

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIGN TECHNOLOGY, INC.,
Petitioner,

v.

DENTAL MONITORING SAS,
Patent Owner.

IPR2024-00052
Patent 11,049,248 B2

Before JEAN R. HOMERE, MICHAEL R. ZECHER, and
KARA L. SZPONDOWSKI, *Administrative Patent Judges*.

SZPONDOWSKI, *Administrative Patent Judge*.

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

I. INTRODUCTION

Align Technology, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting institution of an *inter partes* review of claims 1, 2, 4, 7, 8, and 13–16 of U.S. Patent No. 11,049,248 B2, issued on June 29, 2021 (Ex. 1001, “the ’248 patent”). Dental Monitoring SAS (“Patent Owner”) filed a Preliminary Response (Paper 8, “Prelim. Resp.”).

Institution of an *inter partes* review is authorized when “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Based on the current record, and for the reasons explained below, we determine that Petitioner has established a reasonable likelihood that it would prevail with respect to at least one challenged claim, and we institute an *inter partes* review.

II. BACKGROUND

A. *Real Parties-in-Interest*

Petitioner identifies itself as the real party-in-interest. Pet. 63. Patent Owner identifies itself as the real party-in-interest. Paper 4, 1 (Mandatory Notices of Patent Owner).

B. *Related Matter*

Petitioner and Patent Owner identify *Dental Monitoring SAS v. Align Technology, Inc.*, No. 3:22-cv-07335-WHA (N.D. Cal.) (“the California litigation”). Pet. 63; Paper 4, 1.

C. *The ’248 Patent (Ex. 1001)*

The ’248 patent is titled “Method for Analyzing an Image of a Dental Arch” and describes, among other things, “[a] method for assessing the

shape of an orthodontic aligner.” Ex. 1001, codes (54), (57). In particular, the orthodontist determines the positioning of the teeth that he or she wants to obtain, and has manufactured an orthodontic appliance suited for this treatment, such as an orthodontic aligner. *Id.* at 27:26–34. The ’248 patent describes that, conventionally, an aligner is in the form of a removable monobloc appliance made of a transparent polymer, that comprises a tray shaped in such a way to house teeth. *Id.* at 27:35–39. The shape of the aligner is “adapted to hold the aligner in position on the teeth, while exerting an action of correction on the positioning of certain teeth.” *Id.* at 27:40–42. Conventionally, the shapes that the different aligners have to take during the treatment are determined and manufactured at the start of treatment, and the patient changes the aligner at predetermined times. *Id.* at 27:48–52. The patient visits the orthodontist at regular intervals for a visual inspection, so that the orthodontist can determine whether the aligner being worn by the patient is still suited to the treatment. *Id.* at 27:55–69.

The invention described in the ’248 patent “considerably simplifies the assessment of the good suitability of the aligner to the treatment,” in particular, because “the method may be implemented from simple photographs or films, taken with no particular precautions, for example by the patient,” thereby limiting the number of appointments with the orthodontist. Ex. 1001, 28:35–42. Specifically, a method is proposed “for analyzing an image called ‘analysis image’, of a dental arch of a patient, a method in which the analysis image is submitted to a deep learning device, preferably a neural network, in order to determine at least one value of a tooth attribute relating to a tooth represented on the analysis image, and/or at

least one value of an image attribute relating to the analysis image.” *Id.* at 1:22–29.

The “analysis image” is “an image representing the aligner worn by the teeth of the patient” and is preferably captured by the patient on a cellphone. Ex. 1001, 8:43–53, 8:66–67, 30:16–18, 30:31–32. The “analysis image” may be taken “when the assessment of the shape of an aligner is desired, for example, more than 1 week after the start of the treatment with the aligner,” and preferably, at least one reminder is sent to the patient to capture the “analysis image.” *Id.* at 30:19–30.

The “analysis image” is submitted to and analyzed by a “deep learning device,” preferably a neural network, that was trained on a specific dataset, called a “learning base.” Ex. 1001, 1:39–43, 1:66–2:1, 16:5–6, 16:44–45, 24:3–5. According to the ’248 patent, the neural network may be, for example, Microsoft ResNet or VGG Net. *Id.* at 16:7–25. “By presenting, as input for the deep learning device, historical images (images+descriptions), the deep learning device progressively learns to recognize patterns on an image, and to associate them with tooth zones and with tooth attribute values, for example tooth numbers.” *Id.* at 16:38–43. The deep learning device, therefore, analyzes the “analysis image” and is capable of recognizing patterns therein. *Id.* at 16:46–49. The tooth attribute may be related to separation, such as the separation between the tooth and an aligner worn by the tooth. *Id.* at 28:43–67, 30:35–41. “The value for this tooth attribute therefore provides an information item relating to the shape of the aligner relative to the shape of the teeth of the patient.” *Id.* at 30:42–44. Based upon this information, an assessment can be made as to the suitability of the aligner. *Id.* at 30:54–31:3.

D. Illustrative Claim

Among the challenged claims, claims 1 and 15 are independent. Independent claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A method for assessing the shape of an orthodontic aligner, said method comprising the following steps:

a") more than 1 week after the start of the treatment with the aligner, acquisition of at least one image at least partially representing the aligner in a service position in which it is worn by a patient, called "analysis image", the analysis image being a photograph, or an image extracted from a film;

b") analysis of the analysis image by means of a deep learning device, trained by means of a learning base, so as to determine a value

for at least one tooth attribute of an "analysis tooth zone" representing, at least partially, a tooth on said analysis image, the tooth attribute relating to a separation between the tooth represented by the analysis tooth zone, and the aligner represented on the analysis image,

in the step a"), a cellphone is used to acquire the analysis image.

Ex. 1001, 32:6–23.

E. Prior Art and Asserted Challenges to Patentability

Petitioner asserts that claims 1, 2, 4, 7, 8, and 13–16 are unpatentable based on the following challenges (Pet. 14):

Claims Challenged	35 U.S.C. § ¹	Basis/References
1, 2, 4, 7, 8, 13–16	103	Kim, ² Invisalign, ³ Salah, ⁴ Maninis ⁵

In support of its proposed challenges, Petitioner relies on the Declaration of Dr. Hassan Foroosh. *See* Ex. 1002.

III. DISCRETIONARY DENIAL

A. *Discretion to Deny Institution Under 35 U.S.C. § 314(a)*

Patent Owner contends that we should exercise our discretion to deny institution under 35 U.S.C. § 314(a) in light of the California litigation. Prelim. Resp. 51–57. Patent Owner contends that the factors identified in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”), weigh in favor of exercising discretion to deny institution. *Id.*

¹ Because the ’248 patent issued from a patent application that was filed after March 16, 2013 (Ex. 1001, codes (21), (22)), patentability is governed by the version of 35 U.S.C. § 103 of the Leahy-Smith America Invents Act (“AIA”), Pub L. No. 112–29, 125 Stat. 284 (2011).

