

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

138 EAST LCD ADVANCEMENTS LIMITED,
Patent Owner.

Case No. IPR2024-00955
U.S. Patent No. 7,668,365

PATENT OWNER'S PRELIMINARY RESPONSE

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IPR2024-00955

U.S. Patent No. 7,668,365

TABLE OF EXHIBITS

Number	Description
2001	Declaration of Nikolaos Papanikolopoulos, Ph.D.

I. PRELIMINARY STATEMENT

Pursuant to 37 C.F.R. § 42.107, Patent Owner 138 East LCD Advancements Limited (“138 East” or “Patent Owner”) submits its Preliminary Response to the Petition for *Inter Partes* Review of U.S. Patent No. 7,668,365 (“the ’606 patent”). Paper 2 (“Petition” or “Pet.”). Petitioner Google LLC challenges the validity of claims 1-33 of the ’365 patent.

The Petition does not establish a reasonable likelihood that the asserted references render any of claims 1-33 unpatentable. The asserted references, alone or in combination as presented in the Grounds, do not disclose all limitations of any challenged claim. In particular, the Petition identifies no reference or combination of references that discloses (1) analyzing color range and position data to determine a “main object” in an image, or (2) acquiring the properties (such as color or statistical values) of determined main object image data and then acquiring correction conditions corresponding to those properties to use in adjusting the main object image data. Instead, the art relied on by the Petition merely determines the probabilities that individual pixels in an image are part of different types of subject matter and performs standardized adjusting processes on each pixel using its probability values. The Board therefore should deny institution for failure to present a likelihood that the Petitioner will prevail on any Ground.

II. THE '365 PATENT

The '365 patent describes and claims inventions that improve digital image quality adjustment processes to more accurately identify “main objects” in an image and perform more accurate adjustments to those main objects based on their specific characteristics. The '365 patent describes a “main object” as a portion of the image “characterizing the image.” Ex. 1001, 1:8-10, 1:20-29, 2:16-18, 17:60-63. The patent identifies several examples of main objects, including “sky,” “people (faces)” (or “flesh”), and “vegetation” (or “green”). '365 at 18:2-6, 18:65-19:5; Ex. 2001, ¶¶44-47.

The '365 inventions address two problems in prior image processing systems “for automatically adjusting picture quality using standard values without the need for user input.” Ex. 1001, 1:12-19. First, prior systems did not accurately identify “the main object characterizing the image.” *Id.*, 1:20-29. “[T]he erroneous determination of the main object can thus result in poor picture quality.” *Id.* Therefore, “there is a need for a technique to accurately determine the main object.” *Id.*

Second, prior systems made “main object” determinations “across the board, without taking into consideration subtle differences in the main object characterizing the image.” *Id.*, 1:30-40. Further, in those prior systems, “a standardized picture quality adjusting process is carried out on the main object that

has been determined.” *Id.* Using a standardized process for all main objects makes it “inherently impossible to carry out a picture quality adjusting process that takes advantage of the subtle characteristics of the main object, and it is [therefore] not always possible to output a more attractive main object.” *Id.* Therefore, “[t]here is [] a need for a picture quality adjusting technique that is more responsive to variations in main objects.” *Id.*

The ’365 patent describes a “First Embodiment” that provides an improved technique for accurately determining main objects and a “Second Embodiment” that provides an improved picture quality adjusting technique that is more responsive to variations in main objects. *Id.*, 7:21-14:14 (“First Embodiment”), 14:16-27:33 (“Second Embodiment”).

A. “First Embodiment”: Improved Main Object Determination Using Color Range and Position Condition Comparisons.

The “First Embodiment” of the ’365 invention improves accuracy of main object detection by analyzing three types of data, as recited in the claims:

(1) “color range” of areas of pixels, (2) “position data” corresponding to color range areas of pixels, and (3) “position conditions stipulating the position where an object that corresponds to the specific color range [is] to be present.” Ex. 1001, 27:54-28:13 (claim 1); *see also id.*, 7:36-65 (describing how to determine main objects using these data), 8:47-10:22 (describing formation of “color range areas”),

10:23-11:38 (describing use of color ranges, color range area position data, and position conditions to determine main objects and more accurately differentiate main objects bearing the same color ranges), 13:33-58 (describing aggregation of individual pixels bearing the same “color range” to create areas and comparing the color range and position of areas to position conditions); Ex. 2001, ¶¶48-60.

Claim 1 recites an embodiment of this aspect of the '365 invention, including “analyz[ing] the image data . . . and determin[ing] the color range,” “defin[ing] color range areas” that include adjacent groups, “acquir[ing] position data for the color range areas,” “acquir[ing] position condition stipulating the position where an object that corresponds to the specific color range [is] to be present,” and, finally “determin[ing] the main object” by using the color range, position data, and position conditions:

1. An image processing device that determines the main object which characterizes an image, the image processing device comprising:

- image data acquiring module that acquires image data that is data of the target image and that is composed of a plurality of pixel data;

- color range determining module segmenting that segments the image data into a plurality of pixel

data groups according to the plurality of areas into which the image is split, **analyzes the image data in terms of pixel data units, and determines the color range exhibited by the pixel data groups;**

color range area defining module that **defines color range areas by associating pixel data groups that exhibit the same color range and that are adjacent to each other among pixel data groups exhibiting specific color range;**

position data acquiring module that **acquires position data for the color range areas;** position condition acquiring module that **acquires position conditions stipulating the position where an object that corresponds to the specific color range to be present;** and

main object determining module that **determines the main object corresponding to the color range areas using the color range and the position data of the color range areas as well as the position conditions;**

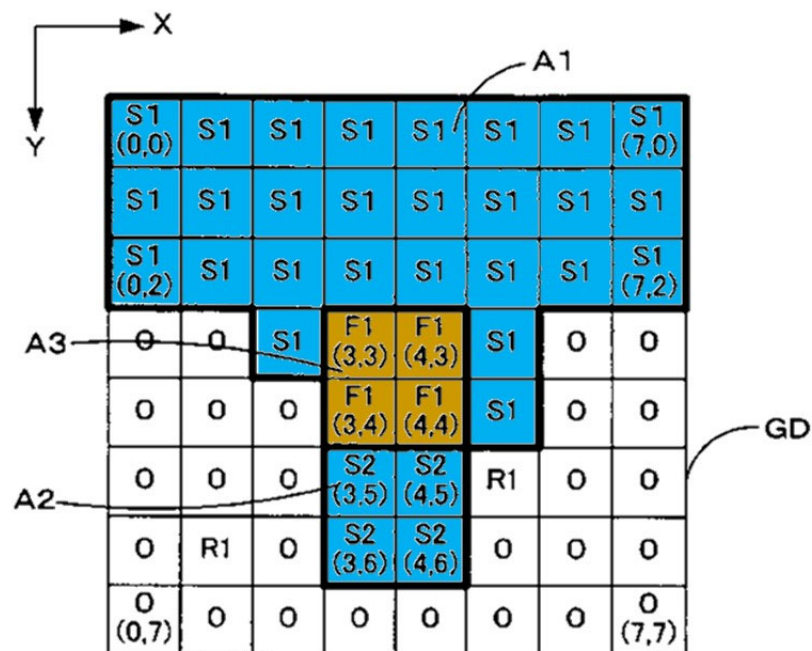
wherein each of the modules of the image processing
device is executed by an integrated circuit.

