

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 PRELIMINARY RESPONSE

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PATENT OWNER'S EXHIBIT LIST

EX2001	Petitioner's Answer to Complaint and Counterclaim, dated June 20, 2024, in <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)
EX2002	Docket from District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)
EX2003	Scheduling Order from District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)
EX2004	Defendant's Second Supplemental Preliminary Invalidity Contentions, dated January 9, 2025, in District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)
EX2005	Letter from Patent Owner to Associate General Counsel for Petitioner, dated August 20, 2020, enclosing copy of U.S. Pat. No. 7,181,143 and Claim Chart Presentation
EX2006	R. Sedgewick, Algorithms in C, Addison-Wesley Pub. Comp. Inc., 1990
EX2007	Declaration of Dr. Majumder In Support Of Patent Owner's Preliminary Response.
EX2008	CV of Dr. Majumder

I. INTRODUCTION

The Petition (Paper 2) challenging claims 1-2, and 6-11 (the “Challenged Claims”) of US Patent 7,336,805 (the “’805 Patent) does not demonstrate a reasonable likelihood of success on the merits and therefore should be denied. The Petitioner fails to demonstrate a reasonable likelihood of prevailing with respect to any challenged claim of the ‘805 Patent. Both Ground 1 and Ground 2 rely on a fundamental misreading of the claim language and an erroneous attempt to equate the proactive, destination-driven guidance system of the ‘805 Patent with a reactive vehicle-following system disclosed in the cited prior art. The Petition’s analysis overlooks the technical architecture and purpose of the invention—namely, a system that autonomously detects fixed, geometrically plausible destinations in the vehicle’s environment, stores the interrelationships of edge segments in a single mathematical tree structure, and calculates an optimized trajectory to guide the vehicle to a final fixed destination such as a parking spot.

Ground 1 relies on Broggi, which describes a vision-based platooning system where a trailing vehicle mimics the movement of a lead vehicle without recognizing or planning a path to any destination. However, Broggi does not identify or evaluate plausible fixed destinations, does not compute optimized travel paths to a target location, and does not include any hierarchical data structure that organizes image features into a unified tree. Petitioner attempts to bridge these gaps by introducing

Huttenlocher, which it alleges discloses a “mathematical tree structure.” Yet, Huttenlocher depicts at most a collection of disconnected segment groupings—what computer scientists call a “forest”—that lacks the essential properties of a tree, including a common root and unique path connectivity, as required by the claim language and expressly defined in the specification through incorporation of Sedgewick’s textbook *Algorithms in C* (EX2006).

Ground 2 fares no better. It adds Bertozzi to the combination, but Bertozzi merely confirms the limitations of Broggi, as both references describe the same ARGO system. Bertozzi makes clear that the system performs reactive convoying based solely on the position of a preceding vehicle, and lacks any ability to identify destinations, extract positional parameters, perform multistage plausibility filtering, or compute optimized trajectories to a defined endpoint. Like Broggi, Bertozzi also lacks any disclosure of a mathematical tree structure. Neither Huttenlocher nor Brady provides the missing claim elements. Brady, like the other references, is silent on the core limitations of destination identification, tree-based feature organization, and destination-based trajectory planning.

Because neither Ground 1 nor Ground 2 presents a combination of references that teaches or suggests all of the limitations of the challenged claims, and because Petitioner’s analysis is contradicted by the intrinsic evidence and fails to withstand scrutiny, institution is not warranted.

II. OVERVIEW OF THE ‘805 PATENT

The ‘805 Patent is directed to a system and method for assisting the guidance of a motor vehicle, particularly trucks, to fixed destinations such as docking stations or loading platforms, using image data acquired from an onboard sensor. The invention aims to eliminate the need for dedicated visual markers at the destination by identifying potential destinations solely through the analysis of geometric features within the image data. EX2007, ¶29

The core of the invention lies in a multistage image processing pipeline that first extracts positional parameters of candidate destination objects from the surrounding environment. This is achieved by performing edge detection and segmentation on the acquired image data, followed by organizing the resulting edge segments in a mathematical tree structure that encodes the interrelationships among them. This tree structure is then traversed to identify geometric objects—such as rectangles or squares—that plausibly correspond to destinations like cargo doors. EX2007, ¶30

Once potential geometric matches are identified, they undergo a plausibility analysis using a matching algorithm (e.g., an Iterative Closest Point (ICP) algorithm) to determine alignment with stored object models. The system further refines its selection through an acceptance analysis that considers the expected distortion in the image caused by the sensor’s perspective (e.g., trapezoidal deformation of a

rectangular object viewed from above). Only those objects that satisfy both geometric plausibility and sensor-based consistency are retained as candidate destinations. EX2007, ¶34

From these, the most proximate accepted destination is selected and used to calculate an optimized travel path to guide the vehicle. This calculated trajectory may then be provided to a driver assistance system for visual display or used directly for semi-automated or automated vehicle control. The invention supports real-time recalibration of the destination and path if conditions change, and it accounts for the steering limitations of the vehicle when generating the trajectory. EX2007, ¶36

In summary, as explained by Dr. Majumder, “the ‘805 Patent provides a robust, marker-free vehicle docking assistant that autonomously identifies and localizes geometric destinations in the environment and computes optimized trajectories to guide a motor vehicle safely and accurately to its final stopping point.” EX2007 ¶37.

III. CLAIMS OF ‘805 PATENT

Claim 1 of the ‘805 Patent is only the independent claim among the challenged claims. Claim 1 recites

1. A method for assisting guidance of a motor vehicle on the basis of image data, the method comprising:
 acquired image data using an imaging sensor from a surrounding field of the motor vehicle;

extracting from the acquired image data positional parameters of at least one potential destination relative to the motor vehicle; and

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,

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;

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;

analyzing the one or more potential geometric objects for plausibility using a matching algorithm so as to identify one or more plausible objects;

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

storing at least one accepted object that corresponds to a most proximate destination together with corresponding relative positional data in an object list.

EX1001,7:57-8:23.

IV. CLAIM CONSTRUCTION

The Patent Owner maintains that the Challenged Claims should have their plain and ordinary meaning. However, a determination that a claim term “needs no construction” or has the “plain and ordinary meaning” may be inadequate when a

term has more than one “ordinary” meaning or when reliance on a term’s “ordinary” meaning does not resolve the parties’ dispute.” *O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008). Instead, “[t]he terms used in the claims bear a presumption that they mean what they say and have the ordinary meaning that would be attributed to those words by persons skilled in the relevant art.” *Honeywell Int’l, Inc. v. ITC*, 341 F.3d 1332, 1338 (Fed. Cir. 2003). Accordingly, “Properly viewed, the ‘ordinary meaning’ of a claim term is its meaning to the ordinary artisan after reading the entire Patent.” *Aylus Networks, Inc. v. Apple Inc.*, 856 F.3d 1353, 1358 (Fed. Cir. 2017).

A. The ‘805 Patent Limits the Invention to Guiding a Vehicle to Fixed, Physical Destinations Identified by Geometric Analysis, as Expressly Described in the Summary of the Invention.

When a patentee describes the features of the “present invention,” it is well-settled that “this description limits the scope of the invention.” *Pacing Techs., LLC v. Garmin Int’l, Inc.*, 778 F.3d 1021 (Fed. Cir. 2015). In this regard, the “Summary of the Invention” of the ‘805 Patent describes as the “present invention” a system and method for identifying fixed, physically meaningful destinations—such as docking stations or parking bays—based on the geometric properties of image data.

An 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, as well as to provide a device suited for implementing the method, which functions without the need for affixing specific visual signatures at the destination.**

EX1001, 2:15-20. (emphasis added).

In the system according to the present invention for assisting a motor vehicle guidance on the basis of image data, in particular for maneuvering trucks toward docking stations, including a method and a device suited for implementing this method, image data are acquired by an imaging sensor from the surrounding field of a vehicle and, from these data, the positional parameters of at least one potential destination relative to the motor vehicle are extracted. This results in the calculation of a trajectory describing an optimized travel path in order to assist a subsequent vehicle guidance for at least one of the potential destinations. In this connection, along the lines of the present invention, to extract the relative positional parameters of the at least one potential destination, the image data undergo an edge detection and edge segmentation. To that end, the image data are broken down into individual edge segments, and their interrelationships are stored in a mathematical tree structure. In a subsequent step, these edge segments are then analyzed to check for the presence of a geometric object that is similar to a geometric form which, typically, at least partially describes a potential destination. If 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. Within the framework of the inventive method, the detected geometric objects that correspond to the typical geometric form are then analyzed for plausibility using a matching algorithm, these objects, which are classified as plausible, undergoing an additional acceptance analysis to the effect that, based on the knowledge of the imaging properties of the imaging sensor in relation to its surrounding field, the shape of the image formation of the objects in the image data is analyzed (thus, an image of a typical rectangular geometric form viewed from an elevated location is formed in the image data as a trapezoid that tapers toward the top). In a final method step, at least that object which is determined within the scope of the acceptance analysis and which corresponds to the most

proximate destination is stored, along with the corresponding relative positional data, in an object list, and, to this end, at least one trajectory describing an optimized travel path is computed EX1001, 3:23-63. (emphasis added).

In this manner, a driver assistance is able to be devised by using the device according to the present invention and on the basis of the method according to the present invention, which computes **a trajectory describing an optimized travel path to at least the most proximate destination, based solely on the knowledge of the geometric appearance of the destination, without having to affix specific symbols or markings.**

EX1001, 3:64-4(emphasis added).

Thus, the claim language reciting “Potential 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. As Dr. Majumder explains, the system described in the ‘805 Patent “is able to locate a specific physical location in the vehicle’s environment that the system identifies as a suitable endpoint for the vehicle to approach and stop at, such as a docking station, loading platform, or parking bay.” EX2007, ¶35.

Therefore, when read in light of the intrinsic evidence, “potential destination” cannot encompass arbitrary or transient objects like moving vehicles, but must instead be understood as referring to stationary, geometrically identifiable endpoints in the vehicle’s environment that the system is configured to recognize and guide the vehicle toward. Accordingly, any construction that seeks to expand the term

beyond this fixed, structural understanding is inconsistent with both the claim language and the Patent's express description of the invention.

B. “A Mathematical Tree Structure” is a Single Connected Hierarchical Structure, Not a Forest

The Patent Owner maintains that the Challenged Claims should have their plain and ordinary meaning. However, a determination that a claim term “needs no construction” or has the “plain and ordinary meaning” may be inadequate when a term has more than one “ordinary” meaning or when reliance on a term’s “ordinary” meaning does not resolve the parties’ dispute.” *O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008). Accordingly, “Properly viewed, the ‘ordinary meaning’ of a claim term is its meaning to the ordinary artisan after reading the entire Patent.” *Aylus Networks, Inc. v. Apple Inc.*, 856 F.3d 1353, 1358 (Fed. Cir. 2017).

