

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,

Petitioner,

v.

AUTONOMOUS DEVICES, LLC,

Patent Owner.

Case: IPR2024-00745

U.S. Patent No. 11,633,474

REMOTE DEPOSITION OF

JASON ANDRE JANET, Ph.D.

Thursday, December 19, 2024

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REPORTED BY: Dawn A. Jaques, CSR, CLR

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1 I-N-D-E-X

2 WITNESS: PAGE:

3 JASON JANET, Ph.D.

4 Examination by Mr. McCommas 5

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7 E-X-H-I-B-I-T-S

8 JANET EXHIBIT NUMBER: PAGE:

9 Exhibit 1 U.S. Patent 11,663,474

10 (Cosic) (Exhibit 1001) 16

11

12 Exhibit 2 March 29, 2024, Declaration

13 of Jason A. Janet, Ph.D.

14 (Exhibit 1003) 19

15

16 Exhibit 3 U.S. Patent Application

17 Publication 2014/0089232

18 (Buibas) (Exhibit 1005) 72

19

20 Exhibit 4 U.S. Patent 9,604,359

21 (Grotmol) (Exhibit 1008) 84

22

1 P R O C E E D I N G S

2 THE REPORTER: Dr. Janet, if you'll
3 raise your right hand to be sworn,
4 please.

5 (The witness was administered the oath)
6 Whereupon,

7 JASON ANDRE JANET, Ph.D.,
8 was called as a witness, after having
9 been first duly sworn by the Notary
10 Public, was examined and testified as
11 follows:

12 EXAMINATION BY COUNSEL FOR THE PATENT OWNER

13 BY MR. McCOMMAS:

14 Q Good morning, sir. Will you please
15 state and spell your full name for the record?

16 A Yes. My full name is Jason Andre
17 Janet.

18 Q And could you spell your name,
19 please?

20 A First name J-A-S-O-N, middle name
21 A-N-D-R-E, last name J-A-N-E-T.

22 Q And I know we've done some

1 depositions before, Dr. Janet, but I'll just
2 run through a few ground rules quickly just to
3 remind everybody.

4 So you understand you've been placed
5 under oath today just as though you were in a
6 court of law, correct, sir?

7 A Yes, sir.

8 Q And you understand that you're bound
9 to answer my questions truthfully today?

10 A Yes, sir.

11 Q If you don't understand a question,
12 if it's unclear, please let me know so that I
13 can rephrase as necessary, otherwise I'll
14 assume that you understand my question.

15 Is that okay?

16 A Yes, sir.

17 Q As you know, because your testimony
18 is being transcribed by a court reporter, you
19 understand you need to answer my questions
20 verbally instead of with gestures.

21 Is that right, sir?

22 A Yes, sir.

1 Q Obviously, I'm going to do my best,
2 and I'm going to ask that you do your best so
3 that we don't speak over each other during the
4 deposition. It just makes the court
5 reporter's life easier.

6 Does that sound good?

7 A Yes, sir.

8 Q And again, if you need a break, just
9 let me know. All I ask is that if a question
10 is pending before we take a break, that you
11 answer the question, and then we can take a
12 break. Is that okay?

13 A Yes, sir.

14 Q Okay. And any questions on your end
15 before we begin?

16 A No, sir.

17 Q Are you aware of any reason that you
18 are unable to answer my questions truthfully
19 today, sir?

20 A No, sir.

21 Q And are you taking any medications
22 that would prevent you from providing honest,

1 accurate, and complete answers?

2 A No, sir.

3 Q Any health conditions that would
4 prevent that?

5 A No, sir.

6 Q And do you understand that you have
7 to answer my questions even if your counsel
8 objects, unless he directly instructs you not
9 to answer?

10 A Yes, sir.

11 Q And I would like to caution you not
12 to discuss the substance of your testimony
13 during your breaks, okay?

14 A Yes, sir.

15 Q Dr. Janet, is there anyone in the
16 room with you today?

17 A No, sir.

18 Q And do you have any documents with
19 you in the room today, either electronic or
20 hard copy?

21 A I just have my normal day job
22 documents here, not relevant to this.

1 Q Okay. I'll be asking you questions
2 about IPR2024-00745, which involves
3 U.S. patent number 11,663,474.

4 For convenience, I will refer to
5 that patent at the '474 patent.

6 Is that acceptable?

7 A Yes, sir.

8 Q And I will refer to the '474 IPR,
9 IPR2024-00745, as the '474 patent IPR.

10 Is that okay?

11 A Yes, sir.

12 Q And you submitted a declaration for
13 the '474 patent IPR; is that correct?

14 A Yes, sir.

15 Q Okay. And do you have a copy of
16 that declaration with you right now?

17 A I might be able to dig it up on the
18 hard drive, but my impression was that you
19 would furnish that.

20 Q Yeah, that's right. Okay.

21 And are you aware that your
22 declaration is Exhibit 1003 in the '474 patent

1 IPR? Is that right?

2 A That's my recollection.

3 Q Okay. Now, without telling me the
4 substance of any communications you may have
5 had with counsel, what did you do to prepare
6 for your deposition today?

7 A My preparation for the deposition
8 today comprised reading through the
9 declaration and the cited references to
10 refresh my memory, and just in general recall
11 where things were in the document.

12 Q And did you meet with counsel at all
13 to prepare for today?

14 A Not today, but yes, we had a telecon
15 I believe earlier in the week.

16 Q And who was in attendance?

17 A That would be Nick Stephens, and
18 at times, Chris von Gunten.

19 Q And about how long was that meeting?

20 A I believe it was maybe a couple of
21 hours.

22 Q Okay. You mentioned a few documents

1 you read in preparing for the deposition
2 today. Did you read the Board's Institution
3 Decision in this case?

4 A I did. It was a while ago.

5 Q Okay. And have you read the
6 petition filed by Tesla?

7 A I did; that also was a while ago.

8 Q Okay. And the preliminary response
9 by Patent Owner?

10 A Yes, sir, also a while ago.

11 Q Okay. Up until today, about how
12 many hours have you spent on this matter
13 related to the '474 patent IPR?

14 A I don't actually recall. My
15 declaration was submitted a while ago. I
16 don't even remember the actual date that it
17 was submitted.

18 And I believe that I submitted an
19 invoice, although I'm pretty notorious for not
20 submitting those promptly.

21 Bottom line is I don't have a number
22 for you in my head.

1 Q Do you think it's less than

2 100 hours or more than 100 hours?

3 A I'm reasonably sure it's less than

4 100 hours.

5 Q What about less than 50 hours?

6 A I would be guessing.

7 Q Okay. So you've been offered as a
8 person of ordinary skill in the art with
9 respect to the '474 patent and its invention.
10 Is that right, sir?

11 A Yes, sir.

12 Q And you've offered opinions on the
13 asserted claims in this case; is that right?

14 A Yes, sir.

15 Q Okay. And I'm going to ask you,
16 what does it mean to correlate an input with
17 an instruction set?

18 MR. STEPHENS: Can you furnish at
19 least his declaration to Dr. Janet right
20 now?

21 MR. McCOMMAS: Well, I'd like him to
22 answer the question without his

1 declaration. We'll get into that.

2 MR. STEPHENS: I believe the witness
3 has a right to have his declaration in
4 front of him. That's what the scope of
5 this deposition is over, and I believe
6 you're cross-examining him on his
7 declaration testimony.

8 Is there a reason that you don't
9 want him to have that available to him?

10 MR. McCOMMAS: Yeah, I just want him
11 to give his general testimony first, and
12 then we'll look at his declaration and
13 I'll ask him specifics about his
14 declaration later, but I wanted to start
15 off and get kind of his general thoughts.

16 MR. STEPHENS: I mean, this is
17 highly unusual. I'd really prefer if we
18 could go ahead, and I think it would just
19 be more efficient for everyone involved
20 for him to have that declaration
21 available to him right now.

22 MR. McCOMMAS: I mean, he's read the

1 patents, he's read his declaration.

2 Is there any reason he can't answer
3 the question? Is he refusing to answer?

4 MR. STEPHENS: Is your question
5 outside the context of the patent? Is it
6 outside the context of the testimony in
7 the declaration?