² Kim, US 2017/0281313, published Oct. 5, 2017 (“Kim,” Ex. 1005). Petitioner contends that Kim is prior art to the ’248 patent under 35 U.S.C. § 102(a)(2). Pet. 6.

³ *The Invisalign Clinical Monitoring Guide*, Align Technology, Inc. (2003) (“Invisalign,” Ex. 1006). Petitioner contends that Invisalign is prior art to the ’248 patent under 35 U.S.C. § 102(a)(1). Pet. 8.

⁴ Salah et al., WO 2016/066651 A1, published May 6, 2016 (“Salah,” Ex. 1008). Petitioner contends that Salah is prior art to the ’248 patent under 35 U.S.C. § 102(a)(1). Pet. 9.

⁵ Maninis et al., *Convolutional Oriented Boundaries: From Image Segmentation to High-Level Tasks*, arXiv.org, published by May 2, 2017 (“Maninis,” Ex. 1007). Petitioner contends that Maninis is prior art to the ’248 patent under 35 U.S.C. § 102(a)(1). Pet. 10.

On June 21, 2022, the Director of the U.S. Patent and Trademark Office (“USPTO”) issued a Memorandum titled “Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings With Parallel District Court Litigation” (“Memorandum”),⁶ which states, among other things, that “the PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents a stipulation not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the PTAB.” Memorandum 3 (citing *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020) (precedential as to § II.A)).

On February 15, 2024, Petitioner submitted in the California litigation “Defendant Align Technology, Inc.’s Stipulation Re Challenged Claims in IPR2024-00052,” which states the following:

Align hereby stipulates that if the Patent Trial and Appeal Board institutes *inter partes* review on IPR2024-00052, then Align will not pursue in this case, against any of the Challenged Claims, the specific ground advanced in IPR2024-00052 or any ground that reasonably could have been raised in an IPR (i.e., any ground that could be raised under §§ 102 or 103 against any of the Challenged Claims only on the basis of prior art patents or printed publications).

Ex. 1028, 2.

Applying the guidance provided in the Memorandum, we decline to exercise our discretion to deny institution in this proceeding under *Fintiv* because Petitioner submitted a *Sotera* stipulation.

⁶ The Memorandum is *available at* https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

B. Discretion to Deny Institution Under 35 U.S.C. § 325(d)

Patent Owner asserts that the Director should exercise her discretion under 35 U.S.C. § 325(d) to deny institution. Prelim. Resp. 47–51. We decline to exercise discretion to deny institution under § 325(d) for the reasons discussed below.

1. Standards of Law

In evaluating the exercise of discretion to deny institution under § 325(d), the Board uses a two-part framework: (1) determining whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of the first part of the framework is satisfied, determining whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims. *Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential). In applying the two-part framework, we consider several non-exclusive factors, including:

- (a) the similarities and material differences between the asserted art and the prior art involved during examination;
- (b) the cumulative nature of the asserted art and the prior art evaluated during examination;
- (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;
- (d) the extent of the overlap between the arguments made during examination and the manner in which petitioner relies on the prior art or patent owner distinguishes the prior art;

(e) whether petitioner has pointed out sufficiently how the examiner erred in its evaluation of the asserted prior art; and

(f) the extent to which additional evidence and facts presented in the petition warrant reconsideration of the prior art or arguments.

Becton, Dickinson & Co. v. B. Braun Melsungen AG, IPR2017-01586, Paper 8 at 17–18 (PTAB Dec. 15, 2017) (precedential as to Section III.C.5, first paragraph) (“*Becton, Dickinson*”). *Becton, Dickinson* factors (a), (b), and (d) relate to whether the art or arguments presented in the Petition are the same or substantially the same as those previously presented to the Office. *Advanced Bionics*, Paper 6 at 10. Factors (c), (e), and (f) “relate to whether the petitioner has demonstrated a material error by the Office” in its prior consideration of that art or arguments. *Id.* Only if the same or substantially the same art or arguments were previously presented to the Office do we consider whether the petitioner has demonstrated a material error by the Office. *Id.* “At bottom, this framework reflects a commitment to defer to previous Office evaluations of the evidence of record unless material error is shown.” *Id.* at 9

2. *Whether the Same or Substantially the Same Art or Arguments Were Previously Presented to the Office*

Petitioner contends that “none of Kim, Invisalign, and Maninis was disclosed or considered during examination” and “Salah was cited in an IDS [Information Disclosure Statement].” Pet. 60–61. Petitioner further contends that the references relied on in the Petition are not “cumulative to the references applied during examination, as the discussion [of] the reasons for allowance shows that the elements that the Examiner indicated were

missing from the cited art were in fact found in prior art references reflecting common orthodontic and image analysis practices, such as Kim, Invisalign, Salah, and Maninis.” *Id.* at 61. Petitioner further contends that, given the discussion provided by Petitioner for the sole challenge, allowance by the Office constituted material error. *Id.*

Patent Owner argues that “the art asserted in the Petition is duplicative of the art considered by the Examiner.” Prelim. Resp. 48. Patent Owner argues that Salah was “cited extensively in the specification of the ’248 Patent, and was disclosed in an IDS by Patent Owner during prosecution.” *Id.* (citing Ex. 1001, code (56), 2:43, 3:10, 7:11, 7:16, 7:24, 7:41, 8:46, 9:29, 14:41, 17:58, 19:27, 20:43, 22:2, 23:34, 23:39, 23:51, 23:58, 25:9–10, 27:7, 27:15; Ex. 1004, 80; Ex. 2002 ¶ 122). Patent Owner argues that Kim is duplicative of Salah because “Petitioner cites Kim in part for the same reasons as Salah.” *Id.* at 49 (citing Pet. 24, 30; Ex. 2002 ¶ 123). Patent Owner also argues that the ’248 patent discusses the “state of the art,” so for the same reasons the claims “were not obvious over orthodontist’s practice of in-person checks to see if aligners were still suitable for treatment, they remain nonobvious in light of” the disclosure relied upon in Kim and Invisalign for determining aligner separation. *Id.* Patent Owner further argues that Maninis does not disclose anything additional regarding neural networks that was not already disclosed in the ’248 patent. *Id.* at 50 (citing Ex. 1001, 16:10–35).

