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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte KEVIN S. BEYER, VUK ERCEGOVAC,
PETER HAAS, EUGENE J. SHEKITA, and FEI XU

Appeal 2019-000908
Application 13/595,446
Technology Center 2100

Before DAVID M. KOHUT, IRVIN E. BRANCH, and
JOSEPH P. LENTIVECH, *Administrative Patent Judges*.

BRANCH, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

Pursuant to 35 U.S.C. § 134(a), Appellant[2] appeals from the Examiner's decision to reject claims 1–11. We have jurisdiction over the pending claims under 35 U.S.C. § 6(b).

We affirm.

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[1] We reference, herein, the Final Action mailed December 18, 2017 ("Final"), Appeal Brief filed May 21, 2018 ("Br."), Examiner's Answer mailed September 10, 2018 ("Ans."), Reply Brief filed November 13, 2018 ("Reply"), and Specification filed August 27, 2012 ("Spec.").

[2] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. According to Appellant, the real party in interest is "International Business Machines Corporation." Br. 3.

RELATED APPEAL

Appellant notes this appeal is related to an appeal of U.S. Application 12/826,077. Br. 4. That appeal has been docketed as Appeal 2019-000812.

STATEMENT OF THE CASE

THE INVENTION

Appellant's claimed subject matter is related to stochastic simulation, a "numerical technique" for analyzing a "probability distribution" (e.g., stock prices). Spec. ¶ 3. Simulation generates random samples from a probability distribution. *Id.* Each sample is generated by a "Monte Carlo replication" that inputs a stream of random integers called "seeds." *Id.* ¶ 4. A simulation computes the samples in parallel (e.g., on respectively "tens to thousands" of parallel processors). *Id.* ¶ 5.

Appellant's invention also "relates to parallel processing of . . . stochastic simulations." *Id.* ¶ 1. Whereas as traditional systems seed at (i.e., provide a stream of random integers to) the parallel processors performing simulations, the invention stores seed sequences (i.e., the streams of random integers) "within" the probability distribution records that will undergo simulation. *Id.* ¶ 6. Because the appropriate seed sequences are carried by the records, simulation workloads can be freely distributed to processors (i.e., the records need not be sent to appropriately seeded processors). *Id.*

The seeds are generated by a pseudo-random number generator that outputs a large "cycle of seeds." *Id.* ¶ 31 (emphasis omitted); Fig. 1. This cycle cannot provide non-overlapped seed sequences to a high quantity of records (e.g., to billions of records each consuming millions of seeds) because the seed integers, and thus the seed sequences, become too large to

store a seed sequence within a record. *Id.* ¶¶ 33–34. The Specification identifies two solutions:

> Accordingly, example embodiments . . . limit the amount of seeding information in a record by employing techniques for ***combining generators and for skipping ahead on a cycle***. Thus, for implementing the parallelization schemes, as per the example embodiments discussed herein, specialized techniques are utilized to provide adequate seeding.

Id. ¶ 37 (emphasis added). These "specialized techniques" (above block quote) are "SeedSkip" and "SeedMult" methods described by reference to Figures 3A and B (and need not be further discussed herein). *Id.* ¶¶ 49–64.

REPRESENTATIVE CLAIM

Claim 1 is representative of all claims (37 C.F.R. § 41.37(c)(1)(iv)) and reproduced, below, with emphasis on "additional elements" (explained *infra*), added formatting, and removal of redundant "code" elements.

> 1. A method ***. . . utilizing at least one processor to execute computer code configured*** to perform the steps of[:]
>
> assigning records of a database for seeding ***to one of a plurality of parallel-processing nodes***;
>
> ***at each of and in parallel with the plurality of parallel-processing nodes,*** seeding each record ***using the node assigned to the record***, said seeding further comprising adding a unique source of pseudorandom numbers to each record;
>
> providing, using a cycle of seeds, seeded records ***to a plurality of processing nodes for parallel asynchronous*** simulations via:
>
> with respect to the cycle of seeds, generating skips of varied length based on the records of the database; . . .

> modifying, based on the generated skips of varied length, a start point for a cycle of at least one simulation; and
>
> each of the seeded records undergoing a single simulation.

Br. 31 (Claims Appendix).

REJECTION

Claims 1–11 stand rejected under 35 U.S.C. § 101 as directed to patent-ineligible subject matter. Final 2–3.

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).