8 I'm not sure what he's supposed to
9 answer.

10 BY MR. McCOMMAS:

11 Q Dr. Janet, are you refusing to
12 answer, or would you go ahead and answer the
13 question?

14 A Counsel, I'm not sure if you were
15 waiting for me to formally ask, but my request
16 is that you furnish me with my declaration
17 before I begin answering any questions.

18 Q Okay. And if I don't provide your
19 declaration, would you go ahead and answer it
20 just not based on your declaration, but based
21 on your opinion as a person of ordinary skill?

22 MR. STEPHENS: Counsel, I object to

1 that procedure. I don't know why you're
2 refusing to provide his declaration to
3 him right now.

4 MR. McCOMMAS: I mean, he's read the
5 patents, he said that -- or he's read the
6 patent, he's read his declaration.

7 MR. STEPHENS: This is not a memory
8 test, Counsel. This is cross-examination
9 on the testimony that he offered in his
10 declaration.

11 Are you going to share the
12 declaration, or are you going to refuse
13 to do so?

14 MR. McCOMMAS: Well, I've asked the
15 question.

16 Dr. Janet, are you going to refuse
17 to answer the question unless I provide
18 your declaration?

19 THE WITNESS: Counsel, my request to
20 you is that you provide me with my
21 declaration before I begin answering any
22 questions, terms related to that.

1 BY MR. McCOMMAS:

2 Q Okay, then I'll go ahead and I'll
3 pull it in.

4 Okay, I've uploaded it in the chat.
5 Why don't you go ahead and take a look at it.

6 We'll mark this as Exhibit 1, and
7 it's Dr. Janet's declaration in the '474 IPR.

8 (Janet Exhibit 1 was marked
9 for identification.)

10 BY MR. McCOMMAS:

11 Q And, Dr. Janet, this is the
12 declaration you submitted in this matter; is
13 that correct?

14 A I'm bringing it up now.

15 Yes, it appears to be.

16 Q So who wrote the declaration you
17 submitted in this case?

18 A Well, this declaration comprises my
19 opinions, and I initiated the drafting of this
20 with major points, and then coordinated with
21 counsel for subsequent revisions.

22 Q And are there parts of this

1 declaration that you recall having written
2 more yourself than you may have relied on the
3 lawyers for?

4 A I don't think it's something that I
5 could necessarily measure. It was written in
6 coordination with counsel. So when I would
7 ask questions or we would visit certain
8 topics -- and, again, I don't remember all of
9 the details because it's been a while -- but
10 then, you know, I would write content or I
11 would ask for excerpts or guidance.

12 So I certainly didn't measure it out
13 that way. I just know that the entirety of
14 the document was written in coordination with
15 counsel, with me starting the initial drafts.

16 Q Now, are there any errors that
17 you're aware of in your declaration?

18 A There are a few. I don't think that
19 they impact my opinion, but I know that I cite
20 incorrectly to, I think the '474 patent, when
21 I meant to cite to Buibas in at least one
22 place, maybe a couple of places.

1 I think I mentioned the '974 patent
2 when I mean the '474 patent.

3 There are a couple of little things
4 where, for example, I might repeat a couple of
5 words in a sentence, like "go on go on," or
6 something to that effect, when I only meant to
7 say it once. Mostly just little things that
8 we'll try to address in an errata.

9 Q Any major errors in your report?

10 A No, sir.

11 Q Okay, let's go back to my previous
12 question.

13 What does it mean to correlate an
14 input with an instruction set?

15 MR. STEPHENS: Objection, form,
16 scope. And, Counsel, to the extent
17 you're referring to the '474 patent,
18 would you be able to furnish a copy of
19 the patent itself?

20 MR. McCOMMAS: Yes, to the extent we
21 refer to that, I will.

22 MR. STEPHENS: You're not furnishing

1 it now? I take it you're not referring
2 to the '474 patent?

3 MR. McCOMMAS: No. I'm just
4 referring to the witness's knowledge
5 generally.

6 MR. STEPHENS: Okay.

7 MR. McCOMMAS: I'm happy to provide
8 the '474 patent now if the witness would
9 like that, but --

10 THE WITNESS: I would like that.

11 MR. McCOMMAS: Okay.

12 (Janet Exhibit 2 was marked
13 for identification.)

14 BY MR. McCOMMAS:

15 Q Okay, we'll mark as Exhibit 2 the
16 '474 patent, which is United States patent
17 11,663,474, and I've entered it into the chat.

18 And, Dr. Janet, when you have
19 downloaded it and confirmed it's the patent,
20 would you please let us know?

21 A Okay, I have it up.

22 Q Okay. And this is the '474 patent,

1 correct, sir?

2 A Yes.

3 Q And I'll ask my question again.

4 What does it mean to correlate an
5 input with an instruction set?

6 MR. STEPHENS: Objection, form.

7 THE WITNESS: If there's something
8 specific that you're referring to in my
9 declaration, or even the '474, I'm happy
10 to visit that.

11 "Correlate" means that the
12 instruction set is related to or can be
13 correlated to the -- in this situation,
14 in the context of the '474, the
15 circumstance representation.

16 BY MR. McCOMMAS:

17 Q So you said it means that the
18 instruction set is related to the input -- or
19 the input is related to the instruction set;
20 is that right?

21 A It's correlated to it.

22 Q Could you describe that a bit more?

1 What do you mean by "correlate"?

2 A You know, I'm happy to look up
3 alternative words for you, but a person of
4 ordinary skill would understand that
5 correlated means correlated.

6 If I have some set of data here, and
7 it is correlated to an output there, then it
8 simply means that it's correlated.

9 Q You said earlier it means related.
10 Does that mean there's a
11 relationship between the two sets of data?

12 A Again, we can look at the dictionary
13 terms, but I don't think that a person of
14 ordinary skill needs any other way to describe
15 what "correlated" means. It's a very common
16 term.

17 If I have a data set here and it's
18 correlated to an output here, or it's
19 correlated to some cluster of data, it's
20 correlated.

21 Q Those two sets of data have a
22 relationship then, a special relationship?

1 MR. STEPHENS: Objection to form.

2 THE WITNESS: They're correlated.

3 BY MR. McCOMMAS:

4 Q Turning back to the '474 patent, can
5 you describe the patent at a high level?

6 A Paragraph 38 I think does a pretty
7 good job of that. I say that, "The
8 '474 Patent generally describes techniques for
9 training devices (e.g., robots) to operate
10 autonomously based on the device's current
11 circumstance. The '474 Patent's background
12 discussion explains that '[d]evices or systems
13 commonly operate by receiving a user's
14 operating directions in various
15 circumstances.'"

16 And then requote, "'Instructions are
17 then executed to effect [sic] the operation of
18 a device or system based on user's operating
19 directions,' and '[h]ence, devices or systems
20 rely on the user to direct their behaviors.'
21 According to the background, '[c]ommonly
22 employed device or system operating techniques

1 lack a way to learn operation of a device or
2 system and enable autonomous operation of a
3 device or system," which the background is
4 inaccurate, but that's what the background
5 says.

6 Going further, "The specification
7 purports to address these problems through a
8 process of user-guided learning of
9 instructions that can be applied to
10 autonomously operate a device. For example,
11 the specification discloses how a device can
12 '[1] learn [] [its] operation in various
13 circumstances, [2] stor[e] this knowledge in a
14 knowledgebase (i.e. neural network, graph
15 sequences, etc.), and [3] enabl[e] autonomous
16 operation of the device.' In some examples,
17 the device learns 'circumstances' based on
18 encoded sensory inputs, correlates the learned
19 circumstances with instruction sets that
20 reflect how a user operated the device in the
21 learned circumstances, and stores the learned
22 circumstances and correlated instruction sets

1 in a knowledgebase. The specification refers
2 to this approach as 'device's circumstances
3 for autonomous device operation,' or 'DCADO,'" which always makes me think of that movie
4 Dodgeball, where you're supposed to dodge,
5 dive, duck, and dodge. I'm not sure why
6 that's twice in the same acronym.

8 But the Figure 32 is in -- or
9 associated with paragraph 39, and it shows the
10 learning steps highlighted in red, and the
11 autonomous operation highlighted in green.

12 Q How are inputs used in the system in
13 the invention of the '474 patent?

14 A Well, a person of ordinary skill
15 knows that an input is a place where or a
16 device through which information flows into a
17 system. It's no different.

