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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HENRY MARKRAM, RODRIGO de CAMPOS PERIN, and THOMAS K. BERGER

Appeal 2018-008166
Application 14/838,013[1]
Technology Center 2100

Before JASON V. MORGAN, MICHAEL M. BARRY, and DAVID J. CUTITTA II, *Administrative Patent Judges*.

CUTITTA, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the rejection of claims 1–19, all of the claims pending in this application. This appeal is related to an appeal (2018-008410) for co-pending application 13/566,128. *See* App. Br. 1. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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[1] Appellants identify Ecole Polytechnique Fédérale De Lausanne as the real party in interest. App. Br. 1.

THE INVENTION

According to Appellants, the disclosed and claimed invention is directed to configuring a neural network "to achieve improved information processing and/or information storage." Spec. 2:6–7.[2]

Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A neural network device implemented in hardware or in a combination of hardware and software, the neural network device comprising:
>
> a collection of node assemblies interconnected by a plurality of between-assembly links, each node assembly itself comprising a network of nodes interconnected by a plurality of within-assembly links, wherein each of the between-assembly links and the within-assembly links have an associated weight, each weight embodying a strength of connection between the nodes joined by the associated link, the nodes within each assembly being more likely to be connected to other nodes within that assembly than to be connected to nodes within others of the node assemblies, wherein an average weight of the within-assembly links within each respective node assembly increases as the number of within-assembly links within the respective node assembly increases at least for numbers of within-assembly links that are less than or equal to the number of nodes within the respective node assembly.

[2] This Decision refers to: (1) Appellants' Specification filed August 27, 2015 ("Spec."); (2) the Non-Final Office Action mailed June 27, 2017 ("Non-Final Act."); (3) the Appeal Brief filed December 26, 2017 ("App. Br."); (4) the Examiner's Answer mailed June 15, 2018 ("Ans."); and (5) the Reply Brief filed August 13, 2018 ("Reply Br.").

REJECTION

Claims 1–19 are rejected under 35 U.S.C. § 101 because the Examiner concludes 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. *See* Non-Final Act. 4–6.

DISCUSSION

We have reviewed the Examiner's rejection in light of Appellants' arguments that the Examiner erred. In reaching this decision, we have considered all evidence presented and all arguments articulated by Appellants. We are persuaded by Appellants' arguments regarding the pending claims.

Standard for Patent Eligibility

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*. *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, 191 (1981)); "tanning, dyeing, making water-proof 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 (alteration in original)). "[M]erely requir[ing] generic computer implementation[] fail[s] to transform that abstract idea into a patent-eligible invention." *Id.*

USPTO January 7, 2019, Revised Section 101 Memorandum

The USPTO recently published revised guidance on the application of § 101. *See* 2019 *Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. at 50 (Jan. 7, 2019) ("Memorandum"). Under the Memorandum 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)).

See 84 Fed. Reg. at 52–55.

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, and conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception.

See 84 Fed. Reg. at 56.

Furthermore, the Memorandum "extracts and synthesizes key concepts identified by the courts as abstract ideas to explain that the abstract idea exception includes the following groupings of subject matter, when recited as such in a claim limitation(s) (that is, when recited on their own or per se)":

> (a) Mathematical concepts—mathematical relationships, mathematical formulas or equations, mathematical calculations;
>
> (b) Certain methods of organizing human activity—fundamental economic principles or practices (including hedging, insurance, mitigating risk); commercial or legal interactions (including agreements in the form of contracts; legal obligations; advertising, marketing or sales activities or behaviors; business relations); managing personal behavior or relationships or interactions between people (including social activities, teaching, and following rules or instructions); and
>
> (c) Mental processes—concepts performed in the human mind (including an observation, evaluation, judgment, opinion).

Id. at 52 (footnotes omitted).

Analysis

The Examiner concludes "the claims fall within the judicial exception of an abstract idea . . . similar to 'organizing information through mathematical correlations.'" Non-Final Act. 4 (citing *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014)). The Examiner further concludes that the claimed "steps are similar to concepts and ideas that have been identified as abstract by the courts." Non-Final Act. 4.

Appellants argue that the claims are "not directed to an abstract idea of organizing information but rather to a neural network device with a particular technical structure." App. Br. 4; *See* Reply Br. 2–3.

On the current record, we are persuaded that the Examiner has failed to establish the claims recite an ineligible abstract idea. Because a "neural network device implemented in hardware or in a combination of hardware and software" and comprising "a collection of [interconnected] node assemblies" is not a mathematical concept, an identified method of organizing human activity, or a mental process, as set forth in our Guidance, we conclude the claimed "neural network device" does not recite an abstract idea. *See* 84 Fed. Reg. at 52 ("Claims that do not recite matter that falls within these enumerated groupings of abstract ideas should not be treated as reciting abstract ideas, except" in rare circumstances.); *see also* App. Br. 4. Although the Examiner concludes the claims are similar to "organizing information through mathematical correlations" (Non-Final Act. 4), the Examiner has not demonstrated the claims recite a mathematical relationship, formula, or calculation. *See* 84 Fed. Reg. at 52. Accordingly, we do not sustain the Examiner's rejection.

DECISION

For the above reasons, we reverse the Examiner's decisions rejecting claims 1–19.

REVERSED