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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MICHAEL HUBER, MICHAEL WASCHBUESCH,
LASSE TOIMELA, and PATRIK KUNZ¹

Appeal 2018-005800
Application 12/821,985
Technology Center 3600

Before ALLEN R. MacDONALD, BRADLEY W. BAUMEISTER, and
ALYSSA A. FINAMORE, *Administrative Patent Judges*.

BAUMEISTER, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner’s
Final Rejection of claims 1–7, 9, 10, and 12–21. App. Br. 3. We have
jurisdiction under 35 U.S.C. § 6(b).

We reverse.

¹ Appellants identify Varian Medical Systems as the real party in interest.
Appeal Brief 1 filed November 20, 2017 (“App. Br.”).

SUMMARY OF THE DECISION

Appellants claim a method and apparatus for automatically propagating visual contouring effects from a “source” digital radiotherapy image to plural registered “target” images. The Examiner concludes that the claims are directed to patent-ineligible subject matter because the claims are directed to “the abstract idea of comparing new and stored information using rules to identify options.” We reverse the rejection under 35 U.S.C. § 101 because the Examiner has not established that the invention employs generic computers to perform well-understood, routine, and conventional activities commonly used in medical imaging industry. The record instead indicates that the automatic propagation process entails an inventive automation technique that more efficiently creates contouring effects on multiple digital images. As such, the Examiner has not established that the claims fail to recite significantly more than an abstract idea.

THE INVENTION

Appellants’ invention relates to methods of enhancing medical images that have been generated by imaging techniques such as X-ray imaging, computer tomography (CT) scans, and magnetic resonance imaging (MRI). Abstract. “Conventional medical imaging techniques include techniques for automatically identifying (‘segmenting’) organs,” tumors, and other large anatomical structures. Spec. ¶ 4. Conventional techniques further include manually or automatically “contouring”—or tracing outlines around—these anatomical structures. *Id.*

It also was known that the sizes or shapes of these anatomical structures sometimes change over time or the course of medical treatment.

Id. ¶ 6. In such events, new images of the structures may need to be taken periodically. *Id.* Each one of these replicated images may need to have an anatomical object contoured. *Id.* ¶ 7. But “manually replicating contouring for a multitude of images can be an extremely intensive and inefficient process.” *Id.*

Appellants’ invention obviates the need for manually contouring each of the replicated images by automatically propagating the contour maps from the first, “source” image to each of the subsequently replicated, “target” images. *Id.* ¶ 10. This automatic propagation is performed with the use of a deformation map. *Id.* The deformation map establishes a correspondence for each point or pixel in the source image with a point or pixel in each of the target images. *Id.*; claim 1.

Independent claim 1, reproduced below, illustrates the claimed invention:

1. A method for automatically propagating defined structures across data sets comprising:
 - accessing a first image acquired using a medical imaging system, the first image comprising a first plurality of structures and a plurality of manually contoured effects corresponding to the first plurality of structures;
 - accessing a second image acquired using the medical imaging system, the second image comprising a second plurality of structures corresponding to the first plurality of structures;
 - generating a deformation map in a processor of the computing system by mapping a first set of pixels comprising at least part of the first image to a second set of pixels comprising at least part of the second image, the deformation map defining a relativity between the first and second plurality of pixels and corresponding to the first and second pluralities of structures, respectively; and

based on the deformation map, using the processor of the computing system to automatically propagate the plurality of manually contoured effects comprised in the first image to the second image,

wherein mapping the first set of pixels to the second set of pixels comprises determining, in the processor, a relativity of a first plurality of pixel intensities corresponding to a feature comprised in the first set of pixels with a second plurality of pixel intensities corresponding to the same feature comprised in the second set of pixels.

THE REJECTION AND CONTENTIONS

Claims 1–7, 9, 10, and 12–21 stand rejected under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter. Final Act. 2–8.² The Examiner determines that the claims are directed to “the abstract idea of comparing new and stored information using rules to identify options.” Final Act. 2. More particularly, the Examiner determines that the independent claims “recite, *in part*, a method wherein comparing new and stored information and using rules to identify options is embodied by the concept of accessing/acquiring/receiving data [i.e. new and stored information] to generate a deformation map using assimilated data [i.e. using rules to identify options].” *Id.* at 3.

The Examiner determines that the claimed subject matter is similar to subject matter that the courts have found to constitute patent-ineligible abstract ideas. *Id.* (citing *Electric Power Group, LLC v. Alstom S.A.*, 830

² Rather than repeat the Examiner’s positions and Appellants’ arguments in their entirety, we refer to the above-mentioned Appeal Brief, as well as the following documents for their respective details: the Final Action mailed May 18, 2017 (“Final Act.”); the Examiner’s Answer mailed March 22, 2018 (“Ans.”); and the Reply Brief filed May 21, 2018 (“Reply Br.”).

