

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VUSIONGROUP SA,
Petitioner,

v.

HANSHOW TECHNOLOGY CO., LTD.,
Patent Owner.

IPR2024-01045
Patent 11,087,272 B2

Before BRIAN J. McNAMARA, PATRICK R. SCANLON, and
TERRENCE W. McMILLIN, *Administrative Patent Judges*.

SCANLON, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

VusionGroup SA (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 1–21 of U.S. Patent No. 11,087,272 B2 (Ex. 1001, “the ’272 patent”). Hanshow Technology Co., Ltd. (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review. *See* 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2023). To institute an *inter partes* review, we must determine that the information presented in the Petition shows “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 determine that Petitioner has not demonstrated a reasonable likelihood that it would prevail with respect to at least one challenged claim. Accordingly, we do not institute an *inter partes* review of the challenged claims on the grounds set forth in the Petition.

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner identifies itself as a real party in interest. Pet. 107. In addition, “[o]ut of an abundance of caution, Petitioner discloses VusionGroup GmbH and Captana GmbH as potential real parties in interest.” *Id.* For purposes of this Decision, we consider Petitioner, VusionGroup GmbH, and Captana GmbH as the real parties in interest.

Patent Owner identifies itself as the real party in interest. Paper 3 (“Patent Owner’s Mandatory Notices”), 1.

B. Related Matters

The parties indicate that the '272 patent was at issue in *Hanshow Technology Co., Ltd. v. SES-imagotag SA*, No. 2:23-cv-00617 (E.D. Tex.). Pet. 107, Paper 3, 1.

C. The '272 Patent

The '272 patent, titled “System and Method for Locating, Identifying and Counting Items,” issued August 10, 2021, with claims 1–21. Ex. 1001, codes (54), (45), 14:63–18:36. The '272 patent relates to a multi-camera sensor suite, which can be mounted on an autonomous robot, that is “capable of accurately monitoring retail or warehouse product inventory without needing an initial planogram.”¹ *Id.* at 1:17–23. The camera system “can be used for detecting shelf labels; optionally comparing shelf labels to a depth map; defining a product bounding box; associating the bounding box to a shelf label to build a training data set; and using the training data set to train a product classifier.” *Id.* at 1:65–2:3. “[A] product bounding box can be defined as the horizontal space on [a] shelf occupied by one or more copies (facings) of the same product, along with the vertical space spanning the distance between a current shelf and the shelf above it.” *Id.* at 8:20–24.

¹ According to Petitioner, “‘Planogram’ is an industry term that refers to a drawing or plan for displaying merchandise in a retail store.” Pet. 3 (citing Ex. 1003 ¶ 81).

Figure 6 of the '272 patent is reproduced below.

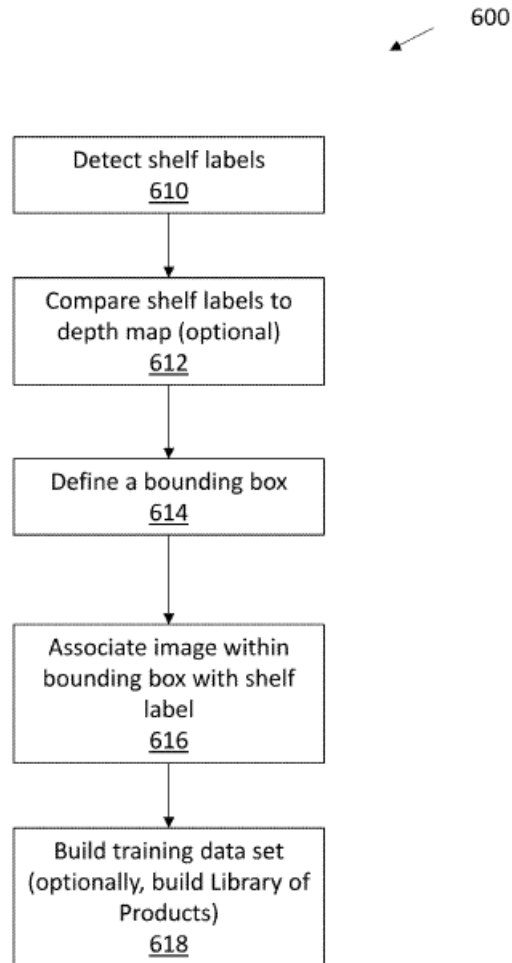


Fig. 6

Figure 6 is a flowchart depicting how a product bounding box can be created from information captured by a camera system. Ex. 1001, 10:65–11:2. In step 610, shelf labels are detected, in either individual shelf images or a stitched panorama. *Id.* at 11:2–4. In optional step 612, an image location of the shelf label is registered or compared to a depth map to recover its 3D location in space. *Id.* at 11:21–23. In step 614, a bounding box is defined as a perimeter enclosing one or multiple facings of the same product, or any

space on the shelf including but not limited a gap between products. *Id.* at 11:31–34.

