

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Jasmin Cosic
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Title: ARTIFICIALLY INTELLIGENT SYSTEMS, DEVICES, AND
METHODS FOR LEARNING AND/OR USING A DEVICE'S
CIRCUMSTANCES FOR AUTONOMOUS DEVICE
OPERATION

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**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 11,663,474 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

TABLE OF CONTENTS

I.	REQUIREMENTS FOR IPR UNDER 37 C.F.R. § 42.104.....	1
A.	Grounds for Standing Under 37 C.F.R. § 42.104(a).....	1
B.	Challenge Under 37 C.F.R. § 42.104(b) and Relief Requested	1
II.	THE '474 PATENT.....	2
A.	Brief Description.....	2
B.	Prosecution History.....	6
C.	Level of Ordinary Skill in the Art.....	7
III.	CLAIM CONSTRUCTION	8
IV.	THE CHALLENGED CLAIMS ARE UNPATENTABLE.....	8
A.	[GROUND 1A] – Buibas in view of Sinyavskiy Renders Obvious Claims 45-47, 51, 56-57, 59, and 68-69	8
1.	Overview of Buibas.....	8
2.	Overview of Sinyavskiy	11
3.	Combination of Buibas and Sinyavskiy	12
4.	Analysis	16
B.	[GROUND 1B] – Buibas in view of Sinyavskiy and Versace Render Obvious Claim 60	45
1.	Overview of Versace	45
2.	Combination of Buibas, Sinyavskiy, and Versace	46
3.	Analysis	50
C.	[GROUND 2A] – Grotmol Anticipates Claims 45-47, 51, 59, and 68-69 51	51
1.	Overview of Grotmol	51
2.	Analysis	54
D.	[GROUND 2B] – Grotmol in view of McClure Renders Obvious Claim 60 73	73
1.	Overview of McClure.....	73
2.	Combination of Grotmol and McClure	74
3.	Analysis	76
E.	[GROUND 2C] – Grotmol in view of Buibas Renders Obvious Claims 45-47, 51, 56-57, 59, and 68-69.....	77
1.	Combination of Grotmol and Buibas	77
2.	Analysis	80

F.	[GROUND 2D] – Grotmol in view of Buibas and McClure Renders Obvious Claim 60	82
V.	PTAB DISCRETION SHOULD NOT PRECLUDE INSTITUTION.....	83
A.	The Petition’s New Art Favors Institution—35 U.S.C. § 325(d).....	83
B.	The <i>Fintiv</i> Factors Favor Institution—35 U.S.C. § 314(a).....	84
C.	The Related IPRs Do Not Favor Discretionary Denial	87
VI.	CONCLUSION AND FEES	89
VII.	MANDATORY NOTICES UNDER 37 C.F.R § 42.8(a)(1).....	89
A.	Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1).....	89
B.	Related Matters Under 37 C.F.R. § 42.8(b)(2)	89
C.	Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3).....	90
D.	Service Information	91

EXHIBITS

TESLA-1001	U.S. Patent No. 11,663,474 (“the ’474 Patent”)
TESLA-1002	U.S. Patent No. 11,663,474 File History
TESLA-1003	Expert Declaration of Jason Janet, Ph.D.
TESLA-1004	First Amended Complaint, <i>Autonomous Devices LLC v. Tesla, Inc.</i> , Case No. 22:1466-MN (D. Del.), Doc. 92 (Sept. 15, 2023)
TESLA-1005	U.S. Patent Pub. No. 2014/0089232 to Buibas et al. (“Buibas”)
TESLA-1006	U.S. Patent Pub. No. 2013/0325768 to Sinyavskiy et al. (“Sinyavskiy”)
TESLA-1007	U.S. Patent Pub. No. 2017/0024877 to Versace et al. (“Versace”)
TESLA-1008	U.S. Patent No. 9,604,359 to Grotmol et al. (“Grotmol”)
TESLA-1009	U.S. Patent No. 5,219,264 to McClure et al. (“McClure”)
TESLA-1010	U.S. Patent Pub. No. 2018/0137403 to Kaur et al. (“Kaur”)
TESLA-1011	U.S. Patent Pub. No. 2016/0167226 to Schnittman (“Schnittman”)
TESLA-1012	Scheduling Order, <i>Autonomous Devices LLC v. Tesla, Inc.</i> , Case No. 22:1466-MN (D. Del.), Doc. 25 (March 22, 2023)
TESLA-1013	Stipulation and [Proposed] Order to Stay Pending <i>Inter Partes</i> Review, <i>Autonomous Devices LLC v. Tesla, Inc.</i> , Case No. 22:1466-MN (D. Del.), Doc. 143 (Jan. 9, 2024)
TESLA-1014	Stay Order, <i>Autonomous Devices LLC v. Tesla, Inc.</i> , Case No. 22:1466-MN (D. Del.), (Jan. 10, 2024)

TESLA-1015	Original Complaint, <i>Autonomous Devices LLC v. Tesla, Inc.</i> , Case No. 22:1466-MN (D. Del.), Doc. 1 (Nov. 7, 2022)
TESLA-1016	Email Correspondence from Patent Owner’s Counsel Mr. John Holley re Asserted Claims of ’474 Patent (Nov. 3, 2023)
TESLA-1017	Autonomous Device’s Infringement Contention Chart for U.S. Patent No. 11,663,474 (Exhibit K), <i>Autonomous Devices LLC v. Tesla, Inc.</i> , Case No. 22:1466-MN (D. Del.), Doc. 92-1 (Sept. 15, 2023) (Public)
TESLA-1018	U.S. Patent Pub. No. 2003/0216834A1 to Allard (“Allard”)
TESLA-1019	U.S. Patent Pub. No. 2006/0181236A1 to Brogardh (“Brogardh”)
TESLA-1020	U.S. Patent Pub. No. 2013/0226345A1 to Zhao et al. (“Zhao”)
TESLA-1021	Federal Court Management Statistics—Profiles, U.S. District Courts—Combined Civil and Criminal (December 31, 2023 Reporting Period), <i>retrieved from</i> https://www.uscourts.gov/sites/default/files/fcms_na_distprofile1231.2023_0.pdf

LISTING OF CLAIMS

Claim 45	
[45.pre]	A first device comprising:
[45.1]	a knowledgebase that includes one or more inputs for inputting at least a portion of a circumstance representation, wherein the one or more inputs are correlated with one or more instruction sets for operating a second device;
[45.2]	one or more sensors;
[45.3]	one or more processors; and
[45.4]	one or more non-transitory machine readable media storing machine readable code that, when executed by the one or more processors, causes the one or more processors to perform at least:
[45.5]	generating a circumstance representation, wherein the generated circumstance representation represents a circumstance detected at least in part by the one or more sensors;
[45.6]	determining the one or more instruction sets for operating the second device at least by: inputting at least a portion of the generated circumstance representation into the one or more inputs, and using a correlation between the one or more inputs and the one or more instruction sets for operating the second device; and
[45.7]	at least in response to the determining, executing the one or more instruction sets for operating the second device, wherein the first device autonomously performs one or more operations defined by the one or more instruction sets for operating the second device.
Claim 46	
[46]	The first device of claim 45, wherein the one or more inputs for inputting the at least the portion of the circumstance representation include one or more inputs for inputting at least a portion of one or more object representations, and wherein the generated circumstance representation includes one or more object representations, and

	wherein the first device is a first vehicle, and wherein the second device is a second vehicle.
Claim 47	
[47]	The first device of claim 46, wherein at least an information related to the one or more instruction sets for operating the second device is learned in a learning process that includes operating the second device at least partially by a user.
Claim 51	
[51]	The first device of claim 46, wherein at least a portion of the one or more instruction sets for operating the second device is learned in a learning process that includes operating the second device at least partially by a user.
Claim 56	
[56]	The first device of claim 46, wherein the one or more inputs are further correlated with another one or more instruction sets for operating a third device, and wherein at least a portion of the one or more instruction sets for operating the second device or at least an information related to the one or more instruction sets for operating the second device is learned in a learning process that includes operating the second device at least partially by a user, and wherein at least a portion of the another one or more instruction sets for operating the third device or at least an information related to the another one or more instruction sets for operating the third device is learned in another learning process that includes operating the third device at least partially by another user.
Claim 57	
[57]	The first device of claim 46, wherein the one or more inputs are further correlated with another one or more instruction sets for operating a third device.
Claim 59	
[59]	The first device of claim 46, wherein the one or more object representations of the generated circumstance representation include one or more information about one or more objects.
Claim 60	

[60]	The first device of claim 46, wherein the one or more object representations of the generated circumstance representation include one or more coordinates of one or more objects.
Claim 68	
[68]	The first device of claim 46, wherein the knowledgebase is a neural network.
Claim 69	
[69]	The first device of claim 46, wherein the knowledgebase includes an artificial intelligence system.

Tesla, Inc. (“Tesla” or “Petitioner”) petitions for IPR of claims 45-47, 51, 56-57, 59-60, and 68-69 (“Challenged Claims”) of U.S. Patent No. 11,663,474 (“the ’474 Patent”).

I. REQUIREMENTS FOR IPR UNDER 37 C.F.R. § 42.104

A. Grounds for Standing Under 37 C.F.R. § 42.104(a)

Petitioner certifies that the ’474 Patent is available for IPR. Petitioner is not barred or estopped from requesting review of the Challenged Claims on the below-identified grounds.

B. Challenge Under 37 C.F.R. § 42.104(b) and Relief Requested

Petitioner requests institution of IPR and cancellation of the Challenged Claims based on the following grounds:

Ground	’474 Patent Claims	Basis for Rejection
1A	45-47, 51, 56-57, 59, 68-69	§ 103 – Buibas in view of Sinyavskiy
1B	60	§ 103 – Buibas in view of Sinyavskiy and Versace
2A	45-47, 51, 59, 68-69	§ 102 – Grotmol
2B	60	§ 103 – Grotmol in view of McClure
2C	45-47, 51, 56-57, 59, 68-69	§ 103 – Grotmol in view of Buibas
2D	60	§ 103 – Grotmol in view of Buibas and McClure

Grounds 1A-2D are further supported by the expert testimony of Dr. Jason

Janet. *See* TESLA-1003, ¶¶1-165.

The '474 Patent is the second continuation in a family whose earliest application was filed November 2, 2016. TESLA-1001, Cover. Petitioner does not concede that the Challenged Claims are entitled to the benefit of the November 2, 2016 filing date. Nonetheless, as shown in the following table, each reference applied in Grounds 1A-2D qualifies as prior art before this date. For purposes of this proceeding, Petitioner treats November 2, 2016, as the Critical Date of the Challenged Claims. TESLA-1003, ¶¶20-34.

Reference	Filing Date	Publication Date	Prior Art At Least Under AIA §102
Grotmol	Jan. 27, 2015	Mar. 28, 2017	§102(a)(2)
Buibas	Mar 14, 2013	Mar. 27, 2014	§102(a)(1), §102(a)(2)
McClure	Apr. 10, 1990	Jun. 15, 1993	§102(a)(1), §102(a)(2)
Sinyavskiy	Jun. 4, 2012	Dec. 5, 2013	§102(a)(1), §102(a)(2)
Versace	Sep. 12, 2016	Jan. 26, 2017	§102(a)(2)

II. THE '474 PATENT

A. Brief Description

The '474 Patent generally describes techniques for training devices (e.g., robots) to operate autonomously based on the device's current circumstance.

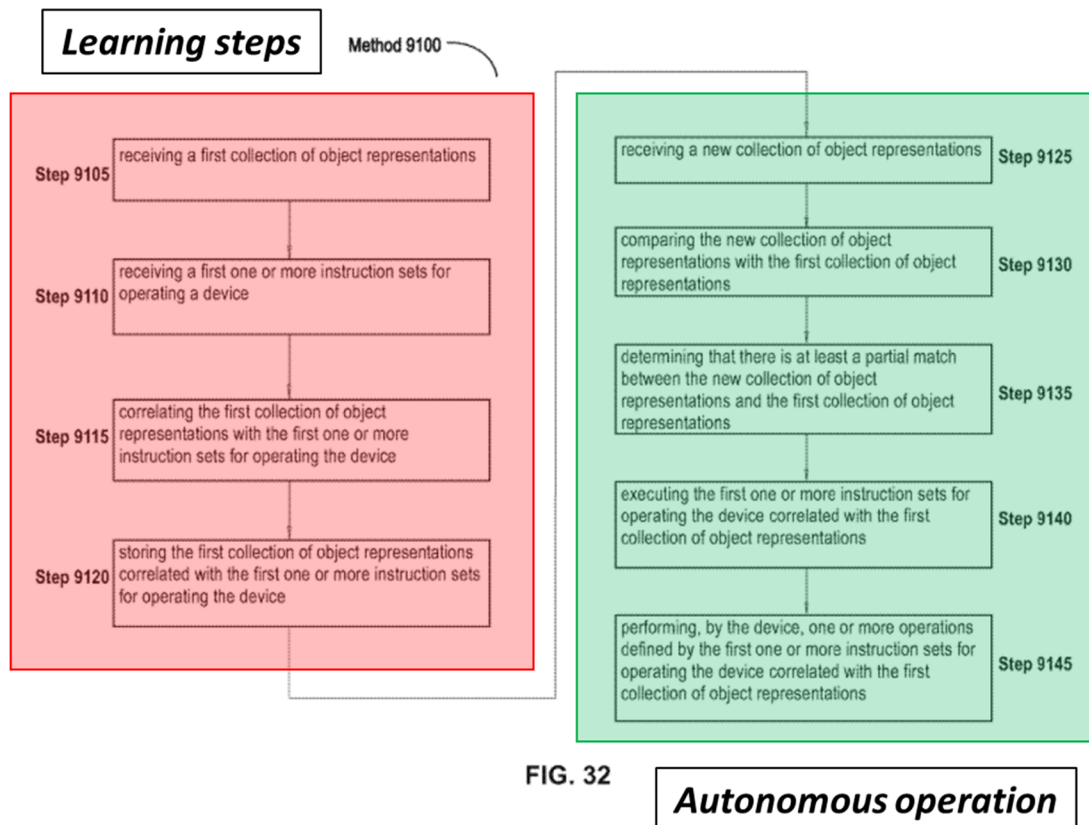
TESLA-1001, 1:28-2:27; TESLA-1003, ¶¶35-38. The '474 Patent's background

discussion explains that “[d]evices or systems commonly operate by receiving a user’s operating directions in various circumstances.” TESLA-1001, 1:46-47.

“Instructions are then executed to effect [*sic*] the operation of a device or system based on user’s operating directions,” and “[h]ence, devices or systems rely on the user to direct their behaviors.” *Id.*, 1:50-51. Concluding, the background notes that “[c]ommonly employed device or system operating techniques lack a way to learn operation of a device or system and enable autonomous operation of a device or system.” *Id.*, 1:51-54.

The specification purports to address these problems through a user-guided process that allows a device to learn circumstances and instructions for autonomously operating the device under various circumstances. TESLA-1003, ¶39. For example, the specification discloses how a device can “[1] learn[] [its] operation in various circumstances, [2] stor[e] this knowledge in a knowledgebase (i.e. neural network, graph, sequences, etc.), and [3] enabl[e] autonomous operation of the device.” TESLA-1001, Abstract. In some examples, the device learns “circumstances” based on encoded sensory inputs, correlates the learned circumstances with instruction sets that reflect how a user operated the device in the learned circumstances, and stores the learned circumstances and correlated instruction sets in a knowledgebase.” TESLA-1001, 58:3-7. The specification refers to this approach as “device’s circumstances for autonomous device

operation,” or “DCADO.” *Id.*, 58:9-13. Figure 32, reproduced below, illustrates this approach:



TESLA-1001, FIG. 32 (annotated and color added).

The '474 Patent also describes techniques for sharing knowledge between autonomously operated devices (e.g., “Devices 98” or “DCADO units 100”), such that operating instructions learned on a **second device** (e.g., the “**training device**”) can be later applied to autonomously operate a **first device** (e.g., the “**operating device**”). TESLA-1001, 102:30-103:39., FIG. 38. This sharing of

knowledge allows devices to “accumulate collective knowledge” such that the knowledgebase on a given device can store instruction sets learned as a result of local training, instruction sets learned as a result of training other devices, or both. *Id.*, 102:49-53. For example, the knowledgebase on **a first device (e.g., the “operating device”)** stores instruction sets that the first device can apply to operate autonomously, and those instruction sets can be learned either by training **the first device** itself or by training **a second device** different from **the first device**. *Id.* In the latter case, the instruction sets learned through training **the second device** are shared with **the first device** and correspond to “one or more instruction sets **for operating the second device**” (*see, e.g.*, [45.1]). *Id.*; TESLA-1017, 5 (infringement contentions referring to “instruction sets which are shared with the fleet”); TESLA-1002, 78 (“sharing instruction sets”), Claims 51-52; TESLA-1003, ¶40.

The specification further explains that knowledge shared between devices can include “circumstances including objects with various properties learned [by the device],” TESLA-1001, 103:30-48. The ’474 Patent lists example object properties in a circumstance to include object “existence, type, identity, distance, bearing/angle, location, shape/size, activity, etc.” *Id.*, 111:15-17; TESLA-1003, ¶41.

B. Prosecution History

Original examination of the '474 Patent was swift. In the only Office Action issued during prosecution, the Examiner rejected all claims as anticipated by Kaur (TESLA-1010). TESLA-1002, 104-107; TESLA-1003, ¶42. The applicant never replied to this rejection, however. The applicant instead conducted an interview with the Examiner, where amendments were discussed that ultimately led to allowance. *Id.*, 100. The Examiner in fact proceeded to enter an entirely new set of claims (i.e., the claims that issued in the '474 Patent) by an Examiner's Amendment that accompanied a Notice of Allowance following the interview. *Id.*, 42-80. The Examiner's Amendment cancelled all previously rejected claims and replaced them with the new claim set. *Id.*

The Examiner's reasons for allowance identified Schnittman (TESLA-1011) as relevant prior art. TESLA-1002, 77-78. The Examiner stated that the allowed claims were distinguishable over Schnittman for the following reasons:

knowledgebase correlated with instruction sets for the first device. Schnittman (US 2016/0167226) discloses a pre-programmed mobile robot that maps its environment on its own based on pre-coded logic, which is very different than the claimed inputting an incoming circumstance representation into a knowledgebase's inputs correlated with instruction sets for operating a device. Schnittman discloses operation of a single mobile robot with no mention of sharing instruction sets, data, or anything with another (i.e. second) robot/device for its operating as the applicant claims. This functionality enables a variety of instructions sets for a variety of circumstances from multiple devices to be used on any of these or other devices, which improves the diversity of circumstances and instruction sets for operating in those circumstances, something that Schnittman does not mention. Prior art further does not disclose

TESLA-1002, 78 (highlighting added); TESLA-1003, ¶43.

Notably, the above reasons for allowance indicate that the Examiner had not considered more pertinent teachings in the prior art during prosecution of the '474 Patent. The references in this Petition, including Buibas and Grotmol for example, confirm that the subject matter of the Challenged Claims—including features identified in the Examiner's reasons for allowance (e.g., "sharing instruction sets")—were well known in the prior art before the '474 Patent. For each of the reasons described in this Petition, the Challenged Claims of the '474 Patent never should have been allowed. TESLA-1003, ¶¶42-43.

C. Level of Ordinary Skill in the Art

A person of ordinary skill in the art ("POSITA") relating to the subject matter of the '474 Patent as of the Critical Date would have had at least: (1) a bachelor's degree in electrical engineering, computer engineering, computer science, systems engineering, or equivalent course work with two to three years of work experience in computer vision, image/video processing, and/or machine learning; or (2) a master's degree in electrical engineering, computer engineering, computer science, systems engineering, or equivalent course work with a focus in computer vision, image/video processing, and/or machine learning. TESLA-1003, ¶¶44-46. Additional graduate education could substitute for professional experience, and *vice versa*. *Id.*

III. CLAIM CONSTRUCTION

Petitioner acknowledges that claims in an IPR are interpreted according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005); 37 C.F.R. §42.100(b). Given the noticeable overlap between the disclosed embodiments of the '474 patent and the prior art teachings addressed in Grounds 1A-2D, no formal constructions are presently necessary because “claim terms need only be construed to the extent necessary to resolve the controversy.” *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011). Petitioner reserves the right to respond to any constructions offered by Patent Owner or adopted by the Board. TESLA-1003, ¶¶21-25.

Petitioner maps prior art in this Petition in a manner consistent with Patent Owner’s allegations of infringement before the district court. *See generally* TESLA-1017; TESLA-1003, ¶¶21-25.