“Previously presented art includes art made of record by the Examiner, and art provided to the Office by an applicant, such as on an Information Disclosure Statement (IDS), in the prosecution history of the challenged patent.” *Advanced Bionics*, Paper 6 at 7–8. There is no dispute

that Salah was of record during prosecution of the '248 patent. Ex. 1001, code (56). There is no evidence, however, that the Examiner substantively considered Salah during prosecution. Nor is there any evidence that Kim, Invisalign, and Maninis were of record during prosecution or that the Office considered the Kim, Invisalign, Salah, and Maninis combination proposed by Petitioner.

Although Patent Owner appears to argue that the disclosure in Kim, Invisalign, and Maninis is cumulative to disclosure in the '248 patent, Patent Owner does not meaningfully explain how the references asserted (i.e., Kim, Invisalign, and Maninis) are cumulative of the references cited during prosecution in light of this disclosure in the '248 patent. For example, in the Reasons for Allowance, the Examiner stated that the references cited (Matov and Wen) do not teach or suggest the limitations “more than 1 week after the start of the treatment with the aligner, acquisition of at least one image at least partially representing the aligner in a service position in which it is worn by a patient,” “tooth attribute relating to a separation between the tooth represented by the analysis tooth zone, and the aligner represented on the analysis image,” and “a cellphone is used to acquire the analysis image.” Ex. 1004, 960–961. Petitioner relies on Kim, Invisalign, and Salah to teach these limitations, *see* Pet. 28–41, and argues that the missing elements identified by the Examiner are found in these prior art references, so they are not cumulative. *Id.* at 61. On this record, we are not persuaded otherwise, as Patent Owner does not address all of these limitations, or explain how Kim, Invisalign, or Maninis are cumulative of the references considered by the Examiner (Matov and Wen), and thus, does not sufficiently support the

position that the Examiner considered combinations the same as, or similar to, those presented by Petitioner.

Under these circumstances, we find the first part of the *Advanced Bionics* framework is not satisfied because the Petition sets forth a combination of prior art and arguments that are not the same or substantially the same as that considered by the Examiner during prosecution. Accordingly, we decline to exercise our discretion to deny institution pursuant to 35 U.S.C. § 325(d).

IV. ANALYSIS

A. *Legal Standards*

A claim is unpatentable under 35 U.S.C. § 103 if “the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when in evidence, objective evidence of nonobviousness, i.e., secondary considerations. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

A patent claim “is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). An obviousness determination based on a combination of references requires finding “both ‘that a skilled artisan would have been motivated to combine the teachings

of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367–68 (Fed. Cir. 2016) (citation omitted); *see KSR*, 550 U.S. at 418.

Further, an assertion of obviousness “cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*, 550 U.S. at 418; *In re NuVasive, Inc.*, 842 F.3d 1376, 1383 (Fed. Cir. 2016) (a finding of a motivation to combine “must be supported by a ‘reasoned explanation’” (citation omitted)).

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3)); *see also Intelligent Bio-Sys.*, 821 F.3d at 1369. Therefore, to prevail in an *inter partes* review, Petitioner must explain how the proposed combination of prior art would have rendered the challenged claims unpatentable. At this preliminary stage, we determine whether the information presented in the Petition shows there is a reasonable likelihood that Petitioner would prevail in establishing that at least one of the challenged claims would have been obvious over the proposed combination of prior art.

B. Level of Ordinary Skill in the Art

Petitioner contends a person of ordinary skill in the art “would typically have an advanced degree, such as a Masters’ Degree or Ph.D. in computer science, computer engineering, electrical engineering, or a related field, with at least two years of work in computer vision, image analysis,

medical imaging, or related areas.” Pet. 14 (citing Ex. 1002 ¶¶ 60–61). In addition, Petitioner contends, a person of ordinary skill in the art “could have less education but significant professional experience in one or more of these fields” and “could be a member of an interdisciplinary team.” *Id.*

Patent Owner does not contest Petitioner’s definition at this stage.
Prelim. Resp. 17.

We find Petitioner’s proposal is consistent with the level of ordinary skill in the art reflected by the prior art of record, and, therefore, adopt Petitioner’s proposed level of ordinary skill in the art for purposes of this Decision. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

C. Claim Construction

Petitioner provides constructions for the term “tooth attribute” as recited in claim 1, the term “image attribute” as recited in claims 8 and 15, and the term “image extracted from a film” as recited in claims 1 and 15. Pet. 15–18. In addition, Petitioner contends that the second step of claims 1 and 15 (i.e., steps 1(b”) and 15(b”)), whether construed as a means-plus-function limitation or not, does not distinguish over the prior art. *Id.* at 19. However, Petitioner identifies the function as “analyzing an image” and the structure “to encompass a device comprising a deep learning neural network trained with a learning base.” *Id.* at 19–20.

Patent Owner does not respond to Petitioner’s proposals, and argues that “even under Petitioner’s proposals, the Board should deny institution.” Prelim. Resp. 7.

Only terms that are in controversy need to be construed, and then only to the extent necessary to determine whether to institute *inter partes* review. *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))). After reviewing the parties’ arguments and evidence, we determine that we do not need to expressly construe any term for purposes of this Decision.

D. Alleged Obviousness Over Kim, Invisalign, Salah, and Maninis

Petitioner contends claims 1, 2, 4, 7, 8, and 13–16 would have been obvious over Kim, Invisalign, Salah, and Maninis. Pet. 20–59. Having considered the arguments and evidence before us, we find that the record establishes a reasonable likelihood that Petitioner would prevail on at least one claim in this asserted ground of unpatentability.

1. Kim (Ex. 1005)

Kim is titled “Method and System for Providing Remote Teeth Alignment Services and Computer-Readable Medium on Which the Method is Recorded,” and is generally directed to “a method and system for providing remote teeth alignment services to remotely advise an appropriate step of a clear aligner using a smartphone of an orthodontic patient, and a computer-readable medium on which the method is recorded.” Ex. 1005, code (54), ¶ 1.

In particular, Kim describes:

a method and system for providing remote teeth alignment services, by which an orthodontist may obtain accurate teeth alignment information using a device, e.g., a smartphone, of an orthodontic patient, may remotely and accurately diagnose the condition of the patient based on the teeth alignment information, and may remotely provide information about an accurate step of a clear aligner to be currently worn by the

orthodontic patient, thereby greatly reducing a diagnosis time and cost of the orthodontic patient and the orthodontist, the accuracy of diagnosis may be improved by automatically obtaining photos of accurate sizes and locations using various virtual lines, the teeth alignment information may be easily used by the orthodontist by providing the teeth alignment information in the form of report information and classifying the teeth alignment information based on time, teeth alignment may be precisely performed in a customized manner by providing manufacturing information to a clear aligner manufacturer when an additional or modified clear aligner is necessary, interest of orthodontic patients may be increased by disclosing the teeth alignment information of a selected orthodontic patient, and the orthodontic patients may be inspired with a greater desire for aligned teeth by providing benefits to the selected orthodontic patient, and a computer-readable medium having recorded the method thereon.

