

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 SUR-REPLY
TO PETITIONER'S REPLY**

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I. GROUND 1, 3, CLAIMS 4, 11, AND 18: TIAN DOES NOT TEACH “REDUC[ING] A RESOLUTION”

A. Tian’s Teachings Are Ambiguous

All challenged claims include processing circuitry, a device, or a method step to “reduce a resolution” of an image. (Ex. 1001, Claims 4, 11, 18). Petitioner relies on Tian for this limitation. (Paper 2, 26-27, 36-37, 42, 75-76). Tian does not expressly or implicitly teach resolution reduction, the Parties dispute a POSITA’s understanding of Tian’s teachings, and Petitioner provides no additional evidence clarifying Tian’s ambiguous teachings.¹ Petitioner has not met its burden by a preponderance of the evidence.

1. Summary of Parties’ Arguments Regarding Resolution Reduction

The Petition identifies only a single sentence from Tian for allegedly “creat[ing] lower-resolution images by down-sampling from original images[,]” rather than obtaining the reduced-resolution images from some other source: “The lower resolution images are down-sampled from the originals.” (Paper 2, 26; Paper 22, 6 (same); *Tian* (Ex. 1005), Abstract, Table 1, 000002 (repeating teaching three times verbatim)). The sentence is ambiguous when taken alone and, in context,

¹ To correct Petitioner’s mischaracterization, Patent Owner **does not** acknowledge that Tian teaches “resolution reduction.” (Paper 22, 4).

shows that the reduced-resolution images were obtained from a database. (Paper 17, 7-9; Ex. 2020, ¶¶ 4-9; Ex. 2001, ¶¶ 48-49).

The Petition’s only support is Doermann’s conclusory opinions. Doermann opines: “Tian creates lower-resolution images by down-sampling from original images and analyzes multiple different resolutions.” (Ex. 1003, ¶ 119, *cited by* Pet. 26). Doermann’s opinion merely repeats the Petition’s attorney argument without a basis or explanation for the opinion. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9, 15 (PTAB Aug. 24, 2022) (“conclusory and unsupported” expert testimony is entitled to “little weight”). Doermann observes: “Tian illustrates example images in reduced resolutions,” citing to Table 1:

Table 1: An example in five different resolutions from Cohn-Kanade database. The head region is cropped for display purpose only. The lower resolution images are down-sampled from the originals.



Doermann summarily concludes: “Therefore, Tian teaches reducing the resolution of an image to obtain a reduced-resolution image.” (Ex. 1003, ¶ 119). Doermann provides no argument or evidence explaining why Tian’s statement teaches creating the reduced-resolution images as opposed to obtaining them from some other source.

Petitioner's Reply adds a second sentence of Tian for allegedly teaching resolution reduction, namely Table 1's caption: "An example in five different resolutions from Cohn-Kanade database." *Tian*, 000002. Petitioner argues, with only attorney argument, that "'in five different resolutions' and 'from Cohn-Kanade database' both modify 'example.'" (Paper 22, 6). Patent Owner's expert, Saber, disagrees, explaining why he believes a POSITA would read the caption for Table 1 as "indicating all images, including the lower resolution images, come 'from the Cohn-Kanade database.'" (Ex. 2020, ¶ 5, ¶¶ 4-11 (explaining why Tian does not teach resolution reduction); Paper 17, 3-9 (same); Ex. 2001, ¶¶ 48-49)). The caption is properly read as illustrating five example images of a subject's head region, in five different resolutions, from the Cohn-Kanade database. The referenced sentence does not state the Tian system performs the actual resolution reduction.

Petitioner argues that Ex. 1031 (a belatedly introduced reference cited by Tian as describing the Cohn-Kanade database) gives the as-digitized image size of 640x480 "without mentioning any reduced resolutions..." (Paper 22, 7). Doermann similarly argues that Ex. 1031 and Tian describe the original pixel array as 640x480 "without mentioning other resolutions." (Ex. 1034, ¶ 2, ¶ 4 (discussing Ex. 1031)). Regarding a current (i.e., 2024) version of the database, Doermann opines, "I did not find reduced-resolution images in the database." (Ex. 1034, ¶ 4). Doermann concludes this "confirms my understanding that Tian obtains original images from

this database and creates reduced-resolution images by down-sampling.” *Id.*; Paper 22, 7-8.

As discussed below, Petitioner’s arguments as to how Tian should be interpreted are predicated on a failure of Tian to mention resolutions other than the original image size. Petitioner thus does not satisfy its burden to show Tian teaches the affirmative step of reducing the resolution of the images.

**2. *This Board’s Precedent Compels Finding No Unpatentability
When the Prior Art’s Teachings Are Ambiguous***

Petitioner’s two sentences from Tian do not teach actually reducing the resolution and are, at the least, ambiguous. The Parties’ declarants present conflicting opinions regarding how a POSITA would understand the sentences. *Cf.* Ex. 1003, ¶ 119, Ex. 1034, ¶¶ 2-4, *with* Ex. 2020, ¶¶ 4-11, Ex. 2001, ¶¶ 46-50. Petitioner resorts to arguing that the **failure** of Tian or Ex. 1031 to mention resolutions, other than the original resolution size, is evidence that Tian performs resolution reduction. (Ex. 1034, ¶ 2; Paper 22, 7).

