

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SAMSUNG ELECTRONICS CO., LTD., and  
SAMSUNG ELECTRONICS AMERICA, INC.,  
Petitioner,

v.

IMAGE PROCESSING TECHNOLOGIES LLC,  
Patent Owner.

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Case IPR2017-01189  
Patent 6,959,293 B2

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Before JONI Y. CHANG, MICHAEL R. ZECHER, and  
JESSICA C. KAISER, *Administrative Patent Judges*.

CHANG, *Administrative Patent Judge*.

DECISION

Denying Institution of *Inter Partes* Review  
35 U.S.C. § 314(a) and 37 C.F.R. § 42.108

## I. INTRODUCTION

Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc., (collectively, “Petitioner”) filed a Petition requesting an *inter partes* review of claims 2–17, 20, 21, and 23–28 (“the challenged claims”) of U.S. Patent No. 6,959,293 B2 (Ex. 1001, “the ’293 patent”). Paper 2 (“Pet.”). Image Processing Technologies LLC (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”).

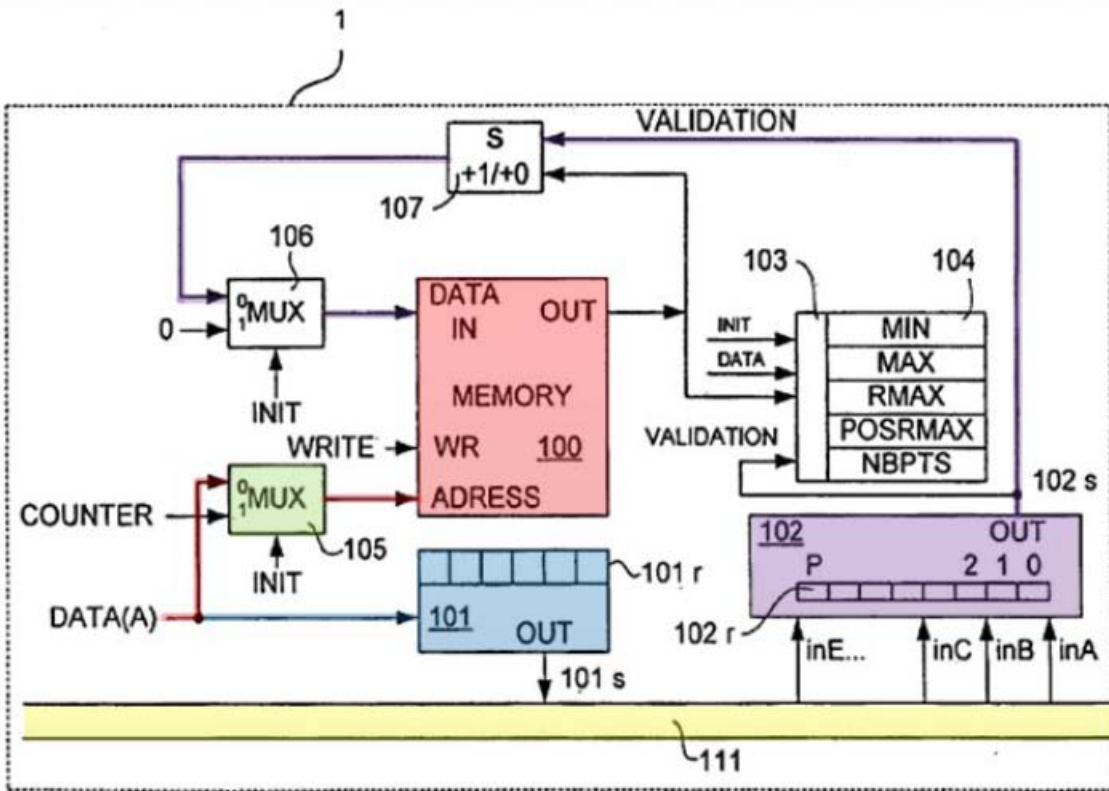
Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless the information presented in the petition “shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” For the reasons that follow, we determine that Petitioner has not established a reasonable likelihood that it would prevail with respect to the challenged claims. We hereby decline to institute an *inter partes* review as to the ’293 patent in this proceeding.

### A. Related Matters

The parties indicate that the ’293 patent is involved in *Image Processing Techs., LLC v. Samsung Elecs. Co.*, Case No. 2:16-cv-00505-JRG (E.D. Tex.) and Case IPR2017-00336. Pet. 2; Paper 4, 2.

### B. The ’293 Patent

The ’293 patent describes a visual perception device, particularly a device for processing image signals using self-adapting histogram calculation units. Ex. 1001, 1:6–10. Figure 3 of the ’293 patent illustrates a passive histogram calculation unit, and is reproduced below with highlighting added by Petitioner (Pet. 6).

