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SIEMENS CORPORATION
INTELLECTUAL PROPERTY DEPARTMENT
3501 Quadrangle Blvd Ste 230
Orlando, FL 32817

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MARINI, MATTHEW G

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YUNSONG MENG
and DAN G. TECUCI

Appeal 2019-002200
Application 14/428,171
Technology Center 2800

BEFORE GEORGE C. BEST, JEFFREY W. ABRAHAM, and MICHAEL G. McMANUS, *Administrative Patent Judges*.

McMANUS, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] seeks review of the Examiner's decision to reject claims 1–17. 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 the real party in interest as Siemens Corporation. Appeal Br. 1.

CLAIMED SUBJECT MATTER

The present application generally relates to "sensor-based diagnosis, and more particularly, to a system of diagnosing turbine systems based on sensor data." Spec. 1.

Claim 1 is illustrative of the subject matter on appeal and is reproduced below:

> 1. A method of diagnosing a fault in a turbine system, comprising:
>
> receiving sensor data of a first component of the turbine system;
>
> identifying a mode of the first component;
>
> inputting the sensor data and the mode of the first component into a first model-based diagnostic engine and a data-driven diagnostic engine to generate a first component diagnosis;
>
> receiving sensor data of a second component of the turbine system;
>
> identifying a mode of the second component;
>
> inputting the sensor data and the mode of the second component into a second model-based diagnostic engine and the data-driven diagnostic engine to generate a second component diagnosis;
>
> generating a component abstraction for the first component diagnosis and the second component diagnosis;
>
> inputting the component abstraction to a system model-based diagnostic engine; and
>
> producing from the system model-based diagnostic engine, a diagnosis for an additional component, different from the first component and the second component, the additional component not contributing to the sensor data of the first component or the sensor data of the second component.

Appeal Br. 15 (Claims App.).

REFERENCES

The Examiner relies upon the following prior art:

Name	Reference	Date
James et al. ("James")	US 2003/0014692 Al	Jan. 16, 2003
Miller	US 2008/0147361 Al	June 19, 2008
de Moura et al. ("de Moura")	US 2009/0192767 Al	July 30, 2009
Khan et al. ("Khan")	US 2010/0153080 Al	June 17, 2010
Glomann et al. ("Glomann")	US 2011/0022214 Al	Jan. 27, 2011

REJECTIONS

The Examiner maintains the following rejections:

1. Claims 1–17 are rejected under 35 U.S.C. § 101 as directed to patent-ineligible subject matter. Non-Final Act. 2–8.
2. Claims 1–3, 7–11, and 15–17 are rejected under 35 U.S.C. § 103(a) (pre-AIA) as being unpatentable over Khan in view of Glomann and Miller. *Id.* at 8–12.
3. Claims 4 and 12 are rejected under 35 U.S.C. § 103(a) (pre-AIA) as being unpatentable over Khan in view of Glomann, Miller, and James. *Id.* at 12–13.
4. Claims 5, 6, 13, and 14 are rejected under 35 U.S.C. § 103(a) (pre-AIA) as being unpatentable over Khan in view of Glomann, Miller, James, and de Moura. *Id.* at 13–14.

DISCUSSION

Rejection 1. The Examiner rejects claims 1–17 as directed to unpatentable subject matter. *Id.* at 2–8. The Examiner determines that the claims are directed to the abstract idea of collecting and analyzing

information and displaying the results thereof. *Id.* at 2. The Examiner further determines that the claims lack additional elements that provide "significantly more" than the recited abstract claim elements. *Id.*

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*. *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." *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 mental processes. *Gottschalk v. Benson*, 409 U.S. 63, 69 (1972). 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.* (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.*

In January 2019, the PTO published revised guidance on the application of section 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 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 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.

[2] Manual of Patent Examining Procedure.

Appellant argues that the method of the claims, considered as a whole, is not an abstract idea under Step 2A of the Section 101 analysis. Even if it were considered abstract, Appellant argues, when considered as an ordered combination, the claims are directed to significantly more than an abstract idea. Appeal Br. 4–10.

Step 1

Step 1 of the eligibility analysis requires determining whether the claimed subject matter falls within any of the four statutory categories of patentable subject matter. Guidance 53–54. 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.