Because of Tian’s ambiguities, a POSITA would not have recognized the significance of and relationships between the teachings of the cited prior art to achieve the claimed subject matter without hindsight knowledge of the claimed invention. Under similar facts, the Board found the claims not unpatentable because the prior art was ambiguous, there was conflicting testimony of expert declarants, and there was no other persuasive evidence supporting Petitioner’s reading of the

prior art. *GMG Products LLC v. Traeger Pellet Grills LLC*, PGR2019-00035, Paper 34, 27 (PTAB Aug. 31, 2020). In *GMG*, the dispute centered around whether metadata for an appliance was current metadata “indicating that an appliance is communicably connected with the cloud.” *Id.*, 20-21. The Board noted Petitioner “infer[red]” from the prior art’s disclosure that “there is an intrinsic indication that the information conveyed includes that the appliance is connected to a network....” *Id.*, 22. The Board considered Petitioner’s argument that how metadata is obtained “necessarily reflects current information” but concluded the argument was “speculative” because the art did not preclude other methodologies and that the record was “nebulous.” *Id.*, 25, 23.

The same result is warranted here. Other than Petitioner’s two sentences from Tian and the conclusory statements from Doermann (Ex. 1003, ¶ 119), Petitioner offers no other evidence to support its contention that Tian teaches reducing a resolution. Petitioner does not point to a system architecture in Tian that would perform resolution reduction. *Cf.* Ex. 2020, ¶ 8. Petitioner does not point to anything in Tian that would **preclude** Tian from obtaining reduced-resolution images from an alternative, third-party source. *GMG*, 25 (finding the art was ambiguous in part because there was “no preclusion” of an alternative).

Tian analyzes a data set derived from the Cohn-Kanade database, called the DFAT subset. (Paper 22, 6; *Tian*, 00005). Tian does not state what images, and at

what resolutions, are in the DFAT subset. We do know **some** transformation of the data set occurs from the Cohn-Kanade database to the DFAT subset because the DFAT subset includes fewer images than the Cohn-Kanade database. *Cf. Tian*, 000005 (*Tian* describing 704 sequences from 97 subjects), *with* Ex. 1031, 000006 (describing 1917 sequences from 182 subjects). Petitioner points to no disclosure in *Tian* that precludes the DFAT subset from including the reduced-resolution images. Petitioner identifies no evidence that necessarily requires the POSITA to infer that *Tian* is performing the resolution reduction as opposed to obtaining reduced-resolution images from another source.

In contrast, Patent Owner presented extensive expert opinion explaining why a POSITA would not understand *Tian* to teach resolution reduction. (Paper 17, 3-10; Ex. 2020, ¶¶ 4-11; Ex. 2001, ¶¶ 44-50).

Like in *GMG*, Petitioner asks the Board to **infer** a teaching in *Tian* because neither *Tian* (when discussing the DFAT subset) nor Ex. 1031 mentions resolution sizes other than the original resolution size. (Ex. 1034, ¶ 2; Paper 22, 7). Per Petitioner's logic, the lack of "mentioning other resolutions" means that it must be the case that *Tian* reduces the resolution. (Ex. 1034, ¶ 2; Paper 22, 7-8). In *GMG*, the Board found a similar logic by Petitioner "speculative[.]" *GMG*, 25 (noting the prior art reference does not preclude the appliance is "no longer connected for communication with the cloud").

Because (1) Tian’s teachings are, at the least, ambiguous, (2) the evidence presents conflicting expert testimony regarding the meaning of these few ambiguous sentences from Tian, and (3) Petitioner offers no other persuasive evidence supporting Petitioner’s contentions, Petitioner has not met its burden in proving unpatentability. It is Petitioner’s burden to prove unpatentability by a preponderance of the evidence. *GMG*, 27. Satisfaction of that burden must be based on evidence of record and cannot be based on ambiguous prior art. *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380–81 (Fed. Cir. 2016). Petitioner’s mapping of ambiguous prior art relies on improper hindsight and therefore fails. *Id.*; *Ex Parte Newton et al.*, Appeal 2018-004205, 6 (PTAB Dec. 26, 2019) (upholding patentability where the prior art was ambiguous); *Ex Parte Newton et al.*, Appeal 2018-004161, 6 (PTAB June 18, 2019) (noting “the references are not explicitly clear,” and did not establish that a skilled artisan would have recognized the significance of and relationships between the teachings in prior art to achieve the claimed subject matter).

B. Petitioner’s Late, Changing Theories of Unpatentability Must Be Rejected

Petitioner seemingly realizes the ambiguity of Tian’s teachings and introduces—for the first time in its Reply—a new theory as to how Tian teaches resolution reduction. (Paper 22, 4-5). Petitioner argues Tian’s lack of structure for resolution reduction “does not negate the **obviousness** of doing so **in light of Tian’s teachings.**” *Id.*, 5 (emphases added).

