

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

AUTONOMOUS DEVICES, INC.,
Patent Owner.

IPR2024-00745
Patent 11,663,474 B1

Record of Oral Hearing
Held: July 31, 2025

Before TERRENCE W. MCMILLIN, STEVEN M. AMUNDSON, and
RUSSELL E. CASS, *Administrative Patent Judges*.

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The above-entitled matter came on for hearing on Thursday, July 31, 2025, commencing at 1:00 p.m., via video teleconference.

P R O C E E D I N G S

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JUDGE CASS: It's 1 pm Eastern Time, so let us begin. This is the oral hearing in IPR2024-00745, Tesla Incorporated versus Autonomous Devices. I am Judge Russell Cass, and with me on the panel today are Judges McMillin and Amundson.

Could we now have an identification from each side of who is present. Petitioner's counsel, please go first?

MR. RENNER: Thank you, Your Honor. My name is Karl Renner, I'm joined in the room by Nicholas Stephens and Chris von Gunten. Also, (INDISCERNIBLE - TECHNICAL DIFFICULTY) --

JUDGE CASS: Sorry, Counsel, we're having some connection issues of some sort, I can't hear you very well, and your video is a bit jerky.

MR. RENNER: My apologies, Your Honor. We'll work on that for a moment.

UNIDENTIFIED MALE SPEAKER: Maybe it's that right there.

MR. RENNER: One second, Your Honor, please. We have our technology person here.

JUDGE CASS: All right. It seems like it might be getting better now.

MR. RENNER: Yeah. I can see you all again. Can you see me?

JUDGE CASS: Yes, that seems better.

MR. RENNER: Oh, terrific. Thank you.

JUDGE CASS: Okay. Mr. Renner, go ahead.

MR. RENNER: My apologies. This is Karl Renner. I'm joined in the room by Nick Stephens and Chris von Gunten, also from Fish & Richardson. And also, on the phone, Paul Margolis from Tesla.

1 JUDGE CASS: All right, terrific. Now, let's have counsel for
2 Patent Owner.

3 MR. JAIRAM: Good afternoon, this is Arvind Jairam from
4 McKool Smith on behalf of Patent Owner, Autonomous Devices. I'm joined
5 remotely by my colleague, Scott Hejny, and also on the public line is client
6 representative, J. Cosic from Autonomous Devices.

7 JUDGE CASS: All right. And, Counsel, this isn't a huge problem,
8 but you are a little blurred so you might want to have your IT folks look at
9 that.

10 MR. JAIRAM: Is that to me, Your Honor?

11 JUDGE CASS: Yes, to you.

12 MR. JAIRAM: Okay. If you could give me just one quick minute,
13 I have to step out of the room to grab an IT person. Is that okay?

14 JUDGE CASS: Yes. Yes, go ahead. Okay. And you're not going
15 to be arguing for a while so I think it should be fine if you can -- if that's
16 okay with you, if you can work on that while we let Petitioner proceed with
17 their case?

18 I think you may be muted.

19 MR. JAIRAM: Thank you, Your Honor. I can try switching to a
20 different camera. Let me see if that might be --

21 JUDGE CASS: Yeah. I mean, if you can't it's -- yeah, that does
22 seem clearer. Yes, that's definitely clearer.

23 MR. JAIRAM: Okay. I will do that. Thank you, Your Honor.

24 JUDGE CASS: All right. So, did you finish your announcement
25 of counsel?

26 MR. JAIRAM: Yes, Your Honor.

27 JUDGE CASS: All right. Well, with that, we'll now begin. In our

1 hearing order, we stated that each party would have 60 minutes of time to
2 present argument. As far as the order of presentation goes, Petitioner will
3 proceed first, followed by Patent Owner's response. Petitioner then may use
4 any of its remaining time for rebuttal to respond to Patent Owner's
5 arguments. And then, finally, Patent Owner may use any of its remaining
6 time for sur-rebuttal, responding to Petitioner's rebuttal arguments.

7 A few reminders before we begin. There is, I believe, a public line
8 for this case. We're not aware of any confidential information that may be
9 discussed, but if that's not the case, please speak up. When you're arguing,
10 please speak slowly, and if you hear another voice, such as one of the
11 judges, please stop so that we don't talk over each other. If either party
12 believes that the other party is making an improper argument, such as a new
13 argument that was not made in the briefs, please raise that issue during your
14 own presentation and do not interrupt the other party's presentation. I will
15 keep time and can give you a warning when you've gone into rebuttal time if
16 you would like. We've also received the parties' demonstrative exhibits and
17 are able to view them on our screens. To ensure that the transcript is clear
18 and everyone can follow along, please refer to your demonstratives as slide
19 numbers as you're going through them.

20 Are there any questions from the parties before we begin?

21 MR. RENNER: No questions here, Your Honor.

22 JUDGE CASS: All right. Let's go back to you, Mr. Renner. How
23 much time would you like to reserve for rebuttal?

24 MR. RENNER: I'll reserve 20 minutes, please.

25 JUDGE CASS: All right. I'll put 40 minutes on the clock here,
26 and you may begin when ready.

27 MR. RENNER: Terrific. Good afternoon, Your Honors. I'm Karl

1 Renner for Petitioner, Tesla. May it please the Board.

2 At the outset, and before my colleague, Nick Stephens, addresses
3 the particulars of several features that are in dispute in the prior-art related
4 disclosures, I wanted to call attention to just two aspects of this case I felt
5 were particularly noteworthy, and the first relates to the motion to amend
6 that is pending.

7 Through its amendments, Patent Owner added a host of new
8 features to the claims, and that's not atypical, nor is it impermissible, but not
9 found in the amendment, so the very features that are being advanced by the
10 Patent Owner to distinguish the grounds set forth in the Opposition.

11 To this point, Patent Owner does not argue that the combination in
12 the Opposition fails to render obvious location or size, the terms that are
13 included within the amended claims. Instead, the Patent Owner's arguments
14 contend that the location and size contemplated in the combination are not
15 an actual, real-world location or size. In doing so, Patent Owner focuses its
16 arguments on unrecited claim terms, the unrecited modifiers "actual" and
17 "real world" of the recited location and size. And this gets more peculiar
18 when you consider the timing of the arguments where these came in.

19 The Patent Owner first offered this argument in response to the
20 preliminary guidance that was offered by Your Honors. And at that time,
21 the Patent Owner has, as you know, two choices. It can either file a revised
22 motion to amend, in which case it can offer additional or different
23 amendments, or it can reply to the actual preliminary guidance and the
24 arguments that were made by the Opposition, and in doing so, stick with the
25 amendments that were introduced by the original motion to amend. It chose
26 to forego introducing further terms by amendment. And yet, at the same
27 time, it chose to argue terms that were not set forth in the original

1 amendments.

2 There's two problems that flow from this. First, because the only
3 claims introduced by the Patent Owner in its motion to amend omit the
4 modifiers of location and size, Patent Owner's arguments fail, and the
5 motion should be denied. To this point, the Opposition sets forth a credible
6 basis with the obviousness of the claims that were set forth in the motion to
7 amend. The credibility of that combination was acknowledged, albeit
8 preliminarily, by the guidance, and it stands unrebutted.

9 Second, even if Patent Owner's motion to amend claims were
10 credited with relied upon and actual, real-world limitations as a modifier of
11 the recited location and size, they remain obvious in view of the applied
12 combination, and this is apparent from disclosures found within the Zhu
13 reference, which was cited in the Opposition before even these arguments
14 were there, but neither acknowledged nor distinguished by Patent Owner.

15 The second observation relates to the original (INDISCERNIBLE -
16 TECHNICAL DIFFICULTY) claims, and this what my colleague is going to
17 begin his presentation on. You'll notice the Patent Owner focuses his
18 attention on just two claims, 56 and 57, in its attempt to distinguish these
19 claims from the applied combination. In that attempt, the Patent Owner
20 devotes a lot of attention to the recited correlations between claimed inputs
21 and the claimed instruction sets. Again, nothing unusual as it relates to this,
22 it's just claim limitations being advanced.

23 But in confronting Patent Owner's arguments regarding these
24 terms, we've been struck by the correspondence, not only between the
25 subject matter disclosed by the prior art and these claim terms, but also by
26 the correspondence between the prior art and the very subject matter that
27 was set forth in the '474 Patent relating to these and supporting these claim

1 terms.

2 This becomes all the more important when you consider that those
3 claims, 56, 57, they weren't original claims; that is, those claims were not
4 introduced as part of the originally filed application; they were instead
5 introduced by amendment later on, so we know that they have to be
6 supported by the specification. And as my colleague will detail, the '474
7 disclosure of the relevant claim terms is no more comprehensive than set
8 forth by the references combined in the asserted grounds, particularly, the
9 Buibas reference.

10 In fact, to the extent that any difference exists, there's simply the
11 byproduct of distinct vocabularies that are used by authors to describe what
12 is essentially the same thing, with differences being obvious to those of skill.
13 And to make this point more clear, my colleague Nick is going to begin his
14 presentation, discussing the manner in which the '474 Patent specification
15 addresses the relevant aspects of the claim term at issue in 56 and 57. And
16 then, he'll turn to the reference in the combination -- the references in the
17 combination and the relevant disclosures, particularly found again in that
18 Buibas reference, to demonstrate the comprehensive nature of the disclosure
19 in the prior art as to the disclosed '474 specification.

20 Your Honors, I'd like to invite Nick to come and begin that part of
21 the presentation. Thank you.

22 MR. STEPHENS: Thank you, Karl. May it please the Board.
23 Nicholas Stephens on behalf of Petitioner, Tesla. Your Honors, as we begin,
24 I wanted to note that I intend to reference material in this portion of the
25 presentation, not only from our demonstrative slides, but also from the
26 Buibas reference, which is the prior art reference that's been marked as
27 Exhibit 1005. I'll also make reference to Patent Owner's Motion to Amend,

1 which is marked as Paper 14 in the record, if Your Honors would like to
2 have those documents at the ready.

3 As Karl noted, I'll begin by addressing Claims 56 and 57, which
4 are the only original claims challenged in the petition for which Patent
5 Owner has advanced patentability arguments. I'll also preface this
6 discussion by noting that the language in the claims at issue is admittedly
7 somewhat dense. Therefore, before turning to the core of the dispute, I'd
8 appreciate your indulgence as I take some time to review both aspects of the
9 claim language at issue, and allegedly supporting disclosure from the '474
10 Patent, which we believe will better contextualize the technology. What the
11 record will show is that Buibas describes substantially the same techniques
12 as the '474 Patent itself. Moreover, the level of disclosure in Buibas, with
13 respect to the claim features, is even more than that offered by the '474
14 Patent.

15 So, please turn to Slide 7 of our demonstratives. On this slide, we
16 show independent Claims 45 and Claim 46, which are the base claims from
17 which Claims 56 and 57 depend. Claim 45 is directed to a first device.
18 Among other features, the first device includes a knowledge base, and that
19 knowledge base is said to include one or more inputs for inputting at least a
20 portion of a circumstance representation; wherein, the one or more inputs are
21 correlated with one or more instruction sets for operating a second device.

22 On Slide 8, we've reproduced the language of Claims 56 and 57.
23 Both claims add a requirement that the one or more inputs are further
24 correlated with another one or more instruction sets for operating a third
25 device. Thus, taken together with the limitations from Claim 45, we have a
26 first device having a knowledge base and one or more inputs to the
27 knowledge base that are correlated, both with instruction sets for operating a

1 second device, and another instruction set for operating a third device.

2 Let's consider what this language means in light of the
3 specification. We back up to Slide 5 of our demonstratives. I'd first note the
4 flowchart that's depicted in Figure 32 of the '474 Patent. This flowchart
5 illustrates the basic process in the patent for training a device to
6 autonomously perform a desired task or behavior.

