step 2B*

Claims 3, 12, and 17 recite substantially similar limitations (*see* Appeal Br. 20, 22, 25 (Claims App.), and we reproduce claim 3 below.

> 3. The method of claim 1, wherein said one or more selected learning goals comprises a pre-determined number of goals based on a threshold value associated with the calculated probability values.

Id. at 20. Thus, claim 3 further defines "said one or more selected learning goals," which is merely an extension of the mental process discussed above regarding claim 1. In other words, claim 3 adds nothing *beyond* the abstract idea recited in claim 1. Thus, claim 3 fails to survive Step 2A, Prong 2, and, for the same reasons, fails to survive Step 2B. We sustain the rejection of claim 3 as patent-ineligible, and claims 12 and 17 fall for the same reasons as claim 3.

Claims 4, 13, and 18 recite substantially similar limitations. Appeal Br. 20, 22, 25 (Claims App.). We reproduce claim 4 below.

> 4. The method of claim 1, comprising:
> calculating the exploration threshold associated with the given student based on (i) the probability value of the given student succeeding in each of the multiple learning goals in the initial set, and (ii) distance values to one or more goals in a given knowledge graph at the given time.

Id. at 20. Claim 4, like claim 3, merely further recites the abstract idea recited in claim 1, adding a calculation step, and fails to survive either of Step 2A, Prong 2 or Step 2B. Accordingly, we sustain the rejection of claim 4 as patent-ineligible, and claims 13 and 18 fall for the same reasons as claim 4.

Claim 19 depends from claim 15 and recites "storing the first sequence of multiple learning activities corresponding to said one or more selected learning goals in a database." Appeal Br. 25 (Claims App.). Claim 20 depends from claim 15 and recites "storing each updated sequence of multiple learning activities in a database." *Id.*

We see no technological improvement, improvement in the functioning of a computer, particular machine, or transformation recited by corresponding independent claim 15 (*see also* claim 1), and Appellant does not contend that any of these is recited. Indeed, the information that is required to be stored in each of claims 19 and 20 is already available, based on the method recited in claim 15. *See id.* at 24. Further, we find the step of storing to be well-understood, routine, and conventional activity. Accordingly, we agree with the Examiner that dependent claims 19 and 20 are patent-ineligible.

DECISION

The Examiner's decision to reject claims 1–20 is affirmed.

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. § 1.136(a)(1)(iv).

AFFIRMED