F.3d 1350 (Fed Cir. 2016); *Cybersource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366 (Fed. Cir. 2011); *Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat’l Ass’n*, 776 F.3d 1343 (Fed. Cir. 2014)).

In the Examiner’s Answer, the Examiner further characterizes the claims as “an idea of itself” (Ans. 2), such as claims “cover[ing] a method and system that can [be] performed mentally or carried out by a human without computer intervention” (Ans. 5). The Examiner reasons,

a human can access an x-ray image from a file cabinet. Using said image, a human can match up body structure in one scan with their counterparts in the other using an overlap technique. Finally, a human can determine [a] relativity of a first image with a second image having the same/similar features.

Id. at 5–6.

The Examiner concludes in relation to step two of the *Alice* framework that “[t]he claim[s] do[] 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.” Final Act. 3. The Examiner reaches this conclusion because the claimed processor, imagers, and computing device “are recited at a high level of generality and [are] recited as performing generic computer functions routinely used in computer applications. *Id.*

The Examiner notes Appellants’ argument that was presented during prosecution—that “the automated propagation of manually contoured effects by generating deformation maps using relative pixel intensities is clearly rooted in computer technology that is not known to have been previously performed manually.” *Id.* at 6. The Examiner finds this argument unpersuasive for the following reasons: Initially, the first claimed image

that is accessed by the system already comprises the claimed manually contoured effects. *Id.* at 7. Second, Appellants' Specification states that the present invention may be implemented in a general purpose computing system environment. *Id.* (citing Spec. ¶ 74; FIG. 7). Third, the Examiner notes that the invention broadly provides, as a replacement for manual means of propagating the contour effects, mechanical or automatic means that accomplish the same results. *Id.* In this latter regard, the Examiner reasons

[i]t is not an 'invention' to broadly provide a mechanical or automatic means to replace manual activity [that] has accomplished the same result. If a new combination of old elements is to be patentable, the elements must cooperate in such manner as to produce a new, unobvious, and unexpected result [in order to] amount to an invention.

Id. at 7–8 (citing *In re Venner*, 262 F.2d 91, 95 (CCPA 1958); *In re Smith*, 161 F.2d 274, (CCPA 1947); *In re Rundell*, 48 F.2d 958 (CCPA 1931)).

Appellants argue that the claims are not directed to an abstract idea. *E.g.*, App. Br. 24–25. Appellants also argue, *inter alia*, that the claims recite significantly more than an abstract idea under step two of the *Alice* framework. *See* App. Br. 10–11 (citing *Diamond v. Diehr*, 450 U.S. 175, 178 (1981) for the proposition that “an invention is not rendered ineligible for patent simply because it involves an abstract concept”); *see also id.* (citing *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) for the proposition that an abstract idea that recites an application of the abstract idea to produce “a new and useful end” should be eligible for patentability); *id.* at 11 (citing MPEP § 21067(II) for the proposition that claims directed to a practical application of an abstract idea should not be rejected under § 101).

Substantively, Appellants note, *inter alia*, that “[c]laim 1 recites, *inter alia*, the claimed limitations of: ‘based on the deformation map, using the processor of the computing system to automatically propagate the plurality of manually contoured effects comprised in the first image to the second image’ (emphasis added).” App. Br. 10 (formatting altered). We understand Appellants position to be that this automatic propagation constitutes a practical application or entails a new and useful means of providing contouring effects on images. App. Br. 10–11.

PRINCIPLES OF LAW

The mailing of the Examiner’s Answer and the filing of Appellants’ Reply Brief occurred prior to the Office issuing the latest guidance on patent eligibility in the Manual of Patent Examining Procedure (MPEP). *See* MPEP § 2106 (9 ed., rev. 8; issued January 2018). We review the presently appealed rejection in light of the current revision of the MPEP and recent relevant court decisions. We also review the appealed rejections for error based upon the issues identified by Appellants, and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential).

Regarding the question of patent eligibility under 35 U.S.C. § 101, the Supreme Court has set forth an analytical “framework for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.” *Alice Corp. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2355 (2014) (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 71–73 (2012)). In the first step of the analysis, we determine whether the claims at issue are

“directed to” a judicial exception, such as an abstract idea. *Id.* at 2355. If not, the inquiry ends. *Thales Visionix Inc. v. U.S.*, 850 F.3d 1343, 1346 (Fed. Cir. 2017); *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1339 (Fed. Cir. 2016). If the claims are determined to be directed to an abstract idea, then we consider under step two whether the claims contain an “inventive concept” sufficient to “transform the nature of the claim into a patent-eligible application.” *Alice*, 134 S. Ct. at 2355 (quotations and citation omitted).

