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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/914,088	02/24/2016	FEI GAO	90160552	7182
146568	7590	06/30/2020	EXAMINER	
MICRO FOCUS LLC 500 Westover Drive #12603 Sanford, NC 27330			CHAMPAKESAN, BADRI NARAYANAN	
			ART UNIT	PAPER NUMBER
			2438	
			NOTIFICATION DATE	DELIVERY MODE
			06/30/2020	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte FEI GAO, ZHIPENG ZHAO, and ANURAG SINGLA

Appeal 2018-006843
Application 14/914,088
Technology Center 2400

Before KEVIN F. TURNER, JOHN P. PINKERTON, and
CARL L. SILVERMAN, *Administrative Patent Judges*.

TURNER, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant¹ appeals under 35 U.S.C. § 134(a) from the Final Office Action dated July 12, 2017 (“Final Act.”), rejecting claims 1, 3–8, 12, and 14–23. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies EntIT Software LLC, the assignee of this application, the real party in interest. (Appeal Brief 1) (hereinafter “Appeal Br.”).

THE CLAIMED SUBJECT MATTER

The claims are directed to a system, a method, and a computer readable medium to detect a system anomaly using pattern discovery. *See* Specification (hereinafter “Spec.”) ¶¶ 9–14. Claims 1, 7, and 12 are independent; claims 3–6, 8, and 14–23 are dependent. Claim 1, reproduced below, is representative of the claimed subject matter:

1. A system comprising:

a plurality of nodes each comprising a processor and a memory, the plurality of nodes comprising a first node, a second node, and a third node,

the first node to:

receive a plurality of itemset and transaction identifier pairs from other nodes of the plurality of nodes;

in response to determining that a first itemset of an itemset and transaction identifier pair of the plurality of itemset and transaction identifier pairs has an itemset size that is not larger than a threshold itemset size, generate a new candidate itemset comprising the first itemset and an itemset of a frequent itemset table that share a given transaction identifier, the frequent itemset table including itemsets comprising items that are associated with transaction sets larger than a threshold transaction size;

the second node to merge the given transaction identifier with a transaction set to produce a resulting transaction set, and to determine that the new candidate itemset is a frequent itemset in response to determining that the resulting transaction set has a size larger than the threshold transaction size; and

the third node to identify a discovered pattern in response to the new candidate itemset having a size larger than the threshold itemset size and the resulting transaction set having the size larger than the threshold transaction size,

the system to identify an anomaly in the system based on

the discovered pattern.

Appeal Br. i–iv (Claims Appendix) (emphasis added).

REJECTIONS ON APPEAL²

Claims 1, 3–8, 12, and 14–23 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more.

Claims 1, 3–8, 12, 14–17, 19, 22, and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Mori (US 2008/0126347 A1, published May 29, 2008) (hereinafter “Mori”), in view of Manganaris et al. (US 2002/0082886 A1, published June 27, 2002) (hereinafter “Manganaris”).

Claim 18 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Mori and Manganaris, and further in view of Agarwal (US 6,389,416 B1, issued May 14, 2002) (hereinafter “Agarwal”).

Claims 20 and 21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Mori and Manganaris, and further in view of Himberger et al. (US 2005/0248457 A1, published Nov. 10, 2005) (hereinafter “Himberger”).

ANALYSIS

I. Rejection of claims 1, 3–8, 12, and 14–23 under § 101

We have reviewed the Examiner’s rejection in light of Appellant’s arguments. For the reasons set forth below, we affirm the Examiner’s subject matter eligibility rejection.

² The Examiner withdrew the rejections under 35 U.S.C. § 112. See Answer 3–4.

A. Principles of Law

Patent eligibility is assessed under 35 U.S.C. § 101, which states that an invention is patent eligible if it claims a new and useful process, machine, manufacture, or composition of matter. 35 U.S.C. § 101. The Supreme Court has held that this statutory provision contains an important implicit exception: laws of nature, natural phenomena, and abstract ideas are not patentable. *E.g.*, *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 215–17 (2014). But claiming the practical application of these concepts may be deserving of patent protection. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 70–73 (2012). In *Alice*, the Supreme Court reaffirmed the framework set forth previously in *Mayo* “for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.” *Alice*, 573 U.S. at 217.