7 In general, the process includes a learning phase, highlighted in red
8 on the slide, and an autonomous phase, highlighted in green. During the
9 learning phase, a user operates the device to teach the device how to perform
10 different actions in different circumstances. Information from the learning
11 phase is stored in a knowledge base, such as a database or a neural network,
12 and the knowledge base is later referenced by the device so that it can
13 operate autonomously by performing actions that the device was trained to
14 perform under different circumstances by the user.

15 On the next slide, Slide 6, we reproduce Figure 38 from the '474
16 Patent, which further illustrates the concepts. Figure 38 shows multiple
17 front-end Loaders, motor vehicles, which are labeled as 98a in our examples
18 of the claimed first, second, and third devices. During the learning phase,
19 the Loaders are manually operated, and they employ on-board sensors to
20 capture information about their current circumstances, such as information
21 about nearby objects. The Loaders also record information about actions or
22 instructions that are provided by the user to control or operate the device.
23 Information about the current circumstance, referred to as a circumstance
24 representation and information about the actions or instructions provided by
25 the user, are correlated with each other and stored in the knowledge base.

26 For example, the system might record that the operator moved the
27 Loader forward by a certain distance upon detecting a boulder of a certain

1 size two meters ahead of the Loader, and that the operator then lowered the
2 boom to begin scooping the boulder. The specification explains how the
3 stored information is later used to inform an autonomous mode of operation
4 so that if a similar circumstance is later encountered, the device can perform
5 the same operations that the user had performed previously.

6 Now, as shown in the snippet at the right of Slide 6, the knowledge
7 base, which is included in what's referred to here as a DCADO Unit 100, can
8 also incorporate knowledge that's been learned by multiple devices, such as
9 each of those front-end Loaders depicted in 38.

10 For example, the specification discloses that any number of
11 Loaders 98 can utilize the remote DCADO Unit 100 for autonomous
12 operation, and the multiple Loaders can each transmit their operations to
13 their DCADO Unit where the knowledge is combined. Thus, according to
14 this disclosure, which Patent Owner has cited as written description support
15 in its motion to amend, a knowledge base that incorporates knowledge of
16 operations and circumstances, contributed by multiple devices, would
17 include, in the parlance of the claims, instruction sets for operating each of
18 the multiple devices, such as instruction sets for operating a second front-
19 end Loader device and instruction sets for operating a third front Loader
20 device. This has sometimes been referred to by the parties as a mixed
21 knowledge base because it incorporates the knowledge from multiple
22 devices.

23 Now, while Figure 38 addresses the concept of a mixed knowledge
24 base generally, it does not specifically address the notion of a knowledge
25 base having one or more inputs correlated with instruction sets for operating
26 multiple devices as recited in Claims 56 and 57. The specification of the
27 '474 Patent, in fact, never uses the terminology of inputs to a knowledge

1 base, let alone, inputs correlated to instruction sets. These expressions were
2 coined for the first time in the new claims of the '474 Patent, but,
3 nonetheless, Patent Owner's motion to amend is again informative. For
4 written description support of similar limitations in its substitute claims that
5 require correlation of knowledge base inputs to instruction sets for operating
6 multiple devices, Patent Owner points to the neural network identified as
7 Model A in Figure 17 of the '474 Patent.

8 So, if you'll turn to Slide 18, on the right side of the slide, we've
9 reproduced a depiction of that model. And I'll return to the slide later on in
10 the presentation because it's important to understand how the correlations
11 work. Here, we see, on the right-hand side of the slide, that there's nothing
12 particularly special or interesting about the network, it's simply a basic,
13 fully-connected, feedforward neural network of a kind that was well-known
14 in the field before the '474 Patent. We have an input layer of neurons that
15 are connected via an intermediate layer to a layer of output neurons, 852.
16 The output layer of neurons produce instruction sets that are used to control
17 operation of a device.

18 And if we refer to page 9 of Patent Owner's motion to amend,
19 which we don't have here on the slides, Your Honor, I apologize, but on
20 page 8 of the motion to amend, Patent Owner explains that, with respect to
21 this model, that Model A shows input nodes/neurons correlated, using
22 downstream connections with output nodes/neurons that include/produce
23 instruction sets for operating a device.

24 Thus, according to Patent Owner, even a conventional feedforward
25 neural network, like that represented as Model A in Figure 17, would
26 include inputs correlated to instruction sets for operating a device that
27 contributed knowledge to that knowledge base.

1 Now, still one interesting question that's left unaddressed by the
2 motion to amend, is specifically how a neural network, like Model A in
3 Figure 17, would be made to include mixed knowledge, including
4 instruction sets for operating multiple devices.

5 Although Figure 38, tersely mentions that multiple front Loader
6 devices, as we saw earlier, could contribute their knowledge to a common
7 knowledge base, the specification doesn't specifically describe how this
8 would be accomplished on a neural network, so as to produce the claimed
9 correlations between inputs and instruction sets for operating multiple
10 devices. Instead, the Patent leaves this to the knowledge and skill of a
11 POSITA.

12 So, if we go to Slide 17, please. As shown on the bottom left of
13 Slide 17, the '474 Patent effectively decouples the functionalities described
14 in the specification. I apologize, the text here is small. I'll read some salient
15 aspects from it. Here, the specification explains that the disclosed systems,
16 devices, and methods are independent of the artificial model and/or
17 technique used. And it further notes that any model and/or technique can be
18 utilized to facilitate the functionalities described herein.

19 In other words, the '474 Patent leaves to a POSITA the details of
20 how to implement the disclosed functionality of a knowledge base on any
21 suitable model, whether a neural network or otherwise. While I won't
22 review them all today, the specification lists a range of conventional models
23 and neural networks that are all said to be as suitable to achieve the
24 disclosed functionalities.

25 What we can glean from these exposures is that, whatever the
26 invention was thought to be in the '474 Patent, it's not related to the specific
27 type or structure of model used. Certainly not related to a novel or improved

1 way of making a correlation between inputs of a knowledge base to the
2 instruction sets of multiple devices. Again, any of a multitude of
3 conventional models are said to be suitable for implementing the disclosed
4 functions, and a POSITA is left by the '474 Patent how to deploy those
5 models to implement the disclosed functionality.

6 On the next slide, Slide 18, having considered the claims now, in
7 light of the specification of the '474 Patent, I'll turn now to the heart of the
8 dispute as it relates to Buibas. Much like the '474 Patent, Buibas disclosed
9 robotic devices that utilize neural networks that can be trained by users
10 autonomously to perform different tasks or behaviors. Buibas's neural
11 network is implemented in a so-called robotic brain, or neuromorphic
12 apparatus is another term that's used in Buibas. The configuration, or state
13 of the neural network, is defined by a data structure that Buibas refers to as a
14 brain image. I'll just note for the record that Buibas describes these concepts
15 in further detail in paragraphs 179 and 201 to 205, for example.

16 On the left side of Slide 18, you can see Figure 10 from Buibas,
17 which depicts an embodiment of a neural network for a robotic brain. On
18 the right side of the slide, as we saw earlier, is the model neural network
19 from Figure 17 of the '474 Patent. As can be seen, the neural network for
20 Buibas is substantially the same in all relevant respects to the example
21 neural network in the '474 Patent. Both networks, for instance, include a
22 layer of input neurons for receiving signals characteristic of a circumstance
23 of an autonomous device. Likewise, the input neurons of Buibas's network
24 are correlated by downstream connections to neurons that produce
25 instruction sets for operating the device.

26 To further address how Buibas discloses and renders obvious the
27 neural network having inputs correlated to instruction sets for operating

1 multiple devices, I'll turn now away from our demonstratives to reference
2 Buibas directly, if you have copies available.

3 Now, the Petition explained, with respect to Claims 56 and 57, that
4 Buibas describes a merge operation. The merge operation effectively brings
5 together the knowledge of two parent brain images so that the offspring
6 (merged image) can realize the combined capabilities of both parents. More
7 specifically, Buibas describes an environment in which users can
8 independently train brain images to perform different tasks or behaviors
9 under individual robots, and in which users share their trained brain images
10 with others such as through a server in the cloud.

11 For example, consider paragraph 70 of Buibas. In this paragraph,
12 Buibas explains that the artificial mind and its traits may be copied, stored,
13 and later retrieved. This state information may be shared with other users.
14 And consistent with the present disclosure, a user may download such stored
15 state information, whether from networked or cloud storage, or any peer-to-
16 peer (PTP) fashion, and apply it to a second neural network, effectively
17 duplicating the first neural network. The last sentence emphasizes that this
18 obviates the second neural device from having to learn the lessons learned
19 by the first neural device.

20 I won't go into it in further detail, but these concepts are further
21 described in Paragraph 171, 194 to 199, and 222 to 226. Buibas also teaches
22 that a user can expand or augment the capabilities of a device by merging
23 brain images.

24 So, if you turn to paragraph 225 of Buibas, here, we see that
25 -- about half-way down the paragraph the user may select --

26 JUDGE CASS: Sorry, what paragraph now?

27 MR. STEPHENS: Paragraph 225.

1 JUDGE CASS: Okay, thank you.

2 MR. STEPHENS: Here, Buibas discloses that the user may select
3 multiple ones from different new functionalities of partial brain images to
4 create a custom hybrid brain that incorporates the functionality of each of
5 the parents. And it goes on to say the merging of brain images involves the
6 combination of one brain image with another brain image. So, what's the
7 effect of doing this?

8 If we go back to paragraph 103, that's 103 of Buibas, here, it
9 discloses a scenario that involves two robots programmed to perform trash
10 collection. One of the robots has been trained in a home environment, and
11 the other was trained in an office building. The brain images for both
12 devices can be merged to, quote, "Produce an offspring exhibiting combined
13 set of capabilities."

14 Now, these descriptions, alone, would have informed a POSITA
15 that a merged brain image in Buibas configures a neural network to provide
16 the combined set of functions or capabilities of each of the parents. Because
17 those functions or capabilities are manifested as instruction sets that are
18 produced by the outputs of the neural network, it would be obvious that the
19 inputs to the neural network are correlated after the merger to instruction
20 sets for operating each of the devices on which the parent brain images were
21 trained. Our expert, Dr. Janet, for example, addresses this in more detail in
22 his declaration in paragraphs 20, 28, and 29.

23 Now, if this weren't enough, Buibas goes into even more detail on
24 how you can perform a merger. In paragraphs 85 to 128, in Figures 3 to 9,
25 this is a long portion of Buibas, it describes various algorithms for merging
26 and transforming networks to realize the trained behaviors learned on
27 difference devices.

1 Just for reference, I'll take a look at Figure 5B, which illustrates a
2 merge operation in one embodiment. There are two merge operations
3 depicted in this figure. They're illustrating, substantially, the same concept,
4 but just take the operation on the left side as one example.

5 We have two weight vectors, A and B, which are weight vectors
6 that define the strengths of connections between neurons and each of the
7 parent brains that have been trained to perform different tasks. According to
8 the merge operation, an algorithm selects portions of the weight vectors
9 from each of the parents and integrates them into a merged offspring.

10 So, you can see that in the center, a weight vector 516 defines the
11 brain image or a merged network. In the result that we saw from paragraph
12 225 and from paragraph 103, is that the merged brain image inherits the
13 capabilities of each of the parent devices. And this make sense, because
14 what's effectively happening here is that by taking the weights of the vectors
15 of the parents, and using those same weights to connect the neurons and
16 create the same neural pathways in the merged neural network, the merged
17 neural network, when it receives a new input would, in at least some cases,
18 produce instruction sets in the same way as each of the parents. And this is
19 corroborated further by disclosure at paragraphs 175, 205, and 173 of
20 Buibas.

21 JUDGE AMUNDSON: This is Judge Amundson. I had a question
22 on this. When you're talking about vectors in this context, what are the
23 component parts of those vectors?

