

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner

v.

AUTONOMOUS DEVICES, INC.,
Patent Owner

Case: IPR2023-01169
U.S. Patent No. 10,607,134

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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EXHIBIT LIST

TESLA-1001	U.S. Patent No. 10,607,134
TESLA-1002	Prosecution File History for U.S. Patent No. 10,607,134
TESLA-1003	Declaration of Jason Janet, Ph.D.
TESLA-1004	Curriculum Viate of Jason Janet, Ph.D.
TESLA-1005	U.S. Patent No. 8,142,268 (“Thomas”)
TESLA-1006	U.S. Patent No. 9,434,072 (“Buehler”)
TESLA-1007	U.S. Patent No. 9,008,840 (“Ponulak”)
TESLA-1008	U.S. Patent App. Pub. No. 2003/0171146 A1
TESLA-1009	U.S. Patent App. Pub. No. 2003/0032467 A1
TESLA-1010	U.S. Patent No. 9,195,934
TESLA-1011	Silva, Marty, <i>A Visual History of American Football Games</i> , IGN, July 8, 2013, available at, https://www.ign.com/articles/2013/07/08/a-visual-history-of-football-video-games
TESLA-1012	Macy, Seth G., <i>A Visual History of Racing Games</i> , IGN, updated Sept. 6, 2017, available at, https://www.ign.com/articles/2015/03/27/a-visual-history-of-racing-games
TESLA-1013	<i>Final Fantasy XI Released</i> , IGN, updated June 16, 2012, available at, https://www.ign.com/articles/2003/10/29/final-fantasy-xi-released
TESLA-1014	Ellis, Tim, et al., <i>Ellipse Detection and Matching with Uncertainty</i> , pp. 137-144
TESLA-1015	Pomerleau, Dean A., <i>Neural Network Perception for Mobile Robot Guidance</i> , Feb. 16, 1992

TESLA-1016	Lee, Ten-min, et al., <i>Computer Simulation of Learning Experiments with Autonomous Mobile Robots</i> (Univ. of Manchester, March 26, 1999)
TESLA-1017	Durrant-Whyte, Hugh, et al., <i>Simultaneous Localisation and Mapping (SLAM): Part I The Essential Algorithms</i>
TESLA-1018	Smith, Randall, et al., <i>Estimating Uncertain Spatial Relationships in Robotics</i> , pp. 167-193
TESLA-1019	Zimmer, Kyle, <i>Evolution of the Game Console</i> , available at citadel.sjfc.edu/students-virtual/k/knz03095/public_html/imd/museum/index.html
TESLA-1020	Stuart, Keith, <i>PS4 and Xbox One: so why aren't they backwards compatible?</i> , The Guardian, December 12, 2023, available at https://www.theguardian.com/technology/2013/dec/12/ps4-and-xbox-one-so-why-arent-they-backwards-compatible
TESLA-1021	Christian, Mark, <i>Saved Game History: Battery Backups, Memory Cards, and the Cloud</i> , Mailchimp, Feb. 21, 2019, available at https://tedium.co/2019/02/21/video-game-save-state-history/
TESLA-1022	Second Declaration of Dr. Jason Janet
TESLA-1023	Transcript of Dr. Eli Saber Deposition
TESLA-1024	Patent Owner's Response (Paper 26) in IPR2023-01055 on U.S. Patent 11,238,344
TESLA-1025	U.S. Patent No. 7,399,224 to Hirai ("Hirai")
TESLA-1026	Excerpt from Merriam-Webster's Collegiate Dictionary (2014)
TESLA-1027	Navarro, Alex, <i>ESPN NFL 2K5 Review</i> , July 21, 2004, available at https://www.gamespot.com/reviews/espn-nfl-2k5-review/1900-6103135/

I. INTRODUCTION

The Patent Owner's Response ("POR") fails to rebut Petitioner's ("Tesla") showing in the Petition that the Challenged Claims of the '134 Patent are unpatentable. Patent Owner's ("Autonomous Devices" or "PO") arguments are based on mischaracterizations of the prior art references (Thomas and Buehler), unwarranted attempts to narrow the scope of the claims, and irrelevant arguments regarding the Petition's stated obviousness rationales. TESLA-1022, ¶¶1-118.

For these and the reasons explained in further detail below, PO's arguments are unavailing and the Challenged Claims should be found unpatentable.

