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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MUHAMMED ZEYD COBAN, YUNFEI ZHENG,
JOEL SOLE ROJALS, and MARTA KARCZEWICZ

Appeal 2017-010039
Application 13/332,054
Technology Center 2400

Before JEREMY J. CURCURI, BETH Z. SHAW, and
JOHN F. HORVATH, *Administrative Patent Judges*.

HORVATH, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant seeks review, under 35 U.S.C. § 134(a), of the Examiner's rejection of claims 1, 3–11, 13–22, 24–32, and 34–45. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM and enter NEW GROUNDS OF REJECTION pursuant to our authority under 37 C.F.R. § 41.50(b).

SUMMARY OF THE INVENTION

The invention is directed to a method for coding a block of video data that includes coding information identifying a scanning order associated with the block of video data. Spec. ¶¶ 2, 6.

According to the Specification, a correlation exists between "a prediction mode and a size associated with a block of video data, and a scanning order associated with the block." *Id.* ¶ 29. As a result, "a particular scanning order may be used to code the block more often than any other scanning order." *Id.* ¶ 30. This allows for increased coding efficiency when "coding scanning order information for blocks of video data." *Id.* ¶ 31. First "an indication of whether the scanning order associated with the block . . . is the most probable scanning order" is encoded. If "the scanning order associated with the block is the most probable scanning order, no further scanning order information" is encoded. *Id.* ¶ 32. However, if "the scanning order associated with the block is not the most probable scanning order," further information is needed for "coding an indication of the scanning order associated with the block." *Id.* In this way, "the scanning order information for the block may be coded using less information than when . . . always coding the scanning order information for the block in its entirety." *Id.*

Claim 1, reproduced below, is illustrative of the invention claimed by Appellant:

> 1. A method of coding coefficients associated with a block of video data during a video coding process, the method comprising:
>
> selecting a most probable predefined scanning order from a set of possible predefined scanning orders, wherein selecting

comprises mapping a prediction mode associated with the block and a size associated with the block to the most probable predefined scanning order in the set of possible predefined scanning orders;

coding an indication of whether a scanning order associated with the block is the most probable predefined scanning order;

in response to the scanning order associated with the block being the most probable predefined scanning order, coding the block using the most probable predefined scanning order; and

in response to the scanning order associated with the block not being the most probable predefined scanning order, coding the block using a different scanning order from the set of possible predefined scanning orders that is different than the most probable predefined scanning order.

REFERENCES

He	US 2005/0036549 A1	Feb. 17, 2005
Ye	US 2008/0310504 A1	Dec. 18, 2008
Chen	US 2009/0232204 A1	Sep. 17, 2009

Lee *Adaptive Scanning for H.264/AVC Intra Coding*, ETRI Journal, Vol. 26, No. 5, Oct. 2008, pp. 668–671.

REJECTIONS

Claim 1 stands rejected under 35 U.S.C §103(a) as unpatentable over *He* and *Lee*. Final Act. 8-10.

Claims 3–8, 11, 13–18, 21, 22, 24–29, 32, 34–39, and 42–45 stand rejected under 35 U.S.C §103(a) as unpatentable over *He*, *Lee*, and *Ye*. Final Act. 11–17.

Claims 9, 10, 19, 20, 30, 31, 40, and 41 stand rejected under 35 U.S.C §103(a) as unpatentable over *He*, *Lee*, *Ye*, and *Chen*. Final Act. 17–19.

Claims 22 and 24–31 stand rejected under 35 U.S.C §112 ¶ 2 as indefinite. Final Act. 6–7.

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).

We have reviewed the Examiner's rejections in light of Appellant's arguments that the Examiner has erred. We disagree with Appellant's contentions for the reasons explained below. We designate our affirmance as including new grounds of rejection.

Obviousness over He and Lee

Independent claim 1 recites a method for coding coefficients associated with a block of video data and requires, *inter alia*, "selecting a most probable predefined scanning order . . . wherein selecting comprises mapping a prediction mode associated with the block and a size associated with the block to the most probable predefined scanning order." App. Br. 24.

The Examiner finds the combination of *He* and *Lee* teaches or suggests this limitation. *See* Final Act. 8, 10. In particular, the Examiner finds *He* teaches or suggests selecting a most probable scanning order from a set of predefined scanning orders, and *Lee* teaches or suggests the selection involves mapping a prediction mode and size associated with the block to the most probable scanning order. *Id.* at 8, 10 (citing *He* ¶ 7; *Lee* § III). The Examiner then reasons that it would have been obvious to modify *He*, per teachings of *Lee*, to identify the most probable scanning order based on a block's prediction mode and size in order to improve the compression efficiency of the block encoding.