18 Q And so what does it mean, then, for
19 an input to be correlated with an instruction
20 set in your own words?

21 A The inputs are what flow through
22 the -- well, the circumstance representations

1 are what flows through the inputs. So it's
2 what's inputted, if you will, into the inputs,
3 and that's what's correlated to the
4 instruction sets.

5 Q What would it mean for an input not
6 to be correlated with an instruction set that
7 wasn't correlated?

8 A It just means that it's not
9 correlated.

10 Q How would you describe that in your
11 own words?

12 A It lacks correlation.

13 Q Could you not use the word
14 "correlation" to define correlation?

15 A Well, correlation is the operative
16 word. Again, we can look up synonyms and
17 antonyms if you'd like to, but a person of
18 ordinary skill uses that word and understands
19 that word.

20 Q And what do they understand that
21 word to mean?

22 A It means correlated.

1 Q So what is the process then for
2 correlating an input with an instruction set?
3 How does that happen?

4 A It can be manifested in a variety of
5 ways, but in the context of the '474, the
6 instruction sets correlated to the
7 circumstance representations occur in a
8 knowledgebase, which the '474 patent states --
9 and I'm reading from footnote 4 on page 44 of
10 my declaration -- "[k]nowledgebase 530 may be
11 or include any data structure or arrangement
12 capable of storing the knowledge of a device's
13 operation in circumstances including objects
14 with various properties' (at least a portion
15 of a circumstance)" representation for
16 correlation with instruction sets.

17 And that's from the '474 patent. I
18 cite to column 101, line 66, through 102,
19 line 29.

20 Q Okay, so I have an input that is not
21 correlated with an instruction set.

22 What is the process, then, for

1 correlating that input with that instruction
2 set?

3 MR. STEPHENS: Objection, form,
4 scope.

5 THE WITNESS: I'm trying to think
6 of -- my concern with answering your
7 question is that there are a lot of ways
8 to interpret how you asked it.

9 Can you I guess maybe be more
10 specific or rephrase a little bit?

11 BY MR. McCOMMAS:

12 Q Sure. So you're familiar with
13 neural networks?

14 A Yes, sir.

15 Q And neural networks can have inputs
16 to them?

17 A Yes.

18 Q So if you have an input that is not
19 correlated with an output or with an
20 instruction set, how would you go about
21 correlating a particular input in a neural
22 network to an instruction set?

1 A Are you speaking generally, or are
2 you speaking in the context of the '474?

3 Q Let's start with just generally.
4 How would you do that?

5 MR. STEPHENS: Objection, form,
6 scope.

7 THE WITNESS: I think that's a very
8 broadly interpretable question, so
9 I think that we're going to have to get
10 more specific about how you would
11 correlate one dataset with, in this
12 situation, an output or an instruction
13 set.

14 BY MR. McCOMMAS:

15 Q So the input, it can be correlated
16 with an output or instruction set, or it can
17 be uncorrelated; is that right?

18 A If it's not correlated, I guess you
19 could say it's uncorrelated, but I'm not
20 really familiar with or it being a term that I
21 would use much.

22 The term "uncorrelated" could also

1 mean that you've broken the correlation.

2 So I think what you're asking is, is
3 it possible for something to not be
4 correlated, but I don't know. I can't tell.

5 Q You used the term "broken the
6 correlation," the phrase.

7 What did you mean by that?

8 A Well, let me just make sure -- back
9 to your previous question. When I say I don't
10 know, I mean I don't know your question.

11 So what did you mean by
12 "uncorrelated"?

13 Q Just not correlated.

14 A Not correlated?

15 Q Yeah, not correlated.

16 A Okay. Anyway, your second question,
17 your most recent one, what was that?

18 Q You said that the term
19 "uncorrelated" could also mean you've broken a
20 correlation.

21 How do you -- so could you break a
22 correlation? If an input is correlated with

1 an instruction set, could you break that
2 correlation somehow?

3 A I'd have to think about that. I
4 know I used that -- I used that term.

5 If something was previously
6 correlated, let's just say an instruction set
7 is correlated to a circumstance
8 representation, and something changes,
9 perhaps, about the device or the sensors or
10 the environment -- which is to say, the
11 circumstance that is being sensed, and then
12 encoded to become a circumstance
13 representation -- if something changes about
14 those, then there's really no longer a
15 correlation.

16 So when I say a correlation is
17 broken, to me it means previously there was
18 one, and then something about any number of
19 aspects of the knowledgebase or the
20 environment that the device is operating
21 changes, then it has gone from previously
22 correlated to somehow not correlated. So

1 that's when I would consider the term "broken
2 correlation" to apply.

3 Q Okay. So how does something go from
4 not correlated, then, to correlated?

5 A For such a very high-level question,
6 I think that the best answer for that again is
7 found in paragraph -- or starting at
8 paragraph 38 in my declaration, which is in
9 the context of the '474.

10 It explains that devices or systems
11 operate by a user's operating directions in
12 various circumstances.

13 The instructions are then executed
14 to affect the operation of a device or system
15 based on the user's operating directions, and
16 hence, devices or systems rely on the user to
17 direct their behaviors.

18 Q So a user -- oh, go ahead.

19 A Well, I mean, I'd be repeating
20 something I already said, but I believe that
21 this overview of the specification, which
22 starts on page 22, paragraph 38, and continues

1 through at least paragraph 41, describes how,
2 in the context of the '474, correlation
3 between instruction sets and the -- I'm sorry,
4 between circumstance representations and
5 instruction sets is established.

6 I didn't mean to cut you off, but I
7 appreciate you letting me reference where that
8 was from.

9 Q So can a user correlate an input
10 with an instruction set?

11 MR. STEPHENS: Objection, form,
12 scope.

13 THE WITNESS: Figure 32 of the
14 '474 patent shows how the system can move
15 through the learning steps, and those
16 learning steps may be guided by a user,
17 which is explicitly described in one of
18 the dependent claims.

19 It may also be guided by or informed
20 by something other than a user.

21 BY MR. McCOMMAS:

22 Q Like what, for example?

1 A Could be another control system. It
2 could be reactionary or supervisory type of
3 control system.

4 Q So correlating an input with an
5 instruction set requires either a user or some
6 other type of control system?

7 MR. STEPHENS: Objection, form,
8 scope.

9 THE WITNESS: From the abstract of
10 '474, the device learns circumstances
11 based on encoded sensory inputs,
12 correlates the learned circumstances with
13 instruction sets that reflect how a user
14 operated the device in the learned
15 circumstances, and stores the learned
16 circumstances and correlated instruction
17 sets in a knowledgebase.

18 And I also cite to '474, column 58,
19 lines 3 through 7. This is in
20 paragraph 39 of my dec.

21 BY MR. McCOMMAS:

22 Q Okay, but that correlating, there it

1 discusses a user doing the correlating; is
2 that right?

3 A It does.

4 Q And you mentioned the only other way
5 to do that would be with some type of other
6 control system. The only other way to
7 correlate an input with an instruction set
8 would be with some other type of control
9 system; is that right?

10 A I wouldn't say that's the only other
11 way. Wherever --

12 Q Go ahead, sorry.

13 A Wherever there's -- did you want to
14 speak?

15 Q Complete your answer. I apologize.

16 A If I'm recalling accurately, in the
17 context of the '474, a user is explicitly
18 called out in dependent claims 51, 47, 56,
19 which suggests to me that the user can provide
20 how the device is operated in the
21 circumstances, and as they depend from the
22 independent claims, their associated

1 independent claims, the user can still satisfy
2 the requirements or limitations of those
3 claims.

4 If it's implied that it's not
5 necessarily a user, but something else, it
6 would still be analogous to a user, and as a
7 person of ordinary skill, that would indicate
8 that it's some sort of supervisory control,
9 that if not by a user, could be automated,
10 could be reflexive, it could be reactive.

11 Q Okay. So correlating an input with
12 an instruction set either needs to be done by
13 a user or some type of control system; is that
14 correct?

15 A You're asking me to provide
16 alternatives to users, and I don't think that
17 I'm necessarily limiting it to a control
18 system.

19 It simply has to be able to provide
20 during the learning steps how the device is
21 operated in the learned circumstances.

22 Q And is there any other way to do

1 that that doesn't involve either a user or
2 some type of control system that you could
3 pick up sitting here today?

