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12 UNITED STATES DISTRICT COURT
13 NORTHERN DISTRICT OF CALIFORNIA
14 SAN JOSE DIVISION

15 UNIVERSITY OF BRITISH COLUMBIA,

16 Plaintiff/Counterclaim-
17 Defendant,

18 v.

19 CAPTION HEALTH, INC.; GE
HEALTHCARE TECHNOLOGIES INC.,

20 Defendant/Counterclaim-
21 Plaintiff.

Case No. 5:24-cv-03200-EKL

**PLAINTIFF UBC'S OPENING CLAIM
CONSTRUCTION BRIEF**

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REDACTED VERSION**I. INTRODUCTION**

The parties dispute the meaning of the following claim terms from U.S. Patent Nos. 11,129,591 (Ex. 1, the “’591 patent”) and 10,751,029 (Ex. 2, the “’029 patent”) (collectively, the “Asserted Patents”): 1) “quality assessment value,” 2) “each of the plurality of predetermined echocardiographic image view categories is associated with a respective set of assessment parameters, each of the sets of assessment parameters being a set of neural network parameters that define a neural network having a plurality of layers”, 3) “determining that a [first/second] set of assessment parameters of the sets of assessment parameters is associated with the [first/second] view category,” 4) “in response to determining that the [first/second] set of assessment parameters is associated with the [first/second] view category, inputting the [first/second] at least one echocardiographic image into the neural network defined by the [first/second] set of assessment parameters,” and 5) “extracted feature representations.” For the first four terms, plaintiff (“UBC”) submits that there is no ambiguity that requires clarification, so the plain and ordinary meaning of the words should apply. In contrast, for each of those terms, Defendants seek to re-word the limitation, not to clarify an ambiguity, but to add ambiguity and/or to narrow the plain meaning of the term. For example, Defendants repeatedly insert “respective” into the claim language, apparently to limit the claims to a scenario where there is a distinct neural network for each view. But the claims do not require that—there can be a subnetwork for a given view—and the Asserted Patents disclose that neural networks can share layers. A [REDACTED] satisfies the claims. Defendants’ attempt to change the scope of the terms should be rejected.

The fifth term—“extracted feature representation”—has no ordinary meaning. For that term, UBC proposes a construction that clarifies that, in the context of the patent, “extracted” means learned using a neural network. This is the only possible meaning consistent with the specification and clarifies the term for the jury. Defendants’ construction—“data representing extracted features”—simply replaces “representation” with “data” and does nothing to explain what “extracted” means. UBC’s proposed constructions should be adopted.

REDACTED VERSION**1 II. BACKGROUND****2 A. The Parties and Technology**

3 UBC is one of the top research universities in the world and has created numerous
4 innovations that benefit society. UBC has invested hundreds of millions in research, including
5 echocardiographic (ultrasounds of the heart) image analysis research. One of the longstanding
6 challenges in echocardiographic image analysis is that operators of the ultrasound devices struggle
7 to capture images of the heart that are useful to cardiologists and other physicians. Slight changes
8 in where an ultrasound transducer is placed, or the pressure applied when using the transducer, can
9 result in significant variation in the quality and usability of an image. In most cases, the actual
10 quality and usability of the image cannot be ascertained by the naked eye. Given the inability to
11 discern the quality of captured echocardiographic images, operators often send inadequate or
12 unusable images to the cardiologist, only to be asked to do it again. As a result, effective
13 echocardiographic analysis can be significantly delayed, which can delay critical treatment. Given
14 this inefficient use of time and resources, there has long been a need for a better system and method
15 for acquiring quality echocardiographic images.

16 The difficulty in assessing echocardiographic images is exacerbated by the fact that
17 echocardiography involves capturing images from multiple strategic views. Different
18 combinations of anatomical structures need to be visible from each of the various views for a proper
19 diagnosis. Additionally, unlike other medical imaging, echocardiography involves capturing the
20 movement of the heart through sequences of images, known as echo cine series. These echo cine
21 series include multiple images (e.g., 20 images) for each view, which further increases the number
22 of images that are assessed. Capturing sequences of images from each of the various views
23 increases the computational demands for assessing the echocardiographic images, especially when
24 assessment feedback is desired quickly.

25 To address this problem, UBC invented a system that dramatically improves the capture
26 and quality of echocardiographic images using neural networks. These neural networks are trained
27 to know when there is a high quality image (or series of images) of the heart, based on specific
28 “view categories” (different viewpoints of the heart). The system signals to the operator visual

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1 representations of the quality assessment value and view category so the operator can capture the
2 image.