In considering whether claims are directed to an abstract idea, we acknowledge, as did the Supreme Court, that “all inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.” *Mayo*, 566 U.S. at 71. We therefore look to whether the claims focus on a specific means or method that improves the relevant technology or are instead directed to a result or effect that itself is the abstract idea and merely invoke generic processes and machinery. *See Enfish*, 822 F.3d at 1336.

In the second step of the *Alice* analysis, if applicable, we must consider whether the claims contain an element or a combination of elements that is sufficient to transform the nature of the claim into a patent-eligible application. *Ultramercial, Inc. v. Hulu LLC*, 772 F.3d 709, 714 (Fed. Cir. 2014); *Alice*, 134 S. Ct. at 2355.

In applying step two of the *Alice* analysis, we must “determine whether the claims do significantly more than simply describe [the] abstract method” and thus transform the abstract idea into patentable subject matter. We look to see whether there are any “additional features” in the claims that constitute an “inventive concept,” thereby rendering the claims eligible for patenting even if they are directed to an abstract idea. Those

“additional features” must be more than “well-understood, routine, conventional activity.”

Intellectual Ventures I LLC v. Erie Indem. Co., 850 F.3d 1315, 1328 (Fed. Cir. 2017) (citations omitted).

Claims that “merely require generic computer implementation[] fail to transform [an] abstract idea into a patent-eligible invention.” *Alice*, 134 S. Ct. at 2357.

ANALYSIS

Appellants do not apprise us of error in the Examiner’s determination that the claims are directed to an abstract idea under step one of the *Alice* framework. As the Examiner determines, the claims recite accessing, receiving, editing, and analyzing data (Final Act. 2), which is similar to the abstract idea of “collecting information, analyzing it, and displaying certain results of the collection and analysis” in *Electric Power Group* (830 F.3d at 1353). Although the present claims recite a particular type of data (namely data relating to images), the court, in *Electric Power Group*, explained “we have treated collecting information, including when limited to a particular content (which does not change its character as information), as within the realm of abstract ideas.” *Id.*

Moreover, Appellants claim, *inter alia*, automatically propagating a plurality of manually contoured effects comprised in a first image to a second image, which is based upon

mapping [a] first set of pixels to [a] second set of pixels [by] determining with a processor, a relativity of a first plurality of pixel intensities corresponding to a feature comprised in the first set of pixels with a second plurality of pixel intensities

corresponding to the same feature comprised in the second set of pixels.

Claim 1.

Such mapping and propagating data implicitly entails performing some sort of mathematical calculations and algorithms. The courts have deemed concepts relating to performing mathematical calculations as constituting an abstract idea. *See, e.g., In re Abele*, 684 F.2d 902, 908 (1982) (holding that merely calculating the difference between local and average data values and displaying the results of the calculations as a gray scale in a picture constitutes a patent-ineligible abstract idea); *see generally* MPEP § 2106.04(a)(2) Part (IV).

We therefore turn to step two of the *Alice* framework. The present claims appear to be similar to those at issue in *Research Corp. Tech., Inc. v. Microsoft Corp.*, 627 F.3d 859 (Fed Cir. 2010). As such, the Examiner has not established that the present claims are directed to patent-ineligible subject matter. Accordingly, the rejection under § 101 must be reversed.

At issue in *Research Corp.* were six patents relating to digital image halftoning, and more specifically to a method of generating a digital halftoned image that uses a two-dimensional array of numbers called a halftone mask. *Id.* at 862–63. “Halftoning techniques allow computers to present many shades and color tones with a limited number of pixel colors.” *Id.* at 863. The inventive mask at issue in *Research Corp.* “produce[d] higher quality halftone images while using less processor power and memory space.” *Id.* at 865.

Our reviewing court found that even though a significant part of the claims incorporate algorithms and mathematical formulas, the claims nonetheless were patent eligible. *Id.* at 869. The *Research Corp.* court

determined that the claimed “invention presents functional and palpable applications in the field of computer technology,” and that “[t]hese inventions address ‘a need in the art for a method of and apparatus for the halftone rendering of gray scale images in which a digital data processor is utilized in a simple and precise manner to accomplish the halftone rendering.’” *Id.* at 868–69. The court reasoned that “inventions with specific applications or improvements to technologies in the marketplace are not likely to be so abstract that they override the statutory language and framework of the Patent Act.” *Id.* at 869. The court further reasoned “that inventions incorporating and relying upon even ‘a well[-]known mathematical equation’ do not lose eligibility because ‘several steps of the process [use that] mathematical equation.’” *Id.*