IV. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. [GROUND 1A] – Buibas in view of Sinyavskiy Renders Obvious Claims 45-47, 51, 56-57, 59, and 68-69

1. Overview of Buibas

Buibas discloses a process for robotic [1] **learning** through “sensory devices 720 [that] allow the robotic device to accept stimulus from external entities.” TESLA-1005, ¶[0132]. The sensory devices 720 can include “video, audio, haptic, capacitive, radio, vibrational, ultrasonic, infrared, and temperature sensors radar,

lidar and/or sonar”—each of which detects information about the environment or other circumstances of the robot. *Id.* Buibas discloses that, in operation, an “encoded signal” generated from the robot’s “sensory input” is inputted into an “interface” or input “connections” of a “robotic brain” for a particular task or behavior. TESLA-1005, ¶¶[0130]-[0131], [0153], [0159]; TESLA-1006, ¶[0110], FIG. 6A. FIG. 10 illustrates an example “spiking neural network” used in Buibas’ robot “brain.” TESLA-1003, ¶47.

Buibas discloses that robotic devices operate autonomously to perform tasks or implement behaviors defined in “brain images.” TESLA-1005, ¶¶[0070]-[0072], [0085], [0179]-[0203]. Among other things, a “brain image” **[2]** stores information that the robot uses to carry out a particular task or implement a particular behavior. *Id.* Buibas’ “brain image” and related techniques are implemented according to “any number of different artificial intelligence models and paradigms” including, for example, an “artificial spiking neural network.” *Id.*, ¶[0072]; TESLA-1003, ¶48.

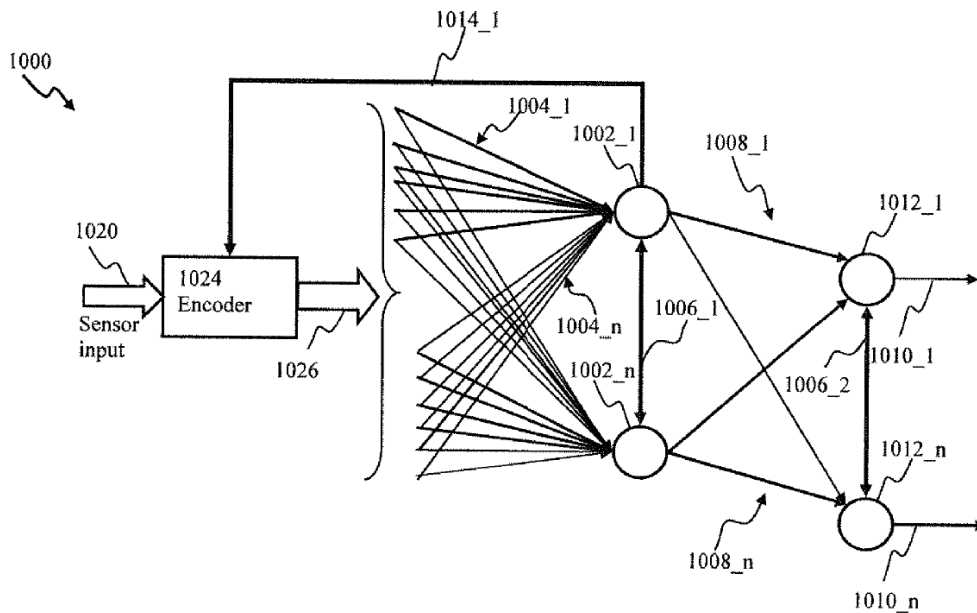


FIG. 10

TESLA-1005, FIG. 10.

Example robotic devices that [3] **enable** Buibas' techniques for operating robotic devices include "industrial robot[s], autonomous and other vehicles," "unexploded ordinance/improvised explosive device[s]," and "automated building management" systems." TESLA-1005, ¶¶[0227]-[0236]; TESLA-1003, ¶49.

Buibas further teaches that brain images can be shared and loaded on robots other than the robot on which the brain image was originally trained. TESLA-1003, ¶50. For example, Buibas describes how brain images can be uploaded to a cloud server and made available for use by other robots. TESLA-1001, [0071] ("[A] cloud-based repository of brain 'images' (e.g., neural network state information) is introduced. Users may access the cloud repository (such as under a

subscription, per-access, or other business model) and browse brain images created by other users.”); *see also id.*, ¶¶[0070], [0085], [0184], [0188], [0196].

Buibas is analogous art to the ’474 Patent: it is from the same field of endeavor (e.g., training/operating autonomous devices) and is reasonably pertinent to a problem the ’474 Patent was trying to solve (e.g., the need to efficiently train/operate autonomous devices). TESLA-1001, Abstract, 1:51-54, 58:3-13, 95:29-96:8, 102:30-103:39; TESLA-1003, ¶51.

2. Overview of Sinyavskiy

Like Buibas, Sinyavskiy discloses “spiking” neural networks that can be trained to control the operation of robotic devices. TESLA-1006, ¶¶[0185]-[0188], FIG. 6A ; TELSA-1005, ¶¶[0021]-[0022], [0072]-[0074]; TESLA-1003, ¶52. Sinyavskiy explains how such a neural network can be partitioned to perform processing for different tasks. TESLA-1006, ¶¶[0185]-[0188], FIG. 6A. The partitions are reconfigurable and allow unused resources to be reassigned to different tasks depending on the robot’s current needs. *Id.*; *see also id.*, [0190]-[0192], Abstract. FIG. 6A illustrates an example of Sinyavskiy’s partitioned neural network. TESLA-1006, FIG. 6A.

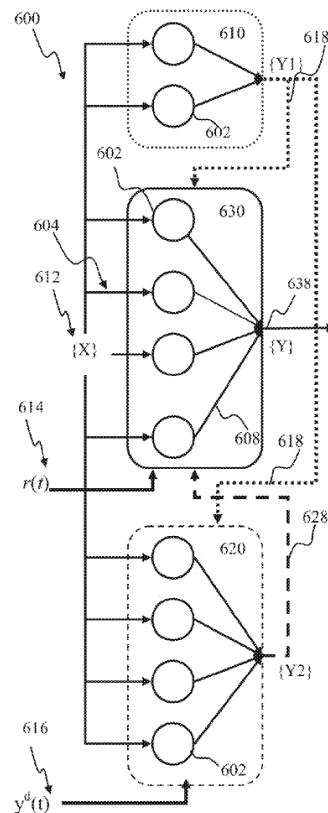


FIG. 6A

TESLA-1006, FIG. 6A.

Sinyavskiy is analogous art to the '474 Patent: it is from the same field of endeavor (e.g., training/operating autonomous devices) and is reasonably pertinent to a problem the '474 Patent was trying to solve (e.g., the need to efficiently train/operate autonomous devices). TESLA-1001, Abstract, 1:51-54, 58:3-13, 95:29-96:8, 102:30-103:39; TESLA-1003, ¶53.

3. Combination of Buibas and Sinyavskiy

As discussed above, Buibas describes techniques for training and operating robotic devices using brain images that can be applied both locally to the robot on

which it was trained and to other robots with which it has been shared. *See supra* §IV.A.1; TESLA-1003, ¶63. Buibas' brain images define states or configurations for spiking neural networks, which Buibas broadly suggests can be partitioned into modules for different tasks or behaviors. TESLA-1005, [0072]-[0074], [0092]-[0094]. In combination with Sinyavskiy, which describes techniques for partitioning similar spiking neural networks, the claims are rendered obvious. *See supra* §IV.A.2; TESLA-1003, ¶63. Indeed, it would have been obvious to partition Buibas' spiking networks according to the specific techniques disclosed in Sinyavskiy. *Id.* TESLA-1005, ¶¶[0071]-[0072], [0085], [0092], [0179]-[0203]; TESLA-1006, ¶¶[0012], [0185], [0188], [0191], FIG. 6A; *see supra* §IV.A.4.[45.pre]. Multiple reasons would have prompted a POSITA to implement this combination. TESLA-1003, ¶63.

First, a POSITA would have been motivated to partition Buibas' spiking neural network as suggested by Sinyavskiy to parallelize task execution on the robot and improve learning capabilities (e.g., through faster learning, greater computing efficiency, and task-specific learning models) of the Buibas mobile robotic apparatus as described by Sinyavskiy and discussed by Dr. Janet. TESLA-1003, ¶64 (citing TESLA-1006, ¶¶[0012], [0185], [0188]).

Second, partitioning Buibas' robotic brain as suggested by Sinyavskiy would have beneficially expanded the range of tasks that the robot could perform by

dedicating partitions to specialized tasks. TESLA-1006, ¶¶[0012], [0185], [0188] (“Different partitions ... may be configured[] ... to perform specialized functionality”), FIG. 6A; TESLA-1005, ¶¶[0071]-[0072], [0085], [0092], [0179]-[0205]; TESLA-1003, ¶65.

Third, a POSITA would have been motivated to partition Buibas’ spiking neural network as suggested by Sinyavskiy to permit unused partitions or unused resources in the partitions to be reassigned for different tasks. TESLA-1006, [0191] (“When certain functionality of the robot is not required ... the available network resources (i.e., the nodes 602) may be reassigned to perform different tasks.”). Sinyavskiy explains that “[s]uch reuse of network resources” allows for “(i) smaller network processing apparatus, having lower cost, size and consuming less power[] ... and/or (ii) increased processing capability for the same network capacity.” *Id.*; *see also id.*, [0190]-[0192], [0105], [0034], Abstract; TESLA-1003, ¶66.

Fourth, Buibas briefly mentions that its spiking neural networks can be partitioned but discloses little detail about the partitioning. TESLA-1005, ¶[0092] Buibas’ suggestion invites a POSITA to turn to other references for additional detail on how to implement partitioning, and a POSITA would have turned to Sinyavskiy to learn how to implement a particularly advantageous form of

partitioning (e.g., including reconfigurable partitioning) consistent with Buibas' objective. TESLA-1003, ¶67.

Fifth, a POSITA would have been motivated to pursue the Buibas-Sinyavskiy combination because doing so merely involves the application of known techniques (e.g., Sinyavskiy's partitioned neural network) to a known system (e.g., Buibas' mobile robot and robotic brain) to yield predictable results (e.g., Buibas' robot using a spiking neural network partitioned as taught in Sinyavskiy). *See KSR*, 550 U.S. 398, 415-421 (2007); MPEP §2143; TESLA-1003, ¶68. Indeed, as Dr. Janet explains, "the partitioning of the Buibas neural network is reminiscent of Recurrent Fuzzy Neural Networks (RFNNs) that were already commonplace at the end of the 1990's." TESLA-1003, ¶68.

Sixth, a POSITA would have been motivated to pursue this combination because it merely instantiates use of known techniques (e.g., Sinyavskiy's partitioned neural network) to improve a similar system (e.g., Buibas' mobile robot and robotic brain). *See KSR*, 550 U.S. at 415-421; MPEP §2143; TESLA-1003, ¶69.

A POSITA would have reasonably expected success implementing the combination, especially as Buibas and Sinyavskiy describe highly similar systems involving spiking neural networks used for training/operating robots. TESLA-

1005, ¶[0092]; TESLA-1003, ¶70. Buibas itself confirms that its spiking neural network can be partitioned, while Sinyavskiy provides the details for doing so. *Id.*

4. Analysis

Element [45.pre]

To the extent the preamble is limiting, the Buibas-Sinyavskiy combination renders obvious the recited “***first device***.”¹ TESLA-1005, ¶¶[0069], [0130], [0230], FIG. 7; TESLA-1003, ¶71. For example, Buibas describes “autonomous” robotic vehicles including “rovers, unmanned air vehicles, underwater vehicles, smart appliances (e.g. ROOMBA®), etc.” *Id.*, ¶[0230]. Buibas’ robots include “brain images” that are configured through training procedures to autonomously control movements and actions of the robot. TESLA-1005, ¶¶[0071]-[0072], [0085], [0179]-[0203]. Brain images can be used to control the same robot on which it was trained, but they can also be shared with other robots. For example, “a user may extract the state of a neural network (or other useful training-related information) directly from the device” and “the artificial mind and its traits may be copied, stored, [] later retrieved,” and “shared with other users.” *Id.*, ¶[0070]; *see also id.*, ¶¶[0071], [0182]. As explained in the subsequent limitations, the claimed “***first device***” corresponds to a robot in Buibas that includes at least a portion of a

¹ Claim language is denoted in bold italics.

brain image that was trained on another robot (and shared with the first robot).

TESLA-1003, ¶71. FIG. 7, reproduced below, is a block diagram depicting components of an example “robotic apparatus” (*first device*). TESLA-1005, ¶[0130], FIG. 7.

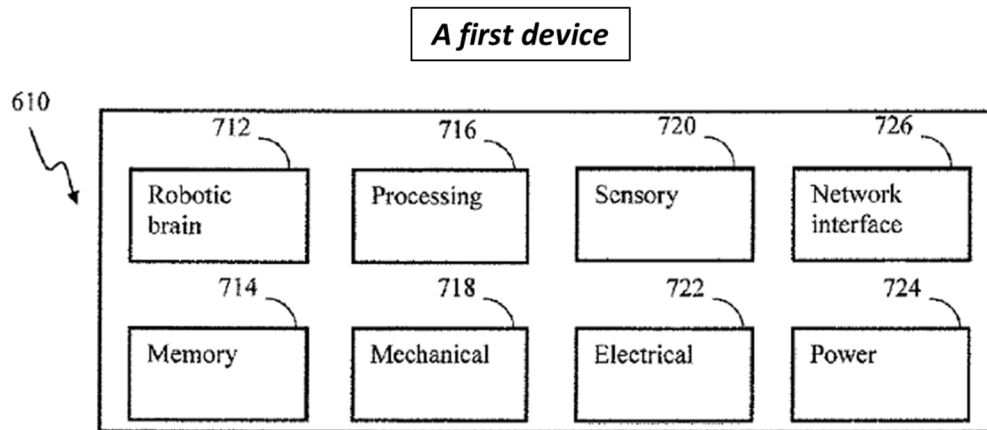


FIG. 7

TESLA-1005, FIG. 7 (annotated).

Element [45.1]

The Buibas-Sinyavskiy combination renders obvious [45.1]. TESLA-1003, ¶72. For example, Buibas teaches that the robotic device (*first device*) can operate autonomously to perform tasks or implement behaviors defined in “brain images.” TESLA-1005, ¶¶[0071]-[0072], [0085], [0179]-[0203]. The “brain image”

provides at least one **knowledgebase** as recited in [45.1]². *Id.* According to Buibas, a “brain image” stores information that the robot can use to carry out a particular task or implement a particular behavior³. *Id.* Buibas’ “brain image” can

² More specifically, this Petition maps the portion of a brain image (e.g., a partition) dedicated to a particular task or behavior to the claimed “**knowledgebase**.” TESLA-1003, ¶72. As described in the overview of the Sinyavskiy-Combination, the brain image can be partitioned into multiple sections each dedicated to a different task or behavior. *Id.*; *supra*, Section IV.A.3; *cf.* TESLA-1001, 101:66-102:29 (“[k]nowledgebase 530 may be or include any data structure or arrangement capable of storing the knowledge of a device’s operation in circumstances including objects with various properties”).

³ Buibas further teaches that “the brain image is loaded onto a ‘brain stem’ (bSTEM) that controls the robotic device,” where “[t]he bSTEM ... is the hardware component on which the brain image is executed.” TESLA-1005, ¶[0202]. Buibas also uses the term “robotic brain,” e.g., to refer to “a trained network or collection of networks.” *Id.*, ¶[0085]. A robotic brain and/or a bSTEM executing a brain image provide related/alternative mappings for the claimed “knowledgebase.” *Id.*; TESLA-1003, ¶72.

be implemented using “any number of different artificial intelligence models and paradigms” including, for example, an “artificial spiking neural network.” *Id.*, ¶[0072]. FIG. 7 illustrates an example robotic device in Buibas with a “robotic brain.” *Id.*, FIG. 7. FIG. 10 illustrates an example “spiking neural network” for a brain image.

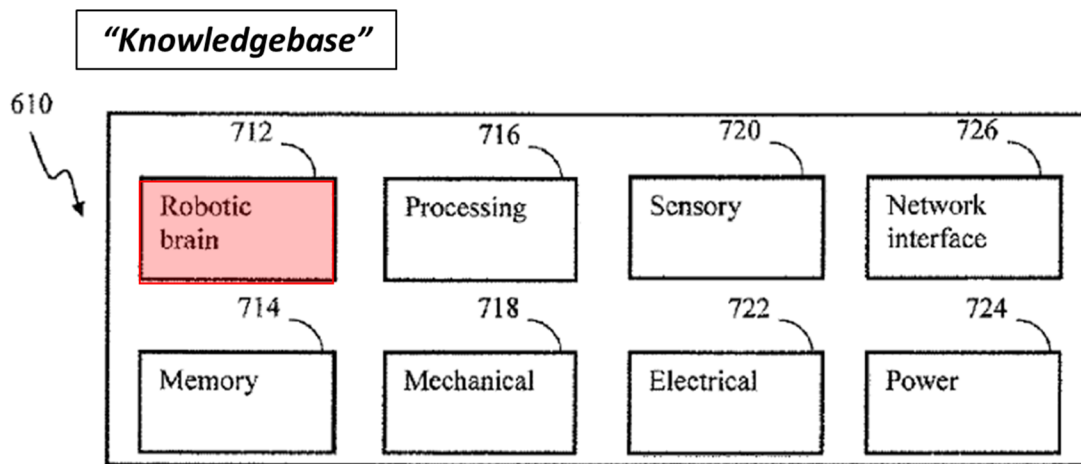
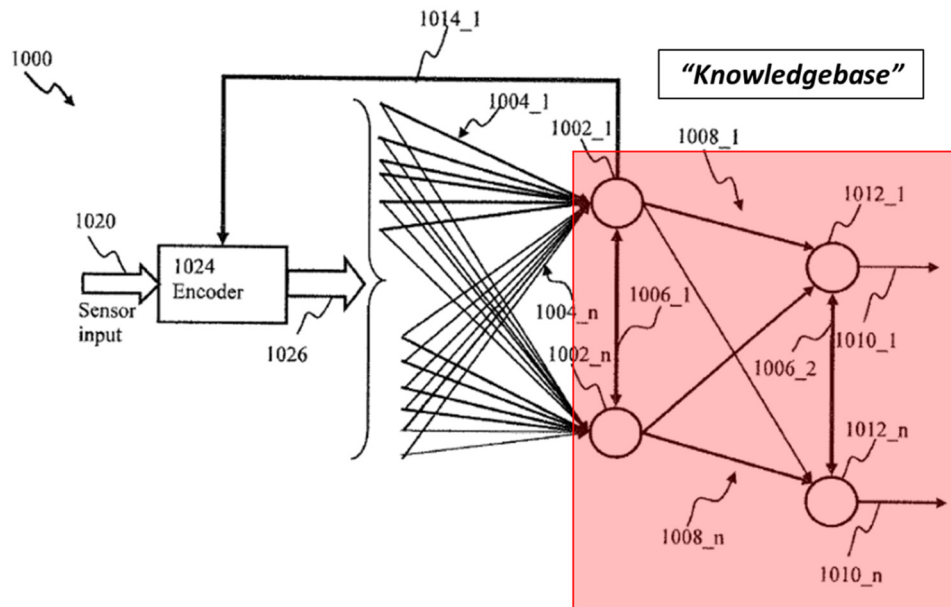
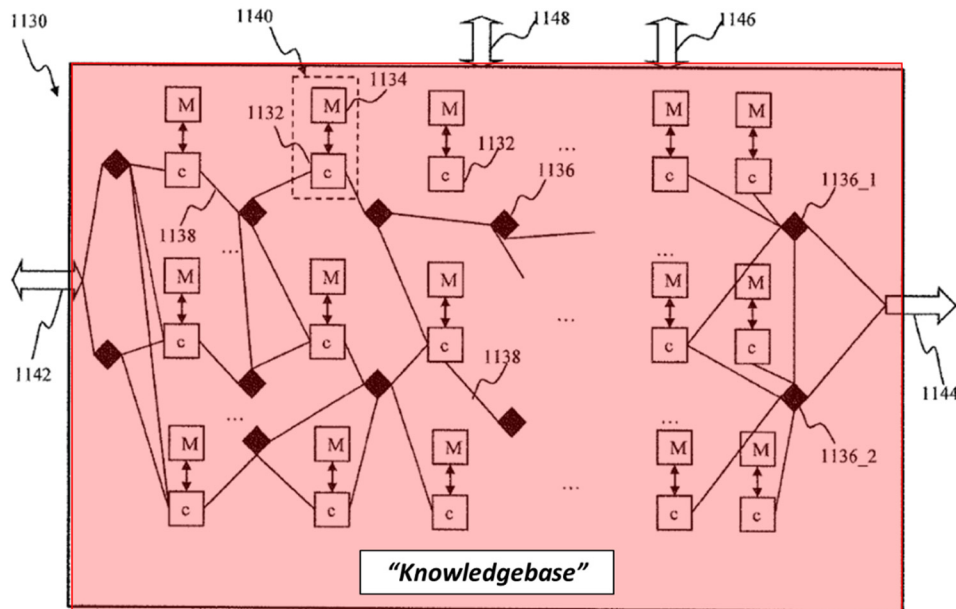


FIG. 7

TESLA-1005, FIG. 7 (annotated and color added).