First, Petitioner asserts for the first time that Tian would render resolution reduction **obvious**, as opposed to the Petition’s original claim that Tian **teaches** resolution reduction. (Paper 2, 26). Petitioner’s new obviousness theory must be rejected. *Juniper Networks, Inc. v. Swarm Tech. LLC*, IPR2021-01445, Paper 62, 29 (PTAB Feb. 7, 2023) (declining a new theory of obviousness advanced in Petitioner’s Reply); *Tesla, Inc. v. Charge Fusion Techs., LLC*, IPR2022-01217, Paper 29, 15 (PTAB Jan. 17, 2024) (finding preponderance of the evidence not supporting Petitioner’s assertions of the prior art’s teachings, noting Petitioner relies on the art’s express teachings and does not assert obviousness of the claim limitation, and that “[o]ur decision is limited to the particular basis for the challenge advanced by Petitioner”); *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016).

Second, if Petitioner is arguing that Tian **inherently** teaches resolution reduction, this is a new argument that was not presented in the Petition and should be rejected. “Inherency...may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *PAR Pharma., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1195 (Fed. Cir. 2014) (citation omitted). Petitioner provides no evidence or argument establishing that Tian necessarily performs the resolution reduction.

C. Obtaining the Reduced-Resolution Images from Another Source Does Not Satisfy the Claim Limitation

Petitioner argues “[n]one of the claims at issue limit resolution reduction to a certain time or stage of processing.” (Paper 22, 4-5). Petitioner relies on an incorrect interpretation of the claims, as the claims require an audience measurement system/method that analyzes a sequence of images “obtained by a camera while the media content corresponding to the content identifying data is presented by the television” (Ex. 1001, Claim 1) and “reduce a resolution” of a first image from the sequence of images (Claim 4). The resolution reduction must occur as part of the overall system/method of analyzing images taken while media content is presented to the audience member. (Paper 17, 10-13). Claim 5, for example, further confirms that the resolution reduction must occur during the media content exposure, as the facial signature of a second image is generated based on a location of the head in the first image (i.e., the reduced-resolution image). The steps of claim 5 could not be performed if the pre-reduced-resolution image was obtained from another source. Petitioner’s argument regarding the time or stage when the resolution reduction is performed is incorrect as inconsistent with the claim language.

II. GROUNDS 1, 3: MOTIVATION TO MODIFY LU-577 OR NIELSEN-372 / STEINBERG

For claims 4, 8, and 11, Petitioner proposes to modify Lu-577 or Nielsen-372/Steinberg with Tian, motivated by saving processing resources without reducing

accuracy. (Paper 2, 27, citing Ex. 1003, ¶ 122; Paper 22, 15-24, pinpoint at 16). The Petition never considers the *increase* in processing resources required by the proposed modification and includes only vague assertions of the claimed savings. *Id.* The Petition thus fails to weigh the advantages versus disadvantages of the modification. In response to Patent Owner’s argument in the POR, Petitioner’s Reply improperly presents new arguments and support for the modification. (Paper 22, 15-18.)

A. Legal Framework for Evaluating Advantages and Disadvantages of the Combination

Where a proposed modification includes both advantages and disadvantages, Petitioner’s burden in establishing the motivation is to provide adequate evidentiary support for how a POSITA would weigh any advantages or disadvantages for the proposed combination. (Paper 17, 20-21 (citing *Oticon Medical AB et al. v. Cochlear Ltd*, IPR2019-00975, Paper 52, 36-41 (PTAB Oct. 14, 2020)). Petitioner has the burden of providing an articulated rationale with rational underpinnings for modifying the prior art references to avoid impermissible hindsight that uses “the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit.” *Comcast Cable Comms., LLC v. Promptu Sys. Corp.*, IPR2018-00341, Paper 58, 19 (PTAB Mar. 29, 2019) (rejecting Petitioner’s motivation to combine and finding claims patentable) (citations omitted). Here, Petitioner has not done so.

Petitioner's Reply also introduces new arguments and evidence for the motivation. Petitioner newly addresses the disadvantages and attempts to reframe previously cited references as evidence of the disadvantages. These arguments and evidence are untimely and should be stricken. *Juniper Networks*, 29.

B. Petitioner Fails to Weigh the Advantages/Disadvantages

Petitioner incorrectly analyzes the computational advantages and disadvantages of the combination. There is a computational cost (disadvantage) in resolution reduction. (Ex. 2020, ¶¶ 38-39 and Ex. 1034, ¶ 7 (Saber and Doermann agreeing there is a computational cost for resolution reduction)). There is a computational cost in performing facial analysis. (Ex. 2020, ¶ 44 and Ex. 1034, ¶ 6 (Saber and Doermann agreeing there is a computational cost for performing facial analysis)). Petitioner argues that the computational cost of performing facial analysis for a reduced-resolution image is less than for a non-reduced-resolution image. (Paper 22, 18). Petitioner also argues that the cost to reduce the resolution is less than the cost to perform the facial analysis on the nonreduced-resolution image. *Id.* However, Petitioner's new arguments for the combination have several errors.