Appellant argues *He* does not teach or suggest selecting a most probable scanning order, but rather teaches selecting one of two possible scanning orders to encode the fewest bits in a frame. App. Br. 9. Appellant further argues *Lee* does not teach or suggest selecting a most probable scanning order based on prediction mode and size, but rather teaches selecting a scanning order based only on prediction mode. *Id.* at 9–10. Appellant also argues that *Lee* fails to teach or suggest selecting a most probable scanning order at all, because *Lee* fails to recognize that a selected scanning order may differ from the most probable scanning order. *Id.* at 10.

We are not persuaded by Appellant's arguments, which attack the teachings in *He* and *Lee* separately, and fail to consider their combined teachings. The test for obviousness "is *not* whether . . . the claimed invention [is] expressly suggested in any one or all of the references," but rather "what the combined teachings of the references *would have suggested* to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (emphasis added). Thus, "the Board must weigh each reference for its power to suggest solutions to an artisan of ordinary skill." *In re Young*, 927 F.2d 588, 591 (Fed. Cir. 1991).

He teaches that it was known to use a frame/field prediction mode to determine a DCT scan mode, and that "sometimes the best frame/field . . . prediction mode may not produce the best DCT scan mode." *He* ¶ 7. Thus, *He* teaches selecting a "best" or most probable scan mode based on a frame/field prediction mode. *He* further teaches encoding "each frame of [an] image sequence using at least two different scanning modes," to thereby "determine which scanning mode actually will be more efficient." *Id.* ¶ 10; *see also id.* ¶ 53, Fig. 5. Thus, *He* teaches the actual or most efficient scan mode selected for encoding may not be the "best" or most probable scan mode.

Lee teaches that different types of intra coding modes (e.g., intra 16 x 16 and intra 4 x 4) use different prediction modes to encode data, including vertical, horizontal, DC, and planar prediction modes. *Id.* at 668–669. *Lee* selects a "best" one of these prediction modes using a "block-based rate-distortion value." *Id.* at 669. *Lee* then selects a "best" scanning mode based on the selected prediction mode. *Id.* at 670. For example, *Lee* teaches "the horizontal and vertical scanning order are used in the vertical and horizontal prediction mode, and the zigzag scanning order is used in all other prediction modes." *Id.* Thus, *Lee* teaches selecting a "best" scanning mode based on a prediction mode that has itself been selected based on a "block-based" rate distortion measure. The Examiner finds *Lee's* rate distortion measure "is relevant to the size of the blocks" (Final Act. 10), and that *Lee*, therefore, "teaches that a most probable scanning order (such as horizontal scanning order) is assigned/related to a block with a particular prediction mode and size" (Answer 5).

Considering, as a whole, the combined teachings of *He* and *Lee*, we agree with the Examiner that the combination teaches or suggests selecting a most probable scanning order based on block size and prediction mode. *He* teaches selecting a best or most probable scan mode based on prediction mode, and that the scan mode actually selected to encode data may not be the most probable scan mode. *He* ¶¶ 7, 11, 53. *Lee* teaches selecting a best or most probable scan mode based on a prediction mode that is itself selected based on the size of the block to be encoded. *Lee*, 668–670. Thus, the combination of *He* and *Lee* teaches or suggests mapping a prediction mode and block size to a most probable scan mode.

Appellant next argues that a person skilled in the art would not have modified *He* based on the teachings of *Lee*. App. Br. 10. In particular, Appellant argues that *He* teaches applying the same scan mode for all blocks of a frame, *Lee* teaches applying different scan modes on a block by block basis, and that combining the teachings of *Lee* with *He* would therefore fundamentally change the operation of *He*.[1] *Id.* at 10–11.