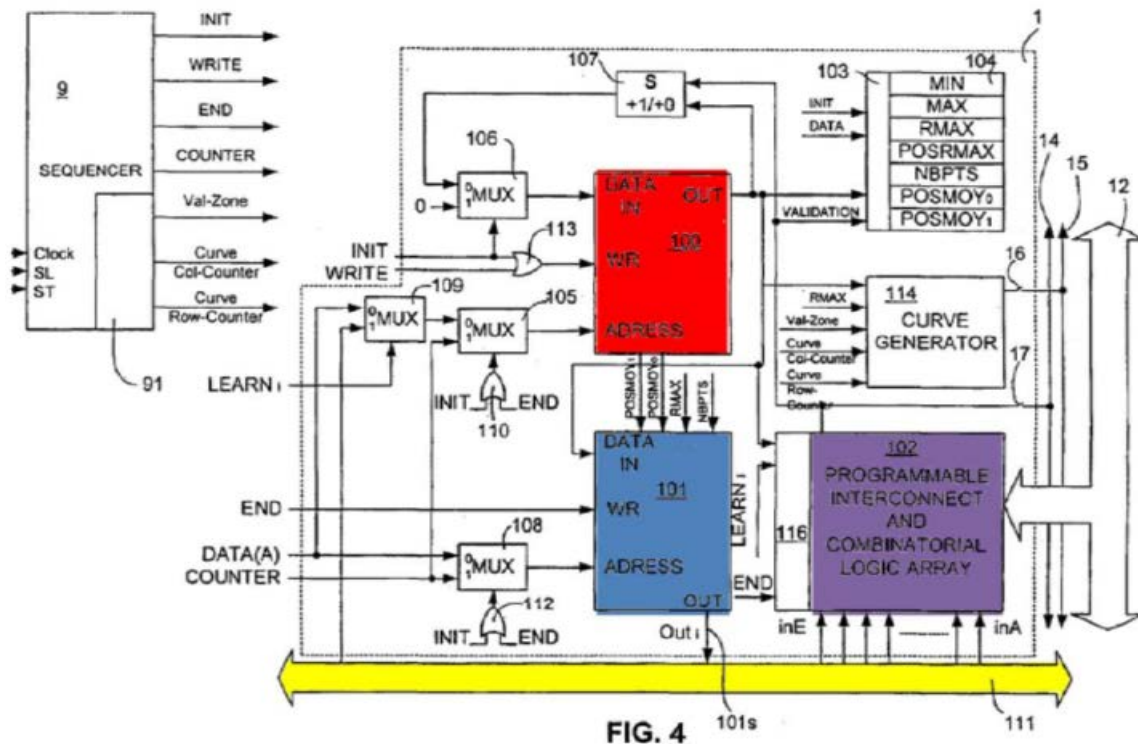


As shown in highlighted Figure 3 above, histogram calculation unit 1 includes analysis memory 100 (highlighted in red), address multiplexer 105 (highlighted in green), data input multiplexer 106, incrementation unit 107, classifier 101 (highlighted in blue), time coincidences unit 102 (highlighted in purple), and test unit 103, which is connected to analysis output registers 104. Ex. 1001, 8:37–43, 9:51–54. Output of classifier 101 is connected to bus 111 (highlighted in yellow). *Id.* at 9:36.

Analysis output registers 104 receive and store statistical information prepared on the basis of the values of parameter A of signal DATA(A) for each frame. *Id.* at 9:51–57. In particular, after processing a complete frame, statistical information representative of this frame is produced and stored in analysis output registers 104. *Id.* at 10:1–14. This statistical information

includes minimum values (MIN) and maximum values (MAX) of the histogram, the number of points (NBPTS) of the histogram, the position (POSRMAX) of the maximum of the histogram, and the number of points (RMAX) at the maximum of the histogram. *Id.* These features are determined in parallel with the formation of the histogram by test unit 103.

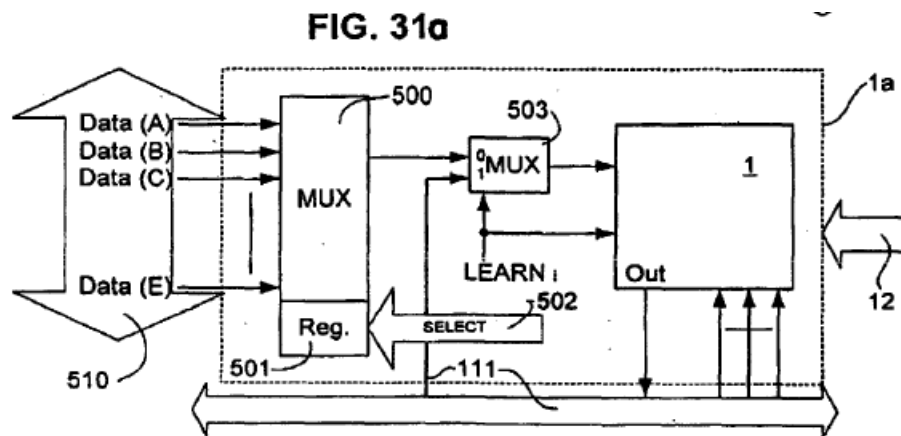
Figure 4 of the '293 patent illustrates a self-adapting histogram calculation unit with anticipation and learning functionalities, and is reproduced below with highlighting added by Patent Owner (Prelim. Resp. 8).



According to the '293 patent, in the self-adapting embodiment illustrated in Figure 4, the content of the memory of classifier 101 is updated automatically. Ex. 1001, 11:14–29. To implement the self-adapting function (i.e., real-time updating of classifier 101), classifier 101 has an

addressable memory whose writing is controlled by signal END, which is generated by sequencer 9. *Id.* Histogram calculation unit 1 also includes selection circuit 110 (e.g., an “OR” gate), receiving as its input signals INIT and END and whose output is connected to the selection input of address multiplexer 105. *Id.*

Figure 31a of the '293 patent illustrates a polyvalent histogram calculation unit that can be programmed to process more than one parameter, and is reproduced below (*id.* at 21:18–36).