TESLA-1005, FIG. 10 (annotated and color added).



TESLA-1005, FIG. 11B (annotated and color added).

Buibas teaches that the partition of a “brain image” (*knowledgebase*) for a particular task or behavior of the robot includes an “interface” or “connections” (*one or more inputs*⁴) that allow the brain image to receive encoded sensory signals and information about the environment, thereby allowing the robot to react appropriately based on the circumstance. TESLA-1005, ¶¶[0058], [0074], [0136]-[0137], [0152]. FIG. 10 illustrates an example “*input* interface configured to receive an input sensory signal.” *Id.*, ¶[0136]. FIG. 11B illustrates another example of a “neuromorphic apparatus” with an input “interface 1142.” *Id.*, ¶[0152], FIG. 11B; TESLA-1003, ¶73.

⁴ The plain language of the claim 45 indicates that the recited “one or more inputs” encompass *interfaces* to the knowledgebase configured to receive data (e.g., “at least a portion of a circumstance representation”) from which operating instructions can be determined. TESLA-1003, ¶73. For example, the language of [45.6] specifically refers to “*inputting* at least a portion of the generated circumstance representation *into the one or more inputs*”—thus distinguishing the “one or more inputs” from the inputted data of the “at least a portion of the generated circumstance representation.” *Id.*

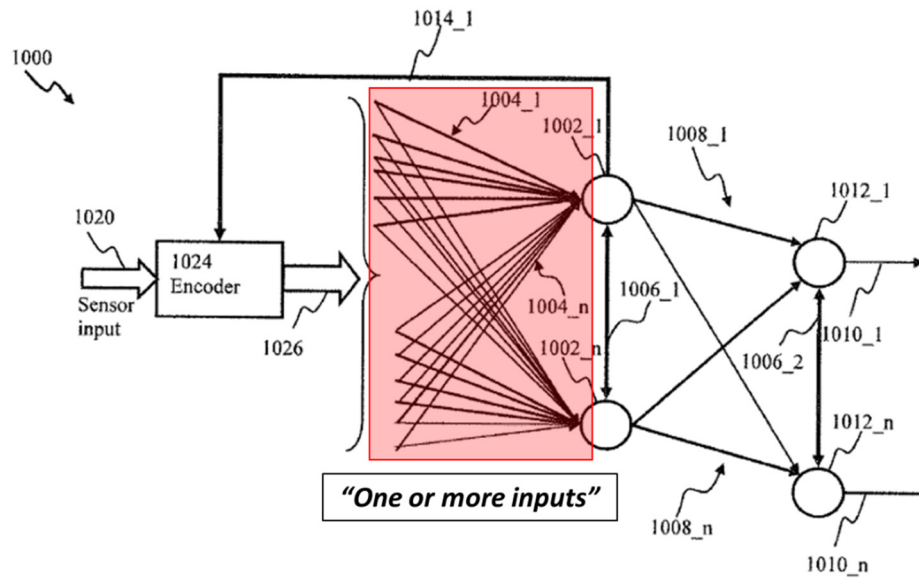


FIG. 10

TESLA-1005, FIG. 10 (annotated and color added).

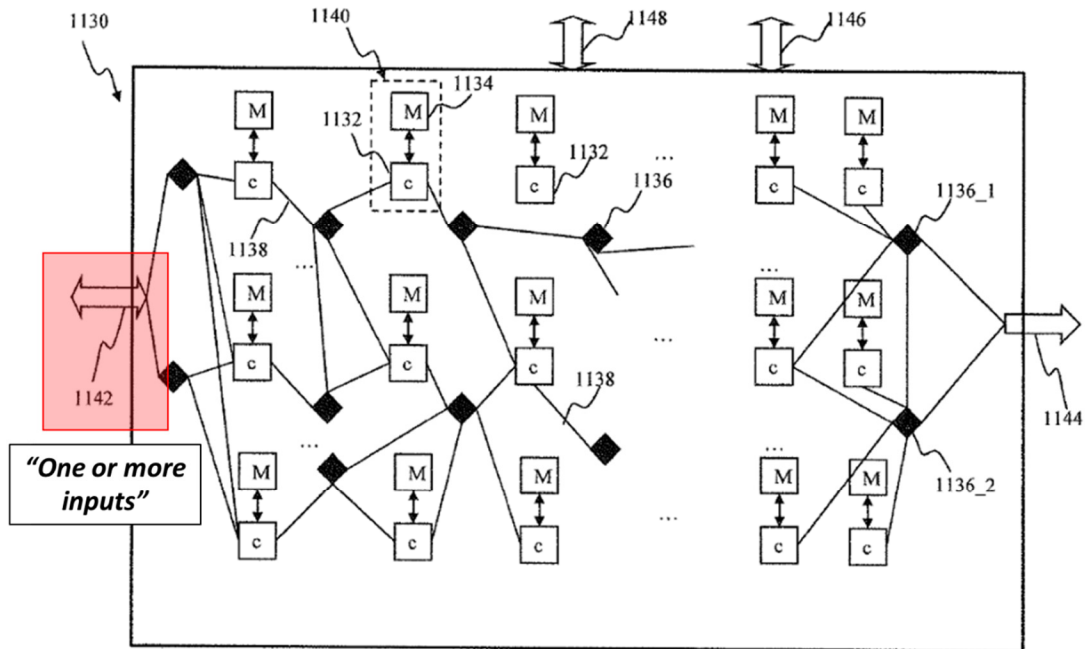


FIG. 11B

TESLA-1005, FIG. 11B (annotated and color added).

Further, according to Buibas, the “brain image” for a particular task/behavior is configured, when executed, to issue “commands” (*one or more instruction sets*) to motors and other components of the robot that cause the robot to carry out a task/behavior defined by the brain image. TESLA-1005, ¶¶[0130]-[0131], [0153], [0157]-[0159], [0161]. Buibas’ example “neuromorphic apparatus” illustrates an output “interface 1144” that “provide[s] output (e.g., an indication of recognized object or a feature, or a motor command, e.g., to zoom/pan the image array)” (*one or more instruction sets*). *Id.*, ¶¶[0152]-[0153], FIG. 11B; TESLA-1003, ¶74.

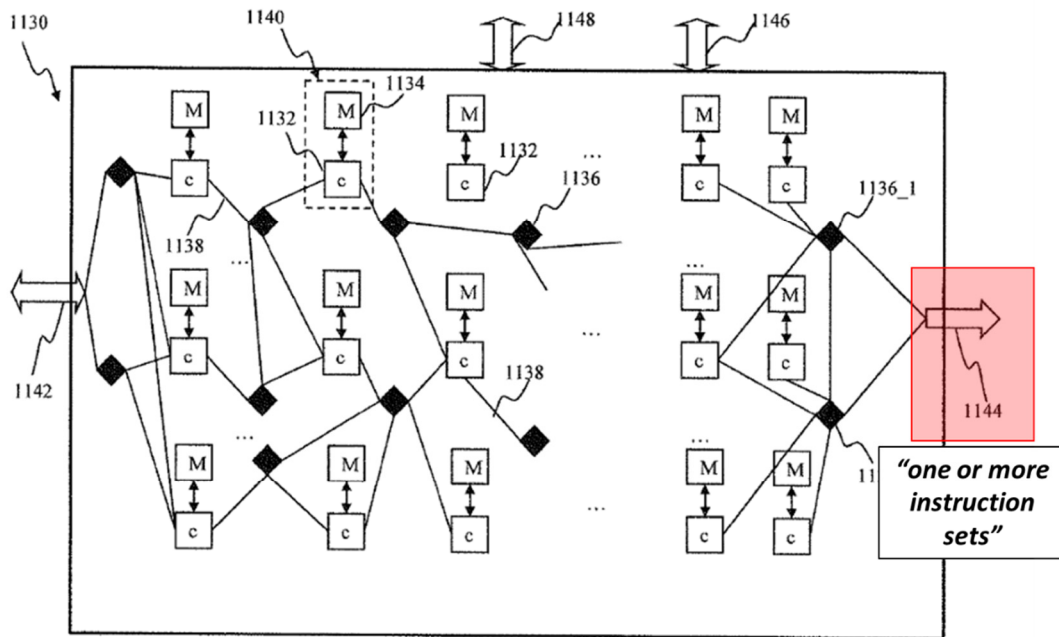


FIG. 11B

TESLA-1005, FIG. 11B (annotated and color added).

Additionally, Buibas teaches implementing its “robotic brain (network)” as “a partitioned network, (e.g., a motor-control partition, or a signal processing partition).” TESLA-1005, ¶¶[0092], [0096]. Although Buibas does not disclose many details about the “partitioned network” configuration, Sinyavskiy does. TESLA-1006, ¶¶[0012], [0185], [0188], FIG. 6A. For example, with respect to FIGS. 6A-6B, Sinyavskiy discloses how different portions of a spiking neural network can be partitioned into sections dedicated to different tasks. *Id.*, ¶¶[0185]-[0192], FIG. 6A; TESLA-1003, ¶75. An example of Sinyavskiy’s partitioned network is illustrated below.

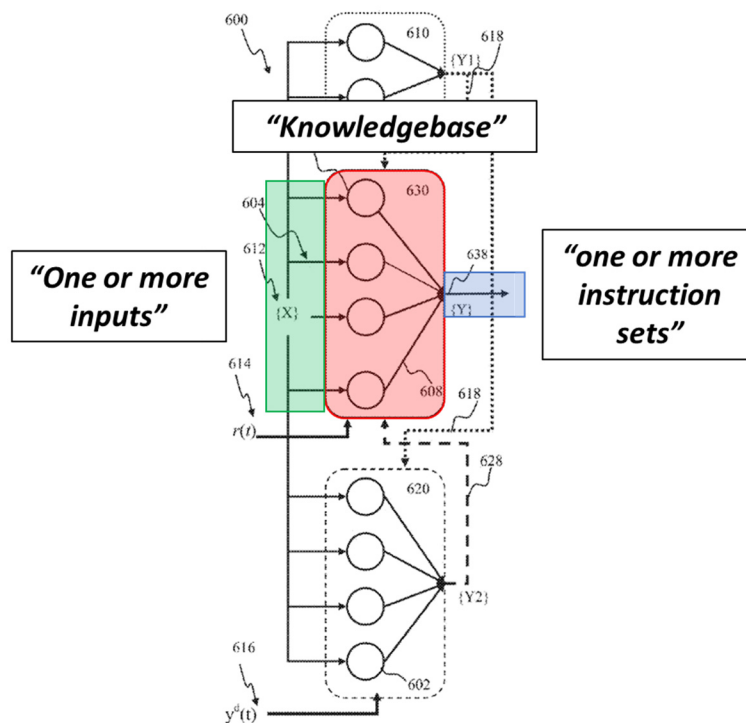


FIG. 6A

TESLA-1006, FIG. 6A (annotated and color added).

Not only does Sinyavskiy partition the brain (network) by tasks, but Buibas also teaches that brain images defining different tasks or behaviors can be combined (e.g., “merged”) to create an “offspring” brain image with enhanced capabilities, where the original (“parent”) brain images persist as partial brain images (e.g., partitions) in the combined (“offspring”) image. TESLA-1005, ¶¶[0094]-[0104], [0188]-[0189], [0220], [0225], FIGS. 4-5; TESLA-1003, ¶76. Buibas’ FIG. 4 illustrates an example of this process.

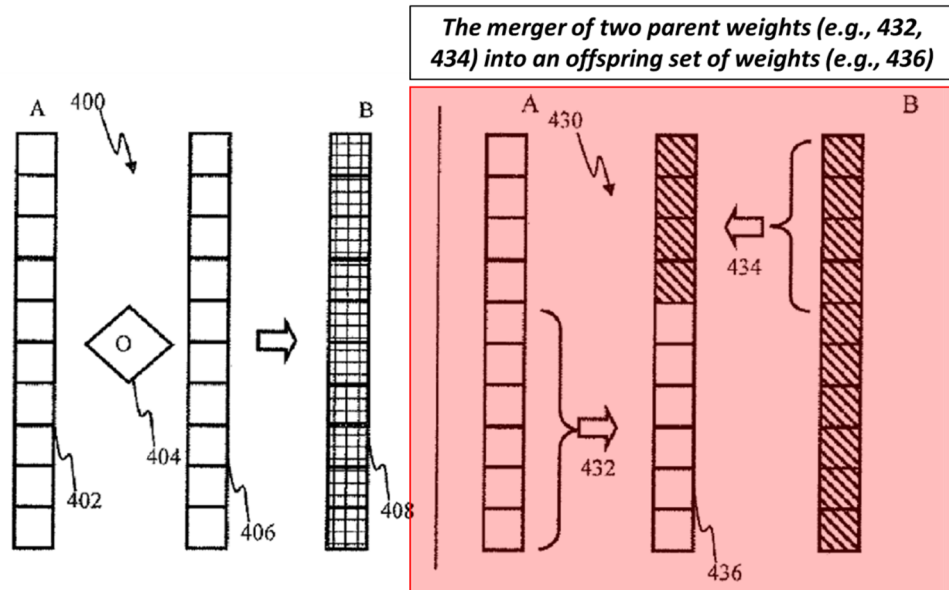


FIG. 4

TESLA-1005, FIG. 4 (annotated and color added).

In the Buibas-Sinyavskiy combination, a partition of a brain image for a particular task or behavior provides the claimed “*knowledgebase*.” TESLA-1005, ¶¶[0092]-[0104], [0188]-[0189], [0220], [0225], FIGS. 4-5; TESLA-1006, ¶¶[0012], [0185], [0188], FIG. 6A. The input interface or connections to an

individual partition (*one or more inputs*) are correlated with the control commands (*one or more instruction sets*) produced by that partition. *Id.* For example, as shown in Sinyavskiy's FIG. 6A, the inputs (*one or more inputs*) of partition 630 (*knowledgebase*) are correlated with the outputted motor control commands "{Y}" (*one or more instruction sets*). Likewise, the inputs of partition 610 are correlated with output "{Y1}" and the inputs of partition 620 are correlated with output "{Y2}" (*the one or more inputs are correlated with one or more instruction sets*). *Id.*, ¶¶[0185]-[0188], FIG. 6A. The correlation relates the inputs of an individual partition to the outputs produced by that partition. Noticeably, the inputs of a given partition are only correlated to the outputs of that same partition (but are not correlated to the outputs of other partitions). TESLA-1003, ¶77.

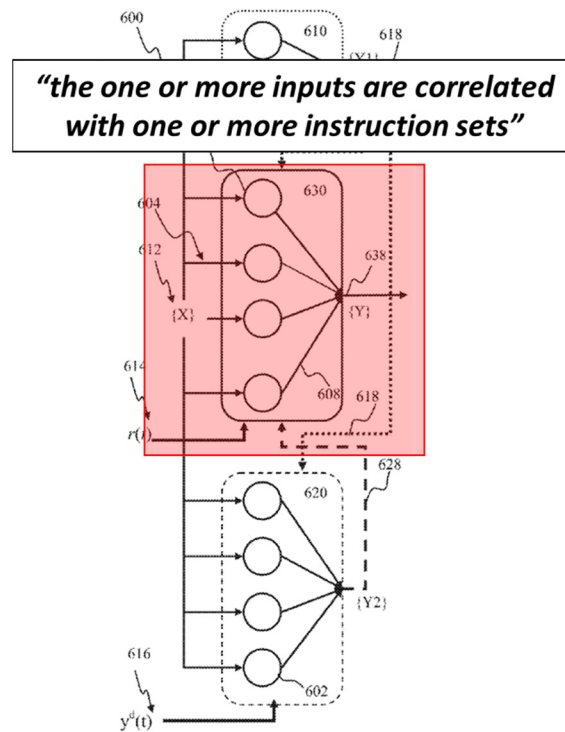


FIG. 6A

TESLA-1006, FIG. 6A (annotated and color added).

As noted above, Buibas further teaches that brain images can be shared and loaded on robots other than the robot on which the brain image was originally trained. TESLA-1005, ¶¶[0070]-[0071], [0085], [0184], [0188], [0201], FIG. 14. When a first robot (*first device*) “loads” a brain image (containing a *knowledgebase*), either in full or as a partial image combined with other images, which was trained on a second robot (*second device*), the commands produced by that brain image constitute *one or more instruction sets for operating a second device*, as claimed. TESLA-1003, ¶78; *see also supra*, §§II.A-B, Claims 51-52. Buibas’ brain image in this context provides instructions that were learned on a

second device but that are applied to applied to operate a first device. *Id.* Buibas’

FIG. 14, for example, illustrates an example “cloud-based training system” that can download stored brain images to a robot.

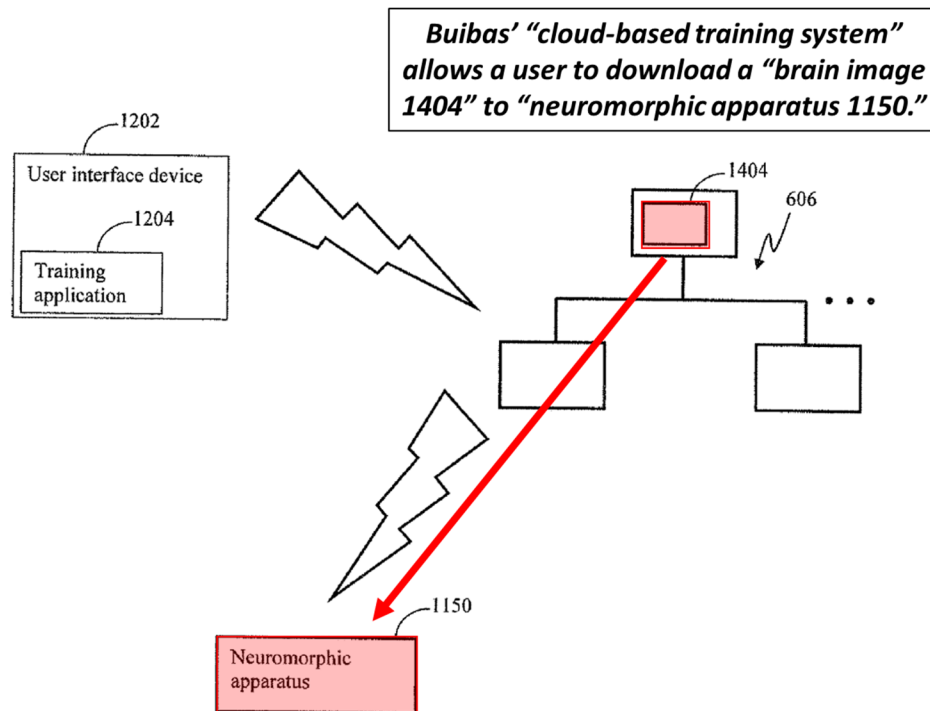


FIG. 14

TESLA-1005, FIG. 14 (annotated and color added).

The above examples are similar to examples given in the '474 Patent, for example, in which “a Device 98 ... having access to a combined Knowledgebase 530 can use the collective knowledge learned from multiple Devices 98 for the Device’s 98 autonomous operation.” TESLA-1001, 103:35-39. This mapping is also consistent with the limitations in dependent claim 51, for example, that “at

least a portion of the one or more instruction sets for operating the second device is learned in a learning process that includes operating the second device at least partially by a user.” TESLA-1001, Claim 51; *see also* Claim 52 (“applied to the first device”); TESLA-1003, ¶79.

