

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

META PLATFORMS, INC.; INSTAGRAM, INC.; WHATSAPP LLC; META
PLATFORMS TECHNOLOGIES, LLC; AND GIPHY, INC.

Petitioners

v.

VL COLLECTIVE IP LLC

Patent Owner

Case IPR2023-00924
U.S. Patent 7,436,980

PATENT OWNER'S SUR-REPLY

TABLE OF CONTENTS

I.	CLAIM CONSTRUCTION	3
A.	“detecting the object . . .”	3
1.	Rewriting “object” as “collection of components” Violates Fundamental Claim Construction Principles.....	3
2.	It Is Contrary to the Canons of Claim Construction to Rewrite the Claims to Encompass the “w=1” Scenario.....	11
3.	Petitioners Do Not Meaningfully Dispute That “upon” Means “based on.”	14
B.	“spatio-temporal model”	15
II.	THE ’980 PATENT IS ENTITLED TO ITS PROVISIONAL APPLICATION DATE	20
III.	TLP IS NOT PRIOR ART.....	22
A.	Petitioners’ ResearchGate Theory Is an Impermissible New Theory.....	23
B.	Petitioners’ New ResearchGate Theory Fails.	24
C.	Petitioners’ original theory of public accessibility still fails.	25
IV.	THE CHALLENGED CLAIMS ARE PATENTABLE	27
A.	Zhao (Ground I).....	27
1.	Claims 1/9	27
2.	Claims 4/12	29
3.	Claims 8/16	30
B.	Steffens in View of Zhao (Ground II).....	31
1.	Claims 1/9	31
2.	Claims 4/12	32

3.	Claims 8/16	32
C.	Ozer in View of Zhao (Ground III).....	32
1.	Claims 1/9	32
2.	Claims 4/12	33
3.	Claims 8/16	33
D.	TLP (Ground IV).....	34
1.	Claims 1/9	34
2.	Claims 3/11	35
3.	Claims 8/16	36
E.	Dependent Claims.	36

TABLE OF AUTHORITIES

Cases

<i>ACTV, Inc. v. Walt Disney Co.</i> , 346 F.3d 1082 (Fed. Cir. 2003)	16
<i>AK Steel Corp. v. Sollac & Ugine</i> , 344 F.3d 1234 (Fed. Cir. 2003)	10
<i>Akzo Nobel Coatings, Inc. v. Dow Chem. Co.</i> , 811 F.3d 1334 (Fed. Cir. 2016)	6
<i>AstraZeneca LP v. Apotex, Inc.</i> , 633 F.3d 1042 (Fed. Cir. 2010)	17
<i>Aug. Tech. Corp. v. Camtek, Ltd.</i> , 655 F.3d 1278 (Fed. Cir. 2011)	12
<i>Barrday, Inc. v. Lincoln Fabrics Inc.</i> , 2023 WL 7871688 (Fed. Cir. Nov. 16, 2023)	12
<i>Bd. of Regents of the Univ. of Texas Sys. v. BENQ Am. Corp.</i> , 533 F.3d 1362 (Fed. Cir. 2008)	10
<i>Blue Calypso, LLC v. Groupon, Inc.</i> , 815 F.3d 1331 (Fed. Cir. 2016)	21
<i>Bradium Techs. LLC v. Iancu</i> , 923 F.3d 1032 (Fed. Cir. 2019)	15
<i>Bushnell Hawthorne, LLC v. Cisco Sys., Inc.</i> , 813 F. App'x 522 (Fed. Cir. 2020)	9
<i>CAE Screenplates, Inc. v. Heinrich Fiedler GmbH & Co. Kg</i> , 224 F.3d 1308 (Fed. Cir. 2000)	6
<i>Cent. Admixture Pharmacy Servs., Inc. v. Advanced Cardiac Sols., P.C.</i> , 482 F.3d 1347 (Fed. Cir. 2007)	9
<i>Cisco Systems, Inc. v. C-Cation Techs., LLC</i> , IPR2014-00454, Paper 12 (PTAB Aug. 29, 2014).....	5

<i>Digital Biometrics, Inc. v. Identix, Inc.</i> , 149 F.3d 1335 (Fed. Cir. 1998)	9
<i>DSW, Inc. v. Shoe Pavilion, Inc.</i> , 537 F.3d 1342 (Fed. Cir. 2008)	11, 30
<i>Eli Lilly and Co. v. Teva Parms. Int’l GmbH</i> , IPR2022-00739, Paper 44 (PTAB Sept. 25, 2023).....	5
<i>Ethicon Endo-Surgery, Inc. v. United States Surgical Corp.</i> , 93 F.3d 1572 (Fed. Cir. 1996)	6
<i>GCE Gas Control Equipment Inc. v. VBOX, Inc.</i> , IPR2023-00326, Paper 27 (PTAB Jun. 18, 2024)	5
<i>Geneva Pharms., Inc. v. GlaxoSmithKline PLC</i> , 349 F.3d 1373 (Fed. Cir. 2003)	8
<i>In re Lister</i> , 583 F.3d 1307 (Fed. Cir. 2009)	25
<i>Intel Corp. v. Qualcomm Inc.</i> , 21 F.4th 784 (Fed. Cir. 2021)	16
<i>Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.</i> , 821 F.3d 1359 (Fed. Cir. 2016)	23, 35
<i>Interactive Gift Exp., Inc. v. Compuserve Inc.</i> , 256 F.3d 1323 (Fed. Cir. 2001)	9
<i>Littelfuse, Inc. v. Mersen USA EP Corp.</i> , 29 F.4th 1376 (Fed. Cir. 2022)	10
<i>MaxLite, Inc. v. Jiaxing Super Lighting Elec. Appliance Co., Ltd.</i> , IPR2020-00208, Paper 14 (PTAB Jun. 1, 2021)	20
<i>Medrad, Inc. v. MRI Devices Corp.</i> , 401 F.3d 1313 (Fed. Cir. 2005)	16, 19
<i>Pacing Technologies, LLC v. Garmin Intern., Inc.</i> , 778 F.3d 1021 (Fed. Cir. 2015)	12

<i>Power Mosfet Techs., L.L.C. v. Siemens AG</i> , 378 F.3d 1396 (Fed.Cir.2004)	6
<i>Primos, Inc. v. Hunter’s Specialties, Inc.</i> , 451 F.3d 841 (Fed. Cir. 2006)	6
<i>Renishaw PLC v. Marposs Societa’ per Azioni</i> , 158 F.3d 1243 (Fed. Cir. 1998)	19
<i>Ruckus Wireless, Inc. v. Innovative Wireless Sols., LLC</i> , 824 F.3d 999 (Fed. Cir. 2016)	8
<i>Samsung Elecs. Co. v. Infobridge Pte. Ltd.</i> , 929 F.3d 1363 (Fed. Cir. 2019)	23
<i>Samsung Elecs. Co., Ltd. v. Infobridge Pte., Ltd.</i> , IPR2017-00099, Paper 43 (PTAB Nov. 13, 2020).....	23
<i>Sequoia Tech., LLC v. Dell, Inc.</i> , 66 F.4th 1317 (Fed. Cir. 2023)	8, 19
<i>SIMO Holdings Inc. v. Hong Kong uCloudlink Network Tech. Ltd.</i> , 983 F.3d 1367 (Fed. Cir. 2021)	12
<i>SRI Int’l, Inc. v. Internet Sec. Sys.</i> , 511 F.3d 1186 (Fed. Cir. 2008)	27
<i>Teva Pharms. USA, Inc. v. Corcept Therapeutics, Inc.</i> , PGR2019-00048, Paper 51 (PTAB Nov. 18, 2020)	5
<i>Trustees of Columbia Univ. in City of New York v. Symantec Corp.</i> , 811 F.3d 1359 (Fed. Cir. 2016)	13
<i>Vizio, Inc. v. Int’l Trade Comm’n</i> , 605 F.3d 1330 (Fed. Cir. 2010)	16
<i>Wi-Fi One, LLC v. Broadcom Corp.</i> , 887 F.3d 1329 (Fed. Cir. 2018)	14
<i>Xilinx, Inc. v. Analog Devices, Inc.</i> , IPR2020-01559, Paper 31 (PTAB Mar. 11, 2022).....	20