As shown in Figure 31a above, polyvalent histogram calculation unit 1a comprises histogram calculation unit 1, input multiplexer 500, associated register 501, and learning multiplexer 503. *Id.* In this embodiment, it is possible to use a single histogram calculation unit to process any of parameters Data (A) – Data (E), which are addressed by bus 510 in relation to SELECT command 502. *Id.* at 20:58–66. Additionally, polyvalent histogram calculation units can be operated in a matrix. *Id.* at 21:37–42.

*C. Illustrative Claim*

Of the challenged claims, claims 3, 23, and 28 are independent. Although claim 2 depends from claim 1 and claims 20 and 21 depend from claim 18, claims 1 and 18 are not being challenged in this proceeding. Claims 4–17 depend from claim 3; and claims 24–27 depend from claim 23. Claim 3 is illustrative:

3. A visual perception processor, comprising:

data bus;

a time coincidences bus; and

two or more histogram calculation units that receive the data DATA(A), DATA(B), . . . DATA(E) via the data bus and supply classification information to the single time coincidences bus,

wherein at least one of said two or more histogram calculation unit processes data  $a_{ijT}$  associated with pixels forming together a multidimensional space (i, j) evolving over time and represented at a succession of instants (T), wherein said data reaches said at least one calculation unit in the form of a digital signal DATA(A) in the form of a succession  $a_{ijT}$  of binary numbers of n bits associated with synchronization signals enabling to define the given instant (T) of the multidimensional space and the position (i, j) of the pixels in this space, to which the signal  $a_{ijT}$  received at a given instant (T) is associated, said unit comprising:

an analysis memory including a memory with addresses, each address associated with possible values of the numbers of n bits of the signal DATA (A) and whose writing process is controlled by a WRITE signal;

a *classifier unit* comprising a memory intended for receiving a selection criterion C of the parameter DATA(A), said classifier unit receiving the signal DATA(A) at the input and *outputting a binary output signal having a value that depends on a result of*

*the comparison of the signal DATA(A) with the selection criterion C;*

a time coincidences unit that receives the output signal from the classifier unit and, from outside the histogram calculation unit, individual binary enabling signals affecting parameters other than DATA(A), wherein said time coincidences unit outputs a positive global enabling signal when all the individual time coincidences signals are positive;

a test unit;

an analysis output unit including output memory;

an address multiplexer;

an incrementation enabling unit; and

a learning multiplexer;

wherein a counter of each address in the memory corresponds to the value  $d$  of  $a_{ijT}$  at a given instant, which is incremented by one unit when the time coincidences unit outputs a positive global enabling signal;

wherein the test unit is provided for calculating and storing statistical data processes, after receiving the data  $a_{ijT}$  corresponding to the space at an instant  $T$ , a content of the analysis memory in order to update the output memory of the analysis output unit, wherein the output memory is deleted before a beginning of each frame for a space at an instant  $T$  by an initialization signal;

wherein the *learning multiplexer* is configured to receive an external command signal and initiate an operation according to a *learning mode in which registers of the classifier unit and of the time coincidences unit are deleted* when starting to process a frame, wherein the analysis output unit supplies values typical of a sequence of each of these registers.

Ex. 1001, 26:65–27:59 (emphases added).

*D. Prior Art Relied Upon*

Petitioner relies upon the prior art references listed below.

|       |              |               |            |
|-------|--------------|---------------|------------|
| Pirim | WO 99/36893  | July 22, 1999 | (Ex. 1005) |
| Yoda  | US 5,239,594 | Aug. 24, 1993 | (Ex. 1006) |
| Qian  | WO 99/35606  | July 15, 1999 | (Ex. 1007) |

Martin Eriksson and Nikolaos Papanikolopoulos, *Eye-Tracking for Detection of Driver Fatigue*, IEEE CONFERENCE ON INTELLIGENT TRANSPORTATION, 314–319 (Nov. 12, 1997) (Ex. 1008, “Eriksson”).

*E. Asserted Grounds of Unpatentability*

Petitioner asserts the following grounds of unpatentability (Pet. 3–4):

| Challenged Claims | Basis                 | References         |
|-------------------|-----------------------|--------------------|
| 2, 23, and 28     | § 103(a) <sup>1</sup> | Pirim              |
| 24–27             | § 103(a)              | Pirim and Qian     |
| 20 and 21         | § 103(a)              | Pirim and Eriksson |
| 3–17              | § 103(a)              | Pirim and Yoda     |

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<sup>1</sup> Because the claims at issue have a filing date prior to March 16, 2013, the effective date of the Leahy-Smith America Invents Act, Pub. L. No. 112–29, 125 Stat. 284 (2011) (“AIA”), we apply the pre-AIA version of 35 U.S.C. § 103 in this Decision.

## II. DISCUSSION

### A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b). Under that standard, the terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art, in the context of the Specification. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

In its Petition, Petitioner does not propose any claim construction, but argues that the claim terms should be interpreted according to their ordinary and customary meaning. Pet. 22. In its Preliminary Response, Patent Owner urges us to adopt our claim constructions in Case IPR2017-00336, which also involves the '293 patent. Prelim. Resp. 10–20. We agree with Patent Owner, and hereby incorporate our previous analysis and claim constructions for the purpose of this Decision. *Samsung Elecs. Co. v. Image Processing Techs. LLC*, Case IPR2017-00336, slip op. 10–16 (PTAB May 25, 2016) (Paper 15).

For clarity, we reproduce our claim constructions in the Institution Decision of Case IPR2017-00336 here. Notably, we interpreted the claim element “the histogram calculation units being configured to form a histogram representative of the parameter,” as recited in claim 1, to mean “the at least two histogram calculation units being configured to each form a histogram representative of *at least one common parameter*.” *Id.* at 10–12.

