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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MITSURU UEDA and TAKAYA UNO
(APPLICANT: HITACHI ALOKA MEDICAL, LTD.)

Appeal 2017-008887
Application 14/368,172¹
Technology Center 3700

Before DONALD E. ADAMS, JOHN G. NEW, and RYAN H. FLAX,
Administrative Patent Judges.

ADAMS, *Administrative Patent Judge.*

DECISION ON APPEAL

This Appeal under 35 U.S.C. § 134(a) involves claims 7–12 (Final Act.² 2). Examiner entered a rejection under 35 U.S.C. § 101. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ Appellants identify “Hitachi, Ltd.” as the real party in interest (App. Br. 2).

² Final Office Action mailed May 19, 2016.

STATEMENT OF THE CASE

Appellants' disclosure "relates to an ultrasound diagnostic apparatus, and in particular to a compounding process of a plurality of sets of frame data; that is, a spatial compounding process" (Spec. ¶ 1). Appellants' claim 7 is representative and reproduced below:

7. An ultrasound apparatus, comprising:

an array transducer that transmits and receives ultrasound beams;

a controller that causes the array transducer to transmit and receive ultrasound beams and sequentially forms N ultrasound beam scanning planes (where N is an integer greater than or equal to 2) while switching an ultrasound beam deflection angle to generate N sets of frame data forming an ultrasound image of an object scanned by the ultrasound beams; and

an information processing device that *generates compounded frame data through a compounding process of the N sets of frame data, wherein*

the information processing device uses a plurality of sub-regions with different overlapping portions between the plurality of sub-regions when the N sets of frame data are spatially overlapped, the plurality of sub-regions including a central sub-region in which all of the N sets of frame data are compounded and a plurality of peripheral sub-regions in which a subset of the N sets of frame data are compounded, with each of N frame data identifiers identifying each of the plurality of sub-regions,

in the compounding process in each of the peripheral sub-regions, the information processing device applies a common compounding function that duplicates at least one set of the N sets of frame data covering the peripheral sub-region for additive elements in the common compounding function so that a gain after the compounding process for the central sub-region and a gain after the compounding process for each of the peripheral sub-regions are matched, and

the information processing device generates the ultrasound image of the object scanned by the ultrasound beams using the compounded frame data having the matched gains for the central region and the peripheral sub-regions,

the common compounding function has the value N in a denominator and N additive elements in a numerator,

a correspondence table which is a table in which the N frame data identifiers for N echo values to be substituted for the N additive elements are registered for each of the plurality of sub-regions, and in which the same frame data identifier for the duplicated at least one of the N sets of frame data covering the peripheral sub-region is registered in a duplicated manner, and

the information processing device substitutes N echo values to the common compounding function while referring to the correspondence table for each of the sub-regions, and executes the common compounding function.

(App. Br. 22–23 (emphasis added).)

Appellants' claims 7–12 stand rejected under 35 U.S.C. § 101.

ISSUE

Does the evidence of record support Examiner's finding that Appellants' claimed invention is directed to patent ineligible subject matter?

ANALYSIS

Those of ordinary skill in this art recognize that “[a]n ultrasound diagnostic apparatus transmits and receives ultrasound to and from a living body, and forms an ultrasound image based on information obtained by the transmission and reception of the ultrasound” (Spec. ¶ 2). As Appellants explain, the use of an “electric linear scanning probe” during an ultrasound is routine in this art and, in the use of such a probe to produce an “electric linear scan, a transmission and reception opening for forming a beam is set on an array transducer in the probe, and the transmission and reception

opening is scanned” (*id.*). Thus, “the ultrasound beam is linearly scanned, and a [rectangular] beam scanning plane is formed . . . in a direction perpendicular to the array transducer; that is, a direction of a beam deflection angle of 0 degree” (*id.*; *see* Ans. 4 (“the claimed array transducer, controller, and processing device are . . . all routine and conventional elements that are well understood in the art (as support[ed] by . . . [Appellants’] . . . [S]pecification . . . [see] Paragraphs 0002-0005”)); *see also* Ans. 4, 5, and 8–9).

In relation to the ultrasound diagnosis, in the related art, a spatial compounding method is known. In the spatial compounding, a plurality of beam scanning planes are repeatedly formed while switching the beam deflection condition in a circulating manner, and, thus, a frame data array arranged in time sequential order is obtained. In the frame data array, a compounding process is sequentially executed with a predetermined number of frames as a unit, to sequentially generate compounded frame data. According to the spatial compounding, an image can be formed based on data obtained by executing transmission and reception of the ultrasound in a plurality of directions with respect to a certain tissue, resulting in a superior image of the tissue. In addition, such a method can reduce noise, such as artifact present in the space, with respect to the signal.