II. GROUNDS 1 AND 2: THOMAS ANTICIPATES OR RENDERS OBVIOUS THE CHALLENGED CLAIMS

A. Claims 1, 10, and 19

PO's sole argument against the Ground 1 challenge of claim 1¹—that "analysis is different than matching"—is premised on an incomplete consideration of the disclosures of Thomas that were cited in the Petition and its proper context. POR, 14-19; TESLA-1022, ¶¶7-12. As described in the Petition and explained further here, a POSITA would have understood the operation of Thomas's playback mode to be based on a *match* between current circumstances and

¹ Similar arguments apply to independent claims 10 and 19.

circumstances previously recorded during learning mode, *e.g.*, a **match** between object representations. TESLA-1022, ¶¶7-12.

Thomas's system analyzes situations that occur during playback mode and identifies similar situations that were recorded during learning mode, in order to invoke the appropriate simulated input responsive to each playback mode situation. *See* TESLA-1005, 5:27-36; Petition, 8; TESLA-1022, ¶¶8-9. A situation is "defined by a set of one or more parameters," at least some of which characterize objects of the application (*e.g.*, parameters specifying locations or archetypes of avatars)—*e.g.*, each situation is defined (at least in part) by object representations characterizing objects that form part of the situation. TESLA-1005, 4:13-59; *see* Petition, 3; TESLA-1022, ¶9. With this context, a POSITA would have understood that identification of similar situations involves identifying situations having at least some similar parameter values, *e.g.*, situations with a **match** between object representations. TESLA-1022, ¶9.

A concrete example of Thomas's reliance on a **match** between object representations is apparent in the context of the "pump fake event" discussed in the Petition. *See* Petition, 16; TESLA-1005, 8:8-15, Institution Decision ("ID"), 30; TESLA-1022, ¶¶10-11. In this example, in learning mode, the simulator "records how covered the user was," *i.e.*, records parameters specifying locations of opposing-team players (first object representations; *see* Petition, 11-14). TESLA-

1005, 8:8-11. Later, in playback mode, the simulator “analyze[s] the location of ... the defensive coverage,” *i.e.*, again, locations of opposing-team players (second object representations; *see* Petition, 14-15). “If criteria is met,” the simulator “invoke[s] a pump fake.” TESLA-1005, 8:8-15; *see* Petition 16. Although PO asserts that the term “‘analyze’ in this citation ... is a different concept than ‘matching,’” this objection is unfounded. POR, 16. A POSITA would have understood that the question of whether “criteria is met,” in the context of analyzing defensive coverage to determine whether to invoke an action (*e.g.*, a pump fake), is based on whether there is a **match** between object representations (*e.g.*, a match between the locations of the opposing-team players in the learning mode and playback mode situations). *See* Petition, 15-16; ID, 30; TESLA-1022, ¶¶10-11. Indeed, PO’s expert, Dr. Saber, concedes that “in [a] very simplistic example, if it sees you 15 feet away and you’ve always pump faked from there, then it’s going to pump fake”—*i.e.*, a pump fake action is invoked if there is a **match** between the player’s location in playback mode and locations where the player pump faked during learning mode. TESLA-1023, 97:11-18.

Thomas’s “pass out of shot event” provides a particularly clear example of Thomas’s system determining whether there is a **match** between object representations defining a situation in learning mode and object representations defining a situation occurring during playback mode. TESLA-1005, 7:55-64;

TESLA-1022, ¶12. As in the pump fake example discussed *supra*, in learning mode, the system “records how open the receiving avatar was and how covered the passing avatar was,” *i.e.*, records parameters indicating locations of opposing-team avatars (first object representations) in the vicinity of the receiving and passing avatars. TESLA-1005, 7:55-59. Later, in playback mode, the locations of opposing-team avatars (second object representations) are again considered: “the simulator 120 will analyze how well the passing avatar and the receiving avatar are covered.” *Id.*, 7:59-61. Just as in the pump fake example, “if the current circumstances meet the criteria,” a pass is invoked, where the criteria are “how much the passing and receiving avatars are covered.” *Id.*, 7:62-64. A POSITA would have understood that the question of whether “current circumstances meet the criteria” in terms of “how much the passing and receiving avatars are covered”—*i.e.*, the locations of opposing-team avatars—is based on whether there is a **match** between locations of opposing-team avatars in the playback mode situation and locations of opposing-team avatars in a learning mode situation in which a pass was invoked. *See* Petition, 15-16; ID, 30; TESLA-1022, ¶12.

