

Demonstratives of Patent Owner Autonomous Devices, LLC

Case No: IPR2023-01054

USPTO Patent Trial and Appeal Board

Oral Hearing: September 18, 2024

The Challenged '974 Patent

'974 Patent (-01054)

'974

States Patent

(10) Patent No.: US 10,452,974 B1
(45) Date of Patent: Oct. 22, 2019

(34) ARTIFICIALLY INTELLIGENT SYSTEMS, DEVICES, AND METHODS FOR LEARNING AND/OR USING A DEVICE'S CIRCUMSTANCES FOR AUTONOMOUS DEVICE OPERATION

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 525 days.

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CPC G06N 3/08; G06N 5/022 (2013.01)

(58) Field of Classification Search CPC G06N 3/08; G06N 5/022 See application file for complete search history.

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Primary Examiner — Santiago Garcia

(57) ABSTRACT Aspects of the disclosure generally relate to computing enabled devices and/or systems, and may be generally directed to devices, systems, methods, and/or applications for learning a device's operation in various circumstances, storing this knowledge in a knowledgebase (i.e. neural network, graph, sequences, etc.), and enabling autonomous operation of the device.

20 Claims, 40 Drawing Sheets

Ex. 1001 at Cover

'974: Disputed Issues

<i>Inter Partes Review Grounds</i>	
<i>Ground 1</i>	Anticipation of Claims 4-5, 7 based on Grotmol
<i>Ground 2</i>	Obviousness of Claim 11 based on Grotmol in view of the knowledge of a POSA
<i>Ground 3</i>	Obviousness of Claims 4 and 11 based on Grotmol in view of Hickman
<i>Motion to Amend</i>	
<i>Issue 1</i>	Patent Eligibility of Substitute Claims
<i>Issue 2</i>	Obviousness of Substitute Claims based on Grotmol in view of Hickman
<i>Issue 3</i>	Obviousness of Substitute Claims based on Grotmol in view of Tolstedt

'974: Disputed Issues – Ground 1 Anticipation

- **Claim 4: Grotmol Does Not Disclose a Knowledgebase Including a Fourth Correlation Learned in Another Learning Process Involving a Second Device**
 - Claim 5: Grotmol Does Not Disclose the Claimed Matching
 - Claim 7: Grotmol Does Not Disclose the Claimed Connections

'974: Grotmol Does Not Disclose All the Limitations of Claim 4

Claim 1 (from which Claim 4 Depends)

- “knowledgebase”
 1. “first correlation”
 2. “second correlation”
 3. “learning process”
 4. “first device”

accessing a memory that stores at least a knowledgebase that includes: a first correlation including a first circumstance representation correlated with a first one or more instruction sets for operating a first device and a second correlation including a second circumstance representation correlated with a second one or more instruction sets for operating the first device, wherein the first circumstance representation represents a first circumstance detected at least in part by one or more sensors of the first device and the second circumstance representation represents a second circumstance detected at least in part by the one or more sensors of the first device, and wherein at least a portion of the first correlation and at least a portion of the second correlation are learned in a learning process that includes operating the first device at least partially by a user;

Ex. 1001; Claim 1

'974: Grotmol Does Not Disclose All the Limitations of Claim 4

Claim 4

- “knowledgebase”

1. “fourth correlation”
2. “second device”
3. “another learning process”

operating the first device, and wherein the knowledge-base further includes a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for operating the second device, and wherein the fourth circumstance representation represents a fourth circumstance detected at least in part by the one or more sensors of the second device, and wherein at least a portion of the fourth correlation is learned in another learning process that includes:

Ex. 1001; Claim 4

'974: Grotmol Does Not Disclose the Claimed Fourth Correlation (Claim 4)

Petition

Grotmol also discloses that the training sets and training configurations from a robot (which include the instruction sets for operating first device) can be “stored” or “saved.” Ex. 1004, 33:12-58 (discussing saved training configurations). The saved training configuration may then be “loaded into the robot being trained thereby providing one or more trained behaviors to the robot.” *Id.*, 33:27-30. Further, the “trained configuration may be loaded to one or more *other robots* in order to provide learned behaviors.” *Id.*, 33:30-32. Thus, Grotmol discloses that the memory component of a first robot can store the claimed first and second correlations as well as a fourth correlation learned in another learning process involving the operation of a second robot—*i.e.*, a circumstance detected by the sensor of a second robot correlated with instructions for operating that second robot. Decl. ¶¶ 93-94.

Pet. [1] at 27-28

'974: Grotmol Does Not Disclose the Claimed Fourth Correlation (Claim 4)

Grotmol

robotic device. The trained configuration may be stored. 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 configura- 30 tion may be loaded to one or more other robots in order to provide learned behaviors. Subsequent to loading of the

Ex. 1004 at 33:27-32

'974: Grotmol Does Not Disclose the Claimed Fourth Correlation (Claim 4)

Response

Grotmol only discloses *one* user operating *one* device in *one* learning process. Ex. 2007, ¶¶74-78. The knowledge gained from this process in Grotmol, when loaded into a second device, *is still knowledge of one user operating one device in one learning process. Id.* Grotmol fails to disclose learning at least portions of multiple correlations in *different (i.e., one and another) learning processes*, the first and second of such multiple correlations including circumstance representations detected by one (i.e., first) device and instruction sets for operating the one (i.e., first) device, and the fourth of such multiple correlations including a *circumstance representation detected by another (i.e., second) device and instruction set for operating the another device. Id.*

PO Resp. [26] at 16-17

'974: Grotmol Does Not Disclose the Claimed Fourth Correlation (Claim 4)

Response

Grotmol only discloses *one* user operating *one* device in *one* learning process. Ex. 2007, ¶¶74-78. The knowledge gained from this process in Grotmol, when loaded into a second device, *is still knowledge of one user operating one device in one learning process. Id.* Grotmol fails to disclose learning at least portions of multiple correlations in *different (i.e., one and another) learning processes*, the first and second of such multiple correlations including circumstance representations detected by one (i.e., first) device and instruction sets for operating the one (i.e., first) device, and the fourth of such multiple correlations including a *circumstance representation detected by another (i.e., second) device and instruction set for operating the another device. Id.*

PO Resp. [26] at 16-17

'974: Grotmol Does Not Disclose the Claimed Fourth Correlation (Claim 4)

Grotmol

robotic device. The trained configuration may be stored. 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 configura- 30 tion may be loaded to one or more other robots in order to provide learned behaviors. Subsequent to loading of the

Ex. 1004 at 33:27-32

'974: Grotmol Does Not Disclose the Claimed Fourth Correlation (Claim 4)

Petitioner's Reply

from the second robot. TESLA1004, 33:27-32; Pet., 27-28. Grotmol's robots instead use a collection of controllers, each of which provides a trained configuration for one or more different tasks or behaviors learned in a respective learning process. Against this background, a POSITA would have understood Grotmol's disclosure at col. 33:30-32 to mean that a trained configuration containing behaviors learned on a second robot and loaded on a first robot would be implemented alongside the trained configurations for other controllers—i.e., controllers that Grotmol expressly

Pet. Reply [30] at 2

PO's Sur-Reply

Reply, 2. Grotmol discloses one user operating one device in one learning process. Therefore, knowledge in all of the robot's controllers in Grotmol is learned only in a single learning process and only on a single robot. Grotmol never discloses using its adaptive controllers to learn multiple correlations in different learning processes involving different devices and storing those correlations in a *single, mixed knowledgebase*, as required by claim 4.

PO Sur-Reply [33] at 4

'974: Grotmol Does Not Disclose the Claimed Fourth Correlation (Claim 4)

Grotmol

robotic device. The trained configuration may be stored. 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 configura- 30 tion may be loaded to one or more other robots in order to provide learned behaviors. Subsequent to loading of the

Ex. 1004 at 33:27-32

'974: Grotmol Does Not Disclose the Claimed Fourth Correlation (Claim 4)

PO's Sur-Reply

Petitioner's statement that Grotmol's configuration may be loaded from one robot to another robot "does not mean that the knowledgebase on a first robot that loads the trained configuration from a second robot would contain only the learned behaviors from the second robot," highlights the conclusory nature of Petitioner's argument. Reply, 2. *The inquiry here is not what the destination robot may or may not already contain in a hypothetical, but what Grotmol discloses the destination robot actually containing.* Grotmol's disclosure cited by Petitioner (Ex-1004, 33:30–32) lacks even a hint of any configuration that may already be in the destination robot, which confirms that the loaded configuration is for the entire robot

PO Sur-Reply [33] at 6

'974: Grotmol Does Not Disclose the Claimed Fourth Correlation (Claim 4)

PO's Sur-Reply

In summary, enabling a system to learn mixed autonomous operation knowledge in different learning processes involving different devices and integrate such knowledge into a single knowledgebase is an approach not disclosed or suggested in Grotmol due to the complexities of combining the mixed knowledge into a single knowledgebase.

PO Sur-Reply [33] at 10-11

'974: Grotmol Does Not Disclose All the Limitations of Claim 4

Claim 4

• ~~“knowledgebase”~~

1. ~~“fourth correlation”~~
2. ~~“second device”~~
3. ~~“another learning process”~~

operating the first device, and wherein the knowledgebase further includes a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for operating the second device, and wherein the fourth circumstance representation represents a fourth circumstance detected at least in part by the one or more sensors of the second device, and wherein at least a portion of the fourth correlation is learned in another learning process that includes:

Ex. 1001; Claim 4

'974: Disputed Issues – Ground 1 Anticipation

- Claim 4: Grotmol Does Not Disclose a Knowledgebase Including a Fourth Correlation Learned in Another Learning Process Involving a Second Device
- **Claim 5: Grotmol Does Not Disclose the Claimed Matching**
- Claim 7: Grotmol Does Not Disclose the Claimed Connections

Claim 1 (from which Claim 5 Depends)

- Claim 1 requires anticipating the first instruction set based on a partial match between the first and third circumstance representations.
- At least partial match between circumstance representations.

anticipating the first one or more instruction sets for operating the first device learned in the learning process based on at least partial match between the third circumstance representation and the first circumstance representation; and

Ex. 1001; Claim 1

'974: Grotmol Does Not Disclose All the Limitations of Claim 5

Claim 5

- Anticipating includes determining a number or percentage of partially matching portions.
- Determining that a number or percentage of partially matching portions of the first and third circumstance representations exceeds a:
 1. threshold number or
 2. threshold percentage

5. The method of claim 1, wherein the anticipating the first one or more instruction sets for operating the first device learned in the learning process based on the at least partial match between the third circumstance representation and the first circumstance representation includes:
determining that a number of at least partially matching portions of the third circumstance representation and portions of the first circumstance representation exceeds a threshold number, or
determining that a percentage of at least partially matching portions of the third circumstance representation and portions of the first circumstance representation exceeds a threshold percentage.