1. Petitioner Error 1

To correctly perform a comparison of the advantages versus disadvantages of resolution reduction prior to facial analysis, the calculus must determine the cost of resolution reduction **plus** the cost of performing facial analysis on the reduced-

resolution image. This total cost must then be compared to the cost of performing facial analysis on the nonreduced-resolution image alone. Fatally to its motivation arguments, Petitioner has not made this comparison.

Instead, Petitioner simply offers the conclusory argument that facial analysis is expensive while resolution reduction is “trivial[.]” (Ex. 1034, ¶ 8; Ex. 1003, ¶ 69). Petitioner makes no showing—even in generalized terms—of whether the cost of reducing resolution is greater than the processing resources for performing facial analysis on reduced versus nonreduced-resolution images. For example, Petitioner should have presented evidence or argument of what the cost difference is between performing facial analysis on reduced versus nonreduced images. Instead of doing this analysis, Petitioner simply generically argues “[t]he processing resources and time can be reduced if the resolution of the image is reduced.” (Ex. 1003, ¶ 69; Paper 17, 26-27 (providing rebuttal to the background references (Exs. 1014-1015) discussed by Doermann at Ex. 1003, ¶ 69, Paper 22, 18)).

The issue is not whether facial analysis is more computationally complex than resolution reduction, as urged by Petitioner. (Paper 22, 16). Rather, the issue is whether the difference in computational cost between facial analysis for reduced- versus nonreduced-resolution images warrants the cost of resolution reduction in the first place. Petitioner flatly states the cost savings “undoubtedly outweigh any processing needed to reduce the resolution.” (Paper 22, 17). This is attorney

argument with no expert declarant support and should be disregarded. *Exacq Techs., Inc. v. Jds Techs., Inc.*, IPR2016-00568, Paper 7, 22 (PTAB June 14, 2016) (noting “Petitioner’s expert does not add materially to Petitioner’s attorney argument...without citation to the evidence that serves as the basis for his opinion”).

Petitioner responds that the combination does not have to be the best option, only a suitable option. (Paper 22, 18). Petitioner’s generic citation to obviousness case law fails to recognize that there is already a suitable option **without** the modification Petitioner proposes (i.e., without resolution reduction). Specifically, resolution reduction prior to facial analysis does not have to be performed to obtain a suitable facial analysis result, as Lu-577 and Nielsen-372 already perform suitable facial recognition.

Doermann also responds by arguing the processing cost for resolution reduction is “trivial” and citing Ex. 1014. (Ex. 1034, ¶ 8; Paper 22, 15). Doermann fails to inform the Board that Ex. 1014 incurs **no** processing cost for down-sampling because Ex. 1014 relies on “dedicated” special-purpose hardware already present in the viewfinder of a digital camera for the subsampled images. (Ex. 1014, 5:21-24 (“Most digital cameras already contain dedicated hardware subsystems to perform image subsampling.”)). None of Tian, Lu-577, or Nielsen-372/Steinberg discloses similar special-purpose hardware. Therefore, reliance on Ex. 1014’s dedicated hardware to support the motivation is inapposite.

2. *Petitioner Error 2*

Petitioner does not analyze the computational cost of pre-processing a down-sampled image, which is required for there to be a reasonable expectation of success in performing facial analysis. An obviousness motivation requires performing sufficient steps to have a reasonable expectation of success.

Patent Owner argued and provided undisputed evidence that the skilled person would understand that down-sampling to obtain a reduced-resolution image introduces artifacts into the image. (Paper 17, 22-24; Ex. 2020, ¶ 38). These artifacts need to be removed, using antialiasing, prior to performing facial analysis. (Ex. 2020, ¶¶ 20-23, 37-39). However, there is a computational cost to performing antialiasing. *Id.*, ¶¶ 38-39. Therefore, the overall cost of resolution reduction is not simply the cost of down-sampling itself. Instead, the overall cost is the cost of down-sampling plus the cost of preprocessing the image (e.g., antialiasing) to render the image suitable for facial analysis. *Id.*, ¶ 39. Petitioner thus fails to correctly calculate the cost of the proposed modification.

Petitioner argues that antialiasing is irrelevant because the claims do not recite antialiasing. (Paper 22, 9-10). Petitioner is not engaging in the correct analysis. The obviousness analysis requires determining whether there would be a motivation for the combination, i.e., a reason *why* the skilled person would want to perform resolution reduction prior to facial analysis. *Key Safety Sys., Inc. v. Am. Vehicular*

Scis., LLC, IPR2016-01872, Paper 7, 14-15 (PTAB Apr. 4, 2017). If the skilled person recognizes that preprocessing of the image (e.g., antialiasing) is suitably and desirably done prior to facial analysis to have a reasonable chance of successfully recognizing a face, then the skilled person would only be motivated to perform the proposed combination in conjunction with performing antialiasing. *Natera, Inc. v. NeoGenomics Lab. Inc.*, 106 F.4th 1369, 1378 (Fed. Cir. 2024) (finding “[u]nclaimed factors relevant to the feasibility of creating a useful claimed invention can impact the motivation to combine analysis if a skilled artisan would reasonably consider them.”). Because a POSITA would determine there is no reasonable expectation of success from forgoing preprocessing (e.g., antialiasing) of the down-sampled image, a POSITA would not be motivated to make the combination.