Ex. 1001, 27:54-28:13 (emphasis added).

By determining color ranges of areas of pixels, acquiring position data corresponding to those areas, and comparing to position conditions stipulating a location where an object corresponding to a color range may validly be present, the '365 invention can more accurately differentiate among main objects that exhibit the same color range: “the main object can be determined more accurately from the standpoint of both the color range and positions.” *Id.*, 13:53-59. In the invention, “when the main object corresponding to the color range areas is determined, the determination is made using position conditions where the specified main object to be present in addition to the color range data which the specific main object should have.” *Id.*, 11:15-38. As a result, “[i]t is thus possible to make more accurate determinations, that is, to reduce determination errors, compared to when the main object is determined using just color range data.” *Id.*

For example, the main object detection process first uses the hue of color range areas to narrow the main object candidates to either “sky, green, or persons.” *Id.*, 10:52-54. As shown in Figure 6 below, “sky” is a main object candidate for the color ranges A1 and A2 (highlighted in blue) because they exhibit sky blue color, and “person (face)” is a main object candidate for color region A3 (highlighted in

Fig.6



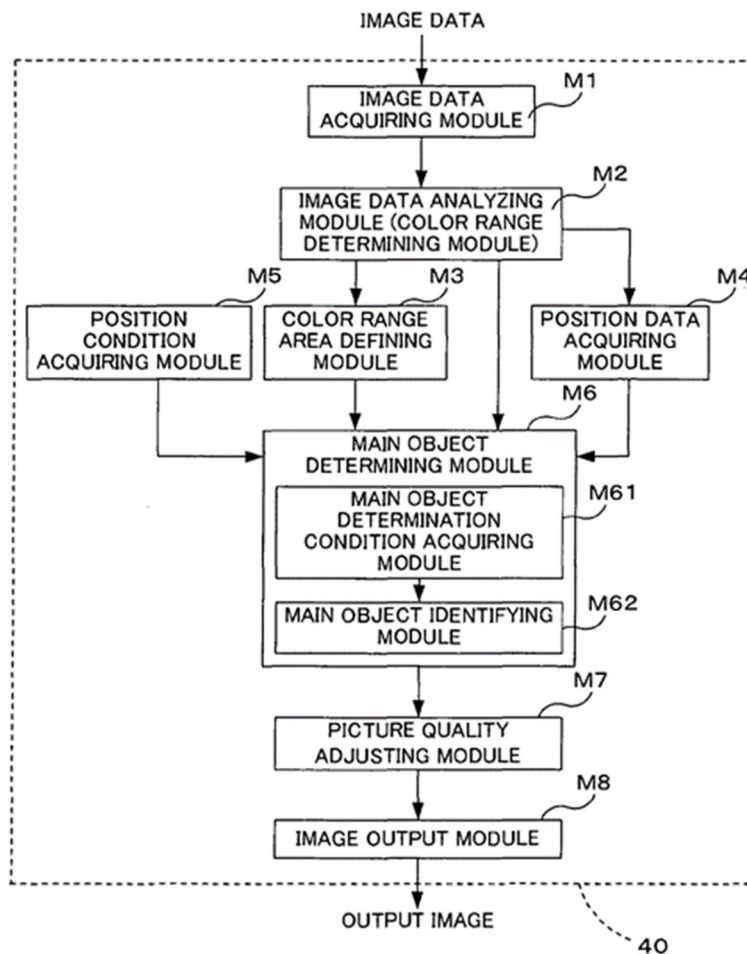
Id., Fig. 6.¹

¹ All colors are added annotations unless otherwise noted.

The main object is detected by comparing the color range and position conditions to possible main object candidates in the image data. *Id.*, 10:59-11:14. For example, “sky” is determined as a main object for region A1 because the color range of region A1 exhibits a hue of “sky blue” and the color range area meets the position conditions defining the object “sky” (an area in x-y position coordinates $(x,0): 0 < x \leq 7$ and $(0,y): 0 \leq y \leq 2$). *Id.* However, region A2, which also exhibits sky blue color, is determined not to be “sky” because, although region A2 exhibits the same color range as object “sky,” region A2 does not meet the position conditions for the object “sky.” *Id.* Instead, “the color range area A2 corresponds to sky blue clothing.” *Id.*, 11:7-11. And “person (face)” is determined as a main object for region A3 because it “includes an area, such as area (3,4), which meets [the] position conditions” for the object “[p]eople” (an area in x-y position coordinates $(x,0): 2 < x \leq 5$ and $(0,y): 2 \leq y \leq 5$). *Id.*, 10:59-11:3, 11:12-14.

Figure 3 illustrates an embodiment of the system recited in the claims, including three modules corresponding to the three types of data used that the claimed inventions use to determine main objects—color range areas (M3), position data for color range areas (M4), and position conditions (M5):