We are not persuaded by Appellant's arguments for three reasons. First, Appellant's arguments improperly attack the separate teachings of *He* and *Lee*, and fail to consider their combined teachings. *See Keller,* 642 F.2d at 425. *He* and *Lee* must not be read in isolation, but for what they fairly teach in combination with the prior art as a whole. *See In re Merck & Co., Inc.,* 800 F.2d 1091, 1097 (Fed. Cir. 1986). Second, Appellant's arguments depend on bodily incorporating the teachings of *Lee* into *He*, which is also improper. *See Keller*, 642 F.2d at 425 ("The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference."). The Examiner does not suggest bodily incorporating the teachings of *Lee* into the teachings of *He*. Rather, the Examiner suggests "adapting a block based technique into [a] frame based technique" or vice-versa (e.g., adapting He's frame based technique to operate on a block by block basis) because a person skilled in

[1] The Examiner provides a reason to combine the references that is rational and supported by evidence drawn from the record. *See* Final Act. 10 (citing Lee, Abstract). Appellant does not provide any particularized arguments as to why this reasoning is incorrect. *See* App. Br. 8–12.

the art would have known that "determining [the] degree of granularity of [a] video data portion on which the encoding operation is applied is a trade-off between encoding/compression efficiency and computational complexity." Ans. 6–7.

Third, and finally, we disagree with Appellant's contention that "He literally discloses that <u>the same scan</u> is used for <u>**all** blocks of a frame</u>." App. Br. 10. Rather, *He* <u>expressly</u> discloses its method can be performed on either a frame-by-frame or block-by-block basis. *See He*, claim 5 (disclosing dividing a picture into different portions "wherein different portions are coded using different scan modes"); *id.*, claim 6 (disclosing the different "portions comprise[] at least one of slices, macroblocks, and subblocks").

Accordingly, for the reasons stated above, we affirm the Examiner's rejection of claim 1 as obvious over *He* and *Lee*, and designate the rejection a new ground of rejection.

Obviousness over He, Lee, and Ye

The Examiner rejected claims 3–8, 11, 13–18, 21, 22, 24–29, 32, 34–39, and 42–45 as obvious over *He*, *Lee*, and *Ye*. Final Act. 11–17.

1. *Claims 8, 11, 18, 21, 22, 29, 32, 39, and 42–45*

Appellant argues these claims are patentable over the combination of *He*, *Lee*, and *Ye* for the same reasons that claim 1 is patentable over the combination of *He* and *Lee*. App. Br. 12–15, 22. We have considered Appellant's arguments above, and affirm the Examiner's rejection of claims 8, 11, 18, 21, 22, 29, 32, 39, and 42–45 as obvious over *He, Lee, and Ye* for the same reasons discussed above with respect to claim 1, and designate the rejection a new ground of rejection.

2. *Claims 3, 13, 24, and 34*

Claim 3 depends from claim 1, and recites:

> coding the indication of whether the scanning order associated with the block is the most probable predefined scanning order comprises performing a context adaptive entropy coding process that includes applying a context model based on at least one context, wherein the at least one context includes one of the most probable predefined scanning order, the prediction mode associated with the block, or the size associated with the block.

App. Br. 24. Claims 13, 24, and 34 recite a similar limitation. *Id.* at 27, 29, 33.

The Examiner finds the combination of *He* and *Lee* does not teach this limitation, but that it is taught in paragraphs 104 and 129 of *Ye*. Final Act. 11. Therefore, the Examiner finds it would have been obvious to further modify *He* based on the teachings of *Ye* to code the most probable scanning order using a context adaptive entropy coding process to improve the coding efficiency. *Id.* at 12.

Appellant first argues that claims 3, 13, 24, and 34 are patentable over the combination of *He*, *Lee*, and *Ye* for the same reasons that claim 1 is patentable over the combination of *He* and *Lee*. App. Br. 15. We are not persuaded by this argument for the reasons discussed above with respect to claim 1. Appellant next argues that these claims are patentable because paragraph 129 of *Ye* describes using a context adaptive coding process to adjust the actual scanning order for a block, rather than the most probable scanning order. *Id.* at 16. Appellant further argues that although *Ye* teaches using a context adaptive coding process to encode a prediction mode for a block, *Ye* fails to teach using the process to encode whether a scanning order is the most probable scanning order. *Id.* Thus, Appellant argues, a person skilled in the art would not have looked to *Ye* to teach this limitation. *Id.*

The Examiner responds that paragraph 104 of *Ye* teaches "a context adaptive entropy encoding process (CABAC or CAVLC) that includes a context model of prediction mode . . . to perform coding of *indication/syntax* related to video data." Ans. 8 (emphasis added). The Examiner further finds *Ye's* coding of syntax information "is applicable to the coding of an indication of whether a scanning order associated with the block is the most probable predefined scanning order in *He's* system." *Id.* Appellant does not contest these findings, which are supported by evidence drawn from the record, and therefore waives any argument that they are erroneous. *See* Reply Br. 3–8; 37 C.F.R. § 41.37(c)(iv).