The first step in the analysis is to “determine whether the claims at issue are directed to one of those patent-ineligible concepts.” *Id.* If the claims are directed to a patent-ineligible concept, the second step in the analysis is to consider the elements of the claims “individually and ‘as an ordered combination’” to determine whether there are additional elements that “‘transform the nature of the claim’ into a patent-eligible application.” *Id.* (quoting *Mayo*, 566 U.S. at 79, 78). In other words, the second step is to “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.’” *Id.* at 217–18 (alteration in original) (quoting *Mayo*, 566 U.S. at 72–73).

In 2019, the USPTO published revised guidance on the application of § 101. *See* USPTO's January 7, 2019 Memorandum, *2019 Revised Patent Subject Matter Eligibility Guidance* (“Guidance”). “All USPTO personnel are, as a matter of

internal agency management, expected to follow the guidance.” Guidance, 84 Fed. Reg. 50, 51 (Jan. 7, 2019); *see also* October 2019 Update at 1 (October 2019 Update: Subject Matter Eligibility).³ Under that guidance, we 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 § 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 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 Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019).

B. Discussion

In the Final Action, the Examiner determined that claims 1, 3–8, 12, and 14–23 are not patent-eligible subject matter because, under the broadest reasonable interpretation, the claims do not amount to anything more than an abstract idea. *See* Final Action 6–12 (hereinafter “Final Act.”); Answer 12–25 (hereinafter “Ans.”). The Examiner explained that the claims, viewed individually and as a whole, recite “collecting data, analyzing them and manipulating further.” *See*

³ USPTO, *October 2019 Update: Subject Matter Eligibility* (the “October 2019 Update”) (available at https://www.uspto.gov/sites/default/files/documents/peg_oct_2019_update.pdf).

Final Act. 8–10 (citing cases that found similar ideas abstract), 11 (“an abstract idea (collecting data from server(s))”); Ans. 13, 14 (“perform tasks relating to pattern discovery using itemsets and transaction identifiers and transaction sets, in combination with identifying an anomaly in a system based on the discovered pattern”). The Examiner categorized this abstract idea as a certain method of organizing human behavior and “an idea of itself” because it is similar to organizing, manipulating and comparing intangible data. *See* Final Act. 8–10; Ans. 13, 14, 25. The Examiner further explained that the claims recite a mathematical concept because the limitations organize and compare data using mathematical correlations. *See* Final Act. 9–10; Ans. 21, 25. Similarly, the Examiner explained that the claims recite a mental process since the steps can be performed mentally and with pen and paper. *See* Final Act. 8–10, 12. The remaining elements were found by the Examiner to be well-understood, routine, and conventional functions of generic computers and did not impose meaningful limits on the claimed invention, such as improving technology or a technical field. Final Act. 11–12; Ans. 13–25.

Appellant argues that the Examiner erred in determining that the claims are directed to patent-ineligible subject matter. Appeal Br. 10–20; Reply Brief 1–22 (hereinafter “Reply Br.”). Specifically, Appellant asserts that the claims are directed to anomaly identification using a plurality of nodes performing tasks relating to pattern discovery of itemsets, transaction identifiers, and transaction sets. Appeal Br. 12–17; Reply Br. 4–6. Appellant argues that the Examiner did not consider that the claims relate to improving the relevant technology or computer functionality. *Id.* Similarly, Appellant argues that the claims are directed to solving a problem specifically arising in computer networks, “such as a worm, virus, or other anomaly,” which amount to “significantly more.” Appeal Br.

17–20; Reply Br. 4–5, 19–21. Appellant asserts that the Examiner categorized the additional elements as “well-understood, routine, and conventional functions of generic computers” without any support. Reply Br. 21–22.

