

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS INC.,
Petitioner,

v.

VELOS MEDIA, LLC,
Patent Owner.

Case IPR2019-00194
Patent 9,338,449 B2

Before RAMA G. ELLURU, JASON W. MELVIN, and
AARON W. MOORE, *Administrative Patent Judges*.

MELVIN, *Administrative Patent Judge*.

DECISION
Instituting *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Petitioner, Unified Patents, Inc., filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1–3, 5, 13–15, and 17 (“the challenged claims”) of U.S. Patent No. 9,338,449 B2 (Ex. 1001, “the ’449 patent”). Patent Owner, Velos Media, LLC, timely filed a Preliminary Response. Paper 7 (“Prelim. Resp.”). Pursuant to 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a), we have authority to determine whether to institute review.

An *inter partes* review may not be instituted unless “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). For the reasons set forth below, we conclude that Petitioner has shown a reasonable likelihood it will prevail in establishing the unpatentability of at least one challenged claim. We, therefore, institute *inter partes* review of the challenged claims of the ’449 patent in this proceeding.

A. THE ’449 PATENT

The ’449 patent is titled “Harmonized Scan Order for Coding Transform Coefficients in Video Coding” and describes techniques related to processing of video-compression data. Ex. 1001, [54], 1:16–2:17. The patent describes that video compression involves processing blocks of image data with spatial or temporal prediction to generate blocks of residual data that represent pixel-level differences between the original block and the predictive block. *Id.* at 1:35–55. Further processing transforms the data into a transform domain and quantizes the data, thus producing blocks of quantized residual transform coefficients. *Id.* at 1:55–58. The two-

dimensional blocks of transform coefficients may be scanned to produce a one-dimensional vector of transform coefficients suitable for entropy coding. *Id.* at 1:58–62. The patent explains that, “[t]o entropy code a block of quantized transform coefficients, a scanning process is usually performed so that the two-dimensional (2D) array of quantized transform coefficients in a block is processed, according to a particular scan order, in an ordered, one-dimensional (1D) array, i.e., vector, of transform coefficients.” *Id.* at 5:51–56.

The ’449 patent states that “scan order may be important for efficient entropy coding.” *Id.* at 6:5–6. It purports to improve the scanning process by selecting the order for scanning a block of transform coefficients during each of multiple passes. *Id.* at 2:12–51. In the video-compression standards discussed, the transform coefficients are first scanned to determine the location of significant (nonzero) coefficients, creating a significance map identifying such locations. *Id.* at 7:28–8:31. Then, the level of each significant coefficient is scanned and coded. *Id.* at 8:31–34. The ’449 patent states that conventional coding processes disadvantageously used different scan orders for coding the significance map and coding the coefficient levels. *Id.* at 10:11–44. The ’449 patent proposes approaches that address the drawbacks with conventional coding processes. *Id.* at 10:65–11:1. One proposed approach is scanning the transform coefficients in the same order for significance coding and level coding. *Id.* at 13:47–55, 16:36–56. The challenged claims reflect that approach, as set forth below.

B. CHALLENGED CLAIMS

Challenged claims 1 and 13 are independent. Claim 1 is illustrative and is reproduced below:

1. A method of coding a plurality of transform coefficients associated with residual video data in a video coding process, the method comprising:
 - coding information indicating significant coefficients for the plurality of transform coefficients according to a scan order in a first scan pass, wherein the scan order includes a scan pattern and a scan direction; and
 - coding information indicating levels of significant coefficients of the plurality of transform coefficients according to the scan order used for coding the information indicating significant coefficients in a second scan pass.

Id. at 39:45–55. Claim 13 recites parallel limitations, recited as instructions on a non-transitory computer-readable storage medium that cause a processor to perform the claimed method. *Id.* at 40:36–48.