A POSITA reading the entirety of the ‘805 Patent would understand “a mathematical tree structure” to mean 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.” This understanding is consistent with 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 (EX2006).

Claim 1 recites “storing interrelationships of the plurality of edge segments in a mathematical tree structure.” The plain language links all of the detected edge segments (“the plurality”) to a singular structure. This language would be internally inconsistent if interpreted to permit a collection of disjointed substructures. Only a single, unified structure can store interrelationships among the entire set of edge segments.

The specification reinforces this interpretation. It expressly states:

“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.”

EX1001, 4:45–51

Sedgewick defines a tree as a connected, acyclic graph with exactly one path between the root and each other node. He further distinguishes a forest as a collection of disjoint trees, which lacks a single root and does not ensure connectivity among all nodes. Specifically:

“If there is more than one path between the root and some node, or if there is no path between the root and some node, then what we have is a graph ... not a tree.”

EX2006, 51

Accordingly, by citing Sedgewick as the interpretive authority, the patentee expressly incorporated this distinction into the meaning of “a mathematical tree structure.”

Sedgewick further makes clear that a “forest” is not a tree. For example, Sedgewick states:

A graph with no cycles is called a tree (see Chapter 4). A group of disconnected trees is called a forest.
EX2006, 432

Accordingly, a POSITA would understand “a mathematical tree structure” “to mean 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.” EX2007, ¶43. As Dr. Majumder highlights, “a mathematical tree structure excludes disconnected structures and forests, which aligns with both the claim language and the specification.” EX2007, ¶99.

As a result, while Patent Owner maintains that the term “a mathematical tree structure” should be given its plain and ordinary meaning, the intrinsic evidence confirms that the plain meaning—as understood by a person of ordinary skill in the art after reading the entire Patent—refers to a single connected hierarchical structure in which each node has exactly one parent (except the root), and in which there is exactly one path between the root and every other node. This understanding is grounded in the claim language, which requires that interrelationships among all

edge segments be stored in a tree structure, and is expressly supported by the specification's incorporation of Sedgewick's authoritative definition. Sedgewick unambiguously distinguishes a tree from a forest, identifying a forest as a collection of disconnected trees that lack the unified connectivity essential to a tree. As such, any interpretation that would allow a "forest" or other disconnected structures to satisfy this claim limitation is inconsistent with the intrinsic record and should be rejected. The proper construction of "a mathematical tree structure" is limited to a single, connected structure that stores interrelationships among the entire set of edge segments.

V. REFERENCES RELIED ON IN THE PETITION

A. Broggi - "Visual Perception of Obstacles and Vehicles for Platooning" (EX1005)

Broggi (EX1005), titled Visual Perception of Obstacles and Vehicles for Platooning, discloses a vision-based perception and control system implemented in the ARGO autonomous vehicle, developed at the University of Parma. The focus of Broggi is on enabling two principal driving functions using onboard cameras: road following and platooning, with particular emphasis on the latter. EX2007, ¶47

Platooning, as defined in Broggi, is the autonomous trailing of a lead vehicle by a follower vehicle—here, the ARGO car—using only visual input. The goal of platooning is to allow a vehicle to maintain a fixed time headway and proper lateral alignment with a vehicle directly ahead, forming a convoy-like chain. Unlike

destination-based navigation, platooning does not involve the follower vehicle planning its own route or identifying an endpoint. Instead, the lead vehicle determines the path and speed, and the trailing vehicle mirrors that behavior in real time. EX2007, ¶50-51. As Broggi states explicitly, platooning is “the automatic following of the preceding vehicle, that requires the localization and tracking of a target vehicle.” EX1005, 166.

Broggi implements platooning by using monocular image processing to detect and track the preceding vehicle. The system searches for rectangular shapes in the image plane that exhibit symmetry and contrast patterns characteristic of a vehicle’s rear. Once a candidate region is identified, the system uses template matching and frame-to-frame correlation to track the preceding vehicle as the scene evolves. The system estimates the relative distance to the preceding vehicle using a simplified stereo triangulation method, relying on a known baseline and disparity estimation.

Once the preceding vehicle’s position is established, ARGO calculates a steering correction based on the lateral offset between ARGO’s current heading and the projected centerline of the detected vehicle. This offset, or steering error, is passed through a gain-scheduled proportional controller to compute a steering angle that realigns the vehicle with the path of the leader. At the same time, ARGO’s speed is controlled to maintain a target headway, allowing the vehicle to safely trail the preceding vehicle.

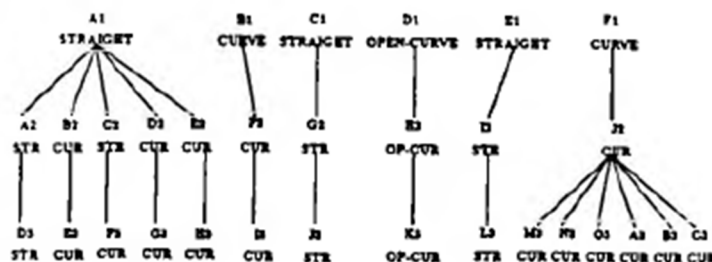
Importantly, as explained by Dr. Majumder, “the platooning system described in Broggi does not involve the detection or recognition of a fixed or predefined destination.” EX2007, ¶72. There is no analysis of geometric forms in the environment, no extraction of spatial features to identify plausible destinations, and no calculation of optimized trajectories toward contextually meaningful endpoints. Instead, the system operates purely reactively: the ARGO vehicle responds to the current position and movement of the preceding vehicle without any knowledge of where that vehicle is going.

B. Huttenlocher - “Object Recognition Using Alignment” (EX1006)

Huttenlocher describes a method for object recognition in which a model is first geometrically aligned with an image based on a small number of corresponding features, and then the transformed model is compared directly with the image to determine a match. The system is designed to identify rigid, potentially occluded objects in arbitrary three-dimensional orientations and scales using a two-stage approach: an initial alignment phase followed by a matching phase. EX2007, ¶52.

The alignment process is driven by scale-space segmentation of image edge contours. Edge segments are classified by curvature and shape (e.g., straight, curved, closed, or open), and organized hierarchically into a multiscale representation. This segmentation hierarchy is visualized in Figure 4 of Huttenlocher (reproduced below) as a so-called “segment tree,” which groups edge segments detected at coarse scales

with their finer-scale counterparts. The hierarchy is used to identify candidate feature points for model alignment and ultimately to match model objects against observed image data.



Although Huttenlocher describes this structure as a “(multi-rooted) tree,” it is, in fact, a forest—i.e., a collection of disconnected trees—lacking a single root and not providing a unified set of interrelationships among all edge segments. Each subtree corresponds to an independent segment group rather than forming a single, connected structure. As Dr. Majumder explains, “Figure 4 does not identify any relationship between ‘A1 Straight,’ ‘B1 Curve,’ ‘C1 Straight,’ ‘D1 Open Curve,’ ‘E1 Straight,’ and ‘F1 Curve’.” EX2007, ¶103.

Specifically, from Figure 4 it is impossible to extract any information about the relationship between any two nodes. As shown “in Patent Owner’s annotated combined version of Huttenlocher’s Figure 3 (bottom) and Figure 4 (top), Figure 4 does not show the inter-relationships between the edge segments ‘A1 Straight,’ ‘B1

images to detect and classify vehicles and track their movement through traffic environments. Vehicle classification is achieved by evaluating edge element intensities (horizontal and vertical) at each pixel, converting these into directional vectors, and applying fuzzy logic to characterize the region. EX2007, ¶59.

D. Bertozzi - “Automatic Vehicle Guidance: The Experience of the ARGO Autonomous Vehicle” (EX1008)

Bertozzi provides a comprehensive overview of the development and functionality of the ARGO autonomous vehicle referenced in Broggi, with specific emphasis on its capabilities for vision-based road following and platooning. The ARGO vehicle, developed by the University of Parma, integrates stereo and monocular vision systems to enable automated guidance, obstacle detection, and lane following. One of its central features is the implementation of a platooning mode, which allows the vehicle to automatically follow a preceding vehicle. EX2007, ¶59.

Importantly, Bertozzi confirms and elaborates on the limitations of this platooning approach: ARGO’s platooning functionality is fundamentally reactive and depends entirely on visual tracking of the vehicle directly ahead. The system detects and tracks the leading vehicle based on features such as symmetry, shape, and position, using monocular and stereo imagery. Once detected, the preceding vehicle is treated as a dynamic reference point, and ARGO continuously adjusts its

trajectory to follow it. However, ARGO does not possess any knowledge of the destination of the vehicle it is following. It does not plan or compute a trajectory toward a known or predefined destination. Instead, it adapts its movements in real-time to mirror the path taken by the preceding vehicle. EX2007, ¶60.

This lack of foresight or destination-awareness is a defining characteristic of ARGO's platooning mode. As such, Bertozzi's disclosure underscores a critical distinction between reactive following behavior—where the vehicle simply mimics the leader's path—and proactive guidance systems that calculate an optimized trajectory to a known potential destination based on environmental data. Accordingly, Bertozzi confirms that ARGO, in platooning mode, merely follows the car in front and does not compute an optimized path to a destination, as required by the challenged claims. EX2007, ¶61.

VI. THE PETITION FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS ON THE MERITS

Grounds 1 and 2 of the Petition fail to establish unpatentability because they are based on a fundamental misreading of the '805 Patent's claims and a misapplication of the cited references. The claims are directed to a destination-based vehicle guidance system that identifies fixed, plausible endpoints—such as docking stations—using geometric analysis of image data, stores the interrelationships of detected edge segments in a connected mathematical tree structure, and calculates optimized travel paths to those destinations. These limitations require proactive

recognition and planning to reach a defined stopping point, not merely reactive steering based on transient objects.

The Petition relies primarily on Broggi, which discloses a reactive platooning system in which a vehicle blindly follows a lead car without recognizing a destination, computing a planned trajectory, or performing structured geometric filtering. This reactive behavior is fundamentally distinct from the proactive, destination-driven guidance claimed in the '805 Patent. To satisfy the tree structure limitation, the Petition relies on Huttenlocher, but that reference discloses disconnected edge segment groupings—at most a forest, not the single, connected tree structure expressly required by the claims and defined in the Patent through incorporation of Sedgewick's textbook.

Ground 2 adds Bertozzi to the combination, but this inclusion only confirms—not cures—the deficiencies in Broggi. Bertozzi, which describes the same ARGO vehicle, reinforces that the system performs reactive convoying behavior, without identifying fixed destinations or calculating optimized travel paths as required. Bertozzi also fails to disclose or suggest the claimed mathematical tree structure. Accordingly, the asserted combinations in both Ground 1 and Ground 2 fail to teach or suggest the destination-based trajectory computation and data structure limitations of the challenged claims, and the Petition must be denied.

A. Ground 1 Is Deficient Because It Misreads the Claimed Destination-Based Guidance System and Misapplies the Tree Structure Limitation.