4 A I could not rule out something other
5 than a user or a control system.

6 I'm happy to go back through
7 the '474 to see what it provisions, but I
8 believe it's very open about that.

9 Q But sitting here today, you can't
10 think of anything besides a user or a control
11 system that would correlate an input with an
12 instruction set; is that right?

13 A I'm sure I could think of other
14 things.

15 Q But right now you can't?

16 A Well, we could spend quite a bit of
17 time coming up with possibilities, but another
18 possibility is what does the environment do?
19 That's not necessarily a control system.

20 It might be -- let's just say,
21 for example, you're riding down a river, and
22 from your boat, your sensors perceive the

1 environment, the circumstance, and a bend or a
2 tree or a rock is identified as a circumstance
3 representation, and the environment itself in
4 that situation, the natural flow may inform
5 the device how to deal with that kind of
6 circumstance representation.

7 It's not necessarily an internal or
8 supervisory control system. It's something
9 from the environment that informs it.

10 There could easily be other things
11 as well, but that's just one example.

12 Q So how could something from the
13 environment correlate an input in a neural
14 network with an instruction set?

15 A I just gave you an example.

16 Q But could you explain that a little
17 more? I guess I'm confused. How does that
18 work? How is the input correlated with the
19 instruction set, but by the environment?

20 A Well, the input would be the
21 circumstance representation. The circumstance
22 representation in that hypothetical might be

1 some sort of an obstacle or limitations on the
2 path, and the environment in that situation
3 would inform the device that it needs to,
4 for example, turn.

5 Subsequent to that, if that device
6 is, let's just say moving on a lake that's
7 more quiescent, and a similar circumstance
8 representation -- i.e., an obstacle on the
9 water, or a limitation to the boundaries of
10 the lake -- become recognized, that previously
11 learned instruction set of turning would be
12 correlated to the circumstance representation
13 of an impending or limiting boundary or
14 obstacle.

15 Q But didn't the user -- or in the
16 learning mode, didn't the user then perform
17 the correlation?

18 A In what situation are you referring?

19 Q The situation on the river where the
20 boat learned to turn away from the particular
21 rock or impediment, didn't the user -- in
22 learning mode, doesn't the user perform that

1 correlation?

2 A The learning steps are highlighted
3 in Figure 32. First step is receiving a first
4 collection of object representations.

5 Second step is receiving a first one
6 or more instruction sets for operating a
7 device.

8 Third step is correlating the first
9 collection of object representations with the
10 first one or more instruction sets for
11 operating the device.

12 The fourth step is storing the first
13 collection of object representations
14 correlated with the first one or more
15 instruction sets for operating the device.

16 The term "user" is not in this. The
17 hypothetical I gave you did not necessarily or
18 inherently require a user.

19 You had asked me what might there --
20 what other ways -- what alternatives might
21 there be to a user, and I mentioned that one
22 could be there's some supervisory control

1 system, or multiple systems. There could be
2 environmental indicators.

3 It could be in the sense of a
4 genetic algorithm, just simply surviving
5 something through a random process, and
6 learning that you did, and subsequently
7 correlating -- when I say "you," I mean the
8 device. The device realizes that it survived
9 a circumstance representation through just
10 some random process, and it correlates the
11 instruction set to the circumstance
12 representation, and then it files it away.

13 So in our discussion, we've now at
14 least covered four ways that instruction sets
15 and circumstance representations or object
16 representations, whatever you want to call
17 them, are correlated.

18 Q This analysis also applies to inputs
19 being correlated with instruction sets; is
20 that right?

21 A I missed the first part of what you
22 just said.

1 Q So the analysis you just described,
2 that also applies to correlating inputs with
3 instruction sets; is that right?

4 A Yes, with the understanding that
5 those inputs are the circumstance
6 representations. Again, inputs are a place
7 where or a device through which information
8 flows into a system, and the instruction sets
9 can have a broad range to them.

10 So that's the structure or the
11 topology for the system, and the circumstance
12 representations are what produce the
13 instruction sets through that correlation.

14 Q And then just to clarify, so each of
15 the items you described, whether it's the user
16 correlating or there's some type of
17 supervisory control system, there's an
18 environmental indicator, genetic algorithm, in
19 each of those instances, there's processing
20 going on, there's steps happening to achieve
21 this correlation; is that right?

22 A The steps are reflected in Figure 32

1 of the '474 patent.

2 Q But as a part of that figure, as a
3 part of the correlating, depending on the
4 situation, like if the user is correlating,
5 certain processing steps are happening.

6 If there's a control system that's
7 doing the correlating, or genetic algorithm,
8 or environment indicators, there are specific
9 processing steps that are happening, correct?

10 A Could you elaborate on what you mean
11 by "processing steps"?

12 Q Yeah. You know, like, for example,
13 you said -- you described it like a genetic
14 algorithm.

15 So if the device is simply
16 surviving, you know, it may create a
17 correlation between an input and instruction
18 set.

19 Or if a user is training the device,
20 you know, that is going to involve processing
21 steps of, you know, taking the input and,
22 you know, correlating or connecting it with

1 the instruction set.

2 So there are specific processing
3 steps that are involved when you correlate an
4 input with an instruction set; is that right?

5 A If I understand your question
6 correctly, again, the steps are articulated in
7 Figure 32 of the '474.

8 The mechanisms used in those steps
9 include, but aren't limited to, neural
10 networks, as an example.

11 Again, if you look at footnote 4 on
12 page 44, it describes a knowledgebase which
13 may be or include any data structure or
14 arrangement capable of storing the knowledge
15 of a device's operation in circumstances,
16 including objects with various properties.

17 Q Yes, but what I'm saying is, within
18 the correlating of an input with an
19 instruction set, there are specific steps,
20 depending on the mechanism that's used to do
21 that correlating, that take place; is that
22 right?

1 A I don't think I disagree with you.

2 I think that what I described about
3 Figure 32, and also footnote 4, the fact that
4 a data structure or arrangement capable of
5 storing the knowledge shows that there is
6 processing going on even if it's at the
7 simplest level of putting information and
8 observations into a data structure.

9 Q Okay. We've been going for about an
10 hour. Do you want to take maybe a 10-minute
11 break? Is that okay with you, Dr. Janet?

12 A Fine with me. I'm fine if we don't
13 as well.

14 MR. McCOMMAS: Okay, why don't we --
15 actually, then, why don't we take a
16 10-minute break so I can collect my
17 thoughts. Let's go off the record.

18 THE REPORTER: Off the record at
19 10:58.

20 (A break was taken.)

21 THE REPORTER: Back on the record at
22 11:10.

1 BY MR. McCOMMAS:

2 Q Dr. Janet, did you speak with your
3 counsel during the break regarding the
4 substance of your testimony?

5 A No, I did not.

6 Q Okay. Let's turn to claim 45 in the
7 '474 patent, and could you just let me know
8 when you're there?

9 A I'm there.

10 Q And this claim is involved in this
11 IPR, correct?

12 A This claim is what?

13 Q It's involved in this IPR?

14 A Yes.

15 Q And you've offered opinions on this
16 claim in this IPR, correct?

17 A Yes, sir.

18 Q Okay. Could you just read where it
19 says "A first device comprising:" and it says
20 "a knowledgebase." Could you read the
21 knowledgebase limitation out loud?

22 A "A first device comprising: a

1 knowledgebase that includes one or more inputs
2 for inputting at least a portion of a
3 circumstance representation, wherein the one
4 or more inputs are correlated with one or more
5 instruction sets for operating a second
6 device."

7 Q And what's a knowledgebase?

8 MR. STEPHENS: Objection, form.

9 THE WITNESS: Footnote 4, page 44 of
10 my dec, "The '474 patent states that a
11 'knowledgebase 530 may be or include any
12 data structure or arrangement capable of
13 storing the knowledge of a device's
14 operation in circumstances including
15 objects with various properties.'"

16 BY MR. McCOMMAS:

17 Q And what's an input?

18 A As I mentioned before, an input is
19 where or a device that allows information to
20 flow into a system.

21 Q Is it physical?

22 A It can be physical.

1 Q And how is an input used in a neural
2 network?

3 A What kind of neural network are we
4 referring to?

5 Q Just a generic neural network with
6 nodes and connections. How would you use an
7 input in a generic neural network?

8 A Well, Counsel, I would argue that
9 there really isn't a generic neural network.
10 There are lots of different kinds.