Fig.3

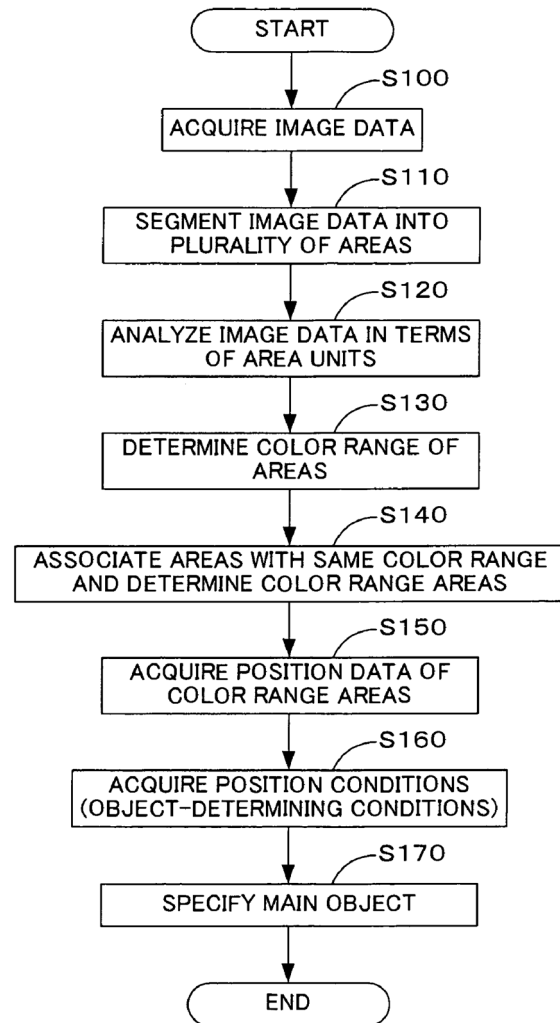


Id., Fig. 3, 7:23-8:5 (describing Fig. 3). The invention first analyzes the image data in “image data analysis module (color range acquiring module) M2” to “determine[] the color range” of the image data, for either pixels or areas of pixels. *Id.*, 7:32-38. “[C]olor range area defining module M3” then “forms color range areas by associating adjacent image data areas exhibiting the same color range using the determined color range data.” *Id.*, 7:37-44.

Figure 3 also illustrates two modules, M4 and M5, that acquire data relating to position. *Id.*, 7:44-50. “The position data acquiring module M4 acquires position data . . . for color range areas formed using the results of the analysis of the image data.” *Id.* “The position condition acquiring module M5 acquires position conditions stipulating where objects exhibiting specific color range [are] to be present.” *Id.* Finally, “[t]he main object determining module M6 determines the main object corresponding to the color range areas using the color range and position data of the color range areas as well as the position conditions.” *Id.*, 7:51-54.

Figure 5 illustrates a corresponding process for determining main objects that also analyzes the image data to determine color ranges (step S130), determines color range areas by associating pixels or areas “of the same color range” (step S140), acquires position data for the defined color range areas (step S150), and acquires position conditions (step S160) to then determine a main object (step S170):

Fig.5



Id., Fig. 5, 8:47-11:14 (describing Fig. 5). “The position conditions (object-determining conditions) are conditions used to determine whether or not the color range areas correspond to a certain object by means of the color range and position data of the color range areas.” *Id.*, 10:45-49.

By determining color range areas and acquiring their position data, the system can “compare[] the position data of color range areas . . . with the position

data corresponding to [associated main objects] to determine the main object.” *Id.*, 10:59-11:14. Specifically, “position conditions” stipulate valid position conditions (e.g., ranges) where objects exhibiting a specific color range may be present. *Id.* For example, as illustrated in Figure 11, position conditions for the object “sky” define an area in x-y position coordinates such as (x,0): $0 < x \leq 7$ and (0,y): $0 \leq y \leq 2$:

Fig.11

OBJECT	HUE	POSITION	
SKY	SKY BLUE/ RED	TOP OF IMAGE AND TOUCHING EDGES OF IMAGE	AREA(x,0), (0,y), (7,y) $0 \leq x \leq 7, 0 \leq y \leq 2$
VEGETATION	GREEN	BOTTOM OF IMAGE AND TOUCHING EDGES OF IMAGE	AREA(x,7), (0,y), (7,y) $0 \leq x \leq 7, 4 \leq y \leq 7$
PEOPLE	FLESH TONE	MIDDLE OF IMAGE	AREA(x,y) $2 \leq x \leq 5, 2 \leq y \leq 5$

Id., Fig. 11, 10:44-11:3.

The system and process claimed for the “First Embodiment” of the ’365 inventions improve accuracy for main object image detection. *Id.*, 11:15-38. The system and process more accurately determine main objects by using both color ranges and the position information of the color range areas (assessing, for example, whether a color range area resides in a location where a corresponding object is expected to appear). *Id.*

Independent apparatus claims 5 and 10 recite variations of this aspect of the ’365 invention. *Id.*, 28:33-48 (claim 5), 29:4-20 (claim 10). Both claims recite

performing analysis of the image data, acquiring position data for “areas of the image data” (claim 5) or “pixel data groups” (claim 10), and using the results of the analysis and the acquired position data to determine the main object. *Id.*

Independent method claims 15, 16, and 17 recite methods corresponding to the functions performed by the systems recited in apparatus claims 1, 5, and 10, respectively. *Id.*, 29:47-30:25.

B. “Second Embodiment”: Improved Adjustment of Data Determined to Represent a Main Object Using Properties (e.g., Statistical and Color Values) of the Main Object Data to Acquire Correction Conditions Corresponding to Those Properties.

The ’365 patent’s “Second Embodiment” improves image quality adjustments to main objects that the image processing system has identified by analyzing the properties (such as color and statistical values) of the image data for those objects and selecting correction conditions corresponding to those properties. Ex. 1001, 3:42-61, 4:17-31, 17:54-18:9. By adjusting the main object image data using “correction conditions corresponding to the properties” of the identified main object image data, “[i]t is thus possible to improve the picture quality of the main object characterizing the image.” *Id.*, 3:42-61; Ex. 2001, ¶¶61-72.

This aspect of the invention improves upon inferior prior art systems that carried out “a standardized picture quality adjusting process . . . on the main object that has been determined,” and thus did not “carry out a picture quality adjusting

process that takes advantage of the subtle characteristics of the main object.” *Id.*, 1:30-40.

Claim 18 recites a system configured to perform the improved process described in the “Second Embodiment,” with modules that “determine[] the main object image data,” “acquire[] the properties of the determined main object image data” and “acquire[] correction conditions corresponding to the properties that have been acquired”:

18. An image processing device comprising:

main object image data determining module that

determines the main object image data

corresponding to the main object characterizing the

image;

property acquiring module that **acquires the**

properties of the determined main object image

data;

correction condition acquiring module that **acquires**

correction conditions corresponding to the

properties that have been acquired; and

picture quality adjusting module that adjusts the picture
quality of the main object image data using the
acquired correction conditions;
wherein each of the modules of the image processing
device is executed by an integrated circuit.

Id., 30:26-39 (emphasis added).