Beyond PO’s failure to acknowledge the scope of Thomas’s disclosure, PO appears to read the claim improperly to require an active matching step, stating that Thomas “never discloses **comparing** or **matching** the spatial positions of defenders.” POR, 15 (emphasis added); *see* 17 (“Thomas ... still fails to disclose

the specifically claimed matching using object representations”). POR, 17. But claim 1 does not recite “matching,” as PO contends, instead reciting only that the first one or more instruction sets are determined “based on at least partial match” between object representations—which, as discussed *supra*, a POSITA would have understood to be disclosed by Thomas. PO’s apparent demand that Thomas provide disclosure of an active “matching” step is both immaterial and incorrect.

Finally, PO’s and Dr. Saber’s overly rigid analyses fail to account for the reasonable inferences that a POSITA would bring to bear in reviewing Thomas, and they hence follow an approach that is inconsistent with well-established law of anticipation. *See, e.g., In re Predai*, 401 F.2d 825, 826 (CCPA 1968) (“it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom”); *Eli Lilly v. Los Angeles Biomedical Research Inst.*, 849 F.3d 1073, 1074-1075 (Fed. Cir. 2017); *In re Graves*, 69 F.3d 1147, 1152 (Fed. Cir. 1995); *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

B. Claim 3

PO’s efforts to discredit the Petition’s showing that Thomas anticipates claim 3 fail. To start, PO improperly attempts to import a requirement for “counting” matching portions of circumstance representations in a manner that is

not required by the plain language of claim 3. *See* POR, 22. PO's arguments thus fail at the outset as they are based on unclaimed features that need not be met by the prior art in the first place. Indeed, the recited language "determining *that* a number [or percentage] of at least partially matching portions" does not necessarily involve "counting" since the condition can be determined even without an affirmative counting step. TESLA-1022, ¶¶13-15. That is, for instance, while a number of items (*e.g.*, a number of partially matching portions) can be determined by simply counting the items, it can also be determined in other ways, such as by calculation (*e.g.*, by adding together the number of items in multiple subsets of known (or estimated) quantity or by computing the value of an equation indicative of the number of items) or by estimation, among others. *Id.*

Regardless, as explained in the Petition, Thomas discloses determining that a number/percentage of matching portions exceeds a threshold. *See* Petition, 20-21; TESLA-1022, ¶16. For instance, in the pass out of shot example, a pass is invoked "if the current circumstances meet the criteria, *e.g.*, how much the passing and receiving avatars are covered." TESLA-1005, 7:62-64; *see* Petition, 20-21. A POSITA would have understood that "how much" an avatar is covered refers to how many opposing-team players are within the vicinity of that avatar. TESLA-1022, ¶16. A POSITA further would have understood that determining whether that coverage "meet[s] the criteria" is a threshold question of whether the avatar is

open or sufficiently covered to justify invoking a pass action—*e.g.*, whether the number of opposing-team players within the vicinity of that avatar *exceeds a threshold* to warrant invoking the pass. TESLA-1022, ¶16. A POSITA would have reached a similar understanding regarding the “criteria” for the “defensive coverage” in Thomas’s pump fake example, as explained by Dr. Janet. TESLA-1022, ¶17. Alternatively/additionally, to the extent this threshold feature is not expressly disclosed by Thomas, the Petition asserted that “it would have been obvious to use a threshold number or percentage to determine whether the criteria ... is met,” *e.g.*, because that is one way of implementing a determination of whether “how much the avatars are covered” satisfies criteria. Petition, 21; TESLA-1022, ¶18.

C. Claim 4

PO seeks to distinguish the claimed “connection” over Thomas by advancing a narrow construction of this term as a “relationship that includes a link.” POR, 9-13. For the reasons described further below, however, PO’s construction is incorrect and unjustifiably narrows the plain meaning of “connection.” TESLA-1022, ¶¶19-30. Even so, Thomas discloses the claimed connection whether or not a link is required. *Id.*