Ex. 1005 ¶ 10. Figure 1, which depicts “a conceptual view of a system for providing remote teeth alignment services,” (Ex. 1005 ¶ 26) is reproduced below:

FIG. 1

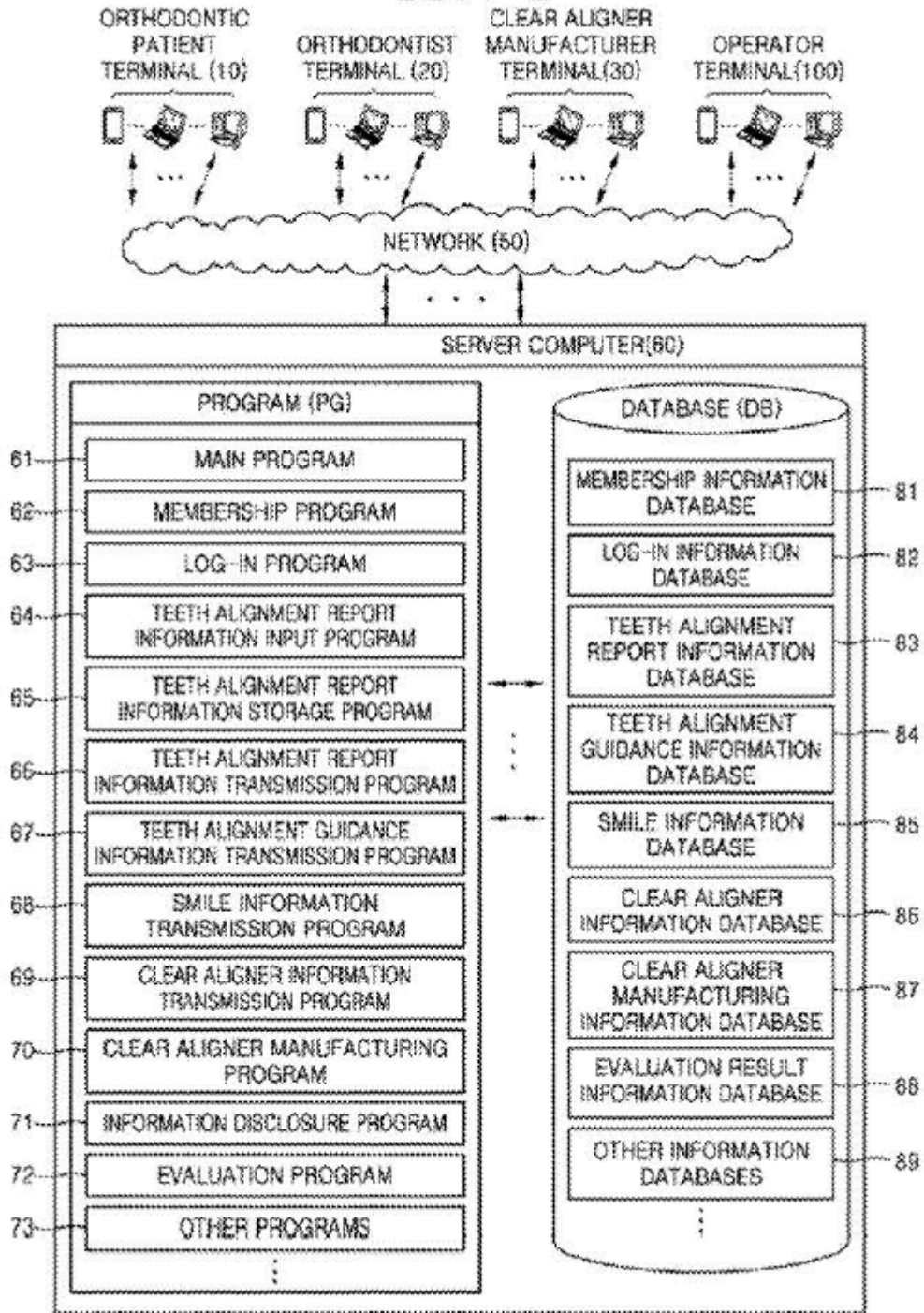


Figure 1, shows, among other things, orthodontic patient terminal 10, orthodontist terminal 20, clear aligner manufacturer terminal 30, operator terminal 100, and server computer 60, all interconnected through network 50. Ex. 1005 ¶ 39, 49, Fig. 1. Orthodontic patient terminal 10 may be, for example, a mobile device. *Id.* ¶ 42. Orthodontist terminal 20 may, likewise, be a smartphone or mobile device. *Id.* ¶ 44.

According to Kim, the patient may provide “teeth alignment information” to orthodontist terminal 20 by taking a variety of photographs of the patient’s teeth from different angles using orthodontic patient terminal 10. *Id.* ¶¶ 10, 42, 55, 56, 60 80. Orthodontic patient terminal 10 may send “clear aligner information about a currently worn clear aligner” to orthodontist terminal 20, so that “the orthodontist checks a photo or a video of the clear aligner currently worn by the orthodontic patient, and determines whether the clear aligner is normal and corresponds to an appropriate step.” *Id.* ¶ 66; *see also id.* ¶ 10.

2. *Invisalign (Ex. 1006)*

Invisalign is “intended to help the Invisalign practitioner successfully monitor Invisalign treatments and address issues that may arise between receipt of Aligners from Align to the completion of treatment.” Ex. 1006, i. Invisalign provides guidance to monitor treatment progress of patients after aligners have been received and are being worn by the patient. *Id.* at i–iv. For example, the practitioner can “evaluate any fit concerns that may arise” by “[h]av[ing] patients arrive with the previous stage Aligner and the current Aligner.” *Id.* at ii. Invisalign includes information on “Managing Aligner fit and seating,” and advises that an “Aligner [is] seating poorly” if there is greater than 1 mm gap between the teeth and aligner. *Id.* at 1. Invisalign

further states that “Aligners should be fitting well at the end of the 2-week period.” *Id.*

3. *Salah (Ex. 1008)*

Salah is titled “Method for Monitoring Dentition,” and is generally directed to “monitoring . . . the appearance of the teeth of a patient.” Ex. 1008, codes (54), (57). Salah generally describes methods for monitoring the positioning, shape, and/or appearance of a patient’s teeth by obtaining two-dimensional (“2D”) images of a patient’s teeth and comparing them to a three-dimensional (“3D”) digital reference model. *Id.* at 1:1–2:19.