(Spec. ¶ 3.) “In the above-described spatial compounding, in a two-dimensional compounding space, a plurality of sub-regions are generated; that is, a plurality of sub-regions are defined, based on a difference in the overlapping manner of a plurality of sets of frame data; that is, a difference in the overlapping structures” (*id.* ¶ 4).

For example, when a basic frame data set of a rectangular shape obtained under the condition of the beam deflection angle of 0 degree, a positive-side deflection set of frame data of a parallelogram shape obtained under the condition of the beam

deflection angle of +15 degrees, and a negative-side deflection set of frame data of a parallelogram shape obtained under the condition of the beam deflection angle of -15 degrees are compounded, there are generated a central sub-region (I) in which three sets of frame data overlap, two peripheral sub-regions (II) and (III) in which two sets of frame data overlap, and a deep sub-region (IV) in which only the basic set of frame data exists. The deep sub-region (IV) is a region which is in general not displayed.

Basically, the spatial compounding executes an additive average process for coordinates in each region between a plurality of frames. In the above-described example configuration, in the central sub-region (I), an additive average calculation is executed to divide a sum of three echo values obtained from three sets of frame data by 3, and, in the two peripheral sub-regions (II) and (III), an additive average calculation is executed to divide the sum of two echo values obtained from two sets of frame data by 2.

(*Id.* ¶¶ 4–5; *see* Ans. 3 (“a review of . . . [Appellants’] [S]pecification (Paragraphs 0003-0005) shows that ‘spatial compounding’ . . . was well known in the art of ultrasound imaging”); *see also* Ans. 9.)

In sum, the evidence on this record supports a finding that an ultrasound apparatus comprising an array transducer within the scope of Appellants’ claims, a controller within the scope of Appellants’ claims, and an information processing device, within the scope of Appellants’ claims, that manipulates data, produced by the apparatus, to produce an image is routine, conventional, and well-understood by those of ordinary skill in this art (*see* Spec. ¶¶ 2–5; *see* Ans. 3–5 and 8–9).

As Examiner explains, the difference between Appellants’ claimed ultrasound apparatus and those known to those of ordinary skill in this art is the manner in which the ultrasound data is manipulated to produce an image (*see* Final Act. 3–4). In this regard, Examiner finds that Appellants’ claim 7

is directed to “mathematical operations for relating data,” an abstract idea, wherein “compounded frame data [is generated] through a compounding process of . . . N sets of frame data” using “a plurality of sub-regions with different overlapping portions between the plurality of sub-regions when the N sets of frame data are spatially overlapped” and

a common compounding function [is used in the compounding process] that duplicates at least one of the N sets of frame data covering the peripheral sub-region for additive elements in the common compounding function so that a gain [after the compounding process for each of the peripheral sub-regions] are matched.

(Final Act. 3 (internal quotation marks and citations omitted).) *See Electric Power Group, LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016)

(“The focus of the asserted claims . . . is on collecting information, analyzing it, and displaying certain results of the collection and analysis. . . . [T]hese claims focus on an abstract idea”).

The scope of 35 U.S.C. § 101 “is subject to an implicit exception for ‘laws of nature, natural phenomena, and abstract ideas,’ which are not patentable.” *Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d 1332, 1338 (Fed. Cir. 2017) (citing *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2355 (2014)).

To determine whether the exception applies . . . a court must determine: (1) whether the claim is directed to a patent-ineligible concept, i.e., a law of nature, a natural phenomenon, or an abstract idea [(the “abstract idea” step)]; and if so, (2) whether the elements of the claim, considered “both individually and ‘as an ordered combination,’” add enough to

“transform the nature of the claim’ into a patent-eligible application [(the ‘inventive concept’ step)].” (*Intellectual Ventures*, 850 F.3d at 1338 (quoting *Alice Corp.*, 134 S. Ct. at 2355)).

Mathematically manipulating ultrasound data to produce an image is an abstract process. *See Intellectual Ventures*, 850 F.3d at 1340 (“an invention directed to collection, manipulation, and display of data was an abstract process”); *see id.* (“customizing information and presenting it to users based on particular characteristics is abstract as well”). In addition, “simply implementing a mathematical principle on a physical machine, namely a computer, . . . [is] not a patentable application of that principle.” *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66, 84–85 (2012). Therefore, we find that Appellants’ claimed invention is “directed to a patent-ineligible concept,” specifically an abstract idea.