In step 616, each bounding box is associated with an identifier selected from a shelf label. *Id.* at 12:8–11. Last in step 618, image descriptors can be classified and labelled with the identifier. *Id.* at 12:44–45.

This process can be repeated for every image of the bounding box associated to the same identifier, whether the image is captured in the same store at different times, or in different stores. In time, this allows automatically building a product library (i.e. the “Library of Products”), without requiring an initial planogram or storage of specific product databases.

Id. at 12:46–51.

D. Challenged Claims

As noted above, Petitioner challenges claims 1–21 of the '272 patent. Claims 1, 10, and 18 are independent. Claim 1, reproduced below with Petitioner’s bracketed annotations inserted, is illustrative.

1. [1.0] A method comprising:
 - [1.1] capturing one or more images of a portion of a shelf with a camera;
 - [1.2] detecting and reading content of a shelf label on the portion of the shelf within the one or more images;
 - [1.3] defining one or more product facing bounding boxes surrounding one or more corresponding facings of a product within the one or more images;
 - [1.4] associating the shelf label content with each of the one or more product facing bounding boxes that includes and defines each of the one or more corresponding product facings;
 - [1.5] cross-correlating the one or more product facing bounding boxes and one or more other product facing bounding boxes across one or more stores by matching the shelf label

content with other shelf label content associated with the one or more other product facing bounding boxes;

[1.6] building training data based on the association of the shelf label content with the cross-correlated product facing bounding boxes;

[1.7] using the training data to build a product classifier; and

[1.8] using the product classifier to classify an item as the product.

Ex. 1001, 14:63–15:20; Pet. vii (showing Petitioner’s bracketed annotations).

E. Asserted Grounds of Unpatentability

Petitioner contends that the challenged claims are unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. §²	References/Basis
1, 3–13, 15–21	103	Schwartz, ³ Katircioglu ⁴
2, 14	103	Schwartz, Katircioglu, Avegliano430 ⁵
1, 3–6, 10, 15–18, 20–21	103	Avegliano157, ⁶ Rodriguez ⁷
2, 7–9, 11–14, 16, 19	103	Avegliano157, Rodriguez, Avegliano430

Pet. 2. Petitioner relies on the Declaration of Andrew Wolfe, Ph.D. (Ex. 1003) in support of its arguments.

² Because the ’272 patent has an effective filing date subsequent to March 16, 2013, the effective date of applicable amendments to the Leahy-Smith America Invents Act (“AIA”), 125 Stat. 284 (2011), we apply the AIA version of § 103.

³ US 2017/0178060 A1, published June 22, 2017 (Ex. 1005).

⁴ US 2015/0262116 A1, published Sept. 17, 2015 (Ex. 1007).

⁵ US 2017/0193430 A1, published July 6, 2017 (Ex. 1008).

⁶ US 2015/0235157 A1, published Aug. 20, 2015 (Ex. 1009).

⁷ US 2015/0055855 A1, published Feb. 26, 2015 (Ex. 1010).

III. ANALYSIS

A. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, 35 U.S.C. § 103 requires us to resolve the level of ordinary skill in the pertinent art at the time of the invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *Id.* In a given case, one or more factors may predominate. *Id.*

Petitioner contends that

[a] person of ordinary skill in the art (“POSITA”) in November 2016 would have had a Bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, and two or more years of work experience or research related to computer vision, image analytics, machine learning, artificial intelligence or automated object recognition methods and systems, or equivalent training and work experience in the field. Formal education can substitute for work experience and relevant work experience could substitute for formal education.

Pet. 8–9 (citing Ex. 1003 ¶ 29). Patent Owner indicates it agrees with Petitioner’s definition of a person having ordinary skill in the art. Prelim. Resp. 4–5.

Based on our review of the record before us, we determine that Petitioner’s stated level of ordinary skill in the art is reasonable because it appears consistent with the evidence of record, including the asserted prior

art. Accordingly, for the purposes of this Decision, we adopt Petitioner’s definition.

B. Claim Construction

In *inter partes* reviews, the Board interprets claim language using the district-court-type standard, as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1313–14. Although extrinsic evidence, when available, may also be useful when construing claim terms under this standard, extrinsic evidence should be considered in the context of the intrinsic evidence. *See id.* at 1317–19.

Petitioner contends that “[n]o formal claim constructions are necessary ‘to resolve the controversy.’” Pet. 9 (quoting *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011)). Petitioner adds that there is a rebuttable presumption that § 112(f) does not apply because the challenged claims do not recite “means.” *Id.* In the event the presumption is overcome with respect to the claim terms “processor” and “product classifier,” Petitioner identifies the disclosure describing the corresponding structure for these terms. *Id.* at 9–10.