Claims 1–8 are to a "method." Appeal Br. 15–16 (Claims App.). A method falls within the scope of the term "process" as used in section 101. *See* 35 U.S.C. § 100(b). Accordingly, claims 1–8 fall within a statutory category. Claims 9–16 are to a "system" that includes elements such as a memory device and a processor. Appeal Br. 17–18 (Claims App.). Such a system qualifies as an article of manufacture. *See* MPEP § 2106.03 (Rev. 08.2017, January 2018). Claim 17 is to "[a] computer program product . . . comprising: a non-transitory computer readable storage medium." Appeal Br. 19 (Claims App.). Because the medium is non-transitory, it may fall within the category of a "manufacture." MPEP § 2106.03 (Rev. 08.2017, January 2018).

In view of the foregoing, we determine that the claimed subject matter falls within one or more of the four statutory categories of patentable subject matter.

Step 2A, Prong 1

Under Step 2A, Prong 1 of the Guidance, we must determine whether claim 1, being directed to a statutory class of invention, nevertheless recites a judicial exception. Guidance 54.

The Examiner determines that the claims are directed to the abstract idea of "collecting information, analyzing it, and displaying certain results of the collection and analysis." Non-Final Act. 2. The Examiner determines that claim 1 recites certain abstract ideas as follows:

> Claim 1 recites, in part, inputting the sensor data and the mode of the first component into a first model-based diagnostic engine and a data-driven diagnostic engine to generate a first component diagnosis; receiving sensor data of a second component of the turbine system; identifying a mode of the second component; inputting the sensor data and the mode of the second component into a second model-based diagnostic engine and the data-driven diagnostic engine to generate a second component diagnosis; generating a component abstraction for the first component diagnosis and the second component diagnosis; and inputting the component abstraction to a system model-based diagnostic engine and producing from the system model-based diagnostic engine, a diagnosis for an additional component, different from the first component and the second component, the additional component not contributing to the sensor data of the first component or the sensor data of the second component. These steps describe the concept of collecting information (via sensor data), analyzing it (via identifying, abstraction and generating), and displaying certain results of the

> collection and analysis (via the diagnosis), which corresponds to concepts identified as abstract ideas by the courts.

Id. at 3. Independent claims 9 and 17 include the same or closely similar limitations. Appeal Br. 17, 19 (Claims App.).

The claims require the collection of data from a first and second sensor. The claims further require identification of data regarding the mode of functioning of the first and second components (identification of mode of functioning appears to be derived from sensor data, *see* Spec., Fig. 3). This information is analyzed "to generate a first [and second] component diagnosis." The claims further require using the component diagnoses to generate "a component abstraction." The component abstraction is input "to a system model-based diagnostic engine."

In determining that the claims are directed to an abstract idea, the Examiner relies upon *Electric Power Group, LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016). There, the Federal Circuit determined certain claims to be directed to an abstract idea where "[t]he focus of the asserted claims . . . is on collecting information, analyzing it, and displaying certain results of the collection and analysis." *Id.* at 1353. In that case, the court further held that "we have treated analyzing information by steps people go through in their minds, or by mathematical algorithms, without more, as essentially mental processes within the abstract-idea category." *Id.* at 1354; *see also SAP Am., Inc. v. InvestPic LLC*, 898 F.3d 1161, 1163 (Fed. Cir. 2018) (holding that claims to a "series of mathematical calculations based on selected information" are directed to abstract ideas); *see also Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1350 (Fed. Cir. 2014) (holding that claims to a "process of organizing information through mathematical correlations" are directed to an abstract idea).

Claims 1, 9, and 17 require the collection and analysis of data so as to ultimately arrive at a "diagnosis for an additional component." An early process step is "inputting the sensor data and the mode of the first component into a first model-based diagnostic engine and a data-driven diagnostic engine."

The model-based diagnostic engine is described as "a set of logical rules describing how the system should perform, the set of constraints it should obey, etc." Spec. 6. This falls within the *Electric Power Group* court's description of abstract ideas as "analyzing information by steps people go through in their minds, or by mathematical algorithms."