The analysis also asks whether the skilled person would be motivated to put the combination together as proposed by Petitioner. *Key Safety*, 14-15 (Petitioner failed to show a skilled person would have been motivated to assemble the combination as proposed). This analysis must account for steps, even if unclaimed, that would be known and expected for a useful combination. Here, the skilled person would find Petitioner’s combination unsuitable and undesirable for performing the claimed facial analysis without antialiasing. (Ex. 2020, ¶¶ 20-23, 37-39; Paper 17, 17-40).

Petitioner’s argument that antialiasing is not needed because Tian does not describe performing antialiasing (Paper 22, 10) is meritless because Tian does not include *any* discussion of performing the resolution reduction process, let alone the applicable preprocessing techniques. (*See* Ex. 1005 *generally*.)

3. *Petitioner Error 3*

In arguing that the “resource savings outweigh any purported cost[,]” Petitioner points to the steps for performing face detection, including feature extraction. (Paper 22, 16). Petitioner then argues that “[h]ead orientation determination also requires feature extraction[,]” and that feature extraction “includes computing convolution multiple times...for each pixel.” *Id.* Petitioner’s highlighting of convolution-based methodologies for head orientation determination is not consistent with Tian, which discloses utilizing neural networks to estimate head pose (i.e., head orientation determination). *Tian*, 000002 (“Then a three-layer neural network (NN) is employed to estimate the head pose.”). Hence, Petitioner improperly analyzes the cost for facial analysis using a convolution-based algorithm not discussed in Tian, while Tian teaches a suitable neural-network algorithm that Petitioner ignores. (Paper 22, 16; Ex. 1034, ¶ 6). Petitioner does not provide any cost analysis whatsoever of Tian’s approach. As a result, Petitioner fails to weigh whether using Tian’s neural network methodology would have less computational cost on a reduced-resolution image than Petitioner’s proposed convolution method.

4. *Petitioner Error 4*

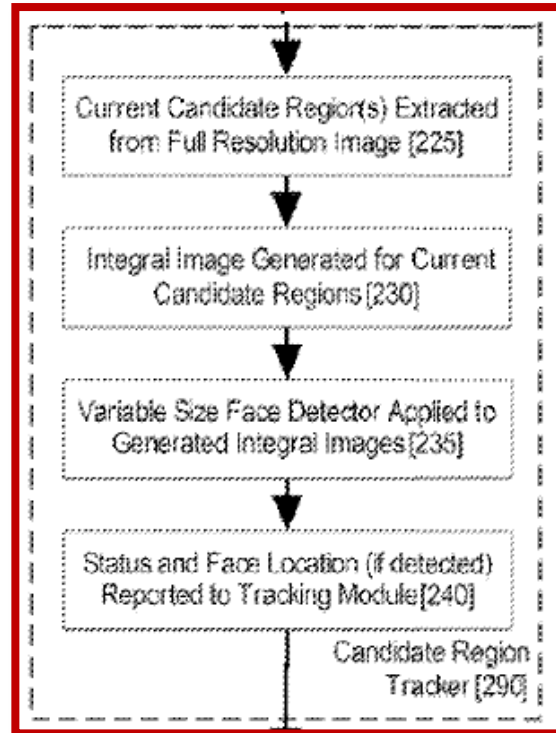
Petitioner's combination performs resolution reduction regardless of whether a head is detected in the image because head detection is performed on reduced-resolution images. Resolution reduction is thus performed **for every frame**, while face recognition can only be skipped **for some frames**, but Petitioner completely ignores the computational cost of resolution reduction. Any weighing of the benefits and the drawbacks must account for the fact that the resolution-reduction process would be performed more often than the head-orientation determination process could be skipped, even if the latter were more computationally expensive each time it was run. Thus, the weighing of the advantages and the drawbacks is significantly more complex than Petitioner's simple assertion that the advantages "easily outweigh" the disadvantages. (Paper 22, 18). Because Petitioner offers no evidence of the net computational cost of its modification, Petitioner fails to account for the drawbacks and thus fails to meet its burden.

C. Reducing the Resolution Runs Counter to Conventional Wisdom

The evidence shows that in the prior art, performing facial analysis on high-resolution images is more accurate and desirable, thus discouraging resolution reduction prior to facial analysis. (Paper 17, 18; Ex. 2018, 71:1-9 (Doermann agreeing image analysis on higher-resolution images would "[o]f course" improve results); *Tian*, 000002 (Tian suggesting that conventional approaches rely on

performing facial analysis on “very high resolution faces”). “[P]roceeding contrary to the accepted wisdom...is ‘strong evidence of unobviousness.’” *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 668 (Fed. Cir. 2000) (citation omitted).

