

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

TESLA, INC.,
Petitioner,
v.
iQAR INC.,
Patent Owner.

Case No. IPR2024-00499
U.S. Patent No. 10,829,002 B2

PATENT OWNER'S RESPONSE

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TABLE OF EXHIBITS

Exhibit	Description
2001	Declaration of Dr. David M. Bevly
2002	Transcript of the November 1, 2024 Deposition of Dr. Vassilios Morellas
2003	Demonstrative Exhibit from the November 1, 2024 Deposition of Dr. Vassilios Morellas

I. INTRODUCTION

Patent Owner iQar Inc. submits this response to Tesla, Inc.’s Petition for *Inter Partes* Review (Paper 1, the “Petition”) of U.S. Patent No. 10,829,002 (the “’002 patent”).

The Petition has not shown that the challenged claims are unpatentable as obvious. There are fundamental differences between the ‘002 patent’s claims and the primary prior art reference on which the petition here relies (Kudo 325). The ‘002 patent discloses—and the claims require—a system and method that predicts a vehicle’s destination by analyzing sensor data collected and stored as a vehicle travels. This analyzed sensor data must then be used with particular types of historical data—including data regarding route segments and sequences of route segments previously traveled by the vehicle—to predict the vehicle’s destination. This is not what the prior art discussed in the Petition teaches.

First, the Petition only points to Kudo 325’s storage of historical information relating to particular points or locations (which Kudo 325 calls “nodes”) through which a vehicle previously traveled. Kudo 325’s historical data does not distinguish between the many different routes the vehicle may have traveled between these stored points. Showing this, Kudo 325 explains that its system records any intersection where the vehicle proceeded in different ways as nodes. But it ignores intersections the vehicle simply passed through. Thus, while the stored data

indicates points the vehicle passed, it purposefully does not record or indicate the how the vehicle actually got from one point to another. This, however, is what the claims here require: “data ... regarding” “multiple route segments” (portions of a route, not just individual points along a route) and “multiple sequences of route segments” (sequential portions of a route) must be stored.

Second, none of the prior art teaches “predicting a destination” using the types of data required by the ’002 patent’s claims. The claimed “predict[ion]” must be based on both a detected “pattern” and the specific types of stored “historical data.” As the prior art identified in the Petition does not store the required “historical data” it also cannot make the claimed type of prediction.

Finally, the art does not teach what dependent claims 2, 3, and 10 require. Claims 2 and 3 require storage of “map coordinates.” The Petition’s prior art stores only nodes, not map coordinates. Claim 10 requires transmission of both a prediction and historical data to a remote database. While the prior art in the Petition does reference remote databases, when historical data is transmitted to this database it is the database—and not the vehicle—that then performs the prediction. Thus, no prediction will be transmitted as the claim requires.

II. ARGUMENT

A. The '002 Patent's Invention

The '002 patent relates to “methods and systems for controlling power applied to a vehicle....” (Ex. 1001, 1:15-16.). The patent explains that “FIGS. 1A and 1B compare a traditional ‘cruise control’ device (in FIG. 1A) to” the patent’s “power management device ... (in FIG. 1B).” (*Id.*, 6:51-53.) In Figure 1A, “[a]s the vehicle moves across ... roads having different elevations ..., or through different weather conditions, the traditional cruise control device adjusts the power supplied to the vehicle[] (and thus the speed) based only on the set velocity” and the vehicle’s current condition. (*Id.*, 6:53-64.) In other words, in prior art systems, speed and power determinations are made for individual points along a travel route. (*See id.*)

This type of “velocity control ... cruise control device” is different from that of the '002 patent shown in FIG. 1B. (*Id.*, 6:64-65.) In that figure, “the power management system receives ... information” regarding “the location and grade (e.g., steepness of any uphill/downhill portions) of the road, the distances traveled.” (*Id.*, 7:1-4.) Using this, along with “information about the state of the vehicle,” “the power management system may calculate applied power to the engine, and may derive a speed (or set of speeds) that optimizes the applied power.” (*Id.*, 7:8-17.) By tailoring the vehicle’s speed and applied power to better match variations along the route to be traveled—such as grade, wind resistance, and the like—the '002

patent reduces power consumed by the vehicle compared to a typical “cruise control system.” (*Id.*, 7:17-21.)