The claims further require use of a "data-driven diagnostic engine." The Specification indicates that "[t]he data-driven engine 313a may be learned from sensor data annotated as either faulty or normal and may produce as output such faulty or normal findings for unseen sensor data." Spec. 6. While this description lacks clarity, it is apparent that the data-driven engine performs a set of analytical steps to produce an "output." *Id.* We determine this to be an abstract step on the same basis as with regard to the model-based diagnostic engine, above.

The claims further require generating a "component abstraction" for each component diagnosis. The Specification teaches as follows with regard to the component abstraction:

> In response to the receipt of the component diagnosis 315a and 315x, the component abstraction module 317 aims to improve diagnostics by abstracting away from individual components and their behavior. One way to achieve this is to remove distinctions that are not important for the considered

> system. For example, two pipes connected to the input and output of a valve can be abstracted to just the valve.

Spec. 7. The example from the Specification—treating two pipes and a valve as only the valve—is a concept that may be performed in the human mind and is therefore abstract as a mental process. *See* Guidance 52.

The claims further require use of a system model-based diagnostic engine to generate a diagnosis for an additional component. The Specification gives broad guidance that "[t]he system model-based diagnostic engine uses non-monotonic reasoning," and "[t]he system model-based diagnostic engine include models expressed with Satisfiability Modulo Theories." Spec. 2. We determine this to be an abstract step on the same basis as with regard to the model-based diagnostic engine and data-driven diagnostic engines, above.

Appellant does not submit argument in direct response to this determination. *See generally* Appeal Br. Nor does Appellant submit argument regarding the dependent claims.

In view of the foregoing, we determine that Appellant has not shown error with regard to the Examiner's determination that the claims recite an abstract idea.

Step 2A, Prong 2

Next, we determine whether the claim as a whole integrates the recited abstract idea (judicial exception) into a practical application. The Guidance teaches that one may evaluate integration into a practical application 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.

Guidance 54–55.

The Guidance further teaches certain exemplary conditions that are indicative that an additional element (or combination of elements) may integrate the exception into a practical application. One such circumstance is where "[a]n additional element reflects an improvement in the functioning of a computer, or an improvement to other technology or technical field." *Id.* at 55.

Appellant argues that the claimed method improves the operation of a physical system as follows:

> Appellant agree[s] that the claims are directed towards diagnosing a fault in a turbine system, but respectfully disagrees that the claimed method and system does not effect or improve the operation of a physical system. Appellant specifically mentions and claims that sensor data 240, 303a, 303x is received from a physical system, i.e., a turbine system, *see for example page 2 lines 12 and page 5 lines 16-22*. Accordingly, the claimed method and system recites a specific and concrete output, the diagnosis of an unmonitored system component (of the turbine system) via available sensor data coming from one or more monitored components. One skilled in the art of diagnosing faults in a physical system such as a turbine system would understand that the use of the fault data of an unmonitored component is beneficial so that the system may then make a physical change such as, in an extreme example, a shutdown to protect the turbine system from catastrophic damage.

Appeal Br. 8. That is, Appellant argues that the method relates to a physical system and the method produces information that may lead to a physical change. In its Reply Brief, Appellant additionally argues that the claims are

integrated into the practical application of producing a diagnosis for a turbine system where such turbine system is an additional element. Reply Br. 3.

In the Answer, the Examiner responds that "[t]he instant claims do not recite[] any additional elements or extra solution activities that transform the identified abstract idea to a physical system or the operation thereof." Answer 3. The Examiner further observes that "the features upon which [A]ppellant relies (i.e.[,] so that the system may then make a physical change such as, in an extreme example, a shutdown to protect the turbine system form catastrophic damage) are not recited in the rejected claim(s)." *Id.*

Here, each step of claims 1, 9, and 17 (the independent claims) that occurs subsequent to "receiving sensor data" requires the analysis or manipulation of data. As noted above, a "series of mathematical calculations based on selected information" is abstract in nature. *SAP Am.*, 898 F.3d at 1163. Here, there is simply no "additional" (non-abstract) claim limitation that effects a physical change/improvement. We further concur with the Examiner's determination that a potential physical consequence such as a turbine shutdown is not set forth in the claim and cannot impart patentability.

