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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RAMIN HOMAYOUNI, MICHAEL WAITSEL BERRY,
KEVIN ERICH HEINRICH, and LAI WEI¹

Appeal 2016-003142
Application 11/215,635
Technology Center 1600

Before ERIC B. GRIMES, FRANCISCO C. PRATS, and DAVID COTTA,
Administrative Patent Judges.

GRIMES, *Administrative Patent Judge.*

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a method and computer program product for determining gene relationships, which have been rejected as being directed to patent-ineligible subject matter. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

The Specification states that “vector space modeling has been explored for gene clustering using functional information in annotated

¹ Appellants identify the Real Party in Interest as the University of Tennessee Research Foundation. Appeal Br. 2.

indices or MEDLINE abstracts.” Spec. ¶ 9. “[A] variant of the vector space model, referred to as ‘Latent Semantic Indexing’ (LSI), is shown to improve information retrieval by a factor of thirty percent.” *Id.* ¶ 10. “[U]sing LSI, relevant documents can be retrieved based on the degree of similarity in the word usage patterns in the documents.” *Id.*

The Specification discloses “automated methods for identifying gene relationships based upon a modeling of textual information relating to gene systems within gene documents.” *Id.* ¶ 2. “[G]ene documents can include a collection of textual information obtained from public or private databases such as full-text online journal articles, abstract citations in MEDLINE, digital textbooks, and a variety of online gene centered indexes.” *Id.* ¶ 12. “[T]he method, system and apparatus of the invention can utilize Latent Semantic Indexing (LSI) to identify conceptually related genes based on the textual information in the gene documents.” *Id.*

Claims 1–8 and 13–20 are on appeal. Claim 1 is representative and reads as follows:

1. A semantic gene organization method comprising:
 - producing in a text mining tool executing in memory by a processor of a computer, gene documents for a plurality of selected genes by compiling textual information included as part of citations that cite to publications that have previously been cross-referenced in a database for said selected genes;
 - processing by said processor in said memory said gene documents according to a latent semantic indexing (LSI) model to measure by said processor similarities between gene documents based upon similar word usage patterns in the textual information;
 - receiving in said computer a query vector of at least one term; and,

parsing by said processor said gene documents to produce a result set of semantically relevant gene relationships responsive to receiving the query vector of at least one term.

DISCUSSION

The Examiner has rejected claims 1–8 and 13–20 under 35 U.S.C. § 101 on the basis that “[t]he claims are directed to the abstract idea of using LSI to process gene documents.” Final Action² 2. The Examiner finds that “[t]he additional elements or combination of elements in the claims other than the abstract idea per se amount to no more than mere instructions to implement the idea on a computer.” *Id.* at 2–3. The Examiner concludes that the “additional claim elements do not provide meaningful limitations to transform the abstract idea into a patent eligible application of the abstract idea.” *Id.* at 3.

We agree with the Examiner that claim 1 is directed to a patent-ineligible method. The Supreme Court has

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, we determine whether the claims at issue are directed to one of those patent-ineligible concepts. If so, we then ask, “[w]hat else is there in the claims before us?” To answer that question, we 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.

Alice Corp. Pty. Ltd. v. CLS Bank Int’l, 134 S. Ct. 2347, 2355 (2014) (citations omitted).

² Office Action mailed Feb. 26, 2015.

Here, claim 1 is directed to the abstract idea of applying Latent Semantic Indexing (LSI) to published citations from existing databases to identify related genes. So the next question is, what else is there in the claims before us?

LSI has been in the prior art since at least 1989, when U.S. Patent 4,839,853 was issued. Spec. ¶ 10. “The LSI model has been applied in several different applications including essay grading and standardized testing.” *Id.* ¶ 11. “LSI methods also have been applied to problems in the biological and medical sciences.” *Id.* “Recently it has been demonstrated that LSI techniques can be used to visualize themes and relationships from full-text articles in the scientific literature in order to understand the relations among nominal fields of science.” *Id.* A related method, vector space modeling, “has been explored for gene clustering using functional information in annotated indices or MEDLINE abstracts.” *Id.* ¶ 9.

