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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/786,073	03/05/2013	Suchi Saria	S31-05009.PCT.CON	5550
71897 KPPB LLP 2190 S. Towne Centre Place Suite 300 Anaheim, CA 92806	7590 06/06/2019		EXAMINER TOMASZEWSKI, MICHAEL	
			ART UNIT	PAPER NUMBER
			3686	
			NOTIFICATION DATE	DELIVERY MODE
			06/06/2019	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SUCHI SARIA, ANAND KRISHNAKUMAR RAJANI,
JEFFREY BENJAMIN GOULD, DAPHNE KOLLER, and
ANNA ASHER PENN

Appeal 2017-005593¹
Application 13/786,073
Technology Center 3600

Before MURRIEL E. CRAWFORD, ANTON W. FETTING, and
CYNTHIA L. MURPHY, *Administrative Patent Judges*.

CRAWFORD, *Administrative Patent Judge*.

DECISION ON APPEAL
STATEMENT OF THE CASE

Appellants seek our review under 35 U.S.C. § 134 of the Examiner's final rejection of claims 1–4 and 6–40. We have jurisdiction under 35 U.S.C. § 6(b).

SUMMARY OF DECISION

We AFFIRM.

¹ Appellants identify The Board of Trustees of the Leland Stanford Junior University as the real party in interest. Appeal Br. 3.

THE INVENTION

Appellants claim a system and methods for predicting morbidity in medical patients. (Spec. ¶ 2).

Claim 1 is representative of the subject matter on appeal.

1. A method for predicting morbidity of a premature infant using at least two noninvasive physiological properties, the method comprising:

accessing from a computer storage medium a gestational age and a birth weight of the premature infant;

producing, by a monitoring device comprising a noninvasive sensor, continuous time-series data including at least one of heart rate, respiration rate and oxygen saturation of the premature infant, and the monitoring device further digitizing and recording sensor information;

accessing from a computer storage medium substantially continuous time-series data for two noninvasive physiological properties of the premature infant recorded by the monitoring device during a monitoring period of between about one hour and about ten hours, wherein the substantially continuous time-series data is collected without human intervention during at least one hour of the monitoring period;

computing a stable value and a characterization of dynamics of the substantially continuous time-series data for at least one of the two physiological properties;

determining, via execution of instructions on computer hardware, a morbidity risk factor for: (1) the gestational age of the premature infant, (2) the birth weight of the premature infant, and (3) each of the stable values and the characterizations of dynamics by comparing each of the stable values and the characterizations of dynamics to a nonlinear probability function;

weighting each of the morbidity risk factors using weightings learned from an optimization procedure optimized on a model group of premature infants;

aggregating each of the weighted morbidity risk factors to generate a predictive indicator of morbidity of the premature

infant; and outputting the predictive indicator to a front end module;

wherein the predictive indicator of morbidity is determined, via execution of instructions on computer hardware, using a logistic function to aggregate the morbidity risk factors.

THE REJECTION

Claims 1–4 and 6–40 are rejected under 35 U.S.C. § 101 as directed to a judicial exception without significantly more.

ANALYSIS

35 U.S.C. § 101 REJECTION

We will sustain the rejection of claims 1–16, 18–19, and 22 under 35 U.S.C. § 101.

The Supreme Court

set forth a framework for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts. First, . . . determine whether the claims at issue are directed to one of those patent-ineligible concepts. . . . If so, . . . then ask, “[w]hat else is there in the claims before us?” . . . To answer that question, . . . consider the elements of each claim both individually and “as an ordered combination” to determine whether the additional elements “transform the nature of the claim” into a patent-eligible application. . . . [The Court] described step two of this analysis as a 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.”

Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. at 208 (2014) (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72–73 (2012)) (citations omitted (alterations in original)).