Ex. 1001; Claim 5

'974: Grotmol Does Not Disclose the Claimed Matching (Claim 5)

Petition

Grotmol discloses that the control process for autonomous operation may involve comparing a current image (*i.e.*, third circumstance representation) with an image from the training buffer (*i.e.*, first circumstance representation), and further discloses that determining a control signal for operation of the robot may involve computing a similarity measure for a given training set and another training set, and determining whether that similarity measure exceeds a threshold. Ex. 1004, 3:13-15; 3:35-58, 4:30-39, 39:23-41, 41:8-17, 43:5-9. Thus, Grotmol discloses determining that a number of at least partially matching portions of the third circumstance representation and portions of the first circumstance representation exceeds a threshold number. Decl. ¶ 95.

Pet. [1] at 29

'974: Grotmol Does Not Disclose the Claimed Matching (Claim 5)

Response

measure exceeds a threshold.” Petition, 29 (emphasis added). Grotmol discloses comparing a subset of features within a training set, with “the similarity measure characterizing similarity between features of the subset, and features of the given training set,” *not the number or percentage of the similar features*. Ex. 1004, 3:50-52; *see also* Ex. 2007, ¶¶81-83. A similarity measure is for measuring similarity of elements, not for counting their number or computing their percentage. Ex. 2007, ¶¶82-83. Hence, a similarity measure is clearly different than the number or percentage of the similar elements after the similarity measure of those elements is determined. *Id.*

PO Resp. [26] at 21

'974: Grotmol Does Not Disclose the Claimed Matching (Claim 5)

Grotmol

features. The method may comprise, based on the comparison, determining a similarity measure for a given training set of the plurality of training feature sets. The similarity measure may characterize similarity between features of the subset and features of the given training set. The method

Ex. 1004 at 2:30-34

'974: Grotmol Does Not Disclose the Claimed Matching (Claim 5)

PO's Sur-Reply

Petitioner next accuses Patent Owner of improperly importing a counting requirement into claim 5, Reply, 9–10, but Patent Owner has done no such thing. Patent Owner has merely pointed out that using the number of at least partially matching portions in the matching process of claim 5 *involves counting the portions and determining whether this counted number of portions exceeds a numerical threshold*, and Grotmol does not disclose any such counting of portions and numerical threshold. Response (Paper No. 26), 20–22. Further, using the percentage of at least partially matching portions in the matching process in claim 5 *involves counting the portions to compute the percentage and determining whether this computed percentage of portions exceeds a percentage threshold*. *Id.* However, Grotmol does not disclose any such counting of portions, computation, and percentage threshold, either. *Id.* Petitioner's argument that the claimed determining can be performed without counting is wrong, and Petitioner's expert never explains how the determining steps in claim 5 can be performed without counting as discussed above. See Ex-1010, ¶¶21–22.

PO Sur-Reply [33] at 11

'974: Grotmol Does Not Disclose the Claimed Matching (Claim 5)

PO's Sur-Reply

Petitioner next cites Grotmol's disclosure of comparing shifted/trimmed images and argues that "the 'shifted/trimmed frames' for which a similarity metric is determined are 'at least partially matching portions.'" Reply, 11. But there is no indication that Grotmol discloses determining that a number of these shifted or trimmed frames that are at least partially matched exceeds a threshold number.

Instead, Grotmol discloses using a similarity measure with these shifted/trimmed images. Ex-1004, 40:52-41:17. As discussed above, a similarity measure is *not* a number of at least partially matching portions, as required by claim 5. Further,

PO Sur-Reply [33] at 12

'974: Grotmol Does Not Disclose the Claimed Matching (Claim 5)

PO's Sur-Reply

Finally, Petitioner's attempt to manufacture the use of a threshold in Grotmol's disclosure of a best match process also fails. Reply, 12. Grotmol merely discloses that "if a match search set image with the best match score (e.g., the lowest norm) belongs to the primary particle set then it may be selected as the best match. If the image with the best match score belongs to the secondary particle set than it may be selected based on an evaluation of image history parameter." Ex-1004, 41:35-40. This portion of Grotmol never cites the word threshold or explains how any threshold, much less numeric or percentage threshold as in claim 5 is used, and Petitioner's attempt to manufacture the use of a threshold out of Grotmol's disclosure of match scores fails. Petitioner's claim that the threshold is "zero when a 'best match' is determined with a portion of an image from a 'primary particle' of the matching search set or . . . one or more depending on the window size when a 'best match' is determined with a portion of an image from a 'secondary particle' set," Reply, 12, mischaracterizes Grotmol's disclosure to manufacture a fictional threshold. Grotmol's simple matching using first and second sets never mentions using any threshold, let alone a numeric or percentage threshold.

PO Sur-Reply [33] at 13-14

'974: Disputed Issues – Ground 1 Anticipation

- Claim 4: Grotmol Does Not Disclose a Knowledgebase Including a Fourth Correlation Learned in Another Learning Process Involving a Second Device
- Claim 5: Grotmol Does Not Disclose the Claimed Matching
- **Claim 7: Grotmol Does Not Disclose the Claimed Connections**

'974: Grotmol Does Not Disclose All the Limitations of Claim 7

Claim 7

- Claim 7 includes a first connection generated to connect the first correlation with the second correlation and a second connection generated to connect the second correlation with the fourth correlation.

7. The method of claim 1, wherein the knowledgebase further includes a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for operating: the first device, the second device, or a third device, and wherein a first connection is generated to connect the first correlation with the second correlation, and wherein a second connection is generated to connect the second correlation with the fourth correlation.

Ex. 1001; Claim 7

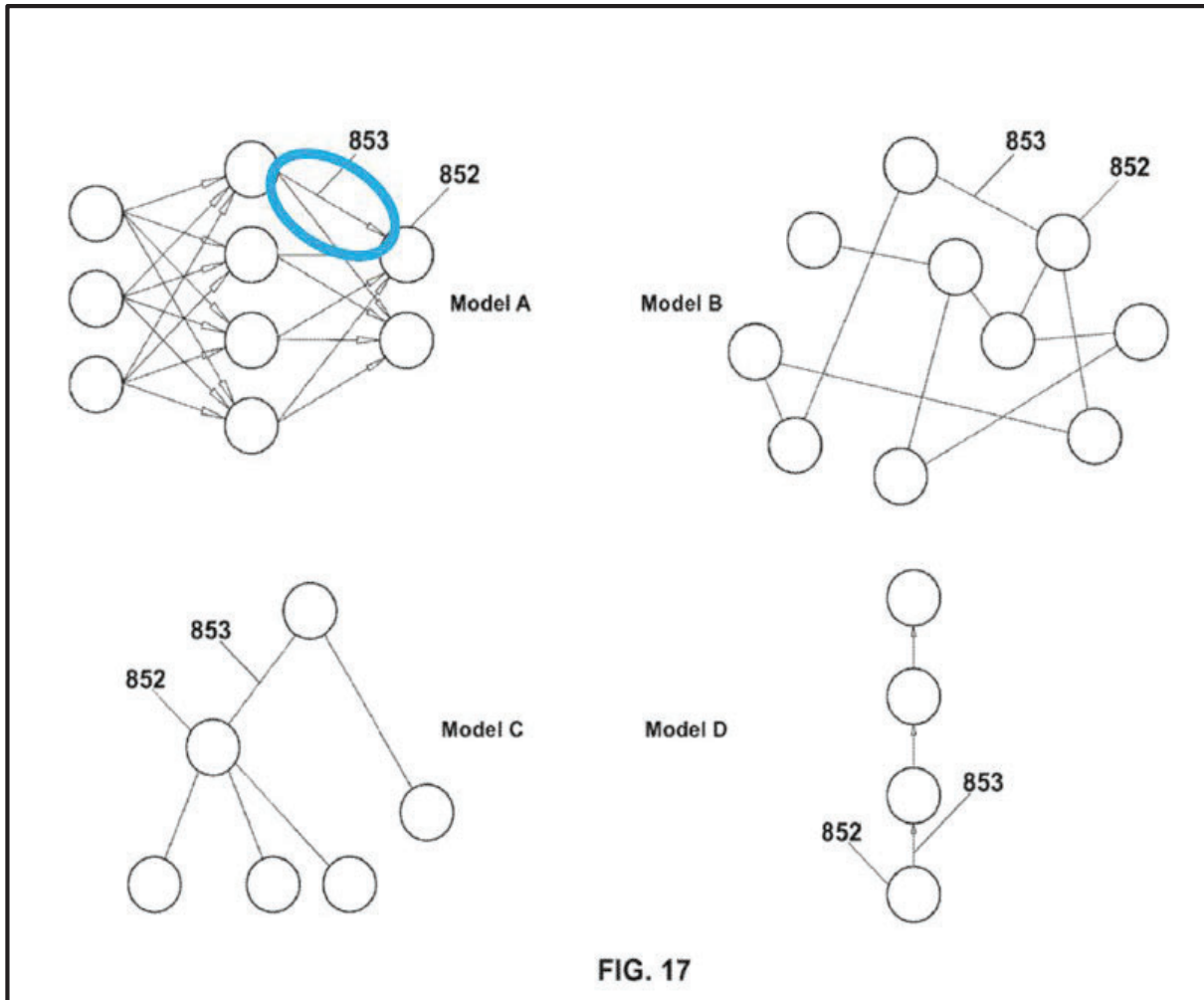
'974: Grotmol Does Not Disclose the Claimed Connections (Claim 7)

PO Response

In the context of claim 7 of the '974 patent, including in light of the claims, specification, and drawings, a “connection” should be construed as a “relationship that includes a link.” Ex. 2007, ¶¶55-62. This construction is supported by the claims, specification, drawings, and intrinsic record as a whole. *Id.* Figure 17 of the '974 patent makes clear that a connection is a relationship that includes a link:

PO Resp. [26] at 11

'974: Grotmol Does Not Disclose the Claimed Connections (Claim 7)