In essence, the method of claim 1 amounts to no more than applying the existing—routine and conventional—technique of LSI to a different kind of data: “textual information included as part of citations that cite to publications that have previously been cross-referenced in a database for . . . selected genes.” Claim 1. “But merely selecting information, by content or source, for collection, analysis, and display does nothing significant to differentiate a process from ordinary mental processes, whose implicit exclusion from § 101 undergirds the information-based category of abstract ideas.” *Electric Power Group, LLC v. Alstom S.A.*, 830 F.3d 1350, 1355 (Fed. Cir. 2016). As in *Electric Power Group*, “[t]he claims in this case do not even require a new source or type of information, or new techniques for

analyzing it.” *Id.* “Merely requiring the selection and manipulation of information . . . by itself does not transform the otherwise-abstract processes of information collection and analysis.” *Id.*

We conclude that claim 1 is directed to the concept of applying LSI to existing data regarding selected genes, and the steps recited in the claim represent the routine and conventional steps of applying LSI to a specific type of data. Therefore, the steps of the claimed method, even considered as an ordered combination, do not transform the nature of the claim into a patent-eligible application of the abstract idea to which claim 1 is directed. *See Alice Corp.*, 134 S. Ct. at 2355.

Appellants argue that the “invention presents the innovative concept of semantic gene organization based upon the computerized identification of conceptually related genes based upon computer parsed textual content of gene documents.” Appeal Br. 10. Appellants argue that ¶¶ 21–27 and Figure 2 of the Specification show that

the innovative concept of Applicants’ claims [is] achieved by the complex interoperation of several computer processing systems—a parser (element 210 of Figure 2), pre-process (element 220 of Figure 2), a matrix generator (element 235 of Figure 2), a document-to-document similarity processor (element 265 of Figure 2) and a self-similarity matrix generator (element 290 of Figure 2).

Id. at 13. Appellants conclude that, “[t]herefore, in contrast to the claims of [*Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343 (Fed. Cir. 2015)], because the innovative concept of Appellants’ claims 1 through 20 are claimed and described as a whole to include how the innovative concept is achieved, Appellants’ claims 1 through 20 are statutory under the law.”

Id.

This argument is not persuasive. The *Internet Patents* court noted that [t]he two-step analytic protocol introduced in *Mayo* directs attention to whether the claim contains an “inventive concept.” Determination of what is an inventive concept favors inquiries analogous to those undertaken for determination of patentable invention, for a known idea, or one that is routine and conventional, is not inventive in patent terms.

Internet Patents, 790 F.3d at 1346.

The court held that “the character of the claimed invention is an abstract idea: the idea of retaining information in the navigation of online forms.” *Id.* at 1348. The court noted that the specification of the patent under consideration acknowledged that the Back and Forward navigation functionalities recited in the claimed method were well-known and conventional. *Id.* Similarly here, Appellants’ Specification acknowledges that the LSI model is known in the art and has previously been applied to analyze a variety of data types, including visualizing relationships based on articles in the scientific literature. Spec. ¶¶ 9–11.

The *Internet Patents* court noted that the patent’s “claim 1 contains no restriction on how the [desired] result is accomplished.” 790 F.3d at 1348. Similarly here, claim 1 contains no restriction on how the text of citations is compiled in order to produce gene documents, or how those gene documents are processed using LSI to measure similarities between them, or how a query vector is generated, or how gene documents are parsed to produce a result set of gene relationships.

Although Appellants point to the Specification’s Figures 1 and 2, those figures are merely “a block diagram of a semantic gene organization system” and “a schematic illustration of a semantic gene organization tool,”

respectively. Spec. ¶¶ 17–18. They do not provide any description of how the functions listed in the diagrams are carried out.

Appellants also point to the description of the disclosed method in the Specification's ¶¶ 21–27, which provide algorithms for carrying out at least some of the functions recited in Figure 2. However, none of the details recited in ¶¶ 21–27 are included in claim 1, which therefore encompasses any method of applying the LSI model to determine gene relationships based on published information about genes in existing databases. In addition, Appellants have not pointed to evidence that the Specification's description of the disclosed method represents anything more than the routine and conventional application of LSI to a particular type of information; in this case, information in existing databases that relates to selected genes.

In summary, claim 1 is directed to an abstract idea and the additional features of the claim do not transform the claimed method into a patent-eligible application of the abstract idea. We therefore affirm the rejection of claim 1 under 35 U.S.C. § 101. Claims 2–8 and 13–20 have not been argued separately and therefore fall with claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

SUMMARY

We affirm the rejection of claims 1–8 and 13–20 under 35 U.S.C. § 101.

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TIME PERIOD FOR RESPONSE

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