We also interpreted the claim element “a classification unit . . . configured to determine *the data in the histogram* that satisfy a selected criterion” as “a classification unit . . . configured to determine *the data to be included in the histogram* based on satisfying a selected criterion.” *Id.* at 12–14 (emphases added). We further determined that the “statistical information,” as recited in the claim element of claim 18—namely, “wherein classification is performed automatically by processing statistical information associated with the calculated histogram”—must be associated with *the same histogram* for which the classification applies. *Id.* at 14–16.

#### *B. Principles of Law*

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

*C. Level of Ordinary Skill in the Art*

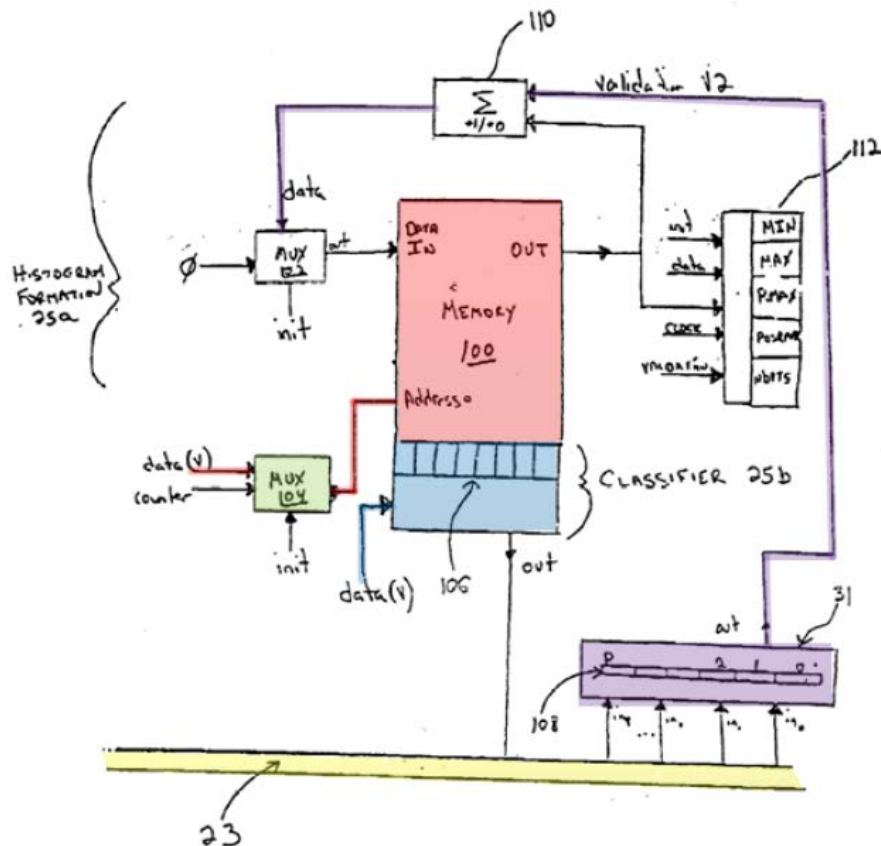
In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (quoting *Custom Accessories, Inc. v. Jeffrey–Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)). In that regard, we do not observe a meaningful differences between the parties’ assessments of a person of ordinary skill in the art at the time of the invention. Pet. 28–29; Prelim. Resp. 9–10. For instance, both the parties agree that such an artisan would have had a degree in electrical engineering or a related field and experience in the field of image processing. *Id.* We further note that either assessment appears consistent with the level of ordinary skill in the art at the time of the invention as reflected in the prior art in the instant proceeding. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). Our analysis in this Decision is supported by either assessment.

*D. Obviousness over Pirim*

Petitioner asserts that claims 2, 23, and 28 are unpatentable under § 103(a) as obvious over Pirim, citing to the Declaration of John C. Hart, Ph.D., for support. Pet. 68–79; Ex. 1002 ¶¶ 140–168. Patent Owner opposes. Prelim. Resp. 32–38. In our discussion below, we first provide a brief overview of Pirim, and then we address the parties’ contentions in turn, focusing on the disputed claim limitations.

## Overview of Pirim

Pirim discloses an image processing system for detecting whether a driver is falling asleep by acquiring pictures of the driver and forming histograms to analyze opening and closing the driver's eyes. Ex. 1005, 3.<sup>2</sup> Figure 14 of Pirim is reproduced below with highlighting added by Petitioner (Pet. 11).



As shown in highlighted Figure 14 above, each histogram formation block 25 has histogram forming portion 25a, which includes memory 100 (highlighted in red) and classifier 25b (highlighted in blue) for selecting the

<sup>2</sup> All references to the page numbers in Pirim are the original page numbers, not the page numbers inserted by Petitioner.

criteria of pixels for which the histogram is to be formed. Ex. 1005, 26–27. Classifier 25b enables only data having selected classification criteria to be considered further. *Id.* at 27. The output of classifier 25b proceeds to bus 23 (highlighted in yellow), which also carries the output of other classifiers in the system. *Id.* at 29. These signals proceed to validation unit 31 (highlighted in purple), which generates a validation signal. *Id.* at 26.