3 Defendants¹ sell a wide range of ultrasound products that, like the patents, incorporate
4 neural networks to help operators capture high-quality echocardiographic images. *See e.g.*, Dkt.
5 46, at ¶¶ 51-53. UBC notified Caption Health of the '591 patent and its concerns about
6 infringement in multiple letters sent in May 2022 and November 2022. *See id.*, ¶¶ 30, 32, 35. When
7 Caption Health failed to respond to UBC's November 2022 letter, UBC was forced to file this
8 lawsuit. *See id.*, ¶ 36.

9 **B. THE ASSERTED PATENTS**

10 **1. The '591 Patent**

11 As noted above, the claims of the '591 patent are directed to capturing and evaluating
12 cardiac ultrasound images. Specifically, the claims address the problems described above of
13 “echocardiographic systems...[that] may not assist echocardiographers in capturing high quality
14 echocardiographic images for use in subsequent quantified clinical measurement of anatomical
15 features.” Ex. 1 ('591 patent), 1:29-34. The claimed inventions solve this problem by training and
16 employing neural networks for assessing the quality of echocardiographic images to help operators
17 optimize the quality of such images. *See, e.g., id.*, 5:30-45, 6:13-20.

18 Further, the neural networks are trained to assess echocardiographic images of a specific
19 view category. *See, e.g., id.*, 5:62-6:20. As described above, cardiologists want echocardiographic
20 images from various views or anatomical planes. *See, e.g., id.*, 5:46-49. Since what is a good
21 image for each of these views can differ, there are different criteria for assessing quality for different
22 views. *See, e.g., id.*, 5:62-67. For example, a quality assessment value for the “AP2” view category
23 may depend on the left ventricle, left atrium, and mitral valve in the image, while a quality
24 assessment value for the “AP3” category may depend on the aortic valve, mitral valve, left atrium,
25 left ventricle, and septum. *See, e.g., id.*, 15:28:39. As the specification explains, the employed
26 neural networks are trained with images and their associated view category information, so that
27

28 ¹ GE Healthcare is a corporation that acquired Caption Health in February 2023 for about
\$150 million. *See* Ex. 3; Ex. 4.

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1 neural network parameters that are eventually used to assess image quality can evaluate quality
2 based on criteria specific to certain view categories. *See, e.g., id.*, 17:60-63, 18:27-35. Applying
3 specialized neural networks for specific view categories improves the system’s ability to assess
4 echocardiographic image quality, for example, because a neural network is better able to consider
5 in its analysis the “variability in the echocardiographic image data than may be possible when
6 analysis of the echocardiographic image relies on an average template or atlas with average shape.”
7 *See, id.*, 11:44-51.

8 2. The ’029 Patent

9 The claims of the ’029 patent are also directed to capturing and evaluating ultrasound
10 images. Specifically, the claims address problems relating to how “[a]ccurate diagnosis in
11 ultrasound requires high quality ultrasound images, which may need to show or contain different
12 specific features and structures depending on various properties of the images,” and that
13 recognizing such features can be especially difficult for inexperienced ultrasound operators. Ex. 2
14 (’029 patent), 1:22-31. The claimed inventions also solve this problem by training and employing
15 an algorithm, for example using a neural network, for assessing ultrasound images for quality, along
16 with specific features or structures, to facilitate more accurate analysis of the images and help
17 operators optimize the capture of desirable images. *See, e.g., id.*, 5:5-22.

18 The employed algorithm is trained to derive a set of extracted feature representations from
19 ultrasound images and then assess the ultrasound images for quality, as well as an image property
20 (e.g., specific features or structures captured in the images) based on the extracted feature
21 representations in one fell swoop. *See, e.g., id.*, FIGs. 3-4, 9:16-15:26. As the specification
22 explains, the algorithm first derives one or more extracted feature representations from a set of
23 ultrasound images. *See, e.g., id.*, 5:34-31. The specification describes that the extracted feature
24 representations are learned using a neural network. *See e.g., id.*, FIGs. 3-4, 9:16-15:26. The
25 algorithm then combines quality assessment and image property assessment to enable simultaneous
26 determination of a quality assessment value and an image category based on the extracted feature
27 representations. *See, e.g., id.*, 5:34-39. With respect to echocardiography, examples of image
28 properties include the view category, left ventricular ejection fraction, and left atrial ejection

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1 fraction. *See, e.g., id.*, 20:41-59. Since specific features or structures can be difficult to recognize
2 in ultrasound images, it is helpful for an operator to receive information about image properties in
3 addition to quality assessment values so that they have more context when capturing an image. *See*
4 *e.g., id.*, 5:5-22. Thus, the '029 patent describes that extracted feature representations are learned
5 using a neural network, which also can simultaneously determine a quality assessment value and
6 view category of ultrasound images. *Id.*