We additionally determine that the "turbine system" claim limitation merely limits the use of an abstract idea "'to a particular technological environment.'" *See Bilski*, *supra*, at 610–611; *see also* Khan ¶¶ 1–2.

Accordingly, we determine that Appellant has not shown error with regard to the Examiner's determination that claims 1, 9, and 17 lack sufficient additional elements to incorporate the claims into a practical application. As Appellant has not presented separate argument with regard

to the dependent claims, it has not shown error with regard to the Examiner's determination that such claims are "directed to" abstract subject matter.

Step 2B

Having determined that claim 1 is directed to an abstract idea, we next consider Step 2B under the Guidance (Step 2 of the *Mayo*/*Alice* framework), whether claim 1 includes specific limitations beyond the judicial exception that are not "well-understood, routine, conventional" activity in the field, or simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception.

Appellant argues that claim 1 (and all independent claims) recites limitations that add "significantly more," including the following:

> producing from the system model-based diagnostic engine, a diagnosis for an additional component, different from the first component and the second component, the additional component not contributing to the sensor data of the first component or the sensor data of the second component.

Appeal Br. 9; *see also id.* at 15 (Claims App.). Appellant argues that the method (or system or computer code) "provides additional diagnostics information for components that are not directly monitored by sensor data, or represented by models associated with components connected to the sensor data." *Id.* at 9. Appellant further argues that "the claimed invention requires a new source or type of information or techniques for analyzing it." *Id.* (citing *Elec. Power Grp.*). Appellant asserts that the claimed method (or system) recites a new type of information to provide a new diagnostic technique. *Id.* As a result, Appellant argues, the claims recite a "specific

and concrete output" that provides significantly more than mere analysis and display of information. *Id.*

In the Answer, the Examiner responds that "[t]he step of producing a diagnosis [relied upon by the Appellant] is nothing but a mathematical result." Answer 4. The Examiner cites caselaw that provides "[a]dding one abstract idea (math) to another abstract idea (encoding and decoding) does not render the claim non-abstract." *Id.* (citing *RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322, 1327 (Fed. Cir. 2017). The Examiner further asserts that an inventive concept is furnished only where an element or combination of elements recited in the claim is in addition to (beyond) the judicial exception, and is sufficient to ensure that the claim as a whole amounts to significantly more than the judicial exception itself. *Id.* (*citing Alice Corp.*, 573 U.S. at 217–8).

Here, the only elements of claim 1 that may be nonabstract are diagnosis "in a turbine system" and "receiving sensor data." Monitoring and diagnosis of a turbine system is well-understood, routine, conventional activity in the field. *See, e.g.*, Khan, Abstract, Fig. 1. Further, the use of sensors in such activity is well-understood, routine, and conventional. *See, e.g.*, *id.*, Abstract, Fig. 3, ¶ 2. Whether the elements of claim 1 (and its dependent claims) are considered individually or as an ordered combination, they do not provide significantly more than the recited abstract elements.

Independent claim 9 is to a "system for diagnosing a fault in a turbine system" that includes "a memory device for storing a program" and "a processor in communication with the memory device." Appeal Br. 17, 19 (Claims App.). Independent claim 17 is to a "computer program product for diagnosing a fault in a turbine system." Use of such general purpose

components is well-understood, routine, and conventional. *See, e.g.*, Khan ¶ 26; Spec. 9. As above, the use of such components, considered individually or as an ordered combination, do not provide significantly more than the recited abstract elements.

We further concur with the Examiner's determination that a sequence of abstract ideas is not "something more" than an abstract idea. Similarly, Appellant has not shown error in the Examiner's determination that producing a diagnosis from a data-based and model-based diagnostic engine is an abstract step.

Accordingly, we determine that Appellant has not shown that any of claims 1, 9, and 17 include additional elements that provide "something more" than the judicial exception so as to render the subject matter of the claim patent eligible. Nor has Appellant offered separate argument regarding any dependent claim. As a consequence, we determine that Appellant has not shown error in the rejection of any claim found to be directed to ineligible subject matter.

Rejection 2. The Examiner rejects claims 1–3, 7–11, and 15–17 as obvious over Khan in view of Glomann and further in view of Miller. Non-Final Act. 8–12.