As another example, Buibas discloses that “multiple mechanical, sensory, or electrical units may be controlled be [*sic*] a single robotic brain via network/radio connectivity.” TESLA-1005, ¶[0130]; *see also id.*, ¶[0161] (“A remote data connection may be used to issue machine coded commands to a mechanical device from the neuromorphic apparatus in second location”); TESLA-1003, ¶80. Buibas thus discloses or plainly suggests that the motor commands issued by a robotic brain can be used to operate not only a local robot (*first device*) on which the brain is installed, but can also be applied to operate a remote robot (*second device*) which receives the operating instructions from the first robot over a wireless connection. *Id.* The control outputs (e.g., motor commands) provided to remotely operate the second device in this example likewise constitute “one or more instruction sets for operating a second device” as claimed. *Id.*

Element [45.2]

The Buibas-Sinyavskiy combination renders obvious [45.2]. TESLA-1003, ¶81. For example, Buibas discloses that its robotic device includes one or more “sensory devices” and “sensory information” (*one or more sensors*). TESLA-

1005, ¶¶[0132], [0136], FIG. 7. Buibas discloses examples of sensory devices that include “video, audio, haptic, capacitive, radio, vibrational, ultrasonic, infrared, and temperature sensors radar, lidar and/or sonar” (*one or more sensors*). *Id.* An example robotic apparatus that includes “sensory devices 720” is illustrated below. *Id.*, ¶[0132], FIG. 7.

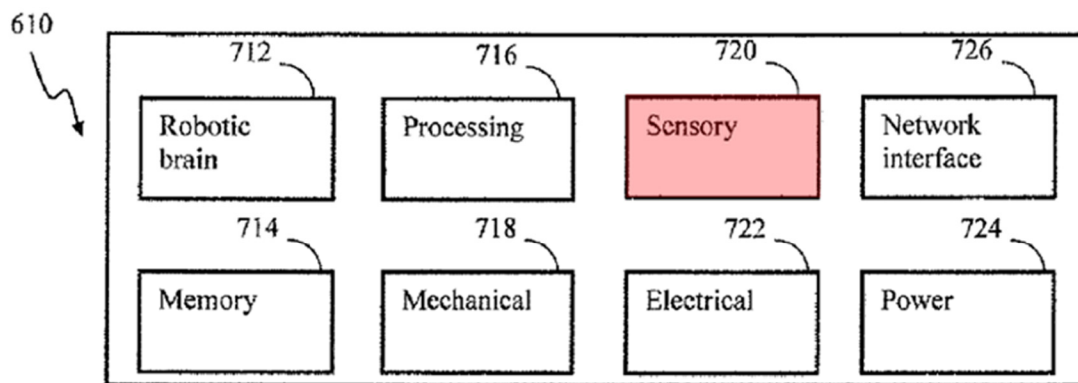


FIG. 7

TESLA-1005, FIG. 7 (annotated and color added).

Element [45.3]

The Buibas-Sinyavskiy combination renders obvious [45.3]. TESLA-1003, ¶82. For example, Buibas discloses that its robotic device includes “processing capacity 716” and “processing devices” (*one or more processors*). TESLA-1005, ¶¶[0130], [0149], FIG. 7. Buibas discloses examples of processing devices that include “a single core/multicore CPU, DSP, FPGA, GPU, ASIC, combinations thereof, and/or other processors” (*one or more processors*). *Id.*, ¶[0149]. An example robotic apparatus that includes “processing capacity 716” is illustrated

below. *Id.*, ¶[0130], FIG. 7.

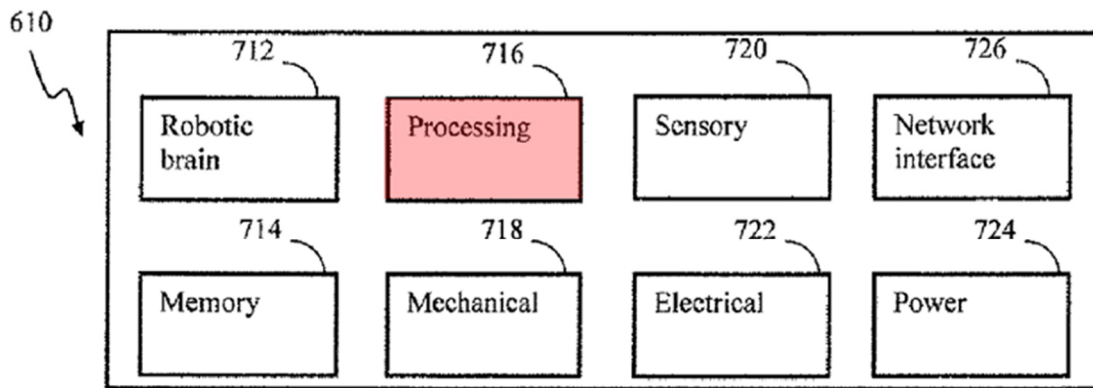


FIG. 7

TESLA-1005, FIG. 7 (annotated and color added).

Element [45.4]

The Buibas-Sinyavskiy combination renders obvious [45.4]. TESLA-1003, ¶83. For example, Buibas discloses that its robotic device includes “memory” and/or “a nonvolatile storage device 1106, comprising, inter alia, computer readable instructions” (*one or more non-transitory machine readable media storing machine readable code that, when executed by the one or more processors, causes the one or more processors to perform ...*). TESLA-1005, ¶¶[0130], [0146], [0154], FIG. 7. Buibas discloses that this media is used to “implement various aspects of spiking neuronal network operation (e.g., sensory input encoding, connection plasticity, operation model of neurons, etc.).” *Id.*, ¶[0146]. An example robotic apparatus that includes “memory 714” is illustrated below. *Id.*, ¶[0130], FIG. 7.

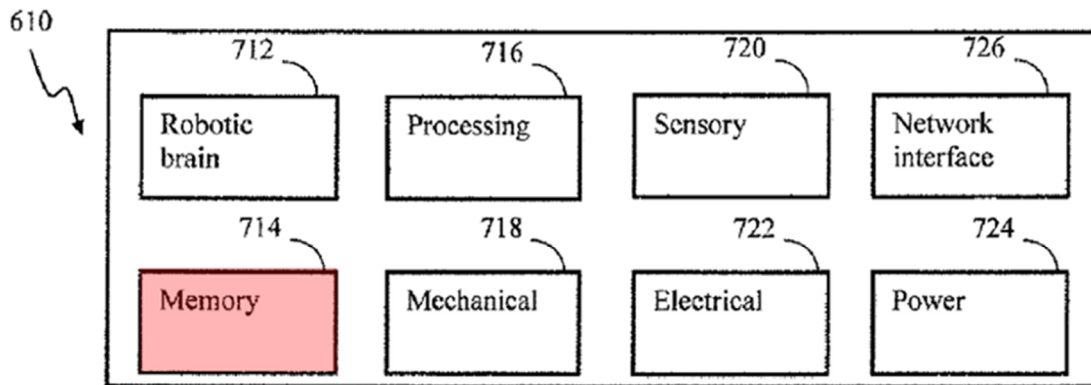


FIG. 7

TESLA-1005, FIG. 7 (annotated and color added).

Element [45.5]

The Buibas-Sinyavskiy combination renders obvious [45.5]. TESLA-1003, ¶84. For example, Buibas describes how the robot’s sensors can detect information representative of a circumstance. TESLA-1005, ¶¶[0088], [0117], [0137], [0188], [0232], FIG. 10. According to Buibas, “sensory devices 720 allow the robotic device to accept stimulus from external entities.” *Id.*, ¶[0132]. The sensory devices 720 can include “video, audio, haptic, capacitive, radio, vibrational, ultrasonic, infrared, and temperature sensors radar, lidar and/or sonar”—each of which detects information about the environment or other circumstances of the robot. *Id.* Buibas discloses that information detected by the robot’s sensors are representative of circumstances of the robot, including for example, “gestures, voice, posture, face, etc.,” types of objects around the robot and events occurring around the robot. *Id.*, ¶¶[0117], [0232] (describing “detecting

events (e.g., for visual surveillance or people or animal counting, tracking)” and “object recognition”).

Buibas further teaches that sensory inputs (e.g., sensory input 1020) *(represent[ing] a circumstance detected at least in part by the one or more sensors)* can be encoded to generate an “encoded signal” (*a circumstance representation*) representative of a circumstance of the robot. TESLA-1005, ¶[0137] (“The apparatus 1000 may comprise an encoder 1024 configured to transform the input signal into an encoded signal 1026. In one implementation, the encoded signal comprises a plurality of pulses ... configured to model neuron behavior”). Buibas’ FIG. 10 illustrates an example “input interface configured to receive an input sensory signal.” *Id.*, ¶[0136]. Sinyavskiy likewise discloses a partition 610 that “adapt[s] raw sensory input of a robot apparatus to internal format of the network.” TESLA-1006, ¶[0188]; TESLA-1003, ¶¶85-86.

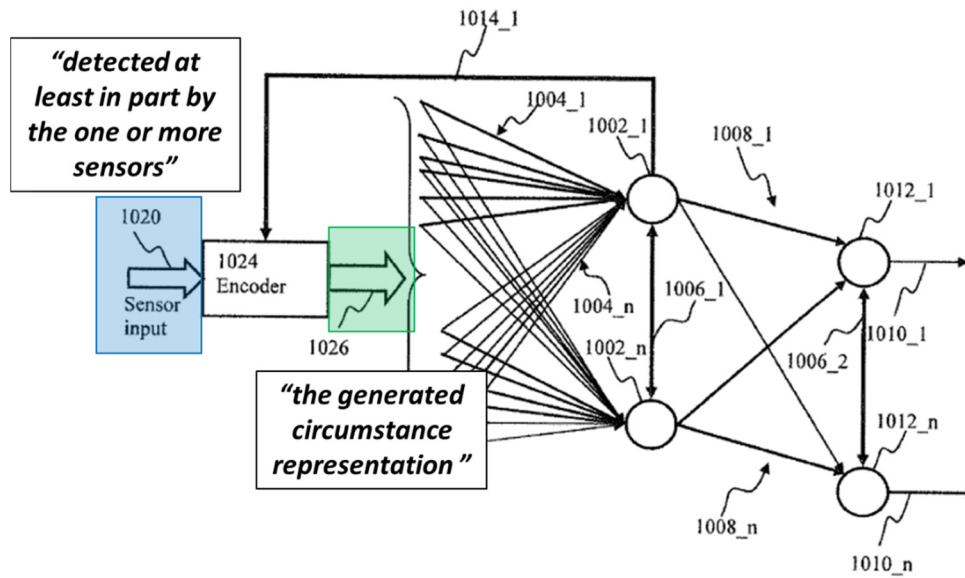


FIG. 10

TESLA-1005, FIG. 10 (annotated and color added).

Element [45.6]

The Buibas-Sinyavskiy combination renders obvious [45.6]. TESLA-1003, ¶87. For example, Buibas discloses that, in operation, at least a portion of the robot's "encoded [sensory] signal" (*at least a portion of the generated circumstance representation*) is inputted into the "interface" or input "connections" (*one or more inputs*) of the robot's brain. TESLA-1005, ¶¶[0130]-[0131], [0153], [0159]; TESLA-1006, ¶[0110], FIG. 6A. In the Buibas-Sinyavskiy combination, the encoded sensory signal is predictably provided to the input interface/connections (*one or more inputs*) of an individual partition of the brain (*knowledgebase*) configured to produce control outputs (e.g., motor commands) (*one or more instruction sets*) for a particular task or behavior of the robot. See

supra, [45.1]. Illustrated below is an example “partitioned neural network” that generates an “output {Y}” from an “input {X}.” TESLA-1006, ¶¶[0185]-[0192], FIG. 6A.

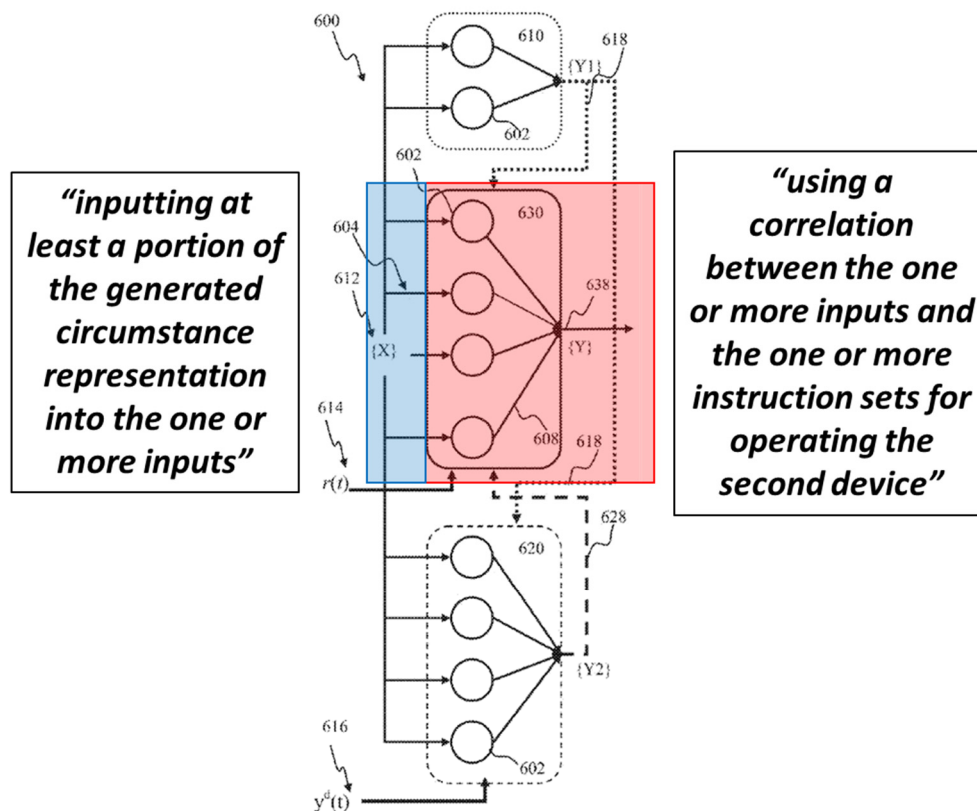


FIG. 6A

TESLA-1006, FIG. 6A (annotated and color added).

As described above with respect to [45.1], the input interface/connections (*one or more inputs*) of a partition of a brain image for a particular task or behavior are correlated with the commands produced by that brain image (*using a correlation between the one or more inputs and the one or more instruction*

sets for operating the second device). See *supra*, [45.1]; TESLA-1003, ¶88.

When the robot (*first device*) operates autonomously to perform a particular task or behavior implemented by the partition, it uses this correlation to determine one or more commands (*one or more instruction sets*) appropriate to carry out that particular task or behavior in view of the inputted encoded sensory signal (*at least a portion of the generated circumstance representation*). *Id.*

Finally, as described above with respect to [45.1], the commands (*one or more instruction sets*) produced by a brain on a first robot (*first device*) can be learned in a training procedure performed on a second robot (*second device*) such that the commands determined based on the inputted encoded sensory signal (*at least a portion of the generated circumstance representation*) are commands for operating the second robot (*one or more instruction sets for operating the second device*). See *supra*, [45.1]. As another example, the brain image on the first robot can determine motor commands to operate both the first robot and a remote, second robot. *Id.*; TESLA-1003, ¶¶89-90.

Element [45.7]

The Buibas-Sinyavskiy combination renders obvious [45.7]. TESLA-1003, ¶91. For example, Buibas discloses that the “robotic brain” interfaces with mechanical and electrical components of the robot to cause the robot to autonomously perform a task or behavior defined in a brain image. TESLA-1005,

¶¶[0130]-[0131], [0153], [0159], [0230]-[0234] (describing different examples of “autonomous” robots). In response to the brain determining “command[s]” (*one or more instruction sets*) based on the encoded sensory input (*at least a portion of a circumstance representation*), the commands are executed either directly or via “driver interfaces” and “software abstraction layers” to cause the robot to perform operations defined by the commands (*wherein the first device autonomously performs one or more operations defined by the one or more instruction sets*).

Id. Buibas’ FIG. 11B illustrates an example “output” provided via an output interface 1144 from a “neuromorphic apparatus.” *Id.*, ¶[0153], FIG. 11B.

Sinyavskiy likewise discloses similar output “motor commands.” TESLA-1006, ¶¶[0110], [0230]-[0232].

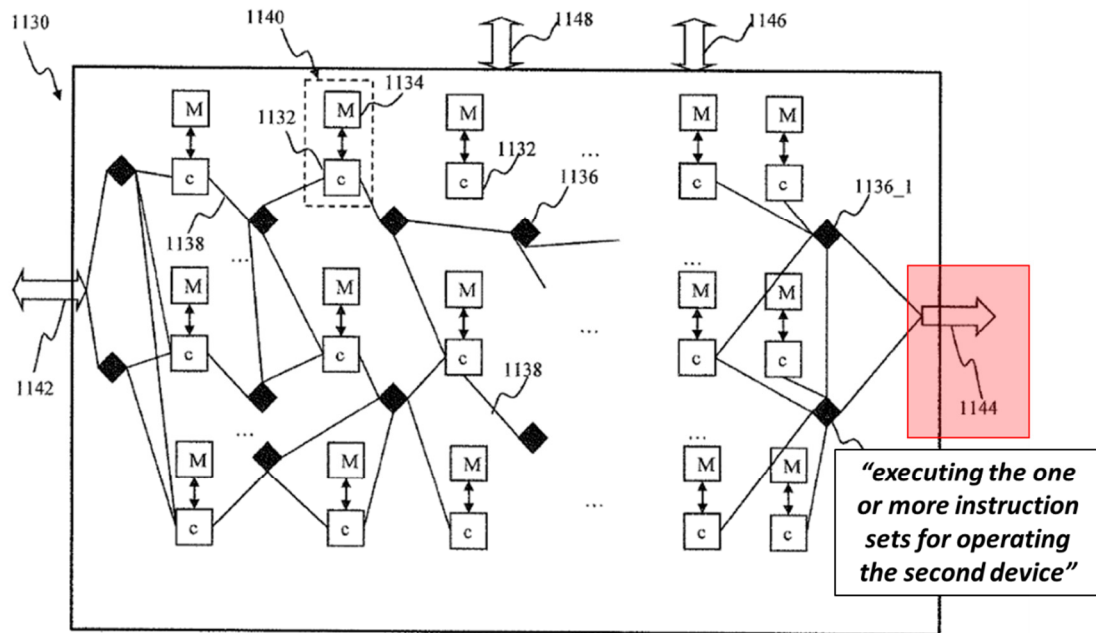


FIG. 11B

TESLA-1005, FIG. 11B (annotated and color added).

Further, as described above with respect to [45.1], the commands (*one or more instruction sets*) produced by a brain on a first robot (*first device*) can be learned in a training procedure performed on a second robot (*second device*) such that the commands determined based on the inputted encoded sensory signal (*at least a portion of the generated circumstance representation*) are commands for operating the second robot (*one or more instruction sets for operating the second device*). As another example, the brain image on the first robot can determine motor commands to operate both the first robot and a remote, second robot. See *supra*, [45.1]; TESLA-1003, ¶¶92-93.

Claim [46]

The Buibas-Sinyavskiy combination renders obvious [46]. TESLA-1003, ¶94. For example, Buibas discloses that the encoded “sensory input” (*circumstance representation*) can include indications of “object features and objects” (*one or more object representations*). TESLA-1005, ¶¶[0117], [0140], [0153], [0157]-[0159]; cf. TESLA-1001, 80:50-55 (“Any number of Object Properties 630 ... and/or other elements or information can be included in an Object Representation 625.”). The input interface/connections (*one or more inputs*) of the brain image partition for a particular task or behavior that receives the encoded sensory input (*at least a portion of a circumstance representation*) includes input interface/connections for inputting at least a portion of “*one or more object representations*” (such that “*the generated circumstance representation includes one or more object representations*”). *Id.*

Buibas further discloses that the first robot (*first device*) and the second robot (*second device*) can be first and second “vehicles,” respectively (*wherein the first device is a first vehicle, and wherein the second device is a second vehicle*). *Id.*, ¶¶[0230]-[0234]; *supra*, [45.pre]-[45.1]; TESLA-1003, ¶95.

Claim [47]

The Buibas-Sinyavskiy combination renders obvious [47]. TESLA-1003, ¶96. For example, Buibas discloses that “synaptic weights,” “neurons,” and “links

between neurons” of the brain image for a particular task or behavior are learned in a “training process” (*learning process*) that includes operating a robot at least partially by “a user,” who “suppl[es] commands” and “provide[s] the neuromorphic apparatus with feedback and/or feed-forward input” (“*a learning process that includes operating the second device at least partially by a user*”). TESLA-1005, ¶¶[0069], [0075], [0172]-[0173], [0176]-[0177], [0201]-[0202], [0205], [0211]-[0221]. The synaptic weights, neurons, and links between neurons of the brain image are all *information related to the one or more instruction sets* for operating the robot being trained. *Id.* For example, the weights, neurons, and links between neurons in the brain image encode information used by the brain image to determine the commands (*one or more instructions sets*) for operating the robot learned in the training process. *Id.*, ¶[0205].

