

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

INTELLECTUAL VENTURES II LLC,
Patent Owner.

IPR2025-00342
Patent 7,336,805 B2

Before KRISTEN L. DROESCH, SCOTT A. DANIELS, and
JASON W. MELVIN, *Administrative Patent Judges*.

MELVIN, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Tesla, Inc. (“Petitioner”) filed a Petition requesting *inter partes* review of claims 1, 2, and 6–11 (the “challenged claims”) of U.S. Patent No. 7,336,805 B2 (Ex. 1001, “the ’805 patent”). Paper 2 (“Pet.”). Intellectual Ventures II LLC (“Patent Owner”) filed a Preliminary Response. (Paper 8, “Prelim. Resp.”). With our authorization, Petitioner filed a Preliminary Reply (Paper 11, “Prelim. Reply”) and Patent Owner filed a Preliminary Surreply (Paper 12, “Prelim. Surreply”). Pursuant to 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a), we have authority to determine whether to institute review.

An *inter partes* review may not be instituted unless “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). For the reasons set forth below, we institute review.

A. REAL PARTIES IN INTEREST

Petitioner and Patent Owner each identifies itself as the real party in interest. Pet. 86; Paper 3 (Patent Owner’s Mandatory Notices).

B. RELATED MATTERS

The parties identify the following related federal district-court litigation involving the ’805 patent:

Intellectual Ventures II LLC v. Tesla, Inc., No. 1-24-cv-00390 (W.D. Tex. April 11, 2024); *Intellectual Ventures II LLC v. Tesla, Inc.*, No. 6-24-cv-00188 (W.D. Tex. April 12, 2024); *Intellectual Ventures II LLC v. Tesla, Inc.*, No. 1-24-cv-00884 (W.D. Tex. April 12, 2024). Pet. 86; Paper 3.

C. THE '805 PATENT

The '805 patent is titled “Docking Assistant” and relates to a method for “detecting the potential target objects in the image data of an image sensor and identifying the potential target objects as potential destinations in a multi-stage exclusionary method” and computing “a trajectory describing an optimized travel path.” Ex. 1001, codes (54), (57). The specification describes that the invention “functions without the need for affixing specific visual signatures at the destination.” *Id.* at 2:19–20.

According to the specification, image data is first recorded and then processed. *Id.* at 4:20–35. Processing includes edge detection and segmentation, such that extracted edges and segments are “stored in a hierarchically organized tree structure in the image data.” *Id.* at 4:43–45. Using “knowledge of the geometric appearance of a destination,” the tree structure is processed “to find geometric shapes that typically correspond to the potential destination.” *Id.* at 4:51–56. Similarly, the '805 patent’s approach can determine distance to a potential destination. *Id.* at 5:34–37. A “trajectory describing an optimized travel path to the potential destination” may be calculated for potential destinations, allowing automated vehicle guidance. *Id.* at 6:21–56. The specification describes that the list of potential destinations is monitored and updated so that new destinations may generate travel paths. *Id.* at 7:1–12.

D. CHALLENGED CLAIMS

Claim 1 is independent and is reproduced below:¹

¹ We include bracketed limitation designations, consistent with Petitioner. *See* Pet. 24–54.

- [1.0] 1. A method for assisting guidance of a motor vehicle on the basis of image data, the method comprising:
 - [1.1] acquir[ing]² image data using an imaging sensor from a surrounding field of the motor vehicle;
 - [1.2] extracting from the acquired image data positional parameters of at least one potential destination relative to the motor vehicle; and
 - [1.3] calculating at least one trajectory describing an optimized travel path using the positional parameters so as to assist a subsequent vehicle guidance for at least one of the potential destinations,
 - [1.4.0] wherein the extracting includes: performing an edge detection and edge segmentation on the image data so as to break down the image data into a plurality of edge segments and storing interrelationships of the plurality of edge segments in a mathematical tree structure;
 - [1.4.1] analyzing the plurality of edge segments for the presence of a geometric object associated with a geometrical form that may at least partially describe a potential destination so as to identify one or more potential geometric objects;
 - [1.4.2] analyzing the one or more potential geometric objects for plausibility using a matching algorithm so as to identify one or more plausible objects;
 - [1.4.3] performing an additional acceptance analysis so as to identify at least one accepted object, the additional acceptance analysis including analyzing a shape of the image formation of each object in the image data based on knowledge of at least one imaging property of the imaging sensor relative to the surrounding field; and
 - [1.4.4] storing at least one accepted object that corresponds to a most proximate destination together with corresponding relative positional data in an object list.