Moreover, we agree with the Examiner's findings and reasoning. *Ye* teaches receiving "block header information for [a] block in the form of one or more header syntax elements." *Ye* ¶ 94. The header syntax elements include "particular characteristics of the current video block, *such as* block type, prediction mode, [and] coded block pattern . . ." *Id.* (emphasis added). *Ye* "encodes the header information," and "may encode the syntax elements of the current block based on the syntax elements of one or more previously encoded video blocks." *Id.* ¶ 95.

As Appellant acknowledges, *Ye* expressly teaches using context adaptive entropy encoding to encode the syntax element identifying the prediction mode for a block. *See* App. Br. 16 (citing *Ye* ¶ 134). In particular, *Ye* teaches "encod[ing] a codeword that represents the prediction mode of the current block. . . . using CAVLC, CABAC or other entropy encoding methodology." *Id.* ¶ 137. *Ye* uses different prediction mode contexts (e.g., first, second, and third) to encode the syntax element identifying the prediction mode for the block because doing so "may result in better compression of the prediction mode information." *Id.* ¶¶ 139–142. *Ye* further discloses that "similar techniques may be used to encode other ones of the header syntax elements." *Id.* ¶ 132; *see also id.* ¶ 95.

A person skilled in the art would have known that scanning order information, such as the best or most probable scanning order, is a header syntax element. *See He* ¶ 7 (using "the frame/field prediction mode to determine the DCT scan mode"); *id.* ¶ 6 (setting "a one-bit flag to signal DCT scan mode in the header"); Spec. ¶ 102 ("According to some *coding standards*, such syntax elements may include scanning order information for the block.") (emphasis added). Thus, we agree with the Examiner that *Ye*'s method of coding syntax information using a context adaptive entropy encoding process "is applicable to the coding of an indication of whether a scanning order associated with the block <u>is the most probable predefined scanning order</u> in *He's* system." Ans. 8.

Accordingly, for the reasons explained above, we affirm the Examiner's rejection of claims 3, 13, 24, and 34 over the combination of *He*, *Lee*, and *Ye*, and designate the rejection a new ground of rejection.

3. *Claims 4, 14, 25, and 35*

Claim 4 depends from claim 1, and recites "wherein coding the block using the different scanning order comprises using a zig-zag scanning order to code the coefficients associated with the block without receiving an additional indication of the scanning order associated with the block." App. Br. 25. Claims 14, 25, and 35 recite a similar limitation. *Id.* at 27, 30, 33.

The Examiner finds *He* teaches this limitation by coding a block of data using a zig-zag scanning order when doing so is more efficient than coding the block using an alternative scanning order, which the Examiner identifies as the most probable scanning order. Final Act. 12 (citing *He* ¶ 53, Fig. 5). The Examiner further finds that *Ye* teaches this limitation by coding a block of data using either a zig-zag scanning order or some alternative scanning order such as a horizontal or vertical scanning order. *Id.* (citing *Ye* ¶ 123).

Appellant first argues that claims 4, 14, 25, and 35 are patentable over the combination of *He*, *Lee*, and *Ye* for the same reasons that claim 1 is patentable over the combination of *He* and *Lee*. App. Br. 17. We are not persuaded by this argument for the reasons discussed above with respect to claim 1. Appellant next argues that *He* fails to teach that either the zig-zag or alternative scanning orders are the most probable predefined scanning order. *Id.* Appellant argues the Examiner acknowledged this deficiency in *He*, and therefore relied on *Ye* for teaching this limitation, but that *Ye* merely teaches the zig-zag scanning order is the initial scanning order in an adaptive scanning process, not an alternative to the most probable predefined scanning order. *Id.* at 17–18.

