



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes sub-tables for EXAMINER, ART UNIT, PAPER NUMBER, NOTIFICATION DATE, and DELIVERY MODE.

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

tphpto@tphm.com
Inteldocs\_docketing@cpaglobal.com

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

*Ex parte* ANIMESH KHEMKA and CHYUAN-TYNG WU

---

Appeal 2018-001247<sup>1</sup>  
Application 14/637,677  
Technology Center 2600

---

Before ERIC B. CHEN, MONICA S. ULLAGADDI, and SCOTT E. BAIN,  
*Administrative Patent Judges.*

ULLAGADDI, *Administrative Patent Judge.*

DECISION ON APPEAL

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

We affirm.

---

<sup>1</sup> The real part in interest is Intel Corporation. App. Br. 3.

## STATEMENT OF THE CASE

Claim 1, reproduced below with emphasis added to a disputed limitation, is illustrative of the subject matter at issue in this appeal.

1. A computer-implemented method comprising:

weighting an input image signal;

modelling a spatially varying point spread function of said input signal as a sum of convolutions with fixed point spread functions; and

*using bilateral interpolation to estimate a fixed point spread function at a location based on the fixed point spread functions of samples adjacent the location.*

(App. Br., Claims Appendix, 9.)

## REJECTIONS

Claims 1–20 stand rejected as directed to non-statutory subject matter under 35 U.S.C. § 101. Final Act. 3–9 (Mar. 29, 2017)<sup>2</sup>.

Claims 1, 6, and 11 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Harmeling et al., (US 2013/0242129 A1; Sept. 19, 2013; hereinafter “Harmeling”) and Maeda (US 2011/0274342 A1; Nov. 10, 2011; hereinafter “Maeda”). Final Act. 11–15.

---

<sup>2</sup> Herein we refer to the Specification, filed Mar. 4, 2015 (“Spec.”): Final Office Action, mailed Mar. 29, 2017 (“Final Act.”); Appeal Brief, filed July 11, 2017 (“App. Br.”); Examiner’s Answer, mailed Oct. 13, 2017 (“Ans.”); and the Reply Brief, filed Nov. 17, 2017 (“Reply Br.”).

Claims 2–5, 7–10, and 12–20<sup>3</sup> stand rejected under 35 U.S.C. 103(a) as unpatentable over Harmeling, Maeda, and Tezaur (US 2015/0110405 A1; Apr. 23, 2015). Final Act. 15–20.

#### ANALYSIS

We have reviewed the Examiner’s rejections in light of Appellants’ arguments presented in this appeal. Arguments which Appellants could have made but did not make in the Briefs are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(iv). On the record before us, we are unpersuaded the Examiner has erred. We adopt as our own the findings and reasons set forth in the rejections from which the appeal is taken and in the Examiner’s Answer, and provide the following for highlighting and emphasis.

#### *35 U.S.C. § 101*

Section 101 of the Patent Act provides “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.” 35 U.S.C. § 101. The Supreme Court has long held that this provision contains an implicit exception: “[l]aws of nature, natural phenomena, and abstract ideas are not patentable.” *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2354 (2014) (quoting *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2116 (2013)). The Court has set forth a two-part inquiry to determine whether this exception applies. First, we must “determine whether the claims at issue are directed

---

<sup>3</sup> Incorrectly set forth as claims 2–5 and 7–20 in the Final Office Action. Final Act. 15.

to one of those patent-ineligible concepts.” *Alice*, 134 S. Ct. at 2355 (citation omitted). Second, if the claims are directed to one of those patent-ineligible concepts, we consider “the elements of each 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.” *Alice*, 134 S. Ct. at 2355 (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1297 (2012)). Stated differently, we must search the claims for an “inventive concept,” that is, “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*, 132 S. Ct. at 1294).