7 **III. LEGAL STANDARDS**

8 Claim terms “are generally given their ordinary and customary meaning,” which is the
9 meaning that the term would have to a “person of ordinary skill in the art in question at the time of
10 the invention” “after reading the entire patent”—that is, the specification, including the claims and
11 written description. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13, 1321 (Fed. Cir. 2005) (en
12 banc) (internal citations omitted). “While claim terms are understood in light of the specification,
13 a claim construction must not import limitations from the specification into the claims.” *Douglas*
14 *Dynamics, LLC v. Buyers Prods. Co.*, 717 F.3d 1336, 1342 (Fed. Cir. 2013) (citing *Phillips*, 415
15 F.3d at 1323); *Liebel–Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 904 (Fed. Cir. 2004) (collecting
16 cases rejecting attempts to import limitations from the specification into the claims). Rather, when
17 “the patentee offers an ascertainable definition in the body of the claim ... cases do not support
18 prescribing a more particularized meaning unless a narrower construction is required by the
19 specification or prosecution history.” *3M Innovative Proprs. Co. v. Tredegar Corp.*, 725 F.3d 1315,
20 1329 (Fed. Cir. 2013) (internal citations omitted). “Therefore, absent a clear disavowal or
21 alternative lexicography by a patentee, he or she ‘is free to choose a broad term and expect to obtain
22 the full scope of its plain and ordinary meaning.’” *Wasica Fin. GmbH v. Cont’l Auto. Sys., Inc.*,
23 853 F.3d 1272, 1282 (Fed. Cir. 2017) (quoting *Thorner v. Sony Comput. Ent. Am. LLC*, 669 F.3d
24 1362, 1367 (Fed. Cir. 2012)). When the plain and ordinary meaning of the disputed claim language
25 is clear, there is no need to construe the term. *See Summit 6, LLC v. Samsung Elecs. Co.*, 802 F.3d
26 1283, 1291 (Fed. Cir. 2015) (affirming the district court’s decision not to further construe a
27 “straightforward term” comprising of commonly used words with no special meaning in the art).
28 Further, the scope of a claim is not limited to preferred embodiments or specific examples in the

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1 specification. *See SSI Techs., LLC v. Dongguan Zhengyang Elec. Mech. LTD.*, 59 F.4th 1328, 1336
 2 (Fed. Cir. 2023) (citing *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1328 (Fed. Cir. 2002))
 3 (construing term broadly because the specification did not limit the term to a specific embodiment).

4 **IV. UBC’S CONSTRUCTIONS SHOULD BE ADOPTED**

5 **A. Person of Ordinary Skill in the Art**

6 UBC asserts that a person of ordinary skill in the art (“POSA”) as of the priority date of the
 7 ’591 patent would have had a person with an advanced degree in Computer Engineering, Computer
 8 Science, Physics, or other field related to computer imaging, and at least 1 year of research or work
 9 experience training machine learning models to analyze medical imaging data (e.g., ultrasound,
 10 CT, PET, MRI, etc.) would also have qualified as a POSITA. Additionally, further education could
 11 substitute for experience and vice versa.

12 On the other hand, defendants asserted in the parallel IPR briefing that “[t]he hypothetical
 13 person of ordinary skill in the art (“POSITA”) would include a person with an advanced degree in
 14 Computer Engineering, Computer Science, Physics, or other field related to computer imaging, and
 15 at least 1 year of research experience training machine learning models to analyze ultrasound data.”
 16 IPR2025-01066, Paper 1 at 11; IPR2025-01422, Paper 1 at 9.

17 UBC does not consider the differences to be material to the claim construction issues.

18 **B. “quality assessment value” (’591 patent, claims 1–3, 5, 7–17, 19; ’029 patent, 19 claims 1, 9-14, 21, 27-30)**

20 UBC’s Proposed Construction	Defendants’ Proposed Construction
Plain and ordinary meaning	score of diagnostic image quality

22 The term “quality assessment value” requires no construction because its plain and ordinary
 23 meaning is clear and understandable—it is a value assessing the quality of one or more images.
 24 This is not a technical term that is beyond the comprehension of the jury or requires clarification.

25 The plain meaning is also consistent with the specification. The specification of the ’591
 26 patent describes the term broadly as a value “representing a quality assessment of at least one
 27 echocardiographic image.” Ex. 1, 5:16-18. Similarly, the specification of the ’029 patent also
 28 describes the term broadly as a value “representing a quality assessment of the set of ultrasound

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1 images.” Ex. 2, 1:42-43; *see also id.*, 6:43-45; *see id.*, 12:56-57; *see id.*, 16:2-3. Thus, no
2 construction is necessary to understand this term.