### Claim 2

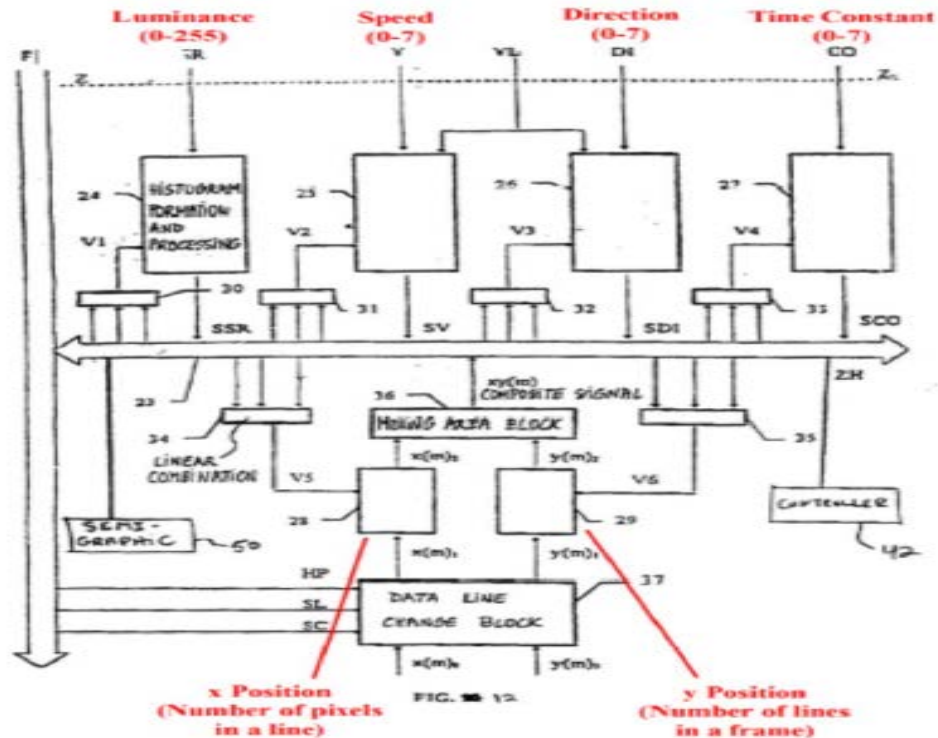
As a dependent claim, claim 2 requires all of the limitations recited in independent claim 1, including “at least two histogram calculation units . . . being configured to form a histogram representative of the parameter.” Ex. 1001, 26:47–50. As discussed above in the claim construction section, we interpret this claim limitation as “the at least two histogram calculation units being configured to each form a histogram representative of *at least one common parameter*.” *See supra* Section II.A.

In this regard, Petitioner acknowledges that Pirim’s histogram units 24–29, as shown in Figure 12, treat *different parameters*, not the same parameter, as required by claim 2. Pet. 72 (citing Ex. 1005, Fig. 12). Nevertheless, Petitioner argues that it would have been “obvious that two histogram units *could process* the same parameter.” *Id.* (emphasis added) (citing Ex. 1002 ¶¶ 144–45). As support, Petitioner notes that Pirim discloses that “each of the histogram formation blocks 24–29 is identical to the others and functions in the same manner.” *Id.* (citing Ex. 1005, 28). According to Petitioner, each of the histogram units “is *capable of* forming a histogram of any of the parameters.” *Id.* (emphasis added).

Patent Owner counters that Pirim does not teach or suggest two histogram calculation units *treating a common parameter*. Prelim. Resp. 32–36. Patent Owner notes that Figure 12 of Pirim shows that each histogram block receives a separate and different parameter. *Id.* (citing Ex. 1005, 75, Fig. 12). Patent Owner argues that the mere possibility that “two histogram units *could* process the same parameter” is not sufficient to render a claim element obvious, especially when Pirim discloses the opposite. *Id.* at 35–36 (citing *In re Giannelli*, 739 F.3d 1375, 1380 (Fed. Cir. 2014) (“In the context of the claimed rowing machine, however, the mere capability of pulling the handles is not the inquiry that the Board should have made; it should have determined whether it would have been obvious to modify the prior art apparatus to arrive at the claimed rowing machine.”)).

We agree with Patent Owner. There is no dispute that Figure 12 of Pirim shows each histogram block processing a *different parameter*. Pet. 70–71; Prelim. Resp. 33–35; Ex. 1005, 27–28, 75, Fig. 12.

Figure 12 of Pirim is reproduced below with annotations added by Patent Owner (Prelim. Resp. 34).



As shown in annotated Figure 12 above, Pirim's histogram formation blocks 24–29 receive input signals for different parameters. Notably, histogram formation block 24 forms histograms for the *luminance values*. Ex. 1005, 27. Histogram formation block 25 forms histograms for *speed* signals; histogram formation block 26 forms histograms for *direction* signals; histogram formation block 27 forms histograms for *time constant* signals; and histogram formation block 28 and 29 form histograms for the *x and y positions* of pixels, respectively. *Id.* at 27–29. In short, each of the histogram formation blocks in Pirim is configured to process a *different parameter*—no two histogram formation blocks are configured to process the same parameter, as required by claim 2.

We are not persuaded by Petitioner’s argument and Dr. Hart’s testimony that “it would be obvious that two histogram units *could* process the same parameter, even if the example of Figure 12 shows them treating different parameters.” Pet. 72; Ex. 1002 ¶¶ 144–45 (emphasis added). As our reviewing court has explained, “obviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.” *Belden Inc. v. Berk-Tek LLC*, 805 F.3d, 1064, 1073 (Fed. Cir. 2015) (citing *InTouch Technologies, Inc. v. VGO Communications, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014)).