Fundamental to the ’002 patent’s power management system is the ability to “deduce[] information about the” vehicle’s destination and “route.” (*Id.*, 7:4-8.) Once determined, the route “may be broken up into segments that may be used by [the] power management device to optimize the power needed to travel th[e] segment.” (*Id.*, 14:2-5.) “The more segments that the route is split into, the more accurate” the power optimization. (*Id.*, 14:30-34.)

According to the ’002 patent, the vehicle’s destination—and thus the route it will travel—may either be “explicitly provided by the operator ... or it may be derived” to determine the vehicle’s “most likely destination[.]...” (*Id.*, 11:51-12:17; *see also id.*, 2:65-3:3 (noting that the system is able to “infer the driver’s destination based on ... the information inputs to the system”).) As part of this, the system receives various “inputs” or “information” relating to the operator, the vehicle, and the vehicle’s environment. (*Id.*, 7:27-38.) This “information” “may be directly measured (e.g., by sensors or other inputs) ... or it may be derived from other information inputs....” (*Id.*, 7:38-41.) “The power management device may” also “refer to a record of historical route information” when determining the vehicle’s route and destination. (*Id.*, 17:31-35.) This record can include a “memory or data structure that holds information on routes or segments [of] routes that the vehicle

has previously travelled.” (*Id.*, 17:32-35.) Importantly, data regarding portions or “segments” of routes is stored, not just data regarding individual points or locations. (*See id.*) This enhances the system’s ability to “determine a probable optimal speed at each point along a route.” (*Id.*, 17:56-59.)

B. Claim Construction

Patent Owner submits that none of the terms of the ’002 patent’s claims require express construction. The claims can be afforded their ordinary meaning. The Petition does, however, employ erroneously overbroad understanding of certain claim elements that effectively read these elements out of claims. This includes, for instance, the elements requiring the storage of “data, regarding ... route segments” and “multiple sequences of route segments.” Each of these elements—and their ordinary meaning—will be discussed in greater detail below.

C. The Petition Has Failed to Show Obviousness

The ’002 patent includes three independent claims: 1, 15, and 16. Petitioner makes the same general argument in connection with each of these claims. Kudo 325 is cited for most claim elements. In particular, according to Petitioner Kudo 325 purportedly teaches a system that collects sensor data and predicts a vehicle destination using that sensor data and stored historical data. *See* Petition at 5-11. Petitioner relies on another reference—Kudo 066—for its teachings of vehicle

position determination via GPS and storage of position information using a server.
Id. at 11-12.

As explained below, this combination of art does not teach what claims 1, 15, and 16 of the '002 patent require. The art also does not teach the additional elements added by dependent claims 2, 3, and 10.

1. Independent claims 1, 15, and 16

Again, numerous of the elements requires by independent claims 1, 15, and 16 are missing from the prior art.