Salah’s method starts with the creation of a 3D “initial reference model” of the patient’s dental arch, then a 2D “updated image” is acquired and analyzed to assess tooth deformation and/or displacement since the “initial reference model,” and then the “initial reference model” is modified until a “final reference model” is obtained that corresponds to the updated image. Ex. 1008, 1:28–2:19.

Salah describes that the “updated image” may be a “photograph taken by the patient.” *Id.* at 2:24, 31:5–7 (“image acquisition can be carried out by the patient himself or by one of their relatives, using a simple cell phone, anywhere, and especially outside a medical, dental or orthodontic practice”); *see also* 27:11–13. In order to compare the updated and reference images, Salah describes comparing discriminant information on both images. *Id.* at 40:19–20. “Discriminant information is preferably chosen from the group consisting of *contour information*, color information, density information, a distance information, brightness information, saturation information, reflection information and combinations of these.” *Id.* at 34:8–10 (emphasis

added). Salah obtains various methods for processing an image to obtain discriminant information, including deep learning. *Id.* at 34:11–36:14.

4. *Maninis (Ex. 1007)*

Maninis is titled “Convolutional Oriented Boundaries: From Image Segmentation to High-Level Tasks,” and relates to using “Convolutional Neural Networks (CNNs)” to “produce[] multiscale oriented contours and region hierarchies starting from generic image classification.” Ex. 1007, Abstract.

Maninis states that the “latest wave of contour detectors takes advantage of deep learning to obtain state-of-the-art results,” and provides “an end-to-end deep framework to boost the efficiency and accuracy of contour detection, using convolutional feature maps and a novel loss function.” *Id.* at 2. Figure 2 of Maninis, reproduced below, further illustrates using a deep learning device for performing contour and edge detection in images. *Id.* at 3.

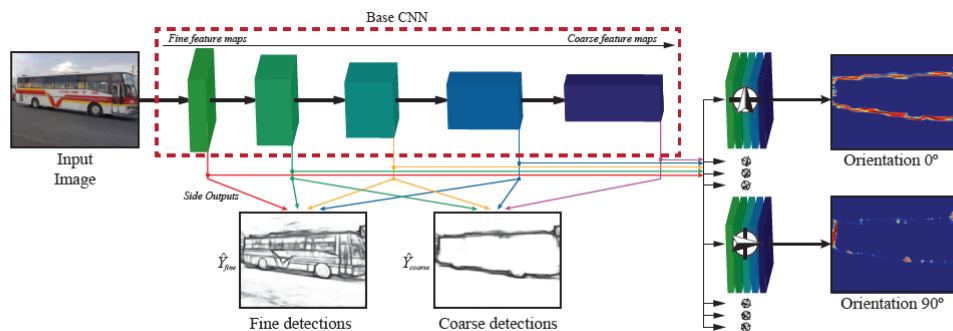


Fig. 2. Our deep learning architecture (best viewed in color). The connections show the different stages that are used to generate the multiscale contours. Orientations further require additional convolutional layers in multiple stages of the network.

Figure 2, above, illustrates a deep learning architecture depicting connections between different stages used to generate the multiscale contours using multiple feature map layers in a CNN to detect image contents at different scales (fine and coarse detections) as well as different

orientations. *Id.* It “depicts how we make use of information provided by the intermediate layers of a CNN to detect contours and their orientations at multiple scales.” *Id.* Maninis further describes “recent approaches to contour detection using deep learning . . . [and] presenting our CNN architecture to produce contour detection.” *Id.* Maninis “start[s] from a deep network pretrained on ImageNet [7], such as VGG [10], or ResNet [11].” *Id.* at 4.

5. Analysis of Independent Claim 1

Petitioner contends that the combination of Kim, Invisalign, Salah, and Maninis teaches the limitations of independent claim 1. Pet. 27–41. In support, Petitioner identifies certain passages and figures in the references and explains their significance with respect to the corresponding claim limitation. *Id.* Petitioner also provides reasons why it would have been obvious to a person of ordinary skill in the art to combine the references with a reasonable expectation of success. *Id.* at 20–27.

a) Preamble

The preamble recites “[a] method for assessing the shape of an orthodontic aligner, said method comprising the following steps.” Ex. 1001, 32:6–7.

Petitioner contends that both Kim and Invisalign teach such a method.⁷ Pet. 28. According to Petitioner, “Kim teaches evaluating an aligner by reviewing an image of the aligner currently worn by the patient, to determine whether the aligner is normal and appropriate.” *Id.* (citing Ex.

⁷ Petitioner does not argue, one way or the other, whether the preamble is limiting. We make no determination at this stage of the proceeding whether the preamble of claim 1 is limiting.

1005 ¶ 66). Petitioner also contends that “Invisalign teaches that evaluating a currently-worn clear aligner includes assessing the fit of the aligner, and that this assessment involves determining a distance between the teeth and the aligner when worn by the patient.” *Id.* (citing Ex. 1006, 1).

At this stage, Patent Owner does not respond to Petitioner’s contentions. *See generally* Prelim. Resp.

Based on our review and consideration of the current record, we determine that Petitioner has sufficiently shown that Kim and Invisalign teach the recited elements of the preamble for purposes of institution.

b) Limitation 1(a’')

Petitioner contends that limitation 1(a’’) would have been obvious over Kim, Invisalign, and Salah. Pet. 29. Limitation 1(a’’) recites “more than 1 week after the start of the treatment with the aligner, acquisition of at least one image at least partially representing the aligner in a service position in which it is worn by a patient, called ‘analysis image’, the analysis image being a photograph, or an image extracted from a film,” and claim 1 further recites that “in the step a’’), a cellphone is used to acquire the analysis image.” Ex. 1001, 32:8–13, 22–23.

Petitioner contends that Kim teaches that the patient’s smartphone camera may be used to acquire photographs “showing a teeth alignment state of the orthodontic patient,” which can further include “receiving the clear aligner information about a currently worn clear aligner,” and enabling the orthodontist to “check[] a photo or a video of the clear aligner currently worn by the orthodontic patient” to “determine[] whether the clear aligner is normal and corresponds to an appropriate step.” Pet. 29 (citing and quoting Ex. 1005 ¶¶ 55, 56, 66). Petitioner further contends that Kim teaches

acquiring an image at least one week after the start of treatment with the aligner, by disclosing that images may be taken recurrently based on calendared appointments. *Id.* at 32–33 (citing Ex. 1005 ¶ 83, Fig. 15).