1. Step 2A, Prong One

Accordingly, under the first step of *Alice*, the claims must be analyzed to determine if the claims are directed to a judicial exception. Taking claim 1 to be representative,⁴ claim 1 recites the following limitations (with paragraph letters and tabbing added):

- (a) receive a plurality of itemset and transaction identifier pairs,
- (b) in response to determining that a first itemset of an itemset and transaction identifier pair of the plurality of itemset and transaction identifier pairs has an itemset size that is not larger than a threshold itemset size, generate a new candidate itemset comprising the first itemset and an itemset of a frequent itemset table that share a given transaction identifier, the frequent itemset table including itemsets comprising items that are associated with transaction sets larger than a threshold transaction size,
- (c) merge the given transaction identifier with a transaction set to produce a resulting transaction set, and determine that the new candidate itemset is a frequent itemset in response to determining that the resulting transaction set has a size larger than the threshold transaction size,
- (d) identify a discovered pattern in response to the new candidate itemset having a size larger than the threshold itemset size and the resulting transaction set having the size larger than the threshold transaction size, and
- (e) identify an anomaly in the system based on the discovered pattern.

Appeal Br. i (Claims Appendix).

⁴ Appellant groups claims 1, 3–8, 12, and 14–23, all of which recite limitations commensurate in scope, together for argument, and we choose claim 1 as representative. 37 C.F.R. § 41.37(c)(iv).

We agree with the Examiner that these limitations, under their broadest reasonable interpretation, recite the mental process and mathematical concept of “collecting, analyzing, and manipulating data.” *See* Final Act. 8–11; Ans. 13–14. The claim limitations recite observations and evaluations that can be performed in the human mind. *See* Guidance, 84 Fed. Reg. 50, 52 (Jan. 7, 2019). Furthermore, the limitations individually and as an ordered combination, recite a mathematical concept in that they recite mathematical relationships in order to analyze and further manipulate data. *See id.* Thus, claims 1, 3–8, 12, and 14–23 recite an abstract idea.

2. *Step 2A, Prong Two*

Having determined that the claims recite a judicial exception, our analysis under the Guidance turns now to determining whether there are “additional elements that integrate the judicial exception into a practical application.” *See* MPEP § 2106.05(a)–(c), (e)–(h). For example, limitations that are indicative of “integration into a practical application” include:

- 1) Improvements to the functioning of a computer, or to any other technology or technical field - *see* MPEP § 2106.05(a);
- 2) Applying the judicial exception with, or by use of, a particular machine - *see* MPEP § 2106.05(b);
- 3) Effecting a transformation or reduction of a particular article to a different state or thing - *see* MPEP § 2106.05(c); and
- 4) Applying or using the judicial exception in some other meaningful way beyond generally linking the use of the judicial exception to a particular technological environment, such that the claim as a whole is more than a drafting effort designed to monopolize the exception - *see* MPEP § 2106.05(e).

In contrast, limitations that are **not** indicative of “integration into a practical application” include:

- 1) Adding the words “apply it” (or an equivalent) with the judicial exception, or mere instructions to implement an abstract idea on a

- computer, or merely uses a computer as a tool to perform an abstract idea - *see* MPEP § 2106.05(f);
- 2) Adding insignificant extra-solution activity to the judicial exception - *see* MPEP § 2106.05(g); and
 - 3) Generally linking the use of the judicial exception to a particular technological environment or field of use - *see* MPEP § 2106.05(h).

See Guidance, 84 Fed. Reg. at 54–55 (“Prong Two”).

As explained by the Examiner, the additional elements of claim 1 recite various computer-related limitations, including “a system,” and “a plurality of nodes each comprising a processor and a memory.” *See* Final Act. 11–12; Ans. 15–16. Independent claims 7 and 12 recite further computer-related limitations such as “a network,” and “a non-transitory machine-readable medium storing instructions.” *See id.* Although these computer-related limitations are recited, we agree with the Examiner that these limitations are no more than generic computing elements performing generic computing functions. *See e.g.*, Spec. ¶¶ 26, 27, 46–47, 58–62 (“the nodes 102, 104, 106, 108, 110 are computing devices, such as servers, client computers, desktop computers, mobile computers, etc.”). A general purpose computer that merely executes the judicial exception is not a particular machine. *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 716–17 (Fed. Cir. 2014), *cited in* MPEP § 2106.05(b). It is true that the invention’s ability to run on a general-purpose computer does not necessarily “doom[] the claims” for purposes of subject matter eligibility. *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016)). However, Appellant has not identified any disclosure in the Specification of any inventive techniques or specialized computer components to perform the recited functions of the claims. As such, we do not find the computer-related limitations sufficient to integrate the judicial exception into a practical application.