Independent claims 1 and 17 require, inter alia, "inputting the sensor data and the mode of the first component into a first model-based diagnostic engine and ***a data-driven diagnostic engine*** to generate a first component diagnosis." Appeal Br. 15 (Claims App.) (emphasis added). Independent claim 9 includes a similar limitation. *Id.* at 17. The Examiner finds that Khan teaches "a data-driven diagnostic engine (301) to generate a first component diagnosis (302)." Non-Final Act. 9.

Khan, titled *PHYSICS-BASED LIFESPAN MODELING*, describes a method for modeling the lifespan of a turbine engine component that "includes determining a design-phase model of the lifespan of a[] turbine engine component; fusing the design-phase model with sensor data collected during operation of the turbine engine component to produce an updated model." Khan, Abstract. Khan further describes "fusing the updated model with data collected during an inspection of the turbine engine component to produce an overall model of the lifespan of the turbine engine component." *Id.*

In support of the rejection, the Examiner relies upon certain steps set forth in Figure 3 of Khan (reproduced below).

FIG. 3

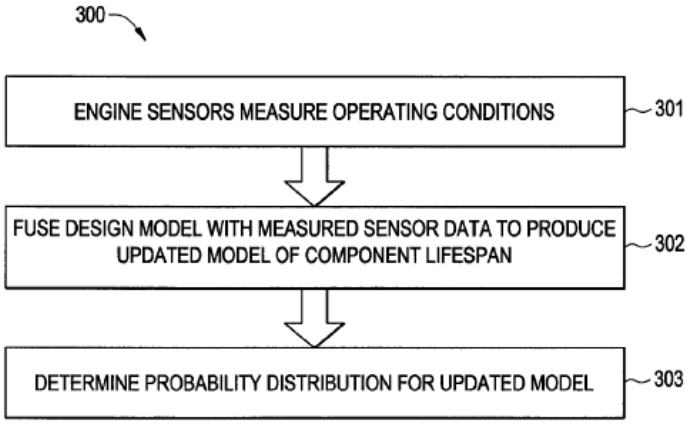

Figure 3 "shows an embodiment of a method **300** for a remote monitoring and diagnostic (RMD) phase." Khan ¶ 20. Khan further teaches that "during engine operation, engine sensors measure the operating conditions of the engine component in block **301** . . . . The collected RMD data provides a unit specific usage profile for the engine component. The design

model created in block **209** of FIG. 2 is fused with the RMD data in block **302**." *Id.*

Appellant argues that Khan does not teach a data-driven diagnostic engine. Appellant argues that the Specification "recites that a data-driven system may make a diagnosis based solely on the sensor data, see page 2 line[s] 15–16, which states, 'A data-driven system may make a diagnosis based solely on sensor data.'" Appeal Br. 9. Appellant seeks to distinguish the claim term "data-driven diagnostic engine" from the model taught by Khan on the basis that Khan teaches to use both sensor ("RMD") data and design model data. *Id.* That is, Appellant argues that the term "data-driven diagnostic engine" is limited to the analysis of sensor data.

In support of its proposed interpretation, Appellant cites to the following portion of the Specification:

> A diagnosis system may be model-based or data driven. A model-based system relies on a model of a system, how system components are connected, how they are intended to function, etc. ***A data-driven system may make a diagnosis based solely on sensor data***.

Spec. 2 (emphasis added).

During prosecution, claims are given their broadest reasonable interpretation consistent with the Specification. *In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007). "Giving claims their broadest reasonable construction 'serves the public interest by reducing the possibility that claims, finally allowed, will be given broader scope than is justified.'" *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004) (citations omitted). "An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible,

during the administrative process." *In re Zletz*, 893 F.2d 319, 322 (Fed. Cir. 1989). "Construing claims broadly during prosecution is not unfair to the applicant . . . because the applicant has the opportunity to amend the claims to obtain more precise claim coverage." *Am. Acad.*, 367 F.3d at 1364.