1. PO's overly narrow construction of "connection" should be rejected

PO's construction of "connection" as requiring a "link" should be rejected as unsupported by the intrinsic record of the '134 patent and an unjustified departure from the term's plain and ordinary meaning. TESLA-1022, ¶¶20-21. In fact, in its POR in related proceeding IPR2023-01055 involving another patent asserted against Petitioner based on similar subject matter, PO advanced the same construction of "connection" and conceded that its construction is *not* the plain and ordinary meaning. TESLA-1024, 22-23 ("Even if Patent Owner's proposed construction is not adopted, ... [the reference] fails to disclose the claimed connections under the term's plain and ordinary meaning."). But the intrinsic record lacks any basis for PO's proposed departure from plain meaning. The Federal Circuit has emphasized that "[t]here are only two exceptions" to the "general rule" that "[t]he words of a claim are generally given their ordinary and customary meaning": namely, "1) when a patentee sets out a definition and acts as his own lexicographer," and "2) when the patentee disavows the full scope of a claim term either in the specification or during prosecution." *Thorner v. Sony Comput. Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). Neither condition is satisfied here, and tellingly, the POR never once even attempts to

argue that the specification or file history contain any relevant lexicography or disavowals. They do not.

PO instead attempts to import a requirement for a connection” to include a “link” by mere reference to *examples* in the specification where a “link” is disclosed. POR, 10. But even these examples are not specifically described in terms of “connections.” TESLA-1022, ¶¶22-23. For example, PO turns to FIGS. 16 and 17A, which are described as “embodiments,” and which do not impose a limiting effect. TESLA-1001, 56:29-34. The ’134 Patent explains that Model A in FIG. 16 “*may* include a network of Nodes 852 ... and Connections 853 similar to that of a brain.” TESLA-1001, 105:21-23. In FIG. 17A, “[e]ach of Connection 853z1 and Connection 853z2 *may* include or be associated with occurrence count, weight, *and/or other parameters or data.*” TESLA-1001, 107:50-53. The ’134 patent also states that a “connection *may include or be associated* with at least one of: an occurrence count, a weight, a parameter, or a data.” TESLA-1001, 16:8-10. These descriptions include a permissive “may,” and are precisely the type of non-limiting language that does not limit the scope of a claim term. *Aventis Pharma S.A. v Hospira, Inc.*, 675 F.3d 1324, 1330 (Fed Cir. 2012). Notably, the textual description of FIGS. 16 and 17A does not once use the word “link,” which PO seeks to import into the construction of “connection.” The specification also broadly describes “connections”—both “direct” and otherwise—at col. 66:12-32

without ever referring to or mandating that a connection include a “link” as proposed by PO. TESLA-1001, 66:12-32.

In addition to the lack of support, PO’s construction is problematic because PO’s construction includes the term “link”—the meaning of which is unclear and undefined by the ’134 Patent. TESLA-1022, ¶¶24-26.

PO cites two dictionary definitions (EX2012, EX2013) as allegedly supporting its construction, each of which provide numerous definitions for “connection.” POR, 13. But PO offers no explanation as to why it cherry-picked one definition involving the word link from the various other available definitions, *particularly when the description in the ’134 Patent does not even use the word “link” to describe a “connection.”* Even if a connection may include a link in some contexts, there is no basis in the specification, file history, or otherwise for limiting a connection to a “relationship that includes a link” as PO contends.

Based on the broad description of the term “connection” in the ’134 Patent (see e.g., TESLA-1001, 16:8-10, 66:12-32), Petitioner submits that no construction is necessary and that the plain and ordinary meaning should apply. The meaning that most closely aligns with the breadth of this term in the intrinsic record is “an association or a relationship.” EX2012, 399-400, EX2013, 481; TESLA-1001, 16:8-10, 66:12-32; TESLA-1022, ¶¶24-26.

2. Thomas discloses the “connection[s]” of claim 4

Thomas discloses the claimed connections. TESLA-1022, ¶¶27-30. As explained in the Petition, Thomas describes correlations each including a different instruction set for the same situation/event, where numerical weights are assigned to the correlations to indicate the frequency of occurrence of the action corresponding to each instruction set. *See* Petition, 23-24; TESLA-1005, 6:19-30. Because these frequency weights establish an association or relationship between the stored data, *e.g.*, indicative of frequency of occurrence of each of multiple options correlated to the same situation/event, Thomas discloses the claimed “connection” between correlations. *See* Petition, 23-24; TESLA-1022, ¶29.