The Petition’s challenge to the ‘805 Patent fails because it fundamentally misinterprets both the claim language and the cited references. The challenged claims are directed to a destination-based vehicle guidance system that identifies fixed endpoints—such as docking stations—using geometric analysis of image data, stores the interrelationships of detected edge segments in a mathematical tree structure, and computes optimized paths to those destinations.

In contrast, the Petition relies on Broggi, which discloses a reactive platooning system where a trailing vehicle simply follows a lead car without knowledge of a destination or any path planning. Broggi does not identify potential destinations, does not calculate optimized travel paths, and does not provide guidance to a fixed endpoint. The Petition improperly equates a moving vehicle with a “potential destination” and mischaracterizes reactive steering corrections as optimized path calculation—misreadings that are inconsistent with the claims and the intrinsic record.

The Petition further fails to satisfy the “mathematical tree structure” limitation by relying on Huttenlocher. The ‘805 Patent, incorporating Sedgewick’s textbook, requires a connected, acyclic structure with a single root and one unique path between each node and the root. But Huttenlocher’s Figure 4 depicts disconnected

components with no shared root and no unique path structure—at most a forest, not a tree. The Petition offers only conclusory expert testimony in place of any actual disclosure of the claimed tree structure.

As explained below, neither Broggi nor Huttenlocher, alone or in combination with other references, teaches or suggests the key limitations of the challenged claims. The Petition’s arguments must therefore be rejected.

1. The Petition fails because it mischaracterizes Broggi’s reactive platooning system as the proactive, destination-based guidance claimed in the ‘805 Patent.

The Petition’s invalidity challenge to the ‘805 Patent is fundamentally flawed because it is premised on a misreading of the claim language and a mischaracterization of both the prior art and the invention described in the specification. The challenged claims are directed to a destination-driven vehicle guidance system that extracts geometric features from image data to identify plausible, fixed destinations—such as docking stations or parking bays—and calculates optimized travel paths to those endpoints. In contrast, the Petition relies primarily on Broggi, a reference that discloses a vision-based platooning system in which a vehicle blindly follows a moving car ahead without any knowledge of a destination, trajectory planning, or environmental context.

Petitioner seeks to conflate a reactive trailing mechanism with a proactive destination-recognition and guidance system. In doing so, it improperly equates the

position of a transient, moving object with the claimed concept of a “potential destination,” misconstrues the meaning of “destination” as used in the Patent, and wrongly characterizes a dynamic steering adjustment as an “optimized travel path” to a defined endpoint. As demonstrated below, these misinterpretations are not supported by the intrinsic record or the applicable prior art. When properly construed in light of the specification, the claims of the ‘805 Patent require functions that Broggi simply does not perform.

Each of the Petition’s core assertions—(1) that a moving vehicle qualifies as a “potential destination,” (2) that Broggi’s tracking of a lead vehicle satisfies the claimed use of a “destination,” and (3) that reactive steering adjustments equate to an “optimized travel path” to a destination—fails under the correct reading of the claims. Accordingly, the Petition has not shown by a preponderance of the evidence that the challenged claims are unpatentable.

a) The Petition Misconstrues the Meaning of “Potential Destination”

The Petition’s challenge rests on a fundamental mischaracterization of the term “potential destination” as recited in the challenged claims. Specifically, the Petition asserts that Broggi teaches or renders obvious the extraction of a “potential destination” by identifying the location of a preceding vehicle in a platoon. Petition, 28. This assertion is premised on the flawed assumption that the location of a moving

vehicle ahead in a driving lane constitutes a valid “destination” as contemplated by the ‘805 Patent. However, as made clear by both the intrinsic record and the plain language of the Patent, the term “potential destination” refers to a stationary location at which the vehicle may come to a stop—such as a parking bay or docking station—not to a transient object whose position constantly changes and whose occupation by the host vehicle would result in a collision. The Petition’s reading is inconsistent with the specification, the purpose of the invention, and how a POSITA would understand the term in context.

Specifically, the Petition states:

“Broggi discloses or renders obvious [1.2] because Broggi renders obvious extracting a location of a preceding vehicle in a platoon from the image data. Ex. 1003, ¶¶83-89. **The location of the preceding vehicle represents a potential destination of the motor vehicle.**” Petition, 28

However, the location of the preceding vehicle is not a “potential destination” as recited in the Challenged Claims. As. Dr. Majumder identifies “if the location of the preceding vehicle was “potential destination,” the vehicles would collide, which is clearly an undesirable result.” EX2007, ¶69.

Specifically, the ‘805 Patent states:

“Many day-to-day driving situations require that an operator of a motor vehicle guide the motor vehicle along a specific course and **bring the vehicle to a stop at a specific location, for example in a parking bay or at a loading platform.** To assist a vehicle operator in such situations, a method and a suitable device for implementing this method, include detecting the

potential target objects in the image data of an image sensor and identifying the potential target objects as **potential destinations** in a multistage exclusionary method, whereupon a trajectory describing an optimized travel path is computed at least in relation to the most proximate destination.” EX1001, Abstract

Accordingly, a POSITA would understand that the “potential destinations” recited in the ‘805 Patent are positions to “bring the vehicle to a stop at a specific location, for example in a parking bay or at a loading platform.” EX2007, ¶69.

This understanding is further explained by the ‘443 Patent, which states

“An 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, as well as to provide a device suited for implementing the method, which functions without the need for affixing specific visual signatures at the destination.” EX1001, 2:15-20

Therefore, the ‘805 Patent makes clear that the invention enables a vehicle to be navigated to its final parking destination. For example, Figure 2 (reproduced below) “shows exemplarily a typical situation of a truck (20) docking at a cargo door (26, 32) of a warehouse (25, 31).” EX1001, 7:13-15

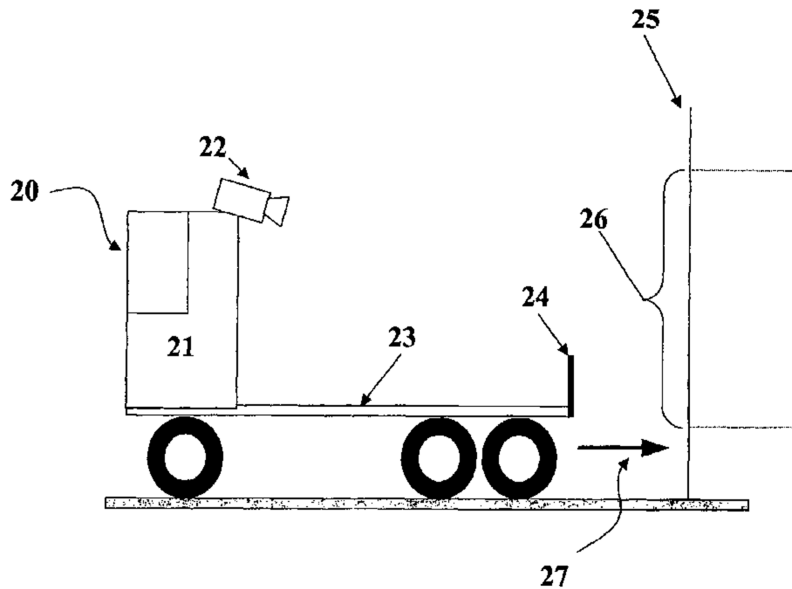


Figure 2

As a result, as Dr. Majumder explains, the “potential destination” “is not just any object in the scene—it is one that meets a series of geometric and contextual criteria suggesting it is a valid endpoint for docking or stopping, like the entrance to a cargo bay or docking door.” EX2007, ¶71.

Therefore, the location of the preceding vehicle cannot represent a potential destination of the motor vehicle as alleged by the Petition because the location of the preceding vehicle is not a valid endpoint for docking or stopping.

Consequently, the Petition’s reliance on Broggi fails to meet its burden of demonstrating that the challenged claims are unpatentable. The asserted mapping of a preceding vehicle’s location to the claimed “potential destination” reflects a clear misreading of the claim language and a disregard for the context provided by the ‘805 Patent. As the intrinsic record and expert testimony confirm, a “potential

destination” must be a fixed, plausible endpoint for stopping—such as a loading platform or docking station—not a moving object like a preceding vehicle in a platoon. Because Broggi does not disclose, teach, or suggest identifying such a destination as required by the claims, the Petition’s challenge under this ground must be rejected.

b) The Petition Mischaracterizes the ‘805 Patent’s Use of the Term “Destination”

The Petition attempts to equate the moving location of a preceding vehicle with the “destination” recited in the claims by arguing that the ‘805 Patent refers to a destination as an “object,” such as a cargo door. Petition, 31. However, this oversimplification ignores the context and function of the “destination” within the claimed invention. While it is true that the ‘805 Patent describes the cargo door as a destination object, it is not merely any object in the scene—it is a fixed, stationary structure that serves as both the ground-truth endpoint and the geometric reference used in a multistage exclusionary process to identify suitable docking targets. The preceding vehicle in Broggi, by contrast, is not fixed, does not serve as a terminal target for parking, and is never subjected to the type of image-based filtering or geometric validation required by the ‘805 Patent. Accordingly, the Petition’s reliance on Broggi misconstrues the term “destination” as it is properly understood in light of the specification and the claims. EX2007, ¶72.

The Petition states:

The *potential destination* being an object—e.g., a preceding vehicle—is consistent with how the ‘805 Patent uses the term “destination,” referring to a destination as an object (e.g., cargo door of a dock). Ex.1001, 7:25-31, 7:50; Ex.1003, ¶88. Petition, 31,

The Patent Owner agrees that the ‘805 Patent teaches that the cargo door(26, 32) is the fixed destination for determining how to park the truck 20 as shown in Figures 2 and 3 (reproduced below):

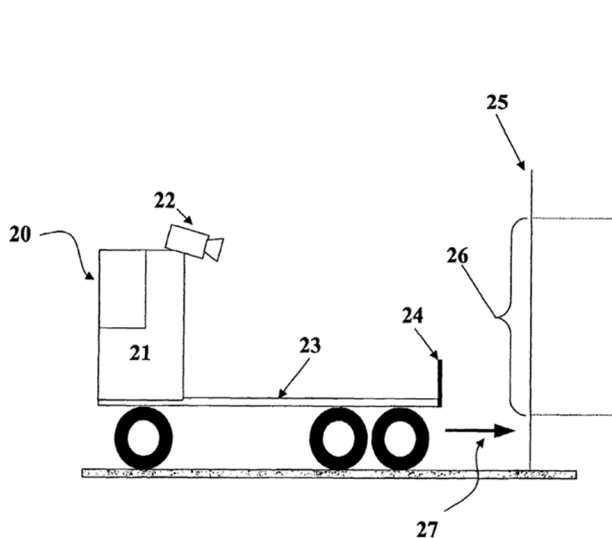


Figure 2

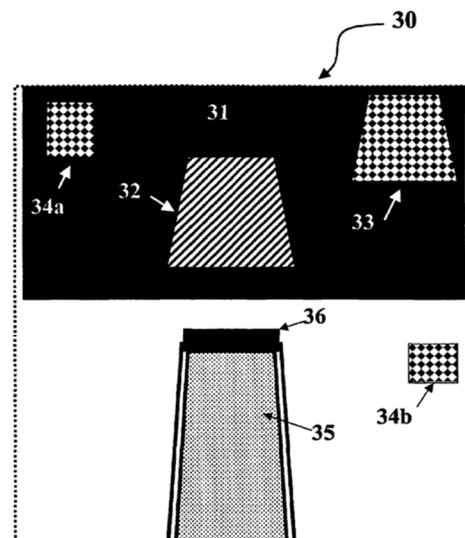


Figure 3

As Dr. Majumder explains

“The cargo door plays a dual role. First, it is the ground-truth endpoint that the vehicle must reach, and second, it is the geometric model against which candidate image features are evaluated and filtered through multiple stages of exclusion. Ultimately, the cargo door’s correct identification enables the system to store its positional data and calculate a reliable trajectory for guiding the truck into position, completing the docking task.” EX2007, ¶73.

