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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SEAN CHEN and DAVID WANG¹

Appeal 2019-000292
Application 15/463,387
Technology Center 2400

Before BRYAN F. MOORE, NORMAN H. BEAMER, and
MATTHEW J. McNEILL, *Administrative Patent Judges*.

MOORE, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134(a) of the Final Rejection of claims 1–18, which are all claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ We use the word “Appellant” to refer to “Applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Polycom, Inc. Appeal Br. 3.

BACKGROUND²

Appellant's disclosed embodiments and claimed invention relate to "the field of video compression, and particularly to a method of motion estimation in video compression." Spec. ¶ 1. Claim 1, reproduced below, is illustrative of the subject matter on appeal:

1. A method of efficiently reducing complexity of sub pixel motion estimation in video compression for limiting degradation, comprising:
 - a) determining, in one or more reference frames of a video picture, a best full-pixel motion vector F for a block in a current frame of the video picture;
 - b) determining a best half-pixel motion vector H from a set of half-pixel motion vectors based on the best full-pixel motion vector;
 - c) determining a best quarter-pixel motion vector Q from a set of quarter-pixel motion vectors based on the best full-pixel motion vector and the best half-pixel motion vector;
 - d) determining the best motion vector for the block as $BMV = F + H + Q$; and
 - e) determining full-pixel motion estimation based on the best motion vector.

Appeal Br. 13 (Claims App'x).

REJECTIONS

Claims 1–18 stand rejected under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter. Final Act. 2–6.

² Throughout this Decision we have considered the Specification filed March 20, 2017 ("Spec."), the Final Rejection mailed September 13, 2017 ("Final Act."), the Appeal Brief filed April 21, 2018 ("Appeal Br."), the Examiner's Answer mailed August 7, 2018 ("Ans.").

ANALYSIS

We review the appealed rejections for error based upon the issues identified by Appellant, and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential). To the extent, Appellant has not advanced separate, substantive arguments for particular claims, or other issues, such arguments are waived. 37 C.F.R. § 41.37(c)(1)(iv).

We have considered all of Appellant's arguments and any evidence presented. We highlight and address specific findings and arguments for emphasis in our analysis below.

Rejection of Claims 1–18 under 35 U.S.C. § 101

A. Applicable Law

Section 101 of the Patent Act provides that “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof” is patent eligible. 35 U.S.C. § 101. But the Supreme Court has long recognized an implicit exception to this section: “[l]aws of nature, natural phenomena, and abstract ideas are not patentable.” *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014) (quoting *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589 (2013)). To determine whether a claim falls within one of these excluded categories, the Court has set out a two-part framework. The framework requires us first to consider whether the claim is “directed to one of those patent-ineligible concepts.” *Id.* at 217. If so, we then examine “the elements of [the] 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.” *Id.* (quoting *Mayo Collaborative Servs. v. Prometheus Labs.*,

Inc., 566 U.S. 66, 78, 79 (2012)). That is, we examine the claim for an “inventive concept,” “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.’” *Id.* at 217–18 (alteration in original) (quoting *Mayo*, 566 U.S. at 72–73).

The Patent Office recently issued guidance about this framework. See 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019) (“Revised Guidance”). Under the Revised Guidance, to decide whether a claim is directed to an abstract idea, we evaluate whether the claim (1) recites one of the abstract ideas listed in the Revised Guidance (“Prong One”) and (2) fails to integrate the recited abstract idea into a practical application (“Prong Two”). See Revised Guidance, 84 Fed. Reg. at 51, 54. If the claim is directed to an abstract idea, as noted above, we then determine whether the claim has an inventive concept. The Revised Guidance explains that when making this determination, we should consider whether the additional claim elements add “a specific limitation or combination of limitations that are not well-understood, routine, conventional activity in the field” or “simply append[] well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality.” *Id.* at 56.

With these principles in mind, we first analyze whether claims 1, 7, and 13 are directed to an abstract idea.

B. Abstract Idea

The Examiner determines that each of the independent claims (as well as their dependencies) are directed to an abstract idea. Final Act. 2–6. In particular, the Examiner determines that the claims are directed to “a method

of efficiently reducing complexity of sub pixel motion estimation in video compression for limiting degradation,” which according to the Examiner, is an abstract idea. *Id.* at 3. For example, the Examiner asserts the claimed “steps for determining motion vectors, if nothing more, are only mathematical algorithm that organize and manipulate information through mathematical correlations.” *Id.* at 2. The Examiner further asserts the claims “do not include additional elements that are sufficient to amount to significantly more than the judicial exception because the claims do not recite elements that would add meaningful limits to practicing the abstract idea.” *Id.* at 3. The Examiner analogizes the claims to the court identified abstract ideas of “organizing and manipulating information through mathematical correlations.” *Id.* at 3 (citing *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344 (Fed. Cir. 2014)).