Patent Owner contends that claim construction is not necessary and the claims should be given their plain and ordinary meaning. Prelim. Resp. 5. Regarding the claim terms “processor” and “product classifier,” Patent Owner argues that Petitioner has not advanced any argument to rebut the presumption that § 112(f) does not apply. *Id.* at 6.

On the present record, we do not discern a need to construe explicitly any claim language because doing so would have no effect on our analyses below of Petitioner’s asserted grounds and will not assist in resolving the present controversy between the parties. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

C. Effective Filing Date of the Challenged Claims

As an initial matter, we address the effective filing date of the challenged claims. The ’272 patent issued on August 10, 2021, from U.S. Application No. 15/471,722, which was filed on March 28, 2017. Ex. 1001, codes (45), (21), (22). The ’272 patent claims the benefit of U.S. Provisional Application No. 62/314,785 (“the ’785 provisional application”), filed on March 29, 2016, and U.S. Provisional Application No. 62/427,509 (“the ’509 provisional application”), filed on November 29, 2016. *Id.* at code (60), 1:7–13.

Petitioner argues that claims 1–21 of the ’272 patent are not entitled to the benefit of the filing date of either the ’785 provisional application or the ’509 provisional application. Pet. 6–8 (citing Ex. 1027). In response, Patent Owner argues that the challenged claims are entitled to the benefit of the ’785 provisional application’s filing date.⁸ Prelim. Resp. 8–11 (citing Ex. 1027).

⁸ Patent Owner argues only that the ’785 provisional application provides support for the challenged claims and does not present any arguments that the ’509 provisional application supports the challenged claims. Prelim. Resp. 8–11.

In this proceeding, determining the '272 patent's effective filing date would impact only whether Schwartz qualifies as prior art. Schwartz was published on June 22, 2017, based on U.S. Application No. 15/164,633, which was filed on May 25, 2016, and claims the benefit of U.S. Provisional Application No. 62/269,899 ("the '899 provisional application"), filed on December 18, 2015. Ex.1005, codes (45), (21), (22), (60), ¶ 1. As noted above, the '272 patent issued on August 10, 2021, from U.S. Application No. 15/471,722, which was filed on March 28, 2017, and claims the benefit of the '785 provisional application, filed on March 29, 2016, and the '509 provisional application, filed on November 29, 2016. Ex. 1001, codes (45), (21), (22), (60), 1:7–13. Thus, Schwartz qualifies as prior art under 35 U.S.C. § 102(a)(2) if the '272 patent is not entitled to the March 29, 2016, filing date of the '785 provisional application.

We are not persuaded the Petition demonstrates sufficiently a reasonable likelihood that Petitioner will prevail with respect to at least one challenged claim based on Grounds 1 and 2, the only asserted grounds that rely on Schwartz, for the reasons discussed below. *See infra* §§ III.D, III.E. Accordingly, we need not reach the issue of whether the '272 patent is entitled to an earlier effective filing date and whether Schwartz qualifies as prior art. For the same reason, we do not need to address the parties' arguments regarding whether Schwartz is entitled to the filing date of '899 provisional application. *See* Pet. 13–14, 48–50; Prelim. Resp. 11–13.

D. Ground 1: Asserted Obviousness Based on Schwartz and Katircioglu

Petitioner challenges claims 1, 3–13, and 15–21 as unpatentable under 35 U.S.C. § 103 based on the combination of Schwartz and Katircioglu. Pet. 11–51. Patent Owner provides arguments addressing this asserted ground of unpatentability. Prelim. Resp. 7–25.

1. Schwartz (Ex. 1005)

Schwartz relates to “analyzing and extracting data and a product from images and comparing that data and the product to a planogram to determine alignment differences that may be used for corrective actions, ground truth generation, and recognition.” Ex. 1005 ¶ 3. Schwartz describes a method that

includes capturing an image, processing the image to identify a product based on a symbolic identifier, receiving a planogram; identifying a region of the planogram based on a linear grouping, determining a geometrically consistent match between the product and a sample product included in the region of the planogram, and determining an alignment between the region of the planogram and a corresponding region of the image that includes the product.

Id. ¶ 6; *see also id.* ¶¶ 116–117, Fig. 3 (describing method of generating corrective action advice in detail).