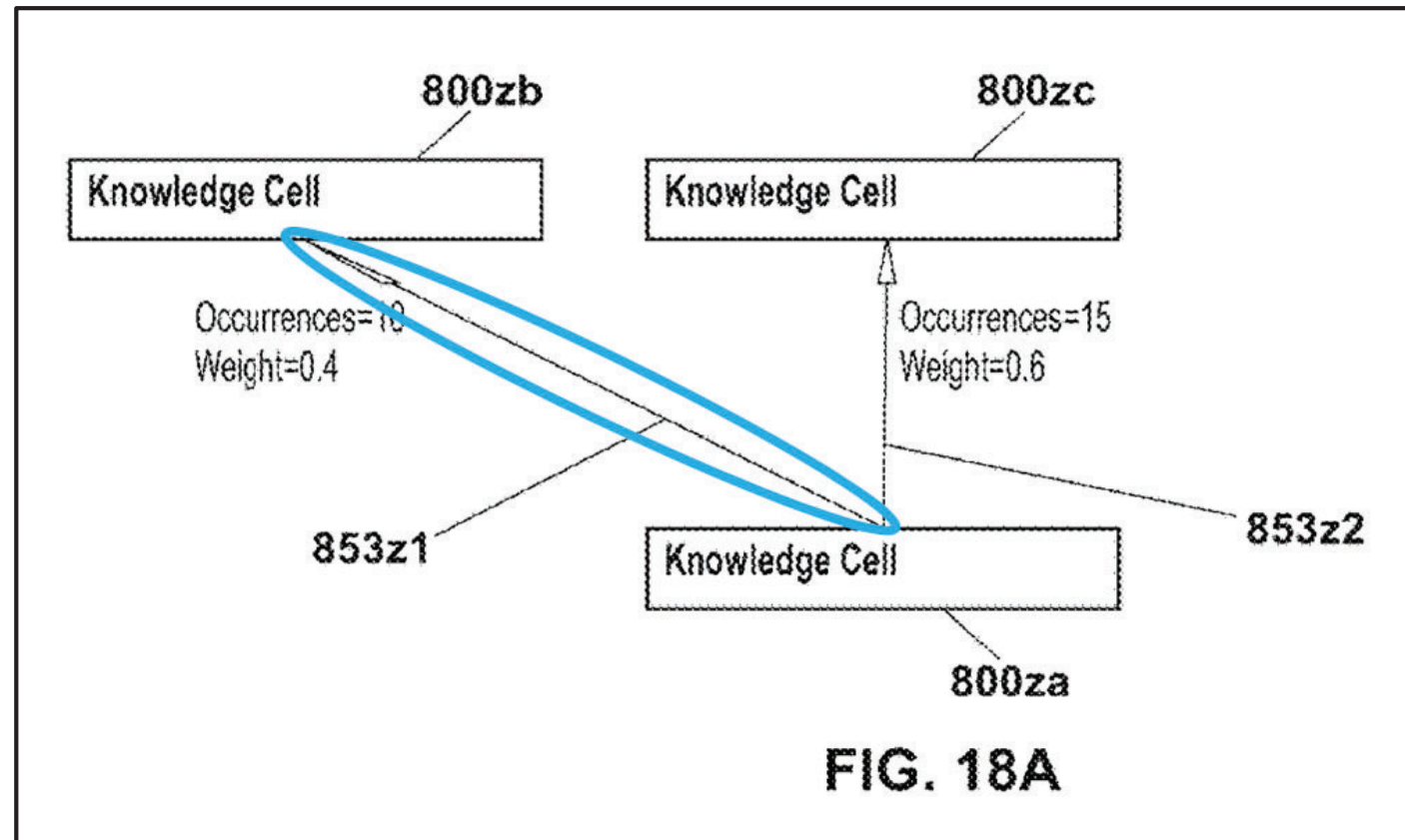


to as artificial neural network, etc.). As such, machine learning, knowledge structuring or representation, decision making, pattern recognition, and/or other artificial intelligence functionalities may include a network of Nodes **852** (also referred to as neurons, etc.) and Connections **853** similar to that of a brain. Node **852** can store any data,

Ex. 1001 at FIG. 17; 103:46-51

'974: Grotmol Does Not Disclose the Claimed Connections (Claim 7)

various properties. Knowledge cells may be connected, interrelated, or interlinked into knowledge structures using



Ex. 1001 at 153:66-67; FIG. 18A

'974: Grotmol Does Not Disclose the Claimed Connections (Claim 7)

PO's Sur-Reply

construction. Further, Petitioner's over-broad proposal for the alleged plain and ordinary meaning of "connection" as "an association or relationship," Reply, 16, contradicts the intrinsic record and *would effectively render the term meaningless since the connection in claim 7 is recited to narrow what is recited in independent claim 1.*

PO Sur-Reply [33] at 14

'974: Grotmol Does Not Disclose the Claimed Connections (Claim 7)

Petition

The training data stored in memory in an order or sequence corresponds to the
claimed first and second “connections” between the first and second correlations,
and the second and fourth correlations. Decl. ¶¶ 100-101.

Pet. [1] at 33

'974: Grotmol Does Not Disclose the Claimed Connections (Claim 7)

Response

The '974 patent explains that the knowledgebase uses connections as links to enhance autonomous operation. Ex. 2007, ¶87. Unlike the simple storage in a sequence disclosed by Grotmol, knowledge cells are created and structured in a specific way to store object representations correlated with instruction sets (i.e., correlations), *id.*, 98:54-99:10, and are connected in the knowledgebase using connections. *Id.*, 131:64-132:26; Fig. 22. *These connections create paths through the knowledgebase that enhance autonomous operation. Id.; see also* Ex. 2007, ¶¶84-90. A simple sequence in Grotmol does not enable anything like this and Petitioner fails to show any support for such connections among knowledge cells (that include correlations) in Grotmol.

PO Resp. [26] at 24

'974: Grotmol Does Not Disclose the Claimed Connections (Claim 7)

PO's Sur-Reply

ordered, but not connected or linked, images. As a result, Grotmol's disclosure of basic memory storing ordered images and instruction sets does not disclose the claimed connections between the first correlation and the second correlation, and

between the second correlation and the fourth correlation of claim 7. Ex-2007, ¶¶84-90.

Finally, claim 7 additionally *requires generating the first and second connections*, and Petitioner has failed to point to any portions of Grotmol that disclose this generation of connections. Reply, 16-18.

PO Sur-Reply [33] at 18-19

'974: Disputed Issues – Ground 2 Obviousness

- **Claim 11: Grotmol Does Not Disclose or Suggest a Knowledgebase Including a Fourth Correlation Learned in Another Learning Process Involving a Second Device and Another User**
 - Claims 4 and 11: It Would Not Have Been Obvious to Combine Grotmol and Hickman to Arrive At the Claimed Invention
 - Claim 4: Grotmol and Hickman Do Not Disclose or Suggest a Knowledgebase Including a Fourth Correlation Learned in Another Learning Process Involving a Second Device
 - Claim 11: Grotmol and Hickman Do Not Disclose or Suggest the Claimed Fourth Correlation, Second Device and Another User

'974: Grotmol Does Not Disclose or Suggest All the Limitations of Claim 11

Ground 2

Claim 11

- “knowledgebase”
 1. “fourth correlation”
 2. “second device”
 3. “another learning process”
 4. “another user”

11. The method of claim 1, wherein the knowledgebase further includes a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for operating the second device, and wherein the fourth circumstance representation represents a fourth circumstance detected at least in part by the one or more sensors of the second device, and wherein at least a portion of the fourth correlation is learned in another learning process that includes operating the second device at least partially by another user.

Ex. 1001; Claim 11

'974: Grotmol Does Not Disclose or Suggest the Claimed Fourth Correlation

Petitioner argues:

- “another learning process” – disclosed
- “another user” – obvious
- “second device” – disclosed/obvious

As described above for claim 10, Grotmol discloses that multiple learning processes can be done to train multiple behaviors, and that it would be obvious that the multiple learning processes could be done by different users operating the robot. Decl. ¶ 139. A POSITA would also understand that Grotmol discloses that a robot can be loaded with a first trained configuration learned during a training process

involving operation of that robot by a user, and the robot can also be loaded with another trained configuration learned during training process involving operation of a different (second) robot by a user. Ex. 1004, 33:24-35; Decl. ¶ 140. For the same reasons discussed with respect to claim 10, it would be obvious to a POSITA that the training process involving operation of the first robot (resulting in the first trained configuration), and the training process involving operation of the second robot (resulting in another trained configuration) could be done by different users. Decl. ¶ 140.

Pet. [1] at 57-58

'974: Grotmol Does Not Disclose or Suggest the Claimed Fourth Correlation

Grotmol

robotic device. The trained configuration may be stored. 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. Subsequent to loading of the saved configuration, the controller learning process may match process configuration being present during saving of the configuration.

Ex. 1004 at 33:24-35

'974: Grotmol Does Not Disclose or Suggest the Claimed Fourth Correlation

Response

another user. Exhibit 2007, ¶¶91-103. As discussed above regarding claim 4 in Section VI.A.1, Grotmol discloses only *one* user operating *one* device in only *one* learning process. *Id.* The knowledge gained from this process in Grotmol, when loaded into a second device, *is still knowledge of one user operating one device in one learning process.* *Id.* Grotmol discloses nothing like the learning at least

PO Resp. [26] at 27

'974: Grotmol Does Not Disclose or Suggest the Claimed Fourth Correlation

Response

Petitioner's own words not supported in Grotmol and is conclusory. Grotmol never discloses that the second robot provides a *fourth correlation* including *a circumstance detected by the second robot and an instruction set for operating the second robot* to be included in the knowledgebase. Ex. 2007, ¶¶98-103. Petitioner is improperly stretching Grotmol's disclosure, as Grotmol merely discloses that "trained configuration may be loaded to one or more other robots in order to provide learned behaviors," Ex. 1004, 33:30-32, *which is about loading the previously learned knowledge on one robot into another robot and not what claim 11*

PO Resp. [26] at 30

'974: Grotmol Does Not Disclose or Suggest the Claimed Fourth Correlation

Grotmol

robotic device. The trained configuration may be stored. 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. Subsequent to loading of the

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Ex. 1004 at 33:27-32

'974: Grotmol Does Not Disclose or Suggest the Claimed Fourth Correlation

Response

Petitioner contends that “it would be obvious that the multiple learning processes could be done by different users operating the robot.” Petition, 57. But this is an unjustified leap that goes outside of Grotmol’s disclosure, and Petitioner has not pointed to a prior art reference that actually discloses the limitation. Ex. 2007, ¶¶98-103. Further, claim 11 requires *another user operating a second device, not another user operating the same device*, as Petitioner contends. *Id.*

PO Resp. [26] at 31

'974: Grotmol Does Not Disclose or Suggest the Claimed Fourth Correlation

Grotmol

robotic device. The trained configuration may be stored. 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. Subsequent to loading of the

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Ex. 1004, 33:27-32

'974: Grotmol Does Not Disclose or Suggest the Claimed Fourth Correlation

Dr. Saber's Declaration

101. In addition, the limitation at issue here, which involves having different users operate different devices in different learning processes to learn mixed knowledge into a single knowledgebase, is complex. Using different users with different devices in different learning processes to learn mixed knowledge into a single knowledgebase would not have been straightforward or unusually simple to a POSA due to the complexities of combining the mixed knowledge into a single knowledgebase.