24 MR. STEPHENS: That's a great question, Your Honor. The
25 vectors here are weight vectors. So, this is how Buibas stores the state
26 information, or how the neural networks have been trained, in what they call
27 a brain image. The brain image can comprise different components, but as

1 shown here in Figure 5B, it includes weight vectors. And what those weight
2 vectors are, are values that define the strength of connections between
3 neurons in the neural network that's been trained to perform a particular
4 action.

5 JUDGE AMUNDSON: Okay.

6 MR. STEPHENS: So, if you --

7 JUDGE AMUNDSON: So, the strength of connections, that's the
8 end result of the learning?

9 MR. STEPHENS: That's the end result of the merge operation,
10 Your Honor. So, when you take the strengths of the -- take the weights from
11 each of the parents, bring them together into the merged network, we're
12 creating the same connections that were exhibited in each of the parents in
13 the merged network, and the result of that is that you -- is that inputs that
14 you might have received in the parents, would produce similar or the same
15 outputs in the merged network, the same instruction sets, to exhibit the same
16 capabilities as the parents in the merged network.

17 JUDGE AMUNDSON: Okay. I think I got it, thank you.

18 JUDGE CASS: This is Judge Cass. I'd like to follow up on that a
19 bit. I'm also trying to understand, in more detail, what the relationship is
20 between the weights and the instruction sets. I know this is an argument
21 discussed in the briefs, but between the weights and the instruction sets and
22 how one of those is translated to the other. And if they are somewhere in a
23 declaration, or somewhere that explains that in more detail, please point me
24 to it. But I'm trying to get a better understanding of that, so if you could
25 explain that in a little more detail that'd be great.

26 MR. STEPHENS: Yes, I'd be happy to, Your Honor. I direct you
27 to paragraphs 20, 28, and 29 of Dr. Janet's second declaration, that's Exhibit

1 1022. And what Dr. Janet explains is that weights and instruction sets are
2 not the same. Even though I think Patent Owner's briefs have maybe sown a
3 little bit of confusion around this concept, we've never contended that they
4 are the same. What's happening in the merger operation, as illustrated in
5 Figure 5B, is that we're bringing together the weights of the neural network
6 so that we're creating connections in which the outputs of the neural
7 networks would produce instruction sets based on the weights that exhibit
8 the combined capabilities of the parents.

9 So, the weights are what define the strengths of the connections
10 between neurons in the neural network, and the instruction sets are what's
11 produced as output by the neural network. When you inherit the weights of
12 the parents and place those weights into the merged neural network, it allows
13 the merged network to produce the same instruction sets, the same outputs as
14 each of the parents.

15 JUDGE CASS: How does that happen? Is there some description
16 of that somewhere in the record?

17 MR. STEPHENS: Well, I think I'd mention a couple things, Your
18 Honors. One is those paragraphs in our declaration from Dr. Janet,
19 paragraphs 20, 28, and 29, describes how this would work. Further, we
20 know this is what happens because Buibas tells us that that's the end result.
21 Paragraph 225, paragraph 103 talks about the end result of a merger is a
22 neural network that exhibits the combined capabilities of each of the parents.
23 And this makes complete sense, in light of what Buibas was trying to do,
24 which is to allow users to individually train their robots and share their
25 knowledge with others.

26 So, if I have a friend that's already trained a robot how to retrieve a
27 ball, if he's already got a great routine for doing that, he can share his brain

1 image. I could download it from the cloud, load it onto my robot, and
2 benefit from my friend's training so that my robot can not only exhibit the
3 capabilities of what I've trained my robot to do, but also what my friend has
4 done. You're taking the weights that define the behavior trained on the other
5 robot and incorporating them into a new merged neural network.

6 JUDGE CASS: Okay. Thank you, Counsel.

7 MR. STEPHENS: And in your deliberations -- I won't spend
8 additional time on it, but paragraphs 173, 175, and 205 of Buibas, I think,
9 are also instructive. Here, you'll see that Buibas is correlating, or explaining
10 how it is the weights of the network that dictate the functionality of the
11 neural network. So, during training, for example, you're training the robot
12 how to perform a particular behavior. The weights are updated, and as the
13 weights are updated, that's what dictates the functionality that's realized by
14 the neural network. That's explained at, again, paragraph 175, 205, and 173.

15 I'll conclude on this issue by turning back to Slide 18. On this
16 slide, we see, again, the depictions of Buibas's neural network alongside the
17 network for the '474 Patent that Patent Owner itself cites for written
18 description support. What differences are there between them relevant to
19 Claims 56 and 57? The record shows there are no relevant distinctions. At
20 least we've not identified any. If the '474 Patent's limited disclosure of its
21 neural network provides inputs correlated to instruction sets for operating
22 multiple devices, Buibas does the same.

23 I'll pause for a moment, if there's any questions further on that
24 issue, otherwise I'll move on.

25 Okay. Now, before turning --

26 JUDGE CASS: Not at this time, I don't.

27 MR. STEPHENS: Thank you. Now, before turning to the motion

1 to amend, I wanted to briefly acknowledge an additional argument that
2 Patent Owner has made with respect to Claim 56, which is that Buibas
3 somehow does not disclose or render obvious another learning process that
4 includes operating the third device at least partially by another user. There's
5 no merit to this argument. Patent Owner raised similar arguments in the
6 prior IPRs with respect to similar language recited in claims of the parents to
7 the '474 Patent, but the Board correctly determined in its final decisions that
8 those limitations were obvious.

9 If you look at Slide 30 of our demonstratives, we've included
10 testimony from our expert, Dr. Janet, which addresses this issue. The
11 problem for Patent Owner is that the specification does not define what a
12 learning process is nor does it describe exactly how to distinguish one
13 learning process from another. Dr. Janet, however, reviewed the opinions of
14 Patent Owner's expert, Dr. Saber, from the IPRs on the parent patents, where
15 Dr. Saber acknowledged that different learning processes may involve, for
16 example, different users, different devices, and learning at different times.

17 But as Dr. Janet explains, all of these factors that implicate distinct
18 learning processes identified by Dr. Saber are also explicitly disclosed in
19 Buibas. As we just discussed, Buibas extensively describes, throughout its
20 specification, how different users individually train their robots to perform
21 different tasks and how those capabilities of the robots are then merged.

22 So, when a user of a first device obtains the brain image of a robot
23 trained by another user on a third device, it's obvious that the instruction sets
24 for tasks trained on the other user's device have been learned in another
25 learning process by another user.

26 I'll turn next to the substitute claims that were presented with
27 Patent Owner's motion to amend. Slides 31 to 70 of our demonstratives lay

1 out, in detail, how the substitute claims are unpatentable based on both
2 grounds under Section 103 and 112. But I intend to spend our limited time
3 addressing just a few discrete issues, inspired by Patent Owner's arguments
4 in its reply to our Opposition to the motion to amend, and these issues
5 pertain specifically to limitations 85.11 and 85.12.

6 So, if you'll turn with me, please, to Slide 52, I'd like to take a
7 moment to just review the language recited in these limitations. As shown
8 on Slide 52, in Limitation 85.11, refers to multiple object representation data
9 structures. Each of the object representation data structures indicates three
10 pieces of information; namely, a label for object type, coordinates for object
11 location, and a computer model for object size. Each data structure also
12 represents multiple objects detected at a first time. A parallel limitation is
13 recited in element 85.12 with respect to another circumstance representation.

14 It's important to bear the precise language of these limitations in
15 mind. Because, as we'll see, Patent Owner's arguments to distinguish the art
16 are not rooted in the language as drafted. Patent Owner, instead, attempts to
17 read in a turn, actual, real-world that's found nowhere in the language of the
18 substitute claims themselves.

19 But first, I'll turn to Slide 53 to review how the Opposition to the
20 motion to amend applied a prior art combination based on Grotmol and Zhu
21 against these limitations. At the top of Slide 53, we present Figure 20A of
22 Grotmol. Figure 20A depicts two images captured by an autonomous robot
23 moving about an environment. The first image, 2000, at the top of Figure
24 20A, is an image acquired by a robot on the robot at a first time, T1.

25 The second image, 2010, at the bottom of Figure 20A, is an image
26 acquired by the robot a short time later, at a second time, T2. In each image,
27 multiple objects are depicted, including a tree, a box, and a ball. The

1 position of the objects, however, are shifted in the two images, and this is the
2 result of movement of the robot between the time that the images were
3 acquired.

4 Grotmol further discloses that either the raw images captured by
5 the robot, or features extracted from the images, including features that
6 identify detected objects, can be used to recognize a circumstance and
7 determine an action to perform by the robot in that circumstance, much like
8 the '474 Patent.

9 Beneath Grotmol's image on Slide 53, we have an additional image
10 from the Zhu reference, and this is Figure 9 from Zhu. Zhu describes
11 techniques for recognizing objects in the vicinity of an autonomous vehicle.
12 To characterize the nearby objects, Zhu generates bounding boxes that
13 surround each of the detected objects in the image.

14 For example, as shown here in Figure 9, three rectangular
15 bounding boxes are overlaid on the image that respectively indicate the
16 locations of each of three vehicles to the front left, front center, and front
17 right of the camera that acquired the image. The Opposition explains how
18 and why a POSITA would have found it obvious to combine the teachings of
19 Grotmol and Zhu before the '474 Patent. And in the proposed combination,
20 features, including Zhu's bounding boxes, would be applied to objects
21 detected in Grotmol's images to characterize a scene and improve
22 autonomous operation of Grotmol's robot.

23 Next slide, Slide 54, I'll note that Zhu discloses a label for object
24 type through its classification of object, such as different vehicle types.
25 Patent Owner hasn't disputed Zhu's teachings in this regard, so I'll therefore
26 turn to object size and location on Slide 55.

27 Let's first consider Grotmol. At column 28, which is shown on the

1 left side of Slide 55, Grotmol describes how features can be extracted from
2 an image, and those features can include, quote -- this is about halfway
3 down, I know it's a lot of text, "But the presence or absence of an object at
4 particular locations in the image, as well as the size and position of
5 objections, and other features in the image."

6 I'd also call attention to another portion of Grotmol that we don't
7 have on this slide, but we have cited in our Opposition, and quoted from in
8 the Opposition. In particular, we reference Grotmol's teaching at column 10,
9 lines 23 to 34. In there, Grotmol explains that the --

10 JUDGE CASS: Counsel, I just want to let you know you started
11 going into your rebuttal time.

12 MR. STEPHENS: Thank you, Your Honor. There, Grotmol
13 discloses that the tasks of the robot may be configured based on a context,
14 including object, size, location.

15 Slide 59, please. Notably, Zhu, additionally discloses object size
16 and location. Here, we highlight Zhu's teaching that object label parameters
17 associated with a bounding box can include coordinates that define the
18 latitudinal placement, longitudinal placement, width, and height of a
19 bounding box for a detected object, as well as coordinates that define, for
20 example, in quote, "the physical height of the object."

21 In short, whether considering Grotmol's feature extraction
22 algorithms for determining the object size and location, or Zhu's disclosure
23 of bounding box parameters that define the location and size of detected
24 objects, the combination renders obvious coordinates for object location and
25 a computer model for object size.

26 As we referenced earlier, however, Patent Owner does argue for
27 patentability on the basis that Zhu allegedly fails to disclose techniques for

1 discerning the actual size, or the actual, real-world location of detected
2 objects. I just want to highlight a few problems with this criticism before I
3 reserve the rest of the time for rebuttal.

4 First, notwithstanding its criticisms of Zhu, Patent Owner's reply to
5 the Opposition to the motion to amend never refutes Grotmol's disclosure,
6 which was cited and quoted with emphasis on pages 10 to 11 of the
7 Opposition. We just discussed those a moment ago.