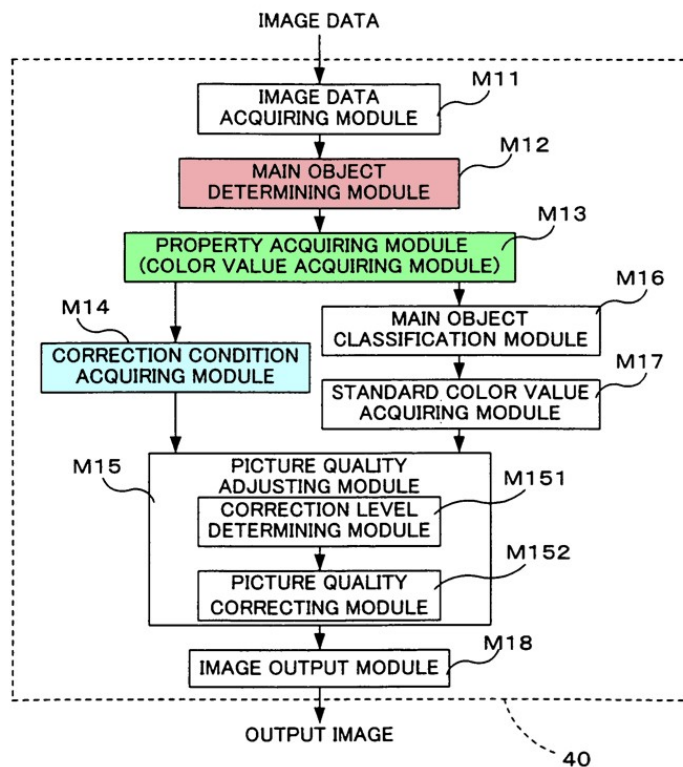
The '365 patent's improved main object image data adjustment process includes several inventive steps. First, the system acquires "properties" of the determined main object image data. *Id.*, 14:51-61, Fig. 13. The specification describes "statistical values and color values" as examples of such "properties." *Id.*, 14:51-61. It describes "maximum and minimum luminance, and histograms of R, G, and B components in the main object image data" as examples of such "statistical values." *Id.*, 16:27-33.

After acquiring the properties, the system "acquires correction conditions corresponding to the acquired properties." *Id.*, 14:51-61. "Correction conditions" include values for image data parameters related to image quality, "and include, for example, shadow, highlight, brightness, contrast, color balance, and memory color correction parameters." *Id.*, 16:15-26.

Figure 13 illustrates the '365 invention's process of determining a main object (highlighted in red), acquiring and analyzing the properties (highlighted in

green) of the image data that has been determined to represent a main object, and then acquiring correction conditions based on those properties (highlighted in blue):

Fig.13

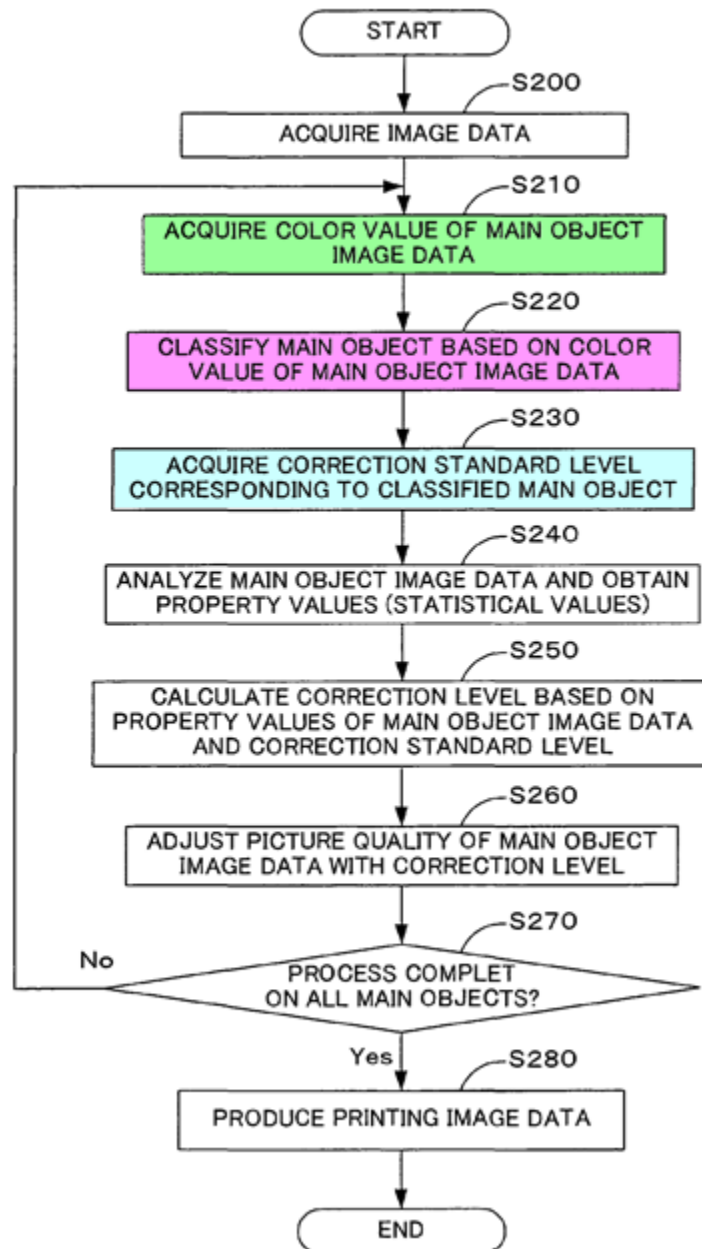


Id., Fig. 13 (color added), 14:44-15:11. The invention determines main object image data (M12), then acquires properties corresponding to the determined main object image data (M13), and then acquires correction conditions corresponding to those properties of the determined main object image data (M14). *Id.* By using this process—instead of a “standardized picture quality adjusting process”—the invention enables more granular adjustment of main objects that have the same

general type (such as a face) but have different properties (such as skin tone). *Id.*, 1:30-40, 17:54-18:9.

For example, because the invention acquires correction conditions based on acquired properties of the main object image data, such as color and statistical values, the invention enables a system that can classify a main object at multiple levels of granularity and acquire correction conditions tailored to that granular classification. *Id.*, Fig. 14, Fig. 15, 15:56-16:3, 16:15-26. Figure 14 illustrates an example process that includes a classification step (S220, highlighted in purple) for the main object, based on its data's acquired properties (here, color values).