11 Is there a topology that you're
12 referring to?

13 Q No. Why don't you pick one that
14 you're familiar with and just describe how
15 inputs are used in that one.

16 A Sure. So let's pick the, to start,
17 neural network from the Buibas reference. And
18 I'm looking, for example, on page 48 of my
19 declaration, Figure 10.

20 Q Yes, go ahead.

21 A The inputs, to borrow your term from
22 your question, for this topology and this

1 architecture, would be, if memory is serving
2 me, those lines I believe labeled 1004.

3 Q So are they the passageways by which
4 information is fed into the neural network?

5 A Yes, that's the where or the device
6 that information flows into the system -- in
7 this situation, the neural network -- and the
8 information in this situation would be the
9 circumstance representation outputted from the
10 encoder 1024.

11 Q And the input is different from the
12 circumstance representation that's inputted
13 into the input; is that correct?

14 A The input in the context of the
15 '474 -- and I mention this in my declaration
16 in reference to the plain language of the
17 element that you just asked me to read -- the
18 input is like a channel through which the
19 circumstance representation flows into the
20 neural network.

21 Q What about an instruction set? How
22 would you define an instruction set?

1 A In the context of Buibas, which is
2 reference 1005, the instruction set would be
3 the commands that would be given to motors and
4 various other components.

5 And I'm looking at, for example,
6 paragraph 74 in my declaration.

7 Q Okay. And so what does it mean here
8 in claim 45 that an input or channel is
9 correlated with instruction sets or commands?

10 A I'm sorry, say that again, please.

11 Q So what does it mean that an input
12 here in claim 45, it says "wherein the one or
13 more inputs are correlated with one or more
14 instruction sets for operating a second
15 device." What does that mean?

16 A Well, a person of ordinary skill
17 would have to look at the phrase just before
18 that where it says that there's "one or more
19 inputs for inputting at least a portion of the
20 circumstance representation."

21 So the inputs are like channels or
22 sockets. Again, a place where or a device

1 through which information flows into the
2 system and the situation in the neural
3 network.

4 The subsequent phrase, "wherein the
5 one or more inputs are correlated with one or
6 more instruction sets for operating a second
7 device," it means that the places, the
8 channels, the sockets, are the conduits for
9 the information that flows that can result in
10 the one or more instruction sets from that
11 system.

12 Q Now, I know we discussed this a
13 little earlier, but how is the correlation
14 done between the input and the instruction
15 set?

16 A How is the -- I'm sorry, say that
17 again.

18 Q How is the correlation done?

19 A Well, I mentioned multiple times now
20 on page 44 that a knowledgebase is a data
21 structure or -- let me be more precise.

22 "[A]ny data structure or arrangement

1 capable of storing the knowledge of a device's
2 operation in circumstances including objects
3 with various properties."

4 So that tells a person of ordinary
5 skill that there are multiple ways of
6 determining the instruction sets as correlated
7 to the inputs.

8 Q Was that what we talked about
9 earlier with the user -- you know, the user
10 could do the correlation, or there are other
11 various means that we discussed earlier.

12 Is that what you're referencing as
13 to how the correlation is done between the
14 input and the instruction set?

15 A When you say "done," what do you
16 mean? Do you mean how is it established, or
17 how is it extracted?

18 Q Let's start with established, and
19 then -- yeah, how is it established first?
20 How is that correlation established?

21 A That correlation is established as
22 shown in Figure 32 on page 23 of my

1 declaration, Figure 32 excerpted or pulled
2 directly from the '474 patent.

3 The learning steps are shown on the
4 left and highlighted in red.

5 First, the system receives a
6 collection of object representations; second,
7 receives a first one or more instruction sets
8 for operating a device; third, it correlates
9 the first collection of object representations
10 with the first one or more instruction sets
11 for operating the device; and fourth, stores
12 the first collection of object representations
13 correlated with the first or one more
14 instruction sets for operating the device.

15 Q I guess I'm asking how is that
16 correlation established? Is it done in memory
17 somehow, or processing steps? How is it
18 established?

19 A The '474 is not specific about that;
20 or said differently, it entertains a very
21 broad spectrum of processing, if you want to
22 call it that, or data storage.

1 But as I mentioned, again from
2 footnote 4, page 44 -- which now I have
3 memorized because we've visited it so many
4 times this morning. I want to be precise
5 here.

6 So knowledgebase that "may be or
7 include any data structure or arrangement
8 capable of storing the knowledge of a device's
9 operation in circumstances including objects
10 with various properties."

11 Q So can an image -- an image can be
12 correlated with an instruction set; is that
13 right?

14 A If that image constitutes a
15 circumstance representation. If that image, I
16 should say, is a circumstance representation
17 in and of itself.

18 Q Okay. And how is that different
19 from an input being correlated with an
20 instruction set in a neural network?

21 A As I mentioned, an input is very
22 simply where -- a place where or a device

1 through which information flows into a system,
2 whether that system is a neural network or
3 something else.

4 What's inputted into it is the -- in
5 the context of the '474 patent -- the fraction
6 of circumstance representations.

7 Q Okay. And when you correlate an
8 input with an instruction set versus
9 correlating that circumstance representation
10 with an instruction set, do you see any
11 differences between those types of
12 correlations?

13 A The circumstance representation is
14 what's inputted. It's what flows through the
15 inputs.

16 And the circumstance representation
17 produces a particular result, la the
18 correlation between the inputs and the
19 instruction sets.

20 Q Let's look at Figure 17 of the
21 '474 patent. Let me know when you turn there.

22 A Okay.

1 Q And can you look at Model A? How
2 would you describe Model A generally?

3 A Counsel, I have a blank pad. I'm
4 just going to write down pages so I can go
5 forth.

6 Q Sure, yeah.

7 A To start, column 56, line 40,
8 Figure 17 is described as "illustrates various
9 artificial intelligence methods, systems,
10 and/or models that can be utilized in the
11 DCADO Unit 100 embodiments."

12 Q Okay. And what is -- go ahead.

13 A Well, I was going to supplement
14 '474's description of Figure 17, if I could,
15 please.

16 On column 103, it says, "Referring
17 to FIG. 17, the disclosed artificially
18 intelligent devices, systems, and methods for
19 learning and/or using a device's circumstances
20 for autonomous device operation may include
21 various artificial intelligence models and/or
22 techniques. The disclosed systems, devices,

1 and methods are independent of the artificial
2 intelligence model and/or technique used and
3 any [new] model and/or technique can be
4 utilized to facilitate the functionalities
5 described herein. Examples of these models
6 and/or techniques include deep learning,
7 supervised learning, unsupervised learning,
8 neural networks (i.e. convolution neural
9 network, recurrent neural network, deep neural
10 network) search-based, logic and/or fuzzy
11 logic-based, optimization-based," and it goes
12 on.

13 So with that in mind, your question
14 was what about Model A?

15 Q Yeah, how would you generally
16 describe Model A?

17 A Model A is described also in
18 column 103 in the '474 patent.

19 It says "In one example shown in
20 Model A, the disclosed artificially
21 intelligent devices, systems, and methods for
22 learning and/or using a device's circumstances

1 for autonomous device operation may include a
2 neural network (also referred to as artificial
3 neural network). As such, machine learning,
4 knowledge structuring or representation,
5 decision making, pattern recognition, and/or
6 other artificial intelligence functionalities
7 may include a network of Nodes 852 (also
8 referred to as neurons) and Connections 853
9 similar to that of a brain. Node 852 can
10 store any data, object, data structure, and/or
11 other item, or reference thereto. Node 852
12 may also include a function for transforming
13 or manipulating any data, object, data
14 structure, and/or other item. Examples of
15 such transformation functions include
16 mathematical functions (i.e. addition,
17 subtraction, multiplication, division, sin,
18 cos, log, derivative, integral, etc.), object
19 manipulation functions (i.e. creating an
20 object, modifying an object, deleting an
21 object, appending objects, etc.), data
22 structure manipulation functions (i.e.

