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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ALEX KUSHKULEY and SU-MING WU

Appeal 2018-001747
Application 13/645,722
Technology Center 3600

Before ELENI MANTIS MERCADER, JAMES W. DEJMEK, and JOYCE CRAIG, *Administrative Patent Judges*.

MANTIS MERCADER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants[1] appeal under 35 U.S.C. § 134 from a rejection of claims 1–20. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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[1] The real party in interest is Oracle International Corporation. App. Br. 2.

CLAIMED SUBJECT MATTER

The claims are directed to a retail product pricing markdown system. Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, cause the processor to determine a pricing markdown schedule for a retail item at a store, the pricing markdown determination comprising:
>
> receive demand parameters of the retail item at the store and one or more constraints, the demand parameters comprising a base demand, an elasticity, an inventory effect and a seasonality;
>
> express an unknown price curve for the retail item as a linear combination of price orthogonal polynomials and price coefficients for the price orthogonal polynomials, and an unknown inventory curve for the retail item as a linear combination of inventory orthogonal polynomials and inventory coefficients for the inventory orthogonal polynomials;
>
> determine a revenue in terms of values of the price coefficients for the price orthogonal polynomials and the inventory coefficients for the inventory orthogonal polynomials;
>
> determine initial guesses of the price coefficients and the inventory coefficients, the initial guesses being based on historical data and determined using integrals;
>
> determine a gradient of the revenue, the gradient of the revenue being determined using $\frac{\partial R}{\partial p_i}$ and $\frac{\partial R}{\partial I_i}$, where R is the revenue, p_i are the price coefficients, and I_i are the inventory coefficients;
>
> maximize the revenue based on the revenue, the initial guesses, the gradient, and the constraints, wherein the constraints are in terms of the price coefficients and the inventory coefficients; and
>
> based on the maximized revenue, generate the price markdown schedule.

REJECTION

Claims 1–20 stand rejected under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter.

OPINION

Appellants argue that the claims are not abstract because had the Examiner conducted the proper analysis, the Examiner would have concluded that the alleged abstract idea of a

> series of steps instructing how to receive demand parameters of the retail item at the store and one or more constraints, express an unknown price curve for the retail item, determine a revenue in terms of values of the price coefficients for the price orthogonal polynomials and the inventory coefficients for the inventory orthogonal polynomials, determine an initial guess of the price coefficients and the inventory coefficients, determine a gradient of the revenue, maximize the revenue based on the revenue, and generate the price markdown schedule

is *not in any way similar* to the concept of reducing distortion in digital image processing of *Digitech*.[2] App. Br. 6–7. Appellants stop short of distinguishing *Digitech* from their case. Appellants also cite *Mayo* for the proposition that a "process is not unpatentable simply because it contains a law of nature or a mathematical algorithm" as "an application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection." *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 69–73 (2012) (internal quotation marks and

[2] *Digitech Image Techs. LLC v. Electronics for Imaging, Inc.*, 758 F.3d 1344 (Fed. Cir. 2014).

emphasis omitted). Again, Appellants stop short of distinguishing *Mayo* from their case.

Appellants further argue that, contrary to the Examiner's finding, there is no evidence that such complex mathematical relationships recited in the pending claims can be performed manually. App. Br. 7–8.

Appellants also argue improvement of computer related technology because, by expressing price curves and inventory curves in terms of an orthogonal polynomial, "the huge space of all possible price curves and all possible inventory curves is reduced to a small set of coefficients," which results in efficiencies. App. Br. 9–10 citing Spec. para. 23.

Finally, Appellants argue that the claims do not preempt an abstract idea. App. Br. 10.

We are not persuaded by Appellants' argument. 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*, 566 U.S. at 75–77). 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, 67 (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 recites 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 (internal citation 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. *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (Jan. 7, 2019) ("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* Manual of Patent Examining Procedure (MPEP) § 2106.05(a)–(c), (e)–(h) (9th Ed., Rev. 08–2017 (Jan. 2018)).

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.

