

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TVISION INSIGHTS, INC.,

Petitioner,

v.

THE NIELSEN COMPANY (US), LLC,

Patent Owner

Case IPR2023-01014
Patent No. 11,470,243

**PATENT OWNER'S PRELIMINARY RESPONSE
TO PETITION FOR *INTER PARTES* REVIEW**

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I. INTRODUCTION

Patent Owner The Nielsen Company, LLC (“Patent Owner”) requests the Board deny institution because Petitioner TVision Insights, Inc. (“Petitioner”) fails to demonstrate a reasonable likelihood of unpatentability of any challenged claim of U.S. Patent No. 11,470,243 (“the ’243 Patent”). Patent Owner is statutorily disclaiming independent claims 1, 9, and 16. Claims 4, 11, and 18 depend respectively from claims 1, 9, and 16.

Petitioner cites *Tian* (Ex. 1005) for teaching dependent claim 4 (and similar claims 11 and 18), which recites reducing a resolution of the image and determining the orientation of the head based on the reduced-resolution image. These steps are performed to determine whether the claimed facial **recognition**¹ process can be successfully performed on the image data. Ex. 1001, *’243 Patent*, Claim 1, 9:18-22; Section III. *Tian* describes facial **expression** analysis—not facial **recognition** analysis. Seemingly recognizing this, Petitioner repeatedly couches *Tian* as “facial analysis.” *Petition*, 8-11, 71-73. Petitioner’s reframing of *Tian* appears purposeful to hide *Tian*’s shortcomings, including failing to teach claim 4’s limitations and being non-analogous art. *Declaration of Dr. Saber* (Ex. 2001)², ¶¶ 44-51, 158-164.

¹ All emphases added unless otherwise noted.

² Citations to *Dec.* are to paragraphs of Ex. 2001, Declaration of Dr. Eli Saber.

Grounds 2 and 3 are perhaps even worse combinations, as the modification requires changing the principle of operation of the primary reference, *Nielsen-372* (Ex. 1006) and frustrates its purpose. In short, *Nielsen-372* employs a camera to view a display device (*e.g.*, TV) to determine if the TV is on. Patent Owner's hindsight-predicated combination requires turning the camera around to face the audience, thus wholly forgoing a significant feature of the *Nielsen-372* disclosure.

For these reasons and others discussed in detail below, Petitioner fails to meet its burden and institution of this Petition should be denied.

II. STATUTORY DISCLAIMER OF CLAIMS 1, 9, AND 16

Patent Owner has filed a statutory disclaimer disclaiming independent claims 1, 9, and 16 of the '243 Patent. Ex. 2002, *Request for Statutory Disclaimer*. Patent Owner makes this disclaimer solely in the interests of streamlining the process of confirming the validity of claims 4-6, 8, 11-14, and 18-20, which are the only claims at issue in the parallel litigation. Ex. 2003, *Complaint for Patent Infringement*, C.A. No. 1:22-cv-01345, Paper 1, p. 19.

Patent Owner's arguments of patentability provided herein are for claim 4 (and similarly, claims 11 and 18). All other Challenged Claims depend, directly or indirectly from claims 4, 11, or 18.

III. PETITIONER MISREPRESENTS THE CLAIMED INVENTION

Petitioner seeks to diminish the innovation of the invention as claimed in the '243 Patent. Petitioner contends none of the Challenged Claims includes any features directed to the “new approach” (per Petitioner) of selectively activating an illumination source and processing images taken without illumination “while reducing the resolution and analyzing [the images] for certain purposes.” *Petition*, 3. Petitioner ignores that the Challenged Claims recite novel and non-obvious steps performed by the audience measurement system *enabling* the “new approach of illumination.” *Id.*; *Dec.* ¶¶ 30-32.

The steps recited in claims 4, 11, and 18 improve performance in low-light environments by providing a way of determining head orientation from a low-light image, thereby removing the need for “frequently using illumination.” *Petition*, 2; *Dec.*, ¶¶ 33-34. The '243 Patent describes performing facial recognition on only some captured images. '243 *Patent*, 8:55-60. To determine whether a given image will be suitable for facial recognition, the system determines the orientation of a detected head and/or face from previous frames. *Id.*, 9:18-22. Because unilluminated frames are likely to be low-contrast, the system reduces the resolution of these frames prior to processing to increase the amount of light per pixel. *Id.*, 10:58-68, 11:19-29. If the head orientation indicates that facial recognition can be performed (*i.e.*, because one or more persons are facing the camera), a light source can be

illuminated to capture an image permitting such facial recognition. But otherwise, the light source is not illuminated to avoid unnecessary light flashes that may be bothersome to the audience.

Determining which frames are suitable for facial recognition is an aspect of the “new approach,” as the illumination source is only activated for images designated for facial recognition. *Id.*, 10:1-7. Even Petitioner’s expert characterizes the “new approach” as including the designation of frames for facial recognition. Ex. 1003, *Declaration of Dr. Doermann*, ¶¶ 18-19. The Challenged Claims recite the step of determining an orientation of the head, which enables the successive steps leading to designating frames. ’243 *Patent*, 15:36-37, 16:35-36, 17:27-28. Thus, contrary to Petitioner’s allegations, the Challenged Claims **do** include “limitation[s] directed to the purported new approach.” *Petition*, 3. Namely, the Challenged Claims recite determining a head orientation based on a reduced-resolution image and matching the head to a known person to “determine audience identification information.” ’243 *Patent*, 15:36-40, 16:35-40, 17:27-32.

IV. GROUND 1: THE COMBINATION OF LU-577 AND TIAN DOES NOT RENDER CLAIMS 4-6, 8, 11-14, AND 18-20 OBVIOUS

A. Discussion of the References

1. Lu-577’s Audience Measurement System

Lu-577 (Ex. 1004) is a rudimentary reference, merely disclosing elements of audience measurement systems that were well known. *Compare Lu-577*, Abstract,

[0039]-[0040], with '243 Patent, 1:43-51, 1:67-2:3. Petitioner effectively admits the basic nature of *Lu-577* by applying *Lu-577* for teaching concepts that Patent Owner admitted were present in the prior art, such as an audience measurement system. '243 Patent, 1:43-2:3; *Petition*, 12. Seemingly, Petitioner mainly applies *Lu-577* to benefit from three references for the price of one (*Lu-000* (Ex. 1008) and *Lert* (Ex. 1009) being incorporated by reference therein). *Petition*, 8, 13.

2. *Tian's Resolution Reduction for Head Pose Estimation*

Tian is applied in the *Petition* to teach certain steps of claim 4 (and similarly, claims 11 and 18). *Petition*, 26-27. *Tian* “explores” the effects of various image resolutions on “facial **expression** analysis”—not to facial **recognition** as recited in the claims.³ *Tian*, 000001. This is why Petitioner repeatedly characterizes *Tian* as “facial **analysis**.” *Petition*, 8-9, 26. To analyze how image resolution affects facial expression analysis in the context of a “real environment” (e.g., “with head motion”), *Tian* includes a “head pose estimation” algorithm as one technique for “face acquisition.” *Tian*, 000005, Table 3. Notably, *Tian* does not teach reducing the resolution of an image prior to performing this head pose estimation, nor **motivate** such a step.

³ All emphases added unless otherwise noted.

3. *Lu-000's Image Recognition System*

Petitioner maps *Lu-000* (which is not actually a reference in Ground 1) for detect[ing] a head appearing in one or more images and determining an audience member's identity by matching the head to someone associated with the media exposure environment. *Petition*, 19-21, 23-25. Petitioner characterizes *Lu-000* as locating heads of audience members and comparing extracted signatures with stored signatures “to identify the audience members.” *Petition*, 8.

Lu-000 discloses an “image recognition audience measurement system” including an “audience scanner.” *Lu-000*, (54), Abstract. The audience scanner captures video images of audience members via a video camera. *Lu-000*, 3:27-30, 3:36-41, 3:61-64. Infrared sensors in the audience scanner produce infrared signals. *Lu-000*, 4:9-25. The infrared signals are converted to digital representations that identify the locations of audience members within the monitored area captured by the video images. *Lu-000*, 4:64-5:2.

The recognition system begins in a “learning” mode to learn the faces of the audience members and store multiple “pattern image signatures” extracted from the digital image representations for each audience member. *Lu-000*, 6:22-51, 7:35-38. *Lu-000* discloses that “multiple face images are learned for each of the audience members” by processing multiple video images for each person. *Lu-000*, 7:31-35. Importantly, multiple pattern image signatures are stored for each audience member

“depending on any changed facial expressions or various profiles of the audience member.” *Lu-000*, 8:36-45. *Lu-000*’s disclosure indicates reference images for multiple poses of the head (*i.e.*, “profiles of the audience member”) are stored for each audience member. *Dec.* ¶¶ 40-41. *Lu-000* does not perform any determination of the head orientation for these images but simply stores all captured images together in an “individual face library” for that audience member. *See Lu-000*, 7:52-55.

When *Lu-000* moves to “recognition” mode, the face data in a candidate image is “compared with each of the individual pattern image signatures.” *Lu-000*, 8:46-50. The comparison of the feature signature to “each” stored pattern image signature would indicate to a POSITA that *Lu-000* teaches using a brute-force method of identifying audience members. *Dec.* ¶¶ 42-43. Namely, every stored signature is compared until subsystem 26 finds a match or does not find a match. *Id.* There is no need (or benefit) in the system of *Lu-577* to determine head orientation, as the system simply stores patterns for different orientations.

B. Petitioner’s Proposed Combination Fails to Teach the Claim Limitations

Challenged Claims 4, 11, and 18 each recites substantially similar steps to reduce a resolution of a first image of the one or more of the images of the media

exposure environment to obtain a reduced-resolution image.⁴ '243 Patent, 15:56-58, 16:49-51, 17:41-43. Each of the remaining dependent claims depends, directly or indirectly, from one of these claims. Petitioner maps *Tian*'s teaching of investigating the minimum viable resolution for facial expression analysis to the reduc[ing] a resolution... limitation. *Petition*, 26-27. As established below, *Tian* does not teach reduc[ing] a resolution of an image of a media exposure environment.

1. Tian Does Not Teach “Reduc[ing] a Resolution”

Tian is generally directed to “explor[ing] the effects of different image resolutions for each step of facial expression analysis.” *Tian*, Abstract. To perform this exploration, *Tian* uses images from a “widely used public database” at five different resolutions. *Id.* To clarify that these images are identical but for resolution, *Tian* states that “lower resolution images are down-sampled from the originals.” *Id.*, 000002.

Petitioner relies on this latter sentence from *Tian* to claim that *Tian* teaches the claimed step to reduce a resolution of a first image ... to obtain a reduced-resolution image. *Petition*, 26. Petitioner mischaracterizes *Tian*'s teachings in support of the claim that “*Tian* **creates** lower-resolution images by down-sampling from original images.” *Id.* A POSITA reviewing the context of Petitioner's carefully

⁴ Claim language is underlined and *italicized* for ease of reference.

selected quotes would not conclude that *Tian* teaches actively creating the reduced-resolution images. *Dec.* ¶¶ 44-48.