C. PROPOSED GROUNDS OF UNPATENTABILITY

Petitioner asserts the following grounds of unpatentability, each based on 35 U.S.C. § 103:

Reference(s)	Claims
Cheon ¹ and Perera ²	1–3, 5, 13–15, and 17
Perera	1–3, 5, 13–15, and 17
Cheon and Mallat ³	1–3, 5, 13–15, and 17

¹ U.S. Publication No. 2011/0096834 (filed Oct. 28, 2010; published Apr. 28, 2011) (Ex. 1003).

² U.S. Publication No. 2008/0043833 (published Feb. 21, 2008) (Ex. 1004).

³ Stéphane Mallat, *Analysis of Low Bit Rate Image Transform Coding*, IEEE Transactions on Signal Processing, Vol. 46, No. 4, April 1998, at 1027 (Ex. 1020).

Pet. 4. Petitioner also relies on the Declaration of Lina J. Karam, Ph.D. (Ex. 1002). *See generally* Pet. 4–79.

II. DISCUSSION

A. CLAIM CONSTRUCTION

Petitioner proposes a construction for “information indicating levels of significant coefficients” as used in the independent claims. Pet. 27. Patent Owner disputes Petitioner’s proposed construction (Prelim. Resp. 18–21) and asserts that the construction of that claim term does not impact issues relevant to this decision (*id.* at 18 n.4). We conclude that, for purposes of this Decision, there is no need to construe “information indicating levels of significant coefficients” to resolve issues presented by the Petition and Preliminary Response. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

As discussed below, the claims recite “coding a plurality of transform coefficients” by coding information “according to a scan order in a first scan pass” and “a second scan pass.” Ex. 1001, 39:45–55. Our analysis of Petitioner’s assertions depends on whether the “first scan pass” and “second scan pass” require scanning the plurality of transform coefficients, or can instead encompass scanning an intermediate data set. For purposes of this decision, we construe “first scan pass” and “second scan pass” as scans of the plurality of transform coefficients. The ’449 patent states that “[t]he quantized transform coefficients, initially arranged in a two-dimensional array, may be scanned in a particular order to produce a one-dimensional vector of transform coefficients for entropy coding.” *Id.* at 1:58–62. When the Specification describes scanning, it is a process applied to the transform

coefficients, to obtain a one-dimensional array from a two-dimensional block of coefficients. *See, e.g., id.* at 5:51–59, 7:61–65, Figs. 2, 3, 6. Thus, we conclude, for purposes of this decision, that the claimed scan passes require scanning the plurality of transform coefficients.

Additionally, to the extent the claimed scan passes could involve scanning a set of data other than the plurality of transform coefficients, it may be important to resolve whether the two scan passes must involve the same data set. In their respective subsequent papers, the parties should address whether claims to “coding a plurality of transform coefficients” by “coding information . . . in a first scan pass” and a “second scan pass” require scanning the transform coefficients and, if not, whether the claims nonetheless require scanning the same information in both passes.

We conclude that no other terms require construction at this stage.

B. UNPATENTABILITY BASED ON PERERA

In the first ground, Petitioner asserts that Cheon teaches most limitations of claim 1 and that Perera teaches performing a second scan “according to the scan order used for coding the information indicating significant coefficients.” Pet. 39–62. In the second ground, Petitioner asserts that Perera teaches all limitations. Pet. 67. We conclude that Petitioner has not shown a reasonable likelihood of success regarding Perera’s asserted teachings.

Claim 1 requires coding information in a first scan pass and second scan pass, performing the two scan passes according to the same scan order. Ex. 1001, 39:48–55. Petitioner asserts Perera “discloses using the same scanning order for encoding the level information and significance map.” Pet. 53 (citing Ex. 1004 ¶¶ 41–43). Addressing Perera’s teachings, Petitioner

states that Perera “codes the levels of series 52 to form coefficients 58 in series 60 in the same scan order as the coding of block 50 to form series 52.” Pet. 53. Petitioner states also that, to generate the values of significant coefficients according to Perera, “series 52 (including significant coefficients) would have been scanned” in the same pattern as encoding of Perera’s significance map 54. *Id.* at 54.