1. USPTO Step 2A, Prong One

Beginning with Prong One of the first step of *Alice*, we must determine “whether the claims at issue are directed to one of those patent ineligible concepts,” including the abstract ideas enumerated in the Revised Guidance. *Alice*, 573 U.S. at 217. One subject matter grouping identified as an abstract idea in the Revised Guidance is “[m]athematical concepts—mathematical relationships, mathematical formulas or equations, mathematical calculations.” *Id.*

Independent claims 1, 7, and 13 are directed to “sub pixel motion estimation in video compression” as recited in the preamble of those claims. Limitations [d] of claims 1, 7, and 13 recites “determining the best motion vector for the block as $BMV = F + H + Q$.” Thus, at least limitation [d] discussed above encompasses mathematical concepts.

Similar to the claims found patent-ineligible in *Digitech*, Appellant’s claim 1 “employs mathematical algorithms [(calculations)] to manipulate existing information to generate additional information[, which] is not patent eligible. ‘If a claim is directed essentially to a method of calculating, using a mathematical formula, even if the solution is for a specific purpose, the claimed method is nonstatutory.’” *Digitech*, 758 F.3d at 1351 (quoting *Flook*, 437 U.S. at 595 (internal quotations omitted)). More recently, our reviewing court explained that, similar to *Digitech*, claims applying a mathematical formula (to assign image codes) as well as encoding and decoding image data recite an abstract idea. *See RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322, 1326–27 (Fed. Cir. 2017). In particular, the Federal Circuit explained that claims focused on mathematical concepts are abstract--“outside of the math, claim 1 . . . is not directed to otherwise eligible subject matter. Adding one abstract idea (math) to another abstract idea (encoding and decoding) does not render the claim non-abstract.” *RecogniCorp*, 855 F.3d at 1327. Accordingly, consistent with our Office Guidance and case law, we determine that at least limitation [d] of independent claims 1, 7, and 13 recite encompasses mathematical concepts and, thus, an abstract idea. *See Revised Guidance*, 84 Fed. Reg. at 52.

Appellant contends that the Examiner erred in rejecting the claims as being directed to patent-ineligible subject matter. *See Appeal Br.* 6–12. Specifically, Appellant contends, “Examiner fails even to set forth a clear definition of the alleged abstract idea,” simply quotes the preamble of the claims, and states the claim recites “organizing and manipulating information through mathematical correlations” citing *Digitech*. *Id.* at 6. As

evinced above, we disagree with these characterizations that the Examiner failed to make a sufficient showing.

Based on the analysis above, we determine that claims 1, 7, and 13 each recite an abstract idea, including mathematical concepts for performing sub pixel motion estimation in video compression. Accordingly, consistent with our Office Guidance and case law, we determine that claims 1, 7, and 13 recite abstract ideas in the mathematical concepts grouping. *See Revised Guidance*, 84 Fed. Reg. at 52.

2. USPTO Step 2A, Prong Two

Because we determine that claims 1, 7, and 13 each recite an abstract idea, we turn to Prong Two of Step 2A of the *Alice/Mayo* framework and consider whether each claim is “directed to” an abstract idea, as opposed to integrating the recited abstract idea into a practical application. *See Revised Guidance*, 84 Fed. Reg. at 51. In doing so, we consider whether there are any additional elements beyond the abstract idea that, individually or in combination, “integrate the [abstract idea] into a practical application, using one or more of the considerations laid out by the Supreme Court and the Federal Circuit.” *Id.* at 54–55.

The Examiner determines that “[t]he claim(s) does/do not include additional elements that are sufficient to amount to significantly more than the judicial exception because the claims do not recite elements that would add meaningful limits to practicing the abstract idea.” Final Act. 3. Specifically, the Examiner determines that “[t]he claim does not include additional elements that are sufficient to amount to significantly more than the judicial exception because the additional elements when considered both individually and as an ordered combination do not amount to significantly

more than the abstract idea. The claim does not recite elements that would add meaningful limits to practicing the abstract idea. No additional elements are recited in the claim beyond the description of the abstract idea.” *Id.* at 4.

We disagree. Claims 1, 7, and 13 are directed to “sub pixel motion estimation in video compression” as recited in the preamble of those claims. Limitations [a], [b], and [c] of claims 1, 7, and 13 recite respectively: determining a full motion vector F, determining a half-motion vector H, and determining a quarter motion vector Q. Limitation [a] recites that the full motion vector F is determined “in one or more reference frames of a *video picture*, a best full-pixel motion vector F for a block in a *current frame of the video picture*.” Limitations [d] and [e] of claims 1, 7, and 13 recite respectively recite “determining the best motion vector for the block as $BMV = F + H + Q$ ” and “determining full-pixel motion estimation based on the best motion vector.” Appeal Br. 13 (Claims App.) (emphases added). We refer collectively to the steps of claims 1, 7, and 13 as “determining steps.”

We are persuaded by Appellant’s arguments that “claims 1-18 are not directed to an abstract idea because the claims are directed to motion estimation in the field of computer video compression and address solving a problem unique to electronic devices, improving the functionality of those devices by reducing the computational complexity of motion estimation.” *Id.* at 8.