For example, the caption for Table 1 begins by characterizing the images as “[a]n example in **five different resolutions from Cohn-Kanade database.**” *Tian*, 000002; *Petition*, 26; Ex. 1003, ¶ 119. Neither Petitioner nor their expert makes any attempt to reconcile *Tian*’s statement that the “five different resolutions” are “from [the] Cohn-Kanade database” with the claim requirement to reduce a resolution of a first image.... That is, selecting a previously created, down-sampled image stored in a database is not equivalent to instructions to reduce a resolution of a first image....

Similarly, *Tian* states, “five different resolutions of the head region are studied ... **based on** Cohn-Kanade AU-Coded Face Expression Image Database[.]” *Tian*, 000002 (left column, last paragraph); *Dec.*, ¶ 49. A POSITA reading this sentence would not understand *Tian* is performing the down-sampling. *Dec.*, ¶¶ 47-49. If *Tian* were actively reducing the resolution in the *Tian* process (as required by claims 4, 11, and 18), then there would be no reason for *Tian* to describe its process as using the five different resolutions “based on” the Cohn-Kanade database. *Dec.* ¶ 49.

Analyzing the facial expressions at whatever resolution was available from the Cohn-Kanade database would also be consistent with *Tian*’s actual purpose, which is to investigate expression analysis in “real environments.” *Tian*, Abstract;

Dec., ¶ 50. Nothing in *Tian* suggests that it would actually be **desirable** to reduce the resolution of an image prior to performing expression analysis; rather *Tian* acknowledges that, given real-world images, they may be provided at a low resolution. *Tian*, 000002 (“Most systems attempt to recognize facial expressions from data collected in a highly controlled laboratory situation with very high resolution faces. **However, in real applications, the face region is often in lower resolutions.**”) (internal parentheticals omitted). In other words, a POSITA would read *Tian* as teaching that expressions are analyzed in images at whatever resolutions are available from the database. *Dec.*, ¶ 50. There would be no reason to actively reduce the resolution of an image further for the purpose of performing expression analysis. *Dec.*, ¶¶ 50-51.

Because Petitioner has the burden to establish that the reference teaches the claim limitation, and because *Tian* does not teach a step to **reduce** the resolution, Petitioner has failed to meet its burden. As such, Petitioner’s Ground 1 fails for at least this reason.

C. The Petition Fails to Establish a Sufficient Motivation to Combine the References

Although Patent Owner has disclaimed independent claims 1, 9, and 16 to streamline the Board’s analysis, Patent Owner submits that there is no motivation to combine *Tian* with *Lu-577* for claims 1, 9, and 16. Because the remaining Challenged Claims depend, directly or indirectly, from claims 1, 9, and 16,

arguments directed to a lack of motivation to combine for the independent claims are similarly applicable to the remaining challenged dependent claims. Additionally, claims 4, 11, and 18 recite further requirements to determine an orientation of the head with respect to the camera recited in the independent claims, namely that the determination is based on the reduced-resolution image. Thus, Patent Owner's arguments for a lack of motivation to combine apply for both the independent claims and, separately, dependent claims 4, 11, and 18.

Each of Petitioner's motivations to combine the references is based either on a flawed alleged improvement or nonexistent problems with the base reference based on Petitioner's declarant misreading the background references. Petitioner's own reference teaches away from Petitioner's proposed modifications. Petitioner's proposed combination would not actually result in any of Petitioner's proposed benefits, and the problems purported to be solved do not actually exist. Rather, Petitioner takes a functional system and uses impermissible hindsight to add in redundant processing steps to the detriment, rather than the benefit, of the system. *Cook Group Incorporated v. Boston Scientific Scimed, Inc.*, IPR2017-00440, Paper 7, 25-26 (using hindsight to employ a "redundant and unnecessary" modification does not provide a "sufficient rationale" for obviousness).

1. Modifying Lu with Tian's Head Pose Estimation Does Not Achieve Petitioner's Proposed Benefit of Improved Facial Recognition Performance

The Petition asserts modifying *Lu-577's* recognition system (incorporated from *Lu-000*) with *Tian's* facial expression analysis would “improve the confidence level of person identification and allow the selective performance of face recognition on suitable images (e.g., where a person opens her eyes and faces the camera).” *Petition*, 9, 10, 8 (Petitioner asserting “[a] POSITA would have found it obvious to combine *Lu-000* and *Tian* because they are similarly directed to image processing and facial analysis, and to use *Tian's* techniques to improve *Lu-000*”). However, incorporating *Tian's* head pose estimation teaching into the (modified) *Lu-577* is not motivated because the combination:

(1) would not improve the performance of the system of *Lu-577* (modified with *Lu-000's* teaching of facial recognition by comparing the captured signature against all stored signatures);

(2) would add an additional unneeded step without any commensurate improvement in accuracy, reduction in cost, or other even minimal benefit; and

(3) would potentially **decrease** the performance of the system of *Lu-577* (modified with *Lu-000's* face recognition) by misidentifying candidate images as unsuitable for facial recognition and therefore failing to even attempt to recognize faces when recognition would succeed if attempted.

Before discussing how the proposed motivation to modify with *Tian* is deficient, Patent Owner provides a discussion of Petitioner’s relied-upon teachings from *Lu-000*.

a) Petitioner’s Cited Teachings to Lu-000 form the Basis of the System to Be Modified by Tian

Ground 1 is the combination of *Lu-577* and *Tian*. *Petition*, 3. *Lu-577* incorporates *Lu-000* by reference. *Lu-577*, [0013], [0039]. To support its mapping of *Lu-577* in combination with *Tian*, Petitioner cites various portions of *Lu-000* relied upon for allegedly teaching certain limitations. *Petition*, 14-15, 18-21, 23-24. The relied-upon portions from *Lu-000* thus, at the least, make up the primary reference of Ground 1, as Petitioner’s mapping essentially treats *Lu-577* and *Lu-000* as a single reference. Therefore, to the extent that Petitioner’s Ground 1 is procedurally sufficient (which Patent Owner disputes), at least those portions of *Lu-000* expressly relied upon by Petitioner in the Ground 1 mapping form the basis for the system being modified by *Tian*. This last point is salient, as portions of *Lu-000* relied on in the mapping create significant issues with Petitioner’s proposed motivation to modify applying *Tian*.

Notably, Petitioner relies on *Lu-000*’s teaching of (per Petitioner) “identifying an audience member by comparing a newly extracted pattern image signature with the stored pattern image signatures.” *Petition*, 23. Petitioner further cites *Lu-000*’s teachings in the Abstract, 2:20-38, and 7:39–8:6 to support Petitioner’s mapping.

Petition, 23-24. As discussed below, *Lu-000*'s cited teachings disclose performing facial recognition by comparing a signature of a captured image to “**each** of the pattern image signatures stored in the individual face library....” *Lu-000*, 7:52-55. Petitioner even quotes *Lu-000*'s teaching in its *Petition* stating: “The extracted pattern image signature is compared with **each of the stored pattern image signatures** to identify a particular one of the predetermined audience members.” *Lu-000*, 2:32-36 (*cited by Petition*, 24). Petitioner continues relying on *Lu-000*, asserting “*Lu-000* teaches searching through stored image feature signatures and identifying one having the greatest similarity with an extracted signature.” *Petition*, 24.

Therefore, Petitioner expressly relies on *Lu-000*'s teaching of comparing the captured signature to “each of the stored pattern image signatures” stored in the database. *Petition*, 24. As detailed below, further modifying *Lu-577* (already modified to include *Lu-000*'s feature of comparing the captured signature to all stored signatures) results in no improvement to the modified *Lu-577* system while detrimentally adding an unnecessary processing step.

b) No Improved Facial Recognition Accuracy with the Modification

The modification to include *Tian*'s teachings would not improve *Lu-577*'s accuracy of facial recognition. *Dec.*, ¶¶ 52, 55. As discussed in the preceding section, the proposed system mapped for Ground 1 incorporates *Lu-000*'s brute force method of facial recognition by comparing the captured image signature with **all stored**

image signatures to identify the face in the captured image. *Lu-000*, 7:7:52-55 (*cited by Petition*, 24); *Dec.*, ¶¶ 54, 56-57. Modifying *Lu-000*'s facial recognition process to determine the head orientation, as allegedly taught by *Tian*, would not improve the accuracy because the brute force method practiced by *Lu-000* would still result in (at best) the same level of accuracy as already achieved in *Lu-000*. *Dec.*, ¶ 57.

Lu-000's brute force method **eliminates the need** to determine head orientation, because the system already accounts for various head poses when recognizing audience members. *Lu-000*, 8:36-45 ("An individual audience member face image may be learned multiple times (R) with R possible different extracted signatures resulting, depending on any changed facial expressions or various profiles of the audience member."), 7:31-35 ("Multiple face images are learned for each of the audience members P by sequentially processing a series of video images of the video camera 28 by the image signal processing blocks of Fig. 6..."). *Lu-000*'s system extracts feature signatures from digital representations generated from video images and compares these signatures to **all stored signatures to determine a match**. *Lu-000*, 4:64-5:2, 7:41-55. Multiple signatures for each person are stored to account for "various profiles of the audience member." *Lu-000*, 8:36-45.

Because *Lu-000* stores various profiles of the audience members and performs facial recognition against the stored profiles, *Lu-000* already performs facial recognition for a variety of head orientations. *Dec.*, ¶ 58. As Dr. Saber explains,

because the *Lu-000* system compares each captured signature to **all stored signatures**, employing head orientation for the purpose of “improved accuracy of facial recognition” is unnecessary. *Dec.*, ¶ 58. And, because various poses are stored, a variety of poses in the feature-extracted image creates a match with one of the stored signatures. *Dec.* ¶¶ 59-60. Thus, in the modified *Lu-577*, the digital representations generated from the video image already serve as “suitable” images for face recognition, **without needing to determine a head pose.** *Id.*

Because *Lu-000*’s captured images are “suitable,” *Lu-000* already provides Petitioner’s claimed benefit of improved accuracy for face recognition. *Dec.* ¶ 60; *10X Genomics, Inc. v. Bio-Rad Laboratories, Inc.*, IPR2018-00489, Paper 13, 15-16, 20-21 (PTAB June 2018) (denying institution where the Petitioner did not demonstrate a reasonable likelihood of success because the primary reference “already” achieves the benefit asserted by Petitioner to motivate the combination). The Board should find Petitioner’s combination “not sufficient to render” the claim limitation obvious because Petitioner does not “persuasively explain why” a POSITA would have sought to modify the system of *Lu-577* (as already modified by *Lu-000*) when *Lu-000* already provides the purported improvement. *RJ Reynolds Vapor Co. v. Fontem Holdings I B.V.*, IPR2016-01692, Paper 45, 24-26 (PTAB March 2018).