8 A second problem with Patent Owner's theory is that it reads in the
9 term, actual, real-world, even though that term is cited nowhere in the
10 substitute claims. As we reviewed earlier, Elements 85.11 and 85.12 recite
11 coordinates for object location and computer model for object size.

12 Patent Owner now seeks to rewrite these limitations to require an
13 actual, real-world location of the location and size of the objects, but the
14 claims don't specify what types of coordinates for object location are
15 required, nor even what object is being located, nor does the phrase
16 computer model for object size specify any requirement for actual or real-
17 world size of the object. It simply refers to a computer model for object
18 size.

19 A third problem with Patent Owner's position is that the
20 specification of the '474 Patent fails to support any requirement for reading
21 an actual, real-world into claimed object size and location.

22 So, to this point, on Slide 58, we've included a snippet of the little
23 description of object size and location that exists in the specification. On the
24 bottom snippet -- this is from column 72, lines 59 to 67, it simply states that
25 object properties can include location of an object, i.e., distance and bearing
26 angle from a known point, coordinates, et cetera, and that the shape/size of
27 an object, and then, in a parenthetical; (i.e., height, width, depth, computer

1 model, point cloud, et cetera.)

2 Noticeably though, beyond the passing reference of a computer
3 model in that parenthetical, there's no further description at all of what this
4 computer model supposedly is. Certainly, there's no description of the
5 computer model necessarily representing the actual, real-world shape and
6 size of a detected object.

7 And fourth, Patent Owner's position suffers from the problem that
8 it fails to distinguish the art. So, even if we were to read in the term, actual,
9 real-world, and assume that the claim required that the object location and
10 size were the actual, real-world size and location of the objects, our art does
11 disclose it.

12 This is discussed further in our sur-reply to the reply to the
13 Opposition to the motion to amend, but on Slide 59, you'll see some relevant
14 disclosure from Zhu in this regard. In column 15, for example, which is
15 reproduced at the left of Slide 59, Zhu discloses that the object label
16 parameters can define the physical height or elevation of the object using
17 physical units referenced to real-world measurements, such as 3 meters
18 above sea level, 2 meters above sea level, et cetera.

19 I'll also just note that Zhu, at column 20, lines 34 to 40, also
20 explains that the object labeled deviations may be measure in, quote,
21 "Physical units, e.g., centimeters, meters, et cetera, and that the deviations
22 may be assigned values based on the physical characteristics of the object."

23 If there are no questions, Your Honors, I'll reserve the balance of
24 time for rebuttal.

25 JUDGE CASS: All right. You've used up about five minutes of
26 your rebuttal time, so that will give you 15 minutes of rebuttal remaining.

27 MR. STEPHENS: Thank you.

1 JUDGE CASS: And with that, we can have counsel for Patent
2 Owner as soon as you are ready.

3 MR. JAIRAM: Good afternoon, Your Honors. This is Arvind
4 Jairam, again, on behalf of Patent Owner. I'm going to attempt to share the
5 demonstratives on the screen.

6 JUDGE MCMILLIN: That's fine. I may not be able to see them
7 on the screen, so if you could just call them out as you're discussing them,
8 that would be appreciated.

9 MR. JAIRAM: I will do so, Your Honors. Are Your Honors able
10 to see -- is anyone able to see the demonstratives that I'm sharing?

11 JUDGE AMUNDSON: This is Judge Amundson. Yes, your
12 sharing is showing the demonstratives as the major portion on at least my
13 screen.

14 MR. JAIRAM: Thank you. And I will be sure to refer --

15 JUDGE MCMILLIN: And this is Judge McMillin, I can see them
16 also. It's a technical limitation of our system that Judge Cass cannot see
17 them even though he's sitting in the hearing room.

18 MR. JAIRAM: Thank you, Your Honors, and I will be sure to
19 refer to the slide numbers as you requested.

20 JUDGE CASS: Yeah. So, it's fine if you go on and go ahead and
21 project them, just make sure you refer to the slide.

22 MR. JAIRAM: Okay. I will, please reserve 15 minutes of my
23 time for sur-rebuttal.

24 JUDGE CASS: All right. You may begin when you're ready.

25 MR. JAIRAM: Thank you, Your Honors. So, referring to Slide 3,
26 I will be discussing several issues. As to the existing Claims 56 and 57, I'll
27 discuss the Grounds 1A and 2C with respect to the mapping of the claim

1 limitations to the prior art. And regarding the contingent motion to amend,
2 I'll primarily discuss Issues 2 and 3 shown on the slide, which are the
3 obviousness for Limitations 85.11 and 85.11 for Issue 2, and obviousness for
4 Limitations 85.13 and 85.14 for Issue 3. And if time permits, I may discuss
5 Issue 1, which is written description support.

6 Turning to Slide 7 of Patent Owner's demonstrative, I've just
7 shown on the screen pertinent limitations, and as highlighted in yellow, there
8 is a limitation that I will refer to as the first disputed limitation, or as the
9 third device limitation of Claim 56, and it's also present in Claim 57. And as
10 highlighted in blue, there's a limitation, which I may refer to as the second
11 disputed limitation, or as the learning process limitation.

12 Turning to Slide 11, we see Figure 4 of Buibas. And there's a lot
13 of dispute and a lot of discussion in the briefs, and also in the argument that
14 we've heard so far regarding the network merge operation and regarding the
15 weight vectors. So, I want to take a minute to show Figure 4.

16 So, Petitioner's mapping for the first limitation of Claim 56 focuses
17 on Figure 4 of Buibas, which is a functional block diagram illustrating a
18 network merge. But the network merge process of Buibas, which you have
19 heard Petitioner's counsel discuss, does not disclose or suggest the claimed
20 inputs are further correlated with one or more instruction sets for operating a
21 third device.

22 I believe we heard Tesla's counsel admitting that the offspring
23 weight vector, which I will show in a couple of slides from now, that the
24 offspring weight vector is the offspring brain image; meaning, that the brain
25 image has no instruction sets.

26 And we heard some questions from Your Honors about exactly the
27 relationship between the weights, and weight vectors, and the instruction

1 sets. And I will attempt to clarify that in my discussion here over the next
2 couple of slides.

3 Turning to Slide 13, here is Buibas explaining on the left that
4 weights, in particular network weights, are downloaded by a receiving robot,
5 and network weight vectors are stored in a cloud server. That's a vector of
6 weights. Weights are numbers and a vector is an ordered collection of
7 numbers. Those are the weights. And on the right, we see Buibas
8 explaining that the brain image comprises network weights, and these
9 weights get sent or configured when downloading a brain image to a new
10 robot.

11 And on the next slide, Slide 14, as explained in Patent Owner's
12 briefs, Buibas, helpfully, has a section devoted to network merges, which is
13 the topic of Petitioner's prior art mapping, and so we can understand exactly
14 what is going on with the network merges by considering what's found in the
15 section of Buibas that's entitled network merges.

16 JUDGE AMUNDSON: This is Judge Amundson. I just had a
17 question about these weights and the weight vectors. I'm getting the
18 impression, and correct me if I'm wrong, but after -- if you train a robot,
19 according to Buibas, the training results in a collection of weight vectors.
20 Do I have that right or do I not have that right?

21 MR. JAIRAM: That's right, Your Honor. Training will cause the
22 weight vectors to reach the values that are appropriate, so you've got the
23 weight vectors that you need for a particular neural network.

24 JUDGE AMUNDSON: So, if I want to combine the learning from
25 robot A and learning from robot B, why don't I just somehow merge the two
26 collections of weight vectors?

27 MR. JAIRAM: Your Honor, Dr. Saber has explained, and that's

1 Patent Owner's expert, has explained that it's not as simple as just taking the
2 weights from one vector and then concatenating onto the end of it, or
3 appending the weights from another weight vector, and that you can then use
4 that right away.

5 And I have a slide that I will show you. If we turn to Slide 29,
6 please. Dr. Saber has explained, with reference to paragraph 77 of his
7 declaration, Exhibit 2001, that if you're going to combine instruction sets,
8 you would need to retrain the network -- retrain the neural network. The
9 weight vectors from -- it looks like a first weight vector and then a second
10 weight vector, it's not as simple as just putting the two of them one after the
11 other and it's ready to go.

12 Dr. Saber has explained, and then on the right side of this screen,
13 you can see at the top, describing techniques such as backpropagation, which
14 is a certain concept involved in neural network training. You would have to
15 retrain the neural network to basically figure out what to do with new
16 weights to get them to the correct values.

17 JUDGE AMUNDSON: Okay. I think I got the concept. So, like
18 robot A is trained to do X under certain circumstances, but robot B is trained
19 to do something else, if you just concatenate the two weights something's
20 going to go amiss. Is that --

21 MR. JAIRAM: That's -- I think that's basically right, Your Honor,
22 that it's not as simple as just take one set of weight vectors and physically
23 just concatenate, or append, or whatever to the other set of weight vectors.
24 And there's declaration testimony, including Dr. Saber's declaration
25 testimony, and deposition testimony, and we have included in our arguments
26 in the briefs, arguments that cite those principles.

27 JUDGE AMUNDSON: All right, thank you. I think I understand.

1 MR. JAIRAM: Thank you. If I could go back to Slide 14, please.
2 So, the network merges section explains that Figure 4 is concerned entirely
3 with weights. And we walked through this very carefully in our briefs and
4 also with Tesla's expert, Dr. Janet, during his depositions. Basically,
5 paragraph by paragraph, equation by equation, just dissecting what is found
6 in that section of Buibas since there is so much emphasis on the network
7 merges in Tesla's arguments.

8 So, in paragraph 94, we see that a merge -- it's actually, basically
9 defined in quotes. It's a network weight update. Paragraph 95 provides
10 detail. The merge results in an offspring network configuration, and I think
11 we heard offspring weight vector described in Tesla's argument a short while
12 ago. And paragraph 95 shows the offspring network configuration is simply
13 a weight vector 408, that is produced by combining parent weight vectors
14 402 and 406, and that's seen in the graphical representation at right on this
15 slide and in Figure 4, which shows the merging operation, the network
16 merge, and the combination of the parent weight vectors on the left.

17 And if we go to slide --

18 JUDGE CASS: Counsel, this is Judge Cass. What is the purpose
19 of the network merge in Buibas? What's it trying to accomplish?

20 MR. JAIRAM: Well, I think it's -- I don't want to go beyond what
21 is actually in the briefs, but I think Buibas is trying to do something from a
22 first robot and with a second robot. But if we look at the arguments set forth
23 in Tesla's briefs, when we address those arguments, and we address those
24 portions of Buibas, we see that Tesla's arguments are deficient. So, since
25 Tesla here has the burden of proof, we do not have to prove what Buibas
26 does, but we have addressed what Tesla has cited to regarding Buibas -- all
27 the paragraphs, virtually, regarding the network merge section -- and

1 explaining exactly what that relates to.

2 JUDGE CASS: So, where I'm going with this, is just looking at
3 some of the paragraphs that Petitioner's pointed to, like 225, 103, and I think
4 there were some others. I mean, it seems to me that the overall purpose of
5 Buibas is pretty similar to what the claims are doing, or at least what the
6 patent is directed to, and that -- I think that it says, in a paragraph 225, for
7 instance, "The user may augment the old brain with new functionality from a
8 partial new brain or merge brain images." I mean, it seems like it's trying to
9 -- the point of merging is to take the learning from different robots that may
10 have been trained at an earlier time by somebody different, and adding that
11 capability to the robot that's being worked on, which seems pretty similar to
12 what the patent is trying to do. But I take it, your point here, or what you're
13 saying here is, that it's not really explaining it in terms of instruction sets.
14 But is that right? Am I wrong about this? What's your perspective?