² Petitioner notes the clear typographic error in the claim (Pet. 24 n.3), and we agree the claim language should be understood as “acquiring” not “acquired.”

Ex. 1001, 7:57–8:23. Claims 2 and 6–11 depend directly or indirectly from claim 1. *Id.* at 8:24–26, 8:38–67.

E. PRIOR ART AND ASSERTED GROUNDS

Petitioner asserts the following unpatentability grounds:

Claim(s) Challenged	35 U.S.C. § ³	Reference(s)/Basis
1, 2, 9, 10	103(a)	Broggi ⁴ , Huttenlocher ⁵ , Brady ⁶
6–8, 11	103(a)	Broggi, Huttenlocher, Brady, Bertozzi ⁷

Pet. 8. Petitioner relies also on the Declaration of Dr. Jeffrey Rodriguez.
Ex. 1003.

³ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284 (2011), effective March 16, 2013, amended the applicable statutes. Because the application from which the ’805 patent issued claims priority to an application filed before this date, the pre-AIA version of § 103 applies.

⁴ Broggi, A., Bertozzi, M., Fascioli, A., Guarino Lo Bianco, C., & Piazzzi, A. (2000). Visual Perception of Obstacles and Vehicles for Platooning. *IEEE Transactions on Intelligent Transportation Systems*, 1(3), 164–176. (Ex. 1005).

⁵ Huttenlocher, D. P. (1987). Object Recognition Using Alignment. In *DARPA Image Understanding Workshop* (Vol. I, pp. 370–380). Los Angeles, CA; Morgan Kaufmann Pubs., Inc. (Ex. 1006).

⁶ U.S. Patent No. 5,434,927, issued July 18, 1995 (Ex. 1007).

⁷ Broggi, A., Bertozzi, M., Fascioli, A., & Conte, G. (1999). Automatic Vehicle Guidance: The Experience of the ARGO Autonomous Vehicle. World Scientific Pub. Co. Pte. Ltd. (Ex. 1008).

II. ANALYSIS

A. LEVEL OF ORDINARY SKILL IN THE ART

Petitioner asserts that ordinarily skilled artisans “would have had a bachelor’s degree in electrical engineering, computer engineering, computer science, or a related subject, and four years of work experience in image processing, automated vehicle control/navigation, or a related field.” Pet. 7. Petitioner’s proposed definition, which Patent Owner does not dispute, appears reasonable and consistent with the asserted prior art and the ’805 patent, and we adopt it here.

B. CLAIM CONSTRUCTION

Petitioner submits that no claim term requires express construction. Pet. 7. Patent Owner asserts that two terms require construction—“potential destination” and “mathematical tree structure.” Prelim. Resp. 6–12. We discuss the construction for those two terms below. Beyond those terms, we can determine whether institution is warranted without express construction. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms that . . . are in controversy, and only to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

To the extent that the scope of a particular claim term impacts a party’s argument during trial, the party should propose an express construction and show how the record supports it.