Dr. Doermann also provides no additional opinions or evidence explaining why modifying *Lu-577* (employing *Lu-000*'s facial recognition process) as proposed would improve facial recognition beyond what is already achieved in *Lu-000*'s method. Ex. 1003, ¶¶ 65-66. Instead, Dr. Doermann provides a conclusory opinion without any factual basis, which should be given no weight. *TQ Delta, LLC v. Cisco Sys., Inc.*, 942 F.3d 1352, 1358 (Fed. Cir. 2019) (“conclusory expert testimony does not qualify as substantial evidence.”).

c) Modifying Lu-000 as Proposed Would Add an Additional Step Without any Commensurate Benefit

As established above, modifying *Lu-000* to determine head orientation would not improve the accuracy of *Lu-000*'s face recognition. *Lu-000* already teaches performing “suitable” face recognition. Therefore, adding *Tian*'s head pose analysis would require performing an additional step to achieve facial recognition, but without any commensurate benefit, such as improved accuracy or lower cost (*e.g.*, processing time).

In fact, a POSITA would be dissuaded from making such a modification, because doing so would add unnecessary additional steps to *Lu-000*'s recognition system. *Dec.* ¶¶ 61-65]; *In re Schweickert*, 676 F. App'x 988, 995 (Fed. Cir. 2017) (reversing Board's obviousness determination where proposed modification is “unnecessary” and would add unwanted “complexity to the system”). The additional unnecessary steps would be a wasted processing step, thereby incurring unnecessary

processing time. Dr. Saber opines that *Lu-000*'s learning mode and recognition mode would require additional processing to only store or analyze frontal poses for recognition. *Dec.* ¶¶ 61-65. Including *Tian*'s head pose classification would add multiple steps to *Lu-000*'s learning mode and recognition mode of the system to determine the orientation and detect whether the head orientation is frontal. *Id.*

d) The Modification Would Decrease the Performance of the Facial Recognition

Finally, modifying *Lu-000*'s facial recognition process as Petitioner proposes would needlessly skip facial recognition opportunities where facial recognition might succeed. In Petitioner's proposed modification, before facial recognition is performed, images are pre-filtered based on head orientation as allegedly taught by *Tian*. *Petition*, 10 (*citing* Ex. 1003, ¶¶ 65-66 ("[When modifying *Lu-577* with *Tian*'s teachings], a person's head pose is first determined in an image and a decision is made as to whether the image will be used for face recognition.")). Presumably, Petitioner is proposing that the image will be used for face recognition only when *Tian* classifies the head pose in the image as "frontal or semi-frontal." *See* Ex. 1003, ¶ 66 ("A POSITA would have understood that certain poses are not suitable for face recognition. For example, in a side view, one or more facial features of a person may not be visible, which may make face recognition with a high accuracy unfeasible.")).

However, this pre-filtering step reduces the frequency of successful facial recognition. *Dec.*, ¶¶ 66-69. Dr. Saber explains that, in a system employing pre-

filtering as Petitioner proposes, fewer faces would be recognized because fewer candidate images would be checked against *Lu-000*'s individual face libraries and because those libraries would have fewer reference images in them. *Id.*

Petitioner's declarant, Dr. Doermann, opines pre-filtering the images in this way "would have improved the accuracy of the audience identification." Ex. 1003, ¶ 61. However, the only evidence he provides in support of this opinion relates to **face detection** rather than to **facial recognition**. *Id.* (quoting Ex-1010, ¶ 0003 ("[A] **typical face detector** can only accurately **detect faces** in a semi-frontal pose.")). Per Dr. Saber, facial recognition is a distinct process from face detection, having different—and opposed—constraints and problems. *Dec.* ¶¶ 70-74. Because Dr. Doermann provides no substantial evidence on the effects of filtering candidate images for **facial recognition** based on *Tian*'s head pose classifications, his unsupported opinions should be afforded "little weight." *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9, 15 (PTAB Aug. 24, 2022).

Additionally, a POSITA would have known that performing face recognition on poses other than "frontal" would result in successful recognition. For example, the Petition's cited reference to Ex. 1021 discusses systems that perform face recognition on a variety of head orientations, including a full profile (side view). *Dec.* ¶¶ 75-78 (citing Ex. 1021's discussion of profile (*i.e.*, side view) facial

recognition). Thus, the evidence of record suggests that Petitioner's proposed modifications would recognize fewer faces without any improvement in accuracy.

For all the reasons discussed above, a POSITA would have no reason to modify *Lu-000*'s recognition system by including *Tian*'s head pose classification to find a "suitable" image. *Petition*, 10.

2. Dr. Doermann's Applied Background References Do Not Support His Opinions

To support Petitioner's motivations to combine, Petitioner relies on Dr. Doermann, who in turn cites several background references that allegedly support his opinions. *Petition*, 8-11. However, on closer reading, each of the cited background references fails to support Dr. Doermann's opinion. Furthermore, Dr. Doermann does not explain his citation to the reference, the import of the reference, or why the reference supports his opinion. This forces Patent Owner (and the Board) to infer Dr. Doermann's reasoning for citing the reference. Petitioner thus fails to meet its burden of particularity. *Harmonic Inc. v. Avid Tech.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing U.S.C. § 312(a)(3) as requiring Petitioners to identify, "with particularity," evidence supporting the challenged grounds).

The remainder of this section systematically addresses **each** of the references cited by Petitioner and its Declarant in the Petition and Ex. 1003 for the alleged motivation to combine *Tian* with *Lu-577* (as modified by *Lu-000*) for the

independent claims.⁵ A discussion of the references cited by Dr. Doermann for dependent claims 4, 11, and 18 is provided in Section IV.C.3.

a) Ex. 1021

Dr. Doermann relies on Ex. 1021 to support his opinions of obviousness. Ex. 1003, ¶ 66; *Petition*, 10. This reliance is misplaced, however, as Dr. Doermann does not perform a complete or accurate analysis of Ex. 1021 and therefore, interprets and applies Ex. 1021’s teachings incorrectly. *Dec.*, ¶¶ 80-82.

Ex. 1021 is a lengthy academic survey article from 2003, and Dr. Doermann cherry-picks quotes from the middle of this article without quoting any relevant text or providing other context from which Patent Owner can infer why Ex. 1021 is cited. Ex. 1003, ¶ 66 (*citing* Ex. 1021, 000042 without further commentary); *Petition*, 10. Dr. Doermann cites Ex. 1021 seemingly in support of his proposition that “pose variations adversely affect [facial] recognition performance.” *Id.* However, in doing so, Dr. Doermann misrepresents both the context of the problem and the problem itself.

⁵ As discussed at the beginning of Section IV.C, Patent Owner presents arguments as to why Ground 1 lacks a motivation to combine for the disclaimed independent claims, which is applicable to the challenged dependent claims.

As best understood given Dr. Doermann's bare citation to Ex. 1021, he appears to be relying on the introduction to Section 6 of Ex. 1021, which states, in part, that "pose change can cause serious performance degradation." Ex. 1021, 000042. However, Dr. Doermann ignores the context of these statements:

The best face recognition techniques reviewed in Section 3 were successful in terms of their recognition performance on large databases in well-controlled environments. However, face recognition in an uncontrolled environment is still very challenging. [...] Though many existing systems build in some sort of performance invariance by applying preprocessing methods such as histogram equalization or pose learning, significant illumination or pose change can cause serious performance degradation. [...]. These problems are unavoidable when face images are acquired in an uncontrolled, uncooperative environment, as in surveillance video clips.

Ex. 1021, 000042, col. 1, para. 3. Read in this context, the "adverse [e]ffect" that Dr. Doermann relies upon to motivate *Lu-000* to incorporate *Tian's* head pose variation falls apart.

Ex. 1021 describes the "pose change" problem as occurring "in an uncontrolled, uncooperative environment," such as acquiring images via "surveillance video[.]" *Id.* By contrast, *Lu-000* acquires face images in a controlled, "monitored area" where individuals are viewing a television program, such as a living room. *Lu-000*, 2:11-14, 3:27-30; *Dec.* ¶¶ 82-83. As Dr. Saber opines, such an

environment where the subjects are sitting still under relatively constant illumination is precisely the sort of well-controlled environment where existing facial recognition techniques are most “successful.” *Id.* Because *Lu-000* does not perform face recognition from images taken in an “uncontrolled” environment such as surveillance, the cited problem in Ex. 1021 would not motivate a POSITA to modify *Lu-000. Id.*

Dr. Doermann goes on to opine that determining a head pose would “address[] the problem that pose variations adversely affect recognition performance[,]” and cites Ex. 1021, 000042 for support. Ex. 1003, ¶ 66; *Petition*, 10. Dr. Doermann does not explain his understanding of “pose variation” or “pose change” as used in Ex. 1021, and therefore, his general citation to an entire page in Ex. 1021 without any context explanation of the relevance of the cited material should be given no weight. *In re Van Os*, 844 F.3d 1359, 1361-1362 (Fed. Cir. 2017) (finding conclusory assertions “with no explanation” are “inadequate” to support a motivation to combine); Ex. 1003, ¶ 66. Dr. Doermann’s lack of explanation of “pose variation” or “pose change” as used in Ex. 1021 appears purposeful, as the context appearing elsewhere in Ex. 1021 illustrates why the reference is unhelpful for Petitioner’s motivations to combine.

Per Dr. Saber, Ex. 1021’s use of “pose variation” or “pose change” refers to pose differences between a person in a captured image and the same person in a

reference image to be matched. Ex. 1021, 000036, col 1, para 4; 38, col 1, para 3 (testing facial recognition algorithms to measure the effects of “pose change”; identifying “recognizing [people] under pose variations” as a major problem area), 000002, col. 2, para 3 (giving the “general statement of the problem” as identifying a person appearing in a “still or video images of a scene” from a “stored database of faces.”), § 6.2 (describing approaches involving rotating a face appearing in-scene to match a standard reference pose); *Dec.* ¶¶ 84-86. Thus, the “problem” of pose change, as discussed in Ex. 1021, refers to matching an unknown head appearing in-scene (with an uncontrolled pose) to a reference image (with a different pose) in a candidate library. *Dec.*, ¶ 86. Exhibit 1021 gives the example of a shoplifting application, where a face from a surveillance video might be matched against a mugshot library. Ex. 1021, Table 1; 000042, col 1, para 4; 000021, col 1, para. 3.

Furthermore, the pose variation problem described in Ex. 1021 (*i.e.*, variations in pose from the captured image compared to the stored images) does not motivate the combination as alleged by Dr. Doermann. *Lu-000* stores a pattern signature of **multiple different “profiles” (*i.e.*, poses) of an audience member**. *Lu-000*, 8:36-45. This is a different solution that is not possible in the surveillance video application. *Dec.*, ¶ 87. Because *Lu-000* compares a feature signature to each stored pattern, *Lu-000* matches the candidate image against a stored signature featuring the same profile of the audience member so **there is no pose change** and

therefore no pose change problem to reduce recognition performance. *Dec.* ¶ 88. Thus, contrary to Dr. Doermann’s claims, the “pose variation” issue would not have motivated a POSITA to modify *Lu-000* to determine a head orientation. Ex. 1003, ¶ 66.

b) Ex. 1012

Next, Dr. Doermann cites *Weinblatt* (Ex. 1012) in support of Petitioner’s proposed motivation for modifying the system of *Lu-577* (employing *Lu-000*’s face recognition system) with *Tian*’s head pose estimation: that of being able to “determine whether a person is watching the television[.]” *Petition*, 10; Ex. 1003, ¶ 67. In particular, Dr. Doermann cites portions of *Weinblatt* discussing gaze tracking (*i.e.*, what the subject is “looking at”) to determine if the subject is watching the TV program:

For example, the facial recognition unit 11 may use the **measurements of the angle of a face, if the eyes of the face are open or closed, and/or if the face of the person is ‘looking at’ the camera** or at the broadcast program to determine if the person is watching the broadcast program.