Nothing in Pirim suggests a system having two histogram blocks treating the same parameter. In fact, as discussed above, each of Pirim’s histogram blocks is configured to process a different parameter. Petitioner does not direct us to where Pirim teaches or suggests otherwise. Neither Petitioner nor Dr. Hart has articulated why one with ordinary skill in the art would have had a reason to modify Pirim’s system to configure two histogram formation blocks for treating the same parameter. *See KSR*, 550 U.S. at 418 (stressing that it is “important to identify a reason that would have prompted [an ordinarily skilled artisan] to combine the elements in the way the claimed new invention does”).

For the foregoing reasons, we determine that Petitioner has not demonstrated sufficiently that Pirim teaches or suggests at least two histogram calculation units being configured to treat the same parameter, as required by claim 2.

Claims 23 and 28

Claim 23 recites, in relevant part:

wherein the classification unit automatically anticipates values associated with the selected parameter at a next instant of time T2 *based on statistical information associated with the calculated histograms at time T1 and at a previous time T0.*

Ex. 1001, 30:44–48 (emphasis added). Claim 28 recites a similar limitation. *Id.* at 31:6–10.

In regard to this claim limitation, Petitioner argues that Pirim discloses processing statistical information associated with the calculated histogram. Pet. 75 (citing Ex. 1005, 30). Petitioner also asserts that Pirim discloses a system that “includes an anticipation function which enables XMIN, XMAS, YMIN and YMAX to be automatically modified by the system to compensate for the speed and direction of the target,” and that the controller in Pirim may modify these values on a frame-by-frame basis. *Id.* at 76–79 (citing Ex. 1005, 12, 16, 30, 38, Fig. 5; Ex. 1002 ¶¶ 157–68). Petitioner contends that it would have been “obvious to anticipate the value of a parameter at time T2 based on statistical information associated with the calculated histograms at time T1 and at a previous time T0.” *Id.*

In Patent Owner’s view, however, Petitioner fails to show Pirim teaches or suggests that the “classification unit automatically anticipates values associated with the selected parameter . . . *based on statistical information associated with the calculated histograms at time T1 and at a previous time T0.*” Prelim. Resp. 36–38 (emphasis added). Patent Owner avers that XMIN, XMAX, YMIN and YMAX are not “statistical information associated with a calculated histogram,” but are values defining

a “user-defined area,” which causes the histogram formation unit to process pixels only within those boundaries. *Id.* at 37 (citing Ex. 1005, 33). Patent Owner also contends that Petitioner fails to identify “histograms at an instant of time T1 and at a previous instant of time T0,” as required by claims 23 and 28. *Id.* at 38.

We agree with Patent Owner. Petitioner’s contention that it would have been “obvious to anticipate the value of a parameter at time T2 based on statistical information associated with the calculated histograms at time T1 and at a previous time T0” is conclusory. Pet. 75–77. Petitioner fails to establish that the XMIN, XMAS, YMIN and YMAX, in Pirim, are “statistical information associated with *the calculated histograms at time T1 and at a previous time T0*,” as required by claims 23 and 28. *Id.* (emphasis added). Nothing in the cited portions of Pirim suggests that those values are associated with both “calculated histograms at time T1 *and* at a previous time T0.” *Id.* at 77 (emphasis added); Ex. 1005, 12, 16, 30, 38.

The cited portions of Pirim, at best, disclose that those values are information associated with *a single calculated histogram*. *Id.* Petitioner does not articulate why a person of ordinary skill in the art would have had a reason to modify Pirim “to anticipate the value of a parameter at time T2 based on statistical information associated with calculated histograms at time T1 and at a previous time T0.” *Id.* Dr. Hart’s testimony is also unavailing, adding nothing beyond the statements already in the Petition. Ex. 1002 ¶¶ 157–168. Obviousness cannot be established “by mere conclusory statements; instead, there must be some articulated reasoning with some

rational underpinning to support the legal conclusion of obviousness.” *KSR*, 550 U.S. at 418 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

It is Petitioner’s burden to explain how the asserted prior art, Pirim, renders the claims unpatentable. 35 U.S.C. § 312(a)(3); 37 C.F.R. § 42.104(b)(4). Here, Petitioner’s conclusory statement, without further explanation as to how the cited disclosures in Pirim support that conclusion, is insufficient to meet its burden.

In light of the foregoing, we determine that Petitioner has not established adequately that Pirim teaches or suggests a “classification unit automatically anticipates values associated with the selected parameter . . . based on statistical information associated with the calculated histograms at time T1 and at a previous time T0,” as required by claims 23 and 28.

### Conclusion

For the foregoing reasons, Petitioner has not demonstrated that there is a reasonable likelihood that claims 2, 23, and 28 are unpatentable under § 103(a) as obvious over Pirim.

### *E. Obviousness over Pirim and Qian*

Petitioner asserts that claims 24–27 are unpatentable under § 103(a) as obvious over the combination of Pirim and Qian. Pet. 79–83. Claims 24–27, as dependent claims, each incorporate all of the limitations recited in independent claim 23. Petitioner relies upon the same arguments presented above to account for the limitation a “classification unit automatically anticipates values associated with the selected parameter . . . based on statistical information associated with the calculated histograms at

time T1 and a previous time T0,”as recited in claim 23. *Id.* In our analysis above regarding claim 23, we have addressed those arguments, and determine that Petitioner’s arguments are likewise unavailing here. Petitioner does not rely on Qian for any teaching that would remedy the deficiencies discussed above in connection with claim 23. Therefore, Petitioner has not established a reasonable likelihood of prevailing on its assertion that claims 24–27 are unpatentable under § 103(a) as obvious over Pirim and Qian.