Petitioner argues, “to the extent Patent Owner may argue Kim does not sufficiently describe the aligner currently worn and imaged is in a service position on the patient’s teeth, taking such an image would have been readily apparent in view of Invisalign’s teachings.” Pet. 21. Petitioner contends that “Invisalign provides a reason to acquire an image of the patient’s teeth with an aligner being worn in a service position: by assessing the gap visible between aligner and teeth, Invisalign teaches that it can be determined whether an aligner fits correctly (e.g., is normal and corresponds to an appropriate step), or whether it is seated or fit poorly.” *Id.* at 30 (citing Ex. 1002 ¶ 88); *see also* Ex. 1006, 1; *see also* Pet. 21–22. Petitioner also contends that Invisalign teaches acquiring an image at least one week after the start of treatment with the aligner, by disclosing the evaluation of issues that may arise during treatment, and that “treatments naturally take course over many weeks, and Invisalign teaches that treatment is assessed over such periods.” Pet. 32 (citing Ex. 1006, 1); *see also id.* (citing Ex. 1002 ¶ 91).

Petitioner contends that, in view of Kim and Invisalign’s teachings, a person of ordinary skill in the art “would have had reason to analyze images of the teeth of a patient wearing an aligner in a service position to evaluate whether the aligner fit appropriately.” Pet. 22. According to Petitioner, the proposed “combination would be applying known methods for orthodontic evaluation of aligner fit based upon the appearance of the aligner worn on the patient’s teeth, as taught by Invisalign, in order to analyze a photo or video of the aligner worn by the patient, as taught by Kim, thereby providing

feedback regarding tooth-aligner separation to aid an orthodontist regarding whether the clear aligner is normal and corresponds to an appropriate step of treatment.” *Id.* at 22–23. Petitioner contends that Kim indicates that “employing such techniques would serve goals including enhancing accuracy, reducing the time and cost of treatment, and facilitating remote assessment.” *Id.* at 23 (citing Ex. 1005 ¶¶ 8–10, 72).

Petitioner further contends that “Salah similarly teaches acquiring dental images with a cellphone, including of teeth fitted with orthodontic appliances.” Pet. 30; *see id.* (citing Ex. 1008, 27:11–13, 31:4–7, 64:7–12, Fig. 11; Ex. 1002 ¶ 89); *see also id.* at 24. According to Petitioner, “[u]se of cellphones to acquire images depicting teeth wearing an aligner is also consistent with published methods of orthodontic practice.” Pet. 31; *see id.* (citing Ex. 1009, 19; Ex. 1002 ¶ 90); *see also id.* at 23–24.

Patent Owner argues that none of the references teach “acquisition of an image of an aligner, as worn by a patient, during assessment of aligner treatment.” Prelim. Resp. 35. According to Patent Owner, “Kim discloses only the acquisition of images of a patient’s teeth.” *Id.* Patent Owner argues that “Invisalign describes aligner issues for which dental practitioners should visually check during in-person, in-office appointments,” and “[t]o the extent that Invisalign teaches any image capture, that image capture is done for the purposes of creating aligners, not assessing the fit of those aligners in a patient’s mouth.” *Id.* at 36–37 (Ex. 1006, i–iii, 4, 6, 9; Ex. 2002 ¶¶ 82–87, 105; Ex. 2004 ¶¶ 43, 46). Patent Owner also argues that the example cited by Petitioner in Salah shows an intraoral appliance, not an aligner. *Id.* at 37.

Petitioner has sufficiently shown that the combination of Kim, Invisalign, and Salah teaches this limitation for purposes of institution.

Patent Owner's arguments largely address the references separately, rather than in combination as proposed by Petitioner. *See, e.g., In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) ("Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references."). That is, Petitioner has shown, at minimum, that the combination of Kim, Invisalign, and Salah teaches "acquisition of at least one image at least partially representing the aligner in a service position in which it is worn by a patient, called 'analysis image', the analysis image being a photograph, or an image extracted from a film," where "a cellphone is used to acquire the analysis image." As asserted by Petitioner, Kim teaches, at minimum, using a cellphone to acquire an image of the patient's teeth,⁸ Salah teaches using a cellphone to acquire an image of the patient's teeth while the user is wearing an orthodontic appliance, and Invisalign provides a reason to acquire an image of the patient's teeth with an aligner being worn, i.e., in order to assess the gap between the tooth and aligner. Ex. 1005 ¶¶ 55–56; Ex. 1008, 27:11–13, 31:4–7, 64:7–12; Fig. 11; Ex. 1006, 1. We are also persuaded by Petitioner's contentions that using cellphones to acquire images depicting teeth wearing an aligner "was known to be a useful practice for assessment of a patient's orthodontic treatment status." Pet. 31 (citing Ex. 1009, 19; Ex. 1002 ¶ 90). We also find sufficient at this stage of the proceeding Petitioner's contentions that the combination of Kim and Invisalign teaches,

⁸ We recognize that there may be a dispute over Kim's disclosure, i.e., whether Kim teaches acquisition of an image of only the patient's teeth, or whether Kim teaches acquisition of an image of the patient's teeth while wearing the "currently worn" aligner. We encourage the parties to further develop these issues during trial.

or at least suggests, acquiring the image “more than 1 week after the start of the treatment with the aligner.” *Id.* at 32–33.

Patent Owner also argues that a person of ordinary skill in the art would not have been motivated to combine Kim or Salah with Invisalign because “Kim and Salah relate to *remote* monitoring of *teeth positions* using images of the patient’s teeth captured *without aligners* in place,” whereas Invisalign “describes a visual approximation performed *in-person* when the patient visits the orthodontist’s office.” Prelim. Resp. 28–29 (citing Ex. 1005 ¶ 10; Ex. 1008, 2:21–27; Ex. 2002 ¶ 99; Ex. 1006, ii; Ex. 2004 ¶ 43). According to Patent Owner, none of the cited prior art “suggests that aligner fit can be *remotely* assessed from an aligner image or describes how that could be done.” *Id.* at 29 (citing Ex. 2002 ¶ 99).

At this stage of the proceeding, Petitioner has shown sufficiently that a person of ordinary skill in the art would have had reasons to combine the reference’s teachings, with some rational underpinning, and would have had a reasonable expectation of success in doing so. We apply “an expansive and flexible approach” to the question of obviousness. *KSR*, 550 U.S. at 415. Moreover, “the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.* at 418.

