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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte VISHNUVYAS SETHUMADHAVAN, MARY ELLEN
CAMPANA, ROBERT DERWARD ROGERS, and
SHAHRAM SHAWN DASTMALCHI

Appeal 2018-001790
Application 13/769,261¹
Technology Center 3600

Before MARC S. HOFF, BARBARA A. PARVIS, and BETH Z. SHAW,
Administrative Patent Judges.

HOFF, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from a Final Rejection of claims 1, 3, 5, 7–11, 13, and 16–20.² We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

¹ Appellants state that the real party in interest is Apixio, Inc.

² Claims 2, 4, 6, 12, 14, and 15 have been cancelled.

Appellants' invention is a system and method for mining aggregated clinical documentation. A processor identifies clinically relevant terms in patient documents, computes associations between pairs of clinically relevant terms using co-occurrences, and filters out random associations. In response to user query, a knowledge provider retrieves patient concepts, ranks a candidate list of results, and provides the ranked candidate list to the user. *See Abstract.*

Claim 1 is reproduced below:

1. In a Medical Information Navigation Engine ("MINE"), a computerized method for computing concept associations by mining patient documentation in the aggregate, the method comprising:

assembling a plurality of patient documents for a single patient;

identifying pairs and triples of clinical concepts in the plurality of patient documents by codes for the clinical concept in a standardized coding system, using the computerized MINE;

computing associations between the pairs and triples of clinical concepts using co-occurrences within at least one of the plurality of patient documents by computing degrees of correlation between any two of the pairs and triples of clinical concepts, using the computerized MINE;

filtering out random associations from the computed associations by taking a ratio of a probability of associations as observed with probability of association due to randomness, using the computerized MINE;

repeating the above steps for each of a plurality of patients;

storing the filtered computed associations for all of the plurality of patients in an association matrix where protected health information for any given patient is not exposed;

receiving a plurality of query concepts from a user query directed to a specific patient, wherein the specific patient is not part of the plurality of patients;

extracting a plurality of clinical concepts from patient documents belonging to the specific patient;
generating a candidate list by cross referencing the plurality of clinical concepts belonging to the specific patient to the plurality of query concepts using the association matrix;
ranking the candidate list; and
providing the ranked candidate list to the user.

The Examiner relies upon the following prior art in rejecting the claims on appeal:

Ruiz Laza	US 2009/0125246 A1	May 14, 2009
Eshwar	US 2012/0089606 A1	Apr. 12, 2012
Phillips	US 2012/0110016 A1	May 3, 2012

Claims 1, 3, 5, 7–11, 13, and 16–20 stand rejected under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter.

Claims 1, 3, 5, 7–11, 13, and 16–20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Phillips, Ruiz Laza, and Eshwar.

Throughout this decision, we make reference to the Appeal Brief (“App. Br.,” filed Aug. 30, 2017) and the Examiner’s Answer (“Ans.,” mailed Oct. 4, 2017) for their respective details.

ISSUES

1. Is the claimed invention directed to a judicial exception?
2. Is the judicial exception integrated into a practical application?
3. Does the combination of Phillips, Ruiz Lara, and Eshwar disclose or suggest identifying pairs and triples of clinical concepts by codes, and computing associations, using co-occurrences, by computing degrees of correlation between any two of the pairs and triples?

4. Does the combination of Phillips, Ruiz Lara, and Eshwar disclose or suggest retrieving a plurality of clinical concepts from patient documents, generating a candidate list by cross-referencing the plurality of clinical concepts belonging to the specific patient to the plurality of query concepts using the association matrix, and providing a ranked candidate list to a user?

PRINCIPLES OF LAW

An invention is patent-eligible if it claims a “new and useful process, machine, manufacture, or composition of matter.” 35 U.S.C. § 101. However, the Supreme Court has long interpreted 35 U.S.C. § 101 to include implicit exceptions: “[l]aws of nature, natural phenomena, and abstract ideas” are not patentable. *See, e.g., Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014).