z4 Techs., Inc. v. Microsoft Corp.,
507 F.3d 1340 (Fed. Cir. 2007) 6

EXHIBIT LIST

Exhibit	Description
2001	Declaration of Jaime F. Cardenas-Navia in Support of Motion for Admission Pro Hac Vice
2002	Zou et al., Object Detection in 20 Years - Survey
2003	Email dated December 29, 2023
2004	Declaration of Eli Saber in Support of Patent Owner's Response
2005	Curriculum Vitae of Eli Saber, Ph.D.
2006	Deposition of Dr. Chandrajit Bajaj
2007	Supplemental Declaration of Eli Saber in Support of Patent Owner's Sur-Reply
2008	2024-07-11 Deposition of Dr. Chandrajit Bajaj
2009	2004-02-13 Email
2010	2003-11-17 Email
2011	2024-07-18 Deposition of Dr. Sylvia Hall-Ellis

The '980 patent's spatio-**temporal** model involves detecting an object in an image based on the probabilities that the object is present in **earlier or later images**. Petitioners concede that no reference teaches this core innovative concept of the patent. Their grounds thus rise or fall based on their efforts to rewrite the claims to encompass models that are not spatio-temporal, i.e., when " $w=1$."

Surprisingly, Petitioners' claim construction arguments on this decisive issue depend on an argument that only appears in the supplemental declaration of Dr. Bajaj—it does not appear in the Petition, Reply, or anywhere else. In his supplemental declaration, Bajaj asserts that "object" and "collection of components"—which are two distinct claim terms and concepts—are actually the same thing. Bajaj therefore rewrites the claims, replacing "object" with "collection of components." Bajaj's word substitution results in the claims encompassing the " $w=1$ " scenario, but not any " $w>1$ " scenarios.

This claim construction position violates numerous canons of claim construction—it renders claim terms superfluous, excludes all preferred embodiments, and renders the claims invalid as indefinite. Perhaps this is why Petitioners buried it in an expert declaration instead of advocating for it in their Petition or Reply. Bajaj's construction is procedurally improper and need not be considered, but if it is, it can be quickly rejected.

Without Bajaj's claim rewrite, it is undisputed that the express language of

the claims do not encompass the “w=1” scenario that all Petitioners’ grounds rely on. While Petitioners nonetheless argue that the claims should encompass the w=1 scenario, they only have a single argument as to why: because “w=1” is disclosed in the specification. But the laws of claim construction do not permit rewriting unambiguous claim language to encompass disfavored implementations like the “w=1” disclosure. The “w=1” implementation does not result in a “spatio-*temporal* model.” It is thus not part of the inventive concept of the patent. It would be legal error to rewrite the claims to encompass a disparaged implementation.

If the claims do not encompass the “w=1” scenario, which they do not, then Petitioners concede that all their grounds fail. For this reason, and for the additional reasons below, all claims should be upheld as patentable.

I. CLAIM CONSTRUCTION

A. “detecting the object . . .”

<u>Term</u>	<u>Patent Owner’s Construction</u>	<u>Petitioners’ Construction¹</u>
“detecting the object in any image upon comparing the probabilities for each image to a threshold for detecting the object”	“detecting the object in any image based on comparing the probabilities for each image of the plurality of images to a threshold for detecting the object”	“detecting the collection of components in any image upon comparing the collection of component probabilities for each image to a threshold for detecting the collection of components”

There are three disputes for limitation 1/9[e]: (1) whether “object” should be rewritten as “collection of components”; (2) whether “the probabilities” are for the object in the plurality of images or for the collection of components in each image; and (3) whether “upon” means “based on.”

1. Rewriting “object” as “collection of components” Violates Fundamental Claim Construction Principles

For the first time in Reply, Petitioners’ expert argues that “object” and “collection of components”—two distinct terms that appear in the claims—are synonymous and interchangeable. For limitation 1[e], Bajaj posits that “comparing

¹ Petitioners do not formally propose this construction (perhaps to avoid subjecting it to scrutiny) but apply it in their invalidity analysis. See Reply, 2, 4-5, 8-11, 25-27.

the probabilities for each image” means “comparing the (collection of component) probabilities for each image.” EX1052, ¶13. Bajaj justifies this rewrite of the claims by assuming (wrongly) that objects are just a collection of components. EX2008, 90:7-11 (“The object is the sum of its parts.”), 92:19-93:1 (“The object is the collection of components.”), 18:2-19:5-21, 21:8-22:4, 24:5-12, 86:18-87:7; EX2007, ¶10.

Pertinently, Bajaj replaces “object” with “collection of components” every time the claims refer to object “probabilities.” EX1052, ¶¶12-13, 16-17; EX2007, ¶11; EX2008, 24:5-12 (“Q. . . . [Y]ou’re saying your interpretation of the claims is that the probabilities are probabilities for components, right? A. Comparing the probabilities for the collection of components because that’s what constitutes the object in each image.”), 19:1-8 (“And then determining a probability that the object -- you can always put parentheses again -- of collection of components because the object is always a collection of components.”), 18:2-19:5-21, 21:8-22:4 (“Since the object is a collection of components, there is a probability for each of the components.”). Petitioners rely on Bajaj’s construction. Reply, 2, 4-5, 8-11, 25-27.

Petitioners did not directly include this construction in their Petition or Reply. It was improperly incorporated by reference and should not be considered. Consolidated Trial Practice Guide (Nov. 2019) (“CTPG”) at 35-36 (citing *Cisco Systems, Inc. v. C-Cation Techs., LLC*, IPR2014-00454, Paper 12 (PTAB Aug. 29,

2014) (informative)).

Additionally, because the proposed construction for “object” was only addressed by Bajaj, there is no affirmative legal argument supporting it. Petitioners’ failure to include such argument should be deemed a forfeiture, and the Board should not consider the proposed construction. *GCE Gas Control Equipment Inc. v. VBOX, Inc.*, IPR2023-00326, Paper 27 at 11 (PTAB Jun. 18, 2024); *see also Teva Pharms. USA, Inc. v. Corcept Therapeutics, Inc.*, PGR2019-00048, Paper 51 at 17 (PTAB Nov. 18, 2020).

In all events, Bajaj’s new claim construction position lacks merit. His rewrite effectively removes the term “object” from the claims. But “objects” are central to all claims and cannot simply be ignored. EX2007, ¶12.

