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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte BARRY FOGEL

Appeal 2018-001628
Application 14/974,236
Technology Center 3600

Before ELENI MANTIS MERCADER, NORMAN H. BEAMER,
and ADAM J. PYONIN, *Administrative Patent Judges*.

MANTIS MERCADER, *Administrative Patent Judge*.

DECISION ON APPEAL
STATEMENT OF THE CASE

Appellant¹ appeals under 35 U.S.C. § 134(a) from the Examiner's final rejection of claims 1, 10, 11, and 13–29, which constitute all the pending claims in this application.² We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

¹ Appellant identifies PointRight, Inc. as the real party in interest (App. Br. 2).

² We note that current dependent claim 10 is dependent on canceled claim 9; should there be further prosecution, the Examiner may wish to review the claim dependencies for compliance.

THE INVENTION

Appellant's claimed invention is directed to "providing personalized prognostic profiles" including a "personalized prognostic graph showing the historical outcomes of a matched population that is a subset of a reference population over a display interval" (Abstract).

Independent claim 1, reproduced below, is representative of the subject matter on appeal:

1. A system for providing personalized prognostic profiles, comprising:

at least one memory operable to store a reference database associated with a plurality of individuals, the reference database comprising a combination of time-independent and time-dependent data items associated with each of the plurality of individuals;

a processor communicatively coupled to the at least one memory, the processor being operable to:

receive, over a network, from a client computing device, time-independent and time-dependent data items associated with an index patient,

wherein each time-dependent data item (1) associated with the index patient, and (2) in the reference database is linked to a corresponding time point or time interval;

receive, over the network, from a client computing device, a first request to generate a personalized prognostic profile corresponding to the index patient, the first request comprising:

- (1) a binary clinical outcome of interest;

(2) a display interval indicating the time interval that will be covered by the personalized prognostic profile;

(3) either (a) two or more time intervals or time points of interest that differ from each other and are each no greater than or are within the display interval, or (b) one or more time intervals or time points of interest and a treatment of interest, and

(4) forced match variables, wherein the forced match variables comprise one or more clinical or demographic items used to define a proper subset of the plurality of individuals, by requiring that every person in the subset match the index patient based on the forced match variables,

wherein, if there are two or more time intervals of interest, each of the plurality of time intervals of interest is associated with a corresponding priority level with respect to the other time intervals; and

generate a personalized prognostic profile corresponding to the index patient, the personalized prognostic profile comprising: a personalized prognostic graph showing the historical outcomes of a matched population that is a subset of the plurality of individuals over the display interval, a necessarily included widget containing identifying information about the index patient, indicating the forced match variables, the time interval(s) of interest, and the treatment of interest if applicable, contextual data associated with one or more of the index patient and the personalized prognostic graph, and one or more supplemental widgets providing further information concerning the index patient's clinical status, care received, care plans, care preferences, or issues related to illness-related clinical or personal concerns of the index patient, wherein:

(1) the matched population is a subset of the plurality of individuals in which every person matches the index patient on the forced match variables and on a further property that an estimated probability of occurrence of the outcome of interest

during one or more user-specified time intervals following a starting point is within a preset interval of the estimated probability of occurrence of the outcome of interest for the index patient during that interval,

wherein predictions are made using predictive models developed on a subset of the matched population that matches the index patient on the forced match variables, and

wherein the starting point is a point in which there are valid values in the reference database for all of the forced match variables and known or imputable values of all variables used in the predictive models; and

wherein the matched population is selected employing an iterative process in which the predictive model at each step is generated, validated, and applied to subsets of the subset of the plurality of individuals created at the previous step, culminating in the selection of the matched population in which each member matches the index patient on the forced match variables and each member's estimated probability in each of two or more predictive models falls within a specified interval of the estimated probability for the index patient;

(2) the personalized prognostic graph shows actual outcomes over the display interval after a starting point for all members of the matched population; and

(3) the necessarily included widget comprises sufficient information for users to know facets of the prognostic profile that were personalized; and

(4) the one or more supplemental widgets comprise checklists of issues for consideration.

Corrected App. Br. 3–5 (Corrected Claims Appendix).

REFERENCES

The prior art relied upon by the Examiner in rejecting the claims on appeal is the following:

Langheier	US 2006/0173663 A1	Aug. 3, 2006
Heywood	US 2009/0125333 A1	May 14, 2009

REJECTIONS

The Examiner made the following rejections³:

Claims 1, 10, 11, and 13–29 stand 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. Final Act. 3.

Claims 1, 10, 11, and 13–29 stand rejected under 35 U.S.C. § 103 as being unpatentable over Heywood and Langheier. Final Act. 8.