Fig.14



Id., Fig. 14, 15:56-16:3, 16:15-26. Figure 15 illustrates example different types of classified main objects that have been classified based on their data's properties (here, color values), and the different correction conditions (here, "correction standard level") corresponding to those properties:

Fig.15

CLASSIFIED MAIN OBJECT	CLASSIFICATION COLOR VALUE	CORRECTION STANDARD LEVEL
BRIGHT SKY	Hcsb, Scsb, Bcsb	CONTRAST b, BRIGHTNESS b, COLOR BALANCE b
ORDINARY SKY	Hcsn, Scsn, Bcsn	CONTRAST n, BRIGHTNESS n, COLOR BALANCE n
DARK SKY	Hcsd, Scsd, Bcsd	CONTRAST d, BRIGHTNESS d, COLOR BALANCE d

Id., Fig. 15, 16:15-26. These correction conditions, corresponding to main object image data properties, allow for “detailed main objects [to] be output at their most attractive.” *Id.*, 16:15-26. The ’365 invention’s improved process allows more granular correction of main objects by using correction conditions corresponding to the properties of the main object image data (e.g., step M14, shown in Figure 13, above) rather than performing the same coarse operation based on a general determined main object, for example, a “sky” (e.g., step M12), regardless of the actual properties of the determined main object. *Id.*

The specification gives several specific examples of the improvement in image quality adjustment facilitated by the invention’s claimed process, including the ability to better reproduce different types of skies:

When, for example, the sky is the main object, there would be different standards with more attractive, higher picture quality for bright sky, ordinary sky, dark sky, brilliant sky, overcast sky, clear sky, and red sky, respectively. The

main object can thus be made to look more attractive by specifying sky in greater detail in terms of what kind of sky it is, and carrying out the optimal picture quality adjusting process on the specified sky.

Id., 18:2-9. The specification teaches several other examples of granular main object image quality adjustment, such as skin tones and vegetation colors. *Id.*, 18:65-19:5.

As discussed above, independent claim 18 recites an embodiment of this aspect of the '365 invention. Ex. 1001, 30:26-39. Independent apparatus claim 23 recites a variation of this aspect of the '365 invention in which the system classifies the main object based on its color value properties and acquires “standard color values”—a form of “correction conditions”—corresponding to the classification. *Id.*, 30:65-31:15 (claim 23). Independent method claims 32 and 33 each recite method steps corresponding to the functions recited in apparatus claims 18 and 23, respectively. *Id.*, 32:23-33 (claim 32), 32:34-48 (claim 33).

* * *

None of the asserted references or combinations disclose or render obvious the claimed systems or processes that deliver the improved main object detection accuracy or improved main object image quality adjustment benefits of the '365 inventions.

III. CLAIM CONSTRUCTION

No claim term requires express construction to determine that the Petition does not establish a reasonable likelihood of unpatentability of any claim and, thus, deny institution. For purposes of this Preliminary Response, Patent Owner contends that the claim terms should receive their ordinary and customary meaning in light of the specification and prosecution history, as understood by a person of ordinary skill in the art. 37 C.F.R. § 100(b); *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005).

IV. LEGAL STANDARD

The Board may not institute an *inter partes* review unless the Petition demonstrates a reasonable likelihood that the petition would prevail with respect to at least one of the claims challenged in the petition. 35 U.S.C. § 314(a).

V. LEVEL OF ORDINARY SKILL IN THE ART

For purposes of this Preliminary Response only, Patent Owner does not dispute the level of skill for a person of ordinary skill in the art (“POSITA”), set forth in the Petition. Pet. at 13-14. The level of skill in the art does not affect whether to deny institution, because the Petition and its expert do not address certain claim limitations and disclosures from the applied references. Patent Owner does not waive, however, any argument regarding the proper level of skill and reserves the right to later advance additional arguments.

**VI. THE PETITION DOES NOT ESTABLISH A REASONABLE
LIKELIHOOD THAT THE ASSERTED REFERENCES RENDER
UNPATENTABLE ANY CHALLENGED CLAIM.**

The Petition’s primary reference upon which every Ground depends, Luo-250, differs fundamentally from the ’365 claims. As to claims 1-17, Luo-250 operates only on individual pixels, and therefore it does not analyze image data to determine color ranges among pixels or compare position data for areas of pixels to position conditions to determine main objects. Luo-250 instead compares individual pixel color values to thresholds to create a probability “belief map,” and therefore it cannot perform the more accurate main object detection facilitated by the ’365 claims’ use of color range analysis and comparing position data for color range areas to position conditions. Ex. 2001, ¶¶74-113.

As to claims 18-33, Luo-250 does not identify “main objects” in image data and then acquire correction conditions corresponding to the properties—such as color or statistical values—of the main object image data. Instead, Luo-250 calculates probabilities, for each pixel in an image, that the pixel belongs to a broad “target subject matter” category, such as sky, grass, or human flesh. Luo-250 then performs standard image adjustment operations to every pixel in an image, and merely weights those operations on a per-pixel basis based on the probability values for each pixel. Unlike the ’365 invention, Luo-250 neither acquires

properties of the main object image data nor acquires correction conditions corresponding to those specific properties. Ex. 2001, ¶¶74-77, 114-138.

As a result, Luo-250 does not disclose multiple claim elements corresponding to either the “First Embodiment” or the “Second Embodiment” of the ’365 inventions. Claims 1-17 of the ’365 patent recite variations of the “First Embodiment” that provide improved accuracy in detecting main objects by determining the main object using the color range, the position data of color range areas, and position conditions. Luo-250 does not analyze color ranges, and it also does not acquire position data for color range areas to use in identifying main objects. Luo-250 does not teach or suggest determining color ranges, determining color range areas, or using position conditions to distinguish among color range areas having similar color ranges, as recited in independent claims 1, 5, 10, 15, 16, and 17. Ex. 2001, ¶¶74-113.

Claims 18-33 of the ’365 patent recite variations of the “Second Embodiment” that provide improved image quality adjustment of detected main objects. Because Luo-250 does not determine properties of the determined main object image data, Luo-250 does not disclose the “acquiring the properties of the determined main object image data” limitations recited in all these claims. Moreover, because Luo-250 does not acquire correction conditions corresponding to any image data properties, much less properties of the image data of the

determined main object, Luo-250 also does not disclose “acquiring correction conditions corresponding to the properties that have been acquired,” again recited (with minor variations) in all of independent claims 18, 23, 32, and 33. Ex. 2001, ¶¶74-77, 114-138.

The Petition does not assert, for any ground, that Luo-250 or any other reference would render these limitations obvious. The Petition instead erroneously contends that Luo-250’s express disclosure satisfies these limitations, but the Petition does not address the aspects of Luo-250 demonstrating that it operates in a fundamentally different way than the ’365 claimed inventions. The Petition does not establish a reasonable likelihood that Luo-250 renders any challenged ’365 claim obvious, alone or in conjunction with any other reference.