The claims recite steps “for **object** detection” where “a spatio-temporal model for an **object** to be detected” is provided, and each step expressly refers to “the **object**” detected using the model. *See* EX1001, claims 1 and 9 (emphasis added); EX2007, ¶13. The claims repeatedly refer to the “object” distinctly from the “collection of components,” which is separately recited in element 1/9[c]. *Id.* This indicates that they are distinct elements and that the patentee was capable of (and did) refer to the “collection of components” (rather than “object”) wherever that was intended. *Id.* Bajaj’s interpretation collapses the two terms, rendering one or the other superfluous, which is “disfavored.” *Id.*; *Akzo Nobel Coatings, Inc. v. Dow*

Chem. Co., 811 F.3d 1334, 1340 (Fed. Cir. 2016); *Power Mosfet Techs., L.L.C. v. Siemens AG*, 378 F.3d 1396, 1410 (Fed. Cir. 2004). Because “object” and “collection of components” are both expressly and distinctly recited in claim 1/9—and even in the same element (i.e., 1/9[c])—they should have different meanings. EX2007, ¶¶14-15; *Primos, Inc. v. Hunter’s Specialties, Inc.*, 451 F.3d 841, 848-49 (Fed. Cir. 2006); *CAE Screenplates, Inc. v. Heinrich Fiedler GmbH & Co. Kg*, 224 F.3d 1308, 1317 (Fed. Cir. 2000); *Ethicon Endo-Surgery, Inc. v. United States Surgical Corp.*, 93 F.3d 1572, 1579 (Fed. Cir. 1996); *z4 Techs., Inc. v. Microsoft Corp.*, 507 F.3d 1340, 1348 (Fed. Cir. 2007).

This distinctness is confirmed by the specification. Figures 2A and 2B depict the “object as a whole” 203 as a distinct entity from the collection of “components” 202. EX1001, 4:18-48; EX2007, ¶15. Modeling objects separately from their constituent components has a purpose: it “allows the inference process to reason explicitly about the object as a whole” and assume “conditional independence of components.” *Id.*; EX1001, 4:37-42. Furthermore, the joint probability distribution described at 3:47-4:7 expressly includes distinct states of the object (“O”) ($X_0^O \dots X_T^O$) and each component (“C”) ($X_0^{C_0}, X_0^{C_1} \dots X_0^{C_N} \dots X_T^{C_0}, X_T^{C_1} \dots X_T^{C_N}$). *Id.* It also includes multiple probabilistic constraints (potential functions) that distinguish between the object and components: $\psi_{ij}(X_i^O, X_j^O)$ for object-to-object constraints;

$\psi_{ik}(X_i^O, X_i^{C_k})$ for object-to-component constraints, and $\psi_{kl}(X_i^{C_k}, X_i^{C_l})$ for component-to-component constraints. *Id.* It also includes distinct likelihoods of object presence ($\phi_i(X_i^O)$) and component presences ($\phi_i(X_i^{C_k})$). *Id.*

Bajaj’s proposed construction also improperly reads all preferred embodiments out of the claims. PO previously explained why claim limitation 1/9[e] should be construed to clarify that the “probabilities” are for “each image of the plurality of images.” POR, 18-25. This is the necessary result of the precise wording of the claims. Limitation 1/9[c] recites “a plurality of images” (i.e., two or more), while 1/9[d] requires “determining a probability that the object is in each image.” Accordingly, there is **a probability** (singular) associated with **the object** for **each image** (of the plurality). The single **probability** for **each image** results in two or more **probabilities** for the **plurality of images**. The reference to “the probabilities for each image” in limitation 1/9[e] must therefore be to the **probabilities** for the **plurality of images**, as there are no other **probabilities** (plural). EX2007, ¶18.

Petitioners do not contest PO’s analysis on this point—they only dispute the conclusion. Thus, Petitioners concede that “plurality of images” means “two or more images,” that there is “a probability” (singular) for each image, and that limitation 1[e] requires comparing “probabilities” (plural). Yet Petitioners, through their expert, improperly rewrite the claim to associate “the probabilities” with the “collection of components” rather than with the “plurality of images.”

The problem with this rewrite is that it results in the object detection of limitation 1/9[e] only ever being based on the probabilities for a **single** image—the one being analyzed. This is the “w=1” scenario. Under Bajaj’s construction, the claims **only** cover this scenario, at the exclusion of the “w>1” scenarios. EX2007, ¶18.

This is fatal to Bajaj’s position. A construction that excludes **a** preferred embodiment is rarely correct; *a fortiori*, a construction that excludes **all** preferred embodiments is surely wrong. *Sequoia Tech., LLC v. Dell, Inc.*, 66 F.4th 1317, 1327 (Fed. Cir. 2023). And here, the “w>1” scenarios are the preferred embodiments. *See* EX1001, 7:20-22, 7:56-8:3 (3-frame spatio-temporal analysis “combines the evidence for accurate estimates throughout the sequence,” unlike the “poor” results of the simple fusion scheme); EX2007, ¶18; EX2004, ¶69. Bajaj’s construction exclude all the w>1 embodiments and encompass only the disfavored single-frame component-based fusion scenario of w=1, which is improper.

Claim constructions that render claims invalid are disfavored. *See Ruckus Wireless, Inc. v. Innovative Wireless Sols., LLC*, 824 F.3d 999, 1004 (Fed. Cir. 2016); *Geneva Pharms., Inc. v. GlaxoSmithKline PLC*, 349 F.3d 1373, 1384 (Fed. Cir. 2003). This is yet another reason to reject Bajaj’s construction: equating “object” with “collection of components” renders all claims indefinite for lack of antecedent basis.

When “object” is equated with “collection of components,” “**the** probabilities” (plural) in 1/9[e] lacks proper antecedent basis. This is because element 1/9[d] introduces only “**a** probability” (singular) for the object in each image, not **multiple** probabilities for the collection of components in each image. The singular/plural mismatch confuses whether 1/9[e]’s “probabilities for each image” refer to the same or different “probability that the object is in each image” in 1/9[d]. EX2007, ¶19; see *Bushnell Hawthorne, LLC v. Cisco Sys., Inc.*, 813 F. App’x 522, 526 (Fed. Cir. 2020).

To make sense, Petitioners’ construction requires rewriting 1/9[d] to say “probabilities that the object is in each image.” But that is not how the claim was drafted, and no such modification has been proposed by Petitioners. Nor is it proper to rewrite the claims in that way. *Digital Biometrics, Inc. v. Identix, Inc.*, 149 F.3d 1335, 1344 (Fed. Cir. 1998) (“The actual words of the claim are the controlling focus.”); *Cent. Admixture Pharmacy Servs., Inc. v. Advanced Cardiac Sols., P.C.*, 482 F.3d 1347, 1355 (Fed. Cir. 2007) (“Claims mean precisely what they say.”). This is particularly true here, where the patentee was deliberate in distinguishing between singular and plural in the claims. EX1001, 8:30-43, 9:18-31; *Interactive Gift Exp., Inc. v. CompuServe Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) (focus must be on the language that the patentee chose).

Bajaj’s construction also creates conflict between claims 1/9 and their

dependent claims 3/11. Claims 3/11 requires “nodes” for both “the object” and “the collection of components,” which requires the “object” and the “collection of components” to be distinct and not the same. EX2007, ¶19. This “is significant” and favors interpreting them differently. *Bd. of Regents of the Univ. of Texas Sys. v. BENQ Am. Corp.*, 533 F.3d 1362, 1371 (Fed. Cir. 2008).

Also, because dependent claims 3/11 expressly distinguish between an “object” and a “collection of components,” independent claims 1/9 must be broad enough to encompass embodiments in which they are distinct. *Littelfuse, Inc. v. Mersen USA EP Corp.*, 29 F.4th 1376, 1380 (Fed. Cir. 2022). Yet under Bajaj’s construction, they would not be. EX2007, ¶19. This is a violation of the doctrine of claim differentiation. *AK Steel Corp. v. Sollac & Ugine*, 344 F.3d 1234, 1242 (Fed. Cir. 2003).

Similarly, claims 4/12 expressly recite detecting an object based on an analysis that includes the object probabilities for “a prior image and a later image relative to the current image.” EX1001, claims 1, 4, 9, 12. This is the “w=3” (or greater) scenario. Yet because claims 1/9 only encompass the w=1 scenario under Bajaj’s construction, claims 4/12 are improperly broader in claim scope than claims 1/9. EX2007, ¶19.