Similarly, the claims are merely using the computer-related limitations as a tool to execute the abstract idea. *See Affinity Labs of Texas, LLC v. DirecTV, LLC*, 838 F.3d 1253, 1262 (Fed. Cir. 2016); *TLI Communications LLC v. AV Auto, LLC*, 823 F.3d 607, 613 (Fed. Cir. 2016), *cited in* MPEP § 2106.05(f). While the additional computer-related limitations may perform the pattern discovery and anomaly detection faster than a human could, using a computer to achieve a solution more quickly may not be sufficient to show an improvement to computer technology. *See Versata Dev. Grp. v. SAP Am., Inc.*, 793 F.3d 1306, 1335 (Fed. Cir. 2015); *see also* MPEP § 2106.05(a)(II) (instructing examiners that a “commonplace business method being applied on a general purpose computer” may not be sufficient to show an improvement). Here, representative claim 1 broadly detects an anomaly without any particular technical improvement to how the processor carries out these operations. In this way, the recited computer-related limitations are merely used to perform calculations. For all these reasons, the claims do not use the computer-related limitations in a way that indicates that the judicial exception has been integrated into a practical application. Therefore, claims 1, 3–8, 12, and 14–23 are “directed to” an abstract idea.

3. Step 2B

If the claims are “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.* (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.*

To determine whether a 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. at 56.

We agree with the Examiner that there is nothing in the subject matter of the claims transforming the claimed abstract idea into an inventive concept. The Examiner’s determination that the additional elements of claim 1 are well-understood, routine, and conventional is amply supported by, and fully consistent with, the Specification, which describes Appellant’s invention in a manner that requires no more than a general-purpose computer with generic computing elements. *See* Spec. ¶¶ 26, 27, 46–47, 58–62 (“the nodes 102, 104, 106, 108, 110 are computing devices, such as servers, client computers, desktop computers, mobile computers, etc.”). Although Appellant asserts that certain limitations have not been shown as well-understood, routine, and conventional, Appellant does not explain specifically why these limitations are *not* well-understood, routine, and conventional, nor does Appellant identify any passages from the Specification that support its assertions. Instead, all of the claim limitations are directed to well-understood, routine, conventional activities as explained above. Therefore, the additional elements in the claims do not amount to significantly more than the judicial exception.

In summary, because we determine that claims 1, 3–8, 12, and 14–23 are directed to an abstract idea and do not contain an inventive concept, we affirm the Examiner’s rejection under 35 U.S.C. § 101.

II. Rejection of Claims 1, 3–8, 12, and 14–23 Under 35 U.S.C. § 103(a)

We have reviewed the Examiner’s rejection in light of Appellant’s arguments. The dispositive issue raised in Appellant’s Briefs is whether the combination of Mori and Manganaris teaches or suggests the limitations of independent claims 1, 7, and 12.⁵ For the reasons set forth below, we reverse the Examiner’s rejections under 35 U.S.C. § 103(a).

The Examiner rejected the independent claims using a combination of Mori and Manganaris. Final Act. 13–16. The Examiner relied on Mori to teach “generating a new candidate itemset comprising the first itemset and an itemset of a frequent itemset table that share a given transaction identifier, the frequent itemset table including itemsets comprising items that are associated with transaction sets larger than a threshold transaction size.” Final Act. 13–14 (citing Mori ¶ 60). However, the Examiner relied on Manganaris to teach the remaining claim limitation that determines “that a first itemset of an itemset and transaction identifier pair of the plurality of itemset and transaction identifier pairs has an itemset size that is not larger than a threshold itemset size.” Final Act. 15 (citing Manganaris ¶¶ 29, 56). The Examiner explained that Manganaris meets the claim limitation because Manganaris determines whether the items “occur with [a]