3 By contrast, Defendants’ construction seeks to narrow the term by replacing “value” with
4 “score,” although nothing in the plain meaning or specification limits a “value” to a “score.”
5 Defendants apparently want to do this to argue that even if the accused devices output some “value”
6 that indicates image quality, it is not a “score of diagnostic image quality.” For example, they
7 might argue that a value representing the [REDACTED]
8 [REDACTED]—which does translate to image quality (because [REDACTED]
9 the better the quality)—is not a “score of diagnostic image quality.” This attempt to twist or narrow
10 the plain meaning of “quality assessment value” should be rejected. “Score” is not synonymous
11 with “value” and does not clarify any ambiguity. Additionally, “diagnostic” is not part of the term
12 at all and simply will introduce ambiguity about what is “diagnostic image quality.” There is no
13 justification for narrowing what is an unambiguous term. *See Wasica*, 853 F.3d at 1282 (quoting
14 *Thorner*, 669 F.3d at 1367) (A patentee is “free to choose a broad term and expect to obtain the full
15 scope of its plain and ordinary meaning.”).

16 As described above, the specifications describe the term broadly as a value “representing a
17 quality assessment of” either “at least one echocardiographic image” or “[a] set of ultrasound
18 images.” Ex. 1, 5:16-18; Ex. 2, 1:42-43, 6:43-45, 12:56-57, 16:2-3. The specifications also provide
19 specific examples of a “quality assessment value,” such as a value that “may represent a suitability
20 for a quantified clinical measurement.” Ex. 1, 14:50-51. Since the specifications never limit a
21 “quality assessment value” to any “score of diagnostic image quality,” Defendants are likely to
22 point out that the specification gives examples of values that are scores. *See* Ex. 1, 14:52-55 (“In
23 some embodiments, the quality assessment value may represent an estimate of an expected score
24 which would be provided by an expert to the input at least one echocardiographic image.”); *see id.*,
25 14:58-61 (“In some embodiments, the quality assessment value may be a score with criteria and/or
26 a range that varies depending on the view category with which the neural network is associated.”);
27 *see id.*, 15:1-5 (“[I]n various embodiments, the quality assessment value may represent an estimate
28 of an expected aggregation of scores derived using semi-quantitative evaluation of component

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1 structures and parameter optimization features[.]”); *see also* Ex. 2, 5:34-39 (“In various
2 embodiments, this may be done through the use of a deep learning neural network, which may, for
3 example, be capable of...determining a quality assessment value acting as a quality estimation
4 score.”); *see also id.*, 7:12-14 (“For example, the classified view and its associated quality score
5 may be displayed in a graphical user interface (GUI) on the display 18 as feedback to the
6 operator.”). But the specification makes clear that these are merely examples of quality assessment
7 values, and never defines or limits “value” to a “score.” Absent disavowal or lexicography (express
8 defining of a term), claim terms should not be limited to examples in the specification, even where
9 those examples are “preferred embodiments.” *See Wasica*, 853 F.3d at 1282 (quoting *Thorner*, 669
10 F.3d at 1367) (“[A]bsent a clear disavowal or alternative lexicography by a patentee, he or she ‘is
11 free to choose a broad term and expect to obtain the full scope of its plain and ordinary meaning.’”);
12 *see also SSI Techs.*, 59 F.4th at 1336 (citing *Teleflex*, 299 F.3d at 1328)) (“[T]he scope of a claim
13 is not ordinarily limited to preferred embodiments or specific examples in the specification”).

14 Additionally, any discussion in the specifications about a “diagnosis” is presented merely
15 as a possible option and is not discussed with respect to a score, let alone a “score of diagnostic
16 image quality.” *See* Ex. 1, 5:38-45 (“The operator may make such adjustments until a high quality
17 assessment value is provided on the display 15, for example, at which point the operator may be
18 confident that the echocardiographic images captured are suitable for subsequent quantified clinical
19 measurement of anatomical features *and/or* to assist in diagnosing a medical condition or a
20 characteristic of the heart.”) (emphasis added); *see also id.*, 5:46-51 (“[T]he operator may wish to
21 capture echocardiographic images for various views or anatomical planes since multiple views may
22 be required in order to perform certain quantified clinical measurement of anatomical features
23 *and/or* to assist in diagnosing a medical condition or a characteristic of the heart”) (emphasis
24 added); *see also id.*, 17:26-32 (“For example, in some embodiments, the operator may...wish to
25 capture images of one or more...view categories to facilitate quantified clinical measurement of
26 anatomical features *and/or* to assist in diagnosing a medical condition or a characteristic of the
27 heart”) (emphasis added); *see also id.*, 24:46-52 (“In some embodiments, using the analyzer 12 to
28 analyze stored echocardiographic images from an image source may facilitate use of the previously