2. It Is Contrary to the Canons of Claim Construction to Rewrite the Claims to Encompass the “w=1” Scenario

Other than through Bajaj’s claims rewrite, Petitioners have no theory or explanation for how the plain language of the claims encompasses the w=1 scenario. They thus concede that it does not.

Accordingly, Petitioners’ assertion that claims 1/9 encompass the w=1 scenario boils down to an argument that the otherwise unambiguous language of the claims should nonetheless be rewritten to encompass it. Petitioners fail to carry their heavy burden on this issue. *DSW, Inc. v. Shoe Pavilion, Inc.*, 537 F.3d 1342, 1347 (Fed. Cir. 2008).

As an initial matter, it makes perfect sense that the w=1 scenario is in the specification but not encompassed by the claims: the w=1 scenario is not part of the inventive “spatio-*temporal*” model at the core of the invention. EX2007, ¶20; POR, 22-23; EX1001, 7:6-22 (distinguishing “single frame component based fusion” from spatio-temporal model); 7:56-8:3 (similar); §I.B, *infra*; EX1052, ¶¶28-29; EX2008, 51:14-52:21 (w=1 “is not using any information from a previous frame or a future frame), 56:1-59:5 (similar). It is instead a simple fusion model on which the inventive contributions to the art were built and improve upon. *Id.*

And “the mere fact” that the specification addresses the mathematical edge case of w=1 does not mean that it must be part of the claims. *Aug. Tech. Corp. v.*

Camtek, Ltd., 655 F.3d 1278, 1285 (Fed. Cir. 2011). Rather, that it was discussed in the specification multiple times yet not encompassed by the claims strongly indicates a deliberate choice. *SIMO Holdings Inc. v. Hong Kong uCloudlink Network Tech. Ltd.*, 983 F.3d 1367, 1378 (Fed. Cir. 2021) (“[W]e should not infer that any particular embodiment is included in a claim when there is probative evidence that sufficiently indicates the contrary.”); *Pacing Technologies, LLC v. Garmin Intern., Inc.*, 778 F.3d 1021, 1026 (Fed. Cir. 2015) (“every claim does not need to cover every embodiment,” especially “where the plain language of a limitation of the claim does not appear to cover that embodiment”).

Further, while constructions that exclude ***preferred*** embodiments should be scrutinized, the $w=1$ scenario is a ***disfavored*** implementation. EX2007, ¶20. No canon of claim construction weighs in favor of rewriting the claims to encompass a disfavored disclosure. There is, however, a canon that weighs in favor of excluding it. *Barrday, Inc. v. Lincoln Fabrics Inc.*, 2023 WL 7871688, at *4-5 (Fed. Cir. Nov. 16, 2023) (excluding embodiments that “the specification expressly criticizes”).

Bajaj suggests that “[i]f $w=1$ was not intended to be included, then the specification could have indicated that w is an odd integer > 1 or w is an odd integer ≥ 3 .” EX1052, ¶¶31-32. But the patent did so by stating that “with $w=1$, the algorithm resembles single frame component-based fusion” and describing this as a scenario in which performing inferences over time with the spatio-temporal model

“is not an option due to the lengthy off-line processing needed.” EX2007, ¶20; EX1001, 7:6-22. *Trustees of Columbia Univ. in City of New York v. Symantec Corp.*, 811 F.3d 1359, 1364 (Fed. Cir. 2016) (“[A] patent applicant need not expressly state ‘my invention does not include X’ to indicate his exclusion of X from the scope of his patent because ‘the patentee’s choice of preferred embodiments can shed light on the intended scope of the claims.’”).

Petitioners again argue that Figure 5 allegedly supports a broader reading of the claims than PO’s. Reply, 3. PO previously explained why Petitioners’ reasoning is erroneous. POR, 21-22. Petitioners do not address PO’s arguments, including the fact that the language in 505 does not match the specification’s description of 505. *Compare* Figure 5 (step 505) *with* 7:53-55. The specification’s and claim’s language are consistent, suggesting that 505 contains a typographical error (i.e., “image” should be “images”). EX2007, ¶21; *compare* 7:53-55 *with* 8:40-43. Tellingly, Bajaj did not offer an opinion in support of Petitioners’ argument on this point.

Finally, Petitioners misinterpret the prosecution history . In the Notice of Allowance, the Examiner began by stating that the features of limitations 1/9[a], 1/9[d], and 1/9[e] “are not taught or suggested by the art of record.” EX1002, 162. Accordingly, the Examiner determined that Cham, indisputably among the art of record, does not disclose the features of 1/9[a], 1/9[d], and 1/9[e]. *Id.* at 162-163. EX2007, ¶22.

Nothing in the Examiner's subsequent discussion of Cham is inconsistent with that finding. EX2007, ¶¶22-23. The Examiner determined that Cham discloses "a kinematic model" (not the spatio-temporal model of 1/9[a]) and "performing feature search operations for object features by comparing a total probability with a predetermined threshold" (not the steps of 1/9[d] and 1/9[e]). The examiner thus twice indicated that Cham does not disclose the features of elements 1/9[a], 1/9[d], and 1/9[e].

3. Petitioners Do Not Meaningfully Dispute That "upon" Means "based on."

Petitioners imply that PO is trying to "override an unambiguous construction," but do not identify the supposedly unambiguous meaning of "upon." PO believes that its construction *is* the unambiguous meaning. If Petitioners have a different view, they needed to provide it so that it could be vetted. Because Petitioners did not, they forfeited the opportunity for a different construction.

Petitioners also allege, incorrectly, that PO "cites *no* support" for its position. Reply, 4 n.1; POR, 24-25. PO's cited evidence shows "the claim must be read as [PO] construed it in order to be faithful to the invention disclosed in the specification." *Wi-Fi One, LLC v. Broadcom Corp.*, 887 F.3d 1329, 1344-46 (Fed. Cir. 2018). Because Petitioners did not contest PO's arguments and evidence on this point, they have conceded them. This is an additional forfeiture by Petitioners.

Bradium Techs. LLC v. Iancu, 923 F.3d 1032, 1048 (Fed. Cir. 2019).

PO’s construction, which is effectively unopposed, clarifies that the detection of the object in “each image” is based on the probabilities that the object is in the other images in the “plurality” that are being analyzed. This is true whether the other images precede or follow the particular image being captured, which is consistent with the disclosure in the specification and necessary to accommodate the 3-image moving window expressly claimed in dependent claims 4/12. EX1001, 1:43-47, 4:34-48, 6:29-31, 7:6-22, 7:56-8:8, Figs. 2A-2B.

B. “spatio-temporal model”

<u>Term</u>	<u>Patent Owner’s Construction</u>	<u>Petitioners’ Construction²</u>
“spatio-temporal model”	spatial model where an object is detected in an image based on the probabilities that the object is in preceding and/or subsequent images	spatial model where an image’s analysis takes into account information from preceding and/or subsequent images

The inventors repeatedly and unambiguously defined “spatio-temporal model.” EX2007, ¶25. PO’s construction is based on this lexicography and ensures that the claims capture the essence of the invention.

² Petitioners do not formally propose this construction but apply it in their invalidity analysis. Reply, 8-11 (citing Ex1052, ¶¶6-22, 23-35).