Further, even if a “connection” required a link as urged by PO (which it does not), a POSITA would have understood Thomas’s occurrence weights to link the various instruction sets that are correlated to a common situation/event. TESLA-1022, ¶30. Thomas describes that during playback mode, “the simulator 120 can randomly invoke a response to a situation and/or event based on weighted statistical values of the stored inputs.” TESLA-1005, 6:28-30. The relationship among the various “stored inputs” (*e.g.*, as represented by the instruction sets of the correlations) that enables a statistically weighted selection of an action is embodied by the numerical weights, *i.e.*, by the **link** between different instruction sets correlated to the same situation/event. TESLA-1022, ¶30.

D. Claim 7

PO attempts to distinguish Thomas by specifying a limiting context for claim 7, stating that this claim relates to “a situation where a stream of object representations and a stream of instruction sets are first stored and ... correlated later, and where a determination of temporal correspondence is needed for correct correlation.” POR, 27. Because “[n]o such situation ... is suggested in Thomas,” PO argues, Thomas cannot disclose the features of claim 7. *Id.*, 28. However, this argument fails at least because the claim does not require the specific context that PO attempts to import into its interpretation of the claim. It is basic that anticipatory prior art need only disclose the limitations actually recited in the claim—not some unclaimed “context” that PO later wishes to import after the patent has issued. *See Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) (““A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference”). And Thomas does so. *See* Petition, 29-30; TESLA-1022, ¶¶31-32.

Indeed, far from requiring streams of object representations or instruction sets, claim 7 merely recites “determining” that first instruction sets “temporally correspond” to first object representations. Thomas discloses this determination of a temporal correspondence. As explained in the Petition, in Thomas, an instruction

set (*e.g.*, an instruction to invoke a pump fake) *temporally corresponds* to the object representations that define the event/situation (*e.g.*, locations of opposing-team avatars) at the time when the user input represented by that instruction set was received. *See* Petition, 29-30; TESLA-1005, 7:55-59, 8:8-15; TESLA-1022,

¶33. A POSITA would have understood that this temporal correspondence is *determined* in Thomas: Thomas’s system identifies (*e.g.*, *determines*) the current circumstances (defined at least in part by object representations) when it receives a user input (instruction sets). *See* TESLA-1005, 7:55-50, 8:8-15; TESLA-1022,

¶34. Moreover, this *determination* is made *to correlate* the object representations with the instruction sets, *e.g.*, to “associate [*correlate*] the one or more data fields” storing user inputs (instruction sets) “with the one or more events and the one or more current circumstances.” TESLA-1005, Abstract; TESLA-1022, ¶34.

E. Claim 12

As explained in the Petition, Thomas allows “any participating users” to “download or access any user profile available in the database.” TESLA-1005, 19:57-62; *see* Petition, 41. PO argues that these interactions are “a different concept than learning at least a portion of the third correlation in another learning process involving operation of the first avatar by another user.” POR, 29. But PO’s interpretation fails to take into account what a POSITA would have

understood from the cited portion of Thomas's disclosure. TESLA-1022, ¶¶35-37. The ability that Thomas provides to its users to "download or access any user profile" is described in the context of "learning *and/or* simulation mode." TESLA-1005, 19:55-60. A POSITA thus would have understood Thomas's disclosure of another user accessing a first user's profile to encompass that other user accessing the first profile in learning mode, and thus that other user operating the first user's avatar in learning mode. TESLA-1022, ¶37. Indeed, it is common for multiple users to share a profile when playing a video game, *e.g.*, when multiple players take turns playing on single console and do not switch profiles between their turns.

The correlations between object representations and instruction sets are learned during learning mode. *See* Petition, 11-14; TESLA-1005, 3:53-61, 4:67-5:13, 7:39-44, 8:8-15; TESLA-1022, ¶37. Thus, a POSITA would have understood that when a correlation is learned in learning mode when the other user is operating the first user's avatar, that correlation is learned in a learning process *that includes operating the first avatar by another user*, as recited in claim 12. TESLA-1022, ¶37.

Moreover, the identity of the user operating an avatar during a learning process is an expression of intended use that is non-limiting on the structural elements of the system of claim 12 and thus should be afforded no patentable weight.

F. Claim 14

Once again, PO's arguments fail because they are based on unclaimed features that need not be met by the prior art in the first place. PO improperly attempts to import a requirement that the third correlation recited in claim 14 be "learned ... involving a different application." POR, 32. This is incorrect. The claim places no constraint on where the third correlation was learned, requiring only that the instruction sets of the third correlation be for "operating an avatar of another application," and that the object representations "represent one or more objects of the another application." TESLA-1022, ¶¶38-39.