Petitioner counters that Ex. 1014 teaches “intentionally reducing the resolution.” (Paper 22, 15). Petitioner is mistaken, as Ex. 1014 uses full-resolution images when performing face detection. Ex. 1014 uses a “fast face detector” that determines “candidate regions” based on subsampled images generated as preview images for a camera display. (Ex. 1014, 5:21-24). However, these “candidate regions” must subsequently be confirmed/rejected as including/not including a face by **full-resolution** “variable size face detection[.]” *Id.*, 6:44-51, FIG. 2.



(Ex. 1014, FIG. 2 (excerpt) (showing that the candidate regions are analyzed at full-resolution to perform face detection and tracking)). Thus, Ex. 1014's subsampled images are available **at no additional processing cost** (because they are present for preview purposes), and Ex. 1014 **still** performs facial analysis on full-resolution images to maintain acceptable performance.

Thus, Ex. 1014 provides no evidence rebutting the conventional wisdom that facial recognition would be performed on high-resolution images. Consequently, Petitioner's modification of intentionally reducing the resolution prior to facial recognition would not be obvious.

III. GROUND 1: MOTIVATION TO MODIFY LU-577 TO PERFORM HEAD POSE DETERMINATION

Petitioner's motivation for modifying Lu-577 to perform head orientation determination is that performing face recognition only when the head is oriented toward the camera would provide higher accuracy. (Paper 22, 21-22). Petitioner argues that every failure to recognize an audience member would result in an identification of the wrong person. (Paper 22, 21).

A **misidentification** of a face is not the same as **failure to identify** the face. *Cf.* Ex. 2020, ¶ 44 (Saber explaining that obscured facial features for certain frames in a video sequence may cause identification to *fail*, not misidentify the audience member). To match, the correlation between the candidate and reference images must exceed a predetermined threshold. (Ex. 1008, 7:55-58). If no audience member

exceeds that threshold, a “no recognition” result is returned, not a misidentification. *Id.*, 8:65-67. By failing to consider the possibility of a “no recognition” result, Petitioner again fails to weigh the advantages and disadvantages of the proposed modification correctly. Petitioner thus does not establish that a POSITA would have a reasonable expectation of success in combining the prior art as Petitioner proposes.

IV. GROUNDS 1, 3: THE COMBINATION DOES NOT TEACH CLAIMS 5, 6, 12, 19

Patent Owner separately argues the patentability of claims 5, 6, 12, and 19, which require a two-frame process for facial recognition. Broadly, the claims require (1) identifying the location of a head in a first frame; and (2) using the identified head location from the first frame to perform facial recognition in a second frame. (Paper 17, 13). Using claims 5-6 as representative:

5. The audience measurement system of claim 4, wherein the processor circuitry is to determine the audience identification information by: (i) generating a facial signature from a region of a second image of the one or more of the images corresponding to a location of the head in the reduced-resolution image, and (ii) comparing the generated facial signature to a database of facial signatures.

(Ex. 1001, Claim 5).

6. The audience measurement system of claim 4, wherein the processor circuitry is to:
identify a region corresponding to the head within the first image from which the reduced-resolution image was obtained;
analyze a portion corresponding to the identified region of a second image; and
based on the analysis of the region of the second image, determine that the head matches the known person.

Id., Claim 6.

Petitioner's combinations fail to teach the claimed two-frame process. Tian instead tracks the head location in every frame and uses the identified head location from the *second* frame to perform face recognition in the second frame rather than using the head location from the *first* frame (i.e., a single-frame recognition process).

Petitioner argues that because the location of the audience member's head may not change between frames, then whenever the head does not change location, Tian's single-frame process satisfies the two-frame requirement of the claims. (Paper 22, 11-14). Petitioner also argues that Patent Owner's two-frame interpretation of the claims improperly imports a negative limitation into the claims.

Petitioner's claim interpretation contradicts one of the fundamental canons of claim construction by rendering claim language meaningless and failing to give effect to every word of the claim. *In re Power Integrations, Inc.*, 884 F.3d 1370,

1376 (Fed. Cir. 2018). Petitioner’s interpretation entirely reads out claim 5’s region “corresponding to the location of the head in the reduced-resolution image” and claim 6’s “corresponding to the identified region.” Applying Petitioner’s interpretation, *any* region of the second image can be analyzed to perform facial recognition because that location *could sometimes* correspond to the location of the head in the first image. The two-frame interpretation properly gives effect to the words of the claim by requiring that the identified head location from the first frame is used to perform facial recognition in a second frame.

V. GROUND 3: PROPOSED COMBINATION OF NIELSEN-372 AND STEINBERG

Patent Owner iterates its POPR argument discussing the claimed “camera” mapped to Nielsen-372’s ON/OFF detector that includes a camera. (Paper 6, 46-57). The Board’s ID rejected this argument and found the Petition mapped the claimed “camera” to Steinberg’s camera. (Paper 10, 42-43). The POR explained why the Petition mapped Nielsen-372’s camera. (Paper 17, 44-48, citing Ex. 1003, ¶¶ 199-200).