Ex. 2007 at ¶ 101

'974: Grotmol Does Not Disclose or Suggest the Claimed Fourth Correlation

Dr. Saber's Declaration

102. Enabling a system to learn mixed autonomous operation knowledge and integrate and/or partially integrate such knowledge into a single knowledgebase from different devices in different learning processes with different users is an approach not disclosed or suggested in Grotmol and definitely not obvious to a POSA. For example, this approach may involve combining the learned knowledge from multiple devices into a coherent knowledge structure, identifying each user to store particular learned operations and preferences in portions of the knowledgebase for user-specific autonomous operations, combining the learned knowledge from specific devices and/or users with other devices' and users' learned knowledge, and/or other issues not found in Grotmol and not obvious to a POSA.

'974: Grotmol Does Not Disclose or Suggest the Claimed Fourth Correlation



Common knowledge of a POSA may only be used to supply a missing claim limitation when that limitation is “unusually simple and the technology particularly straightforward.”

Arendi S.A.R.L. v. Apple Inc., 832 F.3d 1355, 1361 (Fed. Cir. 2016)

'974: Grotmol Does Not Disclose or Suggest the Claimed Fourth Correlation

PO's Sur-Reply

Petitioner's contention that Dr. Saber conceded that "it would have been understood to a POSITA for user commands in Grotmol to be provided by multiple users," Reply, 18-19, is wrong and mischaracterizes Dr. Saber's testimony. The cited testimony merely indicates that multiple users *could* provide commands to multiple adaptive controllers, and not that a POSA would have understood that Grotmol discloses more than one user as required by claim 11. Ex-1011, 166:12-18.

PO Sur-Reply [33] at 19

'974: Grotmol Does Not Disclose or Suggest the Claimed Fourth Correlation

PO's Sur-Reply

Petitioner next contends that it would “have been obvious to a POSITA that when there are multiple robots, particularly different types of robots, they can be trained by different trainers.” Reply, 19. Petitioner is wrong since this argument describes *a situation involving two trained configurations each stored and learned on a different robot, whereas claim 11 recites a single knowledgebase that includes mixed knowledge of correlations (i.e., first and second) learned in one learning process involving one device and one user and an additional correlation (i.e., fourth) learned in another learning process involving a second device and another user.* Ex-2007, ¶¶93-103. Grotmol fails to mention at all any second learning process involving a second device and second user, any detecting of a circumstance by a second device, and any instruction sets for operating a second device, as required by claim 11.

PO Sur-Reply [33] at 20

'974: Grotmol Does Not Disclose or Suggest All the Limitations of Claim 11

Claim 11

• ~~“knowledgebase”~~

1. ~~“fourth correlation”~~
2. ~~“second device”~~
3. ~~“another learning process”~~
4. ~~“another user”~~

11. The method of claim 1, wherein the knowledgebase further includes a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for operating the second device, and wherein the fourth circumstance representation represents a fourth circumstance detected at least in part by the one or more sensors of the second device, and wherein at least a portion of the fourth correlation is learned in another learning process that includes operating the second device at least partially by another user.

Ex. 1001; Claim 11

'974: Disputed Issues – Ground 3 Obviousness

- Claim 11: Grotmol Does Not Disclose or Suggest a Knowledgebase Including a Fourth Correlation Learned in Another Learning Process Involving a Second Device and Another User
- **Claims 4 and 11: It Would Not Have Been Obvious to Combine Grotmol and Hickman to Arrive At the Claimed Invention**
- Claim 4: Grotmol and Hickman Do Not Disclose or Suggest a Knowledgebase Including a Fourth Correlation Learned in Another Learning Process Involving a Second Device
- Claim 11: Grotmol and Hickman Do Not Disclose or Suggest the Claimed Fourth Correlation, Second Device and Another User

'974: Grotmol and Hickman Do Not Disclose or Suggest Claim 4

Claim 4

- “knowledgebase”
 1. “fourth correlation”
 2. “second device”
 3. “another learning process”

operating the first device, and wherein the knowledge-base further includes a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for operating the second device, and wherein the fourth circumstance representation represents a fourth circumstance detected at least in part by the one or more sensors of the second device, and wherein at least a portion of the fourth correlation is learned in another learning process that includes:

Ex. 1001; Claim 4

'974: Grotmol and Hickman Do Not Disclose or Suggest Claim 11

Claim 11

- “knowledgebase”
 1. “fourth correlation”
 2. “second device”
 3. “another learning process”
 4. “another user”

11. The method of claim 1, wherein the knowledgebase further includes a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for operating the second device, and wherein the fourth circumstance representation represents a fourth circumstance detected at least in part by the one or more sensors of the second device, and wherein at least a portion of the fourth correlation is learned in another learning process that includes operating the second device at least partially by another user.

Ex. 1001; Claim 11

'974: Grotmol and Hickman Do Not Disclose or Suggest Claims 4 and 11

Response

Regarding Ground 3, Petitioner fails to show that Grotmol in view of Hickman renders claims 4 and 11 obvious. Ex. 2007, ¶¶104-129. Petitioner has failed to show that Grotmol's training sets and Hickman's shared robot knowledgebase would have been predictably combined by a POSA to arrive at the claimed inventions, as discussed below.

PO Resp. [26] at 35

'974: Grotmol and Hickman Do Not Disclose or Suggest Claims 4 and 11

Response

First, combining Hickman's shared knowledgebase with Grotmol's training sets would not have been predictable or obvious because Hickman specifically teaches away from using the claimed "fourth correlation . . ." (as recited in claims 4 and 11 and shown below). Ex. 2007, ¶¶104-105. Hickman discloses storing

Second, Petitioner has not adequately explained how the correlations and circumstance representations allegedly disclosed by Grotmol would have been combined with the knowledgebase in Hickman to arrive at the claimed invention of these claims. Ex. 2007, ¶106. Since circumstance representations and correlations of

Third, Petitioner fails to show that Grotmol in view of Hickman discloses or suggests all the specifically claimed elements of each of these claims. It is not adequate to merely show that Grotmol and Hickman disclose high level concepts without mapping the disclosure of the references to the specific language of the claims. Ex. 2007, ¶107. Both Grotmol and Hickman fail to disclose "*a fourth*

PO Resp. [26] at 35-37

'974: Grotmol and Hickman Do Not Disclose or Suggest Claims 4 and 11

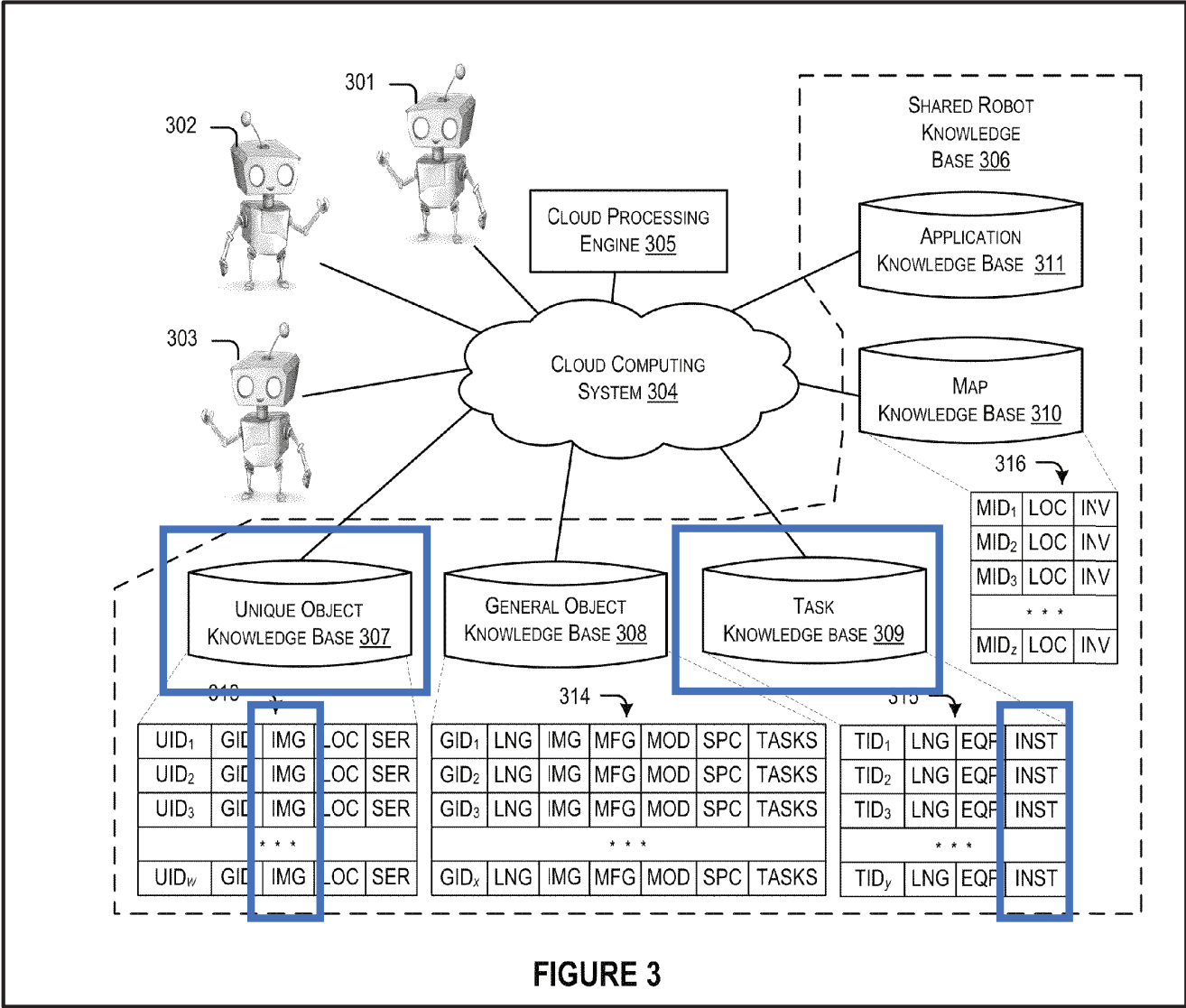
Response

Figure 3 from Hickman below, Hickman teaches that images are stored in one knowledgebase 307 while instruction sets are stored separately (i.e., uncorrelated) in another knowledgebase 309. Ex. 1005, 13:64-21:39. In light of this storage structure, and that Grotmol allegedly discloses that training sets stored in memory include correlated images and instruction sets that are stored together, Ex. 1004, 3:35-49, Hickman teaches away from the claimed “fourth correlation” as claimed in claims 4 and 11, and a POSA would not have been motivated to combine Grotmol and Hickman in the manner proposed by Petitioner. Ex. 2007, ¶¶109-110. Further,