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 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 (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 (1853))); 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 176; *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 (internal 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.* (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.*

PTO GUIDANCE

The United States Patent and Trademark Office (USPTO) recently published revised guidance on the application of § 101. 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019) ("Guidance"). Under the 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 interactions 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 Guidance, 84 Fed. Reg. at 52, 54–55. Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical

application, we conclude the claim is directed to a judicial exception (*id.* at 54) and then look to whether the claim:

> (3) adds a specific limitation or combination of limitations beyond the judicial exception that are not "well-understood, routine, conventional" activity 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 Guidance, 84 Fed. Reg. at 56.

ANALYSIS

There is no dispute that claim 1 falls within a category of patentable subject matter. *See* 35 U.S.C. § 101 ("process, machine, manufacture, or composition of matter"); *see also* Guidance, 84 Fed. Reg. at 53–54 ("Step 1"). We accordingly turn to the issues raised by the Guidance and Appellant's arguments.

STEP 2A, PRONG ONE:[3] *DOES THE CLAIM RECITE ANY JUDICIAL EXCEPTIONS?*

Turning to the first issue set forth by the Guidance (*see supra* 6–7, bullet "(1)"), we determine claim 1 recites judicial exceptions. Specifically,

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[3] The Guidance separates the enumerated issues (1) to (4) (*see supra* 7) into Steps 2A(1), 2A(2), and 2B, as follows:

> [T]he revised procedure . . . focuses on two aspects [of whether a claim is "directed to" a judicial exception under the first step of the *Alice/Mayo* test (USPTO Step 2A)]: (1) [w]hether the claim recites a judicial exception; and (2) whether a recited judicial exception is integrated into a practical application. . . .

we agree with the Examiner that claim 1 recites a mathematical algorithm for "calculations to perform statistical analysis" (Ans. 7) and, more particularly, for "seeding records, adding a unique source of pseudo-random numbers to a record, generating skips, generating a start point of a simulation, and performing a simulation" (*id.* at 6). We also agree claim 1 is analogous to the patent-ineligible claims of *SAP Am., Inc. v. InvestPic, LLC* (Ans. at 6–7), where "[t]he focus of the claims . . . is on selecting certain information, analyzing it using mathematical techniques, and reporting . . . the results" 898 F.3d 1161, 1167 (Fed. Cir. 2018), *cert. denied*, 139 S. Ct. 2747 (2019), *reh'g denied*, (U.S. Aug. 23, 2019).[4]

> [W]hen a claim recites a judicial exception and fails to integrate the exception into a practical application, . . . further analysis pursuant to the second step of the *Alice/Mayo* test (USPTO Step 2B) . . . is needed . . . in accordance with existing USPTO guidance as modified in April 2018.

84 Fed. Reg. at 51.

[4] Because the pertinence of *InvestPic* is not challenged, we do not address it with particularity. We note, however, Appellant's claim 1 and the *InvestPic* claims similarly concern "a technique that utilizes resampled statistical methods for the analysis of financial data" (e.g., "estimat[ing] the distribution of data in a pool . . . by repeated sampling of the data in the pool"). 898 F.3d at 1164 (internal quotation marks omitted). Below is *InvestPic's* cited claim 22 (Ans. 6), which recites a statistical analysis performed via parallel processing.

> 22. A system for providing statistical analysis of investment information over an information network comprising:
>
> a financial data database for storing investment data;
>
> a client database;

We add that the un-emphasized features of reproduced claim 1 (*supra* 3–4) fall within the Guidance's following categories of judicial exceptions:[5] "(a) Mathematical concepts—mathematical relationships, mathematical formulas or equations, mathematical calculations; . . . (c) Mental processes—concepts performed in the human mind." Guidance, 84 Fed. Reg. at 52. We determine so in view of the claim itself, the disclosed invention (*see supra* 2–3), and lack of rebuttal to the Examiner's finding that seeding and simulating are mathematical concepts (Ans. 6 (quoted above)).

For the foregoing reasons, we determine claim 1 recites judicial exceptions.

> a plurality of processors collectively arranged to perform a parallel processing computation, wherein the plurality of processors is adapted to:
>
> receive a statistical analysis request corresponding to a selected investment;
>
> based upon investment data pertaining to the selected investment, perform a resampled statistical analysis to generate a resampled distribution; and,
>
> provide a report of the resampled distribution.

Id. at 1165.