A. Ground 1: The Petition Does Not Establish a Reasonable Likelihood that Luo-250 Renders Obvious Claims 1, 3, 5-19, 21-24, 26, 27, and 30-33.

1. Luo-250: Overview

In contrast to the ’365 inventions, Luo-250 describes a system that performs calculations to determine probability values for individual pixels and performs traditional image operations on all pixels in an image based on those probability values. Ex. 1005, [0031]-[0036], [0038], [0045], [0064]-[0066]. Luo-250’s system assigns probability values to every pixel in an image to indicate the likelihoods that the pixel is part of certain subject matter, such as grass, fabric, or skin. *Id.*, [0038]-

[0040]. It calls these pixel-by-pixel probabilities “belief maps.” *Id.*, [0017], [0032], [0033], [0043], [0044], [0064]; Ex. 2001, ¶¶74-77.

Among other differences from the '365 inventions, Luo-250 neither determines main objects in image data by analyzing color ranges and position data, nor adjusts the picture quality of main objects by acquiring properties (such as color or statistical values) of the determined main object image data and then acquiring correction conditions corresponding to those properties. Luo-250 does not perform image enhancement operations based on properties of a set of main object image data as a whole. Instead, Luo-250 describes determining probabilities that individual pixels belong to subject matter categories and performing traditional image enhancement operations by operating on the individual pixels' probability values. *Id.*, [0032], [0043], [0064].

2. The Petition does not show that Luo-250 discloses or renders obvious all limitations of any challenged claim.

a. Claim 1

i. The Petition does not show that Luo-250 discloses or renders obvious a “color range determining module segmenting that segments the image data into a plurality of pixel data groups according to the plurality of areas into which the image is split, analyzes the image data in terms of pixel data units, and determines the color range exhibited by the pixel data groups” (element 1[b]).

Luo-250 does not disclose any function that “analyzes the image data in terms of pixel data units, and determines the color range exhibited by . . . pixel data groups.” The Petition contends that Luo-250’s system satisfies these limitations by “designat[ing] certain pixels as certain colors” and “determin[ing] the color exhibited by the regions of pixels.” Pet., 17-18.

Luo-250 does not “analyze[] image data” and “determine[] a color range.” First, Luo-250 does not “designate certain pixels as certain colors,” as the Petition contends. Pet. 18. Rather, Luo-250 assigns, to individual pixels, “probability values,” not colors. Ex. 1005, [0032], [0034] (describing “probability values”), [0036] (computing “[f]or each pixel, the probability that it is a skin-tone pixel”), [0038] (describing forming “a skin-tone probability distribution” for the entire image). Thus Luo-250 does not, in the functions relied on by the Petition, determine colors exhibited by pixels at all—it determines probabilities. The

Petition does not address this material distinction between Luo-250's actual disclosure and the Petition's characterization. Pet., 18.

Second, the Petition does not identify, from Luo-250, any determination of a color *range*. Pet., 17-18 (citing Ex. 1005, [0034]-[0039]). The Petition instead relies solely upon Luo-250's designation of pixels as "either skin-tone or non skin-tone." *Id.* The Petition thus asserts, at most, that Luo-250 considers the color of *individual* pixels. *Id.* It does not assert that Luo-250 anywhere "analyzes the image data . . . and determines the color *range*, as claimed." *Id.*

The Petition therefore does not establish a reasonable likelihood that Luo-250 discloses claim element 1[b]. Ex. 2001, ¶¶78-81. The Petition does not contend that Luo-250 renders the missing aspects of this limitation obvious. Pet., 17-18.

ii. The Petition does not show that Luo-250 discloses or renders obvious a "color range area defining module that defines color range areas" and a "position data acquiring module that acquires position data for the color range areas" (elements 1[c], 1[d]).

Luo-250 does not disclose any function that "defines color range areas" and "acquires position data for the color range areas." Luo-250 does not operate on colors to define areas, because it relates only to probabilities of individual pixels, and Luo-250 does not disclose acquiring position data for any defined "area" at all.

Luo-250 describes coordinate data “(x,y)” only for individual pixels, and it does not describe “acquiring” even those coordinates for the “spatially contiguous regions” upon which the Petition relies for “color range areas.” Ex. 1005, [0031], [0032], [0042]-[0044]. Luo-250 neither determines color ranges nor acquires position data for any regions. *Id.* Luo-250 operates only on individual pixels. *Id.*

The claim recites a “color range area defining module that defines color range areas.” Ex. 1001, 27:60-65. The Petition contends that Luo-250 discloses this limitation by associating “[s]patially contiguous regions” of pixels with similar probability values. Pet., 19-20. Luo-250’s description of such “regions” does not satisfy the claimed function of “defin[ing] color range areas.”

First, as discussed above, Luo-250 does not determine “color range areas.” Instead, Luo-250 associates individual pixels that have similar probability—not color—values into “spatially contiguous candidate subject matter regions.” Ex. 1005, [0042] (describing “thresholding the belief values” to form “spatially contiguous regions”).

Second, Luo-250 also does not describe “acquir[ing] position data” for the “spatially contiguous” regions. Throughout its disclosure, Luo-250 describes only coordinate data “(x,y)” for individual pixels. Ex. 1005, [0031], [0032], [0042]-[0044], [0062], [0069], [0072]. Nowhere does Luo-250 describe “position data” for

any “area,” including the “spatially contiguous regions” upon which the Petition relies. *Id.*

Consistent with Luo-250’s singular focus on individual pixel data, for the limitation “acquir[ing] position data for the color range areas,” the Petition reverts away from the “spatially contiguous regions” and instead points to only “pixel position (x,y)” coordinates of individual pixels. Pet., 20-21 (“Each pixel thus has a ‘pixel position (x,y)’ where ‘(x,y) denotes the xth row and the yth column of an image.’” (citing Ex. 1005, [0062], [0069], [0072])). The Petition therefore does not identify a “position data acquiring module that acquires position data for the color range areas.” The Petition does not assert that Luo-250 acquires position data for “spatially contiguous regions,” Pet., 20-21, because Luo-250 does not contain any such disclosure.