Without additional limitations, a process that employs mathematical algorithms to manipulate existing information to generate additional information 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.” *Parker v. Flook*, 437 U.S. 584, 595 . . . (1978) (internal quotations omitted). *Digitech Image Techs., LLC v. Elecs. For Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014); *cf.* App. Br. 14–17; Reply Br. 11.

For the reasons set forth above, we agree with Examiner’s finding that Appellants’ controller, array transducer, and information processing device are well-understood, routine, and conventional elements, which are known and used by those of ordinary skill in this art (*see* Final Act. 4; *see generally id.* at 3–5; Spec. ¶¶ 2–5). Thus, we find that Appellants’ claimed invention fails the second step of the Supreme Court’s test: The search for an

“inventive concept.” *See Intellectual Ventures*, 850 F.3d at 1338. Stated differently, when the elements of Appellants’ claims are considered both individually and as an ordered combination, Appellants’ claimed invention does no more than use a well-understood, conventional, and routine ultrasound apparatus to manipulate ultrasound data to generate additional data, an image, for display (*cf.* Reply Br. 22 (Appellants’ “claim 7 . . . starts with the control and transmission of ultrasound, the transformation thereof into frame data, the transformation thereof into compounded frame data in the specific manner claimed, and the further transformation thereof into an image”)). Thus, the additional elements of Appellants’ claimed invention fail to add enough to “transform the nature of . . . [Appellants’] claim’ into a patent-eligible application.” *Intellectual Ventures*, 850 F.3d at 1338 (internal citation omitted); *see id.* at 1341–42.

“At step two, more is required than ‘well-understood, routine, conventional activity already engaged in by the scientific community,’ which fails to transform the claim into ‘significantly more than a patent upon the’ ineligible concept itself.” *See Rapid Litig. Mgmt. Ltd. v. CellzDirect, Inc.*, 827 F.3d 1042, 1047 (Fed. Cir. 2016) (internal citation omitted); *see also* USPTO, JULY 2015 UPDATE APPENDIX 1: EXAMPLES, 1–22 (Abstract Ideas) (issued July 30, 2015), Example 24,³ p. 14 (“Taken alone or as an ordered combination, . . . [the] additional elements do not amount to a claim as a whole that is significantly more than the exception”); *see* App. Br. 15 (“the claim [set forth in Example 24] was held to be a patent ineligible abstract idea of a mathematical formula, with nothing ‘significantly more’”);

³ Available at <https://www.uspto.gov/sites/default/files/documents/ieg-july-2015-app1.pdf> (hereinafter “Example 24”).

cf. Reply Br. 10–11 and 14–15; *see also id.* at 16–17 (citing “the November 2, 2016 USPTO Subject Matter Eligibility update” and “the May 4, 2016 USPTO patent eligibility guidelines”).

For the foregoing reasons, we are not persuaded by Appellants’ contention that their “claimed invention recites patent eligible subject matter: (A) because it is not ‘directed to’ any claim already found to be an abstract idea by a court under the *Alice/Mayo* Step 2A; and (B) because it recites ‘significantly more’ than the alleged abstract idea under *Alice/Mayo* Step 2B” (App. Br. 3). Instead, we find no error in Examiner’s finding that Appellants’ “claims are not patent eligible” (Final Act. 5).

We are not persuaded by Appellants’ contentions regarding *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016) (*see* App. Br. 3–8). On this record, Appellants’ claimed invention uses a well-understood, conventional, and routine ultrasound apparatus to manipulate ultrasound data to generate additional data, an image, for display (*see* App. Br. 10 (Appellants assert that their claims improve “the image quality of a B-mode image (two-dimensional tomographic image) . . . in comparison to the related art”); *see generally id.* at 14; *see also* Reply Br. 6–12). Thus, Appellants’ claimed invention uses an existing ultrasound apparatus as a tool in aid of processes focused on “abstract ideas.” *See Electric Power Group*, 830 F.3d at 1354.

In contrast, “the claims at issue [in *Enfish*] focused not on asserted advances in uses to which existing computer capabilities could be put, but on a specific improvement—a particular database technique—in how computers could carry out one of their basic functions of storage and retrieval of data.” *Id.*; *cf.* App. Br. 8 (citing USPTO Memorandum, RECENT

SUBJECT MATTER ELIGIBILITY DECISIONS (*ENFISH, LLC v. MICROSOFT CORP. AND TLI COMMUNICATIONS LLC v. A. V AUTOMOTIVE, LLC*) (issued May 19, 2016)). An improvement in computer capability was also found in *Research Corp. Technologies Inc. v. Microsoft Corp.*, 627 F.3d 859 (Fed. Cir. 2010), where “higher quality halftone images [were produced] while using less processor power and memory space.” *Research Corp.*, 627 F.35 at 865. We do not find, and Appellants have not identified, such a technological advance, i.e., “using less processor power and memory space,” in Appellants’ claimed invention. *Id.*; see Ans. 3 (Appellants have “not provided any objective evidence or teachings of the [S]pecification to substantiate . . . [an] assertion that [Appellants’] claimed apparatus ‘improves’ the technology”); *cf.* App. Br. 20; Reply Br. 3–4 and 20–22.