2. Katircioglu (Ex. 1007)

Katircioglu relates to a system for maintaining product inventory data on a shelf that includes a camera configured to capture a shelf image of a plurality of items on a shelf. Ex. 1007 ¶ 4. Katircioglu also discloses a method for maintaining product inventory data on a shelf. *Id.* ¶ 5. The method includes capturing a shelf image of a plurality of items on the shelf, segmenting the shelf image into at least a first inventory image, which contains only items of a single product type on the shelf, and matching the first inventory image with a historical image from an image-count correlation database. *Id.*

More specifically, the image segmentation is a process of partitioning a digital image into patches so that each image patch only contains one specific product. *Id.* ¶ 24. Image segmentation is used to locate objects and

boundaries in images. *Id.* Identifier tags, which may be tags solely for the purpose of product identification, can be associated with items located on the shelves and captured in the shelf image. *Id.* By way of example, the shelf is in a retail store and the identifier tags are price tags. *Id.*

3. *Independent Claim 1*

Petitioner contends that the proposed combination of Schwartz and Katircioglu discloses the limitations of independent claim 1. Pet. 21–40. Petitioner also articulates reasons to combine the relied-upon aspects of Schwartz and Katircioglu. *Id.* at 20–21.

Regarding limitation [1.5], Petitioner relies on Schwartz’s disclosures of “‘aggregat[ing] and summariz[ing]’ object (i.e., product) information received ‘from images of multiple stores of the same or different type’ and ‘with the same or different local demographics’; the data is ‘collected over time,’” and that “the data comes from images ‘taken from a single visit to a single store, multiple visits to a single store, and multiple visits to multiple stores’ where the store may even be substituted for a ‘warehouse, stockroom, store room, cabinet, etc.’” Pet. 36 (citing Ex. 1005 ¶¶ 81, 83). According to Petitioner, one of ordinary skill in the art

would have recognized Schwartz collects and correlates product identification and affiliates shelf label content (e.g., price) information with that of a planogram for a store, and *cross-correlates* that product and affiliated shelf label information *across* stores, store types, and time because this enables, e.g., store A to identify a new, unindexed product C stocked in a different warehouse B and newly appearing in store A to update and ensure planogram compliance showing store A now stock product C to satisfy inventory audits.

Id. (citing Ex. 1005 ¶¶ 83, 90, 100; Ex. 1003 ¶¶ 148–149). Petitioner further contends that one of ordinary skill in the art “would have understood the

same product is often positioned in multiple locations of a single store” (such as candy being located both in an aisle and near the check-out register) and “would have found it obvious to keep all images of the same product together.” *Id.* (citing Ex. 1003 ¶ 150).

In response, Patent Owner argues that Petitioner fails to show that the combination of Schwartz and Katircioglu discloses, *inter alia*, limitation [1.5]. Prelim. Resp. 13–14. In particular, Patent Owner argues that “Petitioner’s assertion that ‘POSITAs would have recognized Schwartz collects and correlates product identification and affiliates shelf label content (e.g., price) information with that of a planogram for a store, and cross-correlates that product and affiliated shelf label information across stores, store types, and time’ is unsupported.” *Id.* at 14 (quoting Pet. 36).

We agree with Patent Owner. At best, Schwartz’s disclosure cited by Petitioner teaches aggregating product information obtained from different stores, but neither the Petition nor Dr. Wolfe explains sufficiently how *aggregating product information* would have suggested *cross-correlating different product facing bounding boxes* to one of ordinary skill in the art. *See* Pet. 35–37; Ex. 1003 ¶¶ 148–151. We are not persuaded that aggregating product information and cross-correlating different product facing bounding boxes would have been recognized as similar or comparable processes. Moreover, Petitioner does not even assert that one of ordinary skill in the art would have recognized that Schwartz cross-correlates one or more product facing bounding boxes *and* one or more *other* product facing bounding boxes as required by limitation [1.5]. Instead, Petitioner asserts only that one of ordinary skill in the art “would have recognized Schwartz . . . *cross-correlates* that product and affiliated shelf

label information *across* stores, store types and time.” Pet. 36 (underlining added).

Furthermore, limitation [1.5] recites cross-correlating different product facing bounding boxes *by matching shelf label content* of the different product facing bounding boxes. But Petitioner does not explain adequately how the combination of Schwartz and Katircioglu satisfies this requirement. Pet. 35–37. Although Petitioner asserts that the combination discloses associating shelf label content with product facing bounding boxes (*id.* at 30–35), we are not directed to any disclosure in either Schwartz or Katircioglu that teaches or suggests matching the shelf label content of different product facing bounding boxes.

For the above reasons, Petitioner fails to persuade us that the combination of Schwartz and Katircioglu discloses limitation [1.5]. Therefore, we determine Petitioner has not met its burden to show a reasonable likelihood it would prevail with respect to the contention that claim 1 is unpatentable over the combination of Schwartz and Katircioglu.