1. “potential destination”

Patent Owner submits that the claimed “[p]otential destination’ refers to a physically fixed and contextually relevant location in the vehicle’s surrounding environment—such as a docking station, cargo bay, or parking spot—that is automatically identified from image data based on geometric features and spatial parameters.” Prelim. Resp. 8. Patent Owner clarifies the intent of its proposed construction—a “‘potential destination’ cannot encompass arbitrary or transient objects like moving vehicles.” *Id.*

Patent Owner relies on language in the specification stating that “[a]n object of the present invention is to provide a method for assisting vehicle guidance on the basis of image data, particularly when maneuvering trucks toward docking stations . . . , which functions without the need for affixing specific visual signatures at the destination.” *Id.* at 6–7 (quoting Ex. 1001, 2:15–20 (emphasis omitted)). Patent Owner points also to language describing that, “[i]f the typical destination is a docking station for trucks at a warehouse, for example, then the typical geometric form substantially corresponds to a rectangle having roughly identical side lengths of approximately 2.5 m.” *Id.* at 7 (quoting Ex. 1001, 3:43–47 (emphasis omitted)).

Petitioner responds that the unrestricted claim language does not support Patent Owner’s construction and, in fact, suggests a contrary scope because the image data is “acquired . . . from a surrounding field of the motor vehicle.” Prelim. Reply 5 (emphasis omitted). Petitioner points out that the specification’s reference to maneuvering trucks toward docking stations is an example, not a limiting definition. *Id.* at 6. And Petitioner notes the specification’s discussion of a “camera-based position detection and lane

control system” and Patent Owner’s assertion of the ’805 patent against Petitioner’s “Autosteer and Auto Lane Change features.” *Id.* (citing Ex. 1001, 1:50–54; Ex. 1016, 10) (emphasis omitted).

We agree with Petitioner. The specification broadly states that the invention is “for assisting a motor vehicle guidance on the basis of image data” and raises “maneuvering trucks toward docking stations” as a “particular” application. *E.g.*, Ex. 1001, 1:6–8. Similarly, it refers to a docking station for trucks as a “typical destination” used only “for example.” *Id.* at 3:43–44. Patent Owner does not point to anything in the prosecution history that would inform the construction of “potential destination.” The intrinsic record does not support Patent Owner’s narrow construction.

Thus, for purposes of this decision, we do not construe “potential destination” as limited to a fixed location. No other aspect of the construction affects our determination whether to institute.

2. “mathematical tree structure”

Patent Owner proposes that we construe a “mathematical tree structure” as “a single connected hierarchical data structure in which each node has exactly one parent (except for the root) and in which there exists exactly one path between the root and every other node.” Prelim. Resp. 9. Patent Owner relies on the intrinsic evidence and “the well-established definition of a tree structure in computer science, as expressly adopted by the patentee through citation to Sedgewick’s *Algorithms in C.*” *Id.*

According to Patent Owner, because the claim language recites “storing interrelationships of the plurality of edge segments in a mathematical tree structure,” all detected edge segments must be in a

singular structure. *Id.* at 10. And in Patent Owner’s view, the specification’s reference to Sedgewick reinforces that view. *Id.*

The specification states that edges and segments extracted from image data are “stored in hierarchically organized tree structure” and asserts that:

Many different proven methods for creating and organizing such a hierarchical tree structure are available to one skilled in the art; reference is made here exemplarily to the comprehensive compilation and discussion of widely varying tree structures by Robert Sedgewick (R. Sedgewick, *Algorithms in C*, Chapter 4, Addison-Wesley Pub. Comp. Inc., 1990).

Ex. 1001, 4:42–51. Importantly, the reference to Sedgewick is made “exemplarily,” not definitionally. Patent Owner’s attempt to limit the claimed “hierarchal tree structure” to a particular definition stands in contrast to the specification’s instruction that skilled artisans understood “[m]any different proven methods for creating and organizing” the claimed structure. We conclude that the specification uses “hierarchical tree structure” in a broader sense than whatever Sedgewick may provide.