For the foregoing reasons we are not persuaded by Appellants’ contentions regarding “Example 3 of the USPTO’s January 2015 Examples,”⁴ which is modeled after the technology in *Research Corp* (see App. Br. 20). Notwithstanding Appellants’ contentions to the contrary, and consistent with the above discussion, Example 3 explains that the Example’s “claimed process with the improved blue noise mask allows the computer to use . . . less memory than required for prior masks, results in faster computation time without sacrificing the quality of the resulting image as

⁴ USPTO, EXAMPLES: ABSTRACT IDEAS, 1–20 (issued January 27, 2015), available at https://www.uspto.gov/sites/default/files/documents/abstract_idea_examples.pdf (hereinafter “Example 3”).

occurred in prior processes, and produces an improved digital image” (Example 3, p. 9). Thus, as Example 3 explains,

[u]nlike the invention in *Alice Corp.*, . . . [claim 1 of Example 3] is not merely limiting the abstract idea to a computer environment by simply performing the idea via a computer (*i.e.*, not merely performing routine data receipt and storage or mathematical operations on a computer), but rather is an innovation in computer technology, namely digital image processing, which in . . . [Example 3] reflects both an improvement in the functioning of the computer and an improvement in another technology

(Example 3, p. 9). As discussed above, we do not find, and Appellants have not identified, such a technological advance in Appellants’ claimed invention (*see* Ans. 3 (Appellants have “not provided any objective evidence or teachings of the [S]pecification to substantiate [an] assertion that [Appellants’] claimed apparatus ‘improves’ the technology”); *cf.* Reply Br. 3–4).

Similarly, we are not persuaded by Appellants’ contentions regarding *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299 (Fed. Cir. 2016) (*see* App. Br. 8–9). Unlike the claims on this record, “[t]he claims in *McRO* were not directed to an abstract idea,” to the contrary, “the claimed improvement . . . [was] allowing computers to produce ‘accurate and realistic lip synchronization and facial expressions in animated characters’ that previously could only be produced by human animators.” *FairWarning IP, LLC v. Iatric Systems, Inc.*, 839 F.3d 1089, 1094 (Fed. Cir. 2016) (internal citation omitted); *see also* App. Br. 9 (citing USPTO Memorandum, RECENT SUBJECT MATTER ELIGIBILITY DECISIONS (issued November 2, 2016)); *cf.* Reply Br. 10–14.

We are also not persuaded by Appellants’ contentions regarding *Diamond v. Diehr*, 450 U.S. 175 (1981) (*see* App. Br. 18–19; Reply Br. 17–20). Although *Diehr*’s claims involved a mathematical equation, unlike Appellants’ claimed invention, *Diehr*’s

overall process [was] patent eligible because of the way the additional steps of the process integrated the equation into the process as a whole. Those steps included “installing rubber in a press, closing the mold, constantly determining the temperature of the mold, constantly recalculating the appropriate cure time through the use of the formula and a digital computer, and automatically opening the press at the proper time.” . . . These other steps apparently added to the formula something that in terms of patent law’s objectives had significance—they transformed the process into an inventive application of the formula.

Mayo, 566 U.S. at 80–81. As discussed above, the preponderance of evidence on this record supports a finding that the additional elements of Appellants’ claimed invention are “well-understood, routine, [and] conventional . . .” in this art, “which fails to transform the claim into ‘significantly more than a patent upon the’ ineligible concept itself.” *See Rapid Litig. Mgmt.*, 827 F.3d at 1047 (internal citation omitted). For the foregoing reasons, we are not persuaded by Appellants’ contention that their claimed “invention recites significantly more than just a mathematical formula,” because well-understood, routine, and conventional elements of an ultrasound apparatus are used to generate data, which is manipulated, to achieve more data, i.e., an image (App. Br. 19; *see also id.* at 17; Reply Br. 17–20). *See Rapid Litig. Mgmt.*, 827 F.3d at 1047.

CONCLUSION

The evidence of record supports Examiner’s finding that Appellants’ claimed invention is directed to patent ineligible subject matter. The

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rejection of claim 7 under 35 U.S.C. § 101 is affirmed. Claims 8–12 are not separately argued and fall with claim 7.

TIME PERIOD FOR RESPONSE

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

AFFIRMED