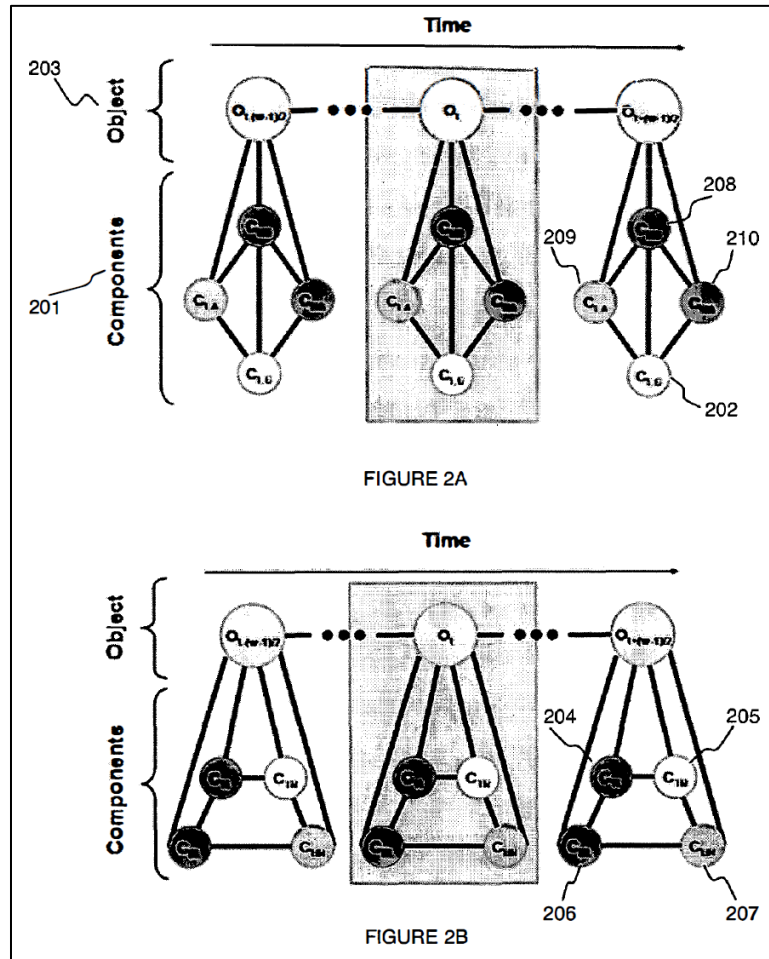
The context of the claim as a whole supports PO's construction. *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 791-92 (Fed. Cir. 2021) (“[O]ur inquiry is not limited to an analysis of the phrase in isolation.”); *ACTV, Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1088 (Fed. Cir. 2003) (“the context of the surrounding words of the claim also must be considered”). The claims expressly state that the function of the “spatio-temporal model” is “for an object to be detected.” EX2007, ¶25; *Medrad, Inc. v. MRI Devices Corp.*, 401 F.3d 1313, 1319 (Fed. Cir. 2005) (“It is ... entirely proper to consider the functions of an invention in seeking to determine the meaning of particular claim language.” (cleaned up)). That function is a property of the “spatio-temporal model” because object detection “is the essence or a fundamental characteristic of the claimed invention,” as evident from the claim language and the specification.³ EX2007, ¶25; *Vizio, Inc. v. Int’l Trade Comm’n*, 605 F.3d 1330, 1340-41 (Fed. Cir. 2010); EX1001, EX1001, 1:28-33, 1:37-39, 1:48-52, 2:7-15, 2:43-54; 3:11-18, 7:6-8:8.

The specification repeatedly uses the term “spatio-temporal model” consistent with PO's construction. EX2007, ¶26; *AstraZeneca LP v. Apotex, Inc.*, 633 F.3d

³ Both parties' experts agree that 1/9[c]-1/9[e] are performed using the spatio-temporal model of 1/9[a], which further supports PO's construction. EX1051, 59:14-63:11; EX2004, ¶¶70-71; EX1052, ¶14; EX2008 at 32:3-10, 32:21-33:2.

1042, 1051-52 (Fed. Cir. 2010). The specification refers to “spatio-temporal model” (or slight variation) no less than 14 times. EX1001, 1:28-2:18, 3:47-4:48, 7:45-8:8. The patent repeatedly indicates that the function of the spatio-temporal model is to detect an object, and to do so based on the probabilities that object is in earlier or later images. EX2007, ¶26; EX1001, 1:28-33, 1:37-39, 1:48-52, 2:7-15, 2:59-60, 3:47-4:8, 4:34-52, 5:58-67, 7:45-55, 7:56-8:8, Figures 2A-2B.

The spatio-temporal model is a spatial model that is “extended over time” or “replicat[ed] ... along the temporal domain ... and then connect[ed] ... across time.” EX1001, 4:34-45, Figs. 2A-2B; EX1003, 7; EX2007, ¶27. The extension or connection over time is probabilistic, *i.e.*, based on the probabilities that the object is in preceding and/or subsequent images. *Id.* The patent repeatedly explains that a spatio-temporal model has probabilistic connectivity, *e.g.*, “edges,” “constraints,” or “compatibilities” connecting the object in multiple frames. *Id.*; EX1001, 2:59-60, 3:47-4:8; 4:49-52; Figs. 2A and 2B; EX1003, 4-7 Figs. 2(a)-2(d). The use of object probabilities from multiple frames in the spatio-temporal model is further shown in the joint probability distribution for the spatio-temporal model described at 3:47-4:7, which expressly includes the object state at multiple points in time ($X_0^O \dots X_T^O$) (*i.e.*, in each image) and probabilistic constraints for the object state across images $\psi_{ij}(X_i^O, X_j^O)$ (*i.e.*, over time). EX2007, ¶27; EX1001, 3:47-4:7.



EX1001, Figs. 2A and 2B

Basing the detection of the object in any image on the object probabilities for other image frames (over time) with the spatio-temporal model “allows the inference process to reason explicitly about the object as a whole ... over time given the overall object appearance.” EX2007, ¶28; EX1001, 4:37-42. This achieves object detection that “considers the consistency of the detection over time” (EX1001, 2:49-50) and its functions of providing detection with “temporal integration,” “temporal consistency,” and “consistent results over time” (*id.*, 7:6-22) to be achieved.

EX2007, ¶28. *Sequoia*, 66 F.4th at 1326 (“[A] patent’s express purpose of the invention informs the proper construction of claim terms.” (cleaned up); *Medrad*, 401 F.3d at 1319 (construction requires “a full understanding of what the inventors actually invented and intended to envelop with the claim.”). The patent demonstrates achievement of these things by comparing a 3-frame spatio-temporal model with a single-frame (non-spatio-temporal) model that had “poor” performance. EX2007, ¶28; EX1001, 7:56-8:3.

By contrast, Petitioners interpret “spatio-temporal model” to merely require using **any** information from a different image than the one being analyzed in **any** way. Reply, 9-11 (“contour updating procedure” and “motion information”); EX1052, ¶14 (Bajaj interpreting the “temporal” aspect of “spatio-temporal model” as being satisfied if the model is able “to change configuration in time.”); EX2008, 33:4-35:20. This view is divorced from the intrinsic evidence, which defines the term much more narrowly. Indeed, Petitioners’ interpretation would encompass purely **spatial** models. EX2007, ¶29. *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998).⁴

⁴ Petitioners incorrectly assert that PO is implicitly requiring the claimed “spatio-temporal model” to be a two-layer graphical model with a coarse layer node and a fine layer node. Reply, 5. PO’s position is that an “object” is distinct from its

II. THE '980 PATENT IS ENTITLED TO ITS PROVISIONAL APPLICATION DATE

The Petition did not dispute the '980 patent's entitlement to its provisional application filing date, as the Board recognized. Pet., 5; EX1004, ¶33; Paper 11 at 48. But petitioners “must first raise the issue of whether PO is entitled to an effective filing date [in the Petition] by ‘identifying, specifically, the features, claims, and ancestral applications allegedly lacking written description support for the claims based on the identified features.’” *MaxLite, Inc. v. Jiaxing Super Lighting Elec. Appliance Co., Ltd.*, IPR2020-00208, Paper 14 at 6 (PTAB Jun. 1, 2021) (citing cases). Petitioners did not do so, and therefore waived their right to argue for a different priority date. *Xilinx, Inc. v. Analog Devices, Inc.*, IPR2020-01559, Paper 31 at 42 (PTAB Mar. 11, 2022) (“Petitioner waived this argument because it was not presented in the Petition.”).