15 MR. JAIRAM: Well, I think we are trying to remain faithful to the
16 claim language. The claim language, which clearly says, instruction sets.
17 So, that has got to be actually mapped in the prior art. It's not Patent
18 Owner's burden to kind of fix problems in the prior art, if the prior art is
19 ambiguous or deficient, and to patch any ambiguities, the burden remains on
20 Tesla in this IPR proceeding to map Buibas's disclosure or in any other
21 references to the actual claim language, which as Your Honor noted, does
22 recite instructions sets. And so, when we go look at the weights, we see that
23 the weights are described in Buibas, and we've asked Petitioner's expert,
24 exactly what's the relationship between these weights and instruction sets,
25 and we also have testimony from our own expert, Dr. Saber. And perhaps if
26 I point you to a portion of Dr. Janet's testimony, that will be helpful on this
27 point.

1 JUDGE CASS: Sure, that'll be helpful.

2 MR. JAIRAM: If we turn first to Slide 32, this is actually from
3 Tesla's brief -- so, this is not the testimony, but this is an admission by Tesla
4 that weights and instructions sets are not the same. Then, if we go to Slide
5 33, we have our expert, Dr. Saber, explaining that a weight is a
6 fundamentally different concept than the instruction set, and there's a lot of
7 explanation. But I will just note that we have illustrated this point in detail.

8 And then, additionally, on the next slide, Slide 34, as I alluded to a
9 moment ago, Dr. Janet, Tesla's own expert, when asked about an instruction
10 set, he's explained that the instruction sets would be commands that would
11 be given to motors and various other components. And then, we also asked
12 him about weight vectors. He has explained, as shown on the right on Slide
13 34, that the weight vector is just going to be a block of values.

14 So, when we look at the merge operation, and we see how is it
15 occurring -- and actually, the next slide I'll turn to in a sec, will further
16 expound on this, but I'll just state the point first, that the weight vectors is in
17 numbers when they are combined -- these are just weights that are being
18 combined in a certain way, using certain operations, which I'll show in a
19 moment, and that these are not having to do anything with instruction sets.

20 So, basically, it's important that the prior art be mapped to the
21 claim language faithfully, and if Tesla has not done that, Tesla cannot, after
22 the fact, say that, well, kind of the general point of a reference is to do
23 something -- when you actually go look at what is being mapped, is it
24 present or not? I would --

25 JUDGE CASS: I think your point, and I don't think there's any
26 dispute about this, that weights in themselves are not the same as instruction
27 sets. Is there a one-to-one correspondence between them? So, in other

1 words, if you have a set of weights, will that necessarily produce a particular
2 set of instruction sets, or is there some other variables involved that can
3 result in the same weights producing different instruction sets?

4 MR. JAIRAM: I don't believe that has been discussed by either
5 party in this proceeding, at least it's not coming to mind. And so, I certainly
6 don't want to speculate, particularly given as it is Tesla's burden if there were
7 any relationship to make that clear. We certainly have done our part to
8 attempt to ask Tesla's expert about these points, because we want to know
9 exactly what is in the portions of Buibas that pertain to the network merge
10 that they are relying upon. So, the frank answer, Your Honor, is, I'm not
11 sure that I know if there is such a correspondence, and in any event, it wasn't
12 our burden to set that forth.

13 JUDGE CASS: All right. Petitioner's counsel pointed us to some
14 other parts of Buibas talking about merging of brain images. And I mean, it
15 seems like brain images can be more than just weights, but do brain images
16 include instruction sets, and how do we know? What's in the record about
17 that point?

18 MR. JAIRAM: Yes, Your Honor. And we have pointed out that
19 brain images are expressed as sparse matrixes, and the sparse matrix, as
20 explained by Dr. Saber, is a matrix of weight. The brain image, for example,
21 at paragraph --

22 JUDGE AMUNDSON: That's at paragraph 203 of
23 (CROSSTALK) --

24 MR. JAIRAM: That's -- you're right. That's right, Your Honor.
25 Paragraph 203 of Buibas, which is shown on Slide 22 of our demonstratives
26 explains what is the brain image. And frankly, the brain image is somewhat
27 confusing, probably for everyone, for Your Honors, and probably for us, for

1 everyone, because it's not very clearly explained in the prior art reference,
2 and it's probably not very clearly explained in Tesla's petition, when you
3 start reading it, and you start looking to see what exactly is the brain image.
4 However, we have noted that paragraph 203 of Buibas says that the brain
5 image is expressed as a sparse matrix.

6 Now, we asked Dr. Janet about this, in addition to providing our
7 own expert testimony. What's going with this sparse matrix? And this is set
8 forth in our Patent Owner's sur-reply. In short, Dr. Janet's testimony on this
9 is very rambling, and evasive, and hard to figure out, and I would encourage
10 Your Honors to go look at what we described in our paper -- our sur-reply
11 paper, and actually the deposition testimony, when we tried to ask him
12 exactly what the sparse matrix is -- matrix -- trying to figure out, is it a
13 matrix of weight values, and what's the deal with sparse, and what is it a
14 matrix of. He gave a very long answer that is pretty confusing and probably
15 detracts from his credibility. But I'm trying to answer Your Honor's
16 question. That's what Buibas says that the brain image is. That it is
17 expressed as a sparse matrix.

18 So, this is consistent with our arguments that merging brain images
19 -- call it a network merge, call it a merger of brain images -- all we're talking
20 about is weight values. Now, it's possible that Buibas meant to say
21 something else, but it was drafted poorly. It's possible that Tesla meant to
22 point to something else, or tied threads together in Buibas, but we are going
23 based on what is actually found in the petition, the arguments and citations,
24 and we are going based on what is actually found in Petitioner's reply. That
25 is what we have consistently addressed.

26 Turning to Slide 26. There are various arguments that Tesla has
27 set forth regarding interleave mergers, non-interleave mergers. And on Slide

1 26, you see, again, this is just talking about weights.

2 On Slide 28 -- oh, here's another slide that may answer Your
3 Honors -- Judge Cass, your question about brain images. This appears to be
4 a definition in paragraph 179 of Buibas, and we have certainly cited and
5 discussed this in our briefs. "Brain images, (e.g., synaptic weight data
6 configurations or profiles)." That appears to be Buibas's explanation of a
7 brain image, and again, that certainly is weights.

8 And I'll note, that Tesla has set forth a back-up argument. At Slide
9 31 of our demonstratives, you'll see that in Petitioner's reply, Tesla has put
10 forth, I think for the first time in the reply, an argument that says, hey, even
11 if the merge operation in Buibas is only merging weights, which clearly it is
12 when you go look at parts in Buibas that talk about it. But Tesla is saying
13 that they still prevail. But that's not correct, Your Honor.

14 If we go to Slide 32, as I noted, they have admitted weights and
15 instruction sets are not the same. And we talked about Slides 33 and 34
16 about the relevant expert testimony on this point.

17 When you go to Slide 35, Dr. Janet further confirmed that weights
18 are distinct from instruction sets. He specifically said that weights are a
19 means of correlating input values to output. And he said knowing the
20 weight vector, alone, is insufficient, and I think this is pretty significant. He
21 said -- this is using Dr. Janet's own words, quote, "Is not going to tell you
22 much about that neural network."

23 So, I'll just move on. But I'll note that everything in the merge
24 disclosure of Buibas, we have addressed it very faithfully; been very
25 carefully to dissect exactly what portions of Buibas are cited. We figure out,
26 to the best of our ability, and our expert's ability, and the opposing expert's
27 ability what is going on with weight vectors, what's going on with

1 instructions sets, and it would seem to me, lacking any disclosure at all about
2 instructions, or instructions sets, particularly when Tesla's expert has said
3 that instructions are commands, motor commands, that this would be fatal to
4 Tesla's argument for the first limitation of Claim 56.

5 I'll briefly address, starting on Slide 37, the second disputed
6 limitation of Claim 56. And it's shown on Slide 38, for Your Honor's
7 convenience, it's shown highlighting in the blue color. But we'll note that
8 when we look at Slide 39, in Petitioner's reply, when they're addressing this
9 limitation, which certainly is a different limitation than the first disputed
10 limitation, Petitioner's reply again is relying on merged brain image.

11 So, we have addressed the merging of brain images, network
12 merging in a great amount of detail. And if you turn to Slide 40. As I
13 explained, brain image merely covers weights. It's not instruction sets, much
14 less the claimed instruction sets in the context of the second disputed
15 limitation; namely, instruction sets for operating different devices learned in
16 different learning processes involving different users.

17 On Slide 41, Tesla is -- so, Slide 41 explains a problem with
18 Tesla's argument. Tesla argued in its reply that Patent Owner did not present
19 affirmative evidence that Buibas's separate training routines on different
20 devices would not amount to separate learning processes. But, of course, not
21 only does that flip the burden of persuasion on its head, we've argued, as
22 shown on this slide, Slide 41, that separate training on different devices in
23 Buibas, let's say, a first robot and a second robot, that would only result in
24 different trained weights. That actually gets to Your Honor -- Judge Cass's
25 question. And training to get such weights still has not addressed the claim
26 limitation when you look at the limitation of instruction sets.

27 I would suggest that another way to look at all of this is to go back

1 in the petition -- I don't have this on a demonstrative, so I apologize. But if
2 we look at the petition, where the instruction sets are first mapped, I believe
3 it's on page 23 of the petition, the first two sentences, or first sentence of
4 page 23, that's Petitioner mapping commands of Buibas to one or more
5 instruction sets. They very clearly put it in parentheses, and bold, and
6 italics, making very clear what their mapping is.

7 So, Patent Owner has basically looked at what is Petitioner's
8 mapping and their arguments, and we've dissected and dismantled that.
9 Now, as to whether instruction sets have some other mapping to something
10 else, that's I don't believe germane. Because when Patent Owner is
11 addressing Petitioner's arguments, we're looking at what they actually
12 mapped right there in the petition, and it might have kind of -- they might
13 have deviated a little bit in their reply, but that is also an inconsistency and a
14 flaw. They have to remain faithful to their mapping.

15 So, I think the reason we focused so carefully on the words and
16 arguments that Petitioner has put is because they have the burden, and they
17 are the master of the IPR, they set forth the prior art mappings. When we
18 are trying to figure out what they are mapping -- commands -- I'm sorry,
19 instruction sets to in a prior art, what they are mapping inputs to in the prior
20 art, we are going based on what they've actually told us in the petition.

21 JUDGE CASS: So, Counsel, this is Judge Cass. Looking at
22 paragraph 153 of Buibas, it says -- and I guess this figure that is on page 22
23 of the petition. I figure I'll let you read paragraph 153 which says "the
24 neuromorphic apparatus is also configured to provide output (e.g., an
25 indication of recognized object or a feature or a motor command." Is a
26 motor command an instruction set?

27 MR. JAIRAM: So, I believe that Dr. Janet has said that the motor

1 command is an instruction set, yes. And I showed a slide, where we asked
2 him what is an instruction set, and he said it's a motor command.

3 JUDGE CASS: So, how should we interpret this reference to
4 motor command being an instruction set. It seems that that's coming out of
5 the output, but is your position that we just heard, the record isn't clear
6 enough as to how it's getting there, what the relationship is between that
7 motor command and the weights?

8 MR. JAIRAM: Well, I think the answer is, we have to look to see
9 what arguments Tesla made in their briefs, in particular, in their petition. As
10 to paragraph 103 of Buibas, which Your Honor just mentioned, I do see it
11 cited at petition page 81. But it is not explained in any detail, it's actually
12 included as part of a string cite of over a dozen paragraphs. And we would
13 just look to see, well, what have they actually argued? And then, we look to
14 see, when we fleshed out the problems with their argument in our Patent
15 Owner response, they certainly had the chance to respond in their Petitioner
16 reply. And when we looked to see what they've actually argued in their
17 Petitioner reply, there's a tremendous amount of discussion about a merger
18 of these brain images by network merges, about these parent -- basically,
19 these portions of Buibas that we have carefully identified and then analyzed.
20 If they wanted to do a more emphatic argument about some other portion of
21 Buibas, including parts that they cited merely in passing at a string cite, they
22 certainly have the opportunity to as they control the petition.