To perform this test, we must first determine whether the claims at issue are directed to a patent-ineligible concept. The Federal Circuit has explained that “the ‘directed to’ inquiry applies a stage-one filter to claims, considered in light of the [S]pecification, based on whether ‘their character as a whole is directed to excluded subject matter.’” *See Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016) (quoting *Internet Patents Corp.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015)). It asks whether the focus of the claims is on a specific improvement in relevant technology or on a process that itself qualifies as an “abstract idea” for which computers are invoked merely as a tool. *See id.* at 1335–36.

In so doing we apply a “directed to” two prong test: 1) evaluate whether the claim recites a judicial exception, and 2) if the claim recites a judicial exception, evaluate whether the judicial exception is integrated into a practical application. *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50–57 (Jan. 7, 2019) (“*Guidance*”).

The Examiner determines that the claims are directed to a method for predicting morbidity of a premature infant using at least two noninvasive physiological properties. (Final Act. 2). The Examiner determines:

The abstract idea is identified as: processing healthcare information. Processing healthcare information is an abstract idea because it uses categories to organize, store, and transmit information, etc.; includes data recognition and storage; compares data to determine a risk level; collects and compares known information; and/or obtains and compares intangible data; uses mathematical relationships/formulas, etc.”

(Final Act. 2).

The Examiner determines that the invention is directed to processing healthcare information by organizing information through mathematical correlations and comparing new and stored information and using rules to identify options. (Ans. 5). The Examiner finds that the method of claim 1 could be performed using pen and paper and/or in the human mind. (Ans. 8).

The Examiner finds the claims do not include additional elements that are sufficient to amount to significantly more than the judicial exception because the additional elements or combination of elements in the claims, other than the abstract idea *per se*, amount to no more than a recitation of a generic computer structure. The generic computer serves to perform generic computer functions that merely link the abstract idea to a particular technological environment and/or functions that are well-understood, routine, and conventional activities previously known to the pertinent value. (Final Act. 3). The Examiner points out that the Specification teaches that the method is implemented via a desktop computer, a notebook computer, a tablet computer, a handheld device, a monitoring device, a mobile telephone, or other suitable device, which are all generic type computers. (Fin. Act. 3).

Appellants' Specification discloses that in a neonatal intensive care unit ("NICU"), premature babies are typically continuously monitored for their heart rate, respiration, and blood oxygen levels. (Spec. ¶ 4). Time-series physiological data is routinely and/or automatically recorded in many intensive care units. Some existing morbidity scoring systems and other medical scoring techniques have been employed that include human observations, qualitative description, data collected using invasive

measurements or techniques, data collected using human intervention or a combinations thereof. (Spec. ¶ 5). According to the Specification, what has been missing in the previous morbidity scoring systems is the use of the stable value (average value or mean value) and the characterization dynamics (variance) of such time-series physiological data. The use of the stable value and the characterization dynamics produces a rapid and accurate morbidity prediction. The stable value can be computed using an average or mean of the time-series data or of a data set derived from time series data. (Spec. ¶ 11). The characterization of dynamics may be computed using one or more measures of the variance of the time-series data or of a data set derived from the time-series data. The stable value and characterization dynamics are used to compute a morbidity risk factor of the premature infant by comparing each of the stable values and the characterization of dynamics to a nonlinear probability function. (Spec. ¶ 13). Each morbidity factor is weighted using weightings learned from an optimization procedure on a model group of infants. Each weighted morbidity risk factor is aggregated to generate a predictive indicator of morbidity of the premature infant and this predictive indicator is outputted. (Spec. ¶ 11). As such, the Specification supports the Examiner's determination that the claims are directed to processing healthcare information.

The recitations of claim 1, for example, also supports this determination because claim 1 recites "accessing . . . gestational age and birth weight of the premature infant," "producing . . . time-series data including at least one of heart rate, respiration rate and oxygen saturation of the premature infant," "accessing . . . continuous time-series data . . . during a monitoring period" each of which involves collecting healthcare

information. Claim 1 also recites “computing a stable value and characterization of dynamics,” “determining . . . a morbidity risk factor,” “weighting each of the morbidity risk factors,” “aggregating each of the weighted morbidity risk factors to generate a predictive indicator,” and “outputting the predictive indicator.” These steps relate to the processing of the healthcare information.