Further, as described above with respect to [45.1], the commands (*one or more instruction sets*) produced by a brain on a first robot (*first device*) can be learned in a training procedure performed on a second robot (*second device*). *See supra* [45.1]; TESLA-1003, ¶97. In this context, the weights, neurons, and links between neurons in the brain image on the first robot are information related to commands for operating the second robot at least partially by a user. *Id.* As

another example, the brain image on the first robot can determine motor commands to operate both the first robot and a remote, second robot. *Id.*

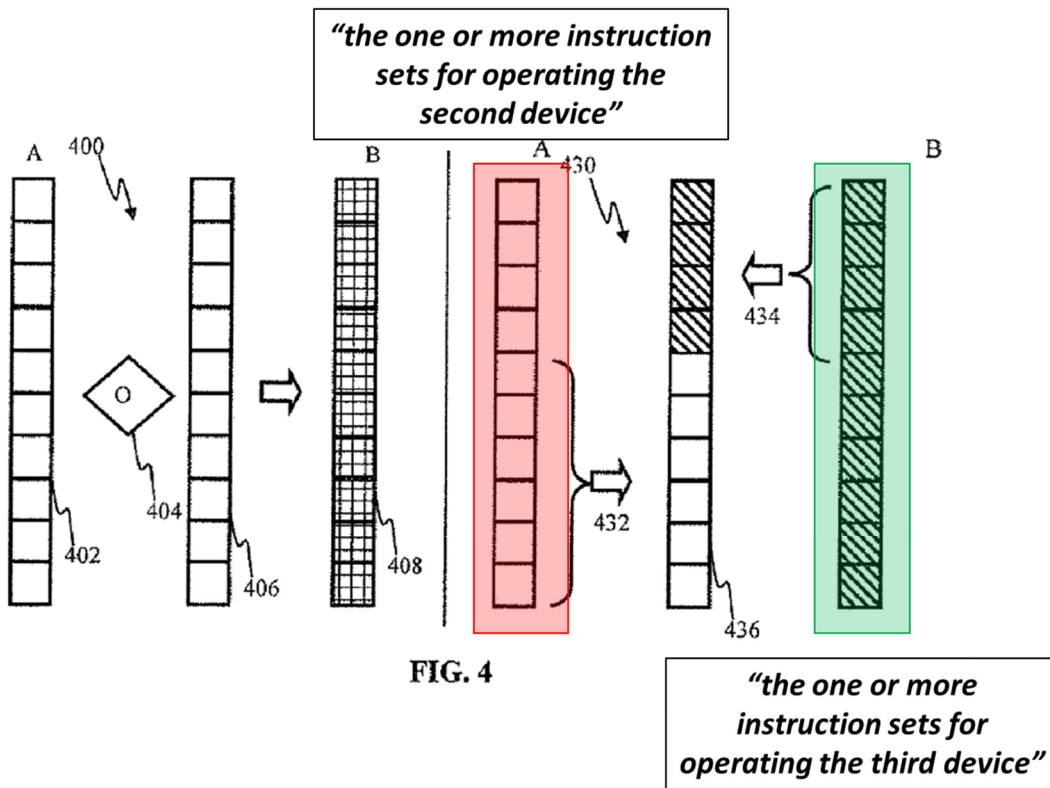
Claim [51]

The Buibas-Sinyavskiy combination renders obvious [51]. TESLA-1003, ¶98. For example, Buibas discloses that at least a portion of the commands (***one or more instruction sets***) for operating the second robot (***second device***), which are produced by the brain image on the first robot (***first device***), is learned in a training procedure (***learning process***) that includes user interaction. TESLA-1005, ¶¶[0069]-[0071], [0176]-[0177], [0184], [0188], [0196], [0201]-[0202]. For example, Buibas describes the user “manually mov[ing] the device,” providing “commands” and “feedback,” and mapping out a “routine” (***a learning process that includes operating the second device at least partially by a user***). *Id.* The brain image learned on the second robot is shared with and loaded on the first robot. *Id.*

Claim [56]

The Buibas-Sinyavskiy combination renders obvious [56]. TESLA-1003, ¶99. For example, as described above with respect to [45.1], Buibas-Sinyavskiy disclose that the input interface/connections (***one or more inputs***) of a partition of a brain image (***knowledgebase***) for a particular task or behavior are correlated with the instruction sets produced by that partition. *See supra*, [45.1]. Buibas further

discloses techniques for “merging” brain images to combine behavior modules learned on two or more robots (a *second device* and a *third device*). *Id.* For example, “non-interleaved” network merges can be used “to combine capabilities of two (or more) parents or to add a capability to one of the parent network.” TESLA-1005, ¶[0096], FIG. 4; *generally id.*, ¶¶[0090]-[0098], [0124]-[0127], [0189], [0225], FIG. 9. Accordingly, it would have been understood and obvious to a POSITA that the parents to a merged network that forms a partition of a brain image on the first device can be trained on separate devices, e.g., a *second device* and a *third device*, by respective users (*a learning process that includes operating the second device at least partially by a user and another learning process that includes operating the third device at least partially by another user*) such that the inputs to the offspring brain image on the first device are correlated with commands (*instruction sets*) for operating both the second device and the third device. *Id.*; *see supra* [51].



TESLA-1005, FIG. 4 (annotated and color added).

Claim [57]

The Buibas-Sinyavskiy combination renders obvious [57] for each of the reasons described above with respect to [56]. *See supra*, [56]. Moreover, “mere duplication of parts has no patentable significance unless a new and unexpected result is produced” (i.e., the *instruction sets* for operating the *third device* of this claim when compared to the *instruction sets* for operating the *second device* of claim 1 produce no unexpected result). *In re Harza*, 274 F.2d 669 (CCPA 1960). Here, the ’474 Patent describes nothing at all unexpected about sharing instruction sets from second and third devices as opposed to just a second device, and the

additional feature claimed in [57] is obvious. TESLA-1003, ¶100.

Claim [59]

The Buibas-Sinyavskiy combination renders obvious [59]. TESLA-1003, ¶101. For example, Buibas discloses that ***object representations*** in the encoded “sensory input” (***circumstance representation***) can include ***one or more information about one or more objects***, e.g., information that allows the robot to detect and recognize “objects” in a vicinity of the robot. TESLA-1005, ¶¶[0117], [0132], [0136], [0140]-[0141], [0153], [0159], FIG. 10; *supra*, [46]; TESLA-1003, ¶101.

Claim [68]

The Buibas-Sinyavskiy combination renders obvious [68]. TESLA-1003, ¶102. Buibas discloses that the brain, and its partition (***knowledgebase***) that implements a particular task or behavior, can be a “***neural network***.” TESLA-1005, ¶¶[0068], [0073]-[0074], FIG. 1. For example, Buibas discloses brains implemented as an “artificial spiking neural network” (***neural network***). *Id.*

Claim [69]

The Buibas-Sinyavskiy combination renders obvious [69]. TESLA-1003, ¶103. Buibas discloses that the brain, and its partition (***knowledgebase***) that implements a particular task or behavior, can include an “artificial intelligence apparatus” (***artificial intelligence system***). TESLA-1005, ¶¶[0005], [0018],

[0068], [0070]-[0073], [0187]. For example, Buibas discloses “artificial neural networks,” “artificial intelligence models and paradigms,” and “artificially intelligent entities.” *Id.*

**B. [GROUND 1B] – Buibas in view of Sinyavskiy and Versace
Render Obvious Claim 60**

1. Overview of Versace

Versace discloses a system that “allows real-time sensing and cognitive reasoning on heterogeneous sensor streams” for “mobile robots with similar or other sensors packs-e.g., LIDAR, IR, RADAR, and virtual sensors in virtual environments.” TESLA-1007, ¶¶[0044]-[0048], FIG. 1. Versace’s system, referred to as “OpenSense,” can be implemented in the “visual domain” (referred to as “OpenEye”) to “learn[] incrementally about its visual input, and identif[y] and categorize[] object identities and object positions.” *Id.*, ¶¶[0049]-[0057]. OpenEye’s operations include “switching between [] coordinate systems centered on the on the robot/camera/sensor (ego-centric), the environment (image-centric or world-centric), and between metrics systems (Cartesian or log-polar)” in response to sensory input or instructions received or executed in varying coordinate systems. *Id.*, ¶¶[0089]-[0091]; TESLA-1003, ¶54.

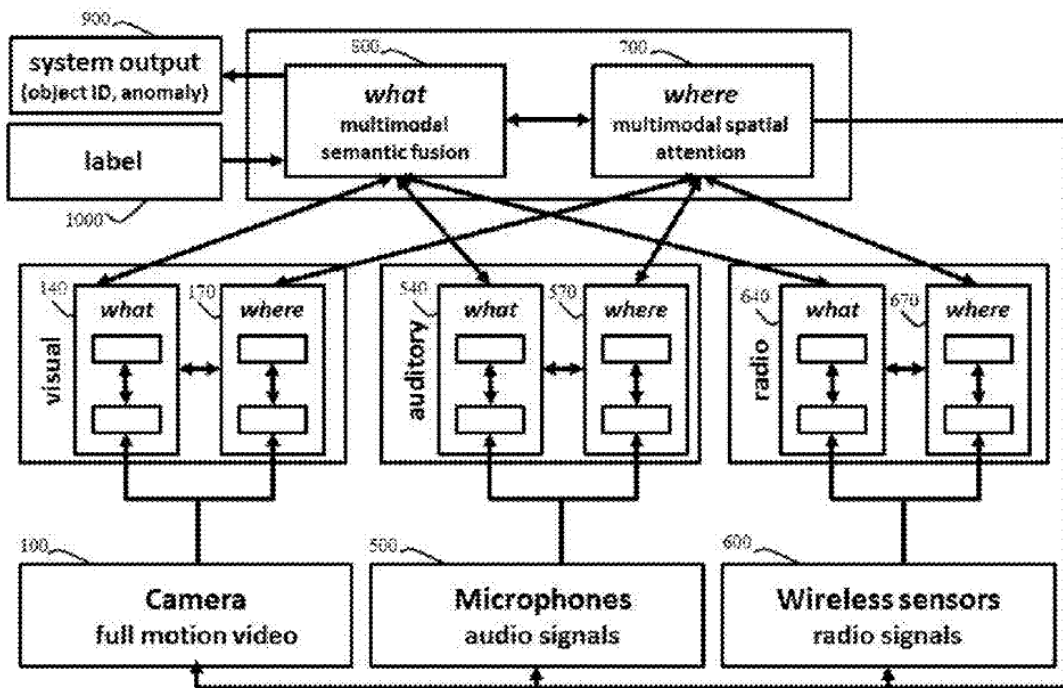


FIG. 1

TESLA-1007, FIG. 1.

Versace is analogous art to the '474 Patent: it is from the same field of endeavor (e.g., training/operating autonomous devices) and is reasonably pertinent to the problem the '474 Patent was trying to solve (e.g., the need to efficiently train/operate autonomous devices). TESLA-1001, Abstract, 1:51-54, 58:3-13, 95:29-96:8, 102:30-103:39; TESLA-1003, ¶55.

2. Combination of Buibas, Sinyavskiy, and Versace

As discussed above, Buibas describes techniques for training and operating autonomous robots. *See supra* §§IV.A.1, III.A.2; TESLA-1003, ¶104. In

combination with Versace, which describes techniques for implementing coordinate systems in robotic systems and locating objects in the coordinate systems, claim 60 is rendered obvious. *See supra* §IV.B.1; TESLA-1003, ¶104; TESLA-1005, ¶¶[0071]-[0072], [0085], [0092], [0179]-[0203]; TESLA-1006, ¶¶[0012], [0185], [0188], FIG. 6A; *see supra* §IV.A.4.[45.pre]. For example, in the combination, it would have been obvious to apply Versace’s suggested use of “coordinate systems” to define multi-perspective points of reference and/or spatial locations for objects in the environment of the robots described in Buibas and Sinyavskiy. *See supra* §§IV.A.1, III.A.2, III.B.1; TESLA-1003, ¶104. The locations of objects and features detected from the sensory inputs of the Buibas-Sinyavskiy robot could then be expressed with spatial coordinates in the applied coordinate system. *Id.* The robots in such a Buibas-Sinyavskiy-Versace combination would predictably used the object locations for various tasks, for example, “search pattern[s],” and/or “motion estimation.” TESLA-1005, ¶¶[0130]-[0131], [0153], [0159], [0230]-[0235]; TESLA-1003, ¶104. A POSITA would have been motivated to apply the teachings of Versace to Buibas-Sinyavskiy in this manner for multiple reasons. TESLA-1003, ¶104.

First, a POSITA would have been motivated to pursue this combination to increase the “awareness” of the Buibas-Sinyavskiy’s robots to “previously learned

objects,” as described by Versace and discussed by Dr. Janet. TESLA-1003, ¶105 (citing TESLA-1007, ¶¶[0146]-[0147]).

Second, a POSITA would have recognized that, by explicitly defining and tracking the location of obstacles, the distance between the obstacles and/or robot could be used for follow on calculations (e.g., plotting a search pattern or route using historical information obtained from a first operation), thereby improving and expanding the capabilities of the robots. TESLA-1005, ¶¶[0130]-[0131], [0153], [0159], [0230]-[0235]; TESLA-1003, ¶106.

Third, a POSITA would have recognized that implementing a coordinate system and expressing object locations with coordinates in the coordinate system would enable finer control for sensitive operations, increasing the Buibas-Sinyavskiy robots’ accuracy “identifying, learning, localizing, and tracking objects.” TESLA-1007, ¶¶[0077]-[0079]; *see also* TESLA-1009, 2:1-22 (describing a coordinate system improving the “manipulative accuracy” of a robot). As Dr. Janet notes, “Buibas discloses that its robots are used in situations where manipulative accuracy is paramount, for instance, ‘unexploded ordinance/improvised explosive device location’ and ‘identify[ing] targets ... and deliver[ing] similar explosives.’” TESLA-1003, ¶107 (citing TESLA-1005, ¶¶[0234]).

Fourth, a POSITA would have been motivated to pursue this combination because doing so would have provided greater spatial certainty to the robot, thereby improving the robot's ability to navigate in its environment. TESLA-1003, ¶108.

Fifth, a POSITA would have been motivated to pursue this combination because doing so is merely the application of known techniques (e.g., operating a robot in a coordinate system as suggested by Versace) to a known/predictable system (e.g., Buibas-Sinyavskiy's robots) to yield predictable results (e.g., a robot using a coordinate system). *See KSR*, 550 U.S. at 415-421; MPEP §2143; TESLA-1003, ¶109. Indeed, Dr. Janet confirms it was well known before the critical date to use coordinate systems to define the location of an object(s) to a robot. TESLA-1003, ¶109 (citing TESLA-1009, 1:54-57, 2:12-16, 5:27-6:19; TESLA-1018, ¶¶[0073]-[0077], [0080]; TESLA-1019, ¶¶[0005]-[0006], [0043], [0046], [0049], [0071], [0076]-[0078], [0091]-[0097], [0109]-[0116]; TESLA-1020, ¶[0007]-[0012], [0020], [0024]-[0025], [0045]-[0050], [0062], [0072], [0086]-[0088]).

Sixth, a POSITA would have been motivated to pursue this combination because it merely instantiates use of a known technique (e.g., operating a robot in a coordinate system) to improve a similar system, e.g., a robot (such as those described by Buibas, Sinyavskiy, and Versace). *See KSR*, 550 U.S. at 415-421; MPEP §2143; TESLA-1003, ¶110.

A POSITA would have reasonably expected success implementing the combination, especially since the use of coordinates and coordinate systems to reference locations of objects and other features in the environment of a robot was common and well-known before the '474 Patent. TESLA-1003, ¶111. Buibas-Sinyavskiy's suggestion for training robots to perform a search or operation in space (TESLA-1005, ¶¶[0130]-[0131], [0153], [0159], [0230]-[0235]) also invites use of Versace's coordinate system to define the location of that space and/or obstacles relative to the robot. TESLA-1003, ¶111.

3. Analysis

Claim [60]

The Buibas-Sinyavskiy combination renders obvious [60]. TESLA-1003, ¶112. For example, Buibas discloses that its techniques can “[a]dvantageously” be employed “to produce an estimate of [] object position,” for example. TESLA-1005, ¶[0235]. To the extent Buibas does not expressly disclose that the encoded sensory signals include “*coordinates of one or more objects*,” the use of coordinates to characterize the locations of objects detected in the environment of a mobile autonomous device was well known before the '474 Patent as demonstrated by Versace. TESLA-1007, ¶¶[0089]-[0090], [0119] (“track the position of objects in the visual field and return their coordinates”); *see supra* §IV.B.2. It would have been obvious to apply Verace's suggested use of object coordinates as a feature for

processing by the brain in the Buibas-Sinyavskiy-Versace combination for each of the reasons discussed above (*supra*, §IV.B.2). *Id.* In the combination, the coordinates of the object(s) detected by the robot would predictably be encoded and provided as object representations(s) to the input interfaces/connections (***one or more inputs***) of a partition of a brain images that would use the object location to perform a particular task or behavior. *Supra*, Ground 1A, [45.5]-[45.6], [46]; TESLA-1003, ¶112.

C. [GROUND 2A] – Grotmol Anticipates Claims 45-47, 51, 59, and 68-69

1. Overview of Grotmol

Grotmol describes “[a]n apparatus and methods for training and/or operating a robotic device to follow a trajectory.” TESLA-1008, Abstract. According to Grotmol, “conventional approaches” to training a robot involved a user “first control[ling] the robot one time or multiple times to move along [a] desired path” – thus “training of the robot” – after which the robot would perform the same task autonomously. *Id.*, 1:67-2:2. A “typical approach” was to store motor commands during training and then “simply replay them.” *Id.*, 2:3-5; TESLA-1003, ¶56.

Grotmol then discloses its own approach, whereby user commands are associated with camera images and other sensor context captured during training, such that during “autonomous operation, an acquired image may be compared with

one or more images from the training buffer” to determine how to control the robot. TESLA-1008, Abstract. Grotmol describes a “listen mode,” where a robot observes a teacher’s commands to “[1] **learn** an association.” *Id.*, 23:3-11. Grotmol also describes an “override mode,” in which a robot will operate autonomously until a teacher sends a command, in which case the robot will apply the teacher’s command and “try to remember it for the next time the same situation occurs.” *Id.*, 23:12-22. “During training, images (e.g., raw and/or pre-processed) may be [2] **stored** in a memory buffer (training buffer),” along with “[m]otor commands issued by a trainer corresponding to time instances when the images are acquired.” *Id.*, 39:13-22. The robot is then [3] **enabled**—either manually or automatically—into an “autonomous mode,” in which the robot performs tasks autonomously based on what it has learned. *Id.*, 23:46-48, 24:1-16. Grotmol further teaches that a robot’s “trained configuration may be [2] **stored**” and “loaded to one or more other robots in order to provide learned behaviors” (e.g., [3] **enable** further autonomous operations). *Id.*, 33:12-35; TESLA-1003, ¶57. An example system according to Grotmol is reproduced below.

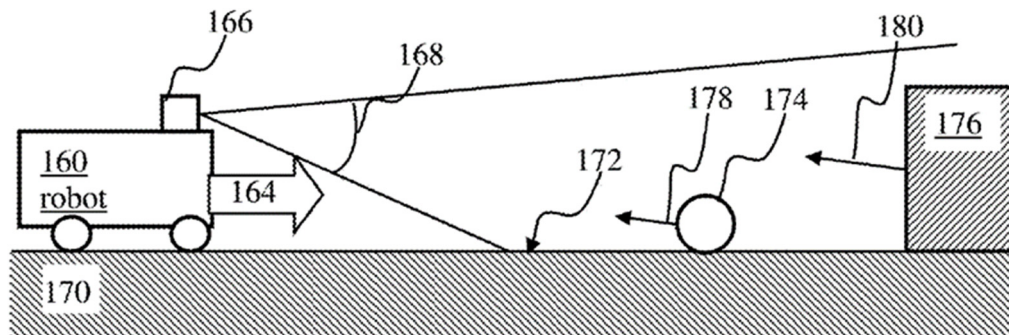


FIG. 1

TESLA-1008, FIG. 1.

Grotmol discloses “adaptive controllers” for controlling operations of the robot and learning behaviors. TESLA-1008, 21:64-22:18, 25:30-42, 26:5-20, 27:24-40, FIGS. 10A-11B, 15. An adaptive controller includes an “interface” configured to receive a selected set of “features” extracted from “[s]ensory input” that can then be used to select or train a “behavior” of the robot. *Id.*, 25:30-42, 26:5-20, 27:24-40. Behaviors learned as a “trained configuration” can be shared with “one or more other robots.” *Id.*, 33:12-35; TESLA-1003, ¶58. FIG. 10A, below, depicts an example of Grotmol’s adaptive controller providing an output based on input features.