Perera discloses that “each block [of residual video data] is scanned in a certain order to generate a series of data (a first data series 52).” Ex. 1004 ¶ 42. It also discloses that “the significance map 54 . . . indicates the location of non-zero values in the data series 52.” *Id.* Thus, Perera discloses determining the significant coefficients by scanning data series 52 rather than by scanning the residual video data. As discussed above, we construe the claimed scan passes as scans of the plurality of transform coefficients. *See supra* at 5. With that understanding of the claim, Perera discloses a different process, in which residual data is first scanned to produce a one-dimensional array and then that array is used to code information indicating the significant coefficients and the levels of those coefficients.

To the extent that the claims encompass scanning two different sets of data for the first and second scan passes (as Petitioner appears to describe Perera), Petitioner does not explain how scanning a block of data to obtain an array could be performed in the same order (pattern and direction) as scanning that array to code information about the levels of coefficients in the array. Petitioner states that “a horizontal pattern moving in a forward direction” applies to Perera’s scans of both block data 50 and data series 52. Pet. 53. But that ignores the multidimensional aspect of scanning a block of data. *See Prelim. Resp.* 42–43; *see also id.* at 41 (“[A] scan of a one-

dimensional data series 52 would not have both a ‘scan pattern’ and a ‘scan direction’”). Because Petitioner asserts that Perera discloses scanning two separate configurations of source data, we cannot conclude on the present record that Petitioner has shown Perera teaches two scans using the same pattern and direction.⁴

Petitioner’s assertions for claim 13 rely on its assertions for claim 1, and, therefore, suffer from the same deficiencies. Petitioner’s assertions for the dependent claims do not remedy those deficiencies. Accordingly, we conclude that Petitioner has not shown a reasonable likelihood of prevailing with respect to unpatentability grounds based on Perera.

C. UNPATENTABILITY OVER CHEON AND MALLAT

Petitioner asserts that Cheon teaches most limitations of claim 1, that Mallat teaches performing a second scan pass in the same order as a first pass, and that persons of skill would have had reason to apply Mallat’s teachings to those of Cheon to arrive at the claimed method. Pet. 68–79.

Cheon discloses image-compression techniques for encoding and decoding blocks of residual data. Ex. 1003 ¶¶ 3, 5, 210–216. Cheon’s coding process involves scanning blocks of residual data to produce a significance

⁴ Patent Owner argues additionally that Perera does not disclose “coding” because (1) converting numbers from one base to another is not coding and (2) Perera involves data transfer within a computer, which does not include actually converting numbers because they are all stored as binary values within the computer. Prelim. Resp. 47–49. We note that the ’449 patent refers to “entropy coding” (*e.g.*, Ex. 1001, 5:51–56), but does not appear to define or limit “coding.” Moreover, Perera discusses entropy coding in the same fashion as the ’449 patent. See Ex. 1004 ¶¶ 7–8. Thus, on the present record, Patent Owner’s argument regarding Perera’s coding is not persuasive.

map and level information for the significant residuals. *Id.* ¶¶ 174–175, Figs. 14A–C.

Mallat discloses image-compression techniques using transform coding. Ex. 1020, 1027. In particular, Mallat describes a wavelet transform coder and discloses that, “[t]o improve the efficiency of this transform coding, the wavelet coefficients are scanned in a predefined order, and the position of zero versus nonzero quantized coefficients is recorded . . .” *Id.* Then, “[i]n the same scanning order, the amplitude of the nonzero quantized coefficients are also entropy coded . . .” *Id.* at 1027–28.

Petitioner asserts that using Mallat’s teachings with Cheon’s would result in the method of claim 1. Pet. 70–79. In particular, Cheon discloses scanning a plurality of transform coefficients with a particular scan pattern and direction to determine a significance map and states that “[l]evel information of an effective coefficient . . . is encoded after the significance map is encoded.” Ex. 1003 ¶ 175. A person of skill would, in Petitioner’s view, configure a system to scan for the level information using the same scanning order as used for scanning for significance information, as taught by Mallat. Pet. 72–79. Petitioner asserts that using the same scan order for both scans “allows for more efficient coding by using statistics of adjacent transform blocks, thereby improving the overall coding efficiency.” *Id.* at 74–75 (citing Ex. 1017, 28:46–51, 29:5–9). Further, asserts Petitioner, scanning according to Mallat’s order (the same order for both scans) would have been a simple substitution for Cheon’s undisclosed second scan order. *Id.* at 77. Petitioner asserts also that it would have been obvious to try using the same scan order for Cheon’s second scan because it was the alternative to using a different scan order. *Id.* at 78.