4. *Independent Claims 10 and 18*

Similarly to limitation [1.5] of claim 1, claim 10 recites “cross-correlating the one or more product facing bounding boxes and one or more other product facing bounding boxes across one or more stores by matching the shelf label content with other shelf label content associated with the one or more other product facing bounding boxes,” and claim 18 recites “cross-correlate the one or more product facing bounding boxes and one or more other product facing bounding boxes across one or more stores by matching the shelf label content with other shelf label content associated with the one or more other product facing bounding boxes.” Ex. 1001, 16:20–25, 17:26–31.

For these limitations of claims 10 and 18, Petitioner relies on essentially the same arguments made in connection with limitation [1.5]. Pet. 40–43. Thus, Petitioner’s challenge to claims 10 and 18 is based on the same deficient assertions regarding the combination of Schwartz and Katircioglu as discussed above in the analysis of the challenge to independent claim 1. For these same reasons, we find that Petitioner has not met its burden to show a reasonable likelihood that claims 10 and 18 are unpatentable over the combination of Schwartz and Katircioglu.

5. Dependent Claims 3–9, 11–13, 15–17, and 19–21

Claims 3–9 depend from claim 1 and, thus, contain all the limitations of claim 1, claims 11–13 and 15–17 depend from claim 10 and, thus, contain all the limitations of claim 10, and claims 19–21 depend from claim 18 and, thus, contain all the limitations of claim 18. Petitioner’s challenges to dependent claims 3–9, 11–13, 15–17, and 19–21 do not overcome the deficiencies discussed above with respect to the challenge to independent claims 1, 10, and 18. *See* Pet. 43–48. Accordingly, for the same reasons discussed above in connection with claims 1, 10, and 18, we find Petitioner has not met its burden to show a reasonable likelihood that claims 3–9, 11–13, 15–17, and 19–21 are unpatentable over the combination of Schwartz and Katircioglu.

E. Ground 2: Asserted Obviousness Based on Based on Schwartz, Katircioglu, and Avegliano430

Petitioner challenges claims 2 and 14 as unpatentable under 35 U.S.C. § 103 based on the combination of Schwartz, Katircioglu, and Avegliano430. Pet. 51–59. Each of these claims depends from either independent claim 1 or independent claim 10 and, therefore, contains all the limitations thereof. Thus, Petitioner relies in part on the same assertions

presented in the challenge of independent claims 1 and 10 based on the combination of Schwartz and Katircioglu, discussed above, in support of its contentions that claims 2 and 14 would have been obvious over the combination of Schwartz, Katircioglu, and Avegliano430. *See id.*

Accordingly, Ground 2 suffers from the same deficiencies noted above (*see supra* § III.D) in connection with Ground 1. Therefore, for the same reasons discussed above, we determine that the information presented in the Petition fails to establish a reasonable likelihood that Petitioner would prevail in showing that claims 2 and 14 are unpatentable.

F. Ground 3: Asserted Obviousness Based on Avegliano157 and Rodriguez

Petitioner challenges claims 1, 3, 5, 7, 9, and 12–16 as unpatentable under 35 U.S.C. § 103 based on the combination of Avegliano157 and Rodriguez. Pet. 51–72. Patent Owner provides arguments addressing this asserted ground of unpatentability. Prelim. Resp. 51–57.

1. Avegliano157 (Ex. 1009)

Avegliano157 relates to

a method for calculating sales trend of a product at a store shelf based on crowdsourcing, including receiving, by a retail store server, availability data of a product measured on a shelf in the retail store from a portable device, wherein the availability data is in the form of a picture acquired of the product on the shelf, identifying products on the shelf using tags attached to the shelves.

Ex. 1009 ¶ 16. A database of product templates including product name, picture, and dimensions, as well as tag templates and their distribution on the store shelves, allows items and each set of tags to be mapped to a shelf and define which products are displayed on a rack of shelves. *Id.* ¶ 60. In one embodiment, “a first image processing application to identify the tags and a second image processing application to identify the products.” *Id.*

Figure 4 is reproduced below.