Similar to the claimed invention of *Research Corp.*, the present claims incorporate algorithms, mathematical formulas, and, in the present case, deformation maps, in order to automatically propagate manually created visual contour effects of a source image across plural registered or linked digital images. *E.g.*, Spec. ¶¶ 33, 34, 42–56, 74–77; Abstract. As such, the invention, as recited in independent claims 1, 14, and 18, presents functional and palpable applications in the field of radiotherapy machines used in radiation diagnostic and treatment applications. Abstract. The present invention addresses a need in the medical imaging technical arts for a method of and apparatus that efficiently creates contouring effects on multiple digital images. *Id.*

McRO, Inc. v. Bandai Namco Games America Inc., 837 F.3d 1299 (Fed. Cir. 2016) also supports our present determination. The invention of McRO “provide[d] a method for automatically . . . producing accurate and

realistic lip synchronization and facial expressions in animated characters.”
McRO, 837 F.3d at 1307.

[McRO’s] patents aim to automate a 3–D animator’s tasks, specifically, determining when to set keyframes and setting those keyframes. This automation is accomplished through rules that are applied to the timed transcript to determine the morph weight outputs. The patents describe many exemplary rule sets that go beyond simply matching single phonemes from the timed transcript with the appropriate morph target. Instead, these rule sets aim to produce more realistic speech by “tak[ing] into consideration the differences in mouth positions for similar phonemes based on context.”

Id. Restated, McRO’s invention “uses rules to automatically set a keyframe at the correct point to depict more realistic speech, achieving results similar to those previously achieved manually by animators.” *Id.*

The *McRO* court’s review entailed determining “whether [McRO’s claims] focus on a specific means or method that improves the relevant technology or are instead directed to a result or effect that itself is the abstract idea and merely invoke generic processes and machinery.” *McRO*, at 1314. The *McRO* court determined that McRO’s invention employed the computer “to perform a distinct process to automate a task previously performed by humans.” *Id.* The court reasoned,

[t]his activity, even if automated by rules, would not be within the scope of the claims because it does not evaluate sub-sequences, generate transition parameters[,], or apply transition parameters to create a final morph weight set. It is the incorporation of the claimed rules, not the use of the computer, that “improved [the] existing technological process” by allowing the automation of further tasks.

Id. (citing *Alice*, 134, S. Ct. at 2358).

This reasoning applies to the present case. In the prior-art contouring method of the present invention, contouring effects of target images were created manually based on the features of the target images alone—e.g., by “specifically contouring the circumference of the area,” Spec. ¶ 4. As such, even if this method of contouring were somehow automated, it would not fall within the scope of Appellants’ claims. This is because the prior art contouring method does not perform the contouring in the target images *based upon disparities mapped from the source image to the target image*.

The Examiner’s reliance on cases such as *Venner, Smith, and Rundell* is misplaced. These cases arise in the context of 35 U.S.C. § 103 rejections and address the obviousness of automating or otherwise modifying known manual devices and activities. *See, e.g.*, MPEP § 2144.04(III) (discussing *Venner’s* holding that “it is not ‘invention’ to broadly provide a mechanical or automatic means to replace manual activity [that] has accomplished the same result”). These cases have no bearing on the question of whether claiming a new method for automating a known manually performed method renders the invention patent eligible under 35 U.S.C. § 101.

We note for completeness that the Federal Circuit addressed a similar question in the context of patent eligibility:

[M]ere automation of manual processes using generic computers does not constitute a patentable improvement in computer technology. In those cases, “the focus of the claims is not on such an improvement in computers as tools, but on certain independently abstract ideas that use computers as tools.”

Credit Acceptance Corp. v. Westlake Servs., 859 F.3d 1044, 1055 (Fed. Cir. 2017). The court in *Credit Acceptance Corp.* then determined that those claims’ automated communication step “does not amount to an improvement in computer technology.” *Id.*

However, that determination was reached in relation to an inquiry under step *one* of the *Alice* framework. *See id.* (supporting the court’s determination by citing to the *Enfish* court’s interpretation of *Alice*’s step-one inquiry). That is, *Credit Acceptance Corp.* supports the Examiner’s determination that the claims are directed to an abstract idea under step one of *Alice*. But we already agree with that legal determination. *See* our discussion of *Electric Power Group* and *Abele*, *supra*. This determination does not address *Alice*’s separate step-two inquiry—whether the claims additionally contain an “inventive concept” sufficient to “transform the nature of the claim into a patent-eligible application.” *Alice*, 134 S. Ct. at 2355.

For the reasons explained above, Appellants have provided persuasive argument under the step-two analysis that the presently claimed invention entails an improvement to medical imaging systems as tools. On the other hand, the Examiner has not provided persuasive evidence that Appellants’ automated propagation of manually contoured effects based upon mappings of pixel intensities was a well-understood, routine, and conventional use of a generic computer.

DECISION

The Examiner’s decision rejecting claims 1–7, 9, 10, and 12–21 is reversed.

REVERSED