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1 captured echocardiographic images for later quantified clinical measurement of anatomical features
2 *and/or* to assist in diagnosing a medical condition or a characteristic of the heart.”) (emphasis
3 added); *see also id.*, Ex. 2, 7:25-32 (“In some embodiments, the operator may make such
4 adjustments until a high-quality assessment value and/or a desired view category is displayed by
5 the display 18, for example, at which point the operator may be confident that the images captured
6 are suitable for subsequent quantified clinical measurement of anatomical features *and/or* to assist
7 in diagnosing a medical condition of the subject, for example.”) (emphasis added); *see also id.*,
8 15:15-21 (“In various embodiments, an operator viewing the displayed representations of both the
9 quality assessment value and the view category, may be able to use this information to recognize
10 the specific features and structures required of various views *and/or* to capture diagnostically
11 relevant heart cines.”) (emphasis added); *see also id.*, 16:53-58 (“For example, in some
12 embodiments, the quality assessment values may be values between 0% and 100% representing
13 whether the set of ultrasound images are suitable for subsequent quantified clinical measurement
14 of anatomical features *and/or* to assist in diagnosing a medical condition.”) (emphasis added).
15 Thus, Defendants’ proposed construction is limiting and improperly ignores the specifications’
16 actual descriptions of a “quality assessment value.” *See SEMICAPS Pte Ltd. v. Hamamatsu Corp.*,
17 No. 17-cv-03440, 2020 WL 1957553, at *5 (N.D. Cal. Apr. 23, 2020) (rejecting defendant’s
18 proposed construction because “[defendant] selected certain examples [from the specification] to
19 support its preferred construction while ignoring others that are inconsistent with its construction”).
20 Defendants also do not point to the file histories as supporting evidence for this term, because there
21 is nothing in them to support its proposed construction. *See* Dkt. 87-3 at 1.

22 In sum, the Court should reject Defendants’ proposed construction as it is limiting and
23 inconsistent with the specifications and file histories, and instead adopt Plaintiff’s proposed plain
24 and ordinary meaning. *See SEMICAPS Pte*, 2020 WL 1957553, at *6 (internal citation omitted)
25 (finding “value” and “another value” should be given their plain and ordinary meanings because
26 “contrary to [defendant’s] position, the patent uses the word ‘value’ throughout the specification
27 without limiting it to [defendant’s proposed construction]...Nor does [defendant] point to anything
28 in the prosecution history to support its proposed construction.”); *see also Firstface Co., Ltd. v.*

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1 *Apple, Inc.*, No. 18-cv-02245, 2022 WL 2161505, at *5 (N.D. Cal. June 15, 2022) (adopting
 2 plaintiff’s proposed plain and ordinary meaning because “[n]othing in the specification suggest[ed]
 3 that the patentee intended to impart a special meaning to [the term] or that the term is not readily
 4 understood by a person of ordinary skill in the art.”).

5 C. “each of the plurality of predetermined echocardiographic image view
 6 categories is associated with a respective set of assessment parameters, each of
 7 the sets of assessment parameters being a set of neural network parameters
 8 that define a neural network having a plurality of layers” (’591 patent, claims
 9 1, 11, and 15)

UBC’s Proposed Construction	Defendants’ Proposed Construction
Plain and ordinary meaning	each of the plurality of predetermined echocardiographic image view categories is associated with a respective set of assessment parameters, each of the sets of the assessment parameters being a set of neural network parameters that define a respective view-category-specific neural network

14 Claims 1, 11, and 15 of the ’591 patent recite, in part, “each of the plurality of predetermined
 15 echocardiographic image view categories is associated with a respective set of assessment
 16 parameters, each of the sets of assessment parameters being a set of neural network parameters that
 17 define a neural network having a plurality of layers.” The disputed claim language is clear and
 18 understandable, as it merely clarifies that each view category has a “respective set of assessment
 19 parameters” that each such set is a “a set of neural network parameters that define a neural network
 20 having a plurality of layers.” Consistent with the claim language, the specification describes that
 21 echocardiographic images are analyzed based on multiple view categories of the heart (e.g., AP2
 22 (apical 2-chamber view), AP3 (apical 3-chamber view), AP4 (apical 4-chamber view), PSAXA
 23 (parasternal short axis at aortic valve level view), etc.), that there are assessment parameters (neural
 24 network parameters) specific to each view, and that those assessment parameters are used when
 25 analyzing an image for that view. *See* Ex. 1, 8:66-9:18; *see also id.*, 11:55-59 (“[E]ach of the sets
 26 of parameters may be associated with a view category to indicate that the set of parameters defines
 27 a neural network that is to be applied to echocardiographic images which are associated with that
 28 view category.”). Given the term’s clear language, it requires no construction. *See, e.g., Thorner,*

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1 669 F.3d at 1368 (“We conclude that the term attached should be given its plain and ordinary
2 meaning. The specification does not redefine attached nor is there any disavowal.”).

