

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.

Petitioner,

v.

INTELLECTUAL VENTURES II LLC

Patent Owner.

Case No. IPR2025-00342

U.S. Patent No. 7,336,805

PATENT OWNER'S AUTHORIZED PRE-INSTITUTION SUR-REPLY

TABLE OF CONTENTS

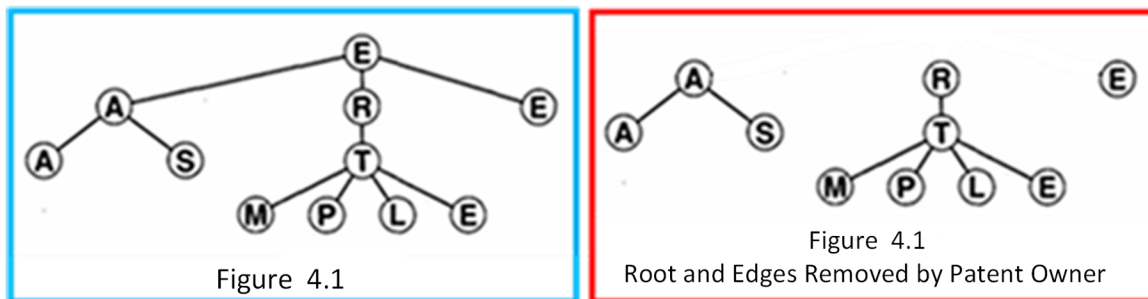
I.	Sedgewick Distinguishes a Forest from a Tree and Confirms That a Forest Is Not a “Mathematical Tree Structure”	1
II.	Petitioner Bears the Burden to Show That the ‘805 Patent Teaches Multiple Trees—But Every Embodiment Supports a Single, Unified Tree Structure....	3
III.	Huttenlocher Fails to Show Interrelationships Among Edge Segments, and Petitioner Relies Solely on Unsupported Expert Testimony	5
IV.	Patent Owner’s Preliminary Infringement Contentions Are Consistent with the Construction of “Potential Destinations” in the POR.....	6
V.	The ‘805 Patent’s Discussion of Prior Art Does Not Expand the Claimed Invention Beyond Fixed, Geometrically Identifiable Destinations	7

I. Sedgewick Distinguishes a Forest from a Tree and Confirms That a Forest Is Not a “Mathematical Tree Structure”

The Petitioner states, “contrary to Patent Owner’s construction—Sedgewick teaches a forest is an example of ‘a mathematical tree structure.’ Ex. 2006, 43-44.” Reply, 2. However, Sedgewick expressly states:

“**Binary trees** have two links below each internal node, so the representation used above for them is immediate. But what do we do for general trees, or forests, in which each node might require any number of links to the nodes below?” Ex. 2006, 43 (coloring added).

Clearly, Sedgewick recognized that **forests** are different than **general trees**. Otherwise, there would have been no reason for Sedgewick to refer to “**general trees** or **forests**” because “**forests**” would have been subsumed within “**general trees**.” The fact that a **forest** is not a form of a **general tree** is consistent with Sedgewick’s explanation that “A set of trees is called a forest: for example, if we remove the root and the edges connecting it from the tree in Figure 4.1, we are left with a forest consisting of three trees rooted at A, R, and E.” Ex. 2006, 36-37.



As shown above, when the root node and the edges are removed from the **general tree** of Fig. 4.1 (left) to form the **forest** (right), information is lost because in the forest there is no information included about any relationships between “A,” “R”

and “E.” Therefore, Sedgewick makes clear that a forest is not a general tree.

Petitioner also appears to be misconstruing what Sedgewick is teaching on Pages 43-44. Specifically, Sedgewick explains:

“To represent a forest for top-down processing, we need a way to handle the children of each node without preallocating a specific number for any node. But this is exactly the type of constraint that linked lists are designed to remove. Clearly, we should use a linked list for the children of each node. Each node then contains two links, one for the linked list connecting it to its siblings, the other for the linked list of its children. **Figure 4.7 shows this representation for the tree of Figure 4.1.”**

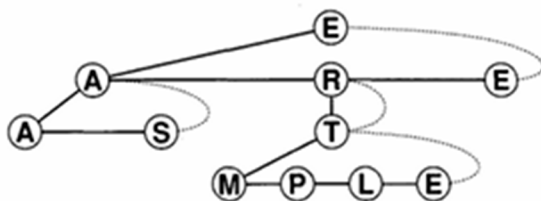


Figure 4.7 Leftmost child, right sibling representation of a tree.

EX2006, 43-44.

Sedgewick is explaining that a forest can be transformed into a “sibling representation of a tree” by adding “sibling” links so that the nodes in the forest can be traversed using top-down processing. However, the insertion of these “sibling” links does not add any information related to a relationship between the disjointed nodes in the forest. Instead, the “sibling” links provide a mathematical trick for the traversal algorithm to visit every node in the forest.