ISSUES

The issues are whether the Examiner erred in finding:

1. the claimed invention to be directed to a judicial exception without significantly more; and

³ The rejection of claims 2–9 and 12 under 35 U.S.C. § 112(a) is now moot, as claims 2–9 and 12 were canceled in an After-Final Amendment entered on April 18, 2017. *See* Final Act. 6; Adv. Act. 1. Similarly, the rejection of claims 1–15 and 17–29 under 35 U.S.C. § 112(b) is now moot, as amendments to correct the identified errors were made to claim 1 and claim 17 in an After-Final Amendment entered on April 18, 2017. *See* Final Act. 7; Adv. Act. 1.

2. the combination of Heywood and Langheier teaches or suggests the limitation of

wherein the matched population is selected employing an iterative process in which the predictive model at each step is generated, validated, and applied to subsets of the subset of the plurality of individuals created at the previous step, culminating in the selection of the matched population in which each member matches the index patient on the forced match variables and each member's estimated probability in each of two or more predictive models falls within a specified interval of the estimated probability for the index patient,

as recited in independent claim 1 (emphasis added), and similarly recited in independent claim 16.

ANALYSIS

Except where indicated, we adopt the Examiner's findings in the Answer and Final Office Action and we add the following primarily for emphasis. We note that if Appellant failed to present arguments on a particular rejection, we will not unilaterally review those uncontested aspects of the rejection. *See Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential); *Hyatt v. Dudas*, 551 F.3d 1307, 1313–14 (Fed. Cir. 2008) (the Board may treat arguments Appellant failed to make for a given ground of rejection as waived).

Patent Eligibility

The Examiner determines the claims are patent ineligible under 35 U.S.C. § 101, because

[t]he abstract idea identified here is receiving patient data of an index patient and a population of patients and generating a personalized prognostic profile for an index patient using predictive models developed from analyzing patient data from the population

(Ans. 4). The Examiner further finds that “generic computer hardware” performs “routine and conventional functions” and “Appellant’s invention is merely using the computer as a tool to carry out the claimed steps” (Ans. 6; *see also Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 573 U.S. 208, 217 (2014) (describing the two-step framework “for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts”)).

After the mailing of the Answer and the filing of the Brief in this case, the USPTO published revised guidance on the application of § 101 (2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019) (hereinafter “Memorandum”)). Under the Memorandum, the Office first looks 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, does the Office then look to whether the claim:

- (3) adds a specific limitation beyond the judicial exception that are not “well-understood, routine, conventional” in the field (*see* MPEP § 2106.05(d)); or
- (4) simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception.

See Memorandum.

We agree with the Examiner that the claim is directed to an abstract idea, and we find that claim 1 recites both mathematical concepts and organizing human activity. Claim 1 recites use of “predictive models” and “each member’s estimated probability in each of two or more predictive models falls within a specified interval of the estimated probability for the index patient,” which in the context of determining a prognostic profile, indicates these models typically estimate the probability that a patient will still be alive at some point in the future, and are estimated using mathematical tools. *See* Spec. ¶¶ 127–145. Accordingly, claim 1 is directed to an abstract idea involving mathematical concepts.

Claim 1 is further directed to organizing human activity and in particular managing a relationship between a doctor and a patient, as the “personalized prognostic profile” generated for a patient serves as a diagnostic tool often used to decide a future treatment regimen for the patient. “An accurate prognosis is the foundation of a rational discussion of advance care plans, including decisions to forgo certain treatments” (Spec.

¶ 2). Additionally, claim 1 requires the “personalized prognostic profile” to include “one or more supplemental widgets [that] comprise checklists of issues for consideration.” These elements of the claim directly relate to organizing human activity, involving medical personnel and especially the patient.

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 (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72–73, 79 (2012)). “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.*

Appellant contends that relevant data is “presented to the patient in an interactive graphical interface to aid in making clinical decisions such as whether to opt for palliative end-of-life care, or to undergo a specific treatment” (Reply Br. 4) and that “[t]he nested, iterative process described in the present claims enable a user to obtain predictions that are truly meaningful to the patient” (Reply Br. 6).

We agree with Appellant, as the combination of the claimed:

1. “iterative process in which the predictive model at each step is generated, validated, and applied to subsets of the subset of the plurality of individuals created at the previous step,”

2. “estimated probability of occurrence of the outcome of interest,” and
3. “personalized prognostic graph show[ing] actual outcomes over the display interval after a starting point for all members of the matched population,”

is integrated together into a practical application to provide useful and potentially life-saving information allowing a physician “to communicate a credible prognosis to patients, families and other stakeholders” (Spec. ¶ 2). See Memorandum, Step 2A, Prong Two.