1 creating a data structure, modifying a data
2 structure, deleting a data structure, creating
3 a data field, modifying a data field, deleting
4 a data field, etc.), and/or other
5 transformation functions. Connection 853 may
6 include or be associated with a value such as
7 a symbolic label or a numeric attribute (i.e.
8 weight, cost, capacity, length, etc.). A
9 computational model can be utilized to compute
10 values from inputs based on a pre-programmed
11 or learned function or method. For example, a
12 neural network may include one or more input
13 neurons that can be activated by inputs.
14 Activations of these neurons can then be
15 passed on, weighted, and transformed by a
16 function to other neurons."

17 Going on, "Neural networks may range
18 from those with only one layer of single
19 direction logic to multi-layer of
20 multi-directional feedback loops. A neural
21 network can use weights to change the
22 parameters of the network's throughput. A

1 neural network can learn by input from its
2 environment or from self-teaching using
3 written rules."

4 Q Okay, so just hang on one second
5 there. So 853 in Figure 17, those are
6 connections; is that right?

7 A Yes.

8 Q And 852, those are nodes, right?

9 A Correct.

10 Q Now, you mentioned when you were
11 reading from the patent a weight.

12 What is a weight?

13 A In column 104, starting at line 10,
14 "Connection 853 may include or be associated
15 with a value such as a symbolic label or
16 numeric attribute."

17 Q So it's a numeric attribute?

18 A It could have a symbolic label as
19 well.

20 Q Numeric attribute or symbolic label?

21 A That's how the '474 defines it.

22 Q How would you define a weight?

1 A Well, given that we're analyzing the
2 '474 patent against prior art, I would define
3 it the way that it's defined in the '474.

4 Q Is that just a number?

5 A That's one way of doing it. When
6 you say "a number," you mean a scalar of some
7 sort?

8 It could be a symbolic label, which
9 could be like a tag, if you will, and that tag
10 may carry certain weight.

11 Q Okay. And then it says here in
12 line 10 of column 104 of the patent,
13 "Connection 853 may include or be associated
14 with a value." And so a weight is a value?

15 A I missed the beginning part. Maybe
16 you might be a little low for your microphone,
17 I'm not really sure, but some of the things
18 are getting kind of merged, yeah, when you --

19 Q Yeah.

20 A Your words are kind of --

21 Q Can you hear me now?

22 A Yes.

1 Q Okay. So in column 104, line 10,
2 the patent says "Connection 853 may include or
3 be associated with a value such as a symbolic
4 label or numeric attribute (i.e. weight)."

5 So my question is, a weight is a
6 value; is that correct?

7 A That's how it's defined here,
8 "Connection 853 may include or be associated
9 with a value such as a symbolic label or
10 numeric attribute (i.e. weight, cost,
11 capacity, length, etc.)"

12 Q And this says that the connection
13 may be associated with the value or the
14 weight; is that right?

15 A That's how it reads, yes, sir.

16 Q Yeah. What does it mean that a
17 weight is associated with a connection in a
18 neural network?

19 A The '474 is very inclusive about not
20 just the types of neural networks, but the
21 parameters and topologies and activation
22 functions associated with them, and that would

1 include the term "weight."

2 And the term "associated," from the
3 perspective of a person of ordinary skill, and
4 again, context of the '474, means that there
5 is a value that's associated with related to
6 that connection.

7 Q And that value is a weighed value?

8 A It can include a value, such as a
9 symbolic label or numeric attribute; i.e.,
10 weight, cost, capacity, length, et cetera.
11 There's no end to that list as far as I can
12 tell.

13 Q Okay. And how are weights used in
14 neural networks?

15 A It depends on the type of neural
16 network. I'm curious if you have a specific
17 neural network in mind, and we can visit how
18 the weight is used.

19 Q Let's just take Model A from
20 Figure 17. How would weights be used in that
21 particular neural network?

22 A So, Counselor, Model A is described,

1 at least in column 103, and bleeds over into
2 104. Column 103, line 56, through 104,
3 line 27.

4 No place in those paragraphs do I
5 see how a particular -- a specific
6 implementation of weight for Model A.

7 It's very inclusive. There are lots
8 of ways in which weights can be used in a
9 neural network.

10 Q Would you describe one?

11 A Sure, but I just want to make very
12 clear for the record that this is just one
13 example, and you're asking me to fill in or be
14 more specific than the '474 patent is, like
15 significantly more specific.

16 So one way in which a weight might
17 be used in a feed-forward neural network would
18 be that if my circumstance representation has
19 a value of 5, the weight for that particular
20 connection might be a simple scalar multiple,
21 let's just say 2.

22 That means that the output of that

1 input value, multiplied by that scalar weight
2 example, would be 10 as it's being inputted
3 into the neuron.

4 The neuron has an activation
5 function, and that would be one of potentially
6 many values that would be fed to that
7 activation function.

8 Q So the weight would be used to
9 determine a value that is fed to an activation
10 function? Is that accurate in that instance?

11 A The word "determine" might not be my
12 first word of choice.

13 That weight may modify the value
14 inputted and produce a, for lack of a better
15 word, weighted value that is fed into the
16 neurons; in this situation, activation
17 function.

18 Q Okay. So you're familiar with
19 neural networks, correct, sir?

20 A Yes, sir.

21 Q And neural networks can have a
22 combination of nodes and layers; is that

1 right?

2 A Yes, sir.

3 Q Now, if I take the weights from the
4 connections in one layer, and then take some
5 weights from a second layer in a neural
6 network and put them in a vector, that's a
7 weight vector, correct?

8 A I confess that I am having a very
9 difficult time visualizing what you are
10 describing.

11 You're taking weights from one layer
12 and combining them with weights in another
13 layer?

14 Q Into a single vector, yes. That
15 would be a weight vector, correct?

16 A Can you point to where in '474 or my
17 declaration where I describe anything like
18 that, or where '474 describes anything like
19 that?

20 Q Well, maybe I'll just ask that level
21 of generality.

22 Are you familiar with the concept of

1 a weight vector?

2 A Well, the term is used, but it can
3 describe multiple things.

4 Q And we've established that a weight
5 is a value, correct, or can be a value; is
6 that right?

7 A Well, weight can be a value, yes.

8 Q Okay. And what is a vector?

9 A A vector would be an array or matrix
10 or a set of values or symbols.

11 Q So a weight vector would just be an
12 array or set of weight values, right?

13 A I wouldn't say inherently, no.

14 Can you draw up what you're trying
15 to get at, or perhaps show me on the -- show
16 me a graphic.

17 Q Well, let's just in the abstract
18 just one more time maybe try to get it.

19 A vector -- let's just say you have
20 a vector with one row and one column, and
21 there are values in that vector that are
22 weighed values. That's a weight vector,

1 correct?

2 A I'm going to hesitate to answer that
3 question.

4 Can you please draw or point to an
5 example here to be sure I'm following what
6 you're asking?

7 Q Yeah, I'll do that in a little bit,
8 but I just want to get -- is there anything
9 about that particular vector that I've just
10 described that would make it not a weight
11 vector?

12 A In the context of neural networks,
13 yes. There are lots of ways in which that's
14 not a weight vector.

15 Q Okay. A vector full of weight
16 values -- so you're testifying that a vector
17 full of weight values is not a weight vector?

18 A In the context of a neural network,
19 which I think is where you're mapping this,
20 that's not inherently a weight vector.

21 I think what you're getting at is
22 this. If I have a matrix of what you're

1 calling weights, I don't know anything other
2 than that's a matrix of -- let's just say it's
3 filled with nothing but numerical values.

4 I know nothing about the topology of
5 the neural network from that; I know nothing
6 about the activation functions; I know nothing
7 about feedback, which might need to be assumed
8 if it's something other than just a pure feed
9 forward type of architecture.

10 So I cannot tell just from looking
11 at a matrix or an array what those weights
12 mean and how they fit into a neural network.
13 I would need to have other information.

14 Q Okay, that's helpful.

15 Are you familiar with retraining of
16 neural networks, sir?

17 A Yes.

18 Q What does that involve?

19 A Well, again, there are several ways
20 of doing this, and as far as I can recall,
21 the '474 is very broadly inclusive if and
22 where it addresses that.

1 Q Okay, but how would one retrain a
2 neural network?

3 A Well, as I mentioned before, there
4 are several ways in which that can happen. So
5 is there something specific in the '474 or my
6 declaration that you want to focus on?

7 Q We'll get to that, but maybe just
8 describe one of the ways in which -- I'm just
9 trying to start at a general level.