We are not persuaded by Appellant's arguments. First, we agree with the Examiner that "[t]he Final Office Action in no place states the deficiency of *He* in teaching the above-mentioned subject matter." Ans. 8. Second, claim 1 recites the most probable scanning order is selected based on the block size and prediction mode of a *given* block of video data without identifying the *given* block's size or prediction mode. *See* App. Br. 24. Thus, *any* scanning order could be the most probable scanning order for any *given* block of video data, including the zig-zag scanning order, depending on the *given* block's size and prediction mode. This is evident from the array mostProbableScan [4][34] disclosed in the Specification, where each of the four rows in the array represent a block size, and each of the 34 columns in the array represent a prediction mode. *See* Spec. ¶¶ 111, 113. Depending on the block size and prediction mode for a *given* block of video data, the most probable scanning order can be zig-zag, horizontal, or vertical, identified in the array by respective values 0, 1, or 2. *Id.* ¶¶ 112, 113. Claim 4 narrows claim 1, again without identifying the size or prediction mode of the *given* block of video data, by requiring the most probable scanning order be a scanning order other than zig-zag. *Id.* at 25.

He, as discussed above in reference to claim 1, teaches it was known to code a "best" or most probable scanning order for a *given* block of video data, and to explore alternative scanning orders because the "best" scanning order may not be the actual (e.g., most efficient) scanning order used to encode that *given* block of video data. *See He* ¶¶ 6, 7, 11, 53. Thus, like claim 1, *He*'s "best" or most probable scanning order could be either the zig-zag or alternative scanning order depending on the characteristics of the given block of video data encoded. For this reason, it was not unreasonable for the Examiner to identify *He's* alternative scanning order as the most probable scanning order, and *He's* zig-zag scanning order as a different scanning order. After all, a person of ordinary skill in the art would have known that *some scanning order* would be the most probable scanning order for a *given* block of video data, and thus *He's* alternative scanning order could be the most probable scanning order and *He's* zig-zag scanning order could be a different scanning order depending on the size and prediction mode of the *given* block of video data.

Accordingly, for the reasons discussed above, we affirm the Examiner's rejection of claims 4, 14, 25, and 35 over the combination of *He*, *Lee*, and *Ye*, and designate the rejection a new ground of rejection.

Claims 5, 15, 26, and 36

Claim 5 depends from claim 1, and recites "wherein coding the block using the different scanning order comprises coding an additional indication of the scanning order associated with the block." App. Br. 25. Claims 15, 26, and 36 recite a similar limitation. *Id.* at 27, 30, 33. The Examiner finds *He*, as modified by *Lee* and *Ye*, teaches or suggests this limitation because paragraphs 122 and 129 of *Ye* teach collecting the statistics of the transform coefficients of encoded data blocks. *Id.* at 12–13.

Appellant first argues that these claims are patentable over the combination of *He*, *Lee*, and *Ye* for the same reasons that claim 1 is patentable over the combination of *He* and *Lee*. App. Br. 18. We are not persuaded by this argument for the reasons discussed above with respect to claim 1. Appellant next argues that the cited paragraphs of *Ye* do not teach or suggest coding an additional indication of the scanning order associated with the block when the scanning order is not the most probable scanning order. *Id.* at 18–21. In particular, Appellant argues that paragraph 122 of *Ye* teaches that *Ye's* encoder and decoder both collect transform coefficient statistics and, therefore, there is no reason for *Ye's* encoder to transmit those statistics to the decoder. *Id.* at 18–19. Appellant further argues that paragraph 129 of *Ye* simply teaches adapting the scanning order from an initial to a different scanning order, but does not teach encoding the scanning order information because, again, *Ye's* decoder independently adapts the scanning order from an initial to a different scanning order based on independently collected transform statistics. *Id.* at 19.

We are persuaded by Appellant's arguments. However, because we find (i) the combination of *He* and *Lee* teaches or suggests encoding a best or most probable scanning order as explained above in reference to claim 1, (ii) *Ye* teaches or suggests encoding header syntax elements for a block of video data using a context adaptive entropy encoding process, and (iii) *Ye's* header syntax element encoding process adds additional information when the syntax element does not have the most probable value, we affirm the Examiner's rejection and designate it a new ground of rejection.

As explained above in reference to claim 3, *Ye* teaches receiving "block header information for the block in the form of one or more header syntax elements." *Ye* ¶ 94. The header syntax elements include "particular characteristics of the current video block, *such as* block type, prediction mode, [and] *coded block pattern* . . ." *Id.* (emphases added). *Ye* then "encodes the header information," and "may encode the syntax elements of the current block based on the syntax elements of one or more previously encoded video blocks." *Id.* ¶ 95. Although *Ye* expressly describes encoding the block's prediction mode syntax element, *Ye* teaches that "similar techniques may be used for encoding other header syntax elements." *Id.* A person skilled in the art would have known that scanning order information, such as the best or most probable scanning order, is a header syntax element. *See, He* ¶¶ 6–7; Spec. ¶ 102 ("According to some *coding standards*, such syntax elements may include scanning order information for the block.") (emphasis added).