In determining whether a claim falls within an excluded category, we are guided by the Supreme Court’s two-step framework, described in *Mayo* and *Alice*. *Id.* at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–77 (2012)). In accordance with that framework, we first determine what concept the claim is “directed to.” *See Alice*, 573 U.S. at 219 (“On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.*, the use of a third party to mitigate settlement risk.”); *see also Bilski v. Kappos*, 561 U.S. 593, 611 (2010) (“Claims 1 and 4 in petitioners’ application explain the basic concept of hedging, or protecting against risk.”).

Concepts determined to be abstract ideas, and thus patent ineligible, include certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 561 U.S. at 611);

mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 69 (1972)). Concepts determined to be patent eligible include physical and chemical processes, such as “molding rubber products” (*Diamond v. Diehr*, 450 U.S. 175, 192 (1981)); “tanning, dyeing, making waterproof cloth, vulcanizing India rubber, smelting ores” (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S. 252, 267–68 (1853))); and manufacturing flour (*Benson*, 409 U.S. at 69 (citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

In *Diehr*, the claim at issue recited a mathematical formula, but the Supreme Court held that “[a] claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula.” *Diehr*, 450 U.S. at 176; *see also id.* at 191 (“We view respondents’ claims as nothing more than a process for molding rubber products and not as an attempt to patent a mathematical formula.”). Having said that, the Supreme Court also indicated that a claim “seeking patent protection for that formula in the abstract . . . is not accorded the protection of our patent laws, . . . and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment.” *Id.* (citing *Benson* and *Flook*); *see, e.g., id.* at 187 (“It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.”).

If the claim is “directed to” an abstract idea, we turn to the second step of the *Alice* and *Mayo* framework, where “we must examine the elements of the claim to determine whether it contains an ‘inventive concept’ sufficient to ‘transform’ the claimed abstract idea into a patent-

eligible application.” *Alice*, 573 U.S. at 221 (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.*

The PTO recently published revised guidance on the application of § 101. USPTO’s January 7, 2019 Memorandum, *2019 Revised Patent Subject Matter Eligibility Guidance* (“Memorandum”). Under that 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 § 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 Memorandum.

ANALYSIS

SECTION 101 REJECTION

Appellants present a unitary argument directed to all claims together. Accordingly, we select claim 1 for discussion as representative of the rejected claims.

Independent claim 1 is directed to a computerized method for computing concept associations by mining patient documentation. The method identifies pairs and triples of clinical concepts by codes for the clinical concept; computes associations between the pairs and triples by computing degrees of correlation between any two of the pairs and triples; filters out random associations; and stores the filtered computed associations in an association matrix. Next, a user query is received; a plurality of clinical concepts are extracted; and a candidate list is generated and ranked, and provided to the user.

ABSTRACT IDEA

We conclude that the claimed invention is directed to the abstract idea of a mental process. If a claim, under its broadest reasonable interpretation, covers performance in the mind but for the recitation of generic computer components, then it is still in the mental processes category unless the claim cannot practically be performed in the mind.³ But for the high-level

³ See *Intellectual Ventures I LLC v. Symantec Corp.*, 838 F.3d 1307, 1318 (Fed. Cir. 2016) (“[W]ith the exception of generic computer-implemented steps, there is nothing in the claims themselves that foreclose them from being performed by a human, mentally or with pen and paper.”); *Mortg. Grader, Inc. v. First Choice Loan Servs. Inc.*, 811 F.3d 1314, 1324 (Fed. Cir. 2016) (holding that computer-implemented method for “anonymous

recitation of “[i]n a Medical Information Navigation Engine (‘MINE’),” the claim steps recite identifying pairs and triples of matching concepts; computing degrees of correlation therebetween, followed by storage of associations in an association matrix; then extracting and presenting a ranked list of matching records in response to a user query. Appellants disclose that the MINE comprises an interface 113, a back-end medical processor 116, and a front-end medical processor 115. Spec. ¶ 34. We determine that but for the generic computer components recited (the “MINE”), the claimed price-point determination, order selection, exclusion, and share allocation is capable of performance in the human mind.