In contrast, in Broggi, the preceding vehicle's location is not fixed (the vehicle is moving) and therefore does not provide the ground-level truth for parking the vehicle. Further, Broggi is wholly silent with regard to the preceding vehicle being processed through a multistage exclusion process.

Therefore, contrary to the Petition's assertion, the usage of the preceding vehicle as the "destination" is *inconsistent* with how the '805 Patent uses the term "destination."

As a result, the Petition's attempt to broaden the term "destination" to encompass a moving vehicle misrepresents both the language and intent of the '805 Patent. As confirmed by the specification, figures, and expert testimony, the claimed "destination" refers to a fixed, stationary endpoint—such as a cargo door—that is used not only as the target for final vehicle positioning, but also as a geometric model validated through a multistage exclusion process. Broggi's disclosure of a preceding vehicle does not satisfy these criteria. It fails to offer a stationary endpoint, plays no role in trajectory finalization, and is not subjected to the detailed image-processing sequence central to the invention. Accordingly, Broggi does not teach or suggest the claimed concept of a "destination," and the Petition's argument on this point should be rejected.

c) The Petition Fails to Show That Broggi Discloses or Suggests Calculating an Optimized Path to a Destination

The Petition contends that Broggi discloses or renders obvious “calculating at least one trajectory describing an optimized travel path...to assist a subsequent vehicle guidance for at least one of the potential destinations,” as required by the challenged claims. Petition, 37. In doing so, the Petition equates Broggi’s calculation of a steering angle for maintaining alignment with a preceding vehicle during platooning with the calculation of a destination-based optimized trajectory as recited in the claims. This argument, however, rests on a fundamental misunderstanding of both Broggi’s system and the claim language.

As described in Broggi, the ARGO vehicle performs “platooning” by visually tracking and following the vehicle directly ahead, using that vehicle’s real-time position to make continuous steering adjustments. But ARGO has no awareness of the lead vehicle’s destination, nor does it generate a planned trajectory to reach a defined endpoint. Rather than computing a path to a specific location, Broggi’s system reacts dynamically to the movements of the vehicle in front. It is, in essence, a follower—not a navigator. EX2007, ¶76.

In contrast, the challenged claims of the ‘805 Patent require a system that extracts positional parameters of a potential destination and then calculates an optimized travel path to that destination in order to assist subsequent vehicle

guidance. Broggi does not disclose such functionality. It lacks both the concept of a fixed destination and the calculation of a trajectory tailored to reach it. EX2007, ¶78. Accordingly, the Petition’s reliance on Broggi is misplaced, and its attempt to map Broggi’s reactive following behavior onto the proactive trajectory planning required by the claims must be rejected.

Specifically, the Petition states:

“Broggi discloses or renders obvious calculating at least one trajectory describing an optimized travel path using the positional parameters (calculating a steering angle describing a desired path using the relative location and associated distance of the preceding vehicle) so as to assist a subsequent vehicle guidance for one of the potential destinations (the steering angle is used for controlling steering of a motor vehicle during platooning to the location of the preceding vehicle).”
Petition, 37

However, in Broggi, no path, let alone an “optimized path,” is calculated “to assist a subsequent vehicle guidance for at least one of the potential destinations,” as required in the Challenged Claims.

Instead, Broggi expressly defines “platooning” as “The automatic following of the preceding vehicle, that requires the localization and tracking of a target vehicle (Vehicle Detection and Tracking).” EX1005, 166. Specifically, in the “platooning” described in Broggi, the preceding vehicle serves as the central reference point for the ARGO vehicle’s platooning functionality. Rather than relying solely on lane markings or predefined routes, ARGO uses visual perception to detect, track, and

follow the vehicle directly ahead. The preceding vehicle effectively defines both the path and speed that ARGO must follow, allowing the system to perform autonomous trailing without additional infrastructure.

As Dr. Majumder explains in Broggi:

“...once the preceding vehicle is localized, ARGO uses its position to calculate a dynamic steering error, which reflects the lateral offset between ARGO’s heading and the centerline of the detected vehicle. This error signal is then filtered and scaled based on vehicle speed, forming the input to a gain-scheduled proportional controller that continuously adjusts ARGO’s trajectory to maintain proper alignment. The preceding vehicle’s role is thus not passive; it actively dictates ARGO’s movement by serving as the moving destination that guides both directional and positional control.” EX2007, ¶76.

Therefore, in the “platooning” system described in Broggi, the path that the ARGO car follows is entirely based on following the car in front of it. In fact, the ARGO has absolutely no knowledge of the destination for the platoon. As a result, the ARGO car taught in Broggi cannot calculate an “optimized path” “so as to assist a subsequent vehicle guidance for at least one of the potential destinations,” as required in the Challenged Claims.

In fact, the Petition expressly states “Broggi’s desired path is an optimized travel path because it is optimized for “automatically follow[ing] the vehicle ahead” as part of the described platooning functionality. Ex.1005, 175, Figs. 21-22; Ex.1003, ¶93.” Petition, 34. However, this is not the language recited in the challenged claims.

The Challenged Claims expressly recite:

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,

Therefore, to satisfy the claim requirement, the “optimized travel path” must lead the vehicle to the “at least one of the potential destinations.” However, in 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. Instead, the ARGO car taught in Broggi blindly follows whatever arbitrary path the preceding car happens to follow.

Dr. Majumder provides the following analogy to demonstrate the distinction between the “platooning” taught in Broggi and the Challenged Claims.

“Consider the difference between a person using GPS navigation to drive to a known restaurant versus a person blindly following another car without knowing where it’s going.

In the first scenario, the GPS system calculates a destination-driven, optimized path based on road conditions, distance, and travel time. The driver knows exactly where they’re going, and the system computes a trajectory that actively assists the driver in reaching that specific location in the most efficient way possible. This reflects what is required in the challenged claims: the system must calculate at least one trajectory describing an optimized travel path using positional parameters specifically to assist vehicle guidance to a destination.

In the second scenario—the one described in Broggi—the driver simply follows the taillights of the car in front, regardless of where that car is headed. There is no understanding of the endpoint, no route optimization, and no calculated guidance to

an actual destination. The leader car could be heading to the store, to the mountains, or even circling a parking lot—the follower has no idea. It adapts its path in real-time solely to maintain alignment and distance with the vehicle ahead, not to reach a defined endpoint. This is akin to ARGO’s platooning: it calculates steering corrections based on the preceding car’s movements, but it never plans a path to a known or optimized destination.” EX2007, ¶¶79-81.

Thus, Broggi’s ARGO is like the second driver—blindly following a lead vehicle without ever knowing or planning where it’s ultimately going. That is fundamentally different from what the challenged claims require: a calculated and optimized trajectory to reach a specific, identified destination.

As a result, the Petition’s reliance on Broggi fails to satisfy the requirement that the system calculate “at least one trajectory describing an optimized travel path...to assist a subsequent vehicle guidance for at least one of the potential destinations,” as recited in the challenged claims. Broggi’s ARGO system does not calculate a trajectory to any destination, nor does it have any awareness of one. Instead, it blindly follows a moving vehicle using reactive steering corrections based solely on visual tracking—without knowledge, planning, or optimization toward a defined endpoint. This reactive, follower-based control is fundamentally distinct from the proactive, destination-driven trajectory planning claimed in the ‘805 Patent. The Petition’s attempt to equate Broggi’s platooning behavior with the claimed destination-guidance functionality is not supported by the record and should therefore be rejected.

d) Broggi's Reactive Platooning System is Not Equivalent to the '805 Patent's Proactive, Destination-Based Guidance Invention

At its core, the Petition attempts to conflate a reactive vehicle-following system disclosed in Broggi with a fundamentally different invention directed to proactive, destination-based vehicle guidance. This conflation is legally and technically unsound and does not withstand scrutiny when the claims are interpreted in accordance with the intrinsic record.

First, the Petition misconstrues the meaning of “potential destination” by equating it with the real-time location of a preceding vehicle in a platoon. However, as the specification makes clear, and as a person of ordinary skill in the art would readily understand, a “potential destination” in the context of the '805 Patent refers to a stationary, plausible endpoint at which a vehicle can come to a controlled stop—such as a parking bay, docking station, or loading platform. The purpose of the invention is to extract geometric cues from image data to identify such fixed locations and assist vehicle guidance toward them. The location of a moving vehicle—particularly one that is itself unaware of its final destination—does not and cannot satisfy this requirement. As Dr. Majumder explains, “to treat such a vehicle as a ‘potential destination’ would lead to collision rather than guidance.” EX2007, ¶67.

Second, the Petition further distorts the term “destination” by lifting it out of context and attempting to apply it to any “object,” including a moving vehicle. But the ‘805 Patent is explicit in describing “destination” not merely as an object in the visual field, but as a ground-truth reference—something physically fixed and contextually significant that can be identified and verified through a multistage exclusionary process involving edge segmentation, geometric analysis, and plausibility checks. In contrast, Broggi’s system never identifies or validates any destination. It does not analyze environmental geometry, filter out non-viable candidates, or determine whether an object fits the spatial profile of a parking target. Instead, Broggi simply detects a preceding vehicle and follows it—regardless of where that vehicle is going.

Third, the Petition erroneously asserts that Broggi discloses calculating an “optimized travel path” to a destination, simply because it adjusts steering in response to the position of the vehicle ahead. But Broggi’s system does not calculate a path to any endpoint—let alone an optimized path. It does not know the destination of the lead vehicle, does not extract or analyze positional parameters of a destination, and does not optimize movement based on efficiency, geometry, or vehicle constraints. Instead, it is a reactive control system that maintains alignment with a moving target in real time. It is akin to blindly following taillights without understanding where the leading vehicle is headed, as illustrated by Dr. Majumder’s

analogy to a driver who follows another car without knowing the route or endpoint. This reactive following behavior is the antithesis of what the claims of the ‘805 Patent require—a system that identifies a fixed destination in advance and computes a precise, optimized trajectory to guide the vehicle to it.