Under a proper interpretation of claim 14, Thomas discloses the claimed third correlation. As described in the Petition, Thomas describes that the user can play games on different "video game console[s]." Thomas, 19:35-42; *see* Petition, 45-47. In this context, Thomas's stored instruction sets (*e.g.*, the actions learned based on user inputs in learning mode) are for operating an avatar in various applications, *e.g.*, for operating an avatar in an instance of a basketball video game on "an Xbox" (one *application*) or for operating an avatar in an instance of the game on a "Playstation" (*another application*). TESLA-1005, 19:35-42; TESLA-1022, ¶40. For instance, instances of the game running on different consoles can be considered different applications because, *e.g.*, the game must be adapted to the specific instruction set architectures, constraints, and interfaces of the respective

consoles. And the corresponding object representations likewise represent objects in various applications, *e.g.*, objects in an Xbox instantiation or objects in a Playstation instantiation of the game. TESLA-1022, ¶40.

G. Claim 16

PO's argument that Thomas's "association of a value or numerical weight with a user input ... does not delete, modify, nor manipulate an element of the correlation" is based on an improper restriction of the scope of the claimed "first correlation." POR, 34; *see* Petition, 47-48. PO states that "the only elements of the first correlation are the first instruction set and the first object representation," and thus that Thomas's values/weights cannot be part of the first correlation. POR, 34. Not so. Claim 1 (from which claim 16 depends) recites "a first correlation ***including*** a first one or more object representations correlated with a first one or more instruction sets." (emphasis added). It is well-established that the term "including" is an open-ended phrase, and thus PO's assertion that the first correlation cannot include further elements is simply not accurate. *See Lucent Techs., Inc. v. Gateway, Inc.*, 525 F.3d 1200, 1214 (Fed. Cir. 2008) ("This court has consistently interpreted "including" and "comprising" to have the same meaning, namely, that the listed elements (i.e., method steps) are essential but other elements may be added. *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314

F.3d 1313, 1344–45 (Fed.Cir.2003); *see also* *CIAS, Inc. v. Alliance Gaming Corp.*, 504 F.3d 1356, 1361 (Fed.Cir.2007)”).

When read properly, nothing in claim 16, nor in its base claim 1, prevents the “first correlation” from including additional elements, *e.g.*, the values/weights identified in the Petition. *See* Petition, 47-48; TESLA-1022, ¶¶41-43.

H. Claim 17

PO attempts to read a temporal limitation into claim 17, stating that “the modifying recited in claim 17 is of instruction sets that are already correlated with object representations (i.e. after they are learned or stored...).” POR, 36. But no such temporal requirement is present in the plain language of the claim, which merely recites (among other things) “modifying: the first one or more instruction sets.” Discounting PO’s unjustified attempt to import of additional features into the claim, the Petition’s identification of “modif[ying] the kick profile” during learning mode is sufficient to demonstrate Thomas’s disclosure of modifying the one or more instruction sets. *See* Petition, 49-51; TESLA-1005, 10:29-30, 12:42-51; TESLA-1022, ¶¶44-45.

IV. GROUND 3: BUEHLER ANTICIPATES CLAIMS 1, 3, AND 17

A. Claim 1

PO presents two distinct arguments against the Buehler-based challenge to claim 1. *See* POR, 50-54. Both of these arguments are unsustainable in their failure to pay consideration to the full context of Buehler’s disclosure, as discussed *infra*. TESLA-1022, ¶¶46-59.

1. The objects acted upon by Buehler’s virtual grippers are “objects of the application”

PO argues that “the object ... that is operated on by Buehler’s virtual gripper is a physical object and not an object of the application.” POR, 51. However, this statement betrays an overly narrow understanding of what constitutes Buehler’s “application” that is both inconsistent with Buehler’s disclosure and unsupported by any evidence other than mere conclusory statements in the POR and in Dr. Saber’s declaration. TESLA-1022, ¶47.