Accordingly, Petitioner’s reliance on Sedgewick to suggest that a forest qualifies as “a mathematical tree structure” is misplaced and directly contradicted by the very passages cited. Sedgewick clearly distinguishes between a tree and a

forest, defining the latter as a collection of disconnected trees that lacks the unified connectivity and single-root hierarchy required of a true tree structure. The use of linked lists described on pages 43–44 does not equate a forest with a tree. The passage merely provides a traversal mechanism for otherwise unconnected nodes. As such, Sedgewick reinforces, rather than refutes, Patent Owner’s position that a forest does not meet the plain and ordinary meaning of a “mathematical tree structure” as required by the challenged claims.

II. Petitioner Bears the Burden to Show That the ‘805 Patent Teaches Multiple Trees—But Every Embodiment Supports a Single, Unified Tree Structure

The Petitioner states, “Patent Owner fails to identify any embodiments in the specification of the ‘805 patent limiting ‘a mathematical tree structure’ to a single tree.” Reply, 3. However, “[i]n an *inter partes* review, the burden of persuasion is on the petitioner to prove ‘unpatentability by a preponderance of the evidence,’ 35 U.S.C. § 316(e), and that burden never shifts to the patentee.” *FanDuel, Inc. v. Interactive Games LLC*, 966 F.3d 1334, 1341 (Fed. Cir. 2020). Accordingly, it is the Petitioner’s burden to show that a POSITA would have understood that a **collection of separate, unrelated trees** are “a mathematical tree structure” in the context of the ‘805 Patent.

Petitioner cannot meet this burden, because in every embodiment discussed in the ‘805 Patent, “the image data are broken down into individual edge segments”

such that “their interrelationships are stored in a mathematical tree structure.” EX1003, 3:37-39. As Dr. Majumder explains, “a collection of separate trees cannot collectively qualify as “a tree structure” because they do not capture the interrelationships between segments in different trees.” EX2007, ¶105. Dr. Majumder further explains

“If edge segments were split across several trees, then no single tree would store the interrelationships of the entire plurality. Instead, each tree would capture relationships only among a subset of segments, with no interrelationship stored between segments in different trees.” EX2007, ¶104.

In short, Petitioner’s attempt to shift the burden onto Patent Owner by demanding identification of limiting embodiments misstates the legal standard. It is not the Patent Owner’s obligation to disprove Petitioner’s theory, but rather the Petitioner’s burden to affirmatively demonstrate that the ‘805 Patent supports a construction of “a mathematical tree structure” that encompasses multiple disjointed trees. Petitioner has failed to do so. Every embodiment in the ‘805 Patent consistently describes storing the interrelationships of edge segments in a single, unified tree structure.

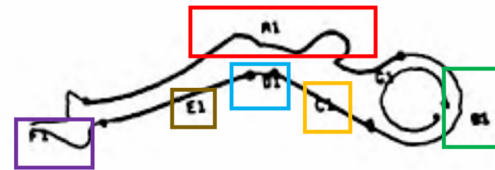
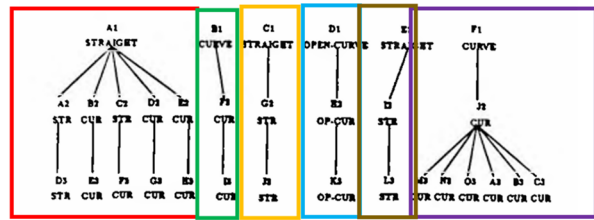
Further, the challenged claims require interrelationships amongst the plurality of edge segments, and that all of such interrelationships be stored in a singular mathematical tree structure. In *Salazar v. AT&T Mobility, LLC*, 64 F. 4th 1311 (Fed. Cir. 2023), the Court held that the proper construction of “a microprocessor” for performing multiple functions “requires a singular element - “a microprocessor” -

to be capable of performing all of the recited functionality.” *Id.*, 64 F. 4th at 1317 (emphasis added). The Court rejected the argument that the claim “would encompass one microprocessor capable of performing one claimed function and another microprocessor capable of performing a different claimed function, even if no one microprocessor could perform all of the recited functions.” *Id.*, 64 F. 4th at 1315. Similar to the claim language in *Salazar*, “storing interrelationships of the plurality of edge segments in a mathematical tree structure” requires a singular element -- “a mathematical tree structure” -- that stores all of the interrelationships. Petitioner’s assertion that the claim language can be met where one subset of the interrelationships are stored in one mathematical tree structure and another distinct subset of the interrelationships are stored in a different mathematical tree structure violates the holding of *Salazar*, and must therefore be rejected.