Here, the Specification states merely that "[a] data-driven system ***may*** make a diagnosis based solely on sensor data." Spec. 2 (emphasis added). The Specification does not clearly indicate that no other information may be considered. Considering the term "data-driven diagnostic engine" in view of the Specification and according such term its broadest reasonable interpretation, we determine that it does not require the exclusion of consideration of information other than sensor data. Accordingly, we do not find Appellant's argument in this regard to be persuasive.

Appellant additionally asserts error with regard to the Examiner's finding that Miller teaches producing "from the system model-based diagnostic engine, ***a diagnosis for an additional component***, different from the first component and the second component" as required by independent claims 1, 9, and 17. Appeal Br. 12–13.

The Examiner finds that Miller teaches to produce a diagnosis for the claimed "additional component" where it teaches signals that represent "an associated subsystem." Non-Final Act. 10. The Examiner finds that the first and second components are "subsystems 106 and 108 used to collect data and predict failures of the associated subsystem." *Id.* Figure 1, depicting such subsystems, is reproduced below.

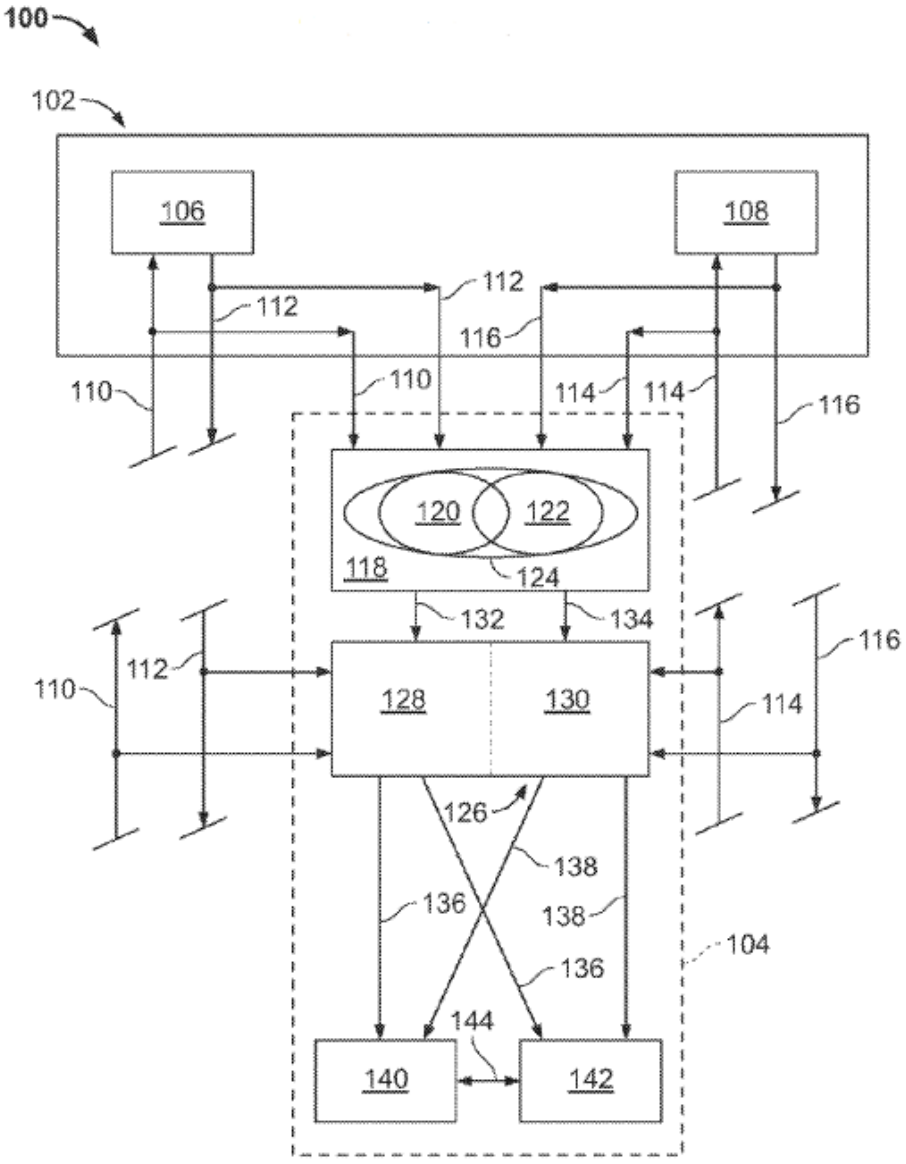

Figure 1 is a block diagram of a health monitoring scheme. Miller ¶ 9.