The POR nevertheless identifies written description support in the provisional application for every challenged claim on an element-by-element basis, and this analysis is buttressed by Dr. Saber. POR, 7-10. Petitioners' Reply only disputes whether elements 1/9[d] and 1/9[e] have written description support in the

“collection of components.” *Supra*, §II.A.1. Having separate nodes for objects and collection of components would be one way to implement that, but is not the only way.

provisional application. Reply, 5-7. EX2007, ¶¶30-31.

Petitioners' only substantive argument is that the provisional does not include the '980 patent's Figure 5 flowchart or the exact text of element 1/9[e]. Reply, 6. But "the exact terms appearing in the claim 'need not be used *in haec verba*'" in the specification. *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1346 (Fed. Cir. 2016). Petitioners' argument fails as a matter of law.

Regardless, the provisional application does provide written description support for elements 1/9[d] and 1/9[e]. The provisional describes an "inference algorithm" that uses a "probabilistic image likelihood model $\phi_i(X_i)$," which is "the likelihood of observing the [] image conditioned on the state X_i of node i ." EX1003, 9; EX2007, ¶32. It further states that "[t]he output of the AdaBoost classifier is a confidence $h_k(I)$ " that is converted to a likelihood function, *i.e.*, a probability, where "[i]t is customary to consider object present if $h_k(I) \geq \frac{1}{2} \sum_{k=1}^K \alpha_k$." EX1003, 10; EX2007, ¶32. The provisional application thus supports element 1/9[d].

The provisional further states that "[o]bject detection and tracking are formulated as inference in a two-layer graphical model," where "[i]nferring the state of the object and its components in our framework is defined as estimating a belief in a graphical model" using "a form of non-parametric belief propagation." EX1003, 4, 8; EX2007, ¶33. "The approach is a generalization of particle filtering" where "the conditional distribution used in standard particle filtering is replaced by product

of incoming messages,” where “we integrate information from all components in the second-layer node,” (*i.e.*, in the object) and send messages between “the set of neighbors of node i ” (as well as between frames) based on “the local evidence (or likelihood) associated with the node i ” ($\phi_i(X_i)$) and “the potential designating the compatibility between the states of node i and j ” (which can be in different frames). EX1003, 8-9; EX2007, ¶33. In other words, the object is detected based on object probabilities from multiple frames. *Id.* Furthermore, a “ w -frame windowed smoothing algorithm” can be used for object detection, “where w is an odd integer ≥ 1 (see Fig. 2cd),” to achieve “temporal integration” and “temporal consistency” between frames.” *Id.* Based on all these disclosures, the POSITA would understand that that the inventors were in possession of element 1/9[e]. *Id.*

Saber’s expert testimony from the perspective of the POSITA is unrebutted. Mere attorney argument is insufficient to overcome PO’s showing. EX1052.

III. TLP IS NOT PRIOR ART

The Petition’s only theory of public accessibility for TLP is that TLP was allegedly “widely disseminated and made publicly available for the IEEE Computer Society Conference on Computer Vision and Pattern Recognition by at least April 9, 2004,” *i.e.*, the alleged deadline for manuscript submissions for the conference. Pet., 6. Bajaj’s declaration confirms Petitioners’ theory is that TLP was allegedly “disseminated and made publicly available *through the submission process*, and no

later than April 9, 2004.” *Id.* citing EX1004 ¶¶65-66.

After the Board found that the Petition did not show a reasonable likelihood that TLP published before May 27, 2004, Paper 11, 49, Petitioners moved to file supplemental information purporting to show that a TLP co-author (Michael Black) “uploaded TLP to Research Gate and listed a publication date as early as January 2004.” Paper 18, 4. The Board was clear that “granting the Motion does not mean [it] will entertain impermissible new theories in the Reply.” Paper 28, 4.

Despite the Board’s warning, Petitioners now argue *two* theories of public accessibility: (1) dissemination by April 9, 2004 as part of the CVPR peer review process, and (2) publication “as of at least January 31, 2004” based on Mr. Black’s purported upload to ResearchGate. Reply, 7, 21-22.

A. Petitioners’ ResearchGate Theory Is an Impermissible New Theory.

Petitioners’ ResearchGate theory is a new theory of alleged public accessibility. *See Samsung Elecs. Co. v. Infobridge Pte. Ltd.*, 929 F.3d 1363, 1369-70 (Fed. Cir. 2019) (public accessibility argument not made in petition was waived); *Samsung Elecs. Co. v. Infobridge Pte., Ltd.*, IPR2017-00099, Paper 43 at 42 (PTAB Nov. 13, 2020) (public accessibility argument not made in petition was new theory). Accordingly, it should not be considered. CTPG at 74; *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369-70 (Fed. Cir. 2016).

B. Petitioners' New ResearchGate Theory Fails.

Dr. Hall-Ellis confirmed that TLP was not available on ResearchGate (or Semantic Scholar) before 2008 because ResearchGate (and Semantic Scholar) didn't exist until then. EX2011, 12:17-16:3 (“**Q.** TLP was not available on ResearchGate prior to 2008, correct? **A.** That is true.”), 40:14-41:4. Hall-Ellis also testified that TLP was not catalogued or indexed until at least August 30, 2004. *Id.*, 45:15-47:2.

Petitioners nevertheless argue that the “Jan 2004” date on the ResearchGate website is a public availability date of TLP, purportedly indicated by Michael Black. Reply, 7, 201-22. The evidence does not support—indeed, it discredits—that assumption. Hall-Ellis confirmed that ResearchGate does not identify “Jan 2004” as a publication date and that she is only inferring that it is a publication date. EX2011, 19:2-22:8. Moreover, hovering a cursor over the words “Author content” on the ResearchGate website causes a popup graphic to appear that says “All content in this area was uploaded by Michael J Black on Mar 02, 2014,”⁵ nearly a decade after the relevant time. If Black did indicate the Jan 2004 date, he thus did so many years later, and there is no evidence suggesting he meant it as a publication date, much less that he knew what “printed publication” means under the patent laws. *Id.*,

⁵ See EX1050, ¶41 n.16 (https://www.researchgate.net/publication/4082208_Tracking_loose-limbed_people)

25:16-27:9.

Hall-Ellis does not claim to have personal knowledge about how “Jan 2004” came to appear on the ResearchGate website or even ResearchGate’s practices for determining and posting such information. Her opinions are “pure speculation” and unreliable. *In re Lister*, 583 F.3d 1307, 1317 (Fed. Cir. 2009). Moreover, while Hall-Ellis asserts in her declaration that the January 2004 ResearchGate date for TLP has “strong indicia of reliability” (EX1050, ¶47), when confronted by the large and unpredictable gaps between the ResearchGate dates and the dates of formal publication for other publications on ResearchGate, she was singing a very different tune. EX2011, 48:6-59:13 (“So, to say the [ResearchGate] date is accurate or it is close, or it is not close, I think that is asking a lot from the authors who are very busy, who really do what they do when they do it. . . . I would never take these [ResearchGate dates] solely on face value, never. Everything has to be investigated more fully. . . . How carefully we transcribe [ResearchGate dates], I think varies from person to person.”).

