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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CHARLES T. BYE, FAN LIU, and
KENNETH STEVEN MORGAN

Appeal 2018-000027
Application 13/464,298
Technology Center 2800

Before DONNA M. PRAISS, MICHELLE N. ANKENBRAND, and
MICHAEL G. MCMANUS, *Administrative Patent Judges*.

PRAISS, *Administrative Patent Judge*.

DECISION ON APPEAL¹

STATEMENT OF THE CASE

Appellants² seek our review under 35 U.S.C. § 134(a) from the Final rejection of claims 11–20. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ In this Opinion, we refer to the Specification filed May 4, 2012 (“Spec.”), the Final Office Action dated Feb. 19, 2016 (“Final Act.”), the Appeal Brief filed July 19, 2017 (“Appeal Br.”), the Examiner’s Answer dated July 31, 2017 (“Ans.”), and the Reply Brief filed Sept. 29, 2017 (“Reply Br.”).

² Honeywell International Inc. is identified in the Appeal Brief as the real party in interest. Appeal Br. 1.

THE INVENTION

The invention relates to an attitude estimator system that includes a navigation system to output navigation data, a Kalman filter to output Kalman filter feedback to the navigation system, and a form observations module executable by a processor. Spec. ¶ 4. According to the Specification, existing inertial navigation systems contain inertial sensors of both high and low performance gyroscopes, as well as high and low performance accelerometers in which the low performance gyroscopes and accelerometer sense axes are co-aligned parallel to the force of gravity in operation. *Id.* ¶ 2. Performance of the navigation algorithms and the Kalman filter are degraded when the low performance accelerometer is tilted and the low performance sense axis is no longer optimally aligned parallel to the force of gravity, degrading the estimate of heading. *Id.* ¶¶ 2, 3.

Claim 11 is illustrative, and is reproduced below from the Claims Appendix to the Appeal Brief (emphasis added):

11. A method to improve performance of a navigation system communicatively coupled to a first high performance accelerometer and a first high performance gyroscope aligned to a first sensor-frame-level axis, a second high performance accelerometer and a second gyroscope aligned to a second sensor-frame-level axis, and a third low performance accelerometer and a third low performance gyroscope aligned to a third sensor frame axis, the method comprising:

computing at least one observation based on input to a form observations module from at least one of the first high performance gyroscope, the first high performance accelerometer, and the second high performance accelerometer;

outputting the at least one observation to a Kalman filter from the form observations module;

inputting observations formed in the form observations module at a module in the Kalman filter to rotate an error into a sensor-frame;

rotating the observation into the sensor-frame;

zeroing selected gains associated with at least one of the third low performance accelerometer and the third low performance gyroscope at a compute Kalman gains module in the Kalman filter; and

outputting error corrections as Kalman filter feedback from the Kalman filter to the navigation system, wherein the navigation system updates a navigation solution based on the Kalman filter feedback.

Appeal Br. 11 (Claims Appendix).

Claim 16 is also independent and similar to claim 1, but recites:

[a] program product for improving performance of a navigation system . . . the program-product comprising a non-transitory processor-readable medium on which program instructions are embodied, wherein the program instructions are operable, when executed by at least one processor included in an attitude estimator system communicatively coupled to the navigation system, to cause the attitude estimator system to

execute the same steps of claim 11.

Id. at 13–14.

THE REJECTION

The Examiner maintains and Appellants appeal the rejection of claims 11–20 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Ans. 2; Appeal Br. 5–10; Final Act. 2.

ANALYSIS

Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 134 S. Ct. 2347 (2014) identifies a two-step framework for determining whether claimed subject matter is judicially-excepted from patent eligibility under § 101.

According to *Alice* step one, “[w]e must first determine whether the claims at issue are directed to a patent-ineligible concept,” such as an abstract idea. *Alice*, 134 S. Ct. at 2355.

In that regard, the Examiner determines that the claims are directed to an abstract idea since they are directed to a series of computational steps. Final Act. 2.

Appellants contend that the Examiner erred in applying the first step to conclude that claim 11 is directed to an abstract idea. Appeal Br. 6–7. According to Appellants,

the characterization of the claims as either “data manipulations and analysis” or “steps for deriving the error corrections” is overly broad and reads a majority of the limitations out of the claim.

Id. at 6. Instead, Appellants contend that the claims are “directed to a specific method for improving the performance of a navigation system” and that “features recited in claim 11 improve the overall accuracy of the navigation solution of the navigation system.” *Id.* at 6–7. Appellants note that the use of a combination of high performance and low performance gyroscopes and accelerometers in prior art navigation systems “does not account for errors contributed by the low performance sensors.” *Id.* at 6. Appellants conclude that “[c]laim 11 does not merely add generic components to a mathematical equation, but instead is directed to a specific

implementation of a solution to a problem in the technological field of navigation.” *Id.* at 7. Appellants rely on these same arguments for claims 12–20. *Id.* at 10.

The “directed to” inquiry applies a stage-one filter to the claims which, when considered in light of the Specification, is based on whether “their character as a whole is directed to excluded subject matter.” *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015); *see also Genetic Techs. Ltd. v. Merial L.L.C.*, 818 F.3d 1369, 1376 (Fed. Cir. 2016); *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016) (“inquiring into ‘the focus of the claimed advance over the prior art.’” (Citation omitted)).