Ex. 1003, ¶ 67 (quoting *Weinblatt*, [0039]). Here, it is not even necessary to go beyond Ex. 1012’s quoted material to realize that Petitioner’s proposed modification would **not** result in a system capable of determining television-watching activity for an audience member, as Petitioner contends. This is the case at

least because *Tian*'s system does not determine any of the criteria *Weinblatt* uses to determine if the person is watching the broadcast program.

Tian performs head pose estimation to determine (only) whether a subject's head pose is suitable for facial expression analysis. *Weinblatt*, on its face, describes three options for gaze tracking: (1) measurements of the angle of a face; (2) if the eyes are open or closed; and (3) whether the face of the person is "looking at" the camera or television. Given a head pose as classified by *Tian*, it would not be possible to determine **any** of this information. *Dec.* ¶¶ 89-94.

In particular, *Tian* does not measure a face angle or determine whether the eyes are closed; as discussed above, *Tian* merely classifies whether a face image is suitable for expression analysis. *Tian* might, at first blush, seem to be useable to determine whether the face of the subject is "looking at" the camera. However, *Tian*'s classifications do not break down neatly into "looking at the camera" or "not looking at the camera" as would be required for *Weinblatt*'s gaze tracking. *Dec.* ¶¶ 91-94.

As such, a POSITA would not have been motivated to modify *Lu-577* (employing *Lu-000*'s face recognition) with *Tian*'s head pose estimation by the purported benefit of being able to determine whether an audience member is watching the television, at least because the proposed benefit would not actually be achievable in Petitioner's proposed combination. *Dec.* ¶ 94.

Additionally, Petitioner’s reliance on Ex. 1012 and the “watching activity” benefit is conclusory. Ex. 1003, ¶ 67. Dr. Doermann opines because *Lu-577* measures viewing of a TV program, a POSITA would have found the modification of *Lu-000* with *Tian*’s head pose estimation to be “beneficial[.]” *Id.* As discussed above, such a modification would not, in fact, have provided any benefit. Absent this non-existent benefit, Dr. Doermann does not provide any factual basis for his conclusory testimony, only opining that determining watching activity using head pose was “known[.]” *Id.* A technique being “known” in the art does not provide sufficient reasoning as to **why** a POSITA would have been motivated to make the modification. This only shows a POSITA **could** have modified *Lu-577* (employing *Lu-000*’s face recognition) with some reference teaching gaze tracking for the purpose of determining watching activity, not that a POSITA “would have been motivated” to combine *Tian* and *Lu-000* to do so. *Truist Bank v. United Services Automobile Association*, IPR2023-00143, Paper 15, 23 (PTAB May 16, 2023) (quoting *Belden Inc. v. Berk-Tec LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015)) (“obviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make*” the combination). Because Dr. Doermann does not provide a factual basis for his proposed benefit, Petitioner provides no “substantial evidence” supporting the proposed motivation. *TQ Delta, LLC*, 942 F.3d at 1358.

c) Ex. 1010

Finally, in support of Petitioner’s argument that a POSITA would have found it obvious to modify *Lu-577*’s system (incorporating *Lu-000*’s facial recognition system) with *Tian*’s head pose classification “to determine whether an image is suitable for face recognition” (*Petition*, 10; Ex. 1003, ¶ 66), Dr. Doermann contends: “A POSITA would have understood that certain poses are not suitable for face recognition. For example, in a side view, one or more facial features of a person may not be visible, which may make face recognition with a high accuracy unfeasible.” Ex. 1003, ¶ 66. Dr. Doermann then cites *Bigioi* (Ex. 1010) at [0003] to support this statement. However, the cited portions of *Bigioi* do not actually support Dr. Doermann’s opinion: “a typical **face detector** can only accurately **detect faces** in a semi-frontal pose.” *Bigioi*, [0003]. In other words, *Bigioi* is actually discussing **face detection**, not **facial recognition**. Face detection, expression analysis, and facial recognition are distinct processes with different—and opposed—constraints. *Dec.* ¶¶ 70-74. *Bigioi*’s discussion of being limited to a semi-frontal pose relates to the constraints of face detection. *Bigioi*, [0001]-[0002]. Dr. Doermann’s citation to *Bigioi* and its discussion of **face detection** to support opinions regarding **facial recognition** is yet another example of Petitioner’s conflation—whether purposefully or accidentally imprecise—of these disparate fields. *Dec.* ¶¶ 95-96.

In fact, Petitioner’s own background art again undermines their proposed motivations to combine. *Dec.* ¶¶ 97-98. Ex. 1021 expressly discusses strategies for “face recognition [performed] using profiles[,]” *i.e.*, side views of the face—the very pose Dr. Doermann characterizes as “unsuitable for face recognition” and “mak[ing] face recognition with a high accuracy unfeasible.” *Cf.* Ex 1021, 000006, col. 2, para 2 *with* Ex. 1003, ¶ 65; *Dec.* ¶ 98. Ex. 1021 also provides direct teachings of how one example of such recognition can be performed: “[w]hen part of a face is invisible in an image due to rotation in depth, the facial texture is recovered from the visible side of the face using the bilateral symmetry of faces.” Ex. 1021, 000034, col. 2, para. 2. Dr. Doermann provides no explanation for the direct contradiction between his stated opinions and the express teachings of Ex. 1021.

Without any factual basis or supporting evidence, Dr. Doermann’s position must be given little weight. *Xerox Corp.*, 15; *TQ Delta LLC*, 942 F.3d at 1358. This is particularly the case where, as here, the position in question is directly contradicted by the background art Dr. Doermann claims to base it on. Thus, *Bigioi*’s discussion of the challenges presented in face detection accuracy **would not motivate a POSITA** to include *Tian*’s head pose classification in the modified Lu-577 recognition system.

3. Claims 4, 11, and 18: Petitioner Provides No Credible Motivation for Analyzing Reduced-Resolution Images and Tian Teaches That Doing So Is Undesirable

Regarding claims 4, 11, and 18, Petitioner asserts a POSITA would have found it obvious to apply *Tian*'s teachings to *Lu-577*'s system to “reduce[] the resolution of a first image” and “perform[] face detection or head pose estimation on the reduced-resolution image.” *Petition*, 27.⁶ As discussed in Section IV.B, *Tian* does not teach a step of “reducing a resolution.” Separately, Petitioner’s proposed motivation for modifying *Lu-577*'s system to analyze a reduced-resolution image fails to withstand the most cursory scrutiny. Petitioner’s arguments are directed to why there is a motivation to perform **face detection** on a reduced-resolution image rather than the claimed **head orientation determination** on a reduced-resolution

⁶ The Petition’s mapping for claim 4 cites Ex. 1003, ¶¶ 117-122. *Petition*, 26-27. Exhibit 1003, ¶¶ 120 and 122 provide the alleged motivation to combine for claim 4. In those paragraphs, Dr. Doermann refers back to §V1.A.1, which allegedly is “explaining why it would have been obvious to analyze reduced-resolution images; that analysis is incorporated here.” Referring to that section of Ex. 1003, it appears only ¶¶ 68-70 address the reduced-resolution limitation. Therefore, Patent Owner addresses relevant sections from ¶¶ 68-70 in the present analysis of a lack of motivation to combine for claims 4, 11, and 18.

image. Therefore, Petitioner's arguments do not respond to the actual claim language. Additionally, *Tian* teaches away from the combination because *Tian* teaches reduced-resolution images are **undesirable** in the context of expression analysis.

Thus, Petitioner fails to provide a credible motivation for combining *Tian*'s alleged **teaching of determining head pose estimation on reduced-resolution images** into *Lu-000*'s recognition system, and a POSITA would not be motivated to make the proposed modification.

a) Tian's Mapped Teachings

Petitioner maps *Tian*'s teaching of analyzing images of various resolutions for claim 4. *Petition*, 26. *Tian* explores the "effects of different image resolutions for each step of facial expression analysis." *Tian*, Abstract. *Tian* attempts facial expression analysis of (pre-processed) "down-sampled" original face images as "lower resolution images." *Tian*, Abstract, 00002; *Dec.* ¶¶ 103-104. As discussed above, Petitioner also maps *Tian*'s head pose estimation for teaching determining the head orientation. *Petition*, 27. *Tian* performs head pose estimation on all the face images at each resolution. *Tian*, 000005.

b) No Motivation for Modifying Lu-577 (Modified by Lu-000) with Tian’s Reduced-Resolution Head Pose Estimation

A complete analysis of obviousness requires a reason, “based upon rational underpinnings,” why a POSITA would have been motivated to “modify the prior art[.]” *Ice Castles, LLC v. James Youngstrom*, IPR2021-01179, Paper 13, 9 (January 7, 2022) (citing *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016)). To satisfy this requirement, a petitioner “must...articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.” *Id.* (citing *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007)).

Here, Petitioner asserts a POSITA would have been motivated to modify *Lu-577* with *Tian’s* teachings because, per Petitioner, reducing the resolution of the image “**can** reduce the time and resource consumption of tasks such as **face detection and pose estimation.**” *Petition*, 10, 72; *see also* Ex. 1003, ¶ 69 (“The processing resources and time can be reduced if the resolution of the image is reduced.”). This conclusory motivation is not supported by substantial evidence.

Petitioner’s declarant cites three references (Exs. 1013-1015) to support Petitioner’s motivation of reducing “time and resource consumption.” *Petition*, 10; Ex. 1003, ¶ 69. However, none of these references provides any support for the proposition that **head pose estimation**, as allegedly taught by *Tian*, is resource-intensive or would benefit from reduced processing time.

Notably, Petitioner’s arguments are directed to problems with **face detection**, rather than **head pose estimation**. Face detection is a distinct step from head pose estimation, according to *Tian*. *Tian*, 000002; *Dec.*, ¶¶106-107. Specifically, *Tian* differentiates between head detection (*i.e.*, detecting there is a head in the image) versus head pose estimation. *Dec.*, ¶¶ 107-108 (discussing *Tian*’s teaching at 000002 of head detection followed with “After the head is located, the head image is converted.... Then a [neural network] is employed to estimate head pose.”).

First, Dr. Doermann opines that “tasks such as **face detection** can be resource-consuming.” Ex. 1003, ¶ 69 (citing Ex. 1013, 000001). However, neither the opinion nor the cited Ex. 1013 actually addresses the claim language of the ’243 Patent, directed to **determining the orientation of the head** on the reduced-resolution image. Dr. Doermann’s opinion relates to **face detection** rather than head orientation. A POSITA would have understood detecting a face is a distinct operation from determining head orientation, as even *Tian* differentiates between the two steps. *Dec.* ¶¶ 107-108.