⁵ Appellant groups claims 1, 7, and 12, all of which recite limitations commensurate in scope, together for argument, and we choose claim 1 as representative. 37 C.F.R. § 41.37(c)(iv).

frequency lower than the minimum support threshold in any context.” Final Act. 15 (citing Manganaris ¶ 56); Ans. 7. The Examiner asserts that “Manganaris clearly teaches that Alarms (i.e., items) and sets of alarms (i.e., itemsets) that tend to occur often (i.e., more frequently) within bursts (i.e., transactions) are considered ‘frequent itemsets’” and that “itemsets with frequency lower than a minimum support threshold [sic] are counted as frequent itemsets if there are more items occurring within the transactions.” Ans. 5–7 (citing Manganaris ¶¶ 29, 53, 58).

Appellant argues that Manganaris does not determine that the first itemset has “an itemset size that is not larger than a threshold itemset size” as claimed in independent claims 1, 7, and 12. Appeal Br. 21–23; Reply Br. 23–27. Appellant argues that Manganaris makes a determination based on frequency, not itemset size. Appeal Br. 22–23; Reply Br. 24–27. Appellant contends that the Examiner erred in interpreting “itemset size” as a size, count, amount, or rate and in applying that construction to find Manganaris met the claim limitation. *See* Reply Br. 23–26 (citing Ans. 5). Appellant further contends that the Examiner erred because the asserted references do not generate a new candidate itemset *in response* to first determining that the “itemset size is not larger than the threshold itemset size.” Appeal Br. 21–23; Reply Br. 28.

We agree that the Examiner erred. First, as per the Specification, we find that “itemset size” means the number of items in an itemset. *See, e.g.*, ¶¶ 17, 20, 38 (“If it is a new single item set or the item set size has not reached a threshold (e.g., max item size) of the transaction, the transaction builder module 156 will attempt to build all possible new candidate item sets with size = [incoming item set].size+1 and elements as incoming item set elements plus one of the frequent single item (not in the incoming item set) for transaction ID.”). Reading the claim

language in light of the Specification, Manganaris does not teach a determination based on itemset size. Instead, the cited paragraphs of Manganaris make a determination regarding the frequency of an item compared to a frequency threshold. *See* Manganaris ¶¶ 26, 56. While the remainder of the claim recites a frequency threshold, the Examiner determined Mori met that part of the claim. *See* Final Act. 13–14. Thus, we find that the asserted references do not teach or suggest determining that the first itemset has “an itemset size that is not larger than a threshold itemset size.”

On the record before us, we find the preponderance of the evidence does not support the Examiner’s finding that the combined teachings of Mori and Manganaris teach or suggest the disputed limitation of independent claims 1, 7, and 12. We agree that the Examiner erred because the combined teachings and suggestions of Mori and Manganaris would not have rendered the subject matter of claims 1, 7, and 12 obvious under 35 U.S.C. § 103(a). Thus, we reverse the Examiner’s rejection of claims 1, 7, and 12. For the same reasons, we reverse the Examiner’s rejections of dependent claims 3–8, and 14–23, which fall together with claims 1, 7, and 12. 37 C.F.R. § 41.37(c)(1)(iv).

DECISION

The Examiner’s decision to reject claims 1, 3–8, 12, 14–23 is affirmed.

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed

Appeal 2018-006843
Application 14/914,088

1, 3–8, 12, 14–23	101	Patent-eligible subject matter	1, 3–8, 12, 14–23	
1, 3–8, 12, 14–17, 19, 22, 23	103(a)	Mori, Manganaris		1, 3–8, 12, 14–17, 19, 22, 23
18	103(a)	Mori, Manganaris, Agarwal		18
20, 21	103(a)	Mori, Manganaris, Hemberger		20, 21
Overall Outcome			1, 3–8, 12, 14–23	

No 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
37 C.F.R. § 41.50(b)