“In determining the eligibility of respondents’ claimed process for patent protection under § 101, their claims must be considered as a whole.” *Diamond v. Diehr*, 450 U.S. 175, 188 (1981). The question is whether the claims as a whole “focus on a specific means or method that improves the relevant technology” or are “directed to a result or effect that itself is the abstract idea and merely invoke generic processes and machinery.” *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314 (Fed. Cir. 2016).

According to *Enfish*, the question is “whether the focus of the claims is on [a] specific asserted improvement in computer capabilities . . . or, instead, on a process that qualifies as an ‘abstract idea’ for which computers are invoked merely as a tool.” *Enfish*, 822 F.3d at 1335–36. The court found in that case that the “plain focus of the claims” was on “an improvement to computer functionality itself, not on economic or other tasks for which a computer is used in its ordinary capacity.” *Id.* at 1336.

Here, claim 11 sets forth a method to improve the performance of a navigation system “communicatively coupled” to instrumentation having a particular sensor-frame-level axial alignment comprising the steps of computing, inputting, and outputting at least one observation in addition to the steps of “rotating the observation into the sensor-frame” and “zeroing selected gains associated with at least one of the third low performance accelerometer and the third low performance gyroscope at a compute Kalman gains module in the Kalman filter.” Appeal Br. 11 (Claims Appendix). The Examiner finds that claim 11, as a whole, is “similar to what the Court found as an abstract idea for solving navigation equations.” Ans. 2–3 (citing *Thales Visionix Inc. v. United States*, 850 F.3d 1343 (Fed. Cir. 2017)). Specifically, the Examiner finds that “the system appears to be an arrangement of generic data-gathering elements designed to feed orientation data into navigation equations” and, particularly, “determining error corrections [values] from a Kalman filter.” *Id.* at 3.

Appellants agree that the claimed subject matter is similar to that involved in *Thales*, which related to an improvement in sensor technology. Reply Br. 2. Appellants quote the conclusion in *Thales* that the subject matter claimed was not directed to an abstract idea:

We hold that the ’159 patent claims at issue in this appeal are not directed to an abstract idea. The claims specify a particular configuration of inertial sensors and a particular method of using the raw data from the sensors in order to more accurately calculate the position and orientation of an object on a moving platform.

Thales, 850 F.3d at 1349. Appellants assert that the instant claims likewise are not directed to an abstract idea because:

the claims of the present application specify a particular method of using the data from sensors arranged in a particular configuration to more accurately determine the navigation solution of the navigation system. In particular, the claims of the present application include an arrangement of high and low performance sensors in a particular arrangement.

Reply Br. 4.

Because the Examiner determines that the claimed subject matter is similar to that in *Thales* and does not distinguish the analysis of the claims in *Thales* from Appellants' claims, we find persuasive Appellants' argument that the rejection of the claims under 35 U.S.C. § 101 is in error. In *Thales*, our reviewing court determined that:

[t]he mathematical equations are a consequence of the arrangement of the sensors and the unconventional choice of reference frame in order to calculate position and orientation. Far from claiming the equations themselves, the claims seek to protect only the application of physics to the unconventional configuration of sensors as disclosed.

Thales, 850 F.3d at 1349.³ Appellants assert (Reply Br. 4) that their claims likewise seek to protect an arrangement of sensors rather than the data gathering and manipulation steps themselves.

Appellants also assert that the technical improvement to the field of navigation is improved overall accuracy, like the subject matter of *Thales*. Reply Br. 5–6. Appellants specifically identify the features responsible for the improvement in navigation as the steps of:

rotating navigation frame velocity observation from the form velocity observation 198 into at least one or more axis of the

³ Cf. *Diamond v. Diehr*, 450 U.S. 175, 191 (1981) (a mathematical equation itself is not patent-eligible subject matter even if limited to a particular technological environment); *Parker v. Flook*, 437 U.S. 584, 589 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972).

sensor-frame (X_{sf} , Y_{sf} , Z_{sf}) and then zeroing select Kalman filter gains, the sensitivity to one or more of the less accurate accelerometer 153, gyroscope 162, and gyroscope 163 is removed and the overall accuracy of the navigation solution is improved.

Id. (quoting Spec. ¶ 39).

We note that Appellants do not dispute the Examiner’s finding (Ans. 4–5) that the steps of rotating the observation and zeroing selected gains required by claim 11 constitute data manipulation steps that obtain a result and determine an error correction value with reduced contribution of the low performance sensors. Should prosecution continue in this application, clarifying “selected gains” recited in independent claims 11 and 16 would be helpful to determine which gains are selected to be zero and the scope of gains computed for each of “the third low performance accelerometer and the third low performance gyroscope” recited in the claims. According to the Specification, “[t]he gains that are selected to be zero are dependent on the combination of high quality and low quality gyroscopes and accelerometers.” Spec. ¶ 37.

Because we determine that the Examiner erred in step one of the analysis, we need not reach step two of the *Alice* framework, which is “a search for an ‘inventive concept’ — *i.e.*, an element or combination of elements that is ‘sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.’” *Alice*, 134 S. Ct. at 2355 (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 73 (2012)); *see Thales*, 850 F.3d at 1349 (explaining that the court need not proceed to step two where the claims are not directed to an abstract idea).

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We have fully considered the positions of both Appellants and the Examiner. For the foregoing reasons, we are persuaded as to error in the rejection of claims 11–20.

CONCLUSION

Appellants have shown that the Examiner reversibly erred in rejecting claims 11–20 under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

DECISION

The decision of the Examiner to reject claims 11–20 is reversed.

REVERSED