Ye teaches "encoding the prediction mode [for a current block] based on a previously encoded block located directly above the current block . . . and a previously encoded block located directly to the left of the current block." *Ye* ¶ 95. *Ye* does this because "[a] strong correlation may exist between the prediction mode of the current block and the prediction modes of the upper and left neighboring blocks." *Id.* ¶ 102. Thus, when the prediction modes of the upper and left neighboring blocks are the same (e.g., unidirectional), "the probability of the prediction mode of the current block also being one of the unidirectional prediction modes is high." *Id.* A person skilled in the art would have understood this disclosure to mean that when the prediction mode of the current block matches the prediction modes of its upper and left neighboring blocks it is the most probable prediction mode (i.e., having a high probability).

Ye further teaches encoding an indication of whether the prediction mode for a current block is the most probable prediction mode, and adding additional coding information when it is not. Specifically, *Ye* teaches encoding the prediction mode for the current block with a single bit having a value of '1' when it matches the prediction modes used to encode the blocks both directly above it and to its left. *Id.* ¶¶ 96–98. As discussed above, this is the most probable prediction mode for the block. *Ye* further teaches encoding the prediction mode for the current block with two bits when it matches the prediction mode used to encode only one of the blocks directly above it or to its left—the first bit having a value of '1' and the second bit having a value of '1' or '0' to indicate whether the prediction mode of the current block matches the prediction mode of the block directly above it or to its left, respectively. *Id.* ¶¶ 96, 97, 99. Finally, *Ye* teaches encoding the prediction mode for the current block with five bits when it does not match the prediction modes used to encode either of the blocks directly above it or to its left— the first bit having a value of '0' and the next four bits having values that indicate the prediction mode actually used to encode the current block. *Id.* ¶¶ 96, 100.

Thus, *Ye* teaches or suggests encoding a header syntax element (e.g., the prediction mode for a block) with an indication of whether the prediction mode is the most probable prediction mode (i.e., whether it matches the prediction modes used to encode both of the blocks directly above it and to its left), and encoding the header syntax element with additional information when the prediction mode is not the most probable prediction mode (i.e., when it matches only one or does not match either of the prediction modes used to encode the blocks directly above it and to its left.). *Ye* further teaches that "similar techniques may be used for encoding other header syntax elements," and as explained above, a person skilled in the art would have known that a most probable scanning order is a header syntax element. *Ye* ¶ 95.

Therefore, given the teachings in paragraphs 96 through 100 of *Ye* and the teachings in paragraphs 7 and 8 of *He*, it would have been obvious to a person skilled in the art to modify *He*'s one-bit header syntax element identifying the most probable scanning order to include both "an indication of whether a scanning order associated with the block is the most probable predefined scanning order" as recited in claim 1, and "an additional indication of the scanning order associated with the block" when the block's scanning order differs from the most probable scanning order as recited in claim 5. *Ye* expressly suggests the combination as described above, and the combination reflects the substitution of one known element in the art for another to achieve a predictable result. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007.)

Accordingly, we affirm the Examiner's rejection of claims 5, 15, 26, and 36 as obvious over *He*, *Lee*, and *Ye*, and designate the rejection a new ground of rejection.

4. *Claims 6, 16, 27, and 37*

Claim 6 depends from claim 5, and recites "wherein coding the additional indication of the scanning order associated with the block comprises performing a context adaptive entropy coding process that includes applying a context model based on at least one context, wherein the at least one context includes one of the most probable predefined scanning order, the prediction mode associated with the block, or the size associated with the block." App. Br. 25. Claims 16, 27, and 37 recite a similar limitation. *Id.* at 27, 30, 33. The Examiner finds *He*, as modified by *Lee* and *Ye*, teaches or suggests this limitation based on the teachings in paragraphs 104, 122 and 129 of *Ye*. Final Act. 13.