Doermann repeatedly opined that the combination implements Steinberg’s approach on Nielsen-372’s local metering system, including the Nielsen-372 camera:

- “A POSITA would have found it obvious to implement Steinberg’s approach on Nielsen-372’s people meter or other components of the local

metering system because Nielsen-372's system includes hardware needed to implement Steinberg's approach." (Ex. 1003, ¶ 199).

- "Nielsen-372's local metering system includes a camera....A POSITA would have found it obvious to implement [Steinberg's approach] on **either the computer or the camera of Nielsen-372[.]**" *Id.*, ¶ 200.
- "A POSITA would have had a reasonable expectation of success...given that Nielsen-372 provide[s] the hardware architecture for performing Steinberg's face recognition method.... [T]he combination simply implements Steinberg's teachings about facial analysis [] in Nielsen-372's system." *Id.*, ¶ 203.

Petitioner's Reply states "Nielsen-372 provide[s] the hardware architecture for performing Steinberg's face recognition method..." (Paper 22, 27, quoting Ex. 1003, ¶ 203). Under the theory repeated in Petitioner's Reply, Petitioner's mapping relies on using Nielsen-372's camera, **which is pointed at the television and not at the audience**, and does not work for determining audience members using facial recognition. (Paper 6, 50-52).

Petitioner first argues that Patent Owner's argument is improper bodily incorporation, as it focuses on where a specific camera in Nielsen-372's system is pointing at. (Paper 22, 28). Petitioner's argument, however, ignores that Nielsen-372 is the primary reference that indisputably already teaches the camera pointing at the

television. *Nielsen-372*, [0050]. There is no bodily incorporation because Nielsen-372 includes the teaching, i.e., a camera, relied on by Petitioner. (Paper 17, 44-45).

In this argument, Petitioner confirms it is not proposing “turning the Nielsen-372[] camera away from the television.” (Paper 22, 28). Petitioner instead argues that a POSITA could have added another camera to the system or utilized a camera with image sensors for a wide field of view. *Id.* Both arguments are new theories that should be rejected. *Apple Inc. v. Qualcomm, Inc.*, IPR2018-01252, Paper 28, 27-28 (PTAB Jan. 22, 2020) (declining to consider Petitioner’s new theory in Reply). Further, if Nielsen-372’s camera continues facing the television, then Petitioner’s combination needs a second camera to point to the audience members or a special-purpose (e.g., 360°) camera replacing the main camera. If Petitioner’s mapping included such a camera, then Petitioner should have stated such and included a motivation for adding such a camera, which would have increased the costs of the system. Petitioner provides no support that such a camera was intended.

Second, Petitioner contends (1) Nielsen-372’s use of the camera is optional because Nielsen-372 includes embodiments that determine content based on audio, and (2) therefore, not using Nielsen-372’s camera to capture images of the television is “not inconsistent with the purpose and intended operation” of Nielsen-372. (Paper 22, 28). This argument fails because the sole intended purpose and operation of

Nielsen-372's camera is as an ON/OFF detector facing the television. (Paper 6, 50-52).

Finally, Petitioner argues that Nielsen-372 is not a “voluntary audience measurement system” because it fails to use those words verbatim and uses permissive language to describe prompting audience members to identify themselves. (Paper 22, 28-29). Petitioner does not point to any embodiments that automatically identify audience members. *Id.* Changing from voluntary audience measurement to automatic audience measurement would change the principle of operation, and the evidence of Saber's opinion that such a change might cause audience members to reconsider their participation is undisputed. Petitioner's proposed modification to the system of Nielsen-372 would change its principle of operation and would not be obvious.

VI. GROUNDS 1, 3: NON-ANALOGOUS ART

Petitioner's sole argument that Tian and Steinberg are analogous art is that they share a common field of endeavor. (Paper 2, 4-6 (not arguing that the prior art is reasonably pertinent to the problem solved by the inventor)). Petitioner's field-of-endeavor argument conflates the definition of a POSITA with the field of endeavor of the challenged patent. (Paper 22, 29-30). The field of endeavor of a patent is determined “by reference to explanations of the invention's subject matter in the patent application, including the embodiments, function, and structure of the claimed

invention.” *Netflix, Inc. v. DivX, LLC*, 80 F.4th 1352, 1359 (Fed. Cir. 2023). The explanation of the field in the ’243 Patent relates to audience measurement. (Paper 17, 60-61; Ex. 1001, 1:37-39, 1:43–2:3, claims 1, 9, and 16 (preambles)). By contrast, Petitioner’s asserted field of endeavor is untethered to the ’243 Patent.

Saber qualifies as a POSITA because he has the knowledge of “a hypothetical person who is presumed to know the relevant prior art.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). That Saber’s knowledge goes beyond “audience measurement” (Paper 22, 29-30) to include prior art generally related to image processing does not make the field of endeavor of the ’243 Patent broader. The field of endeavor of a patent does not change based on the qualifications of an expert opining on the patent. Petitioner’s arguments are meritless and should be disregarded.