Exhibit 1013, cited by Dr. Doermann in support of his opinion, states “**view-based** [face detection] methods ... are reported to have a good detection performance but the drawback to be computationally rather expensive[.]” Ex 1013, 000001, col. 2, para. 3. Thus, Ex. 1013 does not state that all face detection techniques are computationally expensive, as Dr. Doermann argues. Rather, only a

particular approach (*i.e.*, view-based methods) is computationally expensive. A POSITA having the knowledge of Ex. 1013 would not have understood the claimed step to determine the orientation of the head to be a “resource-consuming” problem that would motivate a modification to Petitioner’s proposed system. *Dec.*, ¶ 109. Even Dr. Doermann admits the “resource-consuming task” is **face detection**, not determining head orientation. *Dec.* ¶¶ 108-109; Ex. 1003, ¶ 69.

Dr. Doermann further opines “processing resources and time can be reduced” for **face detection** if the image resolution is reduced. Ex. 1003, ¶ 69 (*citing* Ex. 1014, 2:43-53). Once again, however, Exhibit 1014 cited by Dr. Doermann describes the possibility of reduced-resolution processing for “**face detection and tracking**,” rather than determining head orientation. Ex. 1014, 2:43-53. Exhibit 1014 makes no reference to head orientations whatsoever. *Dec.* ¶ 110; *see* Ex. 1014 *generally*.

Finally, Dr. Doermann cites Ex. 1015 in support of the same proposition (*i.e.*, that processing resources and time can be reduced for face detection if the image resolution is reduced). In addition to being related to the wrong problem (that of face detection rather than the claimed head orientation determination), the cited material here is even further afield from the modification being proposed by Petitioner. Ex. 1015 describes how the saturation of an image can be averaged (thus reducing the resolution of the **saturation** sampling rather than that of the **image**). Ex. 1015,

[0011]; [0020]. This saturation averaging does not reduce the computational resources required for face recognition but instead allows more efficient methods to be employed. Ex. 1015, [0020]; *Dec.* ¶¶ 111-113. In other words, any motivation provided by Ex. 1015 would be to switch to an entirely different algorithm for face detection more suitable for reduced-saturation images. *Dec.* ¶¶ 112-113. In addition to failing to support Dr. Doermann’s opinion, employing the motivation from this reference would actually require **more extensive** modification beyond that proposed by Petitioner. *Dec.*, ¶ 114. Lastly, *Lu-000* performs face recognition on binarized images that are two-tone (*i.e.*, black-and-white). *Lu-000*, 7:47-55; *Dec.* ¶ 115. Ex. 1015’s reduced “saturation” is thus completely irrelevant to any modification of *Lu-000*, and thus would not have motivated a POSITA to modify *Lu-577* as modified by *Lu-000*. *Id.*

In sum, Dr. Doermann identifies no factual basis for his conclusory statement that performing “head pose estimation on a reduced-resolution image provides savings in processing resources or time[.]” Ex. 1003, ¶ 69. Each of Dr. Doermann’s cited background references is directed to face detection, which is irrelevant to the proposed modification of performing head orientation determination on a reduced-resolution image. *Dec.*, ¶ 116. As such, Dr. Doermann’s conclusory testimony does not “qualify as substantial evidence” for the proposed motivation. *TQ Delta, LLC*, 942 F.3d at 1358.

Thus, viewing Dr. Doermann’s opinions and the cited background references, a POSITA would not understand that head pose estimation as proposed by *Tian* is particularly resource intensive and would not be motivated by the prospect of saving computational requirements to modify *Lu-577* with *Tian*’s teaching of reducing the resolution of an image for performing *Tian*’s **head pose classification**. *Dec.* ¶ 116.

c) ***Tian* Teaches That Performing “Facial Analysis” on Lower Resolution Images is Undesirable**

Tian is generally directed to exploring the effects of image resolution on expression analysis. *Tian*, Abstract. Underpinning the entire exploration *Tian* undertakes, however, is the well-known understanding that low resolution is undesirable for facial image analysis. *Dec.*, ¶¶ 117-119; *Tian*, Abstract. As a background for the “exploration,” *Tian* merely recognizes that, in some real-world scenarios, the only images **available** may be lower resolution. However, a POSITA reading *Tian* would be led away from unnecessarily increasing the difficulty of the facial analysis process by intentionally reducing the resolution of an image prior to processing. *Dec.* ¶ 120.

A prior art reference must be considered in its entirety, *i.e.*, as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). “A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in

the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1069 (Fed. Cir. 2018) (quoting *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009)). Here, Petitioner cherry-picks *Tian*’s results to conclude that determining a head orientation based on a reduced-resolution image is **possible** “without substantially reducing the accuracy of [the] determination” (hardly a glowing endorsement). *Petition*, 27. The Petition fails to consider the portions of *Tian* that would discourage a POSITA from intentionally and unnecessarily reducing the image resolution.

Throughout the reference, *Tian* consistently connects low resolution with difficulty. *See, e.g., Tian*, 000002, 000006 (including “low resolution input images” as being “among the factors that complicate facial expression analysis.”). Similarly, when discussing ways to improve performance, *Tian* discusses techniques for increasing the resolution to increase the accuracy. *Id.* (giving “multiple cameras[,]” “[a]ctive cameras[,]” and “super-resolution” as techniques for increasing resolution and therefore accuracy). Thus, even though *Tian* explores techniques for ameliorating the difficulties of working with low-resolution images when necessary, a POSITA would be nonetheless discouraged from unnecessarily lowering the resolution and thereby intentionally increasing the difficulty of the facial analysis process. *Dec.*, ¶¶ 120-122. As such, *Tian* teaches away from modifying the system

of *Lu-577* (modified by the teachings of *Lu-000*) to reduce the resolution of the captured image of the media exposure environment prior to determining head orientation, and a POSITA would not be motivated to make such a modification. *Dec.*, ¶ 123.

4. *The Petition’s Generalized Allegations of Obviousness Do Not Provide the Required Articulated, Specific Reasoning*

For Ground 1, the Petition provides a series of generalized assertions of obviousness while failing to provide articulated, specific reasoning for the proposed combination. *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) (petitioner must “articulate specific reasoning, based on evidence of record,” to support obviousness); *Microsoft Corporation v. Uniloc 2017 LLC*, IPR2020-00101, Paper 10, 6-7 (PTAB May 6, 2020). For example, the Petition asserts the references are “similarly directed” to “image processing and facial analysis,” *Lu-577* employs “known head location and face recognition software,” and the references are “compatible.” *Petition*, 8-9.

Contrary to Petitioner’s assertion, *Tian* is not “similar” to *Lu-000* or *Lu-577*. *Dec.* ¶¶ 124-125. *Lu-577* (as modified with *Lu-000*) employs head location and **face recognition** software to identify audience members. *Lu-577*, [0039]. *Lu-000* discloses an “**image recognition method and system** ... for identifying predetermined individual members of a viewing audience” by recognizing their faces. *Lu-000*, Abstract, 2:39-47, 7:39-55. By contrast, *Tian* recognizes **facial**

expressions and performs **no facial recognition to identify people**. *Tian*, Abstract, 000002; *Dec.* ¶ 126. Likewise, the “compatibility” of references is meaningless within an obviousness discussion for myriad reasons, the least of which is that references being “similar” is not an indication of obviousness. *Motorola Mobility LLC v. Maxell, LTD*, IPR2023-00110, Paper 7, 32 (June 15, 2023) (Board stating that prior art references being “in the same field and hav[ing] similarities” does not provide an “articulated reason” for combining their teachings).

Lu-577’s capability to employ head location software merely indicates, at most, that a POSITA “once presented with the two references, would have understood that they *could* be combined.” *Personal Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 993 (Fed. Cir. 2017). Two references being allegedly similar does not provide a rationale for why a POSITA **would** have combined the references. Rather, the alleged similarity only indicates (at best) that the combination **could** have been made, which is not the standard for obviousness. *Belden, Inc.*, 805 F.3d at 1073; *Truist Bank*, 23.

Petitioner characterizes *Tian* numerous times as “facial analysis” throughout the obviousness argument. *Petition*, 8-11. Petitioner undoubtedly chose this broad characterization of *Tian* to obfuscate *Tian’s* actual purpose. Petitioner ignores *Tian’s* purpose of “facial **expression** analysis,” which does not require identifying the face making the expression. *Tian*, Abstract; *Dec.* ¶ 127. A POSITA would not have seen

Tian as similar to *Lu-577* and *Lu-000*, because *Tian* explores recognizing **expressions** while *Lu-577* and *Lu-000* recognize **faces** to identify people. *Dec.* ¶ 128. Thus, Petitioner’s general arguments also fail to indicate a POSITA would understand the references even “could” be combinable.

Thus, Petitioner’s general assertions alone do not meet the requirements for *prima facie* obviousness. *Motorola Mobility LLC*, 32.

5. Petitioner’s Motivations to Combine Are Indicative of Hindsight

Petitioner’s background art fails to provide any motivation to apply *Tian*’s head pose classification based on reduced resolution images to *Lu-000*’s recognition system and, in many cases, actually contradicts their expert’s opinions. Furthermore, aside from Petitioner’s failure to meet their burden, a POSITA **would not**, in fact, have been motivated to modify *Lu-000* to determine a head orientation at all, much less based on reduced resolution images. *Dec.* ¶ 129. *Lu-000* already successfully performs face recognition by comparing the captured image to all stored signatures of various poses. *Lu-000*, 7:52-55, 8:36-45; *Dec.* ¶ 129. Thus, Petitioner’s proposed modification is superfluous and would add complexity to *Lu-000*’s recognition system without providing any benefit. *Id.*

The absence of a motivation to combine indicates impermissible hindsight bias, by “pick[ing] and choos[ing] elements” from the prior art (*e.g.*, *Tian*’s head pose classification) without providing “sufficient reasoning[.]” *Pacific Market Int’l*,

LLC v. Ignite USA, LLC, IPR2016-01875, Paper 32, 18-19 (PTAB Mar. 27, 2018); *RJ Reynolds Vapor Co.* at 18-19 (Board stating Petitioner used hindsight because the Petitioner’s “proposed rationale” for modifying the prior art was “not sufficiently supported in the record”). Because Petitioner fails to provide a motivation for combining *Tian*’s head pose classification with *Lu-000*, the Board should deny institution of Ground 1. *Microsoft Corporation* at 17, 19 (denying institution of the Petition because Petitioner did not “adequately explain[] why” a person would have had reason to modify the primary reference).