PO Resp. [26] at 40

'974: Grotmol and Hickman Do Not Disclose or Suggest Claims 4 and 11

Hickman

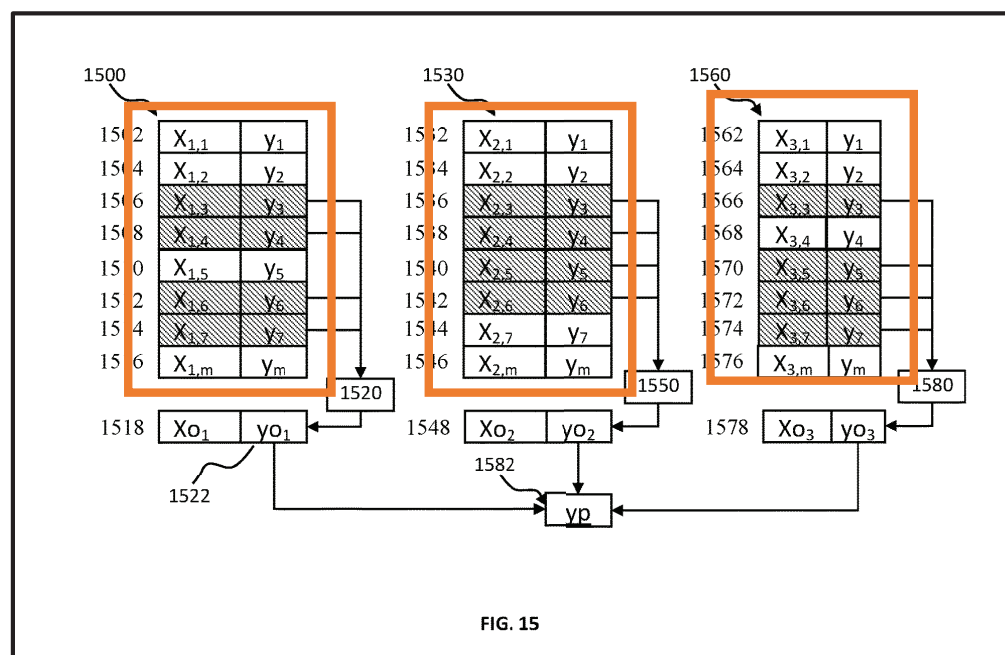


Ex. 1005 at FIG. 3

'974: Grotmol and Hickman Do Not Disclose or Suggest Claims 4 and 11

one of two states. The memory component may be configured to store training sets. A given training set may comprise an instance of the video frame, an instance of the binary signal, and an instance of a motor control indication configured to cause the robot to execute an action. The one or

Grotmol



Ex. 1004 at 3:35-40; FIG. 15

'974: Grotmol and Hickman Do Not Disclose or Suggest Claims 4 and 11

Dr. Saber's Declaration

110. Petitioner's proposed combination would also not have been obvious because Hickman teaches away from the claimed invention. Specifically, as shown in Figure 3 from Hickman below, Hickman teaches that images are stored in one database 313 while instruction sets are stored separately in another database 315. Ex. 1005, 13:64-21:39. In light of this storage structure, and the fact that Grotmol discloses that training sets stored in memory include correlated images and instruction sets that are stored together, Ex. 1004, 3:35-49, Hickman teaches away from the claimed "fourth correlation" as claimed in claims 4 and 11, and a POSA would not have been motivated to combine Grotmol and Hickman in the manner proposed by Petitioner. Further, Hickman also teaches

Ex. 2007 at ¶ 110

'974: Grotmol and Hickman Do Not Disclose or Suggest Claims 4 and 11

PO's Sur-Reply

V. **GROUND 3: GROTMOL AND HICKMAN DO NOT RENDER CLAIMS 4 AND 11 OBVIOUS**

Petitioner's claim that "the organization of knowledgebases is not relevant to the combination of Grotmol and Hickman," Reply, 21, is wrong and undermined by the fact that a key component of the inventions of claims 4 and 11 is the single, mixed knowledgebase that includes mixed knowledge of correlations learned in different learning processes involving different devices, and different users (in claim 11). Petitioner's attempt to divorce *the very general* "Hickman's teachings of

PO Sur-Reply [33] at 21

'974: Grotmol and Hickman Do Not Disclose or Suggest Claims 4 and 11

PO's Sur-Reply

Petitioner's argument that "PO's reliance on other features of Hickman to argue non-obviousness is without merit because '[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference,'" Reply, 21 (quoting *Allied Erecting v. Genesis Attachments*, 825 F.3d 1373, 1381 (Fed. Cir. 2016)), also misses the mark. This has nothing to do with the bodily incorporation, but with the fact that Hickman discloses storing instruction sets and images separately in separate knowledgebases, which a POSA would have found to be incompatible with (and to teach away from) Grotmol's disclosure of training sets or correlations with images and instruction sets correlated and stored together that is a fundamental element missing in Hickman required for the alleged Grotmol-Hickman combination to work at all. Ex-2007, ¶¶104-105.

PO Sur-Reply [33] at 22

'974: Grotmol and Hickman Do Not Disclose or Suggest Claims 4 and 11

PO's Sur-Reply

impermissible. For the first time in its Reply, Petitioner maps the tasks data disclosed by Hickman to the claimed instruction sets. Reply, 21-24. The rule that

23, what Patent Owner is arguing is that a POSA reading Hickman's disclosure of images and instruction sets stored separately would not have been motivated to combine Grotmol and Hickman in the manner proposed by Petitioner, Ex-2007, ¶¶109-110, especially in view of Petitioner's failure to provide how to modify/combine Grotmol and Hickman, and failure to provide evidence of a reasonable expectation of success. Further, simply because Hickman may contemplate "the addition of other fields to the unique object knowledge base 307," Reply, 23-24, says nothing about Hickman's disclosure of storing instruction sets and images separately that teaches away from the claimed invention. A POSA

'974: Grotmol and Hickman Do Not Disclose or Suggest Claims 4 and 11

Hickman

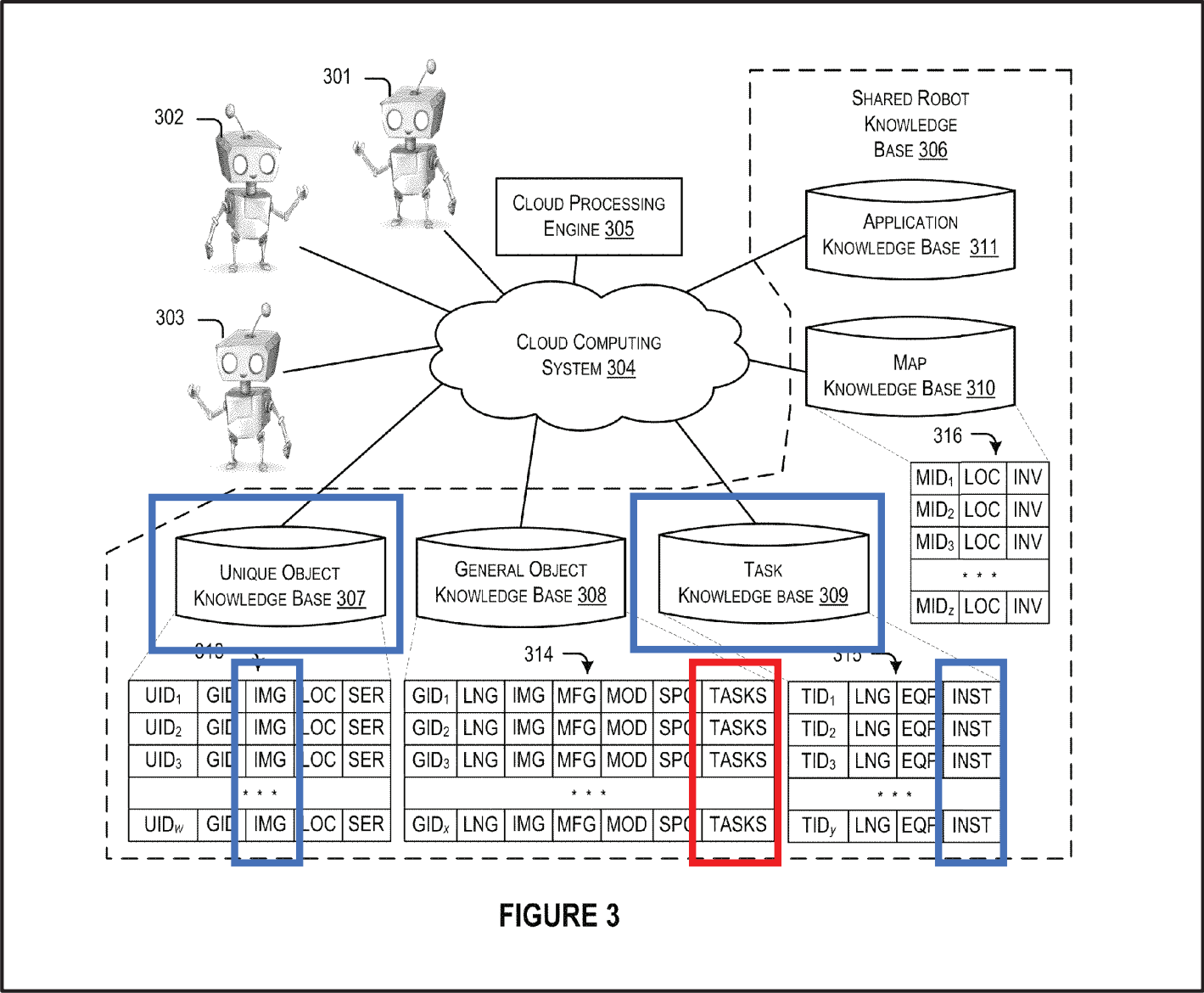


FIGURE 3

'974: Grotmol and Hickman Do Not Disclose or Suggest Claims 4 and 11

PO's Sur-Reply

immaterial, is also wrong. Reply, 24-28. Hickman discloses (i) *storing images and instructions separately in separate knowledgebases (see Ex-1005, Fig. 3) that is not a correlation* as well as (ii) *a single object information that is not a circumstance representation*. Hence, Hickman does not disclose or suggest (and