10 What is one of the ways you could
11 retrain a neural network?

12 A Retraining a neural network means
13 providing, most likely, in the context of the
14 '474, circumstance representation data and the
15 correlated instruction sets.

16 Q So you provide them, and then you --
17 so you're retraining a network, and you're
18 providing instruction sets that are correlated
19 with circumstance representations?

20 Is that retraining the network?

21 A I hesitate to say yes because
22 I think that you're oversimplifying it.

1 Q But generally that's how you retrain
2 a neural network?

3 A Even there, I would hesitate to
4 agree, upon reflection, that's how you train a
5 neural network.

6 If you retrain a neural network,
7 you're still training a neural network. The
8 process would be the same. Whether you start
9 with a certain set of knowledge or start with
10 no knowledge, the process is generally the
11 same.

12 It's how are those knowledgebase
13 values or symbols, or whatever is in the data
14 structure or stored, tuned from their initial
15 start.

16 Q And that process of training is just
17 a process of -- you know, that's just the
18 learning process of -- actually, strike that.

19 That process of training and
20 retraining you said are similar, correct?

21 A They can be. Again, I would argue
22 that not categorically.

1 Q Does retraining a neural network
2 take resources?

3 A Such as?

4 Q Time, you know, processing power.

5 A Well, a person of ordinary skill
6 would know that if you are even doing
7 something as simple as updating a memory
8 location, that that will consume resources.

9 Q So retraining will consume
10 resources?

11 A It depends on how you're defining
12 "retraining."

13 Again, I request humbly that if you
14 are referring to or would like to visit
15 anything in my declaration, the '474 patent,
16 or any other reference that's been utilized
17 here, I'm happy to go there and we can deal
18 with something more specific.

19 Q Okay, but you've been using the word
20 "retraining," and I've been using it. I just
21 want to make sure you answer the question, and
22 we'll get into the specifics of some of the

1 patents in a minute, but at a generic level,
2 retraining a neural network takes resources,
3 based on your understanding of the word
4 "retraining"?

5 A And based on my understanding of
6 your use of the word "resources," yes.

7 MR. McCOMMAS: Let's mark as
8 Exhibit 3 the Buibas reference. I'll put
9 it in the chat.

10 (Janet Exhibit 3 was marked
11 for identification.)

12 BY MR. McCOMMAS:

13 Q Just let me know, Dr. Janet, when
14 you have it and we can proceed.

15 A Yes, I believe I have it up.

16 Q Can we look at Figure 1? If you go
17 to Figure 1 of the Buibas reference.

18 A Yes.

19 Q And just generally, what are we
20 looking at here, Dr. Janet?

21 A The brief description of Figure 1 is
22 at paragraph 25 in the Buibas reference. It

1 says Figure 1 is a "functional block diagram
2 of one exemplary artificial spiking neural
3 network consistent with one or more
4 implementations."

5 In more detail --

6 Q That's okay, you don't need to read.
7 What is 102 here in this figure?

8 A 102 is described in a couple of
9 different places in this reference, starting
10 in, I believe, paragraph 74.

11 It says "A typical artificial
12 spiking neural network, such as the network
13 100, shown for example in FIG. 1, includes a
14 plurality of units (or nodes) 102, which
15 correspond to neurons in a biological neural
16 network. Any given unit 102 may receive input
17 via connections 104, also referred to as
18 communications channels, or synaptic
19 connections. Any given unit 102 may further
20 be connected to other units via connections
21 112, also referred to as communications
22 channels, or synaptic connections."

1 Q Okay. Let's look at Figure 4 of
2 Buibas. Let me know when you're there.

3 Okay, and could you describe this
4 figure at a high level, sir?

5 A Figure 4 is described in this
6 reference under the section entitled "Network
7 Merges" starting paragraph 94.

8 "In some implementations, the
9 network lifecycle may comprise network weight
10 updates comprising two or more resources, also
11 referred herein to as 'merges.'.

12 "In one or more implementations,
13 such as the merge 400 illustrated in FIG. 4,
14 the 'offspring' network configuration (e.g.,
15 the weight vector W) 408 may be obtained using
16 two parent weight vectors 402, 406 combined
17 via an operation 404."

18 Paragraph 96, "In some
19 implementations, the network merge may
20 comprise non-interleaved combination as
21 illustrated by the merges 430 in FIG. 4, where
22 the parent A provides the portion 432 and the

1 parent B provides the portion 434 to the
2 off-spring 436. In some implementations (not
3 shown), the portion 432 may comprise the same
4 number of weights as the portion 434. The
5 non-interleaved network merge, such as
6 illustrated in FIG. 4, may be used, for
7 example, to combine capabilities of two (or
8 more) parents or to add a capability to one of
9 the parent network."

10 Q Okay. So what is A in this figure?

11 A As mentioned in paragraph 96,
12 Parent A provides the portion 432, and
13 Parent B provides the portion 434.

14 So A, to your question, would be the
15 parent, Parent A to be specific.

16 Q Is that a weight vector? A is a
17 weight vector?

18 A Paragraph 95 says, "In one or more
19 implementations, such as the merge illustrated
20 in FIG. 4, the 'offspring' network
21 configuration (e.g., the weight vector W) 408
22 may be obtained using two parent weight

1 vectors 402, 406 combined via an operation

2 404."

3 Q So A and B are weight vectors?

4 A It's just given as an example.

5 Q Okay. Let's look at paragraphs 97

6 through 98 of the reference. Are you there?

7 A I'm there, yes.

8 Q Now, what operations can be

9 performed on these weight vectors as shown in

10 these paragraphs?

11 A Paragraph 97 reads that "various

12 operations 404 of FIG. 4 may be used to

13 produce contributions by one or more parent.

14 In one or more implementations, the off-spring

15 weight vector may be determined by combining

16 the traits from parent A and parent B are

17 combined as follows:" And equation 3

18 describes what looks to be an oring function.

19 Paragraph 98 says, "In one or more

20 implementations, the off-spring weight vector

21 may be determined by determining traits in the

22 parent B that are not in parent A and adding

1 these to the parent A as follows:" And
2 equation 4 appears to be what's referred to as
3 an anding function.

4 Q Okay. And again, your understanding
5 is a weight vector is a vector of weights, of
6 weight values; is that correct?

7 A The weight vector from Buibas, W is
8 described as -- in this image, this array, for
9 lack of a better word, of either values or
10 what may be symbols.

11 Q But they're numerical -- this array
12 is going to store numerical values?

13 A Pardon me?

14 Q The array that you see here in
15 Figure 4 is going to store -- each of these
16 arrays, A and B, are going to store numerical
17 values?

18 A Paragraph 89 says, "In one or more
19 implementations, the efficacy vector may
20 comprise a vector of trained network
21 connection weights W (expressed in a fixed or
22 floating point format) which are used during

1 the network update/merge. In some
2 implementations, the neuron state information
3 may be updated/transferred as well."

4 That being said, it says "in one or
5 more implementations," and a person of
6 ordinary skill would know that a weight could
7 also be a symbol. It doesn't have to be a
8 numerical value necessarily.

9 Q Could you give an example of the
10 symbol?

11 A A symbol could be, let's just say a
12 plus sign or an X, or fraction of a scene, or
13 something to that effect.

14 And if you're doing logical
15 functions like anding and oring, you would see
16 if there's one or the other, or if they both
17 match, which would be the anding.

18 Q Okay. And how would you or two-way
19 vectors together? How would that work?

20 A Lots of ways to do it. Two examples
21 are provided here. There are lots of other
22 logical functions.

1 There are also lots of other
2 topologies that you might extract portions of
3 the neural network and move to another neural
4 network. "Grafting" is another term.
5 "Pruning" is a term.

6 If I were to do a graft,
7 for example, I would use -- and this was done
8 for my Ph.D., my dissertation -- I would pull
9 a portion of that neural network. That
10 portion would include, let's just say a neuron
11 and synaptic weights, biases, activation
12 functions, topology, and I would fold that
13 into another neural network, and I would get a
14 different means of correlating input values to
15 output, in this case, in the context of '474,
16 instruction sets.

17 I was doing that in the '90s.

18 Q So you could extract a portion of a
19 neural network and fold that into another
20 neural network and -- I'm sorry, can you
21 explain that process again?

22 I don't understand how you're --

1 you're extracting a weight vector from a
2 neural network? What are you extracting
3 exactly?