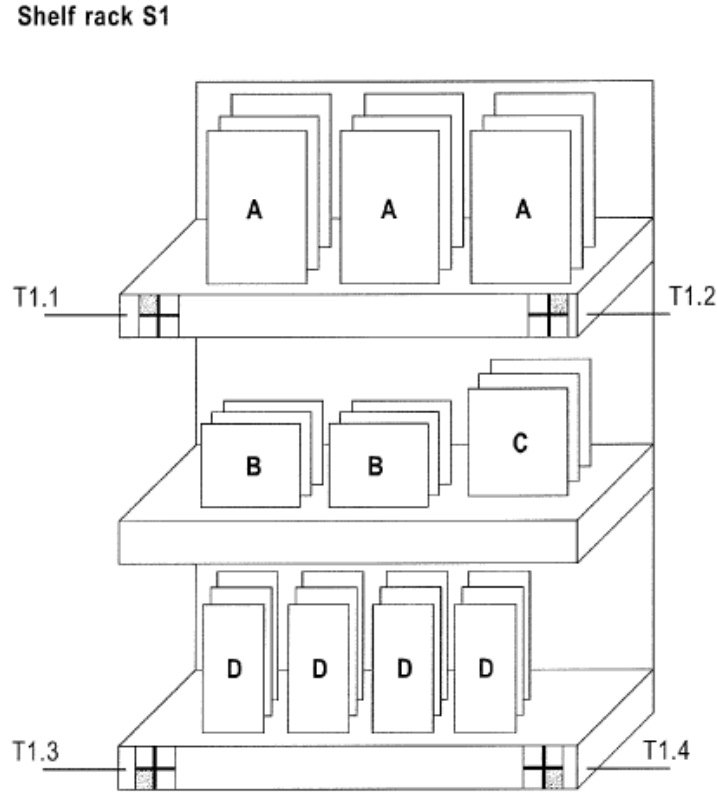


FIG. 4

Figure 4 shows shelf rack S1, containing four types of products A, B, C and D, and four tags T1.1, T1.2, T1.3 and T1.4., where the distance of each tag to the others is measured and stored. Ex. 1009 ¶ 63. Each tag has a unique pattern that enables the tag to be mapped to its location. *Id.*

2. Rodriguez (Ex. 1010)

Rodriguez relates to improving object recognition, such as at supermarket checkouts, through machine learning or image fingerprinting. Ex. 1010 ¶ 9. In one embodiment, a sequence of images depicting an object is captured (e.g., by a camera in a point-of-sale terminal), and the object is identified, such as by a barcode or watermark detected from one or more of the images. *Id.* “Once the object's identity is known, such information can

be used in training a machine learning system to recognize the object from others of the captured images, including images that may be degraded by blur, inferior lighting, etc.” *Id.* Thus, a system can be trained to recognize objects without barcode decoding, watermark decoding, reference fingerprint data, or the like. *Id.* ¶ 186.

Rodriguez also discloses that images may be captured by cameras other than cameras at point-of-sale checkout locations, such as by shoppers with smartphone cameras or camera-equipped wearable devices. *Id.*

3. *Independent Claim 1*

Petitioner contends that the proposed combination of Avegliano157 and Rodriguez discloses the limitations of independent claim 1. Pet. 68–86. Petitioner also articulates reasons to combine the relied-upon aspects of Aksu and Gonzalez. *Id.* at 64–68. Patent Owner provides arguments addressing this asserted ground of unpatentability. Prelim. Resp. 25–32.

Regarding limitation [1.5], Petitioner first asserts that Avegliano157 teaches this limitation. Pet. 80 (citing Ex. 1003 ¶ 244). Specifically, Petitioner argues that Avegliano157 discloses receiving multiple images of product shelves over time and aggregating retail product and affiliated shelf label information to minimize out-of-shelf products. *Id.* at 80–81 (citing Ex. 1009 ¶¶ 6, 16, 21, 30, 33, 46–48, 57–59, 65, code (57); Ex. 1003 ¶ 245). According to Petitioner, one of ordinary skill in the art “would have recognized that determining sales velocity and sales trend over ‘a period of time’ entails *cross-correlating* product and affiliated shelf tag information across images taken at different points of time.” *Id.* at 81 (citing Ex. 1009 ¶¶ 16, 21, 30–33, 46–48, 57–59; Ex. 1003 ¶ 246). Petitioner also asserts that one of ordinary skill in the art would have recognized that “Avegliano157’s ‘vendor-managed inventory (VMI) business model,’ achieves improved

efficiency in a multi-retailer scenario would entail *cross-correlating* product and affiliated shelf tag information *across* multiple retailers, store types, and time because this enables a more accurate determination and evaluation across multiple stores in a geographical region.” *Id.* (citing Ex. 1009 ¶¶ 11–13, 56; Ex. 1003 ¶¶ 248–250).