For the rejection under 35 U.S.C. § 101, claims 1–20 are argued as a group. App. Br. 7. We select claim 1 as representative. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Regarding step one of an analysis under the framework set forth in *Alice*, the Examiner determines, with respect to claim 1, that “[t]he claimed method simply describes the concept of gathering and combining data by reciting steps of organizing information through mathematical relationships,” and therefore, is an abstract idea. Final Act. 4; *see id.* at 2–3. The Examiner further determines that each of the limitations recited in independent claim 1 is directed to an abstract idea. Final Act. 3–4; Ans. 4–5. With respect to the dependent claims, the Examiner explains that the limitations “may result in a narrower abstract idea, but are nevertheless still directed to an abstract idea.” Final Act. 4; Ans. 4. We agree with the Examiner’s determinations, and in particular, that claim 1 specifies types of

manipulated information and mathematical operations (e.g., “spatially varying point spread function”). Data gathering and manipulation, absent more, encompasses an abstract idea. Using mathematical algorithms to manipulate information and generate additional information, as in Appellants’ claims, also encompasses an abstract idea. *See e.g., Elec. Power Grp. LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016) (holding that “collecting information, analyzing it, and displaying certain results of the collection and analysis” are “a familiar class of claims ‘directed to’ a patent-ineligible concept”); *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014) (“Without additional limitations, a process that employs mathematical algorithms to manipulate existing information to generate additional information is not patent eligible.”). Accordingly, we proceed to step two of *Alice*.

In the second step of the analysis:

[W]e 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. 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].”

*Alice*, 134 S. Ct. at 2357 (internal citations omitted). We agree with the Examiner’s determination that the claims lack “significantly more” because particularized types of information and operations merely restrict the recited abstract ideas to a technological environment (e.g., restrict the estimating to a point spread function), as opposed to improving the technological environment (e.g., improving a computer’s estimating of a point spread function). *See McRO, Inc. v. Bandai Namco Games Am, Inc.*, 837 F.3d 1299 (Fed. Cir. 2016) (differentiating between claimed “rules with specific

characteristics” that limit an abstract idea to a technological environment (patent-ineligible) and improve an existing technological process (patent-eligible)).

Appellants argue claim 1 “amounts to something substantially more than an abstract idea” insofar as “the claimed invention . . . is capable of speeding up the determination of convolutions” and thereby “improves the operation of a processor performing this function.” App. Br. 7 (citing Spec. ¶¶ 6–7). Appellants explain the invention improves processor speed by using “bilateral interpolation to estimate the PSF [point spread function] at a targeted location based on PSFs samples adjacent to that location,” and that “[n]one of the cited references do this.” *Id.* Appellants further argue the Examiner concedes the improvement and accordingly must, per *Visual Memory LLC v. NVIDIA Corporation*, 867 F.3d 1253, 1260, 1262 (2017), determine the claims are patent-eligible. Reply Br. 1–2. For the reasons that follow, we are not persuaded the Examiner erred.

First, Appellants present no persuasive evidence that the claimed invention improves computations. The cited paragraphs of the Specification state that

[Using] bilinear interpolation . . . to estimate the . . . PSF at any non-sampled location from the neighboring PSF samples . . . speeds up the computation by a significant margin *in some embodiments*. . . .

*[F]or some embodiments* the complexity is  $O(N^2 \cdot \log(N))$ , and since  $m^2$  is typically much greater than  $\log(N)$ , there *can be* substantial time savings *in some embodiments*.

Spec. ¶¶ 6–7 (emphases added). Appellants do not present sufficient evidence that would tend to persuade us that the bilinear interpolation recited

in independent claim 1 is limited to the “some embodiments” that purportedly enable faster “computation by a significant margin” and provides “substantial time savings.” See *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1369 (Fed. Cir. 2018) (“Claim 1 . . . does not recite any of the purportedly unconventional activities disclosed in the specification.”).

Second, even assuming claim 1 restricts the invention to some subset of embodiments disclosed in the Specification, the alleged improvements associated with these embodiments nonetheless “amount to no more than performing the abstract idea”—employing mathematical relationships to manipulate existing information (Final Act. 2–3)—“with conventional computer components.” See *Berkheimer*, 881 F.3d at 1370.