VII. GROUND 1: INCORPORATION OF LU-000 AND LERT’S EMBODIMENTS INTO LU-577

Petitioner argues Lu-577 does not disparage the approach of Lert. (Paper 22, 25). Lu-577 discusses Lert as an audience measurement approach prior to the switchover in 2006 from analog broadcasting to digital. (Paper 17, 43-44; Ex. 1004, [0007]). After this switchover, “[c]hanges in the methods of measuring the reception of television or radio programming are required....” *Id.* Per Lu-577, Lert’s method of “extraction of a characteristic feature signature” (*id.*, [0004]) to identify

programming will be adversely impacted. *Id.*, [0007]. Lu-577 suggests Lert's techniques will be ineffective after the switchover from analog to digital video.

“A reference teaches 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 in the claim.” *Meiresonne v. Google, Inc.*, 849 F.3d 1379, 1382 (Fed. Cir. 2017). A POSITA reading Lu-577 around 2011 ('243 Patent priority date) would see that the techniques taught by Lert had not been effective since 2006 and would be led to seek out one of Lu-577's “change[d] ... methods of measuring the reception of television or radio programming” for the post-changeover world rather than relying on Lert. (Ex. 1004, [0007]). Lu-577 thus teaches away from the techniques taught by Lert.

VIII. CONCLUSION

Patent Owner requests the patentability of the non-disclaimed, Challenged Claims be maintained.

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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, Annu Rev Neurosci. 2008, 31, 411-437
Exhibit 2013	<i>Stipulation and Proposed Order Regarding Claim Construction</i> , October 30, 2023
Exhibit 2014	DSP, Chapter 4 - Oppenheim
Exhibit 2015	Text Extraction, Enhancement and OCR in Digital Video
Exhibit 2016	US Patent Application Publication No. US2007/0257934A1 to Doermann, et al.
Exhibit 2017	Camera-based analysis of text and documents: a survey
Exhibit 2018	Deposition Transcript of Dr. David Scott Doermann
Exhibit 2019	Declaration of Megan J. Redmond
Exhibit 2020	Supplemental Declaration of Dr. Eli Saber
Exhibit 2021	<i>Machine Analysis of Facial Behavior: Naturalistic and Dynamic Behavior</i> , Maja Pantic, The Royal Society, 2009
Exhibit 2022	<i>Super-Resolution Reconstruction and Its Future Research Direction</i> , Patanavijit, 2009

Exhibit 2023	<i>Analysis and Comparison of Various Image Downsampling and Upsampling Methods</i> , Abdou Youssef, Department of EECS, December 1998
Exhibit 2024	<i>1/2.5 Inch 5Mp CMOS Digital Image Sensor</i> , Aptina Imaging
Exhibit 2025	<i>Aliasing</i> , Bruno Olshausen, October 10, 2000
Exhibit 2026	U.S. Patent No. 7,697,012 to Lee et al. (“ <i>Lee '012</i> ”)
Exhibit 2027	U.S. Patent No. 7,298,866 to Lee (“ <i>Lee '866</i> ”)
Exhibit 2028	U.S. Patent Application Publication No. 2012/0281028 to Orlick et al. (“ <i>Orlick</i> ”)
Exhibit 2029	<i>Quadrature Prefiltering for High Quality Antialiasing</i> , Guenter et al., Georgia Institute of Technology, October 1996
Exhibit 2030	European Patent No. 0694188 to Arbeiter et al. (“ <i>Arbeiter</i> ”)
Exhibit 2031	<i>Filtering by Repeated Integration</i> , Paul Heckbert, ACM, Vol. 20, No. 4, 1986
Exhibit 2032	<i>Using the Convolution Filter Process</i> , Release 9.2, April 14, 2008
Exhibit 2033	<i>Convolution Algorithms</i> , Sidney Burrus, April 10, 2010
Exhibit 2034	<i>Face Recognition Algorithms</i> , Universidad del Pais Vasco, June 16, 2010
Exhibit 2035	<i>Facial Feature Based Head Tracking and Pose Estimation</i> , Jari Hannuksela, Department of Electrical and Information Engineering, University of Oulu, 2003
Exhibit 2036	<i>Is Your TV Too Big for Your Room?</i> , Ann Porter, October 3, 2007
Exhibit 2037	<i>Sectional Sofa With Two Pillows</i> , https://ilovebbcsmlife/product_details/83389857.html
Exhibit 2038	<i>Face Detection and Tracking Techniques: A Review</i> , Intl. Journal of Advanced Research in Computer Science, Vol. 2, No. 5, October 2011

CERTIFICATION OF WORD COUNT

The undersigned certifies pursuant to 37 C.F.R. § 42.24 that the foregoing Patent Owner's Sur-Reply to Petitioner's Reply, 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 5,583 words according to the word-processing program used to prepare this document (Microsoft Word).

Dated: September 4, 2024

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing PATENT OWNER'S SUR-REPLY TO PETITIONER'S REPLY was served on September 4, 2024, by email on the following counsel of record for Petitioner:

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