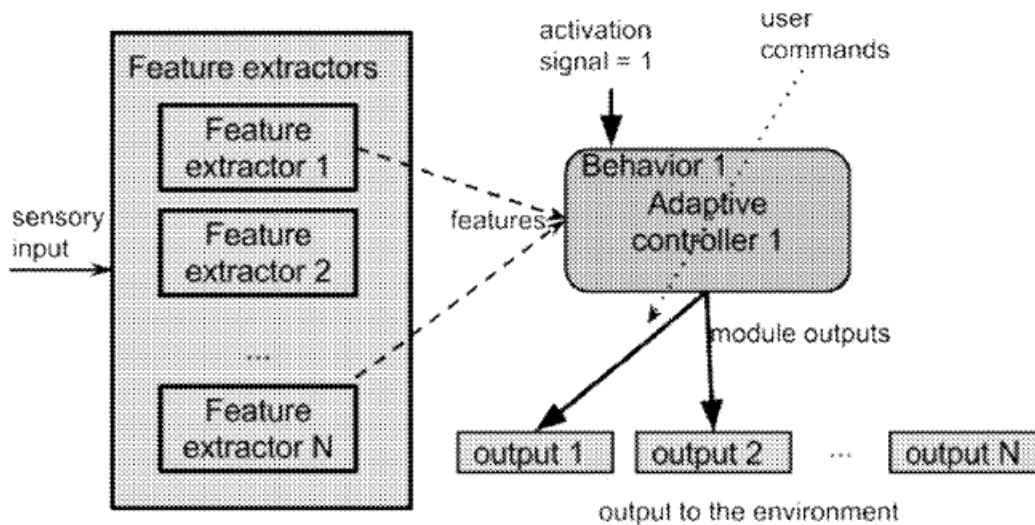


FIG. 10A

TESLA-1008, FIG. 10A.

Grotmol is analogous art to the '474 Patent: it is from the same field of endeavor (e.g., training/operating autonomous devices) and is reasonably pertinent to the problem the '474 Patent was trying to solve (e.g., the need to efficiently train/operate autonomous devices). TESLA-1001, Abstract, 1:51-54, 58:3-13, 95:29-96:8, 102:30-103:39; TESLA-1003, ¶59.

2. Analysis

Element [45.pre]

To the extent the preamble is limiting, it is anticipated by Grotmol. TESLA-1003, ¶113. Grotmol discloses a “mobile robotic apparatus.” TESLA-1008, 3:27-67, 8:57-66, 21:64-67. An example mobile robot from Grotmol is depicted in FIG. 1.

A “first device”

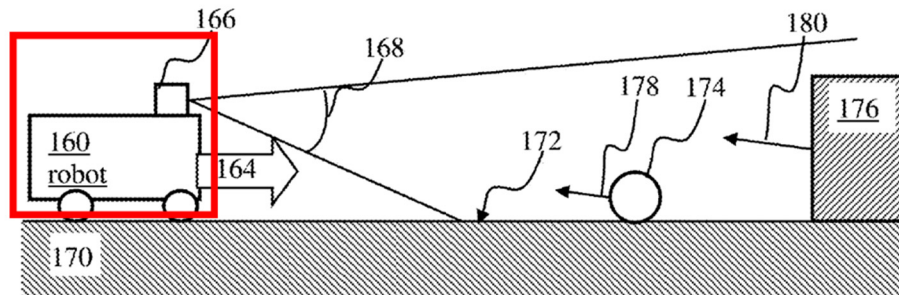


FIG. 1

TESLA-1008, FIG. 1 (annotated).

As described in further detail below (*infra*, [45.1]), Grotmol discloses how its robots can include “adaptive controllers” that are configured to control operation of the robot through a user-guided training procedure. The saved configuration of an adaptive controller trained on a first robot can then be shared with other robots. TESLA-1008, 33:27-30 (“A saved configuration may be loaded into the robot being trained thereby providing one or more trained behaviors to the robot. In some implementations, the trained configuration may be loaded to one or more other robots in order to provide learned behaviors.”). For purposes of mapping to claim 45, the robot that receives/loads the saved configuration for an adaptive controller from another robot corresponds to the recited “***first device***.” TESLA-1003, ¶114. The robot that shared the saved configuration and on which the adaptive controller was trained corresponds to the recited “***second device***.” *Infra*, [45.1]; TESLA-1003, ¶114.

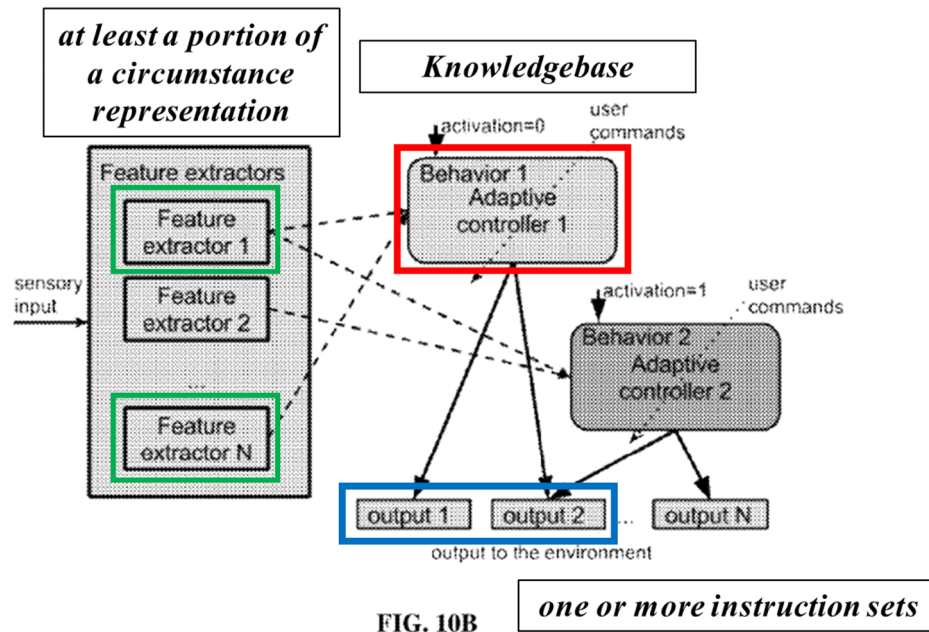
Element [45.1]

Grotmol discloses an “adaptive controller” (***knowledgebase***) that stores “classifiers” or “modules” for controlling operations of a robot. TESLA-1008, 21:64-67, 25:30-42, 26:5-20, 27:24-40, 29:61-30:20, FIGS. 10A-10D, 11A-11B, 15⁵. The adaptive controller includes an “interface” (***one or more inputs***⁶) configured to receive a selected set of “input features” (also referred to as “context”) extracted from “sensory input” (***at least a portion of a circumstance representation***). *Id.*, 25:30-42, 26:5-20, 27:24-40, FIGS. 10A-10D, 11A-11B. The “interface” functions as an input to the modules or adaptive controllers to effectuate an “output” (e.g., instructions for operating the robot), and the interface to a particular adaptive controller is correlated with the instruction sets (e.g., motor commands) stored and produced by that adaptive controller. *Id.*; TESLA-1003, ¶115. By contrast, the inputs of a particular adaptive controller are not correlated to the instruction sets of Grotmol’s other adaptive controllers in the

⁵ The ’974 patent states that a “[k]nowledgebase 530 may be or include any data structure or arrangement capable of storing the knowledge of a device’s operation in circumstances including objects with various properties.” TESLA-1001, 101:66-102:29.

⁶ *Supra*, Footnote 4.

control hierarchy. An example depiction of an adaptive controller in Grotmol's system is shown in FIG. 10B below.



TESLA-1008, FIG. 10B (annotated).

As illustrated above, the “interface” (*one or more inputs*) to the adaptive controller (*knowledgebase*) is correlated with “[control] outputs y (e.g., motor commands)” (*one or more instruction sets*) for operating the robot (e.g., “output 1” and “output 2” of FIG. 10B). TESLA-1008, 27:48-28:44, 29:37-39, 29:54-30:20, FIGS. 10A-10D, 11A-11B, 15; TESLA-1003, ¶116.

As one example, Grotmol discloses that an adaptive controller can include classifiers used in a “random k-nearest neighbors (RKNN) approach” for “learning of predicting output y (e.g., motor commands) based on the input (e.g., plurality of features detected in sensory input)” (*the one or more inputs are correlated with*

one or more instruction sets). TESLA-1008, 29:37-39, 29:54-30:20, FIG. 15.

Grotmol discloses that its adaptive controllers that use the RKNN process (*knowledgebase*) store “classifier” tables, each table comprising a set of data pairs consisting of sensory input “features” (x) and “outputs” (y) learned during a training procedure (*the one or more inputs are correlated with one or more instruction sets*). TESLA-1008, 29:37-39, 29:54-30:20, FIG. 15. In operation, the robot performs an action according to a given behavior by detecting a new set of sensory input features (x0), selecting the “k” closest input features (x) stored in each classifier table, and deriving a predicted/control output (yp) from the respective outputs (y) associated with the k-closest input features (x). *Id.* The inputs to the adaptive controller implementing the RKNN process are correlated with both the outputs (y) stored in the classifier tables and the ultimate output (yp) produced by the RKNN process (*the one or more inputs are correlated with one or more instruction sets*). *Id.* Likewise, the stored input features (x) in the classifier tables are correlated with specific outputs (y) learned during training, which provides another example of “*one or more*

inputs [] correlated with one or more instruction sets” as claimed.⁷ *Id.*;

TESLA-1003, ¶117. Grotmol’s FIG. 15 provides an example illustration of a RKNN process.

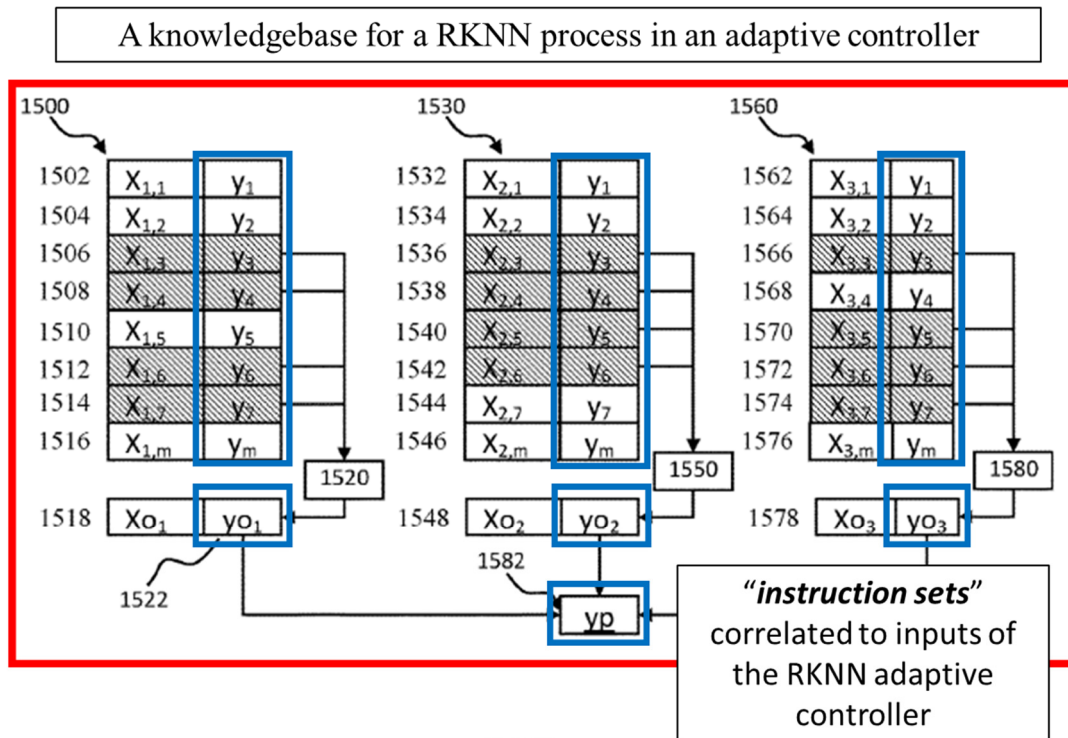


FIG. 15

TESLA-1008, FIG. 15 (annotated).

Grotmol also discloses that training data can be shared between robots.

TESLA-1008, 33:12-35. In particular, the “trained configuration” of an adaptive

⁷ In this example, the stored input features (x) in the classifier tables provide an alternative mapping to the claimed “one or more inputs” of the knowledgebase.

TESLA-1003, ¶117.

controller “may be loaded to one or more other robots in order to provide learned behaviors” (*one or more instruction sets for operating a second device*). *Id.*, 33:27-30. When the trained configuration of an adaptive controller implementing an RKNN process is learned on a second robot and loaded on a first robot, the control outputs used and produced in the RKNN process applied to the first robot are instruction sets for operating the second robot. TESLA-1003, ¶¶118-119; *see also supra*, §§II.A-B, Claims 51-52; TESLA-1001, 103:35-39.

Element [45.2]

Grotmol discloses that the “mobile robotic apparatus” includes sensors for detecting information about its environment (*one or more sensors*). TESLA-1008, 3:27-30, 8:57-9:22, 10:15-22, 15:63-16:4, 27:56-28:9, 38:43-51, 43:42-53, FIG. 1. For example, Grotmol discloses “a variety of sensors” that include “a video camera, IR camera, RADAR, SONAR, LiDAR, ultrasonic imager, and/or other device” (*one or more sensors*). *Id.*, 38:43-51. These sensors provide “sensory inputs” including “a stream of pixel values associated with one or more digital image” and “video, radar, sonography, X-ray, magnetic resonance imaging, and/or other types of sensing” (*one or more sensors*). *Id.*, 8:57-9:22, 27:56-28:9. Grotmol’s FIG. 1 illustrates an example mobile robotic apparatus with a “sensor component 166.” *Id.*, 8:57-9:22, FIG. 1; TESLA-1003, ¶120.

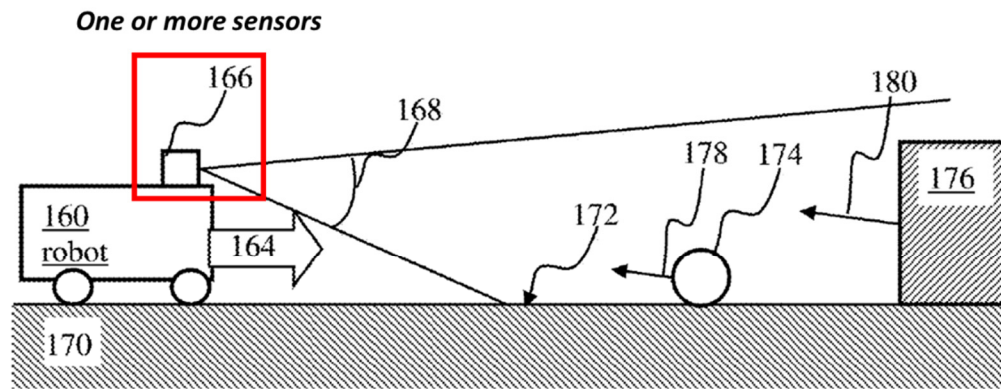


FIG. 1

TESLA-1008, FIG. 1 (annotated).

Element [45.3]

Grotmol discloses that its mobile robotic apparatus includes “one or more physical processors” (*one or more processors*). TESLA-1008, 3:27-30, 8:5-15, Claim 12. Grotmol further discloses that the term “processor” includes:

[A]l types of digital processing devices including, without limitation, digital signal processors (DSPs), reduced instruction set computers (RISC), general-purpose (CISC) processors, microprocessors, gate arrays (e.g., field programmable gate arrays (FPGAs)), PLDs, reconfigurable computer fabrics (RCFs), array processors, secure microprocessors, and application-specific integrated circuits (ASICs).

Id., 8:5-15. Grotmol’s FIG. 8 illustrates an example functional block diagram of a mobile robotic apparatus with a “processing” component. *Id.*, FIG. 8, *see also* 38:33-42; TESLA-1003, ¶121.

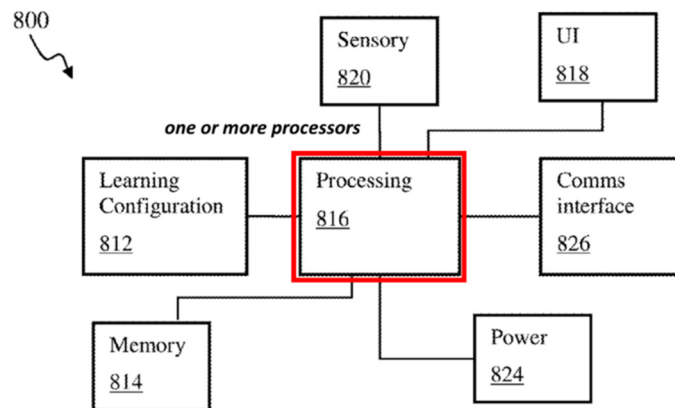


FIG. 8

TESLA-1008, FIG. 8 (annotated).

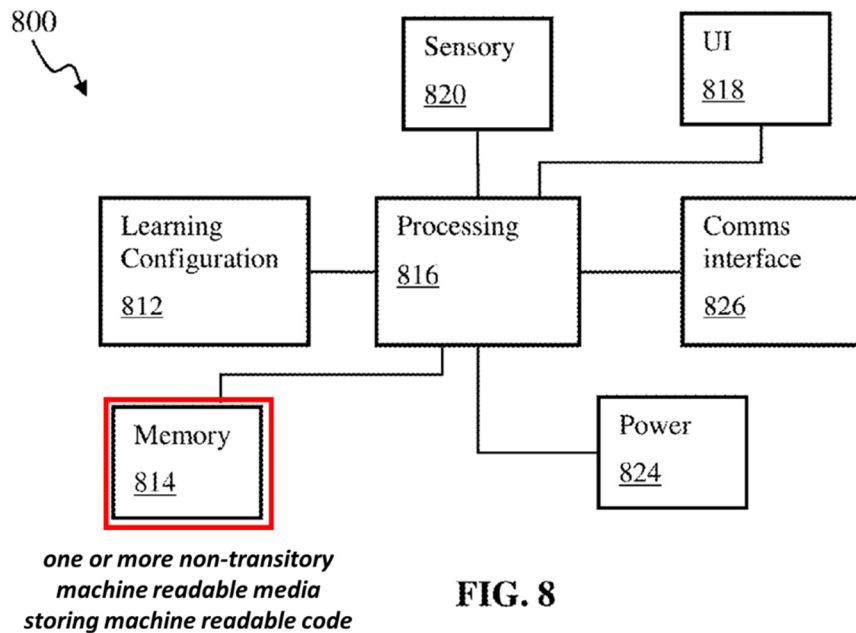
Element [45.4]

Grotmol discloses that its mobile robotic apparatus includes “one or more processors executing instructions stored by a non-transitory computer-readable storage medium.” TESLA-1008, 2:15-18, 3:27-36, 7:66-8:4, 38:33-42, 3:27-36. Grotmol further discloses examples of “memory” that include:

[A]ny type of integrated circuit or other storage device adapted for storing digital data including, without limitation, ROM, PROM, EEPROM, DRAM, Mobile DRAM, SDRAM, DDR/2 SDRAM, EDO/FPMS, RLDRAM, SRAM, “flash” memory (e.g., NAND/NOR), memristor memory, and PSRAM (*one or more non-transitory machine readable media storing machine readable code*).

Id., 7:66-8:4; TESLA-1003, ¶122. Grotmol’s FIG. 8 illustrates an example functional block diagram of a mobile robotic apparatus with a “memory”

component. *Id.*, FIG. 8, *see also* 38:33-42.



TESLA-1008, FIG. 8 (annotated).

Element [45.5]

Grotmol discloses feature extractors that generate “features” (*a circumstance representation*) from “sensory input” (*a circumstance detected at least in part by the one or more sensors*). TESLA-1008, 25:30-42, 26:5-20, 27:56-28:40, 29:54-60. Grotmol’s sensory input, and thus the “features” (*circumstance representation*) derived from the sensory input, represent circumstances of the robot’s operation or environment detected by the sensors (e.g., “sensor component 166”). TESLA-1003, ¶123. The circumstances can include the presence of “obstacles” in the environment, recognized objects in the

environment, and/or the location of a “target” for the robot’s intended travel, for example. *Id.*; TESLA-1008, 7:60-65, 8:57-9:22, 10:23-34, 28:14-58, 31:21-35, FIG. 1, FIG. 10B (showing feature extractors); *supra* [45.2]; TESLA-1003, ¶¶123-124.