In view of the foregoing, we agree with the Examiner that claim 1 is directed to processing healthcare information. We also agree that processing healthcare information is a mental process that could be performed in the human mind and/or with pen and paper.

In this regard, we find the steps of claim 1 constitute analyzing information by steps people go through in their minds which without more, are essentially mental processes within the abstract-idea category. *See Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1354 (Fed. Cir. 2016); *see also buySAFE, Inc. v. Google, Inc.*, 765 F.3d 1350, 1355 (Fed. Cir. 2014) (claims directed to certain arrangements involving contractual relations are directed to abstract ideas).

In the alternative, claim 1 recites several mathematical calculations such as “computing a stable value and a characterization of dynamics,” “determining . . . a morbidity risk factor . . . by comparing each of the stable values and the characterization of dynamics to a nonlinear probability function,” “weighting each morbidity risk factor,” and determining a predictive indicator “using a logistic function to aggregate the morbidity risk factor.”

Mental processes and mathematical calculations are both judicial exceptions. *Guidance 52*.

Turning to the second prong of the “directed to test,” claim 1 requires a “computer storage medium,” and “computer hardware.” The recitation of the words “computer storage medium” and “computer hardware” does not integrate the judicial exceptions into a practical application. *Guidance* at 55. In this regard, the recitation does not affect an improvement in the functioning of a computer storage medium, computer hardware or other technology, does not recite a particular machine or manufacture that is integral to the claims, and does not transform or reduce a particular article to a different state or thing. *Id.* We note that the Specification discloses that the method of the invention can be implemented with one or more physical computer devices, one or more of which can have a processor, memory storage, a network interface, other computing device components or a combination of components. (Spec. ¶ 54). As such, the Specification indicates that generic computer storage medium and computer hardware are used to implement the method of claim 1.

We agree with the Examiner that the monitoring device including a noninvasive sensor is a well-known device, which is merely being using as a tool to perform insignificant data gathering and therefore does not impose a meaningful limit on the judicial exceptions. (Ans. 8). The prohibition against patenting an abstract idea “cannot be circumvented by attempting to limit the use of the formula to a particular technological environment or adding insignificant post-solution activity.” *Bilski v. Kappos*, 561 U.S. 593, 610–11 (2010) (internal citation and quotation marks omitted). The Court in *Alice* noted that “[s]imply appending conventional steps, specified at a high level of generality,” was not ‘*enough*’ [in *Mayo*] to transform an abstract idea. *Alice*, 573 U.S. 208 (quoting *Mayo*, 566 U.S. at 82–83, 77–78, 72–73).

There is no improvement to the monitoring device or sensor recited in the claims. There is no transformation recited in claim 1. As such, the recitation of a monitoring device does not integrate the judicial exceptions into a practical application. *Guidance 55*.

Thus, claim 1 is directed to abstract ideas.

Turning to the second step of the *Alice* analysis, because we find that the claims are directed to abstract ideas, the claims must include an “inventive concept” in order to be patent-eligible, i.e., there must be an element or combination of elements that is sufficient to ensure that the claim in practice amounts to significantly more than the abstract idea itself. *See Alice*, 573 U.S. at 217–218 (quoting *Mayo* 566 U.S. 66, 72–73 (2012)).

The introduction of a computer storage medium and computer hardware into the claims does not alter the analysis at *Alice* step two.

[T]he mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention. Stating an abstract idea “while adding the words ‘apply it’” is not enough for patent eligibility. Nor is limiting the use of an abstract idea “to a particular technological environment.” Stating an abstract idea while adding the words “apply it with a computer” simply combines those two steps, with the same deficient result. Thus, if a patent’s recitation of a computer amounts to a mere instruction to “implemen[t]” an abstract idea “on . . . a computer,” that addition cannot impart patent eligibility. This conclusion accords with the preemption concern that undergirds our § 101 jurisprudence. Given the ubiquity of computers, wholly generic computer implementation is not generally the sort of “additional featur[e]” that provides any “practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.”