23 But I think it's deficient to just include a paragraph, in passing, not
24 even including relevant quote from it at the page of the petition that I just
25 mentioned, but to just include it as part of a string cite, and to expect either
26 Patent Owner, or the Board, to discern the meaning. There's certainly a lot
27 of case law, PTAB case law explaining that the Board is not expected to play

1 archeologist with the record. That Patent Owner is going based on what is
2 actually presented in the briefs, not trying to go fix Petitioner's arguments to
3 make Petitioner's case for it.

4 MR. JAIRAM: I'd like to -- sorry, was there a question?

5 MR. JAIRAM: I'd like to move on to the motion to amend topics
6 in my remaining argument time. And if we could please turn to Slide 78.
7 We've heard discussion today from Tesla's counsel about the bounding
8 boxes and what exactly Zhu discloses. So, consistent with my theme that I
9 explained just a short while ago, that we have looked at what is actually in
10 Petitioner's arguments in their briefs, we have done so here as well. When
11 Petitioner had to map in its MTA Opposition, portions of prior art, in
12 particular, they chose the Zhu reference, when they had to map that to the
13 claim limitations, you'll note that they did something different for the three
14 different features that are in 85.11. Basically, there's something about type.
15 There's something about location. There's something about size. I'll call
16 them A, B, and C.

17 Now, certainly, if they're going to map prior art to claim
18 limitations, they have to do so consistently. As we explained in our Patent
19 Owner MTA sur-reply -- reply in support of MTA, they have -- on one hand,
20 they have been inconsistent, because they chose for the type feature, they
21 chose to map to the actual car. They said -- or motorcycle, car, whatever,
22 passenger -- all -- these things. Whereas, for the location and size, they
23 chose the bounding box.

24 And when we go look at what is going on with the bounding box,
25 what did they specifically choose in their MTA Opposition to argue? Just go
26 look at the words. I mean, it's not a long brief. I think it's 25 pages or less,
27 and there's a few pages about Zhu for this Limitation 85.11, they mapped to

1 the pixels. They specifically said pixels, as shown on Slide 78, Dr. Saber
2 has explained that the Opposition relied on the height and width of the box
3 and pixels for the size of what? The size of the bounding box. Oh, no, that's
4 certainly not the size of the same thing, namely, the car, or the person that
5 was mapped for the first feature of 85.11. And Dr. Saber continues that for
6 the location, the coordinates for location, they've again clearly mapped to the
7 pixel coordinates.

8 Now, this is, of course, paragraph 28 that's shown on the slide. But
9 you could look at the Opposition brief itself, and you see the exact same
10 thing. You see a lot of discussion about pixels, and bounding boxes. And
11 all that we have done, Your Honors, is faithfully carried through Petitioner's
12 mapping, and we've noted a problem with it.

13 Now, could they have done something else? Could they have done
14 some kind of other obviousness argument, or brought in something else? I
15 don't know. That's their burden. But we have addressed what they have
16 actually mapped.

17 As to the issue of actual, real-world, we've heard Tesla's counsel
18 contend that we somehow are improperly reading that into the claim
19 language. That's not the case, Your Honors. We are simply sticking with
20 the actual claim language.

21 And if you look at Slide 76, the reason that we mentioned in our
22 brief, actual, real-world sensors, and talking about the object -- this is
23 -- we're trying to explain -- that's where we're trying to explain our
24 argument. Now, we have tied it to the actual claim language, which I will
25 explain in just a short second here.

26 But it is not needed for us to import that into the claim language.
27 We're not doing claim construction. And Tesla's counsel is right about one

1 thing. We did not go and do a revised motion to amend to add those words
2 into the spec because we don't need to.

3 If we go look at the actual claim language, and at the bottom of
4 Slide 76, you can see in blue highlighting, we've highlighted 85.2, one or
5 more sensors, okay? Then, in 85.5, we've got language about a circumstance
6 detected, at least in part, by the one or more sensors. What are these?

7 Dr. Saber has explained, and we have cited to his explanation, that
8 these are sensors that are detecting things in the real world. These are not
9 sensors that are detecting something in an image. And so, that's why we
10 explained in our brief -- now, we use the words actual and real-world just to
11 kind of explain this to Your Honors.

12 The sensors, 85.2, are clearly sensors that are detecting things in
13 the real world. If we go look at Figure 4B of the '474 Patent -- of the
14 challenged Patent, there are examples. Let me just pull that up. I'm not sure
15 if I can share that on the screen, but I will try. I think due to some technical
16 difficulties of this video conference, I can't share it on the screen. But I'll
17 refer Your Honors to Figure 4A, which is clearly showing that there is
18 detection of things actually in the real-world vicinity of a device which has a
19 sensor. And in Figure 4B, you can see that there are detections that result in
20 figuring out that a cat is 6 meters away, and that a person is at a bearing of
21 287 degrees or a distance of 8 meters.

22 That's what we are trying to explain when we said, actual, real-
23 world, again in our brief, to explain the problem in Petitioner's mapping.
24 Now --

25 JUDGE AMUNDSON: This is Judge Amundson. I think I'm
26 following your argument. But if you could go to your Slide 78.

27 MR. JAIRAM: Yes, Your Honor.

1 JUDGE AMUNDSON: And then you've got Figure 9 from Zhu.
2 And it seems to me what we got in Figure 9 from Zhu is an image from an
3 actual, real-world camera. So, I don't really see how you're distinguishing
4 over what Zhu is doing.

5 MR. JAIRAM: Well, Your Honor, what's shown in Zhu, when
6 you look at the stuff that's in the red box -- or in the white box, inside the
7 bounding box, you say, well, okay, now I need to know the location of that
8 stuff, of that thing -- I guess, it's a car, and you need to know the size of that
9 thing. But what does Zhu tell us -- or rather, I'm sorry, what does Petitioner,
10 in its MTA Opposition cite and argue about that? They are specifically
11 arguing -- and I'll pull up Petitioner's MTA Opposition just so I get it exactly
12 right.

13 At page 11 of the MTA Opposition, when they are telling us what
14 they want to pick and choose from Zhu, they say, the height of the bounding
15 box, e.g., in pixels, the width -- parameter that defines the width of the
16 bounding box, e.g., in pixels -- okay, that's for the size, apparently. And the
17 first pixel coordinate that gives an X coordinate and a second pixel
18 coordinate that gives a Y coordinate.

19 So, they're giving us pixel coordinates and pixel-based size, which
20 is not telling us the size and the location of the object. When you say, what
21 is the object? On an antecedent basis, you go back and see it's the detected
22 object. So, on one hand you know, it's got to be, antecedent basis tells us it's
23 got to be the object that's detected by the sensors to trace back up in the
24 claim. And secondly, you can also go look on page 11 of the MTA
25 Opposition, when they want to do the type -- remember, I said there's A, B,
26 and C, there's three features that are within 85.11. For type, they didn't say
27 the type of the -- something about the bounding box, or the stuff inside the

1 bounding box. They said the type of vehicle detected by a given sensor.
2 That's literally what they have mapped to.

3 So, we have just applied that same mapping through and said, well,
4 hey, there's a problem then when you get to the B and C, when you get to the
5 size and location. That's just a problem in their mapping.

6 To address, Your Honor -- Judge Amundson's question very
7 precisely, are you getting the size and location of the actual car? And I say,
8 actual. Tesla's counsel would probably tear me up there and say, well, the
9 claim doesn't say actual. But you go look at it, it has to be detected by the
10 sensor. The thing that's inside that bounding box, those pixels that are, like,
11 black or white, and that the human eye interprets as a representation of the
12 actual car, those black and white, and the orange, or whatever pixels are
13 inside the bounding box, are not what is detected by the sensor.

14 If you take Petitioner's mapping, okay --

15 JUDGE AMUNDSON: I think I understand your position. You're
16 saying, they're inconsistent. For parameter A, it's the vehicle. For
17 parameters B and C, it's the bounding box, so their mapping falls apart; is
18 that it?

19 MR. JAIRAM: That's part of it, Your Honor. As noted at page 9
20 of our MTA reply -- reply in support of MTA, at page 9, the last sentence on
21 the first paragraph of page 9 says even if the Board was inclined to agree
22 with -- side with Petitioner on certain points, Petitioner's inconsistency in its
23 mapping is another basis for rejecting.

24 So, we gave two arguments. We explained substantively their
25 argument actually fails. Because you go look at the antecedent basis, what's
26 the object? Where did the object come from? It's this thing that's detected
27 by sensors. Is the thing they mapped to, actually the location and size of the

1 claimed object when you're faithful to those principles on an antecedent
2 basis.

3 And secondly, Tesla screwed up. It's mapping jumps from one
4 hand saying, for type, they're doing something. And then, for the second
5 and third things in 85.11, they're doing something entirely different
6 regarding a bounding box.

7 So, there are those two problems. And yes, the inconsistency is a
8 separate, entirely independent basis for their argument being deficient.

9 JUDGE AMUNDSON: Thank you.

10 MR. JAIRAM: I realize I might be jumping into my rebuttal time.
11 I'm aware of that. But I will, please, quickly try to address 85.13 and 85.14.

12 JUDGE CASS: Thank you.

13 MR. JAIRAM: (CROSSTALK) --

14 JUDGE CASS: You're just about going into your rebuttal time, so
15 --

16 MR. JAIRAM: Thank you, Your Honor.

17 JUDGE CASS: -- you're correct.

18 MR. JAIRAM: I'm going to go to Slide 83, please. What exactly
19 does Grotmol disclose. This is going to be relevant to the question of what
20 are the features in Grotmol. Because Petitioner asserted that features of
21 sensory input are inputted into input neurons according to Grotmol.

22 Well, Grotmol discloses that a video camera obtains images, which
23 are fed as input into a neural network. So, the images, or a portion thereof,
24 are fed into a neural network, and in particular, fed into the input of the
25 neural network. But nowhere does Grotmol disclose, or suggest inputting
26 anything other than images, or image features into the inputs of the neural
27 network.

1 And if you turn to Slide 84, we see Grotmol explaining, or defining
2 what is a feature. That's at the top, left of the slide. And also, Grotmol
3 describes image processing techniques, such as shifting or scaling, for
4 processing the pixels before providing the image features, such as corners,
5 edges -- before providing those as inputs to the neural network.

6 And if you go to Slide 85, Dr. Saber explained that Grotmol only
7 discloses those image pixels, or image features as inputs to the neural
8 network, and significantly, Grotmol does not, and Zhu also does not,
9 disclose the claimed inputting of the specifically claimed object
10 representation data structures of 85.11 and 85.12 into the input neurons.

11 Petitioner made an argument in its MTA sur-reply that we -- that
12 Patent Owner was somehow reading Zhu in isolation and not considering the
13 teachings of Grotmol. But what we did is, we looked at what is actually
14 found in Petitioner's brief.

15 So, I'm going to go to page 13 of the MTA Opposition. And I
16 don't have this on a slide, so I'm trying to address some comments that I
17 heard from Petitioner's counsel. On page 13 of the MTA Opposition, at the
18 very top of the page is where -- actually, Petitioner mentions obvious for the
19 first time in that section. "Obviousness is invoked for various limitations of
20 the substitute claim, Claim 85, but as pertinent to claim -- Element 85.11,
21 you see a lot of disclosure about Grotmol, and you see some -- I'm sorry,
22 discussion about Grotmol, some discussion about Zhu.