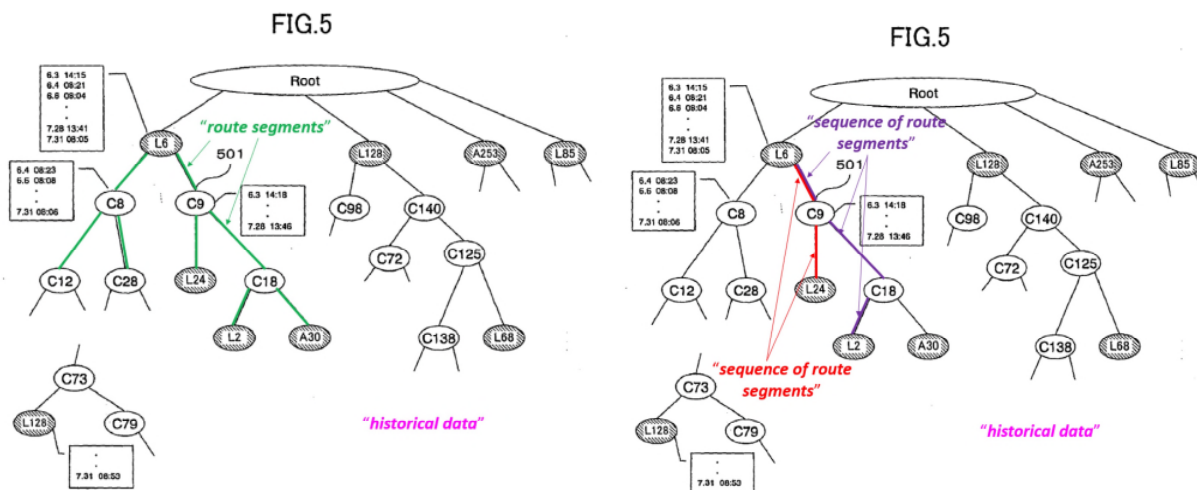
- a. ***“[H]istorical data compris[ing] ... data, regarding multiple route segments ... data, regarding multiple sequences of route segments”***

Claims 1, 15, and 16 all require storage (and then use) of specific types of “historical data.” This “historical data” must include “data ... regarding multiple route segments” and “data ... regarding multiple sequences of route segments.” In other words, data regarding **portions** of a route (and not just **individual points** along a route) must be stored. The Petition failed to establish that the prior art teaches what this element requires.

To begin, a “route segment” is plainly more than a single point along a route. The '002 patent explains that a “segment” “may comprise any distance to be traveled, including the entire route, or small portions of the route.” (Ex. 1001, 14:2-8.) In one example, “[t]he entire route ... may be divided up into N segments.” (*Id.*,

14:30-34; 18:24-27 (similar).) Put another way, a “route segment” is some portion or fraction of the “route” being traveled by a vehicle. Such a route “segment” is different from single points along a route, which the ’002 patent alternatively refers to as “segment destination[s],” “intermediate” destinations, “intersection[s],” or “junctions.” (*Id.*, 5:21-25; 12:65-13:12; *see also* Ex. 2001, ¶¶ 72-84.)

The Petition seems to agree that this is what the term “route segment” means in the ’002 patent’s claims. Rather than identifying the “nodes” stored by Kudo 325 as “route segments” (the nodes represent individual points along a route), the Petition instead highlights the *space* between these nodes. An example of this is shown in the below annotated versions of Figure 5 of Kudo 325 in the Petition:



Petition at 54-56. According to the Petition, green annotated “connections between nodes” in the figure to the left are purportedly stored “route segment[s]” because they “represent[] a portion (e.g., segment) of a route extending from a starting node to a destination node.” *Id.* The red and purple annotations in the figure to the right

purportedly show stored “sequences of route segments.” *Id.* at 55-56. So, per the Petition, only “portion[s]” of a route—not individual points or locations—constitute “segments.”

While the Petition is of course correct that a “route segment” must span a “portion” of a route, it mischaracterizes the data that Kudo 325 actually stores. The portion of Kudo 325 relied upon by the Petition discusses the storage of only two types of data, neither of which are the types of “historical data” the ’002 patent’s claims require.

First, as shown in Figure 3, Kudo 325’s system stores a record of an entire route. (*See, e.g.*, Ex. 1004, Fig. 3; *see also id.*, [0087] (noting that “travel history” can be stored in “segments” “from engine start (travel start) to engine stop (travel end),” “from departure from home to going back home,” or for an entire “day”).) The Petition does not allege that this constitutes storing “data ... regarding route segments” or “data ... regarding multiple sequences of route segments.” Instead, the Petition points only to Figure 5 when attempting to explain why the prior art teaches the storage of the types of “historical data” the claims here require. (*See* Petition at 54-56.)