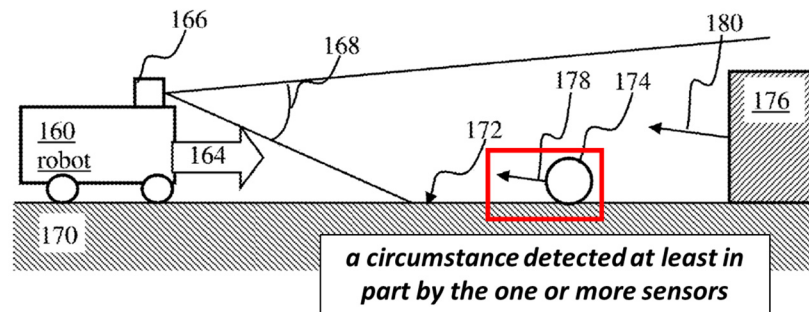


FIG. 1

TESLA-1008, FIG. 1 (annotated).

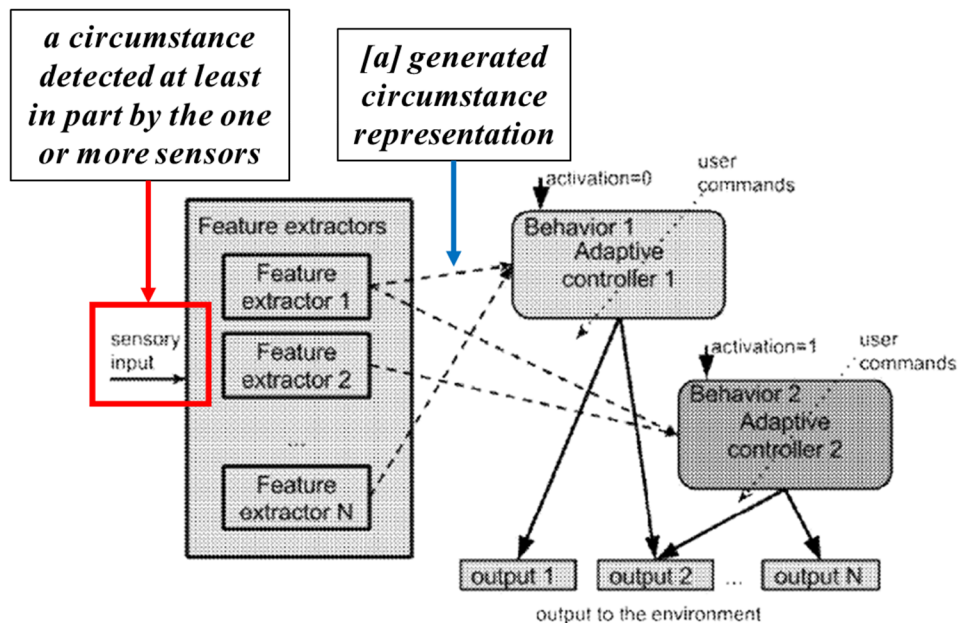
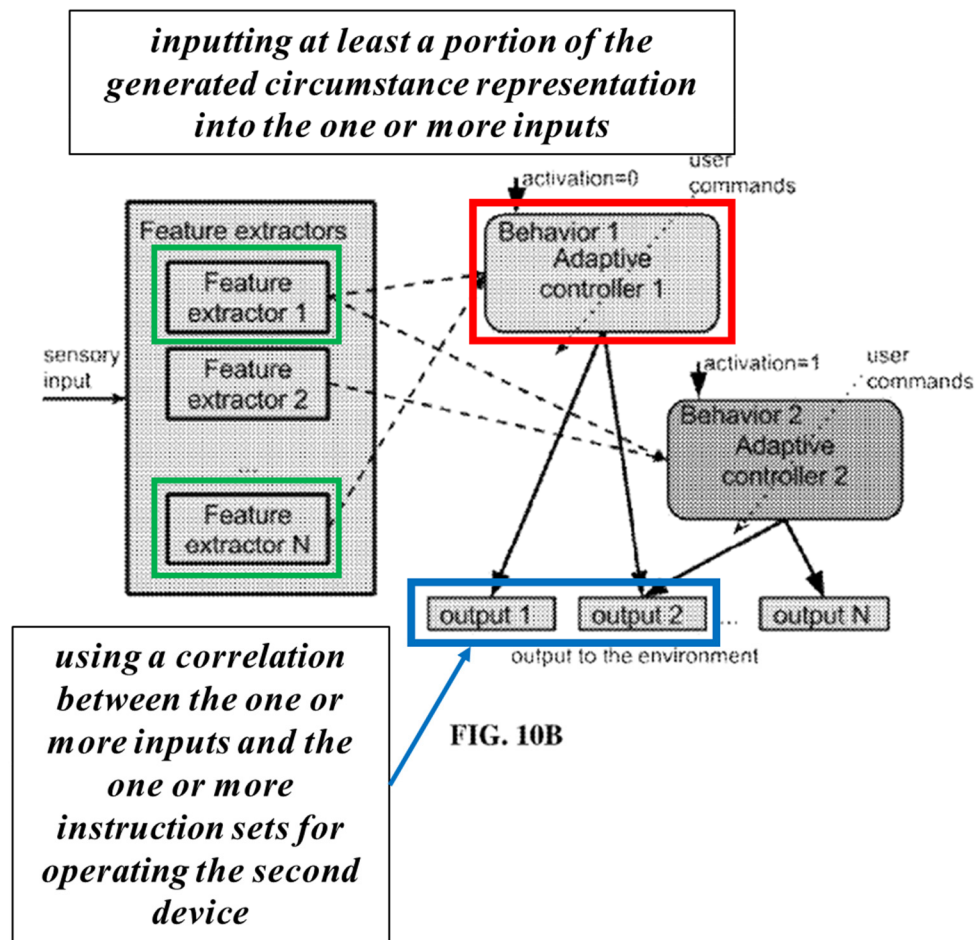


FIG. 10B

TESLA-1008, FIG. 10B (annotated).

Element [45.6]

Grotmol discloses that its mobile robotic apparatus “determine[s] classifier output” (***determining the one or more instruction sets***), for example, “motor commands” or other “outputs (yp)” for autonomous operation, by (i) inputting extracted “features” (***inputting at least a portion of the generated circumstance representation***) into the input “interface” (***into the one or more inputs***) of the adaptive controller and (ii) using a correlation between the “interface” and the one or more “outputs” (***using a correlation between the one or more inputs and the one or more instruction sets for operating the second device***). TESLA-1008, 25:30-42, 26:5-20, 27:56-28:40, 29:61-30:20, FIGS. 10A-10D, 11A-11B, 15; *see supra* [45.1]. The correlation between the input “interface” of a given adaptive controller and the “outputs (y)” of that controller allow the robot to determine an appropriate action to perform based on the inputted “sensory features” (***using a correlation between the one or more inputs and the one or more instruction sets for operating the second device***). *Id.*, 26:34-55, 29:1-5, FIG. 15; TESLA-1003, ¶125. An example process for determining instruction sets is illustrated below.



TESLA-1008, FIG. 10B (annotated).

In further detail, Grotmol discloses that its adaptive controllers that implement an RKNN process determine control outputs for operating the robot (e.g., y_p) (*one or more instruction sets*) by inputting features x_0 (*at least a portion of the generated circumstance representation*) of the sensory input into the interface (*one or more inputs*) of the controller. TESLA-1008, 29:37-39, 29:54-30:20, FIG. 15; *supra*, [45.1]; TESLA-1003, ¶126. The adaptive controller, and its RKNN process, use the correlation between the inputs and the instruction

sets stored and produced by the RKNN process to determine the instruction sets for operating the robot (e.g., y_p) as described above. *Id.*

Likewise, according to the alternative mapping discussed above with respect to [45.1] (e.g., where the learned input features (x) stored in the RKNN classifier tables are taken as the claimed “***one or more inputs***”), [45.6] is also met by Grotmol since the outputs (y) for operating the robot are determined by inputting features x_0 (***at least a portion of the generated circumstance representation***) to the learned/stored input features (x) in the classifier tables (which are compared to determine the nearest neighbors). *Id.* Grotmol’s process then uses a correlation between the nearest learned/stored input features (x) (***one or more inputs***) and the outputs (y) (***one or more instruction sets for operating the second device***)—which are associated with the nearest learned/stored input features (x) as shown in FIG. 15—to determine the control outputs (***one or more instruction sets for operating the second device***) that are applied to operate the first robot. TESLA-1008, 29:37-39, 29:54-30:20, FIG. 15; *supra*, [45.1]; TESLA-1003, ¶127.

Further, as described above (*supra*, [45.1]), when a first robot uses a configuration of an adaptive controller trained on “one or more other robots” (***the second device***) and shared with the first robot, the determined instruction sets (e.g., motor commands) correspond to instructions for operating the “one or more

other robots” (*the second device*)—even when the instruction sets are applied to the first robot. *Id.*, 33:12-35; *see supra* [45.1], §§II.A-B, Claims 51-52; TESLA-1001, 103:35-39; TESLA-1003, ¶¶128-129.

Element [45.7]

Grotmol discloses that, in response to determining the “predicted output” (e.g. y_p) (*one or more instruction sets for operating the second device*), the first robot “execute[s]” the predicted output to “autonomous[ly]” perform one or more operations defined by the predicted output. TESLA-1008, 3:13-18 (“the control signal may be configured to cause the robot to execute the action”), 17:21-34, 22:1-18, 23:46-24:8, 25:30-42, 26:5-20, 27:24-40, 29:57-60, 33:12-35, FIGS. 10A-10D, 11A-11B, 15; *see supra* [45.1], [45.6]; TESLA-1003, ¶130.

Moreover, as described above (*supra*, [45.1]), when a first robot uses a configuration of an adaptive controller trained on “one or more other robots” (*the second device*) and shared with the first robot, the operations defined by the determined instruction sets (e.g., motor commands) correspond to operations defined by instructions for operating the “one or more other robots” (*the second device*)—even when the instruction sets are applied to the first robot. *Id.*, 33:12-35; *see supra* [45.1], §§II.A-B, Claims 51-52; TESLA-1001, 103:35-39; TESLA-1003, ¶131.

Claim [46]

Grotmol discloses that “features” extracted from the robot’s sensory inputs (*circumstance representation*) can include features representative of an “object” detected by the robot’s sensors (*wherein the generated circumstance representation includes one or more object representations*). TESLA-1008, 7:60-65, 10:23-34, 28:14-40, 28:51-58; *cf.* TESLA-1001, 80:50-55 (“Any number of Object Properties 630 ... and/or other elements or information can be included in an Object Representation 625.”). As discussed above in [45.1], Grotmol’s adaptive controllers include an “interface” (*one or more inputs*) configured to receive a selected set of “input features” extracted from “sensory input,” which can include at least a portion of one or more object representations. *Id.*, 25:30-42, 26:5-20, 27:24-40, FIGS. 10A-10D, 11A-11B; *see supra* [45.1]; TESLA-1003, ¶132.

Additionally, Grotmol discloses that its robotic devices can be “robotic vehicle[s]” (*wherein the first device is a first vehicle, and wherein the second device is a second vehicle*). TESLA-1008, Cover, 10:23-26, 15:38-42, FIG. 1; TESLA-1003, ¶133.

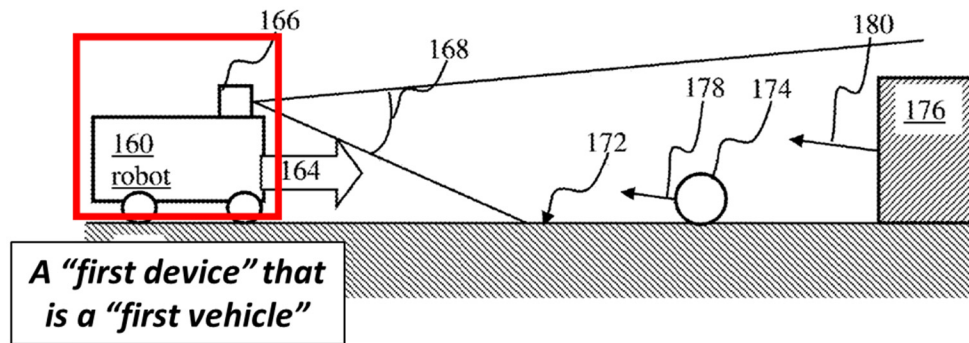


FIG. 1

TESLA-1008, FIG. 1 (annotated).

Claim [47]

Grotmol discloses that a “user [can] train behaviors” (*a learning process that includes operating the second device at least partially by a user*) of the mobile robotic apparatus such that at least a portion of the instruction sets (e.g., outputs (y_1 - y_m , y_p) in FIG. 15) are learned in a learning process that includes operating the robot by a user. TESLA-1008, 27:24-40, 33:17-35 (“A user may control/training the robot with a remote device ...”), FIGS. 10A-10D, 11A-11B, 15; *see supra* [45.1] (describing further detail regarding Grotmol’s disclosure of sharing saved configurations of adaptive controllers and allowing a user to operate and train the second robot (*second device*)); TESLA-1003, ¶134.

Grotmol also discloses how various *information related to the one or more instruction sets* can be learned by a user operating the robot (e.g., operating the *second device*). TESLA-1008, 26:34-55, 29:1-5, FIG. 15. For example,

higher-level behavior controls (e.g., “switchers”) (*an information related to ...*) that activate “low level” behavior modules containing the instruction sets for operating the robot can be learned through “user input” (*a learning process that includes operating the second device at least partially by a user*). *Id.*

Likewise, the “sensory features” (e.g., input feature sets ($X_{1,1}$ - $X_{1,m}$, $X_{1,1}$ - $X_{1,m}$, $X_{1,1}$ - $X_{1,m}$) in FIG. 15) (*an information related to ...*) associated with learned instruction sets (e.g., outputs (y_1 - y_m , y_p) in FIG. 15) are learned in Grotmol’s user-led training process (*a learning process that includes operating the second device at least partially by a user*). *Id.*; TESLA-1003, ¶135.

Claim [51]

Grotmol discloses that a “user [can] train behaviors” (*a learning process that includes operating the second device at least partially by a user*) of the mobile robotic apparatus such that at least a portion of the instruction sets (e.g., outputs (y_1 - y_m , y_p) in FIG. 15) (*at least a portion of the one or more instruction sets for operating the second device*) are learned in a learning process that includes operating the robot by a user. TESLA-1008, 27:24-40, 33:17-35 (“A user may control/training the robot with a remote device ...”), FIGS. 10A-10D, 11A-11B, 15; *see supra* [45.1] (discussing that Grotmol’s training is shared between robots), [47]; TESLA-1003, ¶136.

Claim [59]

Grotmol discloses that “features” (*circumstance representation*) derived from the robot’s “sensory input[s]” can include “representations of one or more objects” (*object representation*), which include *information about one or more objects*. TESLA-1008, 7:60-65 (“a representation of an object edge, determined by change in color, luminance, brightness, transparency, texture, and/or curvature”), 10:23-34 (“object size, location”), 28:14-40 (disclosing many different examples of *information*), 28:51-58 (“representations of objects determined using video data”); *supra*, [46]; TESLA-1003, ¶137.

Claim [68]

Grotmol discloses that the adaptive controller (*knowledgebase*) can be implemented using various neural network architectures (e.g., “signal spiking neuron networks”) (*the knowledgebase is a neural network*). TESLA-1008, 19:10-18, 26:5-20, 34:3-12; TESLA-1003, ¶138.

Claim [69]

Grotmol discloses that the adaptive controller (*knowledgebase*) can include an artificial intelligence system, such as a neural network and/or an “RKNN model” (*the knowledgebase includes an artificial intelligence system*). TESLA-1008, 19:10-18, 26:5-20, 27:56-28:9, 34:3-12; *see supra* [68]; TESLA-1003, ¶139.

**D. [GROUND 2B] – Grotmol in view of McClure Renders
Obvious Claim 60**

1. Overview of McClure

McClure discloses a “mobile robot or automatic guided vehicle having a multijointed robot arm.” TESLA-1009, Abstract, 1:49-68, 3:46-66, FIGS. 1-2.

McClure’s mobile robot operates on “coordinate system[s]” that define the spatial relationship of objects relative to the mobile robot and/or the robot’s “gripper.”

Id., 1:54-57, 2:12-16, 5:27-6:19, FIGS. 4-8. For example, McClure discloses a “base coordinate system” which acts as the “overall frame of reference” for the mobile robot. *Id.*, 5:51-68; TESLA-1003, ¶60.

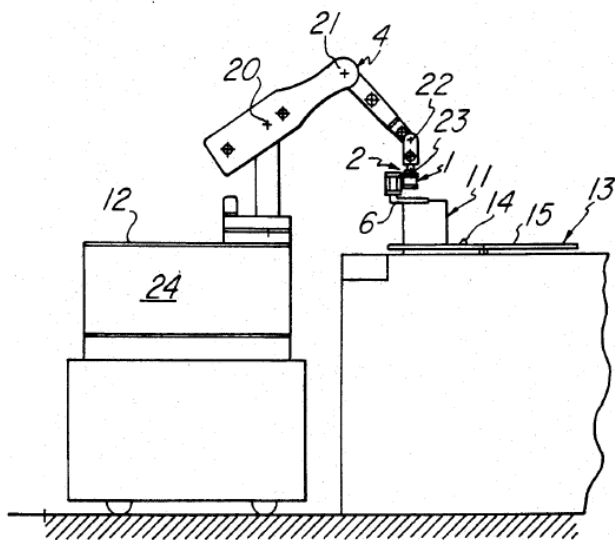


Fig.2

TESLA-1009, FIG. 2.

McClure is analogous art to the '474 Patent: it is from the same field of endeavor (e.g., training/operating autonomous devices) and is reasonably pertinent

to the problem the '474 Patent was trying to solve (e.g., the need to efficiently train/operate autonomous devices). TESLA-1001, Abstract, 1:51-54, 58:3-13, 95:29-96:8, 102:30-103:39; TESLA-1003, ¶61.

2. Combination of Grotmol and McClure

As discussed above, Grotmol discloses techniques for training and operating autonomous robots. *See supra* §§IV.C.1; TESLA-1003, ¶140. In combination with McClure, which describes techniques for implementing coordinate systems in robotic systems, claim 60 is rendered obvious. *See supra* §IV.E.1; TESLA-1003, ¶140.

According to a predictable application of McClure's teachings to Grotmol, the "coordinate systems" of McClure (e.g., at least the "base coordinate system") would define a point of reference and/or a spatial location for Grotmol's robot. TESLA-1008, 3:27-67, 8:57-66, 21:64-67; *supra* §IV.C.2 [45.pre]; *see also* §§IV.C.1, IV.E.1; TESLA-1003, ¶141. The robot would have then used this point of reference and/or location, for example, to determine coordinates for obstacles in the environment and to avoid obstacles when navigating to a target. TESLA-1008, 10:23-34, 24:31-25:25; TESLA-1003, ¶141.

A POSITA would have been motivated to use coordinates to express locations of objects in a robot's environment as suggested by McClure in the Grotmol-McClure combination for multiple reasons. TESLA-1003, ¶142.

First, a POSITA would have been motivated to pursue this combination to increase the “manipulative accuracy” (also referred to as “dexterity,” according to Dr. Janet) of the mobile robotic apparatus, as described by McClure and discussed by Dr. Janet. TESLA-1003, ¶143 (citing TESLA-1009, 2:1-22).

Second, a POSITA would have recognized that, by explicitly defining and tracking the location of obstacles using coordinates, the distance between the obstacles and/or mobile robotic apparatus could be more determined using well-known calculations (e.g., plotting a second route using historical information obtained from a first route). TESLA-1008, 10:23-34, 24:31-25:25; TESLA-1003, ¶144.

Third, a POSITA would have been motivated to pursue this combination because doing so is merely the application of known techniques (e.g., operating a robotic apparatus in a coordinate system as suggested by McClure) to a known system (e.g., Grotmol’s mobile robotic apparatus) to yield predictable results (a mobile robotic apparatus using a coordinate system for navigation or other operations). *See KSR*, 550 U.S. at 415-421; MPEP §2143; TESLA-1003, ¶145. Indeed, Dr. Janet confirms it was well known before the critical date to use coordinate systems to define the location of object(s) to a robot. TESLA-1003, ¶145 (citing TESLA-1009, 1:54-57, 2:12-16, 5:27-6:19; TESLA-1018, ¶¶[0073]-[0077], [0080]; TESLA-1019, ¶¶[0005]-[0006], [0043], [0046], [0049], [0071],

[0076]-[0078], [0091]-[0097], [0109]-[0116]; TESLA-1020, ¶[0007]-[0012], [0020], [0024]-[0025], [0045]-[0050], [0062], [0072], [0086]-[0088]).