23 But when we actually try to figure out what exactly is their
24 obviousness theory as, of course, Petitioner is required to do, it's stated. And
25 I'm going to just read out loud the sentence on page 13, top of the page. "It
26 would have been obvious to a POSITA to apply Zhu's suggestion for
27 labeling the type of detected objects, and defining bounding boxes for

1 detected objects that provides a computer model for object-size coordinates
2 for object location" -- that's a mouthful, but notice everything I said there,
3 they're saying Zhu's suggestion of all of that, and they didn't say anything
4 about Grotmol right there. The sentence continues: "To Grotmol, for the
5 reasons described above."

6 Okay. So, they're saying, you got something in Grotmol. And
7 then, what is it that you're taking from Zhu? Now, of course, we know
8 Graham v. John Deere, and probably lots and lots of other cases, you've got
9 to figure out what are the teachings of the prior art? What are probably the
10 teachings of the claim limitations? What are the claim limitations? What
11 are the teachings of the prior art? What are the gaps or missing portions of
12 the claim limitations that are not in the prior art? And then, use some
13 rationale to do obviousness. Say, well, it would have been obvious to arrive
14 at those missing claim limitations.

15 There's nothing here that's saying, well, we're actually relying on
16 Grotmol for this, and we're relying on -- no. The Petitioner, when they had
17 their chance to set forth their obviousness theory, they're saying, we take all
18 of the stuff from Zhu, and we apply it to Grotmol. And if you read page 11
19 and page 12, it's very clear, they are clearly relying on the bounding boxes
20 and the latitude and longitude, horizontal and vertical coordinates, what have
21 you, of Zhu for this.

22 So, there's actually -- there's a pending motion to strike. There are
23 two pending motions to strike, but one of them pertains to their attempt to
24 kind of shift course and do things with Grotmol.

25 The last thing I just want to note very briefly, is if we turn to page
26 88 -- Slide 88, I'm sorry. So, neither Grotmol nor Zhu describes anything
27 other than image pixels and features as inputs. And we look to see, does

1 Zhu input its -- some data structure into an input neuron? Does Grotmol do
2 this data structure, containing these specific limited features into the input
3 neuron? No, neither limitation does.

4 And we look to see, well, what exactly is the basis then for
5 Petitioner to arrive at that? And it's conclusory. If you go look at the MTA
6 Opposition, I guess it would be page 15 on the MTA Opposition, Petitioner
7 just jumps in to saying, it would have been obvious to input all these things
8 into the neural network. And they cite their expert. And you go look at the
9 expert declaration, it says basically the same thing. It's conclusory. They
10 couldn't find this in the prior art. People may have done other things in the
11 prior art, and that could be why Petitioner couldn't find a reference that
12 discloses the claimed functionality. And they instead say, it would have
13 been obvious, and they did so in a summary fashion.

14 And what I want to say with respect to Slide 88, is that our expert,
15 Dr. Saber, has explained why this matters, okay? You might think, well,
16 hey, I could just grab anything and make that be the thing that's input into
17 the neural network, combine Grotmol with -- virtually any reference teaches
18 -- I don't know, any kind of features, and why not? Why not just do that?

19 Dr. Saber has explained that it would have been complex. It
20 wouldn't have been unusually simple or straightforward, and that's pertinent
21 because of the *Arendi* case that says, when can you supply missing
22 limitations with, basically, just an expert saying so.

23 And he's explained that you would have to do a lot to basically
24 make it work, that this stuff is hard. That you'd have to do new training, you
25 would have to -- you would have to, basically, address this.

26 Now, in their -- in Petitioner's MTA sur-reply, they just glossed
27 over all of this, and I'll just note that none of this was mentioned in their

1 MTA Opposition. And you've got to look at the actual position, and you've
2 got to look at the actual MTA Opposition to see where their arguments are.
3 The reason we have two pending motions to strike is we believe there were a
4 lot of new arguments on both the existing claim and the substitute claim side
5 that were not properly set forth at the time and place where Petitioner was
6 supposed to set forth its arguments.

7 I want to stop right there and reserve any remaining time for
8 rebuttal. Thank you.

9 JUDGE CASS: All right, Counsel. So, you've used up nine
10 minutes of your rebuttal so that will give you six minutes remaining. And
11 with that, we will turn back to counsel for Petitioner, and you have 15
12 minutes.

13 MR. RENNER: Your Honor, would it be possible to have a very
14 short break just for a minute for the facilities?

15 JUDGE CASS: Yes. Yes, we can do that.

16 MR. RENNER: I appreciate that.

17 JUDGE CASS: So, why don't we take a five-minute break.
18 Everybody, who can, just stay where we are, and. Actually, why don't we
19 -- if it's okay, why don't we just stay on the record because it might be
20 -- well, I don't know what's easier for us, to stay off the record or to get off.
21 Why don't we just stay on the record --

22 MR. RENNER: Thank you, Your Honor --

23 JUDGE CASS: -- until you get back. We'll take five minutes, and
24 we'll reconvene at -- I think -- what are we at here? Sorry, I'm still on
25 Mountain time, but.

26 UNIDENTIFIED MALE SPEAKER: It's 2:55. We'll get back
27 (CROSSTALK)

1 JUDGE CASS: It's 2:50, so we'll reconvene at 2:55.

2 (Whereupon, the above-entitled matter went off the record at 2:50
3 p.m. and resumed at 2:55 p.m.)

4 JUDGE CASS: It looks like we have everyone here, so you have
5 15 minutes, and you may begin. But I would like to, as we start, go back to
6 this question of the weights versus instruction sets. And I was wondering if
7 there is anywhere in the record you can point me to to answer the question I
8 think I asked of Mr. Jairam, which is: Is there a one-to-one relationship
9 between weights and instruction sets, such that if you have a particular set of
10 weights, you're necessarily going to get a particular set of instruction sets, or
11 are there other variables, or other things that can change the instruction sets
12 you get?

13 MR. STEVENS: And great question, Your Honor. I would say,
14 yes, there is a one-to-one relationship there, and that's what -- and I'll get
15 into this further, but I think we can discern that, both from Buibas's
16 teachings itself, but also just how a POSITA understands how neural
17 networks work. I would -- so, I'll refer, for example, to Exhibit 1022. This
18 is Dr. Janet's second declaration.

19 In paragraph 28 of the declaration, he explains how this works.
20 And I know it's been characterized by Patent Owner's counsel as if Petitioner
21 has made some type of admission here that instruction sets are not the same
22 as weights. It's not an admission, it's just an acknowledgement of how these
23 networks operated. And this is described in detail by Dr. Janet. Here, he
24 explains that a POSITA -- this is at the bottom of page 24, or marked as page
25 20 -- that a POSITA would not have conflated weights for instructions sets,
26 but the framework of Patent Owner's argument does not reflect how a
27 POSITA would have analyzed the issue in Buibas's disclosure. Although

1 weights and instruction sets are not the same, they are, nonetheless,
2 interrelated, particularly, in the context of Buibas's neural networks, which
3 are configured to output instruction sets; that is, motor commands, for
4 example, for operating a device. Weights define the strength of connections
5 between successive neurons, while instruction sets are produced at the
6 output. Weights and instruction sets are thus interrelated, insofar as the
7 output. Instruction sets produced for a given input depends on the weights
8 of connections between the input and the output. A POSITA therefore
9 would not have understood that Buibas does not specifically discuss how
10 instruction sets are combined in a merge operation because the merging of
11 weights itself has the effect of configuring the connections between the input
12 and output neurons that allow the offspring to produce instruction sets
13 corresponding to the combined capabilities of the device.

14 So, if we tie that back to what we've seen in Buibas's disclosure,
15 and I think Judge Cass, he correctly referred to paragraph 153 in Buibas,
16 which tells us that the output of the neural network, paragraph 153 reads the
17 neuromorphic apparatus, 1130, is also configured to provide output, which
18 can include a motor command. That's consistent with Dr. Janet's testimony
19 and our explanation of how the merge operation takes place in Buibas.

20 "Weights were attributes of the network --

21 JUDGE CASS: Counsel.

22 MR. STEPHENS: I'm sorry. Yes, Your Honor.

23 JUDGE CASS: No, go ahead. I didn't mean to interrupt.

24 MR. STEPHENS: Okay. So, there's no -- we're not conflating the
25 two, but there is a correspondence between the weights that are merged in
26 the merge operation and what the output of the neural network is. With the
27 weight --

1 JUDGE CASS: So, I'm looking at -- I'm looking at paragraph 28
2 of Exhibit 1022. And, I mean, certainly Dr. Janet says that weights and
3 instructions sets are interrelated. I'm not sure that necessarily means there's
4 a one-to-one correspondence, and also says that the merging of weights
5 allows the offspring to produce the instructions -- or has the effect -- I'm
6 sorry, that the merging of weights has the effect of configuring connections
7 between input and output neurons that allow the offspring to produce
8 instruction sets corresponding to the combined capabilities of the parents,
9 but, I don't know, I guess I'm not sure if that's really telling us whether
10 there's one-to-one correspondence or not. I mean, clearly there's an
11 interrelationship, and the weights have an impact on the instruction sets. But
12 I guess from reading this, it's not clear to me whether other things could too,
13 or if you've got the same weights, you're always going to get the same
14 instruction sets. That's sort of what I'm wondering about.

15 MR. STEPHENS: I think, to go back to the backdrop of the '474
16 Patent itself. We reviewed the disclosure. What have they offered to tell us
17 how they're bringing together knowledge from different devices? All that
18 they pointed to is model A, that basic feedforward neural network. They
19 don't describe any training, in particular, to bring together that knowledge.
20 They don't describe the distinction between weights and instruction sets. A
21 POSITA is assumed to understand that it's the weights that define how the
22 neural network operates. The output, because it's been -- because the neural
23 network has been trained on data for multiple devices, produces instruction
24 sets for operating multiple devices.

25 And so, in all of these distinctions that Patent Owner has raised in
26 its brief, are all directed to unclaimed features and things that the patent
27 itself tells us a POSITA would understand. But I think that Buibas is quite

1 clear, nonetheless, with much more extensive disclosure than the patent
2 itself as to how its merge operation works. It tells us the result of the merge,
3 I think demonstrates the correspondence between weights and instruction
4 sets.

5 When we look at paragraph 103, when we look at paragraph 225,
6 paragraph 70 and 71 of Buibas, they're all saying, why do we do the network
7 -- that merge. It's so that we can realize the capabilities of the parent
8 networks and the merged offspring.

9 Our expert has explained that that means to exhibit the capabilities
10 of the parents, you have to produce the same instruction sets as the parents.
11 And it's consistent with Figure 5B, which we looked at earlier. When we
12 take the weights from each of the parents in a merge operation, we are
13 defining neural pathways through the neurons, using the same weights, the
14 same connections as the parents, thereby producing the same instruction sets
15 at the output of the merged device. And that's what our expert has said.

16 It seems to us, that the way that Patent Owner is challenging
17 Buibas's disclosure is to somehow say -- and they haven't directly come out
18 to say it, because it'd be quite a high burden to say that Buibas's disclosure is
19 not enabling. Buibas is telling us what its network does -- it merged the
20 parents to produce a combined set of capabilities, and it tells us the
21 algorithms of how you do that, we merge the weight factors. And yet, Patent
22 Owner's counsel is saying, well that's somehow -- they're saying that won't
23 work. I don't think that's a credible position. Buibas, while we've cited here
24 the pre-grant publication, it issued as a U.S. Patent that's presumed to be
25 valid and enabling. This is also a device by Brain Corp. that actually
26 produces these products.