C. Petitioners’ original theory of public accessibility still fails.

Petition’s sole public accessibility theory for TLP—that it was publicly accessible through the 2004 CVPR peer review process—fails as a matter of law. POR, 54-58. Bajaj’s declaration includes no explanation or evidence for his assertion that “papers are widely disseminated and made publicly available to

academics for peer review.” EX1004 ¶66. And despite claiming that his paper underwent the same process as TLP, Bajaj provided no explanation or evidence of that process. *Id.*

Petitioners’ supplemental information does not cure the Petition’s deficiency. Petitioners have failed to show that TLP’s submission to the CVPR conference (at any time) rendered it publicly accessible before May 27, 2004. POR, 54-58. To the contrary, emails received from Michael Isard (a co-author of TLP) confirm that TLP was not publicly available or publicly disseminated through CVPR pre-publication review. EX2009; EX2010.

In a February 13, 2004 email to Leonid Sigal (an author of TLP) from two CVPR 2004 Program Chairs, the Program Chairs shared information about the peer review process for 2004 CVPR submissions. EX2009; EX2007, ¶61-62. TLP was provided to peer reviewers, who then provided feedback that was reviewed by the Program Committee Members and Area Chair(s) in charge of reviewing TLP. *Id.* Responses may not include any information that might reveal the authors, and “the entire decision process will be conducted double-blind.” *Id.* Consistent with this anonymous and “blind” review approach, an email between three of the TLP authors dated November 17, 2003 includes what appears to be a draft of TLP with author-identifying information removed. EX2010; EX2011, 35:15-37:5.

These emails are consistent with industry norms, customs, and standard

practices of keeping conference submissions strictly confidential and anonymous during review and until the time of official conference publication. EX2007, ¶63. As Dr. Saber explains, public disclosure of TLP during the CVPR review process would have been considered unethical and potentially exposed any leaker to discipline. *Id.* The evidence therefore shows “no intent to publicize” TLP during pre-publication review, and that TLP was not “accessible to anyone other than the peer-review committee, thus further suggesting an absence of actual public accessibility” before May 27, 2004. *Id.*, ¶64; *SRI Int’l, Inc. v. Internet Sec. Sys.*, 511 F.3d 1186, 1197-98 (Fed. Cir. 2008).

IV. THE CHALLENGED CLAIMS ARE PATENTABLE

A. Zhao (Ground I).

1. Claims 1/9

The dispute boils down to: (1) whether PO’s or Petitioners’ claim constructions are correct, and (2) whether Zhao’s RCR algorithm detects an object in a given image based on the probability that the object is in another image using a spatio-temporal model. EX2007, ¶34.

As to the first issue, PO’s constructions are correct . POR, 18-34; §I, *supra*; EX2007, ¶35.

As to the second issue, Zhao’s RCR process operates on a single image and does not detect an object (a human) in the image under consideration based on the

probability that the object is in another image. POR 11-12, 26-34. Further, Zhao's body model has no temporal probabilistic connectivity. *Id.* Petitioners' new arguments fail to show otherwise. EX2007, ¶36.

Zhao's RCR algorithm is not "much more than a 'simple fusion scheme,'" as it does not use object probabilities from multiple frames—the probabilistic analysis is confined to the single frame under consideration. EX2007, ¶37; POR 11-12, 26-34; EX2004, ¶¶81-85, 107-112. Nor does Zhao's body model combine probabilities from multiple frames—the body model has no temporal components at all. EX1006 at 43-45. Accordingly, Zhao does not disclose a spatio-temporal model. *Id.*

Petitioners' argument that Zhao's RCR algorithm would "contain" a comparison of the object probability in the previous frame to a threshold is incorrect. Reply, 10-11; EX2007, ¶38. The probabilistic analysis in Zhao's RCR algorithm operates on a single frame at a time. While the RCR process can use some limited information from previous frames in the form of "motion information," EX1006, 91-92, that motion information does not include probabilities, much less probabilities for objects. Zhao therefore does not disclose the claimed spatio-temporal model.

*Id.*⁶

2. Claims 4/12

Petitioners claim that PO ignores “Zhao’s disclosure” of using measurements from “adjacent frames,” where “adjacent frames” (according to Petitioners) “necessarily includes previous and later frames.” Reply, 11. Petitioners cite no such “disclosure” in Zhao regarding “adjacent frames” and there is none—Zhao only refers to “previous frames.” *Id.*; EX2007, ¶39. Zhao discusses “adjacent *features*,” but they are within a single frame, not adjacent frames. *Id.*

Bajaj does not “clarify” his prior opinions—he offers new opinions based on new evidence and obviousness rationale. Reply, 12; EX1052 ¶¶36-39 (newly citing EX1015 at 7, EX1011 at 3 and Fig. 5); EX2007, ¶40. These untimely opinions should be disregarded. Regardless, EX1011’s techniques of tuning vibration modes using training data and EX1015’s use of “tracking” with “static detection” do not teach or suggest determining the probability an object is in an image or doing so using measurements of the object from prior and later images. EX2007, ¶¶41-42.

⁶ Saber did not “acknowledge” that Zhao teaches probabilistic temporal connectivity. Reply, 11. He repeatedly explained the opposite. EX2007, ¶38; EX1051, 180:3-194:2; *see id.* at 167-251.

3. Claims 8/16

Claim 8/16's joint probability distribution includes elements for a spatio-temporal model that do not exist in Zhao's framework. POR, 38-40. Petitioners argue that lacking certain parts of the distribution "does not affect the *formula* of the joint probability distribution." Reply, 13 (emphasis added). In other words, Petitioners construe claim 8/16 as only requiring a generic joint probability distribution *formula*—regardless of the distribution's actual parts. EX2007, ¶¶43-44.

Petitioners identify no intrinsic evidence to support this claims rewrite. DSW, 537 F.3d at 1347. Regardless, the POSITA would not distill the claims to a generic "formula" in light of the express claim language and intrinsic evidence, including the specification's description of a spatio-temporal model and joint probability distribution that includes terms that expressly distinguish between the object's state and the components' states, and includes probabilistic relationships that are specifically object-to-object, object-to component, or component-to-component. EX2007, ¶¶43-44; see § I, *supra*. Petitioners' and Bajaj's attempt to distill claim 8/16 to a generic "formula" is another improper attempt to read out any distinction between the "object" and "components" in the claims. EX2007, ¶¶45-46.

B. Steffens in View of Zhao (Ground II).

1. Claims 1/9

a. Elements 1/9[d]

Petitioners conceded that Steffens’s similarity measure “is not explicitly stated as calculating a ‘probability’ that an object is an image.” Pet. 44. They now argue that “Steffens’ ‘similarity’ measure is *related to* probability.” Reply, 14 (emphasis added). It is not. EX2007, ¶48. Even if it were, merely being “related” to probability is not enough.

Steffens’ approach is not probabilistic. EX2007, ¶48. Bajaj’s opinions, which incorrectly characterize “the normalized scalar product of the amplitude vector” of two jets in Steffens as a probability, do not prove otherwise. *Id.*

As Saber explains, normalizing the absolutes of two vectors does not yield a probability. *Id.*; see EX1007 at 8:56-67. Accordingly, Steffens’ normalization of Gabor wavelets does not make them probabilities. EX2007, ¶¶49-50; see EX1007 at 8:14-67. Moreover, Steffens includes no discussion of a probabilistic similarity measure. *Id.* Thus, Steffens does not simply use different terminology than Zhao or the ’980 patent—it employs a fundamentally different framework that is incompatible with Zhao’s. *Id.* Zhao’s teaching away from wavelet-based approaches, POR 42-43, underscores their incompatibility. EX2007, ¶51.

b. Elements 1/9[a] and 1/9[e]

Petitioners rely on arguments that were previously addressed and fail. EX2007, ¶52.