Buehler’s robot training system implements an “augmented reality” application that encompasses “real-world data (or the real world itself) augmented with computer-generated data.” TESLA-1006, 2:4-5; *see* Petition, 56-57; TESLA-1022, ¶48. That is, both real-world objects (*e.g.*, the physical objects operated on by Buehler’s virtual grippers) and computer-generated data (*e.g.*, Buehler’s virtual grippers) constitute aspects of Buehler’s augmented reality application. TESLA-1022, ¶48. Indeed, Buehler is explicit that real-world objects are part of its

augmented reality application, *e.g.*, in its description of visual display of a task “in an augmented-reality display,” where “the robot overlays computer-generated graphics ... onto the real-world.” TESLA-1006, 3:59-62. Going beyond displays, Buehler further clarifies that interactions with real-world objects are within the scope of its augmented reality application: “visual augmented reality need not necessarily use camera images. Instead, the robot may place optical signals into the real world itself,” *e.g.*, by “shin[ing] a laser pointer at the object” “to communicate its object selection to the user.” *Id.*, 12:60-65; TESLA-1022, ¶49. And PO’s expert, Dr. Saber, also confirms that augmented reality applications include both real-world and computer-generated elements. *See* TESLA-1023, 106:16-21 (“Q. And an augmented reality application involves some computer-generated aspects, and some real-world aspects, is that agreeable? A. Generally speaking, yes. It’s overlaying of computer generated objects upon the real environment.”).

That is, a proper understanding of Buehler’s augmented reality application as encompassing both real-world and computer data/objects reveals PO’s error in failing to recognize Buehler’s real-world objects (as represented by images, *e.g.*, object representations) as “objects of the application,” as claimed. *See* Petition, 56-57; TESLA-1022, ¶50.

2. Buehler discloses matching of object representations

PO's second argument—that Buehler does not disclose a match between object representations, but instead identifies a physical object—ignores that Buehler relies on a match between an image of a real-world physical object (*e.g.*, a second object representation) and a template image from a library (*e.g.*, first object representations) as part of the process of identifying that real-world physical object. *See* POR, 53-54; TESLA-1022, ¶¶51-52.

As set forth in the Petition, Buehler discloses a “detection algorithm” that “compares real-time camera images against the template and determines, based on a similarity metric, whether the real-time image contains the object of interest.” TESLA-1006, 18:50-54; *see* Petition, 58-59; TESLA-1022, ¶53. While the ultimate output of Buehler's detection algorithm is the identification of a physical object, the nature of the output does not preclude the use of matches between images to perform this identification. TESLA-1022, ¶53. And indeed, a POSITA would have understood that Buehler discloses exactly that: a physical object is identified based on a **match** between a template image (a first object representation; *see* Petition, 56-57) and a “real-time camera image[]” of that physical object (a second object representations; *see* Petition, 57-58). *See* TESLA-1006, 18:50-54; TESLA-1022, ¶53. For instance, as explained by Dr. Janet, it was well-known that image processing techniques for identifying objects in images

(*e.g.*, as implemented in Buehler’s system) commonly involved finding matches between an image of an object to be identified and a library of template images. TESLA-1022, ¶53.

PO further argues that Buehler’s disclosure of its detection algorithm does not constitute disclosure of the claimed match because “[o]bject identification, recognition, or detection using image features are different than matching of object representations.” POR, 54. Yet neither PO nor Dr. Saber provides any explanation of what these purported differences are. In fact, Dr. Saber even confirms that Buehler’s approach involves a comparison (*e.g.*, a ***match***) between images. *See* TESLA-1023, 111:11-16 (“Q. Okay. So you agree that the object detection algorithm of Buehler identifies objects by comparing a captured image to a stored image template, right? A. Yes. That’s what – that’s what we read; right?”). To the extent PO is attempting to distinguish Buehler by attributing a special meaning to the “match” of the claim, it neither articulated that meaning nor pointed to any textual support for that meaning in the ’134 Patent. With this absence of any substantive detail to underpin its position, PO’s attempt to frame the operation of Buehler’s detection algorithm to exclude involvement of a ***match*** between object representations (*e.g.*, between template images and a real-world image of an object to be identified) fails.

B. Claim 3

PO's argument that Buehler's metric/score "is not the specifically recited threshold number or threshold percentage" of claim 3 discounts how a POSITA would have understood Buehler's "set threshold" as disclosure of a threshold number or percentage for determining whether there is a match between object representations. POR, 55-56; *see* Petition, 61-62; TESLA-1006, 18:54-57; TESLA-1022, ¶¶54-55.