Even Sedgewick itself does not support Patent Owner’s narrow construction. While Sedgewick states that “the defining property of a tree is that there is exactly one path between the root and each of the other nodes in the tree” (Ex. 2006, 51⁸), and distinguishes trees from a forest (a group of disconnected trees) (*id.* at 51–52, 432), it further states that “any forest can be represented as a binary tree” by configuring the nodes in a particular fashion (*id.* at 59). Petitioner relies on this teaching to distinguish the claimed “mathematical tree structure” from a “mathematical tree,” arguing

⁸ We cite to the page numbers added to Sedgewick for this proceeding, not the original document’s page numbering.

that the distinction permits multiple trees—known as a forest—within the claim scope. Prelim Reply 1–2. Sedgewick supports that view by teaching the interchangeability of trees and forests through representation changes. Moreover, the claim language reciting a “mathematical tree structure” (not just “mathematical tree”) permits a structure of multiple trees (i.e., a forest). *See* Prelim. Reply 2. Although Patent Owner points to Sedgewick’s distinction between a “general tree” and a forest, arguing that it shows the two are different (Prelim. Surreply 1), that distinction does not address Petitioner’s reliance on “structure” in the claim language. We agree with Petitioner that the claimed mathematical tree structure is not limited to a single mathematical tree.

Finally, we recognize Patent Owner’s argument that the claimed single mathematical tree structure must store all interrelationships of all identified edge segments. Prelim Surreply 3–4. That argument, however, stretches the claim language to require more than it recites. The claim recites identifying “a plurality of edge segments and storing interrelationships of the plurality of edge segments in a mathematical tree structure.” That language does not require processing *all* edge segments, only a plurality, and does not require storing *all* interrelationships, just an unspecified quantity. Thus, it is possible that a method using multiple trees in a multi-rooted tree structure (i.e., a forest) could satisfy the claim language even under Patent Owner’s construction, if one of the trees alone meets the other claim limitations.

C. OBVIOUSNESS OVER BROGGI, HUTTENLOCHER, AND BRADY

Petitioner relies on Broggi for the basic claimed approach. Pet. 9–11, 22–37. Broggi describes a prototype vehicle developed in the ARGO project—an “autonomous vehicle equipped with vision systems and

automatic steering capability” that “detect[s] vehicles and potential obstacles on its path” to facilitate either road following or platooning (“the automatic following of a preceding vehicle”). Ex. 1005, 3, 4.⁹ Petitioner relies on Broggi’s platooning process, which identifies a preceding vehicle and then calculates a desired path to that preceding vehicle. *Id.* at 9–11, 12–14.

For the specific method of extracting positional parameters to identify a potential destination, Petitioner relies on Huttenlocher. Pet. 38–53. Huttenlocher describes a pattern-matching approach that “uses edge-based shape features for matching.” Ex. 1006, 17. In its approach, an image is first processed by an edge detector, and then those edges are chained together and chains merged when appropriate. *Id.* From edge chains, Huttenlocher derives shape descriptors using local curvature, forming a “hierarchy of curve segmentations.” *Id.*

⁹ We cite to the page numbers added to Broggi for this proceeding, rather than the original document’s page numbers.

Huttenlocher's Figure 3 is reproduced below:

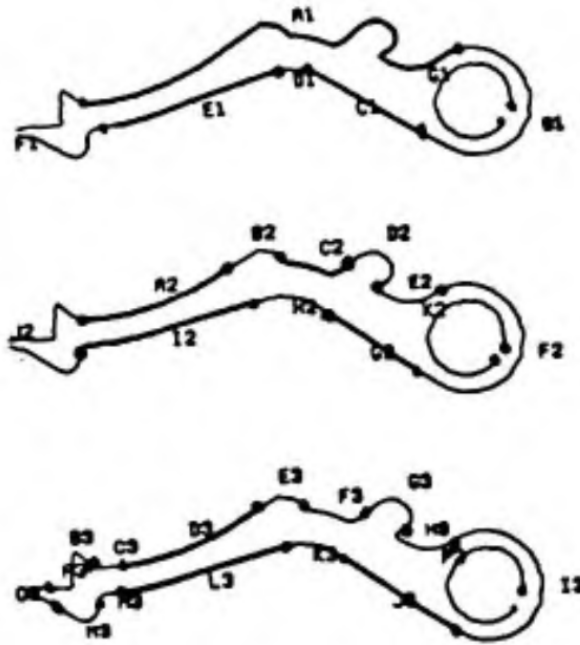


Figure 3. A simple curvature scale-space segmentation of a widget.