Figure 5 depicts the storage of the second type of data referenced in the portion Kudo 325 on which Petitioner relies. Kudo 325 calls this “transition state” data. (Ex. 1004, ¶ [0093].) Here, a collection of “nodes” (intersections, landmarks, or

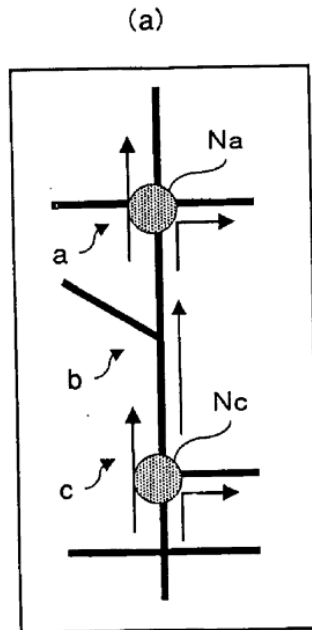
specific areas through which a vehicle has passed) are stored in a tree-like data structure. (See *id.*, ¶¶ [0081]-[0085], [0093].) Each node includes “state information” like “dates and times” “indicating that the automobile departs from, passes through or arrives at the node (data indicated in rectangular areas in FIG. 5). . . .” (*Id.*, ¶ [0093]-[0094].) While Kudo 325 is not entirely clear on exactly what form this data takes, the data structure also includes “transition state” data for each node. (See *id.*) This can include “histories of past node transition[s] from the respective nodes as base points.” (*Id.*, ¶ [0093].) This appears to essentially be—for any given node—a list of (or pointers to) all other nodes to which the vehicle previously traveled from that node. (See *id.*) Thus, example node C9 in Figure 5 will list both nodes L24 and C18, as the vehicle traveled to both these nodes from C9 at some point. (See *id.* at Fig. 5.) “[I]nformation relating to the degree of transition” from one node to another can also apparently be stored. (See *id.*, ¶ [0093].) This is the **only** stored historical data identified by the Petition. The Petition **does not** point to the storage of any data regarding what occurred—or what path the vehicle traveled—between the different nodes in Kudo 325’s transition state data. (See also Ex. 2002, 10:16-16:25 (Petitioner’s expert confirming that Kudo 325’s “transition state data” stores only nodes, time/date, driver information, weather information, and a list of other nodes).)

This is not the type of “historical data” required by the ’002 patent’s claims. No “data ... regarding multiple route segments” (*i.e.*, portions of a route) is stored. Instead, Kudo 325 simply stores data relating to individual **points** along a route. Again, each of Kudo 325’s “nodes” represent specific “intersections, landmarks [or] area names” passed by a vehicle. (*Id.*, ¶ [0081]; *see also* Ex. 2002, 16:6-17:13.) And in the portion of Kudo 325 on which Petitioner relies, this “transition state information” includes only, for each node, (1) the dates/times when a vehicle passed through the node (the data in the “rectangular areas” shown in Figure 5) and (2) a list of other possible nodes the vehicle previously went to from that node (the “transition state information”). (*See* Ex. 1004, ¶ [0093].) No “data ... regarding ... route segments”—data relating to portions of a route traversed by a vehicle—is stored. Point specific data provides no information regarding an actual route, or a portion of an actual route that was traveled. In other words, Kudo 325’s transition state information is simply information about what occurred (or could possibly occur) at particular points. While the data indicates that the vehicle passed through particular points at particular times, it provides no information regarding the route the vehicle traveled between the points. This, however, is what the claims here require: data regarding **“route segments.”** (*See* Ex. 2001, ¶¶ 85-104.)

Moreover, no “data ... regarding multiple sequences of route segments” is stored. Even if one considered Figure 5’s storage of a list of (or pointers) to

possible adjacent node transitions to constitute the storage of “route segments” (it is not), each node will include only a list of immediately adjacent nodes. No node stores any list or sequence of nodes beyond those that are immediately adjacent. As a result, there would be only storage of “route segments” and no storage anywhere in Kudo 325’s transition state information of “**sequences** of route segments.” The claims here require storage of “data ... regarding” “multiple” such sequences.