3 Defendants’ proposed construction replaces “a neural network having a plurality of layers”
4 with “a respective view-category-specific neural network.” This does not clarify any ambiguity
5 and instead is an attempt to change the meaning of the term, apparently so that Defendants can
6 argue that the claims require a different (“respective”) neural network for each view category. But
7 that is not what the claim says—it simply says that there is a neural network with multiple layers
8 for each view. There is nothing that says that it cannot be the [REDACTED]

9 [REDACTED]. Indeed, Defendants’
10 construction, if it purports to assert that neural networks cannot share layers or overlap, is
11 inconsistent with the specification, which explains that “a neural network may include more than
12 one neural network within,” where each neural network within can include shared parameters and
13 a set of view category specific parameters. *See e.g.*, Ex. 1, 12:7-41; *id.*, FIG. 8 (illustrating shared
14 layers). Since the plain and ordinary meaning of the term is clear, no construction is needed to aid
15 in understanding of the term. *See Summit 6*, 802 F.3d at 1291 (affirming the district court’s decision
16 not to further construe a term comprising of commonly used words with no special meaning in the
17 art).

18 **D. “determining that a [first/second] set of assessment parameters of the sets of**
19 **assessment parameters is associated with the [first/second] view category”**
20 **(’591 patent, claims 1, 11, 15)**

UBC’s Proposed Construction	Defendants’ Proposed Construction
Plain and ordinary meaning	determining which of the respective sets of assessments parameters is associated with the [first/second] view category

23 Claims 1, 11, and 15 of the ’591 patent recite, in part, “determining that a first set of
24 assessment parameters of the sets of assessment parameters is associated with the first view
25 category,” and “determining that a second set of assessment parameters of the sets of assessment
26 parameters is associated with the second view category.” The disputed claim language here is clear
27 and understandable, as it simply requires determining that “a [first/second] set of assessment
28 parameters” is associated with a [first/second] view category. In other words, the system needs to

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1 apply the correct neural network for a given view. The meaning of the term is clear in light of the
2 surrounding claim language, which describes that “each of the plurality of predetermined
3 echocardiographic image view categories is associated with a respective set of assessment
4 parameters,” and thus within all these “sets of assessment parameters” include assessment
5 parameters associated with a “first view category” and “second view category.” Thus, no change
6 to the claim language is needed to aid understanding of the term. *See Looksmart Grp., Inc. v.*
7 *Microsoft Corp.*, No. 17-cv-04709, 2018 WL 7858686, *5 (N.D. Cal. Nov. 8, 2018) (agreeing that
8 “the claims’ surrounding language renders unnecessary the language . . . [added] in [the] proposed
9 construction”).

10 The specification is also consistent with this claim language. For example, the specification
11 describes that “each of the sets of parameters may be associated with a view category to indicate
12 that the set of parameters defines a neural network that is to be applied to echocardiographic images
13 which are associated with that view category.” *See Ex. 1*, 11:55-59. The specification further
14 explains that “the parameters may define neural network architectures and may include weight and
15 bias values for the neural networks” and that “[a] neural network trainer...may have previously
16 determined...the weight and bias values for each of the neural networks and provided these values
17 to the analyzer 12.” *See id.*, 11:60-11:66. Additionally and alternatively, the specification refers
18 to a “determin[ation] that a set of assessment parameters of the sets of assessment parameters stored
19 in [a] location . . . is associated with” the view category to be used during analysis of an image. *See*
20 *id.*, 14:5-10; *see also id.*, 14:11-26 (describing an embodiment in which the determination involves
21 finding where assessment parameters associated with a view category are stored). Thus, the
22 specification describes that the claimed determination can occur at some point before analysis of
23 the image. Given the term’s clear language, the term requires no construction. *See e.g., Thorner*,
24 669 F.3d at 1368 (“We conclude that the term attached should be given its plain and ordinary
25 meaning. The specification does not redefine [the term] nor is there any disavowal.”); *see also*
26 *Summit 6*, 802 F.3d at 1291 (affirming the district court’s decision not to further construe a term
27 comprising of commonly used words with no special meaning in the art).

28 By contrast, Defendants’ proposed construction should be rejected because it unnecessarily

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1 makes the claim language less precise. Specifically, Defendants’ proposed construction replaces
 2 “determining that a [first/second] set of assessment parameters of the sets of assessment
 3 parameters...” with “determining which of the respective sets of assessments parameters...”
 4 Defendants apparently intend to argue that the accused system applies [REDACTED]
 5 [REDACTED] and thus does not “determin[e]” any assessment
 6 parameters associated with a specific view category. However, this is inconsistent with the
 7 specification which, as described above, describes the determination step with respect to
 8 determining parameters for each view category during the training phase and/or simply obtaining
 9 and using assessment parameters associated with a view category during evaluation of an image.
 10 Since Defendants’ proposed replacement removes the “[first/second] set of assessment parameters”
 11 antecedent basis for the following claim limitation addressed below and makes the claim language
 12 less precise, Defendant’s proposed construction brings unnecessary ambiguity into the term. *See*
 13 *Chrimar Sys Inc. v. Cisco Sys Inc.*, No. C 13–01300, 2015 WL 1250106, at *6 (N.D. Cal. Mar. 18,
 14 2015) (adopting a construction reciting “the first and the second” because it was “more consistent
 15 with the words of the claim itself and avoid[ed] unnecessary ambiguity”). Thus, Defendant’s
 16 proposed construction should be rejected.