Alternatively, Petitioner asserts that Rodriguez teaches limitation [1.5]. Pet. 81. Specifically, Petitioner argues that Rodriguez discloses capturing many product images over time to improve classification accuracy. *Id.* at 81–82 (citing Ex. 1010 ¶¶ 52, 82, 87, 89, 159, 160, Figs. 7A–7F; Ex. 1003 ¶¶ 251–252). Petitioner also argues that Rodriguez discloses that the captured images include a machine-readable identifier such as a barcode, and one of ordinary skill in the art would have understood that the images are temporally separated. *Id.* at 82–83 (citing Ex. 1010 ¶¶ 82, 83, 159; Ex. 1003 ¶¶ 253–255). In addition, Petitioner argues that Rodriguez discloses capturing images at different locations in a supermarket, such as in the aisles and at different checkout stations. *Id.* at 83 (citing Ex. 1010 ¶ 186; Ex. 1003 ¶ 256). Petitioner contends that one of ordinary skill in the art “would have been motivated to implement Rodriguez’s method of machine-learning based image processing techniques in Avegliano¹⁵⁷ to identify and recognize objects efficiently and reliably.” *Id.* (citing Ex. 1010 ¶¶ 19, 159, code (57)).

Next, Petitioner argues that one of ordinary skill in the art “would have known the same product is often displayed in multiple locations (e.g., aisles, aisle endcaps, near point-of-sale checkout counters, and/or in different stores),” and “would have understood a person walking through the supermarket would have captured images of the same product displayed at different locations.” *Id.* at 84 (citing Ex. 1003 ¶ 258). In Petitioner’s view,

capturing images from multiple locations would help meet Rodriguez’s goal of capturing as many training images as possible to improve classification accuracy. *Id.* (citing Ex. 1010 ¶ 52; Ex. 1003 ¶¶ 258–259).

In response, Patent Owner argues that the combination of Avegliano157 and Rodriguez does not disclose limitation [1.5]. Prelim. Resp. 25. First, Patent Owner argues that, contrary to Petitioner’s assertion, Avegliano157 does not disclose cross-correlating product and affiliated shelf tag information across images. *Id.* at 26. Patent Owner contends that, instead of disclosing an association between shelf label content and a product facing bounding box, Avegliano157’s “tag coordinates are used to retrieve product height and width information (which is not present on the tag and therefore not ‘shelf label content’), and the height/width information is used to identify the product.” *Id.* at 28. Patent Owner also contends that Avegliano157’s shelf tags are identified using a tag template and the list of products associated with the current shelf is read separately from the product templates for the current shelf stored in a product database. *Id.* (citing Ex. 1009 ¶ 62–63). Thus, according to Patent Owner, one of ordinary skill in the art “would not be motivated to match tags of Avegliano157 with other tags from elsewhere when the information already exists in the tag database of Avegliano157,” and “would not be motivated to cross-correlate one product facing bounding box with another when product templates are stored in an established product database of Avegliano157.” *Id.* In addition, Patent Owner argues that “[e]ven if Avegliano157 discloses some kind of correlation, such correlation cannot be cross-correlation with other shelf label content,” and Avegliano157 “does not remotely disclose cross-correlating with other shelf label contents across multiple retailers and stores.” *Id.* at 29–30.

We agree with Patent Owner. Contrary to Petitioner’s assertions, we are not persuaded that either Avegliano157’s method of determining sales velocity and sales trend over a period of time or its vendor-managed inventory business model entail cross-correlating product information with affiliated shelf tag information. Neither the Petition nor Dr. Wolfe explains sufficiently how Avegliano157 teaches or suggests the claimed cross-correlating step. *See* Pet. 80–81; Ex. 1003 ¶¶ 244–250. More importantly, Petitioner’s assertion that Avegliano157 discloses cross-correlating *product information with affiliated shelf tag information*, even if true, is insufficient to establish that Avegliano157 discloses limitation [1.5]. As noted above, limitation [1.5] requires cross-correlating one or more product facing bounding boxes *and* one or more *other* product facing bounding boxes. Petitioner does not even assert, much less establish sufficiently, that Avegliano157 discloses cross-correlating one or more product facing bounding boxes with one or more *other* product facing bounding boxes.

For the above reasons, we are not persuaded that Avegliano157 discloses limitation [1.5].

Second, Patent Owner disputes Petitioner’s contention that Rodriguez discloses limitation [1.5]. Prelim. Resp. 31–32. In particular, Patent Owner argues that “there is not a single disclosure of shelf label content (or, for that matter, ‘shelf’) in Rodriguez.” *Id.* at 31. In Patent Owner’s view, “Petitioner apparently thinks that the mere multi-image-taking process in Rodriguez somehow teaches the cross-correlation step, but without any bounding box and any shelf label content, there is nothing to correlate, much less cross-correlate as required by the claims.” *Id.* at 32.

We agree with Patent Owner. Petitioner does not direct us to any disclosure in Rodriguez regarding capturing shelf label content. Indeed,

Rodriguez does not appear to mention “shelf label” or even “shelf.” *See generally*, Ex.1010. Even if the combination of Avegliano157 and Rodriguez discloses capturing shelf label content, Petitioner does not explain adequately how Rodriguez’s alleged teaching of capturing images from multiple locations would have taught one of ordinary skill in the art to cross-correlate one or more product facing bounding boxes and one or more other product facing bounding boxes.