[5] The Examiner alleges a judicial exception not recognized by the Guidance. Namely, the Examiner alleges an exception of "collection and analysis of information." Ans. 6. Pursuant to USPTO policy, we do not uphold this determination. *See* Guidance 84 Fed. Reg. at 51 ("All USPTO personnel are, as a matter of internal agency management, expected to follow the guidance."). We do not, however, find this identification of a judicial exception error as a matter of law. *See id.* ("Rejections will continue to be based upon the substantive law."). Instead, and because the Guidance was issued after submission of the appeal papers, we apply the Guidance to facilitate prosecution.

STEP 2A, PRONG TWO: ARE THE RECITED JUDICIAL EXCEPTIONS INTEGRATED INTO A PRACTICAL APPLICATION?

Turning to the second issue set forth by the Guidance (*see supra* 7, bullet "(2)"), we determine the recited judicial exceptions are not integrated into a practical application. *See* Guidance, 84 Fed. Reg. at 53 (describing a "practical application" as a "meaningful limit on the [recited] judicial exception[s], such that the claim is more than a drafting effort designed to monopolize the . . . exception[s]"); *see also id.* at 55 ("exemplary considerations . . . indicative that an additional element (or combination of elements) may have integrated the exception into a practical application" (footnote omitted). Specifically, we agree with the Examiner that claim 1's "additional elements [are] a generic parallel processing computer system that only performs well-understood, routine, and convention[al] computer process[es,] . . . including assignment of records to nodes and mathematical calculations." Ans. 9. We also agree that claim 1's inclusion of these features does not result in an invention "directed towards solving a problem specific to parallel computing or simulation[; e.g.,] in contrast[, the patent-eligible claim of *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299 (Fed. Cir. 2016)] was directed towards solving a problem specific to 3-D animation." Final 3.

We add that *McRO* exemplifies claim 1's lack of a practical application. *McRO's* claim was held patent-eligible in part because of "us[ing] a combined order of specific rules that renders information into a specific format that is then used and applied to create desired results." 837 F.3d at 1315. The underlying basis for this finding was that a claim reciting a judicial exception is nonetheless patent-eligible ***if reciting a***

mechanism that prevents preemption of the exception; i.e., the claimed rules satisfied this criterion. *Id.* at 1314. *McRO* explains:

> The preemption concern arises when the claims are not directed to a specific invention and instead improperly monopolize the basic tools of scientific and technological work. . . . A patent is not good for an effect . . . because such patents would prohibit all other persons from making the same thing by any means whatsoever. . . . We therefore look to whether the claims in these patents focus on a specific means or method that improves the relevant technology or are instead directed to a result or effect that itself is the abstract idea and merely invoke generic processes and machinery.

Id. (citations and internal quotation marks omitted). Claim 1 does not overcome these concerns. Claim 1 recites abstract concepts of stochastic simulation and a broad-scoped implementation thereof (parallel processing for seeding and simulating).

We also add that, except for parallel processing, each of the ***disclosed*** invention's above-discussed features (*supra* 2–3) constitutes a judicial exception and/or is not claimed. That is, we determine the stochastic simulation is a mathematical concept and claimed only to the extent of included seeding and simulating techniques. We determine the cycle of seeds, which skips to a different sequence of seed integers for each simulation, is a mathematical concept and mental step of generating random numbers. We determine the "specialized techniques" (e.g., the "SeedSkip" and "SeedMult" methods) are not claimed; i.e., the claimed "skips of varied length based on the records" merely changes the starting point of a seed sequence (a mathematical concept). We determine the storing of seeds ***within*** a record itself is not claimed; i.e., the claimed "adding . . . []random numbers to each record" and "provide, using a cycle of seeds, seeded

records to . . . processing nodes for parallel asynchronous simulations" does not restrict how (e.g., where) the records and seed sequences are integrated.

We acknowledge the invention's principle objective of storing seed sequences within records ***so as to allow independent seeding and simulating*** (*see, e.g.*, Spec. ¶ 6)—that is, such that a system can: distribute records to parallel processing that stores seed sequences within records; and then freely redistribute those records to parallel processing that performs simulations. Though this independent seeding and simulating may (arguendo) provide a practical application for these basic tools of stochastic simulation, the ***claimed invention*** does not disassociate seeding and simulating. Per claim 1, a first plurality of parallel-processing nodes "seed[s] each record using the node assigned to the record" and a second plurality of parallel-processing nodes are "provid[ed], using a cycle of seeds, seeded records . . . for parallel asynchronous simulations." These limitations are broad enough to read on parallel processing whereby each parallel branch seeds and simulates a record.