Id. Figure 3 depicts an arbitrary-shaped widget having been segmented into edge contours at three different scales. *Id.* Huttenlocher's Figure 4 is reproduced below:

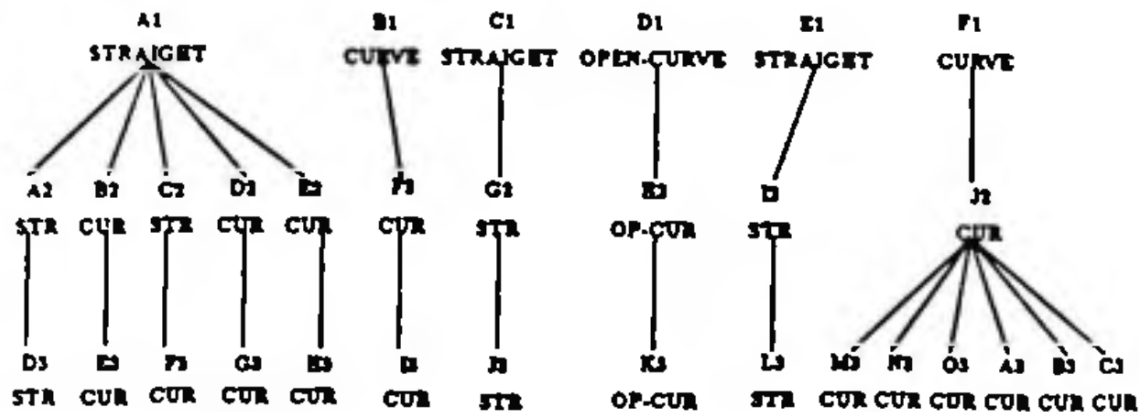


Figure 4. Multi-scale segmentation tree corresponding to the curvature scale-space segmentation in Figure 3.

Id. at 18. Figure 4 represents the curves from Figure 3 in a hierarchal curve segmentation. Huttenlocher additionally describes applying its edge segmentation and hierarchal representation to three-dimensional objects. *Id.* at 19–23.

Petitioner reasons that skilled artisans would have been motivated to use Huttenlocher’s pattern-matching technique as part of Broggi’s vehicle-detection method because Broggi suggests using a “traditional pattern matching technique.” Pet. 16–17. Further, Petitioner reasons, the combination would result in “improved vehicle detection and efficient use of processing resources.” *Id.* at 18 (citing Ex. 1006, 23; Ex. 1003 ¶ 62).

For the claimed storing step, Petitioner relies additionally on Brady. *Id.* at 54–56. Brady discloses a visual vehicle-tracking system that keeps “a vehicle log 102 of all vehicles currently within the scene, including vehicles’ associated track histories, inertial history 104 of the scene . . . and potential future track positions.” Ex. 1007, 11:21–26. Petitioner reasons that skilled artisans would have had reason to use Brady’s teachings as asserted because

“Broggi omits implementation details how the associated data is processed and stored” and because the combination “would improve Broggi’s platooning through accurate and consistent tracking of the preceding vehicle positions used in the associated vehicle path determinations, thereby improving the user experience during platooning.” Pet. 20–21 (citing Ex. 1007, 11:21–25; Ex. 1003 ¶ 67).

Patent Owner challenges Petitioner’s reliance on Broggi as relating to platooning rather than guidance to a fixed endpoint. Prelim. Resp. 21–38. All of Patent Owner’s arguments in that regard depend on us adopting Patent Owner proposed construction for “potential destination.” *Id.* As discussed above, we do not agree that the claimed potential destinations should be limited to fixed locations. *See supra* at 7–8 (§ II.B.1). Accordingly, we do not agree with Patent Owner’s arguments regarding platooning rather than guidance to a fixed endpoint.