Specifically, Appellant asserts

As the preamble to each independent claim states, the claimed systems, methods, and machine readable medium are aimed at ‘reducing complexity of sub pixel motion estimation in video compression for limiting degradation.’ The reduced complexity has a real world result: ‘desirable Rate-Distortion quality in different kinds of motion scenarios’ without the need for ‘highly-

expensive interpolation’ in which ‘sub-pixel motion estimation occupies a significant amount of computation, sometimes even more than that of full pixel motion estimation.’ (Specification at [0002].) The claimed techniques improve the operation of the computer performing video processing, by reducing the ‘amount of computation of the sub pixel motion estimation’ by 30-35% with ‘extremely little’ ‘impact on video quality.’ [Specification at ¶ 17]

Id. at 7–8. Appeal Br. 20, *see also id.* at 19–21. Thus, limitations [a] – [e] of claim 1 integrate the recited abstract idea into a practical application, because they explicitly recite a “video picture” and, described in the Specification, the claimed techniques may improve the operation of the computer performing video processing, by reducing the “amount of computation of the sub pixel motion estimation’ by 30-35% with ‘extremely little’ ‘impact on video quality.” Spec. ¶ 17.

Examiner also argues that Appellant’s Specification indicates that the computer hardware performing the determining steps “are platform-independent and that the techniques may be implemented on a variety of commercial computing platforms having a variety of processors.” Ans. 8 (citing Spec. ¶ 40). Additionally Appellant admits, “the current claims do not expressly recite any computer technology.” Appeal Br. 12.

We agree with Appellant’s citation to *McRO Inc. v. Bandai Namco Games America, Inc.*, 837 F.3d 1299, 1315, (Fed. Cir. 2016) for the proposition that an improvement in computer-related technology that clearly improves the functioning of a computer is not directed to an abstract idea. Appeal Br. 8. Specifically, Appellant contends that the process of claim 1 constitutes a specific process that constitutes a technological improvement similar to *McRO*—the recited techniques provide “address solving a problem

unique to electronic devices” and “improving the functionality of those devices by reducing the computational complexity of motion estimation.”
Appeal Br. 7.

In *McRO*, the at-issue claims focused on methods of automatic lip synchronization and facial expression animation. Although the limitations were embodied in software executed by a generic computer, the recited rules enabled automation of specific tasks (animation) that previously could not be automated or accomplished using identical manual procedures. The Federal Circuit relied on the Specification’s detailed explanation of the rules in finding that the subject matter was patent eligible. It was *McRO*’s rules that (the Federal Circuit found) improved the computer-related technology allowing the computer to perform a function not previously performable by a computer. *See McRO*, 837 F.3d at 1313–16. In the instant claim, the rules regarding sub pixel motion estimation reduce the complexity of video compression.

Similarly, in *BASCOM Global Internet Services, Inc. v. AT&T Mobility LLC*, 827 F.3d 1341 (Fed. Cir. 2016), the Federal Circuit held that a specific technology-based solution that improved a technological process was patent eligible. Such is the case in the instant claims.

In summary, although we conclude that Appellant’s claims 1, 7, and 13 recite a judicial exception (USPTO’s Step 2A, Prong 1; *see* 2019 Revised Guidance), for the reasons above, taken as a whole, claims 1, 7, and 13 integrate the determining full-pixel motion estimation process into a practical application for video compression (USPTO’s Step 2A, Prong 2; *see* 2019 Revised Guidance). We, therefore, determine claims 1, 7, and 13 are directed to patent eligible subject matter.

2. USPTO Step 2B Analysis—Inventive Concept or Significantly More

Having concluded Appellant’s claims are not directed to an abstract idea under the 2019 Revised Guidance Step 2A analysis, and thus are patent-eligible, this ends the patent-eligibility inquiry under the Revised Guidance, and we need not proceed to the Step 2B analysis.³

Summary

For at least the reasons above, we are persuaded of Examiner error in the rejection of claim 1 under 35 U.S.C. § 101. Thus, we reverse the Examiner’s rejection under § 101 of independent claim 1, independent claims 7 and 13, and dependent claims 2–6, 8–12, and 14–18, which depend from claims 1, 7, and 13 (respectively) and which were not separately argued with specificity.

CONCLUSION

Appellant has shown that the Examiner erred in rejecting claims 1–18 under 35 U.S.C. § 101.

DECISION

We reverse the Examiner’s rejection of claims 1–18.

³ Appellant asserts that claims 1–18 are analogous to the claims in the “Digital Image Processing” example presented as Example 3 in the “Abstract Idea Examples 1-8” published by the Office on January 27, 2015. Appeal Br. 9. “Digital Image Processing” Example 3 presents a claim considered by the courts to be eligible subject matter in *Research Corp. Tech., Inc. v. Microsoft Corp.*, 627 F.3d 859 (Fed Cir. 2010). *Id.* The example relates to the Step 2 B Analysis, therefore, we do not need to discuss this argument by Appellant.

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Application 15/463,387

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1-18	101	Eligibility		1-18

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv). *See* 37 C.F.R. § 41.50(f).

REVERSED