4 A Let's unpack that for a second.

5 First of all, you can unpack -- you
6 can pull a weight vector, but that weight
7 vector is not going to tell you much about
8 that neural network. It's just going to be a
9 block of values.

10 Unless that neural network is
11 identical, the topology doesn't change, or
12 something to that effect, that weight vector,
13 for lack of a better word, is not going to
14 give you critical information that you would
15 need to know how it gets folded in.

16 Back to what I was describing, and
17 I'm just using this as an example, and, you
18 know, we're kind of drifting off the
19 references and the declaration, but I can tell
20 you what I did during my Ph.D., and for
21 software that came from this that was used in
22 industry and academia, is it gave the user the

1 ability to -- when I say "extract," I mean you
2 copy the feature of that neural network, and
3 it could be a subtopology.

4 The neurons might have, you know,
5 different activation functions, depending on
6 where they are in the neural network, and they
7 may have different receptors or these synaptic
8 weights, sometimes described as retinal
9 fields, and they may also have a bias. There
10 are lots of aspects to that.

11 But let's just say I want to -- in
12 the spirit of '474, I want to be able to drag
13 and drop. '474 describes references using
14 LabVIEW and some of the iRobot Lego type --
15 LEGO Mindstorm, I think. So the drag-and-drop
16 nature of this would be similar for when you
17 pull a fraction of a neural network into
18 another neural network.

19 I want what that neural network
20 portion or fraction learned to do well to now
21 be part of a, quote/unquote, knowledgebase
22 that's in the network that received it.

1 Q Okay. And so when you pull those
2 weights out, you describe them as a means of
3 correlating input values to output values or
4 instruction sets.

5 So the weights are used in that
6 process; is that correct?

7 A If I pull weights only, it's a
8 mystery what that would do. You can't just
9 pull the weights.

10 You have to understand the topology,
11 you have to understand the activation
12 functions.

13 If I pull all of that over, then I
14 can bring into my neural network a trained
15 system or subsystem to perform a particular
16 function or to yield an instruction set based
17 on the received circumstance representation
18 data.

19 Q So you have inputs, you have
20 weights, you have instruction sets, and you
21 also have this additional information that you
22 would require, all of these are different, but

1 you would require that to -- what did you just
2 say -- to perform a particular function to
3 yield an instruction set; is that right?

4 A Yes. I'm folding in something
5 that -- grafting in, whatever you want to call
6 it -- a neural network, subneural network,
7 aspect of a neural network, just in this
8 example, where it is already, let's just say
9 reasonably tuned to yield an instruction set
10 based on the input circumstance representation
11 data that it receives.

12 Q Yeah. And you say the weights would
13 not be enough, which you would need additional
14 information to yield that instruction set; is
15 that right?

16 A Yes. I would need to know the
17 topology, the activation functions, how these
18 weights interrelate.

19 I mean, even the description in
20 Buibas and '474 describe -- even referring to
21 one figure, but then describing all the
22 different potential permutations of that

1 figure that aren't in the drawing, it's just
2 very clear there are lots of topologies.

3 And so if I get an array of values,
4 that's not enough. I'd need to know the
5 topology, the activation functions, feedback,
6 biases, et cetera.

7 Q To arrive at the instruction set,
8 right?

9 A Well, to contribute to arriving at
10 the one or more instruction sets.

11 Q Okay. And you're familiar with the
12 Grotmol reference, correct, sir?

13 A Yes, sir.

14 Q Okay. I'll mark as Exhibit 4 the
15 Grotmol reference.

16 (Janet Exhibit 4 was marked
17 for identification.)

18 BY MR. McCOMMAS:

19 Q I've placed it into the chat, and
20 when you have it open, if you can take a look
21 and just confirm that this is the Grotmol
22 reference, which is, I'll just say for the

1 record, U.S. patent number 9,604,359.

2 And then just I'm not sure if I read
3 the number for Buibas, but I'll just say the
4 Buibas reference we just discussed is
5 U.S. Patent Application Publication No.
6 2014/0089232.

7 Let us know when you have the
8 Grotmol reference open and ready.

9 A I have it.

10 Q Okay. Let's turn to Figure 10A.
11 Can you describe just -- and maybe use your
12 own words this time.

13 What is Figure 10A showing?

14 MR. STEPHENS: Counsel, we've been
15 on the record for about an hour and
16 20 minutes.

17 I think we're okay to go a little
18 while longer, but I just wanted to see if
19 you would like to take a break soon.

20 Dr. Janet, are you doing okay, or
21 how are you doing in terms of a break?

22 THE WITNESS: I'm doing fine. Yeah,

1 I can work with whatever schedule you
2 want.

3 MR. McCOMMAS: Yeah, we probably
4 have about 20 more minutes of questions,
5 and then we can stop for a bit. So if we
6 can go another 20 minutes?

7 MR. STEPHENS: That's okay with me.
8 Is that okay, Dr. Janet?

9 THE WITNESS: Yes, that works for
10 me.

11 BY MR. McCOMMAS:

12 Q Okay, great.

13 Actually, strike that question.

14 Can you just tell me where in
15 Figure 10A Grotmol discloses one or more
16 inputs as required by claim 45?

17 A So this collection of figures, 10A
18 through 10B, per Grotmol, column 5, line 56,
19 is described as illustrating the "BrainOS
20 system comprising action selection mechanism
21 according to one or more implementations."

22 Q So I see here on the left side of

1 10A there's sensory input going into the
2 feature extractors.

3 Are those the inputs, the one or
4 more inputs in Grotmol, or how would you
5 describe the one or more inputs in this
6 figure?

7 A In paragraph 115 of my declaration,
8 I point out that "[t]he adaptive controller
9 includes an 'interface' (one or more inputs)
10 configured to receive a selected set of 'input
11 features' (also referred to as 'context')
12 extracted from 'sensory input' (at least a
13 portion of a circumstance representation)."

14 Q Let's look at Figure 15 of Grotmol.
15 Let me know when you get there.

16 A Okay, I'm there.

17 Q So in your own words, what is this
18 figure showing?

19 A This figure is also in my
20 declaration on page 114, and it shows a
21 knowledgebase for a random K-nearest neighbors
22 process in an adaptive controller.

1 Q And what are the X values here?

2 What do they represent?

3 A From Grotmol, "For a given time
4 instance, the inputs X1, X2, Xs, in rows 1502,
5 1532, 1562, respectively, may be produced
6 using a respective plurality of input features
7 (e.g., the input 1402 in FIG. 14). Rows 1518,
8 1548, 1578, may denote data pairs (x,y)
9 corresponding to classifier operation
10 configured to produce a predicted output yp
11 based on occurrence of the input Xo," or
12 X sub-zero.

13 Q So X is the input; is that right?

14 A X is a place where a device through
15 which information flows into the system.

16 And in this situation, the
17 information flowing would be a circumstance
18 representation, and the K-nearest neighbors
19 would be where the nearness is measured in a
20 variety of, quote, distance functions. That
21 could be Euclidean distance, that could be
22 percent of match, it could be the Mahalanobis

1 distance. There are a variety of things.

2 Q So this figure shows X -- or inputs
3 X correlated with instruction sets Y; is that
4 right?

5 A Yes. If you look at, again on
6 page 114, the Figure 15 I have annotated, and
7 it says "'instruction sets' correlated to
8 inputs of the RKNN adaptive controller."

9 Q So is X1,1 then correlated to Y1?
10 Is that what this is showing?

11 A That is basically what that's
12 showing, yes.

13 MR. McCOMMAS: We can go off the
14 record.

15 THE REPORTER: Off the record at
16 12:37.

17 (A break was taken.)

18 THE REPORTER: Back on the record at
19 12:44.

20 MR. McCOMMAS: I have no further
21 questions for the witness.

22 MR. STEPHENS: And Petitioner has no

1 questions for the witness.

2 MR. McCOMMAS: Okay, we can go off
3 the record.

4 THE REPORTER: Off the record at
5 12:45.

6 (Whereupon, at 12:45 p.m., the
7 taking of the deposition was
8 concluded. Reading and signature
9 were RESERVED.)

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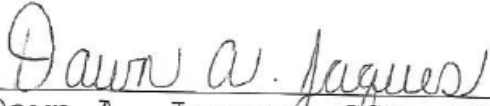
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