*F. Obviousness over Pirim and Eriksson*

Petitioner asserts that claims 20 and 21 are unpatentable under § 103(a) as obvious over the combination of Pirim and Eriksson. Pet. 60–68. Patent Owner opposes. Prelim. Resp. 30–32. In our discussion below, we first provide a brief overview of Eriksson, and then we address the parties’ contentions in turn, focusing on the disputed claim limitations.

Overview of Eriksson<sup>3</sup>

Eriksson discloses an eye-tracking system that uses histograms to identify and track eye movement. Ex. 1008, Abstract, 315.<sup>4</sup> Eriksson locates the eyes using a threshold classifier and an adaptive thresholding method. *Id.* at 316. Starting with a low threshold, if two good eye-regions are found, that threshold is stored, and used the next time the eyes have to be

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<sup>3</sup> An overview of Pirim has been provided previously in the section concerning the obviousness ground based on Pirim alone (Section II.D).

<sup>4</sup> All references to the pages numbers in Eriksson are the original page numbers, not the page numbers inserted by Petitioner.

localized. *Id.* If not, the system automatically uses a higher threshold until the regions are found. *Id.*

Claims 20 and 21

Claims 20 and 21, as dependent claims, each incorporate all of the limitations recited in independent claim 18, including: a classification unit “configured to determine the data in the histogram that satisfy a selected criterion . . . , wherein classification is performed automatically by processing statistical information associated with the calculated histogram.” Ex. 1001, 29:31–35, 43–45. As discussed above in the claim construction section, the “statistical information” used for automatic classification must be associated with *the same histogram for which the classification applies*. See *supra* Section II.A.

In regard to this limitation, Petitioner avers that Pirim discloses processing statistical information associated with the calculated histogram, and Pirim also discloses that “the controller can read the statistical data, can set the values of the classification criteria, and can run a program to do so.” Pet. 64–66 (citing Ex. 1005, 30, 38, 39). Petitioner further argues that Eriksson updates classification thresholds based on previously collected data. *Id.* at 65–66 (citing Ex. 1008, 316; Ex. 1002 ¶¶ 131–33). According to Petitioner, to keep the system working well under a variety of lighting conditions, it would have been obvious to one of ordinary skill in the art to apply Eriksson’s adaptive thresholding to Pirim’s system. *Id.* at 62 (citing Ex. 1002 ¶ 122).

Patent Owner counters that Petitioner has not shown the combination of Pirim and Eriksson teaches or suggests the aforementioned limitation. Prelim. Resp. 30–32. We agree with Patent Owner. In particular, Petitioner does not show sufficiently how Pirim discloses the “classification is performed automatically by processing statistical information associated with the calculated histogram,” as required by claims 20 and 21. Petitioner’s assertion that Pirim discloses “the controller can read the statistical [data,] can set the values of the classification criteria, and can run a program to do so” (Pet. 65) is unsupported by Pirim’s disclosure (Ex. 1005, 30, 38–39). As Patent Owner points out (Prelim. Resp. 31), Petitioner provides no evidence of such a program or configuration in Pirim. Moreover, the cited portions of Pirim do not disclose the statistical information used for automatic classification is associated with *the same histogram for which the classification applies*. Ex. 1005, 30, 38–39. As our reviewing court has articulated, “legal determinations of obviousness, as with such determinations generally, should be based on evidence rather than on mere speculation or conjecture.” *Alza Corp. v. Mylan Labs., Inc.*, 464 F.3d 1286, 1290 (Fed. Cir. 2006).

Petitioner also does not show Eriksson teaches or suggests that the statistical information used for automatic classification is associated with *the same histogram for which the classification applies*. As Patent Owner notes (Prelim. Resp. 31–32), Petitioner acknowledges that the portion of Eriksson on which it relies describes updating “classification thresholds based on *previously collected data*.” Pet. 65–66 (emphasis added) (citing Ex. 1008, 316).

For these reasons, we are not persuaded that Petitioner has shown sufficiently that the combined teachings of Pirim and Eriksson suggest a classification unit “configured to determine the data in the histogram that satisfy a selected criterion . . . , wherein classification is performed automatically by processing statistical information associated with the calculated histogram,” as required by claims 20 and 21. Consequently, Petitioner has not demonstrated that there is a reasonable likelihood that claims 20 and 21 are unpatentable under § 103(a) as obvious over Pirim and Eriksson.

#### *G. Obviousness over Pirim and Yoda*

Petitioner asserts that claims 3–17 are unpatentable under § 103(a) as obvious over the combination of Pirim and Yoda. Pet. 22–60. Patent Owner opposes. Prelim. Resp. 25–29. In our discussion below, we first provide a brief overview of Yoda, and then we address the parties’ contentions in turn, focusing on the disputed claim limitations.

#### Overview of Yoda<sup>5</sup>

Yoda discloses a self-organizing pattern classification neural network system. Ex. 1006, 1:10–15. The neural network system operates in either a classification mode, wherein pattern signals are classified, or a learning mode, wherein the weighting vectors stored in the self-organizing classifiers

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<sup>5</sup> An overview of Pirim has been provided previously in the section concerning the obviousness ground based on Pirim alone (Section II.D).

are modified. *Id.* at 4:44–47. The classifier in Yoda operates in the same way during learning mode but with different inputs. *Id.* at 5:29–36.