There are no additional elements that need to be considered under Step 2B.

Accordingly, we reverse the Examiner’s rejection of claims 1, 10, 11, and 13–29 under 35 U.S.C. § 101.

Obviousness

Appellant argues that “[n]either Heywood nor Langheier, alone or in combination, describes a personalized prognostic survival graph that derives its input, *inter alia*, from an iterative ‘nested’ approach of selecting a matched population” (App. Br. 24). Particularly, Appellant contends that “Heywood does not mention iterative or nested approaches, but focuses, e.g., on **(forced) matching of an index patient to a single population**, e.g., by employing fuzzy logic” (App. Br. 24), and that

Langheier mentions an iterative concept, but this concept is directed to **improving a model for a given outcome** within a specified search space, not on modeling additional outcomes within a search space defined by a combination of forced matches and results of previous models of different binary outcomes

(App. Br. 25). Appellant further contends that “a person of ordinary skill would not look to Langheier to modify the methods in Heywood and would not be motivated to combine the references” (App. Br. 25), because

Langheier is about building a robust, accurate, and highly *generalizable* model, rather than a *valid, personally-relatable* model of an outcome especially meaningful for the patient and/or to a specific user, that is tailored to an individual and essentially *single use*

(Reply Br. 8).

The Examiner finds, and we agree, that Langheier “discusses the iterative population matching steps found in the instant claims” (Ans. 11 (quoting Langheier ¶ 112 and Fig 6); *see* Ans. 9–10). The Examiner additionally finds, and we agree, that “[b]oth Langheier and Heywood are directed towards using data to determine an outcome for a patient, with Langheier being used to teach the specifics on the predictive modeling” (Ans. 11).

Appellant argues the references separately and does not consider application of Heywood’s dataset (which, as Applicant admits, is “matching of an index patient to a single population defined by diagnoses and demographics” (Reply Br. 8 (emphasis omitted))) as the input for application of Langheier’s “hierarchy of predictive models” (Langheier ¶ 112). Further, while Appellant refers to Heywood’s dataset as a “single population,” Appellant provides no factual evidence or reasoning to distinguish Heywood’s “community of patients” having “matching profiles” (*see* Heywood ¶ 51 (describing matching profiles of Multiple Sclerosis patients matching a particular profile)) from the claimed “proper subset of the plurality of individuals.”

We agree with the Examiner that both Langheier and Heywood are directed towards using data to determine an outcome for a patient, and we are not persuaded by Appellant’s argument that one skilled in the art “would not be motivated to combine the references,” as Appellant fails to challenge the Examiner’s finding that Langheier supplies motivation by allowing “for missing values to be considered as an additional category” (Ans. 11; *see also* Final Act. 14 (citing Langheier ¶ 44)). Further, Appellant’s characterizations of the invention as a “personally-relatable model” and “single use” are not commensurate with the scope of the claim.

Accordingly, we sustain the rejection of independent claim 1, and independent claim 16 commensurate in scope, as well as independent claim 17 and dependent claims 10, 11, 13–15, and 18–29 not argued separately.⁴ *See* App. Br. 24–26.

CONCLUSION

The Examiner *erred* in finding:

1. the claimed invention to be directed to a judicial exception without significantly more.

The Examiner *did not err* in finding:

2. the combination of Heywood and Langheier teaches or suggests the limitation of

⁴ We note that independent claim 17 is not commensurate in scope to independent claims 1 and 16 because independent claim 17 contains no limitation corresponding to “wherein the matched population is selected employing an iterative process” as appearing in independent claims 1 and 16.

wherein the matched population is selected employing an iterative process in which the predictive model at each step is generated, validated, and applied to subsets of the subset of the plurality of individuals created at the previous step, culminating in the selection of the matched population in which each member matches the index patient on the forced match variables and each member's estimated probability in each of two or more predictive models falls within a specified interval of the estimated probability for the index patient,

as recited in independent claim 1 (emphasis added), and similarly recited in independent claim 16.

DECISION

The Examiner's decision rejecting claims 1, 10, 11, and 13–29 under 35 U.S.C. § 101 is reversed.

The Examiner's decision rejecting claims 1, 10, 11, and 13–29 under 35 U.S.C. § 103 is affirmed.

The Examiner's decision is affirmed because we have affirmed at least one ground of rejection with respect to each claim on appeal. *See* 37 C.F.R. § 41.50(a)(1).

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