Patent Owner’s arguments do not directly address Petitioner’s reasoning, which is supported by testimony from Dr. Foroosh, that the combination “appl[ies] known methods for orthodontic evaluation of aligner fit based upon the appearance of the aligner worn on the patient’s teeth, as taught by Invisalign, in order to analyze a photo or video of the aligner worn

by the patient, as taught by Kim, thereby providing feedback regarding tooth-aligner separation to aid an orthodontist regarding whether the clear aligner is normal and corresponds to an appropriate step of treatment.” *See* Pet. 22–23. Petitioner provides reasons for the combination, such as those as stated in Kim, of “enhancing accuracy, reducing the time and cost of treatment, and facilitating remote assessment,” and Invisalign’s teachings of “how to evaluate aligner fit.” *Id.* at 22–23 (citing Ex. 1005 ¶¶ 8–10, 72). We find these reasons sufficient for purposes of institution. Moreover, Patent Owner’s argument that none of the cited prior art “suggests that aligner fit can be *remotely* assessed from an aligner image or describes how that could be done,” (*id.* at 29 (citing Ex. 2002 ¶ 99)) is not persuasive, as it implies that the reason to combine the references must come from a single reference. *See DyStar Testilfarben GmbH v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006) (stating that motivation to combine prior art references may exist “even absent any hint of suggestion in the references themselves”).

Therefore, based on our review and consideration of the current record, we determine that Petitioner has sufficiently shown that Kim, Invisalign, and Salah teach limitation 1(a”) for purposes of institution, and has provided sufficient reasoning supported by a rational basis for the combination.

c) Limitation 1(b”)

Petitioner contends that Kim, Invisalign, Salah, and Maninis teach limitation 1(b”). Pet. 34 (citing Ex. 1002 ¶¶ 93–94). Limitation 1(b”) recites “analysis of the analysis image by means of a deep learning device, trained by means of a learning base, so as to determine a value for at least

one tooth attribute of an ‘analysis tooth zone’ representing, at least partially, a tooth on said analysis image, the tooth attribute relating to a separation between the tooth represented by the analysis tooth zone, and the aligner represented on the analysis image.” Ex. 1001, 32:14–21.

Petitioner contends that “Salah teaches that dental images may be analyzed to detect ‘discriminant information,’ which can include contours of objects depicted in the images, including teeth and other intraoral objects such as gums.” Pet. 34 (citing Ex. 1008, 34:5–14, 55:21–56:7). According to Petitioner, the “contours may be detected using deep learning.” *Id.* at 35 (citing Ex. 1008, 36:14; Ex. 1002 ¶ 96). Petitioner contends that Maninis teaches applicable deep learning techniques for contour and object detection, and that “Maninis’s use of a computing device comprising a trained deep-learning convolutional neural network to analyze images matches the ‘248 patent’s preferred embodiment.” *Id.* at 36–38 (citing, e.g., Ex. 1001, 1:24–25, 16:9–36; Ex. 1007, 2, 3–5, 9, Fig. 2); *see also id.* at 24–25.

According to Petitioner, a person of ordinary skill in the art “would have been motivated to use [Maninis’s] techniques to identify teeth and aligners depicted in orthodontic images by detecting their contours and identifying the objects found within each contour.” Pet. 38. Petitioner argues:

Based on Maninis’s flexibility and prospect to improve performance, a [person of ordinary skill in the art] would have been motivated to analyze images using a deep learning device as taught by Maninis to improve image acquisition and analysis apparatus as taught by Salah and Kim. For example, a [person of ordinary skill in the art] would have been motivated to adapt Salah and Kim’s image acquisition and analysis apparatus to employ a deep learning architecture as taught by Maninis, trained on images relevant to the dental imaging applications of

Salah, Kim, and Invisalign. Maninis’s deep learning architecture would provide specific functionalities required by Salah, Kim, and Invisalign, including the ability to identify objects (such as the teeth and aligners depicted in each image) and to detect contours (such as the edges of teeth and aligners useful to assess aligner fit as taught by Invisalign). EX1002, ¶78.

Id. at 26.

Petitioner contends that the adjustments to Maninis’ deep learning device, which “include providing an appropriately annotated training set and setting output layers to provide the required object identifications corresponding to the labels used to identify the locations of teeth, aligners, and the gaps between them,” would have been “straightforward and well within the skill level of the [person of ordinary skill in the art].” Pet. 38. (citing Ex. 1002 ¶ 102); *see also* Ex. 1002 ¶¶ 102–103 (cited at Pet. 38–39).

Petitioner contends that a person of ordinary skill in the art would have been motivated in view of Kim and Invisalign to apply the contour-detection techniques of Salah and Maninis to detect edges of teeth and aligners depicted in images of patient’s teeth so that the assessment of gap between aligner and teeth could be made, as taught by Invisalign. For example, because the detected edges of the aligner and teeth correspond to the edges of the physical objects depicted, a [person of ordinary skill in the art] would have understood that measuring the distance between the outlines of the teeth and the aligner as detected by Salah’s image processing software would allow determination of the gap between each tooth and the corresponding part of the aligner. EX1002, ¶104.

Pet. 39–40; *see also id.* at 26–27. Petitioner contends that, contour detection of a region (as taught by Maninis) containing a tooth (alone, or a tooth and an aligner surface separated by a gap) constitutes an analysis tooth zone at

least partially representing a tooth on the analysis image. *Id.* at 40–41 (citing Ex. 1007, Abstract, 3–5; Ex. 1002 ¶ 106). In addition, Petitioner argues, “this analysis would generate tooth attributes, including the locations of the surfaces of the tooth and aligner (corresponding to detected contours), as well as the measured separation between them (the distance between the contours), consistent with the teachings of Invisalign.” *Id.* at 41 (citing Ex. 1002 ¶ 107).

Petitioner contends that “[t]he resulting combination would use each reference’s teachings to perform substantially the same function as they provide alone, applying the contour detection taught by Salah and Maninis to detect edges of teeth and aligners to produce a measurement of distance between these surfaces, as taught by Invisalign, to assess whether the imaged aligner fits appropriate for the current step in patient treatment, as taught by Kim.” Pet. 27. Petitioner contends that a person of ordinary skill in the art would “have had a reasonable expectation of success, as the combination would be one of complementary techniques, applied in understood ways, to produce a predictable outcome.” *Id.* (citing Ex. 1002 ¶¶ 80–81).

Patent Owner argues that a person of skill in the art would not have been motivated to combine Kim, Salah, and Invisalign with Maninis. Prelim. Resp. 30. Patent Owner argues that “Petitioner lacks any reasoned basis why a [person of ordinary skill in the art] would have been aware of Maninis or selected it from the wealth of computer vision art.” *Id.* According to Patent Owner, “Maninis nowhere mentions the use of its disclosed deep learning architecture for any medical application, let alone specifically for dental or aligner images.” *Id.* at 31 (citing Ex. 2002 ¶ 100).