Although Patent Owner asserts that Broggi also does not calculate an “optimized path” as claimed (Prelim. Resp. 29–33), that argument similarly depends on a construction for “potential destination” that is limited to fixed locations. *See id.* at 31 (arguing that the “car taught in Broggi cannot calculate an ‘optimized path’” because it “has absolutely no knowledge of the destination for the platoon”), 32 (“[I]n Broggi, the ARGO does not calculate a path to a destination because it doesn’t have any knowledge regarding the destination of the preceding car.”). We do not agree with Patent Owner’s argument because, as discussed, the challenged claims do not require an optimized path to a fixed location, but instead read on an optimized path to a transitory location, such as the location of Broggi’s preceding vehicle at a given time. We agree with Petitioner that Broggi

teaches an optimized path because it generates steering commands that lead toward the preceding vehicle and because those commands consider the steered vehicle's capabilities. *See* Pet. 34–35.

Additionally, Patent Owner challenges Petitioner's reliance on Huttenlocher as failing to disclose the claimed "mathematical tree structure." Prelim. Resp. 38–62. All of Patent Owner's arguments in that regard depend on us adopting Patent Owner's proposed construction for "mathematical tree structure." *Id.* As discussed above, we do not agree that the claimed mathematical tree structure is limited to a single tree. *See supra* at 8–10 (§ II.B.2). Accordingly, we do not agree with Patent Owner's arguments regarding Huttenlocher's tree structure.

Patent Owner does not otherwise challenge Petitioner's contentions based on Broggi, Huttenlocher, and Brady. We have reviewed Petitioner's contentions and evidence, and conclude on the present record that Petitioner is likely to prevail with the unpatentability of claims 6–8 and 11.

D. OBVIOUSNESS OVER BROGGI, HUTTENLOCHER, BRADY, AND BERTOZZI

For its second ground, Petitioner additionally relies on Bertozzi, a book written by "several of the same authors as Broggi." Pet. 61. In particular, Petitioner relies on "additional configuration details of the autonomous vehicle described in Bertozzi" such as a control-system "emergency feature" used to "'avoid sudden and therefore dangerous movements of the steering wheel' based on vehicle speed." *Id.* at 62–63 (quoting Ex. 1008, 186¹⁰); *accord id.* at 64–69, 74–75, 77. Petitioner

¹⁰ We cite to the page numbers added to Bertozzi for this proceeding, rather than the original document's page numbers.

additionally relies on Bertozzi's description of displaying the system's analysis on a monitor, including the preceding vehicle, desired path, associated trajectory to the preceding vehicle, and positions of obstacles. *Id.* at 63–64 (citing Ex. 1008, 183–84); *accord id.* at 69–70.

Patent Owner challenges the ground including Bertozzi by asserting that it “does not remedy the fundamental deficiencies” of the ground discussed above. Prelim. Resp. 62–63. As discussed, we do not agree that Patent Owner has identified deficiencies in Petitioner's first ground.

Patent Owner does not otherwise challenge Petitioner's contentions for claims 1, 2, 9, or 10. We have reviewed Petitioner's contentions and evidence, and conclude on the present record that Petitioner is likely to prevail with the unpatentability of claims 1, 2, 9, and 10.

III. CONCLUSION

For the reasons discussed above, we conclude Petitioner has shown a reasonable likelihood of prevailing with respect to at least one claim. We have evaluated all of the parties' submissions and determine that the record supports institution.

This decision to institute trial is not a final decision as to patentability of any challenged claim, or any factual or legal issue underlying patentability. Any final decision will be based on the full record developed during trial. We expressly inform Patent Owner that any argument not asserted in a timely filed Response or another manner permitted during trial shall be deemed forfeited or waived, regardless of whether the argument was presented in the Preliminary Response.

IV. ORDER

Accordingly, it is

ORDERED that, pursuant to 35 U.S.C. § 314(a), *inter partes* review of claims 1, 2, and 6–11 of the '805 patent is instituted on the grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial commencing on the entry date of this decision.

IPR2025-00342
Patent 7,336,805 B2

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