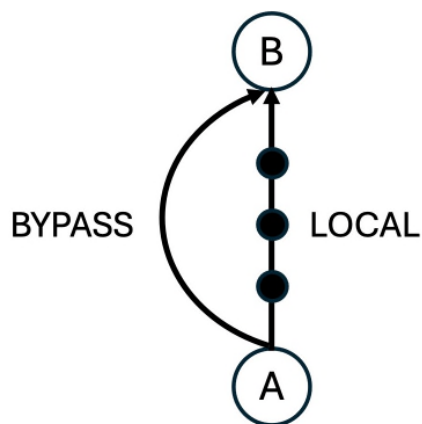
Not only does Kudo 325 only store historical data in the form of points/nodes (and not route segments), but the point-based data that is stored is **incomplete**. This further distinguishes it from the claims. According to Kudo 325, a “node judgment section 102” determine when nodes should be stored. (Ex. 1004, ¶ [0078].) And an intersection is only recorded as a node if the vehicle “travelled in two or more directions” when passing through that intersection. (*Id.*, ¶ [0059]; *see also id.*, ¶ [0085] (similarly noting that “intersections that the user’s automobile has traveled in two or more directions” are stored as nodes).) FIG. 30(a) provides an example. Here, because “the user has traveled in two directions through the intersections a and c,” these “intersections ... are set as nodes Na and Nc...” (*Id.*) But, since the “user has traveled in only one direction” through “intersection b” and never turned this intersection “is not set as a node.” (*Id.*)



(*Id.*, Fig. 30(a); *see also* Ex. 2002, 20:14-22:11, 29:5-16 (recognizing that in Fig. 30(a), Kudo 325 ignores intersections where the vehicle travels in only one direction).) So, as can be seen, Kudo 325’s transition state data stores point-based information, but purposefully **ignores** the route traveled between those points. Moreover, nodes previously stored in Kudo 325’s historical database can also be removed from that database “if the user travels in only one direction through the intersection ... for a past predetermined period....” (Ex. 1004, ¶ [0086].) Kudo 325 also explains that even if a vehicle does occasionally travel in multiple directions when passing through an intersection, only “a node appearing with a frequency exceeding the predetermined value in generating the transition state information from the travel history” is saved. (*Id.*, ¶ [0109].) Less frequently traversed nodes

are ignored. (*See id.*) According to Kudo 325, this “increase[es] the retrieval efficiency by reducing the size of the data to be retrieved.” (*Id.*)

The below demonstrative provides an example of the impact this all has on Kudo 325’s transition state data. In this example, a vehicle passed through intersections A and B when traveling. When doing so, it sometimes took a bypass route with no intermediate intersections. It also sometimes took a local route that does have intermediate intersections. When passing through these intermediate intersections the vehicle never (or at least very infrequently) turned. Instead, it simply passed through the intermediate intersections traveling in the same towards intersection B:



(*See Ex. 2001, ¶¶ 104-113.*) In such circumstances, Kudo 325 will record **only** nodes A and B in its transition state data. None of the intermediate intersections on the local route will be recorded as nodes because the vehicle never (or infrequently) turns at those intersections. As a result, Kudo 325 **will not distinguish between—** and **saves no information regarding—**the actual route the vehicle took between

intersections A and B. Only intersections A and B are saved, along with the fact that the vehicle arrives at intersection B—via some unspecified and unknown route—after leaving intersection A. (*See id.*, ¶ 114-115.) It is impossible to tell what route was followed from this data. Once again, the '002 patent's claims require "historical data" that includes "data ... regarding ... route segments." Because Kudo 325's transition state data is indifferent to the route taken and relates only to the individual intersections, landmarks, or areas the vehicle visited, it is not what the claims require. (*See id.*, ¶¶ 116-126.)