III. Huttenlocher Fails to Show Interrelationships Among Edge Segments, and Petitioner Relies Solely on Unsupported Expert Testimony

Petitioner asserts that Huttenlocher discloses a hierarchical structure that satisfies the “mathematical tree structure” limitation of the challenged claims. Specifically, Petitioner claims that Huttenlocher’s so-called “scale-space segment tree” organizes edge segments in a hierarchy based on granularity and relative position. Reply, 4. However, Petitioner’s argument is not supported by the reference itself and relies entirely on conclusory assertions from its expert, without pointing to any structural relationships. As Dr. Majumder explains:

“A visual inspection of the annotated version of Figures 3 and 4 (below) confirms that the labeled edge segments do not share any structural relationship. They are not part of a hierarchy. There is no single path between segments, no common ancestor, and no indication that they are organized in a tree structure.”



EX2007, ¶107

Accordingly, the Petitioner’s assertion that Huttenlocher discloses a hierarchical organization of edge segments is not supported by the reference itself, but rests solely on the conclusory and unsubstantiated statements of Petitioner’s expert. The edge segments lack a common ancestor, are not connected by any path, and are not arranged in a hierarchy that would constitute a tree structure. Without any evidence of interrelationships among the segments—let alone a connected, acyclic graph—the Petition fails to show that Huttenlocher teaches the claimed “mathematical tree structure,” and this ground must be rejected.

IV. Patent Owner’s Preliminary Infringement Contentions Are Consistent with the Construction of “Potential Destinations” in the POR

Petitioner contends that the Patent Owner’s preliminary infringement contentions contradict the position advanced in this IPR—that “potential destinations” are limited to “stationary, geometrically identifiable endpoints.” Reply, 6. This argument is unfounded. The cited contentions, which identify Tesla’s Autopark feature as infringing the ‘805 Patent, do not rely on moving objects or

transient targets as destinations. Instead, they consistently describe the Autopark system as detecting and guiding the vehicle to fixed parking spaces, such as parallel or perpendicular slots. (see EX1006, 7, 11- 13, 15-17, 20- 22, 29, 30, 37-39). These are precisely the types of stationary, geometrically defined endpoints encompassed by the ‘805 Patent’s claims. Thus, the preliminary contentions are fully aligned with Patent Owner’s construction of “potential destination.”

V. The ‘805 Patent’s Discussion of Prior Art Does Not Expand the Claimed Invention Beyond Fixed, Geometrically Identifiable Destinations

Petitioner contends that the ‘805 Patent is not limited to stationary objects because it references “camera-based position detection and lane control systems,” including DE 10323915.4. Reply, 6. However, the ‘805 Patent cites DE 10323915.4—and similar references like JP 2002-172988 A and JP 2002-172989 A—only in the background section to identify shortcomings in prior systems. Notably, the patent criticizes DE 10323915.4 for requiring destinations to have a “specific, previously known signature.” Ex.1001, 2:3–7. In contrast, the ‘805 Patent expressly defines its objective as guiding vehicles to fixed destinations—such as docking stations—using only image-based geometric analysis, and without any affixed visual markers. Ex.1001, 2:15–20. Accordingly, Petitioner’s reliance on background references misrepresents the invention, which is clearly directed to identifying stationary, geometrically identifiable endpoints rather than enabling general lane control or tracking moving objects.

Respectfully submitted,

Dated: July 9, 2025

By: /Brandon R. Theiss/
Brandon R. Theiss
Registration No. 70,507
Counsel for Patent Owner
Intellectual Ventures II LLC

CERTIFICATE OF SERVICE

The undersigned certifies that pursuant to 37 C.F.R. § 42.6(e), a copy of the foregoing **PATENT OWNER'S AUTHORIZED PRE-INSTITUTION SUR-REPLY** was served via email (as consented to by counsel) on July 9, 2025 to lead and backup counsel of record for Petitioner as follows:

Jonathan R. Bowser
jon.bowser.ipr@haynesboone.com
HAYNES AND BOONE, LLP
2801 N. Harwood Street, Suite 2300
Dallas, TX 75201

Scott T. Jarratt
scott.jarratt.ipr@haynesboone.com
HAYNES AND BOONE, LLP
2801 N. Harwood Street, Suite 2300
Dallas, TX 75201

Gregory P. Webb
greg.webb.ipr@haynesboone.com
HAYNES AND BOONE, LLP
2801 N. Harwood Street, Suite 2300
Dallas, TX 75201

Matthew Beck
matthew.beck.ipr@haynesboone.com
HAYNES AND BOONE, LLP
2801 N. Harwood Street, Suite 2300
Dallas, TX 75201

Michael McCarty
michael.mccarty@haynesboone.com
HAYNES AND BOONE, LLP
2801 N. Harwood Street, Suite 2300
Dallas, TX 75201

Ashraf Fawzy
afawzy@tesla.com
TESLA, INC.
1 Tesla Road
Austin, Texas 78725

Dated: July 9, 2025

By: /Brandon R. Theiss/
Brandon R. Theiss
Registration No. 70,507
Counsel for Patent Owner
Intellectual Ventures II LLC