further teaches away from) (i) any correlations and (ii) any circumstance representations. Since *both* circumstance representations and correlations are fundamental to the operation of the system in Grotmol, Hickman must disclose *both* the circumstance representations and correlations in order to be combinable with Grotmol at all. Ex-2007, ¶106. Petitioner has failed to rebut this argument in its

PO Sur-Reply [33] at 24

'974: Grotmol and Hickman Do Not Disclose or Suggest Claims 4 and 11

Response

Petitioner's argument that it would have been obvious to combine Grotmol's training sets with Hickman's simplistic cloud storage approach uses impermissible hindsight to arrive at the claimed invention. Ex. 2007, ¶¶108-110. The specific language of claims 4 and 11 cannot be carved up and then stitched back together using the broad concepts disclosed in Grotmol and Hickman. Grotmol discloses one user operating one device in one learning process. *Id.* The knowledge gained from this process in Grotmol, when loaded into a second device, is still knowledge of one user operating one device in one learning process. *Id.* Further, Hickman's simple cloud storage of instances of single object information does not contemplate using correlations, circumstance representations, and other data structures to learn knowledge for autonomous operation as required by claims 4 and 11. Petitioner's

PO Resp. [26] at 38

'974: Disputed Issues – Ground 3 Obviousness

- Claim 11: Grotmol Does Not Disclose or Suggest a Knowledgebase Including a Fourth Correlation Learned in Another Learning Process Involving a Second Device and Another User
- Claims 4 and 11: It Would Not Have Been Obvious to Combine Grotmol and Hickman to Arrive At the Claimed Invention
- **Claim 4: Grotmol and Hickman Do Not Disclose or Suggest a Knowledgebase Including a Fourth Correlation Learned in Another Learning Process Involving a Second Device**
- Claim 11: Grotmol and Hickman Do Not Disclose or Suggest the Claimed Fourth Correlation, Second Device and Another User

'974: Grotmol and Hickman Do Not Disclose or Suggest Claim 4

Claim 4

- “knowledgebase”
 1. “fourth correlation”
 2. “second device”
 3. “another learning process”

operating the first device, and wherein the knowledge-base further includes a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for operating the second device, and wherein the fourth circumstance representation represents a fourth circumstance detected at least in part by the one or more sensors of the second device, and wherein at least a portion of the fourth correlation is learned in another learning process that includes:

Ex. 1001; Claim 4

'974: Grotmol and Hickman Do Not Disclose or Suggest Claim 4

Grotmol and Hickman fail to disclose or suggest the claimed:

- “knowledgebase”
 1. “fourth correlation”
 2. “second device”
 3. “another learning process”

In addition, Grotmol and Hickman first fail to disclose “a fourth correlation including *a fourth circumstance representation correlated with a fourth one or more instruction sets for operating the second device.*” Ex. 2007, ¶¶113-120.

Grotmol and Hickman next fail to disclose the “fourth circumstance representation represents a fourth circumstance detected at least in part by the one or more sensors of the second device.” Ex. 2007, ¶114. Petitioner argues that

Further, Grotmol and Hickman further fail to disclose “at least a portion of the fourth correlation is learned in another learning process that includes: generating or receiving *the fourth circumstance representation*; and obtaining or receiving the fourth one or more *instruction sets for operating the second device.*”

PO Resp. [26] at 42-44

'974: Grotmol and Hickman Do Not Disclose or Suggest Claim 4

Claim 4

• ~~“knowledgebase”~~

1. ~~“fourth correlation”~~
2. ~~“second device”~~
3. ~~“another learning process”~~

operating the first device, and wherein the knowledge-base further includes a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for operating the second device, and wherein the fourth circumstance representation represents a fourth circumstance detected at least in part by the one or more sensors of the second device, and wherein at least a portion of the fourth correlation is learned in another learning process that includes:

Ex. 1001; Claim 4

'974: Grotmol and Hickman Do Not Disclose or Suggest Claim 4

Finally, regardless of whether it would have been obvious to combine Grotmol and Hickman, the references fail to disclose numerous claim limitations, as discussed in Patent Owner's Response. Response, 41-56. Petitioner has failed to respond to these arguments and appears to concede that the references fail to disclose the claimed single mixed knowledgebase comprising the claimed fourth correlation

PO Sur-Reply [33] at 24

'974: Disputed Issues – Ground 3 Obviousness

- Claim 11: Grotmol Does Not Disclose or Suggest a Knowledgebase Including a Fourth Correlation Learned in Another Learning Process Involving a Second Device and Another User
- Claims 4 and 11: It Would Not Have Been Obvious to Combine Grotmol and Hickman to Arrive At the Claimed Invention
- Claim 4: Grotmol and Hickman Do Not Disclose or Suggest a Knowledgebase Including a Fourth Correlation Learned in Another Learning Process Involving a Second Device
- **Claim 11: Grotmol and Hickman Do Not Disclose or Suggest the Claimed Fourth Correlation, Second Device and Another User**

'974: Grotmol and Hickman Do Not Disclose or Suggest Claim 11

Claim 11

- “knowledgebase”
 1. “fourth correlation”
 2. “second device”
 3. “another learning process”
 4. “another user”

11. The method of claim 1, wherein the knowledgebase further includes a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for operating the second device, and wherein the fourth circumstance representation represents a fourth circumstance detected at least in part by the one or more sensors of the second device, and wherein at least a portion of the fourth correlation is learned in another learning process that includes operating the second device at least partially by another user.

Ex. 1001; Claim 11

'974: Grotmol and Hickman Do Not Disclose or Suggest Claim 11

Grotmol and Hickman fail to disclose or suggest the claimed:

- “knowledgebase”
 1. “fourth correlation”
 2. “second device”
 3. “another learning process”
 4. “another user”

In addition, Grotmol and Hickman first fail to disclose “a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for operating the second device.” Ex. 2007, ¶¶123-129. As

Grotmol and Hickman next fail to disclose “wherein the fourth circumstance representation represents a fourth circumstance detected at least in part by the one or more sensors of the second device.” Ex. 2007, ¶¶124-129. Petitioner argues that

Grotmol and Hickman fail to disclose that “at least a portion of the fourth correlation is learned in another learning process that includes operating the second device at least partially by another user.” Ex. 2007, ¶¶125-129. Grotmol

PO Resp. [26] at 50-52

'974: Grotmol and Hickman Do Not Disclose or Suggest Claim 11

Claim 11

• ~~“knowledgebase”~~

1. ~~“fourth
correlation”~~

2. ~~“second device”~~

3. ~~“another
learning
process”~~

4. ~~“another user”~~

11. The method of claim 1, wherein the knowledgebase further includes a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for operating the second device, and wherein the fourth circumstance representation represents a fourth circumstance detected at least in part by the one or more sensors of the second device, and wherein at least a portion of the fourth correlation is learned in another learning process that includes operating the second device at least partially by another user.

Ex. 1001; Claim 11

'974: Grotmol and Hickman Do Not Disclose or Suggest Claim 11

Finally, regardless of whether it would have been obvious to combine Grotmol and Hickman, the references fail to disclose numerous claim limitations, as discussed in Patent Owner's Response. Response, 41-56. Petitioner has failed to respond to these arguments and appears to concede that the references fail to disclose the claimed single mixed knowledgebase comprising the claimed fourth correlation

PO Sur-Reply [33] at 24

'974: Disputed Issues – Motion to Amend

- **The Substitute Claims are Patent-Eligible (§ 101)**
 - The Substitute Claims are Patentable Over Grotmol-Hickman (§ 103)
 - The Substitute Claims are Patentable Over Grotmol-Tolstedt (§ 103)

'974: Patent Eligibility Under §101

<i>Alice Step 1</i>	Whether the claim is directed to a judicial exception
	Whether the claim as a whole integrates the judicial exception into a practical application of the exception
<i>Alice Step 2</i>	Whether the claim (as amended) provides an inventive concept

'974: Alice Step 1 – Original Claim Language

Substitute Claim 21

of a second device;

anticipating the first one or more instruction sets for **operating the first device** learned in the learning process based on at least partial match between the third circumstance representation and the first circumstance representation; and

at least in response to the anticipating, **executing the first one or more instruction sets for operating the first device learned in the learning process,** wherein **the first device or the second device autonomously performs one or more operations defined by the first one or more instruction sets for operating the first device** learned in the learning process;

wherein the learning process includes:

generating or receiving the first circumstance representation, and

generating or receiving the second circumstance representation; and

obtaining or receiving the first one or more instruction sets for **operating the first device,** and

obtaining or receiving the second one or more instruction sets for **operating the first device,** and

wherein the knowledgebase further includes a fourth correlation including a fourth circumstance representation correlated with a fourth one or more instruction sets for **operating the second device,** and wherein the fourth circumstance representation represents a fourth circumstance detected at least in part by the one

MTA [28] at App'x 2

'974: Alice Step 1 – Preliminary Guidance

Preliminary Guidance

That is, proposed substitute claims 21–26 recite methods implemented by a computing system/processor circuit(s) for learning, anticipating, decision making, and using a device's circumstances for autonomous device operation—operations that are *not* performable in the human mind (as Petitioner asserts). Rather, the claimed operations and systems implementing them exist exclusively in the realm of computers and control systems, and cannot practicably be performed in the human mind or with pen and paper, and thus do not amount to a mental process. For example, the computing

We are also not persuaded by Petitioner's arguments that the substitute claims are “divorced from any technical context,” “provide no meaningful technological improvement,” “fail to integrate the abstract idea into a practical application,” and recite only “generic, non-technical” elements and “mere instructions to implement [an] abstract idea on a computer.” *See* Opp. 3–4, 6–

Prelim. Guidance [32] at 20, 21

'974: Alice Step 1 – Technological Solution Rooted in Computers/Control Systems



“[T]he claimed solution is **necessarily rooted** in computer technology in order to overcome a problem **specifically arising in the realm** of computer networks.”