The specification reinforces this fundamental distinction by repeatedly describing the invention as one that guides a motor vehicle to a final stopping location based on the detection and validation of fixed geometric forms, without reliance on infrastructure-based markings. The claims embody that invention and cannot reasonably be stretched to cover the unrelated functionality disclosed in Broggi.

Taken together, the Petition’s arguments reflect a clear misreading of the claims and an improper attempt to map the teachings of Broggi onto elements that are simply not present in that reference. Petitioner fails to provide any prior art that teaches, suggests, or renders obvious the critical limitations of the claimed invention—namely, the identification of a “potential destination” as a fixed endpoint, the recognition of a “destination” through structured geometric analysis, and the computation of an “optimized travel path” that guides the vehicle to such a destination.

e) Neither Huttenlocher nor Brady Cures the Fundamental Deficiencies in Broggi

Even if the teachings of Huttenlocher or Brady are considered, they fail to cure the foundational deficiencies in Broggi's disclosure. As detailed above, Broggi does not disclose identifying a fixed "potential destination," performing a structured geometric validation, or calculating an "optimized travel path" to such a destination. Neither Huttenlocher nor Brady supplies the missing limitations. Huttenlocher is directed to object recognition using geometric alignment between known models and image features.

Huttenlocher does not disclose or suggest extracting positional parameters of potential destinations for a vehicle, let alone determining a plausible endpoint for stopping. Nor does it describe calculating a trajectory—optimized or otherwise—based on such positional parameters. The alignment process in Huttenlocher serves to match a stored model to an image, not to support navigation toward a validated destination in the driving environment.

Brady similarly fails to disclose or suggest the features required by the challenged claims. Brady is directed to machine vision classification and tracking, including segmenting image regions and classifying them using fuzzy logic techniques. Brady does not involve vehicle guidance, trajectory calculation, or the contextual plausibility filtering required to identify docking stations or parking bays

as potential destinations. Nor does Brady offer any mechanism for selecting among candidate destinations based on steering constraints.

Critically, the combination of Broggi with either Huttenlocher or Brady would not result in the claimed invention. Adding Huttenlocher's geometric alignment or Brady's classification techniques to Broggi's reactive platooning system does not yield a system that (1) identifies fixed, plausible endpoints for vehicle stopping, (2) validates such endpoints through a multistage exclusionary process, and (3) computes optimized trajectories tailored to reach those endpoints based on positional data. Instead, such a combination merely layers additional perception or recognition techniques atop a fundamentally reactive system that remains blind to destination context and planning.

Accordingly, even if one were to assume that a person of ordinary skill would be motivated to combine these references, the result would still fall far short of the destination-driven guidance system claimed in the '805 Patent. The cited references do not, individually or in combination, teach or suggest the key claim limitations, and therefore cannot render the challenged claims unpatentable.

2. The Petition Fails to Establish That Huttenlocher—or Any Cited Reference—Discloses the Claimed “Mathematical Tree Structure” Required by the ‘805 Patent.

The Petition's attempt to satisfy the “mathematical tree structure” limitation of the challenged claims is fundamentally flawed. It relies on a mischaracterization

of both the claim language and the teachings of the asserted prior art, particularly Huttenlocher. The challenged claims of the '805 Patent require storing the interrelationships of a plurality of edge segments in a singular, connected data structure that satisfies the properties of a mathematical tree. The Patent itself expressly incorporates Sedgewick's well-established definition of a tree as a connected, acyclic graph with exactly one path between a designated root and every other node. This standard unambiguously excludes disconnected structures or multiple trees (i.e., a forest), and it provides the controlling interpretive framework for the claim term.

Despite this, the Petition and its expert improperly assert that the disjointed components depicted in Huttenlocher's Figure 4 satisfy the claim limitation, even though that figure lacks a common root, fails to establish one-to-one connectivity among all nodes, and clearly represents a forest—not a tree. In doing so, the Petition ignores the intrinsic evidence and offers only conclusory assertions unsupported by the cited reference. As the following sections demonstrate, neither Huttenlocher nor Brady discloses or suggests a mathematical tree structure as claimed, and the Petition's attempt to cure Broggi's deficiencies through these references fails both legally and technically.

**a) The Petition Misrepresents the Tree Structure
Required by the ‘805 Patent**

The Petition erroneously asserts that Huttenlocher’s multiscale segmentation figure discloses the “mathematical tree structure” recited in the challenged claims. Relying on their expert, Petitioner contends that Huttenlocher’s Figure 4 satisfies the requirements of a tree structure simply because it includes a hierarchical arrangement of nodes. Petition, 42; EX1003, ¶108. But this argument selectively quotes from the ‘805 Patent while ignoring the full context of its disclosure, including the express incorporation of Sedgewick’s textbook *Algorithms in C* (EX2006) as an exemplary source defining the nature of a “hierarchical tree structure.” As Dr. Majumder explains, “When viewed in light of Sedgewick’s explanation—explicitly referenced in the ‘805 Patent—a tree structure is not merely any hierarchical grouping, but a connected, acyclic graph with exactly one path between the root and every other node.” EX2007, ¶43.

Huttenlocher’s Figure 4, by contrast, depicts multiple disjointed subgraphs that lack a common root and do not satisfy the unique path requirement. As a result, Petitioner’s reliance on Huttenlocher is misplaced, and its expert’s characterization of a forest as a tree is directly contradicted by the very authority the ‘805 Patent invokes.

Specifically, Petitioner’s expert alleges that “Huttenlocher’s multiscale segmentation tree, as reflected in Figure 4 above, is a mathematical tree structure

because it includes the required features of a mathematical tree structure,” EX1003, ¶108. However, as the expert and the Petition recognize, the ‘805 patent states, “Many different proven methods for creating and organizing such a hierarchical tree structure are available to one skilled in the art[.]” (Petition at 42) (marking in original). However, the Petition and Petitioner’s expert both ignore the second part of the sentence from the quotation. The quoted portion of the ‘805 Patent states in its entirety:

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). EX1001, 4:45-51

Accordingly, the tree structure recited in the ‘805 Patent must be interpreted in the context of Sedgewick (EX2006). Sedgewick states that a tree is:

“A *tree* is a nonempty collection of *vertices* and *edges* that satisfies certain requirements. A vertex is a simple object (also referred to as a *node*) that can have a name and can carry other associated information; an edge is a connection between two vertices. A *path* in a tree is a list of distinct vertices in which successive vertices are connected by edges in the tree. One node in the tree is designated as the *root*—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. If there is more than one path between the root and some node, or if there is no path between the root and some node, then what we have is a graph (see Chapter 29), not a tree. Figure 4.1 shows an example of a tree.”

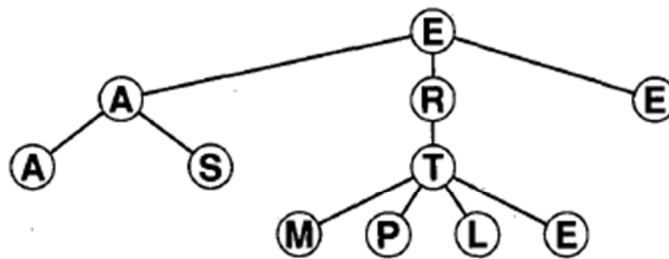
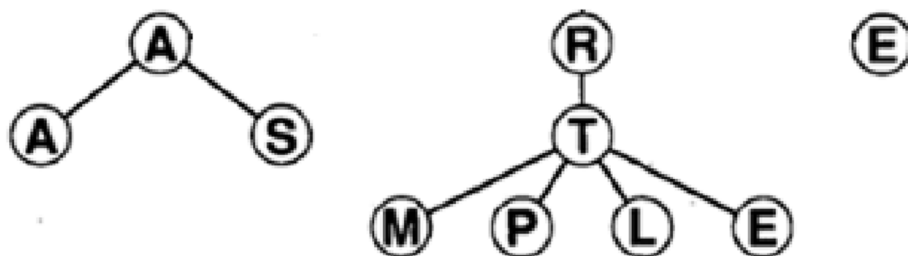


Figure 4.1 A sample tree.

EX2006, 51

Sedgewick distinguishes trees from forests. Specifically, Sedgewick states 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.” EX2006, 51-52. Accordingly, as explained by Sedgewick and depicted in the Patent Owner’s annotated version of Figure 4.1, a forest is formed from disconnected trees.



A Sample Forest

Petitioner relies upon their expert to erroneously equate the forest shown in Huttenlocher's Figure 4 (reproduced below) and the tree structure required by the claims.

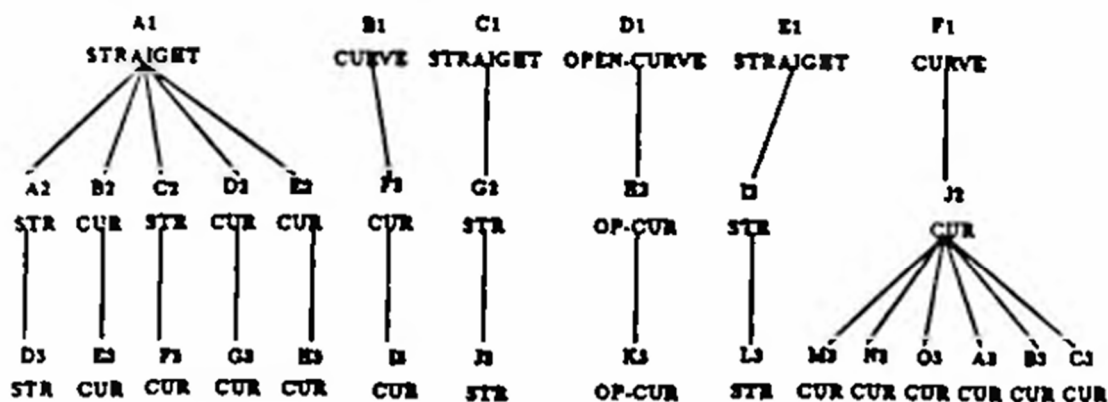


Figure 4. Multi-scale segmentation tree corresponding to the curvature scale-space segmentation in Figure 3.

EX1006, 18

The fact that Figure 4 is not a tree structure is demonstrated by the fact that Figure 4 violates the first property of tree structures. Sedgewick states:

“Property 4.1 *There is exactly one path connecting any two nodes in a tree.*”

Any two nodes have a *least common ancestor*: a node that is on the path from both nodes to the root, but with none of its children having the same property. For example, 0 is the least common ancestor of C and L in the tree of Figure 4.3. The least common ancestor must always exist because either the root is the least common ancestor, or both of the nodes are in the subtree rooted at one of the children of the root; in the latter

case either that node is the least common ancestor, or both of the nodes are in the subtree rooted at one of its children, etc. There is a path from each of the nodes to the least common ancestor-patching these two paths together gives a path connecting the two nodes.”

