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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* GARY W. ATKINSON and DAYU HUANG

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Appeal 2018-008745  
Application 14/182,747  
Technology Center 2800

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Before BEVERLY A. FRANKLIN, JEFFREY B. ROBERTSON, and  
MICHAEL G. McMANUS, *Administrative Patent Judges*.

ROBERTSON, *Administrative Patent Judge*.

DECISION ON APPEAL<sup>1</sup>

Appellants<sup>2</sup> request our review under 35 U.S.C. § 134(a) of the Examiner's decision to finally reject claims 1–20. We have jurisdiction over this appeal under 35 U.S.C. § 6(b).

We REVERSE.

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<sup>1</sup> This Decision includes citations to the following documents: Specification filed February 18, 2014 (“Spec.”); Final Office Action mailed January 5, 2018 (“Final Act.”); Appeal Brief filed June 20, 2018 (“Appeal Br.”); Examiner's Answer mailed August 9, 2018 (“Ans.”); and Reply Brief filed September 7, 2018 (“Reply Br.”).

<sup>2</sup> Appellants identify Alcatel-Lucent USA, Inc. as the real party in interest. (Appeal Br. 2.)

## I. BACKGROUND

The subject matter on appeal relates to temperature estimation, and in particular to estimating temperatures at a plurality of sites based on temperature information from measurement stations. (Spec. ¶ 1.)

Claim 1 illustrates the subject matter on appeal and is reproduced below:

1. A method of estimating a temperature for at least one of a plurality of sites based on temperature information from at least one of a plurality of temperature measurement stations, the method comprising an estimator device:
  - clustering the plurality of sites into a plurality of clusters;
  - determining a centroid for each cluster;
  - associating each centroid with a measurement station;
  - assigning one of a preselected plurality of estimating techniques respectively to the measurement stations, wherein the assigned estimating technique provides a temperature estimate at the measurement station that is more accurate than others of the preselected plurality of estimating techniques for the measurement station, and wherein lapse rate is a parameter of the assigned estimating technique; andestimating a temperature at the at least one of the plurality of sites using the estimating technique assigned to the measurement station associated with the centroid of the cluster including the at least one of the plurality of sites.

App. Br. 11 (Claims Appendix).

## II. REJECTION ON APPEAL

Claims 1–20 stand rejected under 35 U.S.C. § 101 as directed to a judicial exception without significantly more. (Final Act. 11–17.)

### III. DISCUSSION

We limit our discussion largely to claim 1, which is sufficient for disposition of this appeal.

#### 1. *The Examiner's Position*

The Examiner determined “claims 1–20 are directed to an abstract idea related to (a) Collecting information, analyzing it, and outputting certain results of the collection and analysis . . . *and idea itself* and Mathematical Relationships/formulas.” (Final Act. 12 (emphasis in original).) The Examiner determined independent claims 1, 9, and 17 recited additional elements beyond the abstract ideas including a temperature estimating device (claims 1 and 9), data storage (claim 9), a processor (claim 9), and computer-executable instructions (claim 17). (*Id.* at 15.) The Examiner stated these limitations:

are nothing more than generally linking the use of the abstract idea to a particular technological environment or field of use, [which] amount(s) to no more than: . . . recitation of a generic system of temperature estimation system, recited at a high level of generality and not narrowing the claims to a particular application of the abstract idea.  
(*Id.*)

The Examiner further stated: “In summary, [the] claims are drawn to an abstract idea requiring no more than a generic computer to perform generic computer function that are well-understood, routine and conventional activities previously known to the industry.” (*Id.*)

#### 2. *Appellants' Principal Contentions*

Appellants argue the Examiner “has not properly identified the core concept at issue in the claims” and “oversimplifies each element of the independent claims in an effort to characterize them as ‘mathematical

relationships / formulas,’ ‘analysis and algorithm,’ ‘algorithm,’ etc.” (Appeal Br. 5, 8.) Appellants argue the “core concept of claim 1 is temperature estimation for a site that is part of a cluster based on a measurement station associated with a centroid of the cluster, which is more specific than the broad generalizations presented by the Examiner.” (*Id.* at 6.) Appellants argue that under step 2A, the claim as a whole must be analyzed, and none of the cases cited by the Examiner “indicate that temperature estimation for a site that is part of a cluster based on a measurement station associated with a centroid of the cluster is an abstract idea under step 2A.” (*Id.* at 7.) Appellants argue the claims include new techniques and a new estimator device, which are novel and impart subject matter eligibility to the claims. (*Id.* at 7–8.) Appellants do not concede the claims are directed to an abstract idea, and argue the “assigning” and “estimating” steps recited in the claims provide a technical benefit of providing reasonably accurate temperature information when it is impractical to obtain actual temperature measurements at sites of interest, which are novel and amount to “significantly more”. (*Id.* at 8–9.) Appellants argue “clustering the plurality of sites into a plurality of clusters,” “determining a centroid for each cluster,” and “associating each centroid with a measurement station” amount to more than abstract ideas. (*Id.* at 9.)

### 3. *Opinion*

For the reasons discussed below, we agree with Appellants that the claimed subject matter has not been shown to be patent-ineligible as directed to a judicial exception without reciting significantly more.

An invention is patent-eligible if it claims a “new and useful process, machine, manufacture, or composition of matter.” 35 U.S.C. § 101. The Supreme Court, however, 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 (1854)); 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 187; *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 with regard to the first step of the *Alice/Mayo* test (i.e., Step 2A of the USPTO’s Subject Matter Eligibility Guidance as incorporated into M.P.E.P. § 2106). USPTO’s January 7, 2019, *2019 Revised Patent Subject Matter Eligibility Guidance* (“Revised Guidance”). 84 Fed. Reg. 50 (Jan. 7, 2019). Thus, under Step 1 of the Guidance, as revised, we determine whether the claimed subject matter falls within the one of the four statutory categories: process, machine, manufacture, or composition of matter. Step 2A of the Guidance is two-pronged, under which we 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 54–55.

Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then, under Step 2B, 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* 84 Fed. Reg. at 56.

Initially, there does not appear to be a dispute that claims 1–20 fall within one of the four statutory categories of invention under Step 1 of the Guidance, where claims 1–8 recite a method, and claims 9–20 recite a device. (Final Act. 11; Appeal Br. 4.) Accordingly, we turn next to Step 2A(1) of the Revised Guidance.

Under Step 2A(1) we find that claim 1 recites a judicial exception in the form of mathematical concepts and mental processes. Specifically, claim 1 recites “estimating a temperature for at least one of a plurality of sites based on temperature information from at least one of a plurality of temperature measurement stations” and “estimating a temperature at the at least one of the plurality of sites using the estimating technique assigned to the measurement station associated with centroid of the cluster including the at least one of the plurality of sites.” According to the Specification, estimation may be performed using the following equation reproduced below:

$$\theta^*(r, t) = \sum_{n \in N(r, t)} w_n(r, t) [\theta_n(t) - \beta(r, t) z_n] + \beta(r, t) z(r),$$

where  $\theta^*(r,t)$  is the estimate of the ambient temperature at location of interest  $r$  at time  $t$ ,  $N(r,t)$  is the set of measurement stations in and around region  $R$ ,  $w_n(r,t)$  is the weight assigned to the temperature measured at the  $n$ th station,  $\theta_n(t)$  is the ambient temperature measured at time  $t$  at the  $n$ th station,  $\beta(r,t)$  is the lapse rate of decrease of temperature at location  $r$  at time  $t$ , and  $z$  is elevation. (Spec. 11–12 ¶¶ 50–58, 39.<sup>3</sup>) Claim 1 recites “clustering the plurality of sites into a plurality of clusters.” According to

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<sup>3</sup> The Specification contains two paragraphs labeled 39. Here, we refer to paragraph 39 on page 12, ll. 17–18.)

the Specification, “clustering comprises: determining a set of parameters that affect ambient temperature at the sites” and “clustering the sites together that have related parameters.” (Spec. ¶ 5.) Claim 1 recites “determining a centroid for each cluster,” which according to the Specification corresponds to approximating a positional average of a majority of sites within a cluster or evaluating a parameter or parameters that are most likely to impact the similarity of ambient temperature at the sites of that cluster. (Spec. ¶ 37.)

Claim 1 recites “assigning one of a preselected plurality of estimating techniques respectively to the measurement stations, wherein the assigned estimating technique provides a temperature estimate at the measurement station that is more accurate than others of the preselected plurality of estimating techniques for the measurement station, and wherein lapse rate is a parameter of the assigned estimating technique.” According to the Specification, this step involves applying different estimating techniques and then determining which technique provides the lowest average error for that particular station. (Spec. ¶¶ 43–49.)

Thus, claim 1 recites a judicial exception in the form of mathematical concepts and mental processes.

As a result, we now turn to Step 2A(2) of the Revised Guidance to determine whether the claims integrate the judicial exception into a practical application. *Diehr*, 450 U.S. at 187 (“A claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula.”). We determine that claim 1 recites additional elements or steps—associating each centroid with a measurement station—that integrate the mathematical concepts or mental processes into a practical application directed to an improved temperature estimating method that

overcomes problems in prior art techniques. As explained in the Specification (Spec. ¶ 2), “[m]ost ambient temperature information is regionally based and assumes a general uniformity across a wide ranging area” and “time resolution of such temperatures is often based on periods of a day or half-day interval.” The Specification explains “[m]ore specific temperature information could be obtained by deploying more sensors and gathering temperature information from them more often but there are practical and economic limitations on such an approach.” (Spec. ¶ 3.) The Specification explains that such limitations include situations where “the necessary capital investment often would outweigh the potential benefits that could be obtained with such an approach.” (*Id.*)

Given that the claimed invention including the mental processes provides a solution to the problem in the prior art of providing accurate temperature estimation, we determine that the claimed subject matter integrates the judicial exceptions into a practical application that results in an overall improvement in temperature estimation technology. *Diehr* 450 U.S. at 187 (“[O]ne does not need a ‘computer’ to cure natural or synthetic rubber, but if *the computer use incorporated in the process patent significantly lessens the possibility of ‘overcuring’ or ‘undercuring,’* the process as a whole does not thereby become unpatentable subject matter.”) (emphasis added); *but see Flook*, 437 U.S. at 595–96 (merely reciting a new and presumably better method for calculating an alarm limit as part of a catalytic conversion process with no improvement to the catalytic process itself rendered a claim to such process patent-ineligible).

That is, the claimed subject matter integrates the judicial exceptions into a practical application that results in an overall improvement by

specifically providing a method of estimating temperature that is practically integrated into temperature measurement stations. In particular, the estimation method recites the determined centroids of the plurality of sites clustered into a plurality of clusters are associated with a measurement station, and a temperature is estimated using the particular estimating technique assigned to the measurement station. Because our analysis under Step 2A of the Revised Guidance is dispositive, we need not consider Step 2B of the guidance.

As our analysis for claim 1 is also pertinent to the other independent claims (namely, claims 9 and 17), which contain the same or similar limitations, we do not sustain the rejection as maintained against all claims on appeal.

#### IV. SUMMARY

The Examiner's final decision to reject claims 1–20 is reversed.

REVERSED