For the foregoing reasons, we determine claim 1 is directed to the recited judicial exceptions—not to a practical application thereof.

STEP 2B: DOES THE CLAIM RECITE ANYTHING THAT IS BEYOND THE RECITED JUDICIAL EXCEPTIONS AND NOT A WELL-UNDERSTOOD, ROUTINE, CONVENTIONAL ACTIVITY?

Turning to the third and fourth issues set forth by the Guidance (*see supra 7*, bullets "(3)" and "(4)"), we determine the claimed invention does not comprise a feature that is neither a judicial exception nor "well-understood, routine, conventional." 84 Fed. Reg. at 56. Specifically, we agree with the Examiner that:

> Claim 1 recites at least one processor that refers to a general purpose computer[.] . . . The process of assigning records for processing in a computer system is well-understood, routine, and conventional activity in data processing (Specification, [0005] . . .). Seeding records is merely the performance of repetitive calculations, which has been identified as well-understood, routine, and conventional computer functions. Performing repetitive calculations in parallel [is] also well-understood, routine, and conventional as that is a common use of multi-core processors and multiple processor computer systems (Specification, [0002]-[0005]). Performing simulations using the parallel-processing nodes is also the performance of repetitive calculations[.] . . . Parallel asynchronous simulation is a well-understood, routine, and conventional computer function (Specification, [0005] . . .). [In sum,] the additional elements are directed towards a general purpose computer and well-understood, routine, and conventional computer functions[.]

Ans. 4–5. We also agree *InvestPic* shows that nondescript parallel-processing is not a patent-eligible implementation of a judicial exception. *Id.* at 7; *see also InvestPic*, 898 F.3d at 1169–70.

For the foregoing reasons, we determine the claimed additional elements do nothing more than append generic computer technology that merely applies the recited judicial exceptions.

APPELLANT'S ARGUMENTS

We have reviewed Appellant's arguments and, in view of our above findings, are not persuaded the Examiner erred. Moreover, we adopt as our own the Examiner's findings and reasoning set forth in the Final Action and Answer. We address Appellant's below contentions for emphasis.

Appellant contends:

> [The Examiner] has not identified any particular abstract idea allegedly claimed as corresponding to the abstract idea defined

> by the courts. Rather, the Office has simply summarized, generically and incorrectly, the claim language and offered a single case citation, without any application of the claim language to that case.

Br. 16 (emphasis omitted).[6] We are unpersuaded. As reflected above for Step 2A, Prong One, the Examiner determines claim 1 recites a mathematical concept of "perform[ing] statistical analysis" by "seeding records, adding a unique source of pseudo random numbers to a record, generating skips, generating a start point of a simulation, and performing a simulation." Ans. 6. The Examiner also determines claim 1 is analogous to the patent-ineligible claim 22 of *InvestPic*, particularly inasmuch claim 22 is directed to "providing statistical analysis . . . [and] parallel processing . . . to perform . . . the statistical analysis." *Id.*; *see also supra* 9, n. 4 (*InvestPic's* claim 22).

Appellant also contends "the claimed limitations provide a technique for parallel processing of data-intensive simulation by using nodes that perform parallel asynchronous simulations." Br. 17. We are unpersuaded. As reflected above for Step 2A, Prong Two, the ***disclosed*** invention may implement such techniques and accordingly overcome concerns of preemption. The ***claimed*** invention, rather, implements basic tools of stochastic simulation via nondescript parallel processing.

Appellant also contends claim 1 compels a finding of patent-eligibility under *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014). Br. 23–25. We are unpersuaded. Like the claim of *McRO* (*see supra* 11–12), the claim of *DDR* was patent-eligible because of reciting

[6] The Appeal Brief and Reply Brief are identical, i.e., present the same arguments *verbatim*.

a specific mechanism of the invention that prevented preemption of the recited abstract ideas (*see DDR*, 773 F.3d at 1257–59). As explained, claim 1 is not specific in this regard.

CONCLUSION

Claim(s) Rejected	Basis	Affirmed	Reversed
1–11	§ 101	1–11	

DECISION

We affirm the rejection of claims 1–11 under 35 U.S.C. § 101.

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).

AFFIRMED