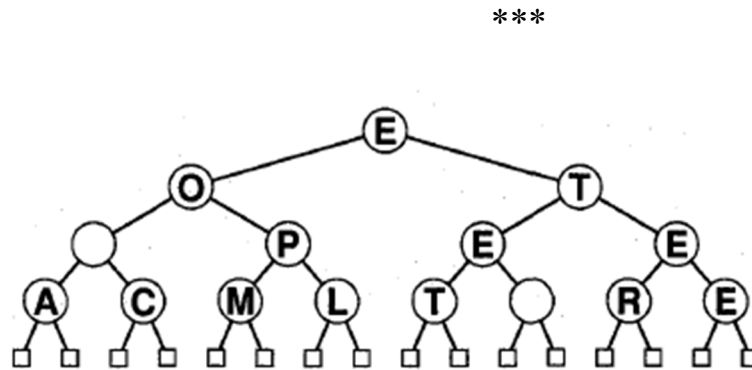
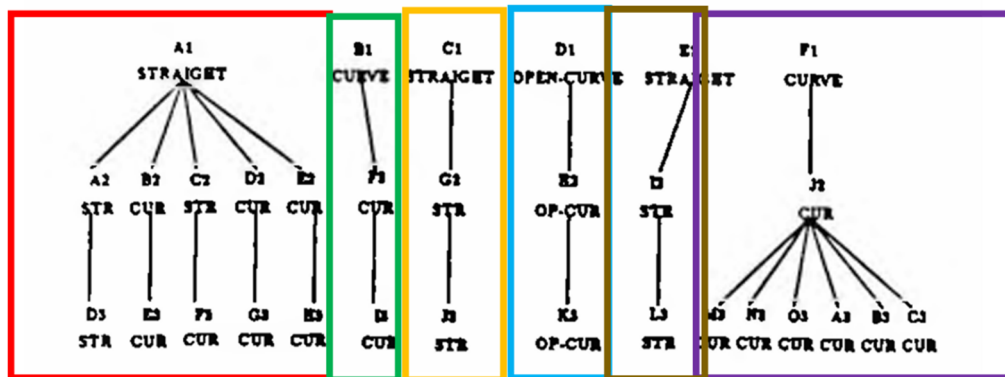


Figure 4.3 A complete binary tree.

EX2006, 53-54

Comparing Sedgewick’s tree structure (above) to Huttenlocher’s (annotated) forest makes the difference clear:



In Figure 4 of Huttenlocher, no path exists connecting any of A1, B1, C1, D1, E1, F1. Further, as shown in Huttenlocher, the majority of the nodes do not share a

common ancestor. Therefore, as defined by Sedgewick, Huttenlocher's Figure 4 does not illustrate a tree structure.

Consequently, Petitioner's assertion that Huttenlocher's Figure 4 discloses the "mathematical tree structure" required by the challenged claims cannot withstand scrutiny. The '805 Patent expressly incorporates Sedgewick's definition of a hierarchical tree structure, which mandates that a valid tree must include a single root and exactly one path between that root and every other node. As shown, Huttenlocher's Figure 4 depicts a disconnected collection of components lacking both a common root and the required unique-path connectivity—characteristics that, under Sedgewick's definition, describe a forest, not a tree. Petitioner and its expert improperly disregard this controlling standard by conflating any hierarchical visual grouping with a mathematical tree, despite the intrinsic record's explicit reliance on Sedgewick to define the claim term. Because Huttenlocher's segmentation framework fails to satisfy the essential properties of a tree as understood by a person of ordinary skill in the art, it cannot meet the tree structure limitation of the challenged claims. Petitioner's attempt to bridge this definitional gap with conclusory expert testimony falls short, and its reliance on Huttenlocher is therefore legally and technically insufficient.

**b) Petitioner’s Expert Mischaracterizes Huttenlocher’s
Figure 4 as a “Mathematical Tree Structure”**

Petitioner’s argument that Huttenlocher discloses the claimed “mathematical tree structure” rests entirely on the assumption that a tree and a forest are equivalent. Huttenlocher describes a multi-rooted tree, and the Petitioner’s expert has already conceded that not all nodes in the structure are connected to each other, but only those within the same subtree corresponding to each root are connected to each other: “the subtree corresponding to each root includes nodes .. such that any two nodes are connected by exactly one path consisting of a sequence of branches.” EX1003, ¶108 . In other words, nodes belonging to different subtrees in a multi-rooted tree such as A1, B1 etc. in Figure 4 are not connected by exactly one path. They are in fact not connected at all. Huttenlocher does not use a tree structure, but a multirooted tree structure, also called a forest, as defined by Sedgewick. So as Dr. Majumder explains “Huttenlocher’s data structure cannot be claimed to be a “mathematical tree structure”, because it is not a tree at all.” EX2007, ¶99. However, the ‘805 Patent requires a tree with the property that any two nodes in the structure are connected by exactly one path.

Furthermore, Petitioner’s Expert alleges, “Huttenlocher’s tree includes multiple levels of relations (i.e., a root node with children nodes, and those children nodes potentially having one or more additional children nodes), which is typical of a mathematical tree structure.” EX1003, ¶108. However, this assertion is directly

contradicted by the reference itself, as well as by the definition of a tree structure expressly incorporated into the '805 Patent. Huttenlocher describes Figure 4 as a “scale-space segment tree,” but it does not disclose—nor does it illustrate—a connected structure in which all edge segments are related through a single or unified set of paths. In fact, as shown by Patent Owner’s annotated version of Figure 4, numerous nodes, such as D3 and F1, reside in completely disconnected components.

As a result, there exists no sequence of branches linking many pairs of segments, thereby violating both the expert’s own definition and the core structural requirement of a tree. As Dr. Majumder explains, “under the definition provided by Sedgewick the structure depicted in Huttenlocher constitutes, at best, a forest of disconnected graphs, not a mathematical tree.” EX2007, ¶98. Consequently, Petitioner’s reliance on Huttenlocher to meet the claim limitation is not only unsupported by the reference but directly at odds with the intrinsic evidence.

For example, Petitioner’s expert offers a conclusory statement that Figure 4 of Huttenlocher “is a mathematical tree structure because it includes the required features of a mathematical tree structure.” EX1003, ¶108. The expert further explains that “[s]pecifically, it is a multi-rooted tree where the subtree corresponding to each root includes nodes with defined relations represented by branches between nodes such that any two **nodes are connected by exactly one path consisting of a sequence of branches.**” EX1003, ¶108

However, Huttenlocher states:

“Figure 4 shows this scale-space segment tree. Each segment in the tree is indicated by its label from Figure 3, and by the type of segment: straight, curve, and open-curve. EX1006, 17”

As shown in Figure 4 of Huttenlocher, annotated below, one path consisting of a sequence of branches cannot be traversed between, to take just one example of many, edge segments D3 and F1. So it is clear in Figure 4 there are multiple nodes that are not connected by a sequence of branches, which is contrary to Petitioner’s expert allegation.

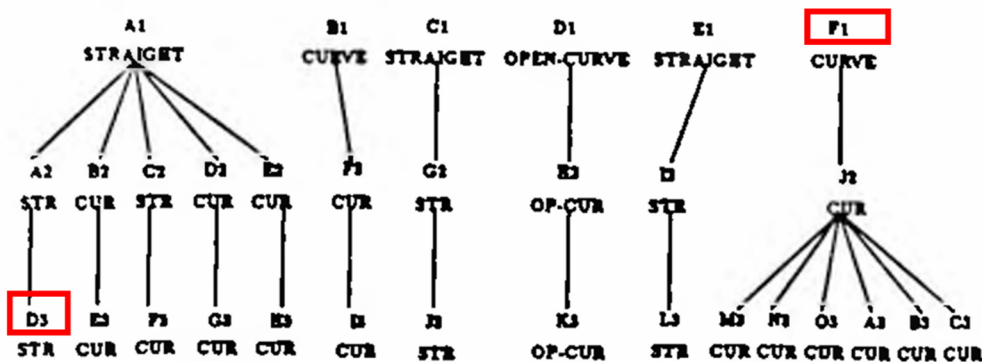


Figure 4. Multi-scale segmentation tree corresponding to the curvature scale-space segmentation in Figure 3.

EX1006, 18

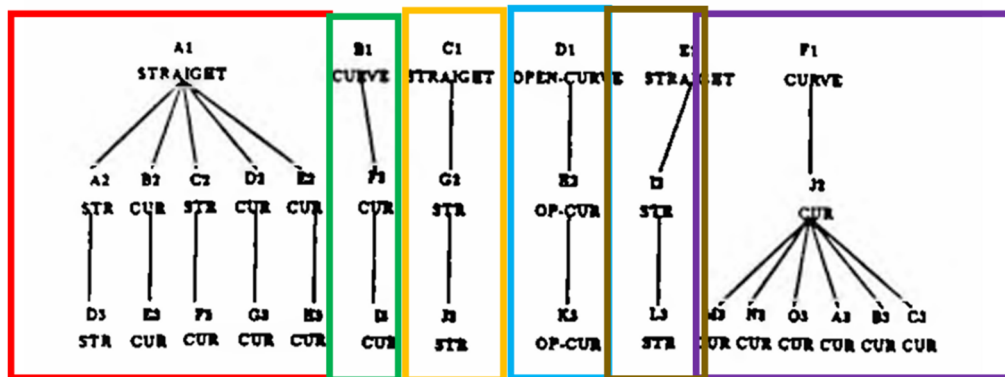
Petitioner’s expert further alleges that Figure 4 (above) shows that “The edge segments are stored in a hierarchical tree structure” and “the hierarchical segmentations “form a (multi-rooted) tree, where each region at a coarse scale corresponds to one or more regions at each finer scale. Ex. 1006, 373,” EX1003, ¶25.

However, this interpretation of a hierarchical tree structure (i.e., “a mathematical tree structure”) is inapposite of the express language of the claims and contrary to the definition provided by Sedgewick (EX2006) that was cited in the ‘805 Patent.

Claim 1 of the ‘805 patent states:

“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;”

Huttenlocher’s multiscale segmentation cannot store “interrelationships” between the segments (e.g. F1 and D3) because there is no connection between the disjointed nodes in separate structures as shown in Patent Owner’s annotation of Figure 4 below. Therefore, there is no known relationship between the disjointed segments (e.g. F1 and D3):



As a result, Huttenlocher’s multiscale segmentation shown in Figure 4 cannot be “a mathematical tree structure” as recited in the claims because it does not store “interrelationships of the plurality of edge segments.”

In addition, Petitioner's expert allegation that Huttenlocher's multiscale segmentation shown in Figure 4 is "a mathematical tree structure" is contrary to the requirements for a tree structure as articulated by Sedgewick (EX2006). For example, Sedgewick states, "If there is more than one path between the root and some node, or if there is no path between the root and some node, then what we have is a graph (see Chapter 29), not a tree." EX2006, 51. Accordingly, Huttenlocher's multiscale segmentation shown in Figure 4 is a graph and not a tree because there are numerous nodes and roots for which there is no path.