Patent Owner argues that neither Cheon nor Mallat teaches a “second scan pass.” Prelim. Resp. 32–37, 49–52. Cheon discloses determining the significance map “according to a predetermined scanning order” and that “level information of an effective coefficient . . . is encoded after the significance map is encoded.” Ex. 1003 ¶ 175. Petitioner submits that because Cheon states that the level information is encoded “after” the significance map is encoded, Cheon teaches that the level information is encoded in a second scanning pass. Pet. 70–71 (citing Ex. 1003 ¶¶ 175, 215; Ex. 1002 ¶ 165); *see also id.* at 61.

Patent Owner argues that Petitioner relies on inherency without adequate support. Prelim. Resp. 32–36. We do not agree. Petitioner contends that Cheon teaches the second scan pass because it teaches that level information is encoded only after creating the significance map as a whole, and that level information is encoded in a scanning operation. *See* Pet. 70–71. According to Petitioner, skilled artisans would have read Cheon and understood it to teach encoding level information in a second scan pass. *Id.* at 61 (citing Ex. 1002 ¶ 127). That is an assertion of what a person of skill would understand Cheon to disclose, not an assertion that following Cheon’s disclosures necessarily produces a certain result.

Petitioner points out that Mallat discloses encoding coefficient amplitudes in a second scan pass that uses the same scanning order as the first scan pass to determine the position of nonzero coefficients. Pet. 71–72 (citing Ex. 1020, 1028–29; Ex. 1002, ¶¶ 167–168). Patent Owner argues that Mallat “does not disclose that its ‘scan order’ has both a ‘scan pattern’ and a ‘scan direction.’” Prelim. Resp. 53. According to Patent Owner, such characteristics are not inherent to a scan order, as confirmed by the

prosecution history of the '449 patent, where the applicants added those characteristics as further requirements of the scan order to secure allowance. *Id.* at 54–55. We need not decide whether Mallat’s scan order has both a scan pattern and scan direction because Petitioner relies on Cheon for the nature (pattern and direction) of the claimed scan, and relies on Mallat as teaching performing the second scan in the same order as the first. *See* Pet. 70–79. Repeating a scan order with a scan pattern and direction (such as Cheon’s scan to determine its significance map) includes repeating the pattern and direction of that scan. Thus, based on the present record, Petitioner has shown that the combination of Cheon and Mallat discloses the claimed “second scan pass” including a pattern and direction.

Patent Owner raises no further arguments at this stage. Petitioner provides contentions regarding the uncontested limitations of claim 1 and regarding the other challenged claims. We have reviewed Petitioner’s assertions of unpatentability based on Cheon and Mallat and determine that they are sufficient to warrant institution.

III. CONCLUSION

For the reasons discussed above, we conclude Petitioner has shown a reasonable likelihood that it will prevail with respect to unpatentability over Cheon and Mallat. Although Petitioner did not meet the institution threshold regarding the other asserted grounds, we include those within the instituted trial. *See BioDelivery Scis. Int’l, Inc. v. Aquestive Therapeutics, Inc.*, 898 F.3d 1205, 1209 (Fed. Cir. 2018) (holding that *SAS Institute, Inc. v. Iancu*, 138 S. Ct. 1348 (2018) “requires institution on all challenged claims and all challenged grounds”).

IV. ORDER

Accordingly, it is

ORDERED that, pursuant to 35 U.S.C. § 314(a), *inter partes* review of the '449 patent is instituted for the challenged claims on the grounds identified in the Petition.

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