Appellant argues that review of the Specification indicates that the "associated subsystem models 120 and 122" are associated with subsystems 106 and 108 – not an additional component. Appeal Br. 12–13; *see also* Spec. ¶¶ 14–19.

In the Answer, the Examiner finds that, while Miller illustrates only subsystems 106 and 108, "system 102 includes any number of subsystems."

Answer 6. This is consistent with Miller which teaches that "only a first subsystem 106 and a second subsystem 108 are illustrated [but that] System 102 includes any number of subsystems." Miller ¶ 10.

The Examiner explains the reasoning of the rejection as follows:

> [M]odels 120 and 122 contain interrelationships related to the subsystems of the system. These model are then limited by a system model, 124, where system 102 characteristics are formed as a function of the interrelated and not interrelated characteristics of subsystems as well as the inherent characteristics of the system 102 that include other associated subsystems that make up the system 102 (but are not depicted). The system model 124 contains at least one predetermined limit by integrating the plurality of subsystem models that includes, at least, models 120 and 122. The subsystem are also disclosed as model 120 to be bounded by at least one predetermined limit **of at least one other subsystem model that includes, at least, model 122** and/or at least one predetermined limit of system model 124. From these models, Miller facilitates operation of systems and their associated subsystems to use **data collected from other subsystems** to predicted a system health of different subsystems interrelated by models of sensed subsystems.
>
> Therefore, it is the examiner's interpretation that Miller collects data from subsystems like 106 and 108, where the data is fed into models that include interrelationships with other subsystems, not depicted, to make predictions of both depicted and non-depicted subsystems related to potential failures of the system that includes all the subsystems.

Answer 6–7. That is, the Examiner finds that Miller teaches subsystems beyond 106 and 108 that contribute to the overall system model.

Here, the last clause of claim 1 provides as follows:

> producing from the system model-based diagnostic engine, a diagnosis for an additional component, different from the first component and the second component, the additional

> component not contributing to the sensor data of the first component or the sensor data of the second component.

Appeal Br. 15 (Claims App.) (claims 9 and 17 include the same or similar limitations). It appears that the intent of the claim may have been to limit this limitation to the production of a diagnosis for a component for which data was not collected. A close review of the claim language, however, indicates that there is no exclusion of a system that produces a diagnosis for an exemplary third component where the system collects sensor data for a third component that does not contribute to the sensor data of the first or second component. This latter type of system is described by Miller.

Accordingly, Appellant has not shown error in the Examiner's finding that Miller teaches the last clause of claims 1, 9, and 17.

Rejections 3 and 4. The Examiner rejects claims 4–6, and 12–14 as obvious over Khan, Glomann, Miller, and certain other references. Non-Final Act. 12–14. Appellant argues that these rejections should be reversed for the reasons set forth above with regard to Khan and Miller. Appeal Br. 13. As we have found Appellant's arguments in this regard not to be persuasive, we determine that Appellant has not shown error in the rejection of claims 4–6, and 12–14 as obvious.

CONCLUSION

The Examiner's rejection of claims 1–17 as directed to ineligible subject matter is affirmed.

The Examiner's rejection of claims 1–3, 7–11, and 15–17 as obvious over Khan, Glomann, and Miller is affirmed.

The Examiner's rejection of claims 4 and 12 as obvious over Khan, Glomann, Miller, and James is affirmed.

The Examiner's rejection of claims 5, 6, 13, and 14 as obvious over Khan, Glomann, Miller, James, and de Moura is affirmed.

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–17	101	Ineligible subject matter	1–17	
1–3, 7–11, 15–17	103(a)	Khan, Glomann, Miller	1–3, 7–11, 15–17	
4, 12	103(a)	Khan, Glomann, Miller, James	4, 12	
5, 6, 13, 14	103(a)	Khan, Glomann, Miller, James, de Moura	5, 6, 13, 14	
Overall Outcome			1–17	

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

AFFIRMED