As a result, Petitioner's attempt to characterize Huttenlocher's multiscale segmentation as a "mathematical tree structure" is both conclusory and contrary to the intrinsic record. The '805 Patent expressly incorporates Sedgewick's definition of a tree, which requires a connected structure with exactly one path between the root and every node. Huttenlocher's Figure 4, however, clearly depicts a set of disconnected components—segments such as D3 and F1 have no connecting path and no shared root—thereby failing the defining criteria of a tree. Petitioner's expert does not reconcile this structural deficiency, nor does he address the absence of interrelationships among all edge segments, as required by the claim language. Instead, the expert misapplies the term "tree" to what is, at most, a forest of unrelated subgraphs. Because Huttenlocher does not disclose or suggest a structure that satisfies the plain and ordinary meaning of "mathematical tree structure" under

Sedgewick, it cannot meet this claim limitation. The Petition’s reliance on Huttenlocher to satisfy this element must therefore be rejected.

c) The Term “A Mathematical Tree Structure” Refers to a Single Tree (Not a Forest)

It is well settled that the indefinite article “a” in a patent claim generally means “one or more” when the claim uses open-ended language such as “comprising.” However, the Federal Circuit has made clear that this general rule yields to context. In *Salazar v. AT&T Mobility, LLC*, 64 F. 4th 1311 (Fed. Cir. 2023), the court held that the use of “a” can require a singular element when the claim language demands unitary performance of certain functions. There, the claim recited “a microprocessor” configured to perform multiple functions (generating, creating, and retrieving), followed by references to “said microprocessor” performing each function. The court rejected the patentee’s argument that “a microprocessor” could encompass multiple processors, emphasizing that the claim language required one microprocessor capable of performing all the recited functions.

As the court explained, “for a dog owner to have ‘a dog that rolls over and fetches sticks,’ it does not suffice that he have two dogs, each able to perform just one of the tasks.” *Salazar v. AT&T Mobility LLC*, 64 F.4th 1311, 1318 (Fed. Cir. 2023) (internal citation and marking omitted). Likewise, having multiple microprocessors each performing only a subset of the tasks would not meet the claim;

the claim language requires at least one microprocessor capable of performing each of the recited functions.

This holding confirms that the article “a” is not automatically plural. When the claim demands that a single instance of an element perform all required functions, “a” must be construed as singular. Here, by parallel reasoning, the claim term “a mathematical tree structure” should be interpreted as a single tree structure, given the role it plays in claim 1. Just as “a microprocessor” had to perform all functions in Salazar, “a mathematical tree structure” must be a single structure that stores the interrelationships of the entire set of edge segments. The context of the claim language necessitates a singular interpretation.

i. The Challenged Claims Demand One Tree Storing All Edge Segment Interrelationships

Claim 1 of the ‘805 Patent is internally consistent in treating the tree structure as a single, unified data structure encompassing all detected edge segments. The claim recites breaking down image data into “a plurality of edge segments” and storing “interrelationships of the plurality of edge segments in a mathematical tree structure.” By referring to “the plurality of edge segments” and requiring their interrelationships to be stored in “a mathematical tree structure,” the claim demands that one tree structure contains the relationships among all the identified segments.

As Dr. Majumder explains:

“allowing multiple disjoint tree structures—i.e., a forest—would defeat the purpose of this language. 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.

As a result, that outcome is incompatible with the claim language, which requires the tree structure to store relationships across the full set of edge segments. Only a unified structure can meet this requirement. Accordingly, the claim demands one tree structure that organizes all edge segments, not multiple disjoint trees.

ii. The Specification Confirms That a Tree Structure Is Singular and Connected

Nowhere in the Patent does the specification suggest that multiple trees may substitute for one. The invention is consistently described as organizing edge segments in a single hierarchical structure. For instance, the image-processing unit is described as producing a hierarchical tree structure, and a tree traversal algorithm is applied to that structure. Had the inventors contemplated a forest, they would have said so—especially given that a forest is a materially distinct concept in data structure theory.

Thus, the intrinsic evidence confirms that “a mathematical tree structure” refers to a single, connected structure. Multiple disconnected trees do not satisfy this requirement.

iii. Petitioner’s Reliance on a Forest Does Not Satisfy the Claim Limitation

Petitioner’s attempt to satisfy the claim limitation using multiple disjoint tree structures—i.e., a forest—must be rejected. Under the proper construction, the claim requires a single mathematical tree structure that stores the interrelationships among all edge segments. A forest does not do that. As Dr. Majumder confirms “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.

Therefore, Petitioner’s reliance on expert testimony asserting that a forest can be equated to a tree structure is legally and technically flawed. It attempts to broaden the claim term beyond its natural and intended meaning. The Federal Circuit has made clear that claim terms must be interpreted consistently with their use in the claims and the specification. Here, the specification’s reliance on Sedgewick, and the claim’s requirement of storing all interrelationships in “a” tree structure, foreclose the argument that multiple unconnected trees suffice.

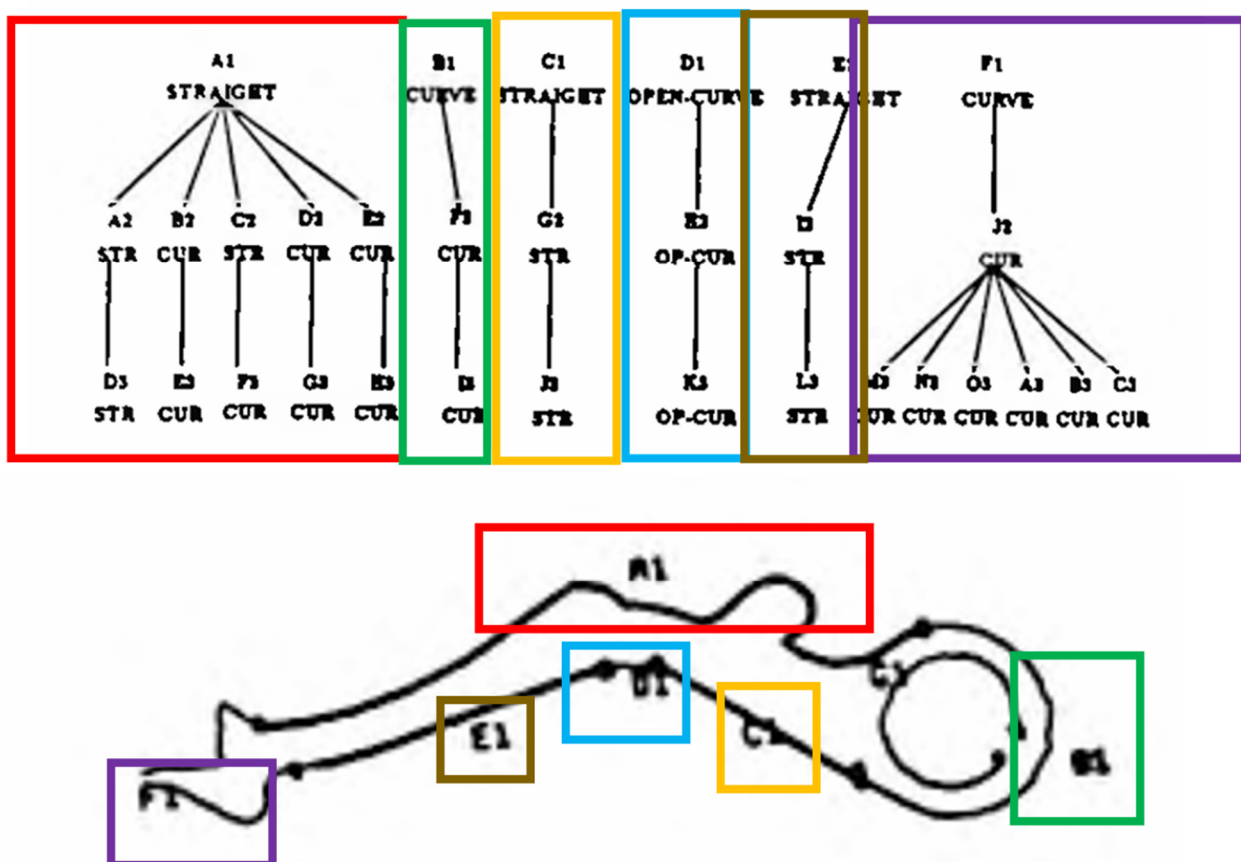
Accordingly, Petitioner’s forest-based reading of the prior art fails to disclose or suggest the required limitation. Because the cited reference does not include a single tree structure encompassing the interrelationships of all edge segments, it cannot satisfy the “mathematical tree structure” limitation.

d) Petitioner's Expert Improperly Attempts to Supply Missing Claim Limitations Not Disclosed in Huttenlocher.

Petitioner attempts to satisfy the claim limitation requiring a “mathematical tree structure” that stores “interrelationships of the plurality of edge segments” by relying on a conclusory assertion from its expert. Specifically, the expert contends that “the tree of Fig. 4 stores the interrelationships of the plurality of edge segments based on granularity and relative position.” EX1003, ¶68. However, this assertion is not supported by the text or figures of Huttenlocher, and is directly contradicted by the reference itself.

As made clear in Huttenlocher, Figure 4 merely assigns labels and types to individual segments and does not disclose any structural or hierarchical relationships among the segments identified as A1 through F1. Indeed, when Figures 3 and 4 are viewed together—as annotated by Patent Owner—it is evident that these segments are not part of a unified structure and share no common ancestor. Contrary to the expert's claim, there is no single path or connected hierarchy linking these nodes, and thus no mathematical tree structure is present. For example, Petitioner's expert alleges, “As shown, the tree of Fig. 4 stores the interrelationships of the plurality of edge segments based on granularity and relative position.” EX1003, ¶68. This statement is false. EX2007, ¶101.

Huttenlocher states with regard to Figure 4 that “[e]ach segment in the tree is indicated by its label from Figure 3, and by the type of segment: straight, curve, and open-curve.” EX1006, 17. As shown in Patent Owner’s annotated combined version of Huttenlocher’s Figure 3 (bottom) and Figure 4 (top), Figure 4 does not show the inter-relationships between the edge segments A1, B1, C1, D1, E1, and F1.



The Petitioner’s expert further states “[t]he edge segments are stored in a hierarchical tree structure.” EX1003, ¶43. However, as shown above, the edge

segments A1, B1, C1, D1, E1, and F1 are not stored in a hierarchical tree structure. Instead, A1, B1, C1, D1, E1, and F1 are in a disjointed data structure where there is no hierarchy among A1, B1, C1, D1, E1, and F1. EX2007, ¶103.

Accordingly, Petitioner’s expert is not interpreting what Huttenlocher actually discloses, but is instead attempting to impermissibly supply missing claim elements by asserting that Figure 4 depicts interrelationships among edge segments A1, B1, C1, D1, E1, and F1—despite the fact that no such interrelationships are shown.