Petitioner does not account for the differences between how Kudo 325 patent stores data and what the claims of the '002 patent requires. Instead, it simply assumes that—because it can draw lines purportedly corresponding to route segments onto Figure 5—Kudo 325 already stores "data ... regarding multiple route segments" and "data ... regarding multiple sequences of route segments" as the claims require. But this is not what is stored in the embodiments of Kudo 325 on which Petitioner relies. These embodiments store **only** data relating to individual nodes or points, not the routes traversed between those nodes. Again, Kudo 325 purposefully ignores the actual route taken between the various nodes stored in its databases. By failing to recognize the differences between how Kudo 325 stores historical data and the "historical data" in the '002 patent's claims, the Petition has

not met its burden. Petitioner's expert does no better and once again does nothing more than repeat the Petition. (See Ex. 1003, ¶¶ 151-165.)

Similarly, neither the Petition nor Petitioner's expert explain why a POSITA would have considered it obvious to modify Kudo 325's "transition state information" to store not just node-specific data, but also "data ... regarding" "multiple routes segments" and "multiple sequences of route segments." Instead, both incorrectly assume that Kudo 325 already teaches what the claims require. "The petitioner's petition ... guide[s]" the scope of an IPR proceeding. *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1355-56 (2018). Here, the only allegation in the Petition is that Kudo 325's "transition state information" already includes the "historical data" required by the claims. It does not.

In assessing the claims in its decision institution review, the Board noted that the '002 patent's claims must embrace the point-based historical data stored by Kudo 325 because an earlier element in claim 1 references a "memory configured to store said sensor data samples for different points in time along a route segment traveled by said vehicle." Institution Decision at 16. These "sensor data samples" that are "store[d] ... for different points in time along a route segment" are, however, collected "during operation of the vehicle." (Ex. 1001, Claim 1.) In other words, it relates to data gathered during the vehicle's **current operation**. In contrast, the claimed "route segments" are "**historical data**." (*Id.*) Because the "sensor data

samples” and “route segments” are two different types of data collected at two different times, the earlier reference in the claim to “sensor data samples for different points in time” says nothing about the later “route segments.” It certainly does not mandate that “route segments” be interpreted in a way that deviates from its ordinary meaning. (See Ex. 2001, ¶¶ 127-130.)

b. “[P]redict[ing] a destination”

Claims 1, 15, and 16 all also require “predicting a destination of a driver.” This “predict[ion]” must be made “in response” to both a detected “pattern” and the required types of stored “historical data.”

The systems of Kudo 325 and Kudo 066 do predict a vehicle’s destination. But they do not do so “in response” to a “pattern” and the types of “historical data” the ’002 patent’s claims require. As explained above, rather than storing and assessing the type of “historical data” required by the claims—“data ... regarding” both “multiple route segments” and “multiple sequences of route segments”—Kudo 325 stores and assesses only data relating to particular “nodes” or points through which a vehicle has previously traveled. (See *id.*) In other words, any “predict[ion]” of a destination made by Kudo 325 or Kudo 066 is not premised on the types of data the claims of the ’002 patent require. (See Ex. 2001, ¶¶ 131-135.)

2. Dependent claims 2, 3

Claims 2 and 3 depend on claim 1. Again, claim 1 requires a “memory configured to store said sensor data samples.” Per the claim, “at least one of said sensor data samples comprises telemetry data.” Dependent claim 2 requires that claim 1’s “telemetry data comprises map coordinates determined in response to a GPS signal.” Claim 3 provides that this same “telemetry data comprises map coordinates determined by a map service.” So, both claims 2 and 3 require storage of “map coordinates” in memory.

Kudo 325’s and Kudo 066’s “power management device” does not store the claimed “map coordinates.” Kudo 325 does include a “position detection section that detects information on the current position of the car navigation system.” (Ex. 1004, ¶ [0077].) So, in these references’ system, “position information such as latitude and longitude” is collected during vehicle operation. (*Id.*, ¶ [0090].)