Alice, 573 U.S. at 223–224 (alterations in original) (citations omitted).

Instead, “the relevant question is whether the claims here do more than simply instruct the practitioner to implement the abstract idea . . . on a generic computer.” *Id.* at 225. They do not.

Taking the claim elements separately, the function performed by the computer at each step of the process is purely conventional. Using a computer to retrieve, select, and apply decision criteria to data and modify the data as a result amounts to electronic data query and retrieval—one of the most basic functions of a computer. All of these computer functions are well-understood, routine, conventional activities previously known to the trading industry. *See Elec. Power Grp.*, 830 F.3d at 1354; *see also In re Katz Interactive Call Processing Patent Litig.*, 639 F.3d 1303, 1316 (Fed. Cir. 2011) (“Absent a possible narrower construction of the terms ‘processing,’ ‘receiving,’ and ‘storing,’ . . . those functions can be achieved by any general purpose computer without special programming”). In short, each step does no more than require a generic computer to perform generic computer functions. As to the data operated upon, “even if a process of collecting and analyzing information is ‘limited to particular content’ or a particular ‘source,’ that limitation does not make the collection and analysis other than abstract.” *SAP Am. Inc. v. InvestPic, LLC*, 890 F.3d 1016, 1022 (Fed. Cir. 2018).

Considered as an ordered combination, the computer components of Appellants’ claims add nothing that is not already present when the steps are considered separately. The sequence of data reception-analysis-access/display is equally generic and conventional or otherwise held to be abstract. *See Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 715 (Fed. Cir. 2014) (sequence of receiving, selecting, offering for exchange, display,

allowing access, and receiving payment recited an abstraction), *Inventor Holdings, LLC v. Bed Bath & Beyond, Inc.*, 876 F.3d 1372, 1378 (Fed. Cir. 2017) (holding that sequence of data retrieval, analysis, modification, generation, display, and transmission was abstract), *Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC*, 874 F.3d 1329, 1339 (Fed. Cir. 2017) (holding sequence of processing, routing, controlling, and monitoring was abstract). The ordering of the steps is, therefore, ordinary and conventional.

The claims do not purport to improve the functioning of the computer storage medium or computer hardware itself. As we stated above, the claims do not affect an improvement to any other technology or technical field. The Specification spells out different generic equipment and parameters that might be applied using this concept and the particular steps such conventional processing would entail based on the concept of information access under different scenarios. The Specification also discloses that monitoring devices, as the one recited in claim 1 are typical in NICUs. (Spec. ¶ 51). Thus, these limitations of claim 1 amount to nothing significantly more than instructions to apply the abstract idea of processing health care information using some unspecified, generic computer and generic monitoring device. Under our precedents, that is not enough to transform an abstract idea into a patent-eligible invention. *See Alice*, 573 U.S. at 222.

We have reviewed all the arguments (Appeal Br. 13--26; Reply Br. 3--10) Appellants have submitted concerning the patent eligibility of the claims before us that stand rejected under 35 U.S.C. § 101. We find that our analysis above substantially covers the substance of all the arguments, which

have been made. But, for purposes of completeness, we will address various arguments in order to make individual rebuttals of same.

We are not persuaded of error on the part of the Examiner by Appellants' argument that the claims have not been considered as a whole when identifying the abstract idea (Appeal Br. 13). Specifically, Appellants argue that the Examiner did not consider the recitations of a monitoring device, determining a morbidity risk factor, weighting each morbidity risk factors and determining a set of score parameters. We have discussed the recitation of the monitoring device above. The other recitations relate to computer processing of the healthcare information. In this regard, the steps of determining a morbidity risk factor, weighting each morbidity risk factors and determining a set of score parameters are steps of processing the healthcare information that is collected by the monitoring device.