17 E. “in response to determining that the [first/second] set of assessment
 18 parameters is associated with the [first/second] view category, inputting the
 19 [first/second] at least one echocardiographic image into the neural network
 defined by the [first/second] set of assessment parameters” (’591 patent,
 claims 1, 11, 15)

20 UBC’s Proposed Construction	Defendants’ Proposed Construction
21 Plain and ordinary meaning	22 in response to determining that the [first/second] set of assessment parameters is associated with the [first/second] view category, inputting the [first/second] at least one echocardiographic image into the respective neural network defined by the [first/second] set of assessment parameters

25 Claims 1, 11, and 15 of the ’591 patent recite, in part, “in response to determining that the
 26 [first/second] set of assessment parameters is associated with the [first/second] view category,
 27 inputting the [first/second] at least one echocardiographic image into the neural network defined
 28 by the [first/second] set of assessment parameters.” The disputed claim language is clear and

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1 understandable, as it merely states that in response to determining which neural network is
2 associated with a view category, inputting an image from that view into that neural network. The
3 specification is also consistent with the claim language and describes that the “determination” step
4 occurs sometime before the echocardiographic image is analyzed using the assessment parameters.
5 *See e.g.*, Ex. 1, 11:62-11:66 (“A neural network trainer...may have previously determined the
6 neural network architecture and/or the weight and bias values for each of the neural networks and
7 provided these values to the analyzer 12.”); 14:5-10 (“The flowchart 400 begins with block 402
8 which directs the analyzer processor 100 to determine that a set of assessment parameters of the
9 sets of assessment parameters stored in the location 146 is associated with the same view category
10 that is associated with the at least one echocardiographic image received at block 202”). At some
11 point after this determination, the echocardiographic image is input into “the neural network
12 defined by the [first/second] set of assessment parameters.” *See e.g., id.*, 14:27-31 (“Block 404
13 then directs the analyzer processor 100 to, in response to determining that the set of assessment
14 parameters is associated with the same view category, apply a function based on the set of
15 assessment parameters to the at least one echocardiographic image received at block 202.”).

16 Defendant’s proposed construction adds “respective” into the claim language because
17 Defendants apparently intend to argue that the claims require a different, separate neural network
18 for each view category. This is the same argument they intend to make in connection with terms
19 at Sections IV.C. and IV.D. above. However, Defendants’ argument is inconsistent with the claim
20 language, which says that there are neural networks with assessment parameters associated with a
21 view category. There is nothing that says that these neural networks cannot be the [REDACTED]

22 [REDACTED].
23 Indeed, Defendants’ construction, if it purports to assert that neural networks cannot share layers
24 or overlap, is inconsistent with the specification, which explains that a neural network can have
25 multiple sub-neural networks—“a neural network may include more than one neural network
26 within,” and where inputting an image into the neural network can result in inputting the image into
27 neural networks within that includes shared parameters and each set of view category specific
28 parameters. *See e.g.*, Ex. 1, 12:7-41; *id.*, FIG. 8. Since the plain and ordinary meaning of the term

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1 is clear, Defendant’s proposed construction should be rejected. *See Summit 6*, 802 F.3d at 1291
 2 (affirming the district court’s decision not to further construe a term comprising of commonly used
 3 words with no special meaning in the art).

4 **F. “extracted feature representations” (’029 patent, claims 1, 3-5, 7, 9-10, 14, 19,**
 5 **21, 26-28, 30)**

UBC’s Proposed Construction	Defendants’ Proposed Construction
Feature representations that are learned using a neural network	data representing extracted features