Even for individual pixels, the Petition does not contend that Luo-250 “*acquires* position data for the color range areas” after identifying “spatially contiguous regions.” Pet., 20. Rather, the Petition asserts that “Luo-250’s candidate subject matter areas, which are formed by associating spatially contiguous regions of pixels, *would have* pixel positions for each pixel in the candidate subject matter area.” *Id.* (emphasis added). The Petition thus contends only that individual pixels within “spatially contiguous regions” in Luo-250’s system “*would have*” individual pixel positions, not that the system performs any operation that

“*acquires*” any position data *for* the “spatially contiguous regions” that Luo-250 identifies based on probability “belief values.” *Id.* (emphasis added).

Luo-250’s limited reference to “specific location (near bottom of the images and in contact with image borders),” Ex. 1005, [0043], does not disclose, expressly or by necessary implication, that Luo-250 “acquires position data for the color range areas.” Luo-250’s reference to “specific location” appears to merely describe where “a light and isotropic texture” may typically be found (for example, “near bottom of the images and in contact with image borders”). Luo-250 does not disclose (and thus the Petition does not describe) how, if at all, the system in Luo-250 determines the position data of the “candidate subject matter region.” *Id.* The Petition does not address this deficiency, arguing instead only that “[e]ach pixel” in a “candidate subject matter area” “*has* a ‘pixel position (x,y),’” Pet., 20 (emphasis added), but providing no argument about how Luo-250 *acquires* the position data of the “candidate subject matter region.”

The Petition does not contend that Luo-250 renders this limitation obvious except to implement Luo-250’s deficient disclosure in a “module.” Pet., 21. The Petition therefore has not established a reasonable likelihood that Luo-250 discloses or renders obvious a “color range area defining module that defines color range areas” and a “position data acquiring module that acquires position data for the color range areas,” as recited in elements 1[c] and 1[d]. Ex. 2001, ¶¶ 82-89.

- iii. **The Petition does not show that Luo-250 discloses or renders obvious a “main object determining module that determines the main object corresponding to the color range areas using the color range and the position data of the color range areas as well as the position conditions” (element 1[e]).**

As discussed above for elements 1[b]-[d], the Petition does not show that Luo-250 describes either (1) determining “color range areas” or (2) acquiring position data for any “areas,” and therefore it also does not show that Luo-250 teaches determining a main object using any such data. Further, the Petition does not show that Luo-250 discloses using “position conditions” to determine a main object.

Claim 18 recites using three types of information to “determine[] the main object”: (1) “the color range,” (2) “the position data of the color range areas,” and (3) “the position conditions.” Ex. 1001, 30:26-39. The Petition has not established that Luo-250 determines “color range areas” or that Luo-250 acquires position data for any area, including Luo-250’s “spatially contiguous regions,” as discussed for elements 1[b]-[d]. The Petition therefore has not established that Luo-250 uses either of those two claimed information categories to “determine[] the main object.”

Further, the Petition does not show that Luo-250 uses “position conditions” to “determine[] the main object.” As discussed above, Luo-250 does not acquire

“position data” for any areas, so it does not disclose comparing any “position data” to “position conditions” that stipulate valid position ranges where objects exhibiting a specific color range may appear. In addition, Luo-250’s brief mention of “specific location” does not describe how—or *if*—Luo-250 defines any “location” or determines whether pixels reside in a “specific location.” Ex. 1005, [0043]. Luo-250’s reference to “specific location” appears to merely describe where “a light and isotropic texture” may typically be found (for example, “near bottom of the images and in contact with image borders”)—Luo-250 does not teach or suggest using “specific location” *data* to perform its probability analysis. *Id.*

The Petition therefore does not establish a reasonable likelihood that Luo-250 discloses this claim element. Ex. 2001, ¶¶90-93. The Petition does not contend that Luo-250 renders the missing aspects of this limitation obvious. Pet., 22-23.

b. Claim 5

i. The Petition does not show that Luo-250 discloses or renders obvious an “image data analyzing module that segments the image data into a plurality of areas for analysis in terms of area units” (element 5[b]).

The Petition does not establish that Luo-250 discloses an “image data analyzing module that segments the image data into a plurality of areas for analysis in terms of area units.” For this element, the Petition relies on its analysis for the

“color range determining module . . . that . . . analyzes the image data in terms of pixel data units, and determines the color range exhibited by the pixel data groups” in element 1[b]. Pet., 25-26.

As discussed above for element 1[b], the Petition does not establish that Luo-250 performs any function that “analyzes the image data in terms of pixel data units.” The Petition contends that Luo-250 satisfies element 1[b] “because Luo-250’s device analyzes the image in terms of pixels or pixel groups and determines the color exhibited by the regions of pixels.” Pet., 17-18. For element 5[b], the Petition does not assert that Luo-250 discloses “analyz[ing]” pixel data in any way other than by determining the color of pixel regions. Pet., 25-26. Luo-250, however, does not determine the color of pixel regions, as set forth above for elements 1[b]-[c].

Instead, Luo-250 determines only pixel-by-pixel probability values indicating whether each pixel might contribute to different categories of “target subject matter.” Before determining any pixel “regions,” Luo-250 assesses color values only to compare individual pixel values to a predetermined threshold for each “target subject matter” and generate an initial probability, called a “belief value.” Ex. 1005, [0036], [0042], [0043]. After assigning “belief value[s],” Luo-250 considers only those probability values for subsequent operations, and it does not determine color values for any individual pixel or region of pixels. *Id.*, [0042]-

[0043] (describing use of “belief value[s],” not color values). Luo-250 does not perform any analysis of the color values among pixels within a region, such as by analyzing color ranges (as discussed for element 1[b]).

Further, claim 5 requires “analysis in terms of *area units*” and not in terms of individual pixels. Ex. 1001, 28:38-40 (emphasis added). Luo-250 operates only on individual pixels. The specification confirms that “area units” include multiple pixels, as it differentiates “area units” from individual pixels:

The flow chart in FIG. 5 shows the steps when the image data areas or pixel data groups are composed of a plurality of pixel data. When the image data areas or pixel data groups are composed of one pixel datum, Step S110 is omitted, and the “area unit” in Step S120 is changed to “pixel (pixel datum),” “each area” in S130 is changed to “each pixel (each pixel datum),” and “areas with the same color range” in S140 is changed to “pixels (pixel data) with the same color range.”

Id., 8:62-9:3, Fig. 5. The Petition does not identify any function from Luo-250 that analyzes multiple pixels; instead, the Petition points to operations only on individual pixels of either high-resolution or low-resolution image data. Pet., 25-26.