### Claims 3–17

Claim 3 recites a *classifier unit* “for receiving a selection criterion C of the parameter DATA(A)” and “outputting a binary output signal having a value that depends on a result of the comparison of the signal DATA(A) with the selection criterion C.” Claim 3 also recites a *test unit* for calculating and storing . . . a content of the analysis memory into order to update the output memory of the analysis output unit.” Claim 3 further recites a *learning multiplexer* that is configured to receive an external command signal, and configured to initiate a learning mode operation “in which registers of the classifier unit and of the time coincidences unit are deleted when starting to process a frame, wherein the analysis output unit supplies values typical of a sequence of each of these registers.” By virtue of their dependency, claims 4–17 also require these limitations. Ex. 1001, 26:65–29:19.

Petitioner takes the position that Pirim discloses a classifier unit (classifier 25b as shown in Figure 14 of Pirim), as recited in claim 3. Pet. 32–33. As support, Petitioner explains that Pirim discloses classifier 25b for comparing parameter data (V) to “register 106 that enables the classification criteria to be set by the user, or by a separate computer program.” *Id.* at 33 (citing Ex. 1005, 27–28). Petitioner also points out that Pirim describes “only data that meets the criteria of the selected class, e.g., speed 2, will result in a classification output of ‘1’.” *Id.* In Petitioner’s

view, Pirim further discloses a test unit (unit 112 as shown in Figure 14 of Pirim) that includes memories for storing statistical data (e.g., the minimum, the maximum, and the number of points in the histogram), as recited in claim 3. *Id.* at 35–36, 40–41.

With respect to the “learning multiplexer” limitation, Petitioner indicates that, although “Pirim discloses that classification criteria may be modified by the computer, it does not describe precisely the process by which such modifications are made.” *Id.* at 23. Nevertheless, Petitioner argues that “[i]t would have been obvious to one of ordinary skill in the art to apply Yoda’s ‘learning mode’ to Pirim’s system in order to improve classifier performance,” citing to Dr. Hart’s testimony for support. *Id.* (citing Ex. 1002 ¶¶ 57–58). Dr. Hart testifies that both Pirim and Yoda are “directed to the same field of target recognition using classifiers to select pixels in an image.” Ex. 1002 ¶ 57. Dr. Hart also testifies that, “[b]ecause Pirim further discloses that the classifiers are capable of being updated by a computer program, one of ordinary skill would have expected such a combination to be successful.” *Id.*

However, neither Petitioner nor Dr. Hart’s testimony explains specifically how or why Yoda’s learning mode would improve Pirim’s classifier performance. Simply stating a general reason to combine the references, such as “to obtain more information” or, as here, improve performance, is insufficient. *See In re NuVasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016) (requiring an articulated specific reason why the additional information would benefit an ordinarily skilled artisan in an obviousness determination). As our reviewing court has explained, reasons to combine

may not consist of mere “conclusory statements,” but instead “must be supported by a reasoned explanation.” *Id.*; see also *ActiveVideo Networks, Inc., v. Verizon Communications, Inc.*, 694 F.3d 1312, 1328 (Fed. Cir. 2012) (“This testimony is generic and bears no relation to any specific combination of prior art elements. It also fails to explain why a person of ordinary skill in the art would have combined elements from specific references *in the way the claimed invention does.*”).

Furthermore, Petitioner and Dr. Hart conflate *combinability* of the references with a *motivation to combine* the references. Pet. 22–23; Ex. 1002 ¶¶ 57–58. Our reviewing court has held such assertions regarding the *combinability* of references, without more, are “insufficient to show persuasively that a relevant artisan would have recognized some deficiency in one reference or had some other reason to motivate looking to the other and combining them.” *Microsoft Corp. v. Enfish, LLC*, No. 2015-1734, 2016 WL 6994254, at \*7 (Fed. Cir. Nov. 30, 2016) (unpublished).

More importantly, as Patent Owner explains (Prelim. Resp. 28–29), Yoda’s weighting vectors are not registers of a classifier unit that “output[] a binary output signal having a value that depends on a result of the comparison of the signal DATA(A) with the selection criterion C,” as required by claim 3. “Classification” as disclosed by Yoda comprises a neural network node function, not a “classifier unit,” as recited in claim 3. Ex. 1006, 4:37–7:6. Yoda’s weighting vectors are not compared with inputs to create a binary output signal, but are used to calculate a non-binary intermediate output  $O_i$ , which is a Euclidean distance formula between the feature vector and the weighting vector. *Id.* at 6:35–46. In short, Yoda’s

output is not a binary classification signal, as required by claim 3, but merely includes scalar values. *Id.* at 5:12–28. Neither Petitioner nor Dr. Hart explains sufficiently how Yoda’s classifier unit teaches this limitation of claim 3, much less how or why a person of ordinary skill in the art would have combined Yoda’s learning mode with Pirim’s classifier unit. *See KSR*, 550 U.S. at 418.

For these reasons, we are not persuaded that Petitioner has shown sufficiently that the combined teachings of Pirim and Yoda teach or suggest a learning multiplexer, as required by claims 3–17. Consequently, Petitioner has not demonstrated that there is a reasonable likelihood that claims 3–17 are unpatentable under § 103(a) as obvious over Pirim and Yoda.

### III. CONCLUSION

For the foregoing reasons, the information presented in the Petition and evidence in this record do not establish that there is a reasonable likelihood that Petitioner would prevail in challenging claims 2–17, 20, 21, and 23–28.

### IV. ORDER

Accordingly, it is

ORDERED that the Petition is *denied*, and no trial is instituted.

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