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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte DONG TIAN, PO-LIN LAI, and JIANCONG LUO

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Appeal 2018-006948
Application 13/138,459
Technology Center 2400

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Before JENNIFER S. BISK, LARRY J. HUME, and
JULIET MITCHELL DIRBA, *Administrative Patent Judges*.

BISK, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

Pursuant to 35 U.S.C. § 134(a), Appellant[2] appeals from the Examiner's decision to reject claims 1, 5, 7–21, and 28–33. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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[1] Throughout this Decision we have considered the Specification filed August 19, 2011 ("Spec."), the Final Rejection mailed July 19, 2017 ("Final Act."), the Appeal Brief filed December 12, 2017 ("Appeal Br."), and the Examiner's Answer mailed April 25, 2018 ("Ans."). Appellant did not file a Reply Brief.

[2] We use the word "Appellant" to refer to "Applicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as THOMSON LICENSING. Appeal Br. 3.

BACKGROUND

Appellant's disclosed embodiments and claimed invention relate to a method and apparatus for encoding and decoding 3d video ("3DV") content in a format that includes both two-dimensional ("2D") video and depth components. Spec. 1. Claim 1, reproduced below, is illustrative of the subject matter on appeal (*emphasis* added to contested prior-art limitations):

1. A method comprising:
    - encoding a set of images, including a two-dimensional (2D) video image and a depth image corresponding to the 2D video image, that are related according to a particular 3D video format, *the set of images being encoded by inter-layer prediction in a manner that exploits redundancy between the 2D video image and the depth image in the set of images using a multi-layer video coding extension of a video coding standard,* wherein *the 2D video image is encoded as a first layer according to the multi-layer video coding extension* and the depth image is encoded as a second layer according to the multi-layer video coding extension;

    - *arranging the encoded images in a bitstream in a particular order, based on the particular 3D video format that relates to the set of images*; and

    - indicating the particular order using signaling information, wherein the particular 3D video format is one of a plurality of different 3D video formats according to which the encoded images may be arranged, and the signaling information indicates the particular 3D video format from among the plurality of different 3D video formats.

Appeal Br. 25 (Claims App.) (emphases added).

REJECTIONS

Claims 1, 5, 7, 10–12, 15–18, and 28–31 stand rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over the combination of US 2009/0103616 A1, published April 23, 2009 ("Ho") and US 2010/0091881 A1, published April 15, 2010 ("Pandit"). Final Act. 7–14.

Claims 8, 9, 32, and 33 stand rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over the combination of Ho, Pandit, and US 2010/0310155 A1, published Dec. 9, 2010 ("Newton"). Final Act. 14–16.

Claims 13, 14, and 19–21 stand rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over the combination of Ho, Pandit, and US 2009/0110007 A1, published April 30, 2009 ("Li"). Final Act. 16–24.

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). To the extent Appellant has not advanced separate, substantive arguments for particular claims, or other issues, such arguments are waived. 37 C.F.R. § 41.37(c)(1)(iv).

We have considered all of Appellant's arguments and any evidence presented. We highlight and address specific findings and arguments for emphasis in our analysis below.

*Rejection of Claims 1, 5, 7, 10–12, 15–18, and 28–31
under 35 U.S.C. § 103(a)*

The Examiner finds that claims 1, 5, 7, 10–12, 15–18, and 28–31 would have been obvious over the combination of Ho and Pandit. Final Act. 7–14. Specifically, the Examiner cites to Ho as teaching the bulk of the limitations, including "the set of images being encoded by inter-layer prediction in a manner that exploits redundancy between the 2D video image and the depth image in the set of images using a multi-layer video coding extension of a video coding standard" (the "inter-layer prediction limitation") and "wherein the 2D video image is encoded as a first layer according to the multi-layer video coding extension" (the "first layer limitation"). *Id.* at 7–8 (citing Ho ¶¶ 7–9, 57). Because "Ho does not explicitly disclose indicating the particular order using signaling information," the Examiner relies on both Ho and Pandit as teaching or suggesting "arranging the encoded images in a bitstream in a particular order, based on the particular 3D video format that relates to the set of images" (the "arranging limitation"). *Id.* at 8 (citing Pandit ¶¶ 13, 54); *see also id.* at 7–8 (citing Ho ¶ 6 as teaching or suggesting "describing multi-view coding plus a depth image . . .").

Appellant "disagree[s] with the Examiner's characterization of the teachings of the cited portions of Ho" and argues that Ho fails to teach or suggest the inter-layer prediction limitation, the first layer limitation, and the arranging limitation. Appeal Br. 16–21. We discuss each of the three disputed limitations below.

First, Appellant argues "Ho fails to teach or suggest an inter-prediction between the texture image and the depth image for reducing the

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correlation between said texture image and said depth image and thus does not disclose" the inter-layer prediction limitation. Appeal Br. 17. However, it is unclear what claim language Appellant is referring to here. The claim language does not recite "reducing the correlation." We are, therefore, not persuaded of error in the rejection based on this argument. Appellant also argues that the Examiner relies on "various excerpts from Ho describing processing of a depth image based on a reference image," where the reference image is "the same as a texture image in Ho" and equivalent to a 2D image in claim 1. Appeal Br. 17 (citing Final Act. 2–3). According to Appellant, Ho's reference image is, instead, equivalent to a depth image. *Id.* at 18–19 (citing Ho Fig. 1, ¶¶ 6, 7, 38).