6. *The Petition Fails to Provide Any Motivation to Combine the Teachings of Lu-000 and Lert with Lu-577*

Although Ground 1 is *Lu-577* combined with *Tian*, Petitioner heavily relies on *Lu-577*’s “incorporation” of *Lu-000* and *Lert* for teaching several limitations of the challenged independent claims.⁷ *Petition*, 12-15, 18-21, 23-25. *Lu-000*’s and *Lert*’s disclosures provide, at most, additional embodiments that could be incorporated into *Lu-577*’s audience measurement system. Patent Owner submits that combining features from a reference that is incorporated by reference is akin to combining two embodiments of a single reference. Both Federal Circuit case law

⁷ Patent Owner cites the limitations in claim 1 mapping *Lu-000* and *Lert*. Petitioner references the same arguments in the other challenged independent claims. Thus, Patent Owner’s arguments apply for all independent claims.

and this Board's case law require a motivation to combine two (or more) embodiments of a reference. *Abiomed, Inc., v. Maquet Cardiovascular, LLC*, IPR2017-01026, Paper 8, 7-8, 10-11 (PTAB Sept. 20, 2017); *In re Stepan*, 868 F.3d 1342, 1346 n.1 (Fed. Cir. 2017) (Board stating an obviousness argument based on "combining multiple embodiments from a single reference" must include a motivation and a reasonable expectation of success).

By analogy, Petitioner must show why a POSITA would have combined the features from *Lu-000* and *Lert* with *Lu-577*, especially considering Petitioner is further proposing modifying *Lu-000*. *Abiomed, Inc.*, Paper 8 at 10-11. (Board finding Petitioner "failed to establish a reasonable likelihood of prevailing" because of Petitioner's "failure to explain sufficiently and support" a combination of two alternative embodiments in a single reference).

Petitioner's mapping applies the teachings of *Lu-000* and *Lert* throughout Ground 1. *Petition*, 3. For example, Petitioner asserts *Lu-000*'s capturing of images and detection of heads within the images teaches the claimed step of detecting a head recited in the independent claims. *Petition*, 18-21. Petitioner also maps *Lu-000*'s teaching of comparing stored signatures with extracted feature signatures to the "audience identification information" limitations recited in the independent claims. *Petition*, 23-25. Petitioner applies *Lert*'s audio processor circuitry and *Lu-000*'s various disclosed processing circuitries for teaching the "processor circuitry to

execute the machines readable instructions” of claim 1. *Petition*, 15-16. Thus, teachings from all three references must be used for Petitioner’s Ground 1 to render the challenged claims “obvious,” even though Petitioner omits both *Lu-000* and *Lert* from Ground 1. *Petition*, 3. Through this omission, Petitioner attempts to improperly benefit from the teachings of three references, without performing the required obviousness analysis.

Because Petitioner did not provide any motivation to combine the features of *Lu-000* and *Lert* with *Lu-577*, Petitioner has not met its burden.

7. *The Petition Fails to Establish a Reasonable Expectation of Success in the Proposed Combination*

Petitioner fails to address how each modification of *Lu-577* with *Tian* would have had a reasonable expectation of success. For example, Petitioner “fails to explain how, specifically, to implement the modification” of applying ***Tian’s head pose classification*** “with any expectation of success.”

A *prima facie* showing of obviousness requires determining a POSITA “would have been motivated to combine or modify the teachings in the prior art **and would have had a reasonable expectation of success in doing so.**” *Endo Pharm. Inc. v. Actavis LLC*, 922 F.3d 1365, 1373 (Fed. Cir. 2019). Establishing a reasonable expectation of success has long been a “consistent criterion” for determining obviousness. *In re Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988); *Autostore System Inc., v. Ocado Innovation Limited*, IPR2022-00443, Paper 7, 21-24 (PTAB

Jul. 20, 2022); *Juniper Networks, Inc. v. Correct Transmission, LLC*, IPR2021-00682, Paper 26, 21 (PTAB Oct. 3, 2022) (Claims upheld because “Petitioner has not proven, by a **preponderance of the evidence**,” a POSITA would have had a reasonable expectation of success in modifying the primary reference based on a teaching from the secondary reference).

Here, Petitioner vaguely asserts that applying *Tian*’s multiple teachings “would have had a reasonable expectation of success” given “overlap” between *Lu-000* (a distinct reference from the primary reference of the combination) and *Tian*. *Petition*, 11. Petitioner also broadly asserts applying the teachings would have been successful because the modifications use “well-known techniques.” *Petition*, 11.

Petitioner’s declarant, Dr. Doermann, does not provide any further analysis or factual basis, instead repeating Petitioner’s conclusion of “reasonable expectation of success.” *Compare, e.g., Petition*, 11, with *Ex. 1003*, ¶ 72. The Board should accord “little weight” to Dr. Doermann’s “verbatim” testimony. *Xerox Corp.*, 15.

Without factual basis from Dr. Doermann, Petitioner’s assertion of reasonable success amounts to mere attorney argument that is not “evidence” for a POSITA understanding. *Flowco Production Solutions, LLC v. Well Master Corp.*, IPR2022-01384, Paper 7, 17 (PTAB Jan. 20, 2023) (citing *Elbit Sys. Of Am., LLC v. Thales Visionix, Inc.*, 881 F.3d 1354, 1359 (Fed. Cir. 2018)). The absence of factual basis further indicates Petitioner failed to make a *prima facie* case of obviousness.

Samsung Elecs. Co. v. Elm 3DS Innovations, LLC, 925 F.3d 1373, 1380 (Fed. Cir. 2019) (stating the question of reasonable expectation of success is a “question[] of fact”).

Petitioner also cites their “Background” discussion to support a POSITA would have been “more than capable” of making the proposed combinations. *Petition*, 11. The cited Background only provides general explanation showing how audience measurement systems were known and, **separately**, facial analysis techniques were known. *Petition*, 1-2. The identification of facial analysis techniques as being known **fails to address** whether a POSITA would have had a reasonable expectation of success in modifying *Lu-577*’s audience measurement system to include *Tian*’s teachings. Additionally, pointing to several prior art references teaching various techniques, at most, shows that a POSITA **could** have made the modifications, not a that a POSITA **would** have. *Belden, Inc.*, 805 F.3d at 1073. Showing a POSITA could have made a modification does not meet the standard of obviousness. *Id.*

At least because Petitioner fails to provide evidence as to how each modification of the *Lu-577* and *Tian* combination would have had a reasonable expectation of success, the Board should deny institution.

V. GROUND 2: NIELSEN-372 IN VIEW OF STEINBERG DOES NOT RENDER OBVIOUS THE CHALLENGED CLAIMS

As discussed above, Patent Owner has disclaimed independent claims 1, 9, and 16, which are the only claims challenged under Ground 2. Thus, Ground 2 is rendered moot. *See* 37 C.F.R. § 42.107(e) (“No *inter partes* review will be instituted based on disclaimed claims.”). However, as Petitioner’s Ground 3 is largely based on the Ground 2 combination, Patent Owner responds to the arguments as applied to the limitations of the independent claims under the heading of Ground 2 for ease of reference.

A. Overview of the Cited References and Petitioner’s Proposed Combination

1. Nielsen-372’s Local Metering System

Nielsen-372 teaches a metering system including “a metering unit 124 and a display device ON/OFF detector 128.” *Nielsen-372*, [0036]; *Dec.*, ¶ 130. The metering unit logs data and generates viewing records. *Nielsen-372*, [0040]. The ON/OFF device determines whether the television is “ON (active)” or “OFF (inactive).” *Nielsen-372*, [0043]. The ON/OFF device increases the accuracy of the metering unit’s viewing records by determining “whether content” is actually “presented by the display device.” *Id.*; *Dec.*, ¶ 131. Separately, the metering system also includes audience measuring functionality in the form of a “people meter” that receives input from the audience member “to indicate that they are present.” *Nielsen-372*, [0048]; *Dec.*, ¶ 132.

As one technique to determine the display device status, the **ON/OFF detector includes a “video sensor,” such as a camera.** *Nielsen-372*, [0050]. The camera is “**positioned to detect the display area of the display device**” that presents the program. *Id.* That is, the camera faces the display device, such as a TV. By analyzing the area of successive video frames captured by the video sensor for changes to the region corresponding to the display device, the ON/OFF detector can infer that the display device is on or off. *Nielsen-372*, [0116]; *Dec.* ¶ 133.

Petitioner proposes repurposing the video sensor for audience measurement in the proposed combination. *Petition*, 44 (“Nielsen-372’s system includes needed hardware (e.g., a computer and a camera) for implementing Steinberg’s approach”); Ex. 1003, ¶ 200 (“Nielsen-372’s local metering system includes a **camera**. Ex-1006, ¶ 0050 (‘The **video sensor 208** may be, for example, a camera, a single output analog or digital light sensor, etc.’).”)

Petitioner’s modification of the ON/OFF video sensor for capturing audience member images completely destroys the function of the ON/OFF device within *Nielsen-372*’s system, thus fatally flawing the proposed combination. *Nielsen-372*’s ON/OFF device is an important aspect of *Nielsen-372*’s system, with *Nielsen-372* listing several “applications” in which people would benefit from the ON/OFF device. *Nielsen-372*, [0002], [0004]-[0006]. Thus, a POSITA would have understood the ON/OFF device to be an essential component of the metering system

for detecting when the display device is off or on. *Dec.* ¶ 134. Yet, by orienting the video sensor **towards the audience** (per Petitioner’s modification) rather than the display device (as taught in *Nielsen-372*), the video sensor would no longer be operable as an ON/OFF detector. Petitioner’s proposed modifications would render *Nielsen-372*’s system unsuitable for its stated purpose. *Dec.*, ¶ 135.

2. Steinberg’s Digital Image Processing System

Steinberg (Ex. 1007) describes a system for performing facial recognition to organize an image collection. *Steinberg*, [0090], *Dec.* ¶ 136. The system includes a face detection module that determines if a face is in an image. *Steinberg*, [0118]. Once a face is detected, a normalization module analyzes the “facial pose.” *Steinberg*, [0120], [0176]. Once the pose of the face is determined, the system compares the image with images in various face classes to identify the face and place the image in the correct class. *Steinberg*, [0156]-[0157], [0159]. Thus, *Steinberg* discloses a facial recognition system that identifies faces within images to accurately place the images in face classes within an image collection. *Steinberg*, [0090], [0003], [0010], *Dec.* ¶ 136. *Steinberg* expressly gives the context of the invention as “collections of consumer digital images which would be generated by a typical user of a digital camera,” which is not pertinent to the field of audience measurement. *Steinberg*, [0010]; *Dec.* ¶ 137.

3. Petitioner’s Proposed Modification of Nielsen-372 to incorporate the teachings of Steinberg

Petitioner’s modification combines *Steinberg’s* “face detection and recognition” into *Nielsen-372’s* metering system. *Petition*, 44. Specifically, Petitioner asserts “*Nielsen-372’s* system **includes needed hardware (e.g., a computer and a camera)** for implementing **Steinberg’s approach.**” *Id.*; *see also* Ex. 1003, ¶ 200. In particular, Petitioner cites *Nielsen-372’s* ON/OFF device video sensor to teach the camera. *Id.* (citing *Nielsen-372*, [0050]). Dr. Doermann similarly points to the “video sensor” as providing the “**hardware needed to implement Steinberg’s approach.**” Ex. 1003, ¶¶ 200; 199. Thus, Petitioner’s combination modifies *Nielsen-372’s* ON/OFF device to implement *Steinberg’s* facial recognition for identifying “audience members.” *Petition*, 44-45 (asserting “*Nielsen-372* provide[s] the hardware architecture for performing *Steinberg’s* method”); Ex. 1003, ¶¶ 199-200, 203; *Dec.* ¶ 138.