27 JUDGE AMUNDSON: This is Judge Amundson. On the

1 complexity point, with regard to merging the weights, it seems to me like
2 there may be a problem if, for example, you've got a vehicle, and trainer A
3 trains it to speed up to go through a yellow light and trainer B trains the
4 vehicle to slow down for a yellow light. But it also seems to me you could
5 have a situation where you're training robot A to play soccer and robot B to
6 play chess, and you're not going to have any conflict at all -- any conflicting
7 instructions. So -- and it seems to me that the claims are broad enough to
8 cover that second situation, where there wouldn't be a conflict and it
9 wouldn't be problematic. Do you want to comment on that?

10 MR. STEPHENS: I would agree with that, Your Honor. I think
11 the claims -- there's no requirement that we see in the claims for the
12 capabilities of each device to be non-overlapping or anything of that sort. I
13 think when we look at Figure 5B in Buibas, we're creating the same neural
14 connection so that, at least for some inputs, maybe not all inputs, you're
15 going to get outputs that correspond to the instruction sets of each of the
16 parents.

17 JUDGE AMUNDSON: Okay. All right. Thank you.

18 MR. STEPHENS: Thank you. I'd like to just also touch on a few
19 points with respect to the Opposition to the motion to amend.

20 JUDGE CASS: Yes. And, Counsel, this is Judge Cass, I would
21 like to hear, in particular, your response on substitute claim Limitations
22 85.13 and 14.

23 MR. STEPHENS: Yeah. If there's a specific point that you had,
24 I'd be happy to respond to that.

25 JUDGE CASS: Yeah. I mean, I think that the argument that
26 Patent Owner made was that -- what's being -- the added limitation requires
27 inputting object representation data structures into input neurons, and that's

1 not how Grotmol does it, it's just inputting pixels, or features, or things like
2 that.

3 MR. STEPHENS: Yes, Your Honor. I think a few responses to
4 that. And we've addressed this in our sur-reply in the briefing. I'll just note
5 that at the first instance, beginning at page 9 of our motion to amend sur-
6 reply.

7 But I think Petitioner's arguments in the reply disregarded aspects
8 of Grotmol's disclosure in a way that I don't think properly credited what it's
9 actually teaching. In their reply, the emphasize that Grotmol's neural
10 network is configured to process images and also features. But what
11 Grotmol also tells us, is that those features can include object -- indications
12 of detected objects in the images, as well as features of those objects,
13 including object size and location. That wasn't addressed in their reply. So,
14 it's neural network is already configured to process attributes of objects
15 detected in images or by other representations of the environment captured
16 by the robot.

17 And the other thing -- going back to the '474 Patent. When you
18 look at the substitute claim it's quite lengthy, like defined a very specific
19 type of object representation data structure, and then you compare that to the
20 disclosure of model A, Figure 17 of the '474 Patent, there's no description
21 there of how to process the specific inputs as claimed, and instead it leaves it
22 up to a POSITA. And I think it goes back to the inventor's explanation, that
23 we can decouple, in their view, the functionality disclosed in the patent,
24 from the particular model used, and it leaves to a POSITA to understand
25 how you would format a data structure, for example, to be processed by the
26 neural network.

27 JUDGE AMUNDSON: Thank you, Counsel.

1 MR. STEPHENS: I did want to note, with respect to Zhu, Patent
2 Owner's counsel, again referenced an apparent lack of -- in their view,
3 disclosure in Zhu of actual, real-world size and location. I just direct Your
4 Honors again to two passages in Zhu. The first is at column 15, lines 1
5 through 20.

6 In this passage, we had cited in our Opposition to the motion to
7 amend. It did not come in after the reply. It was not addressed in Patent
8 Owner's reply, but we had cited it. In there, Zhu specifically describes that
9 the object label parameters, that is for the bounding box, can include, quote,
10 "The physical height or elevation of the object, using physical units." And
11 they give an example of 3 meters above sea level, 2 meters above sea level.
12 So, they're not talking about just the width or height of the bounding box in
13 the image, they're describing actual, physical characteristics of the object
14 that's represented by that bounding box.

15 And then, again, column 20, lines 34 to 40 of Zhu, just emphasizes
16 that point again. Here it says that the object label deviations may be
17 measured in physical units, e.g., centimeters, meters, et cetera. And then, in
18 the next sentence, it explains that the deviations may be assigned values
19 based on the physical characteristics of the objects.

20 So, even if we were to assume that -- and we don't agree that the
21 claims demand this, but even if actual, real-world were inputted into the
22 claims, we still have express disclosure in Zhu that gets us there.

23 JUDGE CASS: Okay, Counsel, I think you're out of time, so thank
24 you very much. And with that, we will turn to counsel for Patent Owner,
25 and you have six minutes remaining in your rebuttal.

26 MR. STEPHENS: Thank you, Your Honors.

27 MR. JAIRAM: Thank you, Your Honors. Again, this is Arvind

1 Jairam on behalf of Patent Owner. And I have six points on rebuttal;
2 coincidentally, there are six minutes. I was actually trying to stay to five
3 because it's a nice, round number, but I just came up with another one based
4 on what I just heard.

5 First point, I'll just note that, if you go look at the petition, what
6 does it say about our Claims 56 and 57? You've got approximately three
7 pages of discussion. You go look in the Petitioner reply, probably more than
8 ten pages on these various pertinent issues. Of course, Patent Owner has
9 streamlined this IPR, but that should not be a vehicle for Petitioner to get to
10 shoehorn a bunch of new argument in -- via the Petitioner reply and
11 accompanying secondary declaration of Dr. Janet.

12 Second point, as to the one-to-one correspondence, we heard
13 Petitioner's counsel just now mention something from Dr. Janet's second
14 declaration. I'll note that all of that, as well as the accompanying argument
15 is, again, not in the petition. It's brought up in the reply, when we pointed
16 out deficiencies through our Patent Owner response. There is no one-to-one
17 correspondence. You can merge, as Buibas says, the weights from two -- I
18 guess, merge two sets of weights, or vectors of weights to get a new vector
19 of weights, but that is not teaching instruction sets. We have clearly got
20 testimony from Dr. Janet about instruction sets being commands. You've
21 got Petitioner's own mapping in its petition, saying that they are mapping it
22 to commands. So, the merger of weights is not teaching instruction sets.
23 Interrelated, I don't even know what that means. Probably everything could
24 be explained to be interrelated to everything else. I don't even know what to
25 say about that.

26 Third point, the pixels and the bounding box in Zhu reside in an
27 entirely different coordinate space than the car that Zhu is concerned with.

1 The car, the passenger, the vehicle, the dog that -- for the label for object
2 type, they're figuring out, okay, this dog is a dog, it lives in a physical
3 coordinate space. Coordinate B of our patent shows we care about figuring
4 out the coordinates of that dog that I detected, or that cat is 3 meters away.
5 That's a different coordinate space, entirely, than the pixel coordinate space
6 that Petitioner has very assiduously mapped. They have explained it.
7 They've got good explanation of pixel X, Y, horizontal, lat, long -- latitude,
8 longitude, but it's different coordinate space. These are different things
9 we're talking about.

10 Fourth point, we are not saying that Buibas is non-enabling. First
11 of all, I think that would even be a new argument for Petitioner to even say
12 to them, we are saying that it is non-enabling, because I don't even
13 remember that argument. We are saying, that Petitioner's argument is ill-
14 formed and faulty, and whatever a synonym for non-enabling is, but it's how
15 Petitioner is relying on the prior art. They are free, as the master of this
16 proceeding, to pick and choose, not just from the prior art that we've been
17 talking about, from any prior art in the whole wide world. They had chosen
18 to make their arguments in a certain way, and we are finding fault with their
19 construction of the arguments. We have not asserted that Buibas is non-
20 enabling, and I think that there's actually a bit of legal Jujitsu to kind of
21 make it seem like we have the burden on that. We don't have the burden on
22 that, and we wouldn't have even tried to take that because -- well, I'm not
23 -- we're not trying to take on additional burdens.

24 Fifth point, as to Zhu 15:1 to 20, I'll turn briefly to Slide 79, and I
25 hope that me pulling up this technical sharing doesn't eat up too much of my
26 time here, but bear with me, please. Actually, I'm just going to refer to it
27 because I don't think I have time to pull it up. Slide 79, we've pointed to the

1 parts of Zhu that they've actually cited. Additionally, we've noted in our
2 MTA sur-reply, that Petitioner made new arguments, okay? We even filed a
3 motion to strike, it's pending. Specifically, the MTA sur-reply at page 6,
4 that we filed -- I'm sorry, MTA sur-reply that Petitioner filed at page 6, relies
5 on a newly cited portion of Zhu, and another portion that was cited for a
6 different purpose to argue that Zhu discloses, quote, "Distances of detected
7 objects and 3-D images." It basically elaborates on a lot of this stuff about
8 physical features and 15:1 to 20.

9 I'll note, that when Petitioner had its chance to do whatever it
10 wanted in its MTA Opposition, they buried 15:1 to 20 on page 12 in a see
11 also cite. That's a see also cite that doesn't even really make any sense,
12 because they just finished talking at page 11 and into page 12 about
13 bounding boxes and pixels, and then they've got a see also in 15:1 to 20, not
14 even a quote, no parenthetical, explaining what part of that they're referring
15 to, but just a see also cite. You just have to look at their discussion of the
16 85.11 on pages 10 through 12, and a little bit into 13, in the MTS Opposition
17 to see what they're talking about. And it is apparent that they are now trying
18 to bring in new arguments. That's why we filed a motion to strike.

19 And six --

20 JUDGE CASS: Hey, Counsel, you have gone out of time.

21 MR. JAIRAM: Could I just say one sentence, please?

22 JUDGE CASS: Well, I think we cut Petitioner off, so I'm kind of
23 reluctant to give extra time because then we might have to call them back --

24 MR. JAIRAM: Okay. But it just pertains to something that is a
25 new argument. May I make it apart from my -- you asked that we refrain
26 from making objections during their thing. Can I make one sentence about
27 an injection?

1 JUDGE CASS: Is it in the motion to strike?

2 MR. JAIRAM: No, because it's a new argument we heard just
3 now for the first time.

4 JUDGE CASS: All right. Well, I will give you 30 seconds, and
5 then I will give Petitioner --

6 MR. JAIRAM: Thank you, Your Honor, I just need less than 30
7 seconds. Petitioner's counsel mentioned a Brain Corp. device -- a Brain
8 Corp. that actually produces these products. That is new argument, attorney
9 argument, and it should be stricken, it's not in the record. With that, I have
10 nothing else, thank you.

11 JUDGE CASS: Okay, thank you. Petitioner, I'll give you the
12 opportunity to respond to that last sentence if you want to do so for 30
13 seconds. I'll leave that up to you.

14 MR. STEPHENS: Thank you, Your Honor. I'll just mention, in
15 our Oppositions to the motions to strike, we cited case law that I think is
16 relevant here. The arguments that we've made in our papers are both
17 consistent with the theories, and also, we should have the right to respond to
18 the arguments that they've advanced in their papers, and that's what we've
19 done.

20 JUDGE CASS: Okay, thank you. All right. With that, this
21 hearing is now concluded. I want to thank counsel for -- both Petitioner and
22 Patent Owner for very well-organized, well-presented presentations. It's
23 clear that you both put a lot of time into your presentations, and it showed,
24 and we very much appreciate it. We will take this matter under advisement,
25 and we will issue an opinion in due course.

26 With that, the hearing is adjourned. I take it -- well, before I
27 adjourn the hearing, I would just ask the parties, are there any procedural

IPR2024-00745

Patent 11,663,474 B1

1 matters that need to be raised before I adjourn the hearing?

2 MR. STEPHENS: Nothing from Petitioner. Thank you, Your
3 Honors.

4 MR. JAIRAM: Nothing from Patent Owner. Thank you.

5 JUDGE CASS: All right. With that, this hearing is adjourned.

6 (Whereupon, the above-entitled matter went off the record at 3:21
7 p.m.)

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