DDR Holdings, LLC v. Hotels.com, L.P., 773 F.3d 1245, 1257 (Fed. Cir. 2014) (emphasis added)

“Contrary to [the challenger’s] contention, there is no evidence here that the calculations here can be **performed entirely in the human mind**. Here, ... the use of a GPS receiver is **essential to the operation** of the claimed methods.”

SiRF Tech., Inc. v. Int’l Trade Comm’n, 601 F.3d 1319, 1333 (Fed. Cir. 2010)

'974: Alice Step 2 – Added Claim Limitations

Substitute Claim 21

Recites practical technical features

Improves computer & autonomous device performance

Achieve less memory usage, faster computation, & improved object representation accuracy

or more sensors of the second device, and wherein at least a portion of the fourth correlation is learned in another learning process that includes:

generating or receiving the fourth circumstance representation; and

obtaining or receiving the fourth one or more instruction sets for operating the second device;

wherein the first circumstance representation includes a first collection of object representations, and the second circumstance representation includes a second collection of object representations;

wherein the first collection of object representations represents multiple objects detected at a first time or during a first time period, and comprises a first data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the second collection of object representations represents the multiple objects detected at a second time or during a second time period, and comprises a second data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the first data structure is correlated with the first one or more instruction sets for operating the first device; and

wherein the second data structure is correlated with the second one or more instruction sets for operating the first device.

'974: Disputed Issues – Motion to Amend

- The Substitute Claims are Patent-Eligible (§ 101)
- **The Substitute Claims are Patentable Over Grotmol-Hickman (§ 103)**
- The Substitute Claims are Patentable Over Grotmol-Tolstedt (§ 103)

'974: Grotmol-Hickman Does Not Disclose the “Second Data Structure...” Limitation

Substitute Claim 21

wherein the first collection of object representations represents multiple objects detected at a first time or during a first time period, and comprises a first data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the second collection of object representations represents the multiple objects detected at a second time or during a second time period, and comprises a second data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the first data structure is correlated with the first one or more instruction sets for operating the first device; and

wherein the second data structure is correlated with the second one or more instruction sets for operating the first device.

MTA [28] at App'x 3

'974: Grotmol-Hickman Does Not Disclose the “Second Data Structure...” Limitation

Supplemental Declaration of Petitioner's Expert

(a) Hickman

87. For the reasons explained above with respect to feature 2, Hickman discloses data structures (“second data structure”) that store “labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects.” It would have been obvious to a POSITA that, in the GHC, a row or set of rows in Hickman’s structure 314 (or 313) that include Grotmol’s image 2000 and objects therein may correspond to the “first data structure,” and a row or set of rows in Hickman’s structure 314 (or 313) that include Grotmol’s image 2010 and objects therein may correspond to the “second data structure.” The depiction of objects in the images together with the first and second data structures provide the claimed “first collection of object representations” and “second collection of object representations,” respectively.

Ex. 1010 at 44

'974: Grotmol-Hickman Does Not Disclose the “Second Data Structure...” Limitation

Preliminary Guidance

With respect to the “second data structure,” Petitioner has not sufficiently explained where or how Hickman discloses or renders obvious *multiple data structures that (i) each include information (types and locations) for the same multiple objects* (as detected at different times or time periods). See Mot. App. A 1–3. Claim 21 appears to require that the first and second data structures each store information about the *same* objects by reciting that the “the first collection of object representations represents multiple objects . . .,” the “*first data structure . . . includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects,*” and the “second data structure . . . includes: labels indicating types *of the multiple objects,* and coordinates indicating locations *of the multiple objects.*” The use of the term “the” before “multiple objects” in the “second data structure” limitation appears to indicate that the objects in the second data structure are the same objects as those in the first data structure. Petitioner references various data structures in Hickman—e.g., (i) “object data [that] is stored in data structures, e.g., data structures 313, 314, or 315 [of Hickman]” (Opp. 20), (ii) “data structures . . . that store ‘labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects’” (Opp. 22 (emphases omitted)), and (iii) “a row or set of rows in Hickman’s structure 314 (or 313) that include Grotmol’s image 2000 and objects therein.” *Petitioner, however, has not identified two data structures that each include information (such as locations) for the same multiple objects* (as detected at different times or time periods).

Prelim. Guidance [32] at 11-12

'974: Grotmol-Hickman Does Not Disclose the “Correlated With...” Limitations

Substitute Claim 21

wherein the first collection of object representations represents multiple objects detected at a first time or during a first time period, and comprises a first data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the second collection of object representations represents the multiple objects detected at a second time or during a second time period, and comprises a second data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the first data structure is correlated with the first one or more instruction sets for operating the first device; and

wherein the second data structure is correlated with the second one or more instruction sets for operating the first device.

MTA [28] at App'x 3

'974: Grotmol-Hickman Does Not Disclose the “Correlated With...” Limitations

Hickman

313 ↘					314 ↘							315 ↘			
UID ₁	GID	IMG	LOC	SER	GID ₁	LNG	IMG	MFG	MOD	SPC	TASKS	TID ₁	LNG	EQP	INST
UID ₂	GID	IMG	LOC	SER	GID ₂	LNG	IMG	MFG	MOD	SPC	TASKS	TID ₂	LNG	EQP	INST
UID ₃	GID	IMG	LOC	SER	GID ₃	LNG	IMG	MFG	MOD	SPC	TASKS	TID ₃	LNG	EQP	INST
* * *					* * *							* * *			
UID _y	GID	IMG	LOC	SER	GID _x	LNG	IMG	MFG	MOD	SPC	TASKS	TID _y	LNG	EQP	INST

Ex. 1005 at FIG. 3

'974: Grotmol-Hickman Does Not Disclose the “Correlated With...” Limitations

Hickman

In the example conceptual data structure **313** for the unique object knowledge base **307** shown in FIG. 3, an individual unique object identifier (UID) may have the following corresponding data: (i) a general object identifier (GID); (ii) image data (IMG); (iii) location data **LOC**; and (iv) serial number data (SER). Various embodiments of the unique object

Ex. 1005 at 12:5-10

In the conceptual data structure **314** for the general object knowledge base **308** shown in FIG. 3, an individual general object identifier (GID) may have the following corresponding data: (i) language data (LNG); (ii) image data (IMG); (iii) manufacturer data (MFG) (if applicable); (iv) model number data (MOD) (if applicable); (v) specification data (SPC); and (vi) task data **TASKS**. In some embodiments, the concep-

Ex. 1005 at 15:28-35

In the conceptual data structure **315** for the task knowledge base **309** shown in FIG. 3, an individual task identifier (TID) may have the following corresponding data: (i) language data (LNG); (ii) equipment data (EQP); and (iii) instruction data (INST). In some embodiments, the conceptual data structure

Ex. 1005 at 20:28-32

'974: Grotmol-Hickman Does Not Disclose the “Correlated With...” Limitations

Preliminary Guidance

21), we find that Petitioner has *not* sufficiently explained how the teachings of Grotmol and Hickman would render obvious the claimed “second data structure” as well as the correlation limitations recited in claim 21 (i.e., “wherein the first data structure is *correlated* with the first one or more instruction sets for operating the first device; and wherein the second data structure is *correlated* with the second one or more instruction sets for operating the first device”). *See* Mot. App. A 1–3 (claim 21).

Prelim. Guidance [32] at 11

'974: Grotmol-Hickman Does Not Disclose the “Correlated With...” Limitations

Petition

8:66-9:3, 10:23-26, 38:36-58, 39:13-22. Thus, Grotmol discloses a memory that stores a knowledgebase² including multiple correlations (training sets), where each correlation includes a “circumstance representation”³ (image of scene from a robot vehicle’s operation) correlated with an “instruction set[] for operating a first device”⁴ (motor control indication configured to cause the robot to execute an action).

The images in Grotmol are “associated with” or “correspond to”—*i.e.*, are correlated with⁵—motor control indications issued around the same time. Decl. ¶

Pet. [1] at 12-13

MTA Opposition

(a) Hickman

Hickman teaches that for each detected object, the knowledge base may store “relevant tasks that a robot may perform with the object” in the task data (TASK) field. TESLA1005, 2:65-3:8, 15:28-43, 18:34-20:20; FIG. 3. Accordingly, a POSITA would have understood that because the tasks for the robot (“*the first one or more instruction sets for operating the first device*”) are part of the first data structure and provide instructions for the robot, “*the first data structure is correlated with the first one or more instruction sets.*” TESLA1010, ¶90.

MTA Opp. [31] at 24

'974: Grotmol-Hickman Does Not Disclose the “Correlated With...” Limitations

Substitute Claim 21

wherein the first collection of object representations represents multiple objects detected at a first time or during a first time period, and comprises a first data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the second collection of object representations represents the multiple objects detected at a second time or during a second time period, and comprises a second data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the first data structure is correlated with the first one or more instruction sets for operating the first device; and

wherein the second data structure is correlated with the second one or more instruction sets for operating the first device.

MTA [28] at App'x 3

'974: Grotmol-Hickman Does Not Disclose the “Correlated With...” Limitations

MTA Opposition

5. Substitute Feature 5 (Element [Sub-5])

Substitute feature 5 added to each of the substitute claims is:

“wherein the second data structure is correlated with the second one or more instruction sets for operating the first device.”

(a) Hickman

For reasons similar to those noted above with respect to substitute feature 4,

it would have been obvious to a POSITA that in GHC, tasks (*“second one or more instruction sets for operating the first device”*) for operating the robot when objects in image 2010 are detected, are stored in a second data structure. TESLA1010, ¶93. Thus, GHC renders obvious substitute feature 5.