We agree with the Examiner that the claim is directed to an abstract idea, and we conclude that claim 1 recites both mathematical concepts and organizing human activity. Claim 1 recites, in pertinent part, mathematical manipulations:

> express an unknown price curve for the retail item as a linear combination of price orthogonal polynomials and price coefficients for the price orthogonal polynomials, and an unknown inventory curve for the retail item as a linear combination of inventory orthogonal polynomials and inventory coefficients for the inventory orthogonal polynomials;
>
> determine a revenue in terms of values of the price coefficients for the price orthogonal polynomials and the inventory coefficients for the inventory orthogonal polynomials;
>
> determine initial guesses of the price coefficients and the inventory coefficients, the initial guesses being based on historical data and determined using integrals;
>
> determine a gradient of the revenue , the gradient of the revenue being determined using $\frac{\partial R}{\partial p_i}$ and $\frac{\partial R}{\partial I_i}$, where R is the revenue, p_i are the price coefficients, and I_i are the inventory coefficients;
>
> maximize the revenue based on the revenue, the initial guesses, the gradient, and the constraints, wherein the

> constraints are in terms of the price coefficients and the inventory coefficients; and
>
> based on the maximized revenue, generate the price markdown schedule.

Accordingly, we conclude that claim 1 reciting the above limitations encompasses generating a price markdown schedule based on price and inventory parameters—i.e., a mathematical relationship. Claim 1 further recites a commercial interaction or sales activity wherein the end result is to "maximize revenue" and "generate the price markdown schedule."

If the claim recites 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*, 566 U.S. at 72–73, 79). "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.*

We agree with the Examiner's determination (*see* Ans. 9) that the claimed combination merely describes how to generally "apply" the concept of maximizing revenue by generating a price markdown schedule using mathematical concepts. The claimed computer components of a computer-readable medium, and a processor are all generic computer elements recited at a high level of generality and are merely invoked as tools to execute mathematical concepts and generate a price markdown schedule.

Appellants' Specification describes the processor as "*any type* of general or specific purpose processor" (para. 14) and the computer readable medium as "*any* available media" (para. 15). Spec. 6. Simply implementing the abstract idea on a generic computer is not a practical application of the abstract idea. *See* Memorandum, Step 2A, Prong Two.

Furthermore, merely combining several abstract ideas does not render the combination any less abstract. *RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322, 1327 (Fed. Cir. 2017) ("Adding one abstract idea (math) to another abstract idea . . . does not render the claim non-abstract."); *see also FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1093–94 (Fed. Cir. 2016) (determining the pending claims were directed to a combination of abstract ideas). In other words, using mathematical concepts for organizing human activity does make the abstract ideas any less abstract.

We also agree with the Examiner that the claimed mathematical concepts could be performed by pen and paper. Ans. 9. Appellants' argument to the contrary is not substantiated by evidence. *In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) ("Attorney's argument in a brief cannot take the place of evidence").

Finally, we note that preemption is the concern that drives the exclusionary principle of judicial exceptions to patent-eligible subject matter. *Alice*, 134 S. Ct. at 2354. However, preemption is not a separate test of patent-eligibility, but is inherently addressed within the *Alice* framework. *See Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015) ("While preemption may signal patent ineligible subject matter, the absence of complete preemption does not demonstrate patent eligibility."). Accordingly, Appellants' argument that claim 1 does not

preempt an abstract idea (App. Br. 10), is not, by itself, persuasive of patent-eligibility.

Appellants' argument regarding improvement of computer related technology because "the huge space of all possible price curves and all possible inventory curves is reduced to a small set of coefficients," resulting in efficiencies (App. Br. 9–10 citing Spec. para. 23), is not persuasive. Appellants do not provide any evidence to support their assertion of computer efficiencies. Furthermore, we agree with the Examiner that receiving demand parameters of the retail item at the store and one or more constraints, determining a revenue in terms of values of the price coefficients for the price orthogonal polynomials and the inventory coefficients for the inventory orthogonal polynomials, determining an initial guess of the price coefficients and the inventory coefficients, and determining a gradient of the revenue are an example of receiving and processing data. Ans. 12. The various additional elements of the claims also receive, process, and store data as well as receive and transmit data over a network. *Id.* Additionally, the Examiner determined that the application of orthogonal polynomials and Chebyshev polynomials does not amount to significantly more and would not result in an improvement to the computer itself or to another technology or technical field, and does not go beyond well-understood, routine, and conventional in the art activities. *See* Final Act. 15. We note that the patents of record including Walser (para. 103), Desai (Figures 2B and 2C), and Myr (paras. 99, 100), use coefficients in the analysis of optimized price markdown schedules. Accordingly, this further supports the Examiner's finding that the application of coefficients is

nothing more than what is well-understood, routine, and conventional activity in the field. *See* Memorandum, Step 2B, Prong 2.

Accordingly, we affirm the Examiner's rejection of claims 1–20 under 35 U.S.C. § 101.

DECISION

We affirm the Examiner's rejection of claims 1–20.

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