Appellant first argues that these claims are patentable for the same reasons that claim 1 is patentable over the combination of *He* and *Lee*. App. Br. 20. We are not persuaded by this argument for the reasons discussed above with respect to claim 1. Appellant next argues that these claims are patentable for the same reasons as claim 5, i.e., that *Ye* teaches using a context adaptive encoding process to encode a block's prediction mode, not its most probable scanning order. *Id.* We are not persuaded by this argument for the reasons discussed above with respect to claim 5. Finally, Appellant argues that these claims are patentable because even if *Ye* does disclose encoding the most probable scanning order for a block, it does not disclose encoding a different scanning order for the block that is not the most probable scanning order. We, are similarly not persuaded by this argument for the same reasons discussed above with respect to claim 5. *Id.*

Accordingly, we affirm the Examiner's rejection of claims 6, 16, 27, and 37 as obvious over *He*, *Lee*, and *Ye*, and designate the rejection as a new ground of rejection.

5. *Claims 7, 17, 28, and 38*

Claim 7 depends from claim 1, and recites "wherein determining the most probable predefined scanning order for the block comprises designating a zig-zag scanning order as the most probable predefined scanning order for the block." App. Br. 25. Claims 17, 28, and 38 recite a similar limitation. *Id.* at 28, 30, 34. The Examiner finds *He*, as modified by *Lee* and *Ye*, teaches or suggests this limitation based on *He's* teachings in paragraphs 7 and 53, and *Ye's* teachings in paragraphs 86 and 123. Final Act. 13.

Appellant first argues that these claims are patentable for the same reasons that claim 1 is patentable over the combination of *He* and *Lee*. App. Br. 21. We are not persuaded by this argument for the reasons discussed above with respect to claim 1. Appellant next argues that these claims are patentable because "nothing in *He* or *Ye* presumes that a zig-zag scanning order is a most probable predefined scanning order." *Id.* We are not persuaded by this argument for the reasons discussed above with respect to claim 4. Specifically, claim 1 does not require the most probable scanning order for a *given* block of data to be the zig-zag scanning order, and the Specification discloses that the most probable scanning order can be either zig-zag, horizontal, or vertical. *See* App. Br. 24; Spec. ¶¶ 111–113. Claim 7, at best, narrows claim 1 without identifying the size or prediction mode for a *given* block of video data, by requiring the most probable scanning order to be the zig-zag scanning order. *Id.* at 25. As explained above, *He*, like claim 1, permits the "best" or most probable scanning order to be either the zig-zag or alternative scanning order depending on the size and prediction mode for the *given* block of video data. For this reason, it was not unreasonable for the Examiner to identify *He's* zig-zag scanning order as the most probable scanning order in claim 7. A person of ordinary skill in the art would have known that *some scanning order* has to be the most probable scanning order, and because the claims do not require encoding a block of video data having a *particular* size and prediction mode, a person skilled in the art would have known that *He*'s zig-zag scanning order could be the most probable scanning order for a *given* block of video data processed by *He's* system depending on the *given* block's size and prediction mode.

Accordingly, we affirm the Examiner's rejection of claims 7, 17, 28, and 38 as obvious over *He*, *Lee*, and *Ye*, and designate the rejection as a new ground of rejection.

We further reject claims 7, 17, 28, and 38 as indefinite under 35 U.S.C. § 112 ¶ 2 for failing to "particularly point out and distinctly claim the subject matter which the inventor . . . regards as the invention." The Specification discloses numerous ways of determining the most probable scanning order for a block of data. For example, in one embodiment, the most probable scanning order is selected "based on which of a plurality of intra-prediction modes is used to code the block." Spec. ¶ 76. In a second embodiment, the most probable scanning order is selected by "designat[ing] a zig-zag scanning order as the most probable scanning order." *Id.* ¶ 85. In a third embodiment, the most probable scanning order is selected by "using scanning order information for previously encoded blocks . . . [having] a same associated prediction mode and size as the currently encoded block." *Id.* ¶ 104.

Claim 1 recites selecting a most probable predefined scanning order by "mapping a prediction mode associated with the block and a size associated with the block to the most probable scanning order." App. Br. 24. Thus, claim 1 is directed toward the invention disclosed in the third embodiment, where the most probable scanning order for a *given* block of video data can be *any* scanning order depending on the block's size and prediction mode. *See* Spec. ¶¶ 111–113. Claim 7, by contrast, appears to be directed to the invention disclosed in the second embodiment, where a *given* block's most probable scanning order is simply designated to be the zig-zag scanning order, regardless of the block's size or prediction mode. This renders claim 7 indefinite because it is unclear whether the claim is directed toward the second or third embodiment, i.e., whether the most probable scanning order is simply designated zig-zag or determined from among a plurality of scanning orders depending on the block size and prediction mode. Applying a similar analysis to claim pairs 11/17, 22/28, and 32/38, we find claims 17, 28, and 38 to be indefinite for the same reasons as claim 7.