Fourth, a POSITA would have been motivated to pursue this combination because it merely instantiates use of a known technique (e.g., operating a robot in a coordinate system) to improve a similar system, e.g., a robot like that described in Grotmol. *See KSR*, 550 U.S. at 415-421; MPEP §2143; TESLA-1003, ¶146.

A POSITA would have reasonably expected success implementing the combination, especially since the use of coordinates and coordinate systems to reference locations of objects and other features in the environment of a robot was common and well-known before the '474 Patent. TESLA-1003, ¶147.

3. Analysis

Claim [60]

Grotmol discloses that sensory features indicative of a context of the robot's environment can include ***one or more object representations***, including “object size, location.” TESLA-1008, 10:23-34 (emphasis added); *see supra* IV.C.2.[59]. The robot uses the location of detected objects, for example, to avoid obstacles while moving in the environment, as well as to identify the location of a target object (e.g., an object that is to be “fetched”) and the location of a base (e.g., the location where the robot should return the fetched object). *Id.*, 24:31-25:25; TESLA-1003, ¶148.

To the extent Grotmol does not expressly disclose that the robot determines *coordinates* for the disclosed “location” of detected objects, this would have been a predictable option for characterizing the location of objects in the environment of a robot long before the ’474 Patent. TESLA-1003, ¶149. McClure, for example, describes a mobile robot that specifically determines “*coordinates*” of detected objects in its environment. TESLA-1009, 5:51-68 (“coordinates of objects detected ...”), 5:33-50, 1:54-60. It would have been obvious to apply McClure’s suggested use of object coordinates to Grotmol’s system for the reasons described above in the combination overview (*supra*, §IV.B.2). TESLA-1003, ¶149. In the combination, the coordinates of the object(s) detected by the robot would predictably be provided as features, e.g., object representations(s), to the inputs of Grotmol’s adaptive controller, which would process the coordinate features to determine control outputs according to a particular task/behavior. *Supra*, Ground 2A, [45.5]-[45.6], [46]; TESLA-1003, ¶149.

E. [GROUND 2C] – Grotmol in view of Buibas Renders Obvious Claims 45-47, 51, 56-57, 59, and 68-69

1. Combination of Grotmol and Buibas

As discussed above, Grotmol describes techniques for training and operating autonomous robots. *See supra*, §IV.C.1; TESLA-1003, ¶150. In combination with Buibas, which describes techniques for sharing knowledge of tasks/behaviors

trained on different robots by different users (e.g., where the shared knowledge is in the form of “brain images” that defined neural network configurations), the claims are rendered obvious. *See supra*, §IV.A.1, §IV.A.3 at [45.pre]-[45.1]; TESLA-1003, ¶150.

For example, in a predictable combination based on Grotmol in view of Buibas, Buibas’ brain images would be implemented as part of the artificial intelligence systems operating on Grotmol’s mobile robotic apparatus (e.g., a neural network). TESLA-1008, 19:10-18, 26:5-20, 34:3-12. Grotmol’s adaptive controller for instance, could include a spiking neural network configured according to a brain image to operate in lieu of or in conjunction with the RKNN classifiers. TESLA-1003, ¶151. Adaptive controller configurations including brain images and/or RKNN classifiers trained on different robots and by different users could then be shared and even combined on different robots, as suggested by Buibas. TESLA-1005, ¶¶[0070]-[0071], [0184], [0188], [0196], [0201]; TESLA-1003, ¶151. Multiple reasons would have motivated a POSITA to pursue this combination. TESLA-1003, ¶151.

First, a POSITA would have been motivated to implement spiking neural networks and brain images in the combination to realize the known benefits of such techniques like those expressly recognized in Buibas, including their ability to be readily trained by users, to evolve, and to be merged and partitioned to

implement multiple tasks/behaviors on a robot. *See, e.g.*, TESLA-1005, [0073]-[0099], FIGS. 3-4; TESLA-1003, ¶152.

Second, a POSITA would have been motivated to implement Grotmol such that its adaptive controllers (e.g., containing spiking neural networks and/or RKNN classifiers) would include inputs and instructions sets learned by training multiple devices to expand the capabilities of the device and to more efficiently obtain training data from a fleet of robots without requiring all training to be performed locally on a single device. Indeed, this arrangement would provide increased scalability for operations at a larger scale (e.g., fleet operations). TESLA-1003, ¶153.

Third, a POSITA would have been motivated to pursue the combination to generate a revenue stream through the sharing of learned knowledge. For example, Buibas discloses that “subscription[s]” can be used to access trained brain images created by other users, thus providing a source of recurring revenue and increased profitability from these subscription models. TESLA-1003, ¶154 (citing TESLA-1005, ¶[0071]).

Fourth, a POSITA would have been motivated to pursue this combination because doing so is merely the application of known techniques as suggested by Buibas to a known system (e.g., Grotmol’s robots) to yield predictable results. *See KSR*, 550 U.S. at 415-421; MPEP §2143; TESLA-1003, ¶155.

Fifth, a POSITA would have been motivated to pursue this combination because it merely instantiates use of known techniques as taught in Buibas to improve a similar system as taught in Grotmol. *See KSR*, 550 U.S. at 415-421; MPEP §2143; TESLA-1003, ¶156.

A POSITA would have reasonably expected success implementing the combination, especially since the techniques were well known before the Critical Date and Buibas' techniques would be applied to a system for training/operating mobile robots as taught in Grotmol similar to that disclosed in Buibas. TESLA-1003, ¶157.

2. Analysis

Claims 45-47, 51, 56-57, 59, and 68-69

The Grotmol-Buibas combination of Ground 2B renders obvious all limitations of claims 45-47, 51, 56-57, 59, and 68-69 for each of the reasons discussed above in Ground 2A, except for claims [56]-[57] and the additional discussion as it relates to claim 45, which incorporate the additional analysis below. TESLA-1003, ¶158.

Claim [56]

The Grotmol-Buibas combination renders obvious [56]. TESLA-1003, ¶159. For example, Grotmol discloses that the inputs of its adaptive controller (*knowledgebase*) are correlated with control outputs (*instruction sets*) stored in

and produced by the adaptive controller, as described above in Ground 2A with respect to [45.1]. *See supra* §IV.C.2 at [45.1]. Grotmol discloses that the control outputs can be learned in a learning process by which the user operates a robot, as described above with respect to [47] and [51] (***operating the ... device at least partially by another user***). *See supra* §§IV.C.2.[47], [51]. Grotmol further discloses that “the trained configuration may be loaded to one or more other robots in order to provide learned behaviors.” TESLA-1008, 33:30-35.

To the extent it is argued or determined that Grotmol does not expressly disclose that the inputs to an adaptive controller on a first device are correlated with control outputs (***instructions sets***) learned on at least two other devices (i.e., a ***second device*** and a ***third device***), these features nonetheless would have been obvious when further considering the teachings of Buibas. TESLA-1003, ¶160. Buibas, for example, describes techniques for sharing and merging behaviors learned on multiple different robots into a single controller. TESLA-1005, ¶¶[0070], [0090]-[0100], [0103], [0225]. It would have been obvious to implement Grotmol in accordance with Buibas’ suggestion sharing and merging behaviors learned on multiple different robots into a single controller for each of the reasons described above in the combination overview (*supra*, §IV.E.1). TESLA-1003, ¶160.

Claim [57]

The Grotmol-Buibas combination renders this claim obvious for at least the reasons addressed above with respect to [56]. *See supra*, [56]. Moreover “mere duplication of parts has no patentable significance unless a new and unexpected result is produced” (i.e., the *instruction sets* for operating the *third device* of this claim when compared to the *instruction sets* for operating the *second device* of claim 1 produce no unexpected result). *In re Harza*, 274 F.2d 669 (CCPA 1960). Here, the ’474 Patent describes nothing at all unexpected about sharing instruction sets from second and third devices as opposed to just a second device, and the additional feature claimed in [57] is obvious. TESLA-1003, ¶161.

Claim [45] – “one or more instruction sets for operating the second device”

The limitations in claim 45 directed to “*one or more instruction sets for operating the second device*” further would have been rendered obvious by the Grotmol-Buibas combination in view of Buibas’ teachings for sharing trained controllers among devices and for each of the reasons described above in the combination overview and with respect to claims 56 and 57. TESLA-1005, ¶¶[0070]-[0071], [0184], [0188], [0196], [0201]; TESLA-1003, ¶162; *supra*, §§IV.C.2, [47], [51].

F. [GROUND 2D] – Grotmol in view of Buibas and McClure Renders Obvious Claim 60

Claim [60]

Claim 60 depends from claim 46. The teachings of Grotmol in view of Buibas render obvious claim 46 for the reasons discussed above in Grounds 2A and 2C. TESLA-1003, ¶163; *Supra*, Section IV.C-D. The additional features recited in claim 60 further would have been obvious in the Grotmol-Buibas-McClure combination for the reasons discussed above in Ground 2B. *Supra*, Section IV.D; TESLA-1003, ¶163.

V. PTAB DISCRETION SHOULD NOT PRECLUDE INSTITUTION

A. The Petition's New Art Favors Institution—35 U.S.C. § 325(d)

The '474 Patent's prosecution involved no discussion between the applicant and the Examiner regarding the teachings of any of the prior art references applied in this Petition. *See, generally*, TESLA-1002; *supra*, Section II.B. Indeed, none of Buibas, Sinyavskiy, Versace, Grotmol, or McClure are even cited on the face of the '474 Patent. *Id.* The Petition's unpatentability challenges are thus based on prior art and arguments that are neither the same as, nor substantially similar to, art or arguments previously presented to the Office in connection with the '474 Patent. *See, generally*, TESLA-1002; *supra*, Section II.B.

Moreover, even if any of the prior art cited in the Petition was cumulative of art or arguments presented to the Examiner during prosecution, the file history contains no indication that the Examiner had previously considered the specific

teachings of Grotmol relied upon in the Petition as anticipating the claims challenged in Ground 2A or the specific combinations of prior art that render the challenged claims obvious in Grounds 1A-1B or 2B-2D. Accordingly, neither condition of the first part of the *Advanced Bionics* framework is satisfied, and there is no need to reach the second part to resolve against discretionary denial under § 325(d). *See, e.g., Oticon Medical AB et. al. v. Cochlear Ltd.*, IPR2019-00975, Paper 15 at 20 (PTAB Oct. 16, 2019) (precedential).

To the extent the Petition relies on any prior art teachings or arguments cumulative to those presented during prosecution, the Examiner erred in not recognizing the significance of those teachings or arguments in relation to the unpatentability of the challenged claims. Institution is warranted under § 325(d).

B. The *Fintiv* Factors Favor Institution—35 U.S.C. § 314(a)

The *Fintiv* factors weigh heavily against exercise of the Board’s discretion to deny institution under 35 U.S.C. § 314(a). *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”).

Factor 1 strongly favors institution. Autonomous Devices (“AD”) currently asserts the ’474 Patent against Telsa in litigation before the U.S. District Court for the District of Delaware (Case No. 22-1466-MN) (“the Related Litigation”). TESLA-1004 (first amended complaint adding the ’474 patent to the Related Litigation). Following institution of IPR2023-01054, IPR2023-01055, IPR2023-

01172, IPR2023-01173, and IPR2023-01169 (“the Related IPRs”) involving other patents at issue in the Related Litigation, the parties stipulated to, and the Court granted, a stay of the litigation “at least until a final resolution” is reached in both the instituted proceedings “and any additional IPR challenge(s) filed by Tesla, Inc. against the ’474 Patent.” TESLA-1013 (stipulation and proposed order to stay pending IPR); TESLA-1014 (stay order). The stay of the Related Litigation “strongly weigh[s] against exercising the authority to deny institution.” *Fintiv*, 6. As the Board recognized in *Fintiv*, “[a] district court stay of the litigation pending resolution of the PTAB trial allays concerns about inefficiency and duplication of efforts.” *Id.*

Factor 2 strongly favors institution. With the Related Litigation stayed pending resolution of Tesla’s IPRs (including this proceeding), the Board’s final written decision in the present IPR will necessarily precede any trial in the Related Litigation while the stay remains in place pending the PTAB’s consideration of Tesla’s IPRs. Even if the litigation were not stayed, the current median time-to-trial in Delaware (38.0 months) indicates that trial would not have begun until late January 2026—i.e., ~3 months after the Board’s final written decision in this IPR.⁸

⁸ The Court’s scheduling order that was in place before the stay provided for trial to begin on June 23, 2025. TESLA-1012, 11.

TESLA-1021, 14.

Factor 3 strongly favors institution. At the time the Court ordered the stay, the Related Litigation was still in an early phase. *Markman* had not yet transpired, and the parties had not even begun claim construction briefing. Likewise, no experts had weighed in on any issue in the proceeding. Only a minority of the parties' and the Court's anticipated investment in the Related Litigation had been realized when the stay was ordered. Moreover, Tesla acted diligently in filing this IPR within just one month of the '474 Patent becoming IPR eligible and ~5.5 months earlier than required under 35 U.S.C. § 315(b).⁹ *Align Tech., Inc. v. 3Shape A/S*, IPR2020-01087, Pap. 15 at 39-40 (PTAB Jan. 20, 2021).

Factor 4 favors institution. With the Related Litigation having been stayed pending resolution of Tesla's IPRs (including the present proceeding), there will be no overlapping issues between an IPR instituted based on this Petition and the

⁹ The '474 Patent issued on May 30, 2023, and only became IPR eligible on March 1, 2024. AD waited to assert the '474 Patent against Tesla until September 15, 2023, when it filed and served its First Amended Complaint in the Related Litigation—i.e., nearly 10 months after it filed its original complaint against Tesla (Nov. 2022) and ~3.5 months after the '474 Patent issued. TESLA-1015 (original complaint); TESLA-1004 (first amended complaint).

Related Litigation.

Factor 5 (whether petitioner is also the defendant in district court) is neutral.

Factor 6 strongly favors institution. As demonstrated above, the merits of this Petition are particularly strong. This is also Tesla's only challenge to the '474 Patent that has ever been or is currently before the Board, making considerations related to follow-on petitions moot.

In short, not one of the *Fintiv* factors weighs against institution, and at least five factors weigh heavily in favor of institution. Taken together, the Board should not exercise discretion to deny institution of IPR.

C. The Related IPRs Do Not Favor Discretionary Denial

Additional circumstances weigh strongly against discretionarily denying the present Petition. Indeed, this is the first Petition that Tesla (or any party) has filed on the '474 Patent at the PTAB. And while this Petition is being filed months after Tesla's petitions in the Related IPRs on *other* patents asserted against Tesla in Delaware, the time gap is the result of AD's own litigation strategy and delayed assertion of the '474 Patent. In fact, as noted above (Footnote 9), AD only added the '474 Patent to the Related Litigation via amended complaint on September 15, 2023—i.e., ~10 months after it had first asserted the patents in the Related IPRs, ~3 months after Tesla had already filed the Related IPRs, and ~3.5 months after the '474 Patent issued. TESLA-1015 (original complaint); TESLA-1004 (first

amended complaint). Under these circumstances, it was inevitable that any IPR on the '474 Patent would be filed months later than the Related IPRs on the earlier-asserted patents. Tesla was nonetheless diligent in filing this Petition the *same month* that the '474 Patent becoming IPR eligible and long before the one-year period permitted by § 315(b) (which expires September 15, 2024). *Align Tech.*, IPR2020-01087, Pap. 15 at 39-40.

To be sure, none of Buibas, Sinyavskiy, Versace, or McClure are relied upon in the Related IPRs and Tesla has worked diligently to prepare this Petition since they were identified and their relevance became apparent to the '474 Patent earlier this year.¹⁰ Collectively, these references address multiple claim features of the '474 Patent not found in AD's earlier-asserted patents and not addressed in the Related IPRs. For example, none of the claims challenged in the Related IPRs include limitations directed to “*one or more inputs [of a knowledgebase]* ...

¹⁰ Tesla acknowledges that Grotmol is cited in several of the earlier-filed IPRs. *See* IPR2023-10154, -01055, -01172, and -01173. However, Grotmol is presented herein with other teachings to address all of AD's asserted claims of the '474 patent (e.g., claim 60). This Petition also applies Grotmol in a different light than any of the Related IPRs due to differences between the features/scope of the Challenged Claims of the '474 Patent and the claims challenged in the Related IPRs.

correlated with one or more instruction sets for operating a second device,” as independent claim 45 recites here. The differences in claim scope and different patents at issue between this proceeding and the Related IPRs confirm that AD will not be unduly prejudiced by the Related IPRs, especially where the time gap between the Related IPRs and the present Petition is most significantly the result of Petitioner’s belated assertion of the ’474 Patent.

For at least these reasons, the Board should not discretionarily deny this Petition in view of the Related IPRs.

VI. CONCLUSION AND FEES

The Challenged Claims are unpatentable. Petitioner authorizes charge of fees to Deposit Account 06-1050.

VII. MANDATORY NOTICES UNDER 37 C.F.R § 42.8(a)(1)

A. Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1)

Tesla, Inc. is the petitioner and the real party-in-interest.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

Tesla is not aware of any disclaimers, reexamination certificates or petitions for *inter partes* review for the ’474 Patent.

The ’474 Patent is the subject of a civil action in *Autonomous Devices LLC v. Tesla, Inc.*, Case No. 22-1466-MN (D. Del.) (“the Delaware Litigation”), which is currently stayed. TESLA-1013, TESLA-1014. In addition to the ’474 Patent,

AD also asserted against U.S Patent Nos. 10,452,974 (“the ’974 Patent”), 11,238,344 (“the ’344 Patent”), 11,055,583 (“the ’583 Patent”), and 10,607,134 (“the ’134 Patent”) against Petitioner in the Delaware Litigation.¹¹ TESLA-1004, TESLA-1015. Tesla has challenged each of these patents in the following IPR proceedings, which have been instituted and are pending as of the filing date of this Petition:

- ’974 Patent: IPR2023-01054
- ’344 Patent: IPR2023-01055
- ’583 Patent: IPR2023-01172, IPR2023-01173
- ’134 Patent: IPR2023-01169

C. Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Petitioner provides the following designation of counsel.

Lead Counsel	Backup counsel
W. Karl Renner, Reg. No. 41,265 Fish & Richardson P.C. 60 South Sixth Street Minneapolis, MN 55402 Tel: 202-783-5070 Fax: 877-769-7945 Email: IPR49649-0038IP1@fr.com	Nicholas Stephens, Reg. No. 74,320 Roberto Devoto, Reg. No. 55,108 Fish & Richardson P.C. 60 South Sixth Street Minneapolis, MN 55402 Tel: 202-783-5070 Fax: 877-769-7945 Email: IPR49649-0038IP1@fr.com

¹¹ The ’474 Patent is a continuation of the ’974 and ’344 Patents.

	Ashraf Fawzy, Reg. No. 67,914 Tesla, Inc. 800 Connecticut Ave NW Washington, DC 20006 Tel: 202-905-9221 Email: afawzy@tesla.com
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D. Service Information

Please address all correspondence and service to the addresses listed above.

Petitioner consents to electronic service by email at IPR49649-0038IP1@fr.com

and afawzy@tesla.com.

Respectfully submitted,

Dated 03/29/2024

/Nicholas W. Stephens/
W. Karl Renner, Reg. No. 41,265
Nicholas Stephens, Reg. No. 74,320
Fish & Richardson P.C.
60 South Sixth Street
Minneapolis, MN 55402
T: 202-783-5070
F: 877-769-7945

Ashraf Fawzy, Reg. No. 67,914
Tesla, Inc.
800 Connecticut Ave NW
Washington, DC 20006
T: 202-905-9221

(Control No. IPR2024-00745)

Attorneys for Petitioner

CERTIFICATION UNDER 37 CFR § 42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 13,955 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

Dated 03/29/2024

/Nicholas W. Stephens/
Nicholas Stephens, Reg. No. 74,320
Fish & Richardson P.C.
60 South Sixth Street
Minneapolis, MN 55402
T: 202-783-5070
F: 877-769-7945

Ashraf Fawzy, Reg. No. 67,914
Tesla, Inc.
800 Connecticut Ave NW
Washington, DC 20006
T: 202-905-9221

(Control No. IPR2024-00745)

Attorneys for Petitioner

CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on March 29, 2024, a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits were provided via Federal Express, to the Patent Owner by serving the correspondence address of record as follows:

AUTONOMOUS DEVICES LLC
2271 Myla Lane
Melbourne FL 32935
(925) 862-9972

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