As an initial matter, Patent Owner notes it is mindful of this Board’s precedent of avoiding bodily incorporation of features from a secondary reference into the modification. *In Re Keller*, 642 F.2d 413, 425 (CCPA 1981); *SK Hynix Inc. et al., v. Netlist, Inc.*, IPR2020-01042, Paper 14, 35 (PTAB December 2020). However, here Petitioner and their expert have made their proposed combination clear: the video sensor of *Nielsen-372* is used as the “hardware architecture” for capturing and processing images using *Steinberg’s* approach of face detection and recognition. *See*,

e.g., *Petition*, 44; Ex. 1003, ¶ 203 (“Nielsen-372 provide[s] the hardware architecture for performing Steinberg’s face recognition method.”). As such, Patent Owner is not resorting to bodily incorporation in its arguments regarding a lack of motivation to combine *Nielsen-372* and *Steinberg*, but rather pointing out issues inherently present in Petitioner’s expressly proposed combination.

B. A POSITA Would Not Have Found It Obvious and Been Motivated to Modify *Nielsen-372* With *Steinberg*

Petitioner’s Ground 2 relies on the combination of *Nielsen-372* and *Steinberg*⁸. *Petition*, 46-49, 53-64. Petitioner’s combination is fundamentally flawed. As discussed below, Petitioner’s combination relies upon the camera of *Nielsen-372* to teach the claim limitations of the ’243 Patent related to capturing images of the “media exposure environment” to collect the audience identification information. As such, the camera must be oriented toward the audience. *Dec.*, ¶ 139. However, as designed, *Nielsen-372*’s camera is oriented toward the **television** in order to determine **media content information**. Petitioner’s proposed modification of *Nielsen-372*’s camera to perform facial recognition of people watching TV would

⁸ Petitioner provides substantially similar mappings for all independent Claims, and thus, Patent Owner’s arguments for independent claim 1 also apply to the other challenged independent claims. *Compare Petition*, 45-64 with *Petition*, 64-71.

frustrate the purpose of *Nielsen-372*'s metering system by rendering it unable to determine media content information and would change the principle of operation.

1. *Petitioner's Proposed Modification Frustrates the Purpose of Nielsen-372's Metering System*

Notably, the video sensor of *Nielsen-372* is “positioned to detect the display area of the display device.” *Nielsen*, [0050]. Per Dr. Saber, a camera positioned to detect the display area of the display device, *e.g.*, a TV, is not positioned to detect the audience viewing the TV. *Dec.*, ¶ 140. Petitioner's proposed combination would, at best, result in the bizarre situation where the “audience measurement system” identifies the actors present in the media content rather than the audience.

As discussed above, it is the function (and the stated purpose) of *Nielsen-372*'s ON/OFF device generally and the video sensor specifically to determine whether the display showing the viewed content is powered on. Thus, the camera faces the display device, **not the audience watching the displayed content**. *Nielsen-372* [0050] (“The video sensor 208 may be, for example, a camera, a single output analog or digital light sensor, etc., **positioned to detect the display area of the display device**”); *Dec.* ¶¶ 141-142. Furthermore, the video images taken to determine the ON/OFF state of the display device **would not include the audience members**. *Id.* The *Nielsen-372* camera does not take images of the audience, as the people meter performs the function of identifying audience members. *Nielsen-372*, [0048]; *Dec.* ¶ 142.

Petitioner’s proposed modification would require the ON/OFF device camera (*i.e.*, the only “camera” of *Nielsen-372*) to face the audience to recognize the faces of the audience members using “Steinberg’s methods.” *Petition*, 44-45; *Dec.* ¶ 143. With the camera facing the audience, the *Nielsen-372* camera would no longer be positioned to take images of the screen to detect when the display is ON or OFF. *Dec.* ¶ 143. As described, detecting when the display device is ON or OFF (to increase the “accuracy” of the generated viewing records) is the purpose of the video sensor in the *Nielsen-372* system. *Nielsen-372*, [0043]; *Dec.* ¶ 144.

Modifying *Nielsen-372* so that the camera faces the audience (to meet the claim limitation of the ’243 Patent) instead of the display (the actual functionality disclosed in *Nielsen-372*) significantly and fundamentally changes how *Nielsen-372*’s system operates and renders it unsatisfactory for its intended purpose, (*i.e.*, generating accurate viewing records by detecting whether the display is on or off). *Dec.*, ¶¶ 144-145. Petitioner’s proposed modification would render the ON/OFF device, and consequentially the metering system, “**unsatisfactory for its intended purpose**,” making the proposed modification **not obvious**. *Victoria’s Secret Stores LLC v. Andra Group, LP*, IPR2020-00853, Paper 12, 28-29 (PTAB Oct. 22, 2020) (citing *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984)).

2. *Petitioner’s Proposed Modification Would Change the Principle of Operations of Nielsen-372’s System*

Modifying the camera of the ON/OFF device to capture images of the audience and automatically identifying audience members using *Steinberg’s* facial recognition techniques would change the principle operation of the *Nielsen-372* system in two important ways: first, the system of *Nielsen-372* would no longer be able to rely on the video sensor to determine the state of the display, but would be forced to rely on other, less accurate techniques. *Dec.*, ¶¶ 146-149. Second, the system of *Nielsen-372* would be fundamentally transformed from a **voluntary** audience measurement system to an **automatic** audience detection system. *Dec.* ¶¶ 150-152.

When a modification would “change the principles” under which a prior art reference “was designed to operate,” as Petitioner’s proposed modification does, a POSITA would not be motivated to modify the prior art reference in that way. *TCT Mobile (US), Inc. v. Fundamental Innovations Systems Int’l LLC*, IPR2021-00597, Paper 8, 14-15 (PTAB Aug. 25, 2021). A change of the principle of operations provides “evidence of non-obviousness,” and thus the Board should deny institution of Ground 2. *Id.* at 15, 17.

First, the system of *Nielsen-372* describes a sophisticated combination of audio sensors, video sensors, and emissions sensors making up the ON/OFF device. *Nielsen-372*, FIG. 2, [0133]; *Dec.*, ¶¶ 147-148. Petitioner’s modification would

entirely remove one class of sensors from this combination. Dr. Saber opines that the video sensor is an important sensor, as it enables determining when the display device is actually presenting changing content (such as a TV show) to the audience. *Dec.* ¶¶ 147, 149. In other words, removing the video sensor would change the system of *Nielsen-372* from one that can detect when a television is presenting content to an audience into one that cannot distinguish an audience watching television from an audience staring at a blank screen. *Dec.* ¶ 149.

Next, Petitioner’s proposed system would change *Nielsen-372* from a voluntary system into one in which the audience is tracked without their input (and potentially without their knowledge). *Dec.* ¶ 150; *see also* Ex. 1003, ¶ 201. Such a change is fundamental and could significantly impact the willingness of an audience to have *Nielsen-372*’s measurement system in their living room. *Dec.*, ¶ 150. For example, Dr. Saber discusses how audiences might be willing to share the majority of their watching habits using the people meter described in *Nielsen-372* but value the ability not to record some “guilty pleasure” watching. *Dec.* ¶¶ 151-152. Such a change represents another fundamental change to the principle of operation of the system of *Nielsen-372*, Petitioner’s unsupported claims to the contrary notwithstanding. *Cf. Dec.*, ¶¶ 147-153 *with Petition*, 45.

Petitioner asserts that all of the modifications *Nielsen-372* based on *Steinberg* would “not have changed the principle of operation for any of the references.”

Petition, 45. Petitioner cites Dr. Doermann’s opinion to support this argument. *Id.* Dr. Doermann merely parrots the attorney’s conclusion, and his testimony should be afforded “little weight.” Ex. 1003, ¶ 203; *Xerox Corp.*, 15. Thus, Petitioner’s assertion is little more than attorney argument, which “does not” provide evidence for an understanding of a POSITA. *Flowco Production Solutions*, 17. Ironically, Dr. Doermann notes both of these fundamental changes in passing but performs no analysis and provides no substantial opinions on their effect on *Nielsen-372*’s principles of operation. Ex. 1003, ¶ 198 (noting the Nielsen’s camera must now “capture one or more images of a television audience”); ¶ 201 (noting that the modified system is now “automatic” and “not affected by the individual’s input or lack thereof.”).

For all of the above reasons, Petitioner’s proposed combination is fatally flawed, as it would fundamentally change the principle of operation of *Nielsen-372*’s metering system in multiple ways. As such, a POSITA would not have found Petitioner’s proposed modification to *Nielsen-372* obvious. *TCT Mobile (US), Inc.*, 14-15. Having presented this flawed combination, Petitioner further fails to explain “why” a POSITA would have been motivated to modify *Nielsen-372* “in a way that it would not work for its intended purpose.” *Id.* at 16. Thus, Petitioner fails to establish a *prima facie* showing of obviousness for Ground 2, and the Board should deny institution. *Endo Pharm., Inc.*, 922 F.3d at 1373.

**3. *The Patent Office Previously Considered Such a Modification
and Concluded That It Would Be Non-Obvious***

The examination history of the '243 Patent further provides evidence that a POSITA would not have found it obvious and been motivated to make Petitioner's proposed modification. The Examiner indicated a prior art reference capturing images of a "screen" viewable "by a viewer," either alone or in combination with another reference teaching images of the audience, did not teach identifying an audience member based on a match to a known person. Ex. 1002, *File History of '243 Patent*, 294; *Dec.* ¶¶ 154-155. The Examiner concluded "it would not have been obvious" to substitute the "screen" images with images of audience members in a "media exposure environment," even if another prior art reference used audience images. *Id.* For similar reasons, a POSITA would not have found it "obvious" to modify *Nielsen-372's* camera to image the audience instead of the "screen" of the display device. *Dec.* ¶ 156.

Notably, upon review of the File History, it is clear *Steinberg* is merely cumulative to prior art previously considered. Ex. 1002, 294. Further, the proposed combination was essentially already considered by the Examiner when reviewing substantially similar prior art references. *Id.* The (1) cumulative nature of the prior art and (2) the combination being "substantially the same" as arguments previously considered by the Examiner both weigh in favor of the Board denying institution under 35 U.S.C. § 325(d). *Husky Injection Molding Systems, Ltd. v. Plastipak*

Packaging, Inc., IPR2020-00429, Paper 23, 8-9 (PTAB July 2020) (citing *Advanced Bionics, LLC v. Med-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 7 (PTAB Feb. 2020)).