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 9 Claims 1, 3-5, 7, 9-10, 14, 19, 21, 26-28, and 30 of the ’029 patent recite “extracted feature
 10 representations.” Feature representations are encodings of image patterns of one or more images.
 11 *See e.g.*, Ex. 2, 11:30-35 (“[T]he commonly defined first feature extracting neural networks (e.g.,
 12 304, 306, and 308 shown in FIG. 4) may be each configured to extract *features that are encodings*
 13 *of image patterns* of a single echo frame which are correlated with the image quality and view
 14 category of the single input echo frame.”) (emphasis added); *id.*, 11:35-39 (“In some embodiments,
 15 these *features (encodings or mappings)* may be in the form of a vector of real-valued numbers
 16 (after the flatten operation), and each number may be considered as the level of presence of a
 17 specific spatial pattern in the input echo frame.”) (emphasis added); *id.*, 12:28-31 (“As a result, in
 18 some embodiments, the features extracted by the LSTM networks may be *encodings of both spatial*
 19 *and temporal patterns* of a multitude of echo frames.”) (emphasis added). UBC proposes that
 20 “extracted feature representations” are “feature representations that are learned using a neural
 21 network,” which is consistent with the specification. For example, the specification’s figures and
 22 corresponding descriptions depict the feature representations, or encodings of image patterns, as
 23 being learned using a neural network. *See e.g.*, *Id.*; *see also id.*, FIG. 2, 8:43-45 (depicting “location
 24 154 for storing first feature extracting neural network parameter data, location 156 for storing
 25 second feature extracting neural network parameter data”); *id.*, FIG. 4, 11:30-32 (depicting feature
 26 extractor neural networks 304, 306, and 308); *id.*, FIG. 5, 11:28-29 (depicting feature extractor
 27 neural network 310); *id.*, FIG. 6 (depicting feature extractor neural network 312); *id.*, FIG. 6, 11:28-
 28 29 (depicting feature extractor neural network 314); *id.*, FIG. 11, 16:3-5 (depicting “location 642

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1 for storing first feature extracting neural network data, location 644 for storing second feature
2 extracting neural network”); *id.*, FIG. 13, 22:33-34 (depicting “three first feature extracting neural
3 network or CNN threads”). Additionally, whenever the specification mentions “deriving extracted
4 feature representations,” it explains that this step is performed using a neural network. *See e.g., id.*,
5 6:35-41 (“The analyzer 14 may then derive one or more extracted feature representations from the
6 received set of ultrasound images. In some embodiments, the analyzer 14 may implement a neural
7 network including a feature extracting neural network and the analyzer 14 may input the set of
8 ultrasound images into the feature extracting neural network in order to derive the one or more
9 extracted feature representations”); *see id.*, 10:9-31 (explaining that “block 204 directs the analyzer
10 processor 100 to derive one or more extracted feature representations from the set of ultrasound
11 images received at block 202” and that the extracted feature representations are learned upon
12 inputting images into various neural networks); *see id.*, 10:32-12:51 (describing further details
13 about implementing neural networks for deriving extracted feature representations). In sum, the
14 specification supports that “extracted feature representations” are “feature representations that are
15 learned using a neural network.”

16 Defendants’ proposed construction, on the other hand, that “extracted feature
17 representations” are “data representing extracted features” does nothing to explain what “extracted”
18 means in this context. However, this is inconsistent with the specification, which is clearly focused
19 on using extracted features that are learned using a neural network, as described above. Thus,
20 Defendant’s proposed construction is improper. *See UltimatePointer, L.L.C. v. Nintendo Co.*, 816
21 F.3d 816, 823-24 (Fed. Cir. 2016) (finding the term “handheld device” was properly limited to a
22 direct-pointing system type of device and did not include indirect pointing system, where the
23 specification repeatedly stated that the invention was a direct pointing system).

24 In fact, all excerpts that Defendants identified pursuant to Patent Local Rule 4-2 support
25 UBC’s proposed construction. *See* Dkt. 87-3 at 7; *see* Ex. 2, 1:55-59 (explaining that extracted
26 feature representations are learned using a first feature extracting neural network); *id.*, 1:66-2:5
27 (explaining that extracted feature representations are learned using a second feature extracting
28 neural network); *id.*, 2:51-65 (describing how extracted feature representations are learned using a

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1 feature extracting neural network); *id.*, 6:35-41 (explaining that deriving extracting features
2 involves using a feature extracting neural network); *id.*, 10:9-16 (describing that deriving one or
3 more extracting feature representations involves deriving a first and second feature representation);
4 *see also id.*, 10:17-31 (explaining that the first and second feature representations are derived using
5 neural networks); *id.*, 10:40-11:12 (describing feature extracting neural networks used to derive
6 extracted feature representations); *id.*, 11:30-42 (describing how extracted feature representations
7 are learned using a feature extracting neural network); *id.*, 11:51-60 (explaining how first feature
8 representations were output and thus learned by a first feature extracting neural network); *id.*,
9 12:28-31 (explaining that extracted feature representations are “extracted by the LSTM [long short
10 term memory module] networks.”); *id.*, 12:42-48 (explaining the form of features that are learned
11 from a RNN (recurrent neural network)); *id.*, 13:34-36 (explaining that a “feature node” made up
12 of extracted feature representations output by a feature extracting neural network); *id.*, 23:4-26
13 (describing the technical implementation of feature extracting neural networks that learn and output
14 extracted features). Thus, Defendant’s proposed construction is not supported by the specification
15 and should be rejected.

16 **V. CONCLUSION**

17 For the reasons discussed above, the Court should adopt UBC’s proposed constructions for
18 each of the disputed terms.

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