As indicated in the Petition, Buehler's detection algorithm involves an image comparison process that "compares real-time camera images" of a target object against [a] template" using "a similarity metric," resulting in "a score for [each pixel." TESLA-1006, 18:51-57; *see* Petition, 61-62. Pixels having "[s]cores above a set threshold" are "clustered to determine the potential location of the object in the image." *Id.*, 18:57-60. These pixels having scores exceeding a threshold correspond to the claimed "at least partially matching portions" of the object representations, *e.g.*, at least because the object representations (template images and real-time camera images) are composed of pixels, and because the scores exceeding a threshold indicate a match. TESLA-1022, ¶¶56-57. Moreover, as explained in more detail by Dr. Janet, a POSITA would have understood that in order for a pair of images to qualify as matching, there would be at least a threshold minimum number or percentage of pixels that have scores above that set

threshold, *i.e.*, that a number/percentage of matching pixels (*a number/percentage of at least partially matching portions* of the object representations) *exceeds a threshold number/percentage*. TESLA-1022, ¶¶56-57.

C. Claim 17

PO's defense of claim 17—that “Buehler's disclosure of a user making coarse and fine adjustments to the position of a gripper” is not a disclosure of “modifying any instruction sets”—fails to consider the objective of those user-driven adjustments in training Buehler's robot, which is to train the robot to perform tasks. POR, 57-58; *see* Petition, 62-63; TESLA-1022, ¶¶58-59.

Consistent with this objective, a POSITA would have understood that if the user adjusts the configuration of the robot during training such that it can better perform a task, that adjustment would be used to modify the robot's training—*e.g.*, to modify instruction sets—such that the robot can improve its performance. TESLA-1022, ¶¶58-59.

VI. PO FAILS TO IDENTIFY ANY MATERIAL DEFICIENCIES IN THE PETITION'S OBVIOUSNESS RATIONALES

PO's criticisms of the obviousness rationales in Ground 2 are unfounded. Contrary to PO's allegations that the Petition does not specify which elements of claims 3, 12, and 14 are not disclosed by Thomas for purposes of the obviousness analysis (POR, 48), the Petition clearly identifies the features it deems are rendered

obvious by reference to a POSITA's knowledge. *See* Petition, 19-21, 40-42, 45-47. There is no ambiguity in Petitioner's positions and grounds. Petitioner (and Dr. Janet) believe claims 3, 5, and 12-14 are anticipated by Thomas alone, hence these claims are challenged under Ground 1. To the extent PO believes Thomas does not anticipate any of these claims, Petitioner offers a second ground that renders them obvious.

VII. CONCLUSION

For all the foregoing reasons, Petitioner respectfully submits that the Board should find the Challenged Claims unpatentable.

Respectfully submitted,

Dated: June 24, 2024

/Gretchen A. DeVries/
Gretchen A. DeVries, Reg. No. 72,505
Fish & Richardson P.C.
60 South Sixth Street
Minneapolis, MN 55402
T: 202-783-5070
F: 877-769-7945

Counsel for Petitioner

CERTIFICATION UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petitioners' Reply to Patent Owner's Response totals 5,061, which is less than the 5,600 allowed under 37 CFR § 42.24.

Respectfully submitted,

Dated: June 24, 2024

/Gretchen A. DeVries
Gretchen A. DeVries, Reg. No. 72,505
Fish & Richardson P.C.
60 South Sixth Street
Minneapolis, MN 55402
T: 202-783-5070
F: 877-769-7945

Counsel for Petitioner

CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(1) and 42.6(e)(4)(iii), the undersigned certifies that on June 24, 2024, a complete and entire copy of this Petitioner's Reply to Patent Owner's Response was provided via email to the Patent Owner by serving the email correspondence addresses of record as follows:

Arvind Jairam Reg. No. 62,759
Stuart McCommas Reg. No. 71,834
MCKOOL SMITH, P.C.
1999 K St. NW, Suite 600
Washington, DC 20006
Telephone: (202) 370-8300
Facsimile: (202) 370-8344
ajairam@mckoolsmith.com
SMccommas@mckoolsmith.com

George Fishback Reg. No. 76,345
MCKOOL SMITH, P.C.
303 Colorado Street, Suite 2100
Austin, TX 78701
Telephone: (512) 692-8700
Facsimile: (512) 692-8744
GFishback@mckoolsmith.com

/Crena Pacheco/

Crena Pacheco
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
pacheco@fr.com