We are not persuaded of error on the part of the Examiner by Appellants' argument that the claims are not analogous to abstract ideas previously identified by the Courts. (Appeal Br. 16). We agree with the Examiner's response to this argument found on pages 6–7 of the Answer that the claims are similar to the claims in *Digitech Image Techs., LLC v. Elec. for Imaging, Inc.*, 758 F.3d 1344 (Fed. Cir. 2014) and *SmartGene, Inc. v. Advanced Biological Labs.*, 555 F. App'x. 950 (Fed. Cir. 2014).

We are not persuaded of error on the part of the Examiner by Appellants' argument that the claims are analogous to the claims of *BASCOM Global Internet Servs. v. AT&T Mobility LLC*, 827 F.3d 1341 (Fed. Cir. 2016). (Appeal Br. 21). Appellants assert that, like the claims in *BASCOM*, the present claims are directed to specific features for predicting morbidity of a premature infant, specific features relating to a system for a

probability for illness severity of a subject and specific features for creating a scoring system for a probability for illness severity of a subject. (Appeal Br. 22).

Contrary to Appellants' arguments, the Federal Circuit did not find that the claims in *BASCOM* recited an inventive concept because the claims recited a specific implementation of the abstract idea of filtering content. Rather, in *BASCOM*, the Federal Circuit followed the Supreme Court's guidance for determining whether the claims recite an inventive concept set forth in *Alice*, 573 U.S. at 221–225.

In *Alice*, the Supreme Court explained that, under the second step of the patent-eligibility analysis, “the relevant question is whether the claims here do more than simply instruct the practitioner to implement the abstract idea of intermediated settlement on a generic computer.” *Alice*, 573 U.S. at 221. The Supreme Court also provided examples of claims that represent more than instructions to implement an abstract idea on a generic computer, such as claims that purport to improve the functioning of the computer itself and claims that effect an improvement in any other technology or technical field. *Id.* at 224–226.

Turning to *BASCOM*, the Federal Circuit held “[t]he inventive concept described and claimed in the '606 patent is the installation of a filtering tool at a specific location, remote from end-users, with customizable filtering features specific to each end user.” 827 F.3d at 1350. In determining this feature to be an inventive concept, the Federal Circuit explained that the remote location of a filtering tool having customizable user-specific filtering features provides the filtering tool both the benefits of a filter on a local computer and the benefits of a filter on the ISP server and

is a technical improvement over prior art ways of filtering content. *Id.* at 1350–51. Notably, the Federal Circuit specifically determined that “the claims may be read to ‘improve[] an existing technological process.’” *Id.* at 1351 (citing *Alice*, 573 U.S. at 223).

As we discussed above, claim 1 does not recite an improvement to any existing technology. Claim 1 does not recite an improvement to the computer storage medium, monitoring device and computer hardware recited in claim 1.

In view of the foregoing, we will sustain the Examiner’s rejection of claim 1 under 35 U.S.C. § 101. We will also sustain the rejection as it is directed to claims 2–4 and 6–33, because the Appellants have not argued the separate eligibility of these claims.

We will also sustain the rejection as it is directed to dependent claims 34, 35, and 36 because these claims merely further define the calculations recited in the independent claims from which they depend. In other words, dependent claims 34, 35, and 36 may limit the scope of the abstract idea to which their respective independent claims are directed but their character remains unchanged, especially given that these dependent claims provide no insight to improvements in computer functionality beyond what one would expect from using a generic computer as a tool in performing the scheme as claimed. None of these claims add anything significantly more to transform the abstract idea.

CONCLUSIONS OF LAW

We conclude the Examiner did not err in rejecting the appealed claims under 35 U.S.C. § 101.

Appeal 2017-005593
Application 13/786,073

DECISION

The decision of the Examiner 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