But the system does not store the position information it collects. Instead, upon collecting position information, Kudo 325 employs a “node judgement section 102” to determine “whether the current position is a node or not by referencing the map information DB 103.” (*Id.*, ¶ [0090].) If “the current position” is determined “to be a node an ID number indicating the node is accumulated in the history accumulation DB 104....” (*Id.*) Kudo 325 explains that nodes represent “intersections, landmarks, area names, and the like.” (*Id.*, ¶ [0081].) Moreover,

rather than corresponding to discrete coordinates on a map, each node is associated with “ranges” of such coordinates. (*Id.*, ¶ [0082].) For example, “an intersection and a landmark” may correspond to “a range” of positions “within a 10-m radius of a representative point as a center.” (*Id.*, ¶ [0083].) And an “area” may correspond to a “range” of positions “within a 1-km radius of a representative point as a center.” (*Id.*; *see also* Ex. 2002, 18:3-8 (agreeing that Kudo 325’s coordinate-to-node conversions are stored in a separate database than the transition state information).)

So, in sum, rather than storing “map coordinates” as claims 2 and 3 require, the system of Kudo 325 and Kudo 066 stores only nodes. The nodes are not map coordinates. Instead, they represent intersections, landmarks, and areas that extend over and correspond to a range of different map coordinates. (*See* Ex. 2001, ¶¶ 136-146.)

3. Dependent claim 10

Claim 10 depends on claim 8, which depends on claim 1. Claim 8 requires that the claimed “power management device” be “configured to transmit said predicted destination to a remote database.” (Ex. 1001, claim 8.) Claim 10 further requires that this “remote database” be “configured to (i) receive said sensor data samples and store said sensor data samples as said historical data and (ii) present said historical data to said device.” (*Id.*, claim 10.)

When addressing claim 10, the Petition argues that it would have been obvious to implement Kudo 325 such that its “historical accumulation database ... is housed at the server.” Petition at 73. The reminder of Kudo 325’s functionality, at least according to the Petition, appears to remain on the vehicle. *See id.* at 69 (annotating Fig. 1 to show history accumulation DB 104 located on a “server” but sections 105-108 remaining on the vehicle). In support of this modification, Petitioner argues that “Kudo-325 explicitly contemplates storage of historical data at the server: ‘the history information accumulated in the history DB 104 is uploaded to the server.’” *Id.* at 68 (quoting Ex. 1004, ¶ [0108].)

The issue with this argument is that it ignores half of what Kudo 325 teaches. Kudo 325 does, as Petitioner notes, explain that “it is further possible that the history information accumulated in the history DB 104 is uploaded to the server.” (Ex. 1004, ¶ [0108].) But it then goes on to explain that doing so “allow[s] the **server** to perform both prediction of the travel destination and selection of information based on the prediction result.” (*Id.* (emphasis added).) Alternatively, Kudo 325 explains that if the user would prefer not to “upload all their travel histories,” the history can be maintained on the vehicle to allow prediction to be performed there such that “only the predicted travel destination” is uploaded. (*Id.*)

In other words, Kudo 325 contemplates two alternatives: (1) upload all the history data to a server such that prediction is performed remotely or (2) upload no

history data, perform the prediction locally, then upload only the prediction. In alternative (1), the history data will be uploaded but the prediction will not (as the prediction is performed by the server, not the vehicle). In alternative (2), the history data will not be uploaded but the prediction will (as the vehicle needs the history data to perform the prediction). Claim 10, however, requires that **both** the claimed “sensor data” and the “predicted destination” be sent to a “remote database.” The Petition offers no explanation regarding why it would have been obvious in view of the prior art to do both of these things at the same time. (See Ex. 2001, ¶¶ 147-163.)

III. CONCLUSION

For the above reasons, Patent Owner respectfully requests that the Board reject Petitioner’s arguments and confirm the patentability of the ’002 patent’s claims.

Respectfully submitted,

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Dated: November 8, 2024

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CERTIFICATE OF WORD COUNT

The undersigned certifies that the foregoing paper complies with the type-volume limitation in 37 C.F.R. § 42.24. According to the utilized word-processing system's word count, the paper—excluding any portions mentioned in § 42.24(a)(1)—contains 4,405 words.

Dated: November 8, 2024

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