For these reasons, we are not persuaded that Rodriguez discloses limitation [1.5].

Furthermore, limitation [1.5] recites cross-correlating different product facing bounding boxes *by matching shelf label content* of the different product facing bounding boxes. But Petitioner does not explain adequately how the combination of Avegliano157 and Rodriguez satisfies this requirement. Pet. 80–84. Although Petitioner asserts that the combination discloses associating shelf label content with product facing bounding boxes (*id.* at 79–80), we are not directed to any disclosure in either Avegliano157 or Rodriguez that teaches or suggests matching the shelf label content of different product facing bounding boxes.

For the above reasons, Petitioner fails to persuade us that the combination of Avegliano157 and Rodriguez discloses limitation [1.5]. Therefore, we determine Petitioner has not met its burden to show a reasonable likelihood it would prevail with respect to the contention that claim 1 is unpatentable over the combination of Avegliano157 and Rodriguez.

4. *Independent Claims 10 and 18*

As noted above, claims 10 and 18 recite limitations that are similar to limitation [1.5] of claim 1. *See supra* § III.D.4.

For these limitations of claims 10 and 18, Petitioner relies on essentially the same arguments made in connection with limitation [1.5]. Pet. 86–89. Thus, Petitioner’s challenge to claims 10 and 18 is based on the same deficient assertions regarding the combination of Avegliano157 and Rodriguez as discussed above in the analysis of the challenge to independent claim 1. For these same reasons, we find that Petitioner has not met its burden to show a reasonable likelihood that claims 10 and 18 are unpatentable over the combination of Avegliano157 and Rodriguez.

5. Dependent Claims 3–6, 15–17, 20, and 21

Claims 3–6 depend from claim 1 and, thus, contain all the limitations of claim 1, claims 15–17 depend from claim 10 and, thus, contain all the limitations of claim 10, and claims 20 and 21 depend from claim 18 and, thus, contain all the limitations of claim 18. Petitioner’s challenges to dependent claims 3–6, 15–17, 20, and 21 do not overcome the deficiencies discussed above with respect to the challenge to independent claims 1, 10, and 18. *See* Pet. 89–94. Accordingly, for the same reasons discussed above in connection with claims 1, 10, and 18, we find Petitioner has not met its burden to show a reasonable likelihood that claims 3–6, 15–17, 20, and 21 are unpatentable over the combination of Avegliano157 and Rodriguez.

G. Ground 4: Asserted Obviousness Based on Avegliano157, Rodriguez, and Avegliano430

Petitioner challenges claims 2, 7–9, 11–14, 16, and 19 as unpatentable under 35 U.S.C. § 103 based on the combination of Avegliano157, Rodriguez, and Avegliano430. Pet. 94–105. Each of these claims depends from either independent claim 1, independent claim 10, or independent claim 18 and, therefore, contains all the limitations thereof. Thus, Petitioner relies in part on the same assertions presented in the challenge of

independent claims 1, 10, and 18 based on the combination of Avegliano157 and Rodriguez, discussed above, in support of its contentions that claims 2, 7–9, 11–14, 16, and 19 would have been obvious over the combination of Avegliano157, Rodriguez, and Avegliano430. *See id.*

Accordingly, Ground 4 suffers from the same deficiencies noted above (*see supra* § III.F) in connection with Ground 3. Therefore, for the same reasons discussed above, we determine that the information presented in the Petition fails to establish a reasonable likelihood that Petitioner would prevail in showing that claims 2, 7–9, 11–14, 16, and 19 are unpatentable.

H. Discretion Under 35 U.S.C. § 314(a)

Patent Owner argues that we should exercise our discretion to deny institution under § 314(a). Prelim. Resp. 33. Petitioner argues that discretionary denial is not appropriate in this case. Pet. 105–06. Furthermore, subsequent to the Preliminary Response and with our authorization, Petitioner filed a *Sotera* stipulation.⁹ Ex.1029.

Because we are not persuaded the Petition demonstrates sufficiently a reasonable likelihood that Petitioner will prevail with respect to at least one challenged claim as discussed above, we need not reach Patent Owner’s arguments regarding discretionary denial under § 314(a).

IV. CONCLUSION

For the foregoing reasons, we do not institute *inter partes* review.

⁹ *See Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 18–19 (PTAB Dec. 1, 2020) (precedential) (finding that “a stipulation that, if IPR is instituted, they will not pursue in the District Court Litigation any ground raised or that could have been reasonably raised in an IPR,” weighed strongly in favor of not exercising discretion to deny institution).

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied* as to all challenged claims of the '272 patent; and

FURTHER ORDERED that no *inter partes* review is instituted.

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