MTA Opp. [31] at 25

'974: Disputed Issues – Motion to Amend

- The Substitute Claims are Patent-Eligible (§ 101)
- The Substitute Claims are Patentable Over Grotmol-Hickman (§ 103)
- **The Substitute Claims are Patentable Over Grotmol-Tolstedt (§ 103)**

'974: Grotmol-Tolstedt Does Not Disclose the “First Data Structure...” Limitation

Substitute Claim 21

wherein the first collection of object representations represents multiple objects detected at a first time or during a first time period, and comprises a first data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the second collection of object representations represents the multiple objects detected at a second time or during a second time period, and comprises a second data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the first data structure is correlated with the first one or more instruction sets for operating the first device; and

wherein the second data structure is correlated with the second one or more instruction sets for operating the first device.

MTA [28] at App'x 3

'974: Grotmol-Tolstedt Does Not Disclose the “First Data Structure...” Limitation

MTA Opposition

(b) Tolstedt (alternative to Hickman)

Tolstedt also discloses that sensor data (one or more images) is processed to classify objects detected in the data and identify attributes of the detected objects such as the type, dimensional information, location, height, width, and color of the object, and actions for the vehicle to take in association with the object (e.g.,

performing object avoidance). TESLA1015, ¶¶83-88. This information is stored in a data structure in a knowledge base. *Id.*; TESLA1010, ¶82.

In some cases, this data structure may also be a map that the vehicle uses for navigation purposes and includes labels for the types and locations of objects.

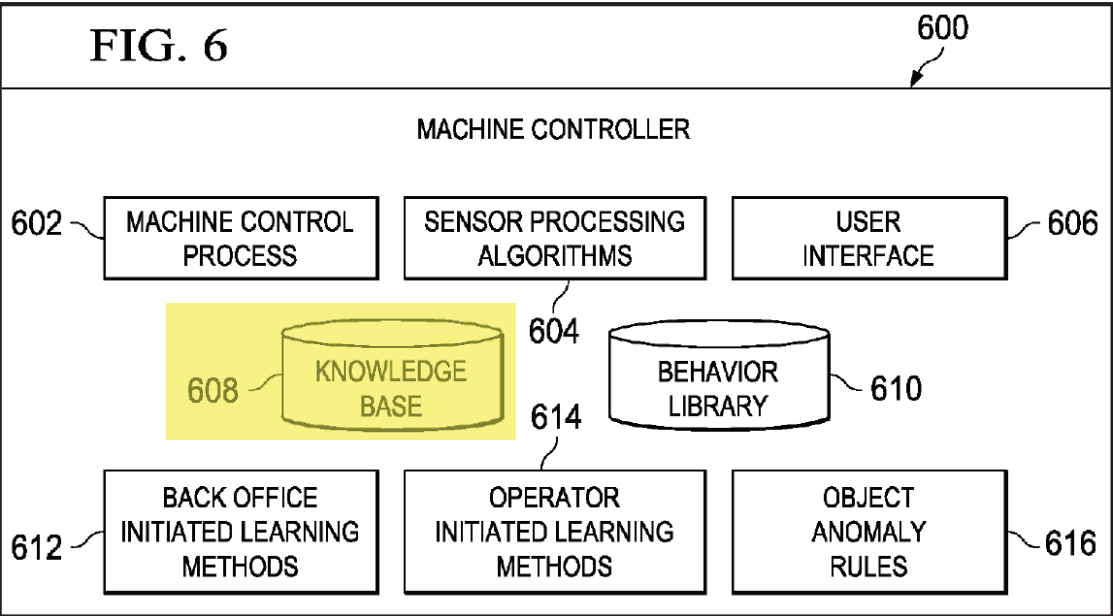
TESLA1015, ¶¶83-88 (“[t]his information may be used to generate a thematic map, which may contain a spatial pattern of attributes”), 73, 103, 123, 134; TESLA1001,

65:45-66:2. This map can be stored in the knowledge base. TESLA1015, ¶¶84-87; TESLA1010, ¶83.

MTA Opp. [31] at 20-21

'974: Grotmol-Tolstedt Does Not Disclose the “First Data Structure...” Limitation

Tolstedt



Ex. 1015 at FIG. 6

MTA Opposition

(b) Tolstedt (alternative to Hickman)

Tolstedt also discloses that sensor data (one or more images) is processed to classify objects detected in the data and identify attributes of the detected objects such as the type, dimensional information, location, height, width, and color of the object, and actions for the vehicle to take in association with the object (e.g., performing object avoidance). TESLA1015, ¶¶83-88. This information is stored in a data structure in a knowledge base. Id.; TESLA1010, ¶82.

MTA Opp. [31] at 20-21

'974: Grotmol-Tolstedt Does Not Disclose the “Second Data Structure...” Limitation

Substitute Claim 21

wherein the first collection of object representations represents multiple objects detected at a first time or during a first time period, and comprises a first data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the second collection of object representations represents the multiple objects detected at a second time or during a second time period, and comprises a second data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the first data structure is correlated with the first one or more instruction sets for operating the first device; and

wherein the second data structure is correlated with the second one or more instruction sets for operating the first device.

MTA [28] at App'x 3

'974: Grotmol-Tolstedt Does Not Disclose the “Second Data Structure...” Limitation

MTA Opposition

associated with the first data structure in Section III.B.2(b). *Id.* In some cases, the second data structure can be a second map of a second location different from the first location and on which multiple objects and their coordinates are added. TESLA1015, ¶¶123, 134, 83-88. In other cases, the knowledge base includes the

MTA Opp. [31] at 23

'974: Grotmol-Tolstedt Does Not Disclose the “Second Data Structure...” Limitation

Substitute Claim 21

wherein the first collection of object representations represents multiple objects detected at a first time or during a first time period, and comprises a first data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the second collection of object representations represents the multiple objects detected at a second time or during a second time period, and comprises a second data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the first data structure is correlated with the first one or more instruction sets for operating the first device; and

wherein the second data structure is correlated with the second one or more instruction sets for operating the first device.

MTA [28] at App'x 3

'974: Grotmol-Tolstedt Does Not Disclose the “Second Data Structure...” Limitation

Preliminary Guidance

Specifically, Petitioner has not sufficiently explained how Tolstedt teaches or suggests *two data structures that each include labels indicating types and coordinates indicating locations of the same multiple objects* as detected at different times or time periods (as recited in proposed substitute claim 21). Petitioner argues that “the second data structure can be a second map of a second location different from the first location and on which multiple objects and their coordinates are added” and that “the knowledge base [of Tolstedt] includes the same type of information as added to the second map.” See Opp. 23 (citing Ex. 1015 ¶¶ 83–88, 123, 134). Petitioner, however, *does not sufficiently explain how Tolstedt discloses or suggests “a second map of a second location different from the first location”* which includes types and locations of the same multiple objects from a first map of the first, different, location. Petitioner also has not identified where in paragraphs 83–88, 123, 134 of Tolstedt is there a teaching or suggestion of *not one but two maps or data structures that each include types and coordinates indicating locations of the same multiple objects* as detected at different times or periods (as required by claim 21).

also lack sufficient support on this record. See Opp. 23, 25. Petitioner does not identify where Tolstedt discloses or suggests *multiple maps or data structures that each include types and coordinates indicating locations of the same multiple objects* as detected at different times or periods (as required by claim 21). The arguments also do not sufficiently explain why an ordinarily

Prelim. Guidance [32] at 17-18

'974: Grotmol-Tolstedt Does Not Disclose the “Correlated With...” Limitations

Substitute Claim 21

wherein the first collection of object representations represents multiple objects detected at a first time or during a first time period, and comprises a first data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the second collection of object representations represents the multiple objects detected at a second time or during a second time period, and comprises a second data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the first data structure is correlated with the first one or more instruction sets for operating the first device; and

wherein the second data structure is correlated with the second one or more instruction sets for operating the first device.

MTA [28] at App'x 3

'974: Grotmol-Tolstedt Does Not Disclose the “Correlated With...” Limitations

MTA Opposition

steering, braking, and propulsion components.” TESLA1015, ¶84. It would have been obvious to a POSITA that a portion of the knowledge base storing information on an object or a map showing the object (“*first data structure*”) is correlated with instructions/actions for operating the vehicle/robot such as object avoidance (“*correlated with the first one or more instruction sets for operating the first device*”). TESLA1010, ¶91.

MTA Opp. [31] at 24

'974: Grotmol-Tolstedt Does Not Disclose the “Correlated With...” Limitations

Petition

8:66-9:3, 10:23-26, 38:36-58, 39:13-22. Thus, Grotmol discloses a memory that

stores a knowledgebase² including multiple correlations (training sets), where each correlation includes a “circumstance representation”³ (image of scene from a robot vehicle’s operation) correlated with an “instruction set[] for operating a first device”⁴ (motor control indication configured to cause the robot to execute an action).

The images in Grotmol are “associated with” or “correspond to”—*i.e.*, are correlated with⁵—motor control indications issued around the same time. Decl. ¶

Pet. [1] at 12-13

MTA Opposition

(b) Tolstedt (alternative to Hickman)

Tolstedt’s system also determines actions (“*the first one or more instruction sets for operating the first device*”) for a vehicle to take in association with a detected object (e.g., performing object avoidance). TESLA1015, ¶¶83-88. In addition to storing classification data on detected objects in the sensor data, Tolstedt’s knowledge base also provides information to a machine control process 602 to “determine which commands [(“*instruction sets*”)] to send to the vehicle’s steering, braking, and propulsion components.” TESLA1015, ¶84. It would have been obvious to a POSITA that a portion of the knowledge base storing information on an object or a map showing the object (“*first data structure*”) is correlated with instructions/actions for operating the vehicle/robot such as object avoidance (“*correlated with the first one or more instruction sets for operating the first device*”). TESLA1010, ¶91.

MTA Opp. [31] at 24

'974: Grotmol-Tolstedt Does Not Disclose the “Correlated With...” Limitations

Substitute Claim 21

wherein the first collection of object representations represents multiple objects detected at a first time or during a first time period, and comprises a first data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the second collection of object representations represents the multiple objects detected at a second time or during a second time period, and comprises a second data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

wherein the first data structure is correlated with the first one or more instruction sets for operating the first device; and

wherein the second data structure is correlated with the second one or more instruction sets for operating the first device.

MTA [28] at App'x 3