In response, the Examiner points to Figure 7 of Ho as illustrating an inter-layer prediction encoding method for a set of images and to Figure 1 of Ho as illustrating using a depth camera to capture a reference image. Ans. 2 (citing Ho ¶ 6). The Examiner further points to Ho's Figure 3 and paragraphs 23, 38, and 45 as describing the depth image is generated by a left or right view image as a reference image. *Id.* According to the Examiner, "Ho discloses multi-layer coding is used because it discloses different sample rates (image resolution)" and "[t]he method disclosed by Ho reduces a bit generation rate using a reference image and improves encoding efficiency." *Id.* (citing Ho ¶ 2). Appellant does not address the Examiner's response.

Appellant's arguments do not persuade us that the Examiner's characterization of Ho is incorrect. Ho describes "obtaining a depth image at a viewpoint and setting the obtained depth image to a reference image" and "applying a 3D warping method to the reference image and predicting

and generating the depth image at a specific viewpoint." Ho ¶ 23. In addition, Ho describes a method in which "positions of the pixel values that exist in a reference image 200 *as a two-dimensional image* are projected onto a three-dimensional space 220 using Equation 1." *Id.* ¶ 42 (emphasis added). This image can be generated by either "a left viewpoint image 300" or "a right viewpoint image 310 as the reference image." *Id.* ¶ 45. Moreover, Ho explicitly describes an "intra-prediction execution unit 720" that "performs inter-prediction and intra-prediction." Ho Fig. 7, ¶ 57. Appellant does not explain how any of these disclosures of Ho are consistent with Appellant's characterization of Ho's use of the term "reference image" such that it is solely equivalent to a depth image. Given these disclosures, we do not read Ho's statement that "[t]he depth image is hereinafter used as a reference image in the preferred embodiments of the invention," as defining a reference image to be equivalent to a depth image. *Id.* ¶ 38. Instead, it appears that the reference image referred to by Ho at least includes a 2D image. Appellant's arguments do not address why the Examiner's rejection is in error given this definition of the term "reference image." We, therefore, are not persuaded by Appellant's arguments that the Examiner's rejection is in error with respect to the inter-layer prediction limitation.

Second, Appellant argues, without further explanation, that Ho does not teach or suggest, without further explanation, the first layer limitation. Appeal Br. 19–20. In response, the Examiner states "Ho describes the texture image as one of the multi-view images and is encoded earlier than the depth image, according to coding standard H.264." Ans. 3 (citing Ho ¶¶ 7–9, 57). In addition, the Examiner points to Figure 7 as showing "layers

of the coding process where the texture image as one of the multi-view images and is encoded earlier than the depth image" and to paragraph 38 as describing "a depth image generating method using the reference image, since the reference image can be obtained in advance." *Id.* Appellant does not address these explanations or disclosures in Ho or explain why they do not at least suggest the first layer limitation. *See* Appeal Br. 19–20. This argument, therefore, does not persuade us of reversible error in the rejection.

Third, Appellant argues that Ho does not teach or suggest the arranging limitation because Ho does "not mention at all" the language of this limitation. *Id.* at 20–21. According to Appellant, the I, B, and P images, included in Ho Figure 6, "are not descriptive of a 3D format." *Id.* at 21. Appellant adds that "Pandit does not appear to relate to a 2D plus depth or any other 3D format" and, therefore, "fails to cure the deficiencies of Ho." *Id.* In response, the Examiner explains that "Ho describes ordering of the coding, according to coding standard H.264." Ans. 3 (citing Ho ¶¶ 7–9, 57). In addition, the Examiner points to Figure 7 as showing "layers of the coding process where the texture image as one of the multi-view images and is encoded earlier than the depth image" and to Figure 6 as showing "the arrangement of the encoded images." *Id.* Appellant does not address these explanations or disclosures in Ho or explain why they do not at least suggest the first layer limitation. *See* Appeal Br. 20–21. This argument, therefore, does not persuade us of reversible error in the rejection.

Accordingly, we sustain the Examiner's rejection of claim 1 as obvious over the combination of Ho and Pandit. We also sustain the rejection of claims 5, 7, 10–12, 15–18, and 28–31, which are not argued

separately (*see* Appeal Br. 22), as obvious over the combination of Ho and Pandit.

Rejection of Claims 8, 9, 32, and 33 under 35 U.S.C. § 103(a)

When arguing the patentability of claims 8, 9, 32, and 33, Appellant relies on the arguments made for claim 1. Appeal Br. 22–23. As discussed above, we are not persuaded by these arguments. Accordingly, we sustain the Examiner's rejection of claims 8, 9, 32, and 33 as obvious over the combination of Ho, Pandit, and Newton.

Rejection of Claims 13, 14, and 19–21 under 35 U.S.C. § 103(a)

When arguing the patentability of claims 13, 14, and 19–21, Appellant relies on the arguments made for claim 1. Appeal Br. 23. As discussed above, we are not persuaded by these arguments. Accordingly, we sustain the Examiner's rejection of claims 13, 14, and 19–21 as obvious over the combination of Ho, Pandit, and Li.

CONCLUSION

We affirm the Examiner's rejection of claims 1, 5, 7–21, and 28–33 under 35 U.S.C. § 103(a).

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	References/Basis	Affirmed	Reversed
1, 5, 7, 10–12, 15–18, 28–31	103(a)	Ho, Pandit	1, 5, 7, 10–12, 15–18, 28–31	
8, 9, 32, 33	103(a)	Ho, Pandit, Newton	8, 9, 32, 33	
13, 14, 19–21	103(a)	Ho, Pandit, Li	13, 14, 19–21	
Overall Outcome			1, 5, 7–21, 28–33	

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). *See* 37 C.F.R. § 41.50(f).

AFFIRMED