2. Claims 4/12

Petitioners suggest that activity tracking “between frames” in Steffens “necessarily involves looking at a prior frame and a later frame relative to a current frame” to detect an object in the current frame. Reply 17-18. Petitioners’ evidence (Steffens and Bajaj) does not support this inherency argument. Steffens detection analysis is performed on a single frame, not across or between frames. EX2007, ¶53. And Steffens’ activity tracking process operates between two frames in the forward direction, which does not include a current, a later, *and* a prior frame. *Id.* Bajaj’s new opinions do not even argue inherency. *Id.* Petitioners’ unsupported assertion that linear motion prediction “necessarily infers object detection using multiple frames” is also contrary to the POSITA’s understanding. *Id.*

3. Claims 8/16

See §IV.A.3, *supra*; EX2007, ¶54.

C. Ozer in View of Zhao (Ground III).

1. Claims 1/9

a. Elements 1/9[a] and 1/9[e]

Petitioners rely on arguments that were previously addressed and fail. EX2007, ¶56.

2. Claims 4/12

Petitioners' argument that Ozer's "activity" classification "encompasses object tracking" fails to show that the specific requirements of claim 4/12 are met. EX2007, ¶57. The claims require "detecting the object in a current image according to measurements of the object ... determined from a prior image **and** a later image relative to the current image." EX1001, claim 4/12. But Petitioners identify no disclosure in Ozer that teaches or suggests *detecting* the object in a current frame using measurements of the object from both a prior **and** a later image.

Instead, Petitioners argue that Ozer's motion classification encompasses "object tracking" over multiple frames, and that the "low level" process (object detection) and "high level" process (activity classification) "work together to detect object parts." Reply 19-20. Petitioners' suggestion that Ozer's detection process uses its motion classification process to detect objects (and therefore is based on multiple images) is incorrect. EX2007, ¶58. Bajaj admits that activity recognition happens only "after" the detection process. EX1052, ¶63. That motion classification over multiple images uses the results of object detection does not mean that object detection spans multiple images. EX2007, ¶58. And in Ozer, it does not, as explained in the POR. *Id.*; POR 50-53.

3. Claims 8/16

See §IV.A.3, *supra*.

D. TLP (Ground IV).

1. Claims 1/9

a. Elements 1/9[a]

The “spatio-temporal model” of 1/9[a] is a “spatial model where an **object** is detected in an image based on the probabilities that the **object** is in preceding and/or subsequent images.” *See* §I, *supra*. TLP does not disclose detecting an **object** or determining the probability that an **object** is in each image—instead, it detects components (*i.e.*, limbs), which are distinct from the object. POR, 62-64; *see* §I, *supra*. Accordingly, TLP does not disclose or render obvious the “spatio-temporal model” of 1/9[a]. EX2007, ¶65.

b. Elements 1/9[d]

Element 1/9[d] requires the determination of an **object** probability. EX1001, claim 1/9. The “object” is distinct from the “components” in the claims. *See* §I, *supra*. Accordingly, element 1/9[d] requires the determination of a probability that the object (as distinct from the components) is in each image. EX2007, ¶66.

Petitioners’ argument is based on their incorrect construction, that equates “object” with “components,” dooming their arguments Reply, 7, 22; *see* §I, *supra*; EX2007, ¶67-69.

Petitioners’ argument that the POSITA would have understood to select a component to represent the object (as a second layer of nodes) is a new obviousness

rationale. Reply, 25-26. It is untimely and based on a non-asserted reference (EX1019), thus it should not be considered. CTPG at 74; *Intelligent Bio-Sys.*, 821 F.3d at 1369–70. Regardless, treating a component as arbitrarily “representative” of the object does not make that component’s probability a probability of the object. EX2007, ¶70. See §I, *supra*.

c. Elements 1/9[e]

PO explained that TLP does not disclose element 1/9[e] because it does not disclose determining an object probability—only component probabilities. POR, 58-64. Petitioners’ counter argument is based on equating “object” with “components” under their incorrect construction, which fails for the same reasons as their construction. Reply, 26; §IV.D.1, *supra*; EX2007, ¶¶71-73.

2. Claims 3/11

Petitioners do not dispute that claim 3/11 requires nodes corresponding to components *and* a node corresponding to the object. Reply, 26-27. But Petitioners do not identify any nodes in TLP that correspond to the *object* (*i.e.*, the body)—only nodes corresponding to *components* (*i.e.*, body parts). *Id.*; Pet. 67 (“each graph node corresponds to a body part (upper leg, torso, etc.)”), 72. To the extent Petitioners argument is that TLP’s body part nodes (*i.e.*, component nodes) are also nodes that correspond to the object, Petitioners again read out the distinction between “object” and “components” in the claims, which is improper. See §I, *supra*; EX2007, ¶74.

3. Claims 8/16

Petitioners claim that “the joint probability distribution equation of claim 8/16 is *identical* to prior disclosures in the art.” Reply, 27 (emphasis added); EX2007, ¶75. But Petitioners’ expert conceded that’s not true. EX2008, 94:7-96:3 (conceding that to be the same would require “rewriting of that formula”).

Petitioners agree that claims 8/16 includes terms for both the object state (X_i^O) and component states ($X_i^{C_k}$). Pet. 76; EX1004, ¶231; EX1052, ¶82; EX2008, 86:18-87:7; EX2007, ¶76. Yet Petitioners do not identify a joint probability distribution in the alleged prior art disclosures (in TLP or otherwise) with both an object node state and component node states. *Id.* Their cited references do not distinguish between an object and components and lack of the actual terms shown in claim 8/16. *Id.* Nor do Petitioners dispute that TLP does not disclose an object level node, which is what X_i^O corresponds to in claim 8/16. *Id.*

To the extent Petitioners argue that TLP’s body part nodes (*i.e.*, component nodes) are also object nodes, they are again reading out any distinction between “object” and “components” in the claims. EX2007, ¶77. As explained above, that is contrary to how the POSITA would interpret the claims. *Id.*; see §I, *supra*.

E. Dependent Claims.

Claims 2-8 and 10-16 are patentable for the same reasons as claims 1 and 9. EX2007, ¶¶47, 55, 60, 79.

Dated: July 24, 2024

By: /Christine E. Lehman/
Christine E. Lehman
PTO Reg. No. 38,535
Counsel for Patent Owner

CERTIFICATE OF COMPLIANCE

The undersigned hereby certifies that this Patent Owner's Sur-Reply complies with the type-volume limits of 37 C.F.R. § 42.24, as modified by Paper 41, and consists of 7,579 words, excluding the table of contents, a table of authorities, certificate of service, this certificate of compliance, or table of exhibits, and claim listing. The undersigned has relied on the word count feature of the word-processing system used to prepare this paper (Microsoft Word).

Dated: July 24, 2024

Respectfully submitted,

/Christine E. Lehman/

Christine E. Lehman

PTO Reg. No. 38,535

Counsel for Patent Owner

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing **PATENT OWNER'S SUR-REPLY** was served on July 24, 2024, via electronic mail to Meta_VideoLabs@kirkland.com, as agreed to by counsel for Petitioners, upon the following counsel:

W. Todd Baker
todd.baker@kirkland.com
KIRKLAND & ELLIS LLP
1301 Pennsylvania Avenue, N.W.
Washington, D.C. 20004

Ellisen Shelton Turner
ellisen.turner@kirkland.com
KIRKLAND & ELLIS LLP
2049 Century Park East
Los Angeles, CA 90067

Jonathan D. Brit
jonathan.brit@kirkland.com
KIRKLAND & ELLIS LLP
601 Lexington Avenue
New York, NY 10022

Jennifer R. Bush
jbush@fenwick.com
FENWICK & WEST LLP
801 California Street
Mountain View, CA 94041
Telephone: (650) 988-8500

Dated: July 24, 2024

/Christine E. Lehman/
Christine E. Lehman