Third, Appellants’ reliance on *Visual Memory* is unpersuasive. The patent-eligible claim of *Visual Memory* was directed to “[c]onfiguring the [claimed] memory system based on the type of processor connected to the memory system[, which] is the improvement in computer technology.” *Visual Memory*, 867 F.3d at 1261. The patent-eligible claim in *Visual Memory* recited features that improved the computer memory. In contrast to the claim at issue in *Visual Memory* and as discussed above, Appellants’ claims are directed to mathematically estimating a mathematical algorithm—not an improvement of computer technology. See *SAP Am., Inc. v. Investpic, LLC*, 890 F.3d 1016, 1018 (Fed. Cir. 2018) (“The claims here are ineligible because their innovation is an innovation in ineligible subject matter.”); *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972) (“The mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that . . . the

patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself.”).

For the foregoing reasons, we are not persuaded of error in the rejection of claims 1–20 under 35 U.S.C. § 101. Accordingly, we sustain the rejection.

*35 U.S.C. § 103*

For the rejection under 35 U.S.C. § 103(a), claims 1, 6, and 11 are argued as a group. App. Br. 7. We select claim 1 as representative. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Claim 1 recites, *inter alia*, “using bilateral interpolation to estimate a fixed [PSF] at a location based on the fixed point spread functions of samples adjacent the location.” The Examiner finds Harmeling teaches a PSF for each pixel of an image. Final Act. 12 (citing Harmeling ¶ 61). The Examiner further finds Maeda teaches replacement of a defective image portion by estimating using bilateral interpolation. *Id.* at 13–14 (citing Maeda ¶ 52). The Examiner concludes, in view of these teachings, it would have been obvious to replace a defective PSF of a pixel via bilaterally interpolating the PSF from the PSFs of neighboring pixels. *Id.* at 13–14.

Appellants argue that “[t]here is no suggestion in [Maeda] that you estimate another point spread function from a first point spread function. . . . It is evident that the BTV (method merely mentioned in the [Maeda]) has nothing to do with point spread functions[.]” App. Br. 8. We, however, are not persuaded the Examiner erred.

Although Maeda does not explicitly disclose bilaterally interpolating a PSF, we agree with the Examiner that the cited portions of Harmeling and Maeda, taken together, would have been understood by the ordinarily skilled

artisan to teach the disputed limitation. In particular, we agree a person of ordinary skill in the art would understand that parameters of an image portion can be bilaterally interpolated from neighboring image portions. *See* Final Act. 12–14; Maeda ¶ 52. We further agree that one of ordinary skill in the art would understand a PSF as a parameter of an image portion, and would thus consider bilateral interpolation a method for estimating PSFs of pixels. *See* Final Act. 12–14; Harmeling ¶¶ 61, 72.

We find Appellants’ argument unpersuasive because the test for obviousness is not whether the claimed subject matter is expressly disclosed in the cited prior art teachings, but whether it would have been obvious to the ordinarily skilled artisan in light of these teachings. *KSR Int’l. Co. v. Teleflex*, 550 U.S. 398 (2007). Further, “a person of ordinary skill is also a person of ordinary creativity, not an automaton.” *Id.* at 421. Moreover, even assuming an ordinarily skilled artisan would not contemplate Maeda’s teaching of bilateral interpolation as applicable to PSFs in view of Maeda’s disclosure alone, the artisan would do so in further view of Harmeling’s teachings. Namely, Harmeling’s teachings that that “poorly estimated PSFs may [be] replaced with neighboring PSFs” (Harmeling ¶ 71) and “replaced . . . by the average of their neighboring PSFs” (*id.* ¶ 72).

For the foregoing reasons, we are not persuaded of error in the rejection of claims 1, 6, and 11 under 35 U.S.C. § 103(a). Accordingly, we sustain the rejection.

Appellants do not present additional arguments against the rejections of claims 2–5, 7–10, and 12–20 under 35 U.S.C. § 103(a). Accordingly, we also sustain these rejections.

Appeal 2018-001247  
Application 14/637,677

DECISION

We affirm the rejections 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)(1)(iv).

AFFIRMED