INTEGRATED INTO A PRACTICAL APPLICATION

Having determined that the claimed invention is directed to a judicial exception, to wit, the abstract idea of a mental process, we nonetheless conclude that the identified abstract idea is integrated into a practical application. We determine that the claimed computation of association between clinical concepts facilitates the later-claimed features of querying patient data, generating and providing a ranked candidate list of similar other patients based upon the matrix of associated concepts. We determine that the

loan shopping” was an abstract idea because it could be “performed by humans without a computer”); *Versata Dev. Grp. v. SAP Am., Inc.*, 793 F.3d 1306, 1335 (Fed. Cir. 2015) (“Courts have examined claims that required the use of a computer and still found that the underlying, patent-ineligible invention could be performed via pen and paper or in a person’s mind.”); *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1375, 1372 (Fed. Cir. 2011) (holding that the incidental use of “computer” or “computer readable medium” does not make a claim otherwise directed to process that “can be performed in the human mind, or by a human using a pen and paper” patent eligible).

claimed invention constitutes an improvement to the functioning of a computer. *See* MPEP § 2106.05(a).

Appellants' Specification discloses that processor 116 performs tasks upon the medical information received by interface 113, including indexing, semantic meta-tagging, and reconciliation. Spec. ¶ 42. For each patient, pairs and triples of clinical concepts are identified by their code in a standardized coding system such as SNOMED, ICD-9, ICD-10, LOINC, and HCPCS. Spec. ¶ 93. Based on the co-occurrence of clinical concepts, their degree of correlation is then computed. Pairwise associations are then filtered to remove spurious associations. Spec. ¶ 94. These associations are then stored in an association matrix that can be accessed to obtain the degree of association between any two concepts. Spec. ¶ 95. Once this processing is completed, a user may query a patient chart and receive a candidate list of related items that are related to said query, and that might be of interest to the user. Spec. ¶ 97.

We do not agree with the Examiner's analogy of the claimed invention to *Digitech Image Technologies v. Electronics for Imaging Inc.*, 758 F.3d 1344 (Fed. Cir. 2014). Ans. 2–3. The invention claimed in *Digitech* was limited to a device profile comprising first data and second data for describing a device. *Id.* at 1347. We also do not agree that the claims are analogous to the invention in *Electric Power Group, LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016). Ans. 3. While *Electric Power Group* concerned gathering, analyzing, and displaying data, the invention under appeal is further concerned with using the results of data analysis to respond

to a user query by providing appropriate matching records ranked according to relevance.

Because we conclude that the claimed abstract idea is integrated into a practical application, we conclude that the claimed invention is directed to patent-eligible subject matter. Accordingly, we do not sustain the Examiner's 35 U.S.C. § 101 rejection of claims 1, 3, 5, 7–11, 13, and 16–20.

SECTION 103 REJECTION

Appellants present arguments with respect to independent claim 1 only, noting that all other claims are asserted to be allowable for “the same reasons.” App. Br. 18. We therefore review the rejection of claim 1 as being representative of all of the appealed claims.

Independent claim 1 recites, *inter alia*, a computerized method for computing content associations by mining patent documentation, comprising identifying pairs and triples of clinical concepts in the plurality of patient documents by codes for the clinical concept, and computing associations between the pairs and triples of clinical concepts by computing degrees of correlation between any two of the pairs and triples of clinical concepts. After computation and storage of this information, the method recites responding to a user query with a ranked list of candidates.

Appellants first argue that Phillips discloses generating a final probability matrix “in a very different way . . . for a very different purpose” than the claimed invention. App. Br. 16. We are not persuaded of Examiner error by this initial argument, because Appellants do not explain how Phillips fails to disclose or suggest any particular claim limitation.

Next, Appellants contend that Phillips fails to disclose that the pairs or triples are correlated based upon their co-occurrences within a patient's

records. App. Br. 16. First, we agree with the Examiner that Appellants are not arguing the precise claim language. Ans. 5. Claim 1 recites “computing associations between the pairs and triples of clinical concepts using co-occurrences within at least one of the plurality of patient documents, by computing degrees of correlation between any two of the pairs and triples of clinical concepts, using the computerized MINE.” Second, we further agree with the Examiner that Appellants’ Specification does not disclose how this computation of degree of correlation occurs. Ans. 5, Phillips ¶ 39. In fact, Appellants disclose only that “[t]he triples and pairs are collected from all the patient charts to compute their co-occurrence within a patient chart” and “[b]ased on the co-occurrence, the degree of correlation between any two concepts is computed.” Spec. ¶¶ 93, 94.