As shown, these segments do not share a common ancestor, nor is there any connecting path between them. Petitioner has therefore failed to establish that Huttenlocher teaches the claimed requirement of storing interrelationships of edge segments in a mathematical tree structure. The reference itself does not disclose such interrelationships, and Petitioner’s expert fails to cite any supporting passage in the reference demonstrating otherwise. Rather, the expert’s assertion contradicts the plain content of Huttenlocher and represents an improper attempt to fill evidentiary gaps with conclusory statements.

As a result, Petitioner has not demonstrated that Huttenlocher discloses the claimed “mathematical tree structure” that stores interrelationships among a plurality of edge segments. The expert’s assertion that such interrelationships are present in Figure 4 is not only unsupported by the reference, but directly contradicted by it. As shown through a detailed comparison of Figures 3 and 4, the segments

labeled A1 through F1 are not arranged in a unified hierarchical structure, do not share a common ancestor, and lack any connecting paths. These disconnected segments form, at best, a collection of isolated elements—not a tree, and certainly not a structure meeting the rigorous definition expressly incorporated into the ‘805 Patent. The expert’s attempt to rewrite Huttenlocher’s disclosure through conclusory statements is insufficient to satisfy the claim limitation. Because neither the Petition nor the supporting declaration identifies where Huttenlocher teaches the required interrelationships in a mathematical tree structure, this limitation is not met, and the Petition fails on this ground.

e) Huttenlocher’s Disconnected Segmentations Fail to Disclose the Claimed Mathematical Tree Structure

The Petition’s attempt to satisfy the “mathematical tree structure” limitation of the challenged claims by relying on Huttenlocher is fundamentally flawed. The ‘805 Patent expressly requires that the interrelationships of a plurality of edge segments be stored in a single, connected data structure that satisfies the definition of a mathematical tree. This definition—incorporated directly into the specification through reference to Sedgewick’s *Algorithms in C*—makes clear that a tree must have a single root and exactly one acyclic path between the root and every other node. As such, disconnected substructures or multi-rooted groupings (i.e., a forest) cannot meet the requirements of the claimed “mathematical tree structure.”

Huttenlocher, however, does not disclose any such structure. Figure 4 in Huttenlocher illustrates multiple disconnected segmentations that lack a common root and have no single path linking all edge segments. As shown in the annotated comparison of Huttenlocher's Figures 3 and 4, segments such as D3 and F1 are part of entirely separate components, and no traversal path exists between them. This structural disconnect alone defeats the Petition's attempt to equate Huttenlocher's output with the claimed mathematical tree. Petitioner's expert attempts to bridge this gap by asserting that Figure 4 represents a "multi-rooted tree" where interrelationships are preserved. However, that assertion is contradicted not only by the visual evidence but also by the express language of Sedgewick, which clearly distinguishes between a tree and a forest and states that a valid tree must contain exactly one path between the root and each node.

Moreover, the Petition and its expert selectively quote from the '805 Patent to support their argument while omitting the remainder of the sentence that cites Sedgewick's textbook as the authoritative source on tree structures. The Petition emphasizes that the '805 Patent references "many different proven methods for creating and organizing such a hierarchical tree structure," but fails to acknowledge that the Patent continues: "reference is made here exemplarily to the comprehensive compilation and discussion of widely varying tree structures by Robert Sedgewick."

As Sedgewick's explanation makes clear, the structure shown in Huttenlocher—a disconnected collection of segments—is, by definition, not a tree.

In short, Huttenlocher does not disclose a mathematical tree structure that stores interrelationships among a plurality of edge segments, as required by the claims. The expert's conclusory statements to the contrary are unsupported by the actual content of the reference and are contradicted by the standard incorporated into the Patent. Because Huttenlocher fails to disclose or suggest this critical claim limitation, the Petition's reliance on it is legally and technically insufficient, and the ground must be rejected.

f) Brady and Broggi Do Not Disclose or Suggest the Claimed Mathematical Tree Structure and Cannot Remedy Huttenlocher's Deficiencies

Even if Huttenlocher's failure to disclose a valid "mathematical tree structure" were excused, neither Brady nor Broggi provides any disclosure or suggestion that cures this fundamental shortcoming. The challenged claims of the '805 Patent require not only edge detection and segmentation, but also that the interrelationships of a plurality of edge segments be stored in a mathematical tree structure—a specific and technical data organization that is both connected and acyclic, with exactly one path between the root and each node, as defined by Sedgewick and expressly incorporated into the specification.

Brady does not address this requirement. While Brady generally relates to image segmentation and shape analysis, it makes no mention of constructing, storing, or traversing a hierarchical tree of edge segments. There is no indication in Brady of a data structure that captures edge interrelationships in a manner that conforms to the definition of a tree under Sedgewick. Nor does Brady disclose any tree traversal algorithms or describe a method for organizing edge segments into a connected structure with a single root and unique paths.

Likewise, Broggi is wholly silent on the use of tree structures for representing edge relationships. As explained elsewhere in this Response, Broggi discloses a reactive platooning system that uses real-time visual tracking to follow a preceding vehicle. While it performs certain feature detection tasks, Broggi does not segment edge data into a plurality of labeled components, nor does it construct or store any interrelationship between such components in a tree-like data structure. In fact, Broggi is concerned primarily with low-level control feedback and does not engage in the type of structured object recognition and geometric abstraction required by the claims.

Because neither Brady nor Broggi discloses or suggests a data structure that meets the definition of a “mathematical tree structure,” and because neither reference addresses the need to store interrelationships of edge segments in a connected, hierarchical format, they cannot cure the deficiencies in Huttenlocher. The Petition

offers no explanation as to how these references could collectively supply the missing limitation, and no rationale is provided for combining their teachings in a way that would result in the claimed tree structure. Accordingly, the Petition's attempt to satisfy this limitation through a combination of references is legally deficient and must be rejected.

B. Ground 2 Is Deficient Because Bertozzi Does Not Cure the Shortcomings of Broggi, Huttenlocher, and Brady

Petitioner's reliance on Bertozzi does not remedy the fundamental deficiencies in Broggi, Huttenlocher, or Brady with respect to the limitations of the challenged claims. Rather than providing missing disclosure regarding destination-based guidance or mathematical tree structures, Bertozzi reinforces the conclusion that Broggi is concerned solely with reactive platooning behavior. As explained above, the challenged claims of the '805 Patent require a system that (1) detects fixed "potential destinations," (2) calculates an "optimized travel path" to those destinations based on positional parameters, and (3) stores edge segment interrelationships in a connected, acyclic tree structure. None of these functions is disclosed or suggested by Broggi, and Bertozzi does not change that.

Bertozzi, like Broggi, is directed to a vision-based vehicle system that enables autonomous following of a lead vehicle. It describes the "ARGO" vehicle—a system developed by the same research group as Broggi's work—that performs real-time tracking of road features and other vehicles for lane keeping and convoying. Indeed,

Bertozzi explicitly describes “convoy driving” (i.e., platooning) as one of ARGO’s operational modes which maintains spacing with the preceding vehicle. The system does not identify fixed destinations, does not calculate an optimized path to a defined endpoint, and does not perform any multistage geometric validation as required by the ‘805 Patent. Instead, it reacts continuously to the position of a moving vehicle, using lateral offset and vehicle-relative location to issue steering corrections—precisely the reactive behavior at the core of Broggi.

Moreover, Bertozzi offers no disclosure of storing edge segments in a mathematical tree structure, nor does it suggest any data structure that meets the definition incorporated into the ‘805 Patent via Sedgewick. Like Broggi and Brady, Bertozzi focuses on low-level image feature detection and tracking without organizing these features into a global structure or using them to generate destination-driven guidance paths.

Thus, rather than filling gaps left by Broggi, Huttenlocher, or Brady, Bertozzi confirms the nature of Broggi’s system as one based on reactive vehicle following. It does not address the core claim limitations of the ‘805 Patent, and its inclusion in the asserted combination underscores the absence of any reference that teaches or suggests the required destination recognition, trajectory planning, or hierarchical data structure. Accordingly, Bertozzi cannot cure the Petition’s evidentiary shortcomings, and the combination remains legally and technically deficient.

VII. SUMMARY OF ARGUMENTS ON THE MERITS

Grounds 1 and 2 of the Petition fail to establish a reasonable likelihood of success because they rely on prior art that fundamentally misunderstands and misrepresents the core limitations of the challenged claims. The ‘805 Patent claims a proactive, destination-based vehicle guidance system that identifies fixed geometric endpoints—such as docking stations—using image-derived positional parameters, stores interrelationships of detected edge segments in a single mathematical tree structure, and calculates optimized travel paths to those endpoints. In contrast, Broggi and Bertozzi disclose a reactive platooning system in which a vehicle blindly follows a preceding vehicle without any recognition of a fixed destination, without computing a planned trajectory, and without organizing image data into a mathematical tree structure. The Petition’s attempt to equate this reactive following behavior with destination-based trajectory planning mischaracterizes the claims and is inconsistent with the intrinsic record.

Moreover, the Petition’s reliance on Huttenlocher to satisfy the “mathematical tree structure” limitation is misplaced. The data structure shown in Huttenlocher is a disconnected forest—not a singular, connected hierarchical structure as required by the claims and as defined through the ‘805 Patent’s incorporation of Sedgewick’s textbook. Petitioner’s expert improperly attempts to bridge this gap through conclusory assertions that contradict both the reference and the specification.

Neither Brady nor Broggi discloses or suggests a tree structure meeting this requirement, and Bertozzi confirms, rather than cures, Broggi's reactive, non-destination-based functionality. Because none of the cited references, alone or in combination, teaches or suggests the essential limitations of the '805 Patent, the Petition fails to demonstrate unpatentability under either Ground 1 or Ground 2. Accordingly, the Petition fails to establish that there is a reasonable likelihood that Petitioner would prevail with respect to any challenged claim, and institution should be denied.

VIII. CONCLUSION

For the above reasons, Patent Owner respectfully requests that the Board deny institution of the Petition.

Respectfully submitted,

Dated: May 13, 2025

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CERTIFICATE OF COMPLIANCE WITH WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), I certify that this **PATENT OWNER'S PRELIMINARY RESPONSE** complies with the type-volume limits set forth in the Memorandum and 37 C.F.R. § 42.24 because it contains 13,774 words, excluding the parts of the Brief that are exempted by 37 C.F.R. § 42.24(a), according to the word processing system used to prepare this Brief.

Respectfully submitted,

Dated: May 13, 2025

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CERTIFICATE OF SERVICE

The undersigned certifies that pursuant to 37 C.F.R. § 42.6(e), a copy of the foregoing **PATENT OWNER'S PRELIMINARY RESPONSE** was served via email (as consented to by counsel) on May 13, 2025 to lead and backup counsel of record for Petitioner as follows:

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