VI. GROUND 3: THE COMBINATION OF NIELSEN-372, STEINBERG, AND TIAN DOES NOT RENDER THE CHALLENGED CLAIMS OBVIOUS

The only difference between the combinations of Grounds 2 and 3 is Petitioner incorporating arguments regarding *Tian* from Ground 1. *Petition*, 71-88. Petitioner relies on the same Ground 2 argument for combining *Nielsen-372* and *Steinberg*. *Petition*, 71. Petitioner recycles the arguments for modifying *Lu-577* with *Tian* into the combination of *Tian* with *Nielsen-372* and *Steinberg*. *Compare Petition*, 8-11 with 71-73. Thus, the obviousness combinations for Ground 3 fail for the same reasons noted for Grounds 1 and 2. *See Section IV-V*.

VII. NEITHER TIAN NOR STEINBERG IS ANALOGOUS ART TO THE '243 PATENT

All of Petitioner's modifications of the primary references across all grounds share a common, fatal flaw: none of Petitioner's secondary references are analogous art. Petitioner alleges that the field of endeavor of the '243 Patent is "media analysis." *Petition*, 4-6 (identifying the field of endeavor for each of the references). Notably, neither Petitioner nor its declarant makes any showing of the cited references being reasonably pertinent to a problem with which the inventor is involved. The field of endeavor of the '243 Patent does not broadly encompass

“media analysis,” and the cited secondary references fail to be within a reasonably scoped field of endeavor for the ’243 Patent.

The ’243 Patent is unambiguous in its general “Field of the Disclosure” statement: “[t]his disclosure relates generally to audience measurement more particularly, to methods and apparatus to capture images.” *’243 Patent*, 1:36-39. This is supported by the claims: independent claims 1 and 9 recite “an audience measurement system,” and independent claim 16 recites “a method for obtaining exposure data for a media exposure environment.” *’243 Patent*, cols. 1, 9, 16; *see also Netflix v. DivX*, No. 22-1138, *10 (Fed. Cir. Sept. 11, 2023) (“We determine the field of endeavor by reference to explanations of the invention’s subject matter in the patent application, including the embodiments, function, and structure of the claimed invention.”) (internal quotes omitted).

As the Federal Circuit recently affirmed, the test for whether a prior art reference is analogous art is a two-prong one: ““(1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor’s endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.”” *Id.* at *8. Here, Petitioner argues *Tian* and *Steinberg* are in the same field of endeavor. Again, Petitioner does **not** argue that either *Tian* or *Steinberg* is “reasonably pertinent” to the particular problem being addressed by the inventors of the ’243 Patent.

Like the '243 Patent, *Steinberg* is unambiguous in its “Field of the Invention” statement: “[t]he invention relates to digital image processing, particularly to the field of **automatic or semiautomatic grouping and classification of images in a database** or image collection and based on the occurrence of faces in the images and the identification and classification of such faces.” *Steinberg*, [0003]. *Tian*, while not a patent reference, includes a similarly straightforward statement of the problem it sets out to solve: “This paper explores the effects of different image resolutions for each step of facial expression analysis.” *Tian*, Abstract. As such, neither *Steinberg* nor *Tian* shares the field of endeavor of the '243 Patent and, as such a POSITA would not have been motivated to combine them with the respective primary references. *Dec.*, ¶ 158.

Petitioner characterizes the field of endeavor of the '243 Patent as “media analysis.” *Petition*, 3, 5-6. But this conflates two entirely distinct fields of endeavor: (1) media **exposure** analysis (*i.e.*, audience measurement); and (2) image processing. *Dec.*, ¶¶ 159-162. As described above, *Tian* is directed to determining the effects of image resolution on facial expression analysis and therefore falls into the category of image processing. *Steinberg* is directed to classifying faces in an image database and is thus likewise directed to image processing. Accordingly, neither of Petitioner’s secondary references is directed to the field of endeavor of the '243 Patent, that of audience measurement. *Dec.* ¶¶ 159-161.

Although Petitioner does not provide any argument that either *Tian* or *Steinberg* is reasonably pertinent to the problem being solved, Patent Owner addresses the second prong as well. A prior art reference is reasonably pertinent to the problem solved “only if its subject matter logically would have commended itself to an inventor’s attention in considering his problem.” *Netflix* at *15 (quoting *Airbus S.A.S. v. Firepass Corp.*, 941 F.3d 1374, 1382 (Fed. Cir. 2019)) As described above, the problem being solved by the claimed invention is that of audience measurement. *Dec.*, ¶ 163. *Tian*’s investigation is broadly related to “facial expression analysis.” *Dec.*, ¶ 164. As Dr. Saber opines, a reference investigating the minimum resolution for an image that still allows an expression to be analyzed would not have logically come to the attention of an inventor solving the problem of audience measurement. *Id.*

Similarly, *Steinberg* is broadly related to the classification of images in a database “in the context of collections of consumer digital images which would be generated by a typical user of a digital camera.” *Steinberg*, [0010]. As Dr. Saber opines, a reference related to classifying collections of images from consumer digital cameras would also not have logically come to the attention of an inventor solving the problem of audience measurement. *Dec.*, ¶ 165. As such, neither *Tian* nor *Steinberg* is analogous art under the second prong of the relevant test.

VIII. DISCRETIONARY DENIAL UNDER § 314(A) IS WARRANTED

Petitioner asserts the Petition should not be discretionarily denied institution under § 314(a). *Petition*, 6-7. Petitioner only addresses a few of the six *Fintiv* factors and ignores the rest, broadly stating “the *Fintiv* factors favor institution.” *Petition*, 6-7; *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020). Petitioner purports the “merits” of the Petition are compelling. *Petition*, 6. For all the reasons discussed above, **the merits of the Petition are not compelling**. Thus, the Petition would not “plainly lead to a conclusion that one or more claims are unpatentable.” *Memorandum: Interim Procedures for Discretionary Denials in AIA*, June 21, 2022, 3-4.

Factor 1: Petitioner misrepresents the Judge presiding over the parallel litigation, as Nielsen and TVision consented to Magistrate Judge **Burke** conducting “all proceedings” in the Delaware district court case. Ex. 2005, *Notice, Consent, and Reference of a Civil Action to a Magistrate Judge*, Nov. 7, 2022. Unlike Judge Noreika, Judge Burke recently **denied** staying cases for IPR proceedings. *See, e.g.*, Ex. 2007, *Topia Technology, Inc. v. Egnyte, Inc.*, No. 21-cv-01821 (D. Del. Mar. 6, 2023), *Hearing Transcript*, 5:4-12, 48:16-22. Thus, *Fintiv* factor 1 favors discretionary denial under § 314(a).

Factor 3: The Parties have invested significant work in the parallel litigation. Ex. 2006, *Docket Report for Case No. 1:22-cv-01345, District Court of Delaware*.

This work includes (1) ongoing discovery in the litigation, including document production and interrogatory requests (Docket Entries 27, 32, 36, 39, 53, 56, 59-61, and 63); (2) exchange of invalidity and infringement contentions (Docket Entries 47 and 51); and (3) exchanged claim constructions on October 6, 2023 (Docket Entries 63 and 65), and claim construction briefing beginning December 11, 2023, with a *Markman* hearing to be held March 14, 2024 (Docket Entry 17). Therefore, close in time to any institution of the IPR, the Parties and the Court will have invested a large amount of the work associated with the parallel litigation.

Factor 4: Petitioner does not address Factor 4. Petitioner did not present any stipulation, including a *Sotera* stipulation. *Petition*, 6-7. All of the references mapped in the challenged grounds were cited by TVision in its Invalidity Contentions. Ex. 2004, *TVision's Initial Invalidity Contentions Regarding the '243 Patent*, Exhibit A1-A4. The references cited in the present IPR grounds are the **only** references included in the Initial Invalidity Contentions, creating a **complete overlap between the prior art cited in the parallel litigation and the Petition's grounds**. *Id.* at Exhibits A1-A4. There is also complete overlap between the challenged and asserted claims. Thus, the parallel proceedings present precisely the potential for inconsistent outcomes that discretionary denial under § 314(a) is employed to avoid. Because Petitioner has not offered a “stipulation that would diminish the overlap,” *Fintiv* Factor 4 favors discretionary denial of the Petition.

Vector Flow, Inc. v. HID Global Corporation, IPR2023-00353, Paper 8, 22 (PTAB Jul. 17, 2023).

Factor 5: Petitioner, TVision Insights, and the defendant in the parallel proceeding are the same party. *See* Ex. 2003; Ex. 2006.

The remaining *Fintiv* Factor 2 regarding the trial date is, at best, neutral toward discretionary denial given that all other factors favor discretionary denial and Petitioner's unwillingness to provide a *Sotera* stipulation. Thus, the Board should exercise its discretion to deny institution of the Petition.

IX. CONCLUSION

For the reasons provided herein, Patent Owner submits that Petitioner has not established a reasonable likelihood that at least one challenged claim is unpatentable, and therefore, institution should be denied.

Respectfully submitted,

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APPENDIX OF EXHIBITS

Exhibit 2001	Declaration of Dr. Eli Saber
Exhibit 2002	<i>Request for Statutory Disclaimer as Filed</i> , October 09, 2023
Exhibit 2003	<i>Complaint for Patent Infringement</i> , C.A. No. 1:22-cv-01345
Exhibit 2004	<i>TVision's Initial Invalidity Contentions Regarding the '243 Patent</i> , Exhibit A1-A4
Exhibit 2005	<i>Notice, Consent, and Reference of a Civil Action to a Magistrate Judge</i> , Nov. 7, 2022
Exhibit 2006	<i>Docket Report for Case No. 1:22-cv-01345</i>
Exhibit 2007	<i>Topia Technology, Inc. v. Egnyte, Inc.</i> , No. 21-cv-01821 (D. Del. Mar. 6, 2023), <i>Hearing Transcript</i> , 5:4-12, 48:16-22
Exhibit 2008	<i>Curriculum Vitae of Dr. Eli Saber</i>
Exhibit 2009	<i>Facial Expression Recognition: A Brief Tutorial Overview</i> , Claude Chibelushi and Fabrice Bourel, Staffordshire University, 2002
Exhibit 2010	<i>Facial Expression Recognition</i> , Maja Pantic, Springer-Verlag Berlin Heidelberg, 2009
Exhibit 2011	<i>Automatic Analysis of Facial Expressions: the State of the Art</i> , Maja Pantic and Leon Rothkrantz, IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 22, No. 12, December 2000
Exhibit 2012	<i>Mechanisms of Face Perception</i> , Doris Y. Tsao and Margaret S. Livingstone, <i>Annu Rev Neurosci.</i> 2008, 31, 411-437

CERTIFICATION OF WORD COUNT

The undersigned certifies pursuant to 37 C.F.R. § 42.24 that the foregoing Patent Owner's Preliminary Response to Petition for *Inter Partes* Review, excluding any table of contents, mandatory notices under 37 C.F.R. § 42.8, certificates of service or word count, or appendix of exhibits, contains 13,998 words according to the word-processing program used to prepare this document (Microsoft Word).

Dated: October 11, 2023

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing PATENT OWNER'S PRELIMINARY RESPONSE TO PETITION FOR INTER PARTES REVIEW was served on October 11, 2023, by email on the following counsel of record for Petitioner:

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