Therefore, for the reasons discussed above for element 1[b], and also because the Petition does not identify any analysis of “area units” including multiple pixel data, the Petition does not establish a reasonable likelihood that Luo-250 discloses an “image data analyzing module that segments the image data into a plurality of areas for analysis in terms of area units,” as recited in element 5[b]. Ex. 2001, ¶¶94-99. The Petition does not contend that Luo-250 renders the missing aspects of this limitation obvious. Pet., 25-26.

ii. The Petition does not show that Luo-250 discloses or renders obvious a “main object determining module that determines the main object using the acquired position data and the results of analysis” (element 5[d]).

The Petition does not establish that Luo-250 discloses a “main object determining module that determines the main object using the acquired position data and the results of analysis.” For this element, the Petition relies on its analysis for the “main object determining module” in element 1[e]. Pet., 26-27. The Petition also relies on its analysis of element 5[b], asserting that “Luo-250’s device determines the target subject matter using the results of the analysis (that is, the analysis of the areas in terms of area units in 5[b]).” *Id.*

As discussed above, the Petition asserts, for element 5[b] (via element 1[b]), that Luo-250 performs “analysis in terms of area units”—and thus the “analysis” in element 5[d]—by “determin[ing] the color exhibited by the regions of pixels.” Pet.,

17-18. But Luo-250 does not determine color for pixel regions; instead, it assesses only “belief” probability values of individual pixels, as discussed above for elements 1[b]-[c]. Once Luo-250 has established a “belief value” for each pixel, it operates only on those values and no longer considers color values. The Petition therefore does not establish that Luo-250 “determines the main object using the acquired position data and the results of analysis,” because it does not perform the alleged “analysis” of determining color ranges for the pixel regions upon which the Petition relies. Pet., 26-27.

In addition, as discussed above for element 1[e], Luo-250 does not teach using position data of any region to determine a main object. Luo-250 does not teach comparing position data of any region to “position conditions.” *Id.* The Petition relies on its analysis of element 1[e] for the limitation “using the acquired position data and the results of analysis” in element 5[d], Pet., 26-27, and therefore the Petition fails for the same reasons and has not demonstrated that Luo-250 discloses either limitation.

The Petition therefore does not establish that Luo-250 “determines the main object using the acquired position data and the results of analysis,” as claimed in element 5[d]. Ex. 2001, ¶¶100-103. The Petition does not contend that Luo-250 renders the missing aspects of this limitation obvious. Pet., 26-27.

c. Claim 10

- i. The Petition does not show that Luo-250 discloses or renders obvious an “image data analyzing module that segments the image data into a plurality of pixel data groups according to the plurality of areas into which the image is split, and analyzes the image data in terms of pixel data units” (element 10[b]).**

The Petition does not establish that Luo-250 discloses an “image data analyzing module that . . . analyzes the image data in terms of pixel data units.” For this element, as for element 5[b], the Petition relies solely on its analysis for the “color range determining module . . . that . . . analyzes the image data in terms of pixel data units, and determines the color range exhibited by the pixel data groups” in element 1[b]. Pet., 30.

As discussed above for element 1[b], the Petition does not establish that Luo-250 performs any function that “analyzes the image data in terms of pixel data units.” Specifically, Luo-250 does not determine “the color exhibited by . . . regions of pixels.” *Id.* The Petition contends that Luo-250 satisfies element 1[b] “because Luo-250’s device analyzes the image in terms of pixels or pixel groups and determines the color exhibited by the regions of pixels.” Pet., 17-18. Luo-250, however, does not determine color of pixel regions, as set forth above, but rather only compares an individual pixel color to pre-determined thresholds and assigns corresponding probability values to the individual pixel to create belief maps.

That is, Luo-250 determines only pixel-by-pixel probability values indicating whether each pixel might contribute to different categories of “target subject matter.” *Id.* After assigning individual pixel “belief” probability values, Luo-250 considers only those probability values for subsequent operations, and it does not assess color values for any individual pixel or region of pixels. Ex. 1005, [0042]-[0043] (describing use of “belief value[s],” not color values). Luo-250 does not perform any analysis of the color values among pixels within a region, such as by analyzing color ranges (as discussed for element 1[b]), but rather establishes individual pixel probability values and operates only on those values.

Therefore, for the reasons discussed above for element 1[b], the Petition does not establish a reasonable likelihood that Luo-250 discloses an “image data analyzing module that . . . analyzes the image data in terms of pixel data units,” as recited in element 10[b]. Ex. 2001, ¶¶104-107. The Petition does not contend that Luo-250 renders the missing aspects of this limitation obvious. Pet., 30.

ii. The Petition does not show that Luo-250 discloses or renders obvious a “main object determining module that determines the main object using the acquired position data and results of analysis” (element 10[d]).

The Petition does not establish that Luo-250 discloses a “main object determining module that determines the main object using the acquired position

data and the results of analysis.” For this element, the Petition relies on its analysis for the “main object determining module” in element 5[d]. Pet., 30-31.

As discussed above, the Petition asserts, for element 5[d] (via element 5[b] and 1[b]), that Luo-250 performs “analysis” by “determin[ing] the color exhibited by the regions of pixels.” Pet., 17-18. But Luo-250 does not determine color for pixel regions; instead, Luo-250 assesses only “belief” probability values of individual pixels, as discussed above for element 1[b]-[c]. Once Luo-250 has established a “belief value” for each pixel, it operates only on those values and no longer considers color values. The Petition therefore does not establish that Luo-250 “determines the main object using the acquired position data and the results of analysis,” because Luo-250 does not perform the alleged “analysis” of determining color for pixel regions upon which the Petition relies. Pet., 26-27, 30-31.

In addition, as discussed above for element 1[e], Luo-250 does not teach using position data of any region to determine a main object. Luo-250 does not teach comparing position data of any region to “position conditions.” The Petition relies on its analysis of element 1[e] (via its assertions for element 5[d]) for the limitation “using the acquired position data and the results of analysis” in element 10[d], Pet., 30-31, and therefore it has not demonstrated that Luo-250 discloses either limitation.

The Petition therefore does not establish that Luo-250 “determines the main object using the acquired position data and the results of analysis,” as claimed in element 10[d]. Ex. 2001, ¶¶108-111. The Petition does not contend that Luo-250 renders the missing aspects of this limitation obvious. Pet., 30-31.

d. Claims 2-4, 6-9, and 11-17.

Because the Petition does not show that Luo-250 discloses or renders obvious any of independent claims 1, 5, or 10, it also does not show that Luo-250 discloses or renders obvious any of dependent claims 2-4 and 7-9 (depending from claim 1), 6 (depending from claim 5), or 11-14 (depending from claim 10