The Examiner finds, and we agree, that Phillips suggests the claimed identification of pairs and triples of clinical concepts in the plurality of patient documents by codes for the clinical concept in a standardized coding system. Final Act. 8. Phillips discloses identifying matching concepts appearing in patient documents that may use different concept identifiers in different terminology code systems. Phillips ¶¶ 80–101. We further agree with the Examiner’s finding that Phillips discloses computing associations between pairs and triples by computing degrees of correlation. Final Act. 8–9. Phillips teaches that “[p]robabilistic matching can be used to match related terminology concepts in ontology-based systems.” Phillips ¶ 39. Phillips teaches a matching algorithm able to match clinical concepts using dissimilar terms. Phillips ¶ 55. Phillips also teaches processing a plurality of coded concepts to determine a potential match between a code from a first code scheme and a code from a second code scheme, as well as assigning a

probability to each potential match and accepting user input to select a match between the first code scheme and the second code scheme. Phillips ¶ 4. Thus, we agree with the Examiner that Phillips discloses or renders obvious the claimed identification of pairs and triples of clinical concepts, and the computation of association therebetween.

Appellants' next argument, that Phillips does not disclose ranking the candidate list, also does not persuade us that the Examiner erred. App. Br. 16. While Phillips does not disclose ranking candidates *in haec verba*, Phillips does teach a code score indicating a probability that a code in a first scheme is the same as another code in a second scheme. Phillips ¶ 27. Phillips thus does teach a quantity indicating utility, which may be used for comparison with other quantities. Further, as found by the Examiner, Appellants' Specification discloses that "[t]he ranking of the results can be based on at least one of recency, risk, strength of association, source of data, and user context." ¶ 12. We agree with the Examiner's finding that "the scoring [in Phillips] is a user context as disclosed." Ans. 6.

Appellants argue with respect to Eshwar that the reference "has nothing to do with medical records, medical analysis, or the like," that "[m]atching identity records has nothing to do with extracting clinical concepts from patient documents," and that Eshwar's candidate list of identity records has nothing to do with the claimed candidate list that is compiled by "cross referencing the plurality of clinical concepts belonging to the specific patient to the plurality of query concepts using the association matrix." App. Br. 17. Appellants' arguments are not persuasive, because Phillips, rather than Eshwar, is relied upon to teach the claim limitations having to do with computing concept associations by mining patient

documentation, and with identifying matching clinical concepts; and because the particular content of the data being queried and retrieved in the Examiner's proposed combination makes no functional difference. *See* Ans. 6–7.

As Appellants do not demonstrate that the Examiner erred, we sustain the Examiner's § 103(a) rejection of claims 1, 3, 5, 7–11, 13, and 16–20 over Phillips, Ruiz Laza, and Eshwar.

CONCLUSIONS

1. The claimed invention is directed to a judicial exception – the abstract idea of a mental process.
2. The judicial exception is integrated into a practical application.
3. The combination of Phillips, Ruiz Laza, and Eshwar suggests identifying pairs and triples of clinical concepts by codes, and computing associations, using co-occurrences, by computing degrees of correlation between any two of the pairs and triples.
4. The combination of Phillips, Ruiz Laza, and Eshwar suggests retrieving a plurality of clinical concepts from patient documents, generating a candidate list by cross-referencing the plurality of clinical concepts belonging to the specific patient to the plurality of query concepts using the association matrix, and providing a ranked candidate list to a user.

DECISION

The Examiner's decision to reject claims 1, 3, 5, 7–11, 13, and 16–20 under 35 U.S.C. § 101 is reversed. The Examiner's decision to reject claims 1, 3, 5, 7–11, 13, and 16–20 under 35 U.S.C. § 103(a) is affirmed.

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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