Accordingly, we reject claims 7, 17, 28, and 38 as indefinite under 35 U.S.C. § 112 ¶ 2, and designate the rejection a new ground of rejection.

Indefiniteness of Claims 22, 24–31, and 44

Independent claim 22 recites a device for coding coefficients associated with a block of video data, and requires the device to include various means, including means for "selecting a most probable predefined scanning order," "coding an indication of whether a scanning order . . is the most probable predefined scanning order," "coding the block using the most probable scanning order," and "coding the block using a different scanning order." App. Br. 29. Claims 24–31 and 44 depend, directly or indirectly, from claim 22, and most of these claims recite additional means for performing additional functions. *Id.* at 29–31.

The Examiner interprets the limitations recited in claims 22, 23–28, 30, and 31 as means-plus-function limitations requiring construction under 35 U.S.C. § 112 ¶ 6. Final Act. 5. The Examiner rejects these claims as indefinite under 35 U.S.C. § 112 ¶ 2 because the Specification fails to "disclose the corresponding algorithm for the claimed functions, which are considered as specialized functions." Final Act. 6–7.

Appellant does not contest the Examiner's rejection of claims 22, 23–28, 30, and 31 as indefinite. *See* App. Br. 6–23. At best, Appellant acknowledges that claim 22 invokes 35 U.S.C. § 112 ¶ 6, and indicates "the claimed means is a processor," and the algorithms performed by that processor are set forth in Figures 7–9 and paragraphs 113, 121, and 174–214. App. Br. 5.[2] However, Appellant fails to explain how these disclosures

[2] We note that Appellant fails to identify any corresponding structure for performing the functions recited by the means limitations recited in claims

amount to algorithms that perform the various functions recited in the various "means" limitations of claim 22. Thus, to the extent Appellant's identification of these disclosures is a response to the Examiner's rejection, it's a response that does little more than invite the Board to independently review the disclosures to determine whether and to what extent they consist of algorithms that are linked to the functions recited in the means limitations. We decline to do so. *See In re Baxter Travenol Labs*., 952 F.2d 388, 391 (Fed. Cir. 1991) ("It is not the function of this [tribunal] to examine the claims in greater detail than argued by an appellant.").

Accordingly, for the reasons discussed above, we find Appellant has waived any argument that the Examiner erred in rejecting claims 22 and 24–31 as indefinite, and summarily affirm the Examiner's rejection. *See* 37 C.F.R. § 41.37(c)(iv).

DECISION

The Examiner's rejection of claims 22, 23–28, 30, and 31 as indefinite under 35 U.S.C. § 112 ¶ 2 is affirmed.

The Examiner's rejection of claim 1 under 35 U.S.C §103(a) as unpatentable over *He* and *Lee* is affirmed, and we designate the affirmance as a new ground of rejection.

The Examiner's rejection of claims 3–8, 11, 13–18, 21, 22, 24–29, 32, 34–39, and 42–45 under 35 U.S.C §103(a) as unpatentable over *He*, *Lee*, and *Ye* is affirmed, and we designate the affirmance as a new ground of rejection.

24–28, 30, and 31. *See* App. Br. 6–23. We, therefore, summarily affirm the Examiner's rejection of these claims for at least this reason.

The Examiner's rejection of claims 9, 10, 19, 20, 30, 31, 40, and 41 under 35 U.S.C §103(a) as unpatentable over *He*, *Lee*, *Ye*, and *Chen* is affirmed, and we designate the affirmance as a new ground of rejection.

Pursuant to our authority under 37 C.F.R. § 41.50(b), claims 7, 17, 28, and 38 are rejected as indefinite under 35 U.S.C. § 112 ¶ 2.

Section 41.50(b) provides that "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review." Rather, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, Appellant must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the newly rejected claims:

> (1) *Reopen prosecution*. Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the prosecution will be remanded to the examiner. . . .
>
> (2) *Request rehearing*. Request that the proceeding be reheard under § 41.52 by the Board upon the same record.

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
37 C.F.R. § 41.50(b)