Patent Owner also argues that Petitioner’s reliance on “image analysis trends” is “inherently suspect and highly subject to hindsight bias.” *Id.*

In addition, Patent Owner argues that Salah would not have motivated a person of ordinary skill in the art to select deep learning for contour detection, nor is Salah combinable with Maninis, because Salah only mentions deep learning once, and is the last, non-preferred option in a list of almost 40 potential methods for determining discriminate information.

Prelim. Resp. 32–34 (citing, e.g., Ex. 1008, 35:12–36:14, 34:5–36:14; Ex. 2002 ¶ 100). Further, Patent Owner argues that Salah does not “suggest[] the use of image processing generally—or deep learning specifically—to detect aligners, let alone a value for a tooth or image attribute relating to a separation between the tooth and the aligner. *Id.* at 39 (citing Ex. 2002 ¶ 111). Rather, Patent Owner argues, Salah discloses monitoring tooth positions, not aligner fit. *Id.* Patent Owner further argues that a person of ordinary skill in the art would not have combined Maninis with Kim or Invisalign because “the cited art contains no suggestion that a deep learning architecture as in Maninis could or should be combined with Kim’s analysis of teeth positions or the Invisalign in-person approximations.” *Id.* at 34 (citing Ex. 2002 ¶ 100).

Patent Owner also argues that a person of ordinary skill in the art would not have had a reasonable expectation of success in combining Kim, Invisalign, Salah, and Maninis for several reasons. Prelim. Resp. 43–46. First, Patent Owner argues that Salah’s analysis method is fundamentally different from Maninis and because “Salah discloses that ‘a zone of weak contrast,’ such as between the aligner and the teeth, can only be ‘likened to a zone corresponding to an outline with a low probability,’ . . . and preferably

should not be used for the analysis.” *Id.* at 43–44 (citing Ex. 2009, 531, 533; Ex. 1008, 60:17–24, 61:2–3; Ex. 2002 ¶ 117). Second, Patent Owner argues that neither Petitioner nor Dr. Foroosh “identifies any prior art teaching as to what constitutes an *appropriately* annotated training set . . . in order to train a deep learning device for this specific dental application.” *Id.* at 44 (citing Ex. 2002 ¶ 118). Third, Patent Owner argues that “Petitioner’s hindsight-based efforts to show that a [person of ordinary skill in the art] *could* have performed the methods recited in the ’248 Patent Challenged Claims do nothing to demonstrate that a [person of ordinary skill in the art] *would* have been motivated [to do so] with a reasonable expectation of success without the ’248 Patent in hand.” *Id.* at 45. Patent Owner also argues that “Petitioner nowhere explains how [measuring the distance between the outlines of the teeth and aligner] would be successfully performed.” *Id.* at 46 (citing Ex. 2002 ¶ 119).

At this stage of the proceeding, Petitioner has shown sufficiently that a person of ordinary skill in the art would have had reasons to combine the reference’s teachings, with some rational underpinning, and would have had a reasonable expectation of success in doing so. Similar to limitation 1(a”) above, Patent Owner’s arguments largely address the references separately, rather than combined as proposed by Petitioner.

Although we agree with Patent Owner that Maninis does not mention use of its deep learning architecture for a medical application, Salah teaches that contours of teeth (i.e., discriminant information) may be detected using deep learning. Pet. 34–35 (citing, e.g., Ex. 1008, 36:14). At this stage, we find sufficient Petitioner’s contentions, which are supported by testimony from Dr. Foroosh, that a person of ordinary skill in the art would have found

Maninis' deep learning techniques for contour and object detection useful, and "would have been motivated to use those techniques to identify teeth and aligners depicted in orthodontic images by detecting their contours and identifying the objects found within each contour." Pet. 35–38. As set forth above, Petitioner relies on Maninis to support the underlying technical functionality of deep learning contour detection techniques, which is not explicitly described in Salah. Patent Owner's argument that Salah would not have provided motivation because it states that "deep learning" is "non-preferred" is also not persuasive on this record. *See In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) ("[O]ur case law does not require that [the] particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention."); *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) (stating "just because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes").

We also find persuasive the illustration provided by Dr. Foroosh, as to how the combined system would work, and in particular, that "the photographs of Kim, Salah, and Invisalign are ordinary camera images such as those acquired by a cellphone, [so] they show essentially the same thing a person would see when viewing teeth and an aligner in real life. The ability to see a gap and virtually assess it in real life naturally maps over the ability to detect and measure the same gap using computer vision techniques like Salah and Maninis' contour and edge detection." Ex. 1002 ¶ 103. We do, however, note that Patent Owner's arguments may have merit on a more complete record, particularly Patent Owner's arguments as to the reasonable

expectation of success of the combination, and we encourage the parties to further develop these issues during trial.

Therefore, based on our review and consideration of the current record, we determine that Petitioner has sufficiently shown that Kim, Invisalign, Salah, and Maninis teach limitation 1[b"] for purposes of institution, and has provided sufficient reasoning supported by a rational basis for the combination.

d) Conclusion Independent Claim 1

For the reasons set forth above, we determine, that the information presented in the Petition demonstrates a reasonable likelihood that claim 1 is unpatentable under 35 U.S.C. § 103 over Kim, Invisalign, Salah, and Maninis.

6. Remaining Claims

Petitioner contends that the combination of Kim, Invisalign, Salah, and Maninis teaches the limitations of claims 2, 4, 7, 8, 13–16 and, in support, identifies certain passages and figures in the references and explains their significance with respect to the corresponding claim limitations. Pet. 41–59. *Id.* At this stage, Patent Owner does not separately challenge these contentions. *See generally* Prelim. Resp.

Because we determine above that Petitioner demonstrated a reasonable likelihood of prevailing in its challenge to claim 1 of the '248 patent, we institute *inter partes* review on all claims and grounds. *See* 37 C.F.R. § 42.108(a) (2023) (“When instituting . . . review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”).

V. CONCLUSION

After considering the evidence and arguments presented in the Petition, we determine Petitioner has established a reasonable likelihood of prevailing on its assertion that at least one claim of the '248 patent is unpatentable, and we institute an *inter partes* review on all the challenged claims and on all grounds presented in the Petition. *See* 37 C.F.R. § 42.108(a).

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that pursuant to 35 U.S.C. § 314, *inter partes* review is instituted as to all the challenged claims of the '248 patent and on all grounds of unpatentability presented in the Petition; and

FURTHER ORDERED that *inter partes* review is commenced on the entry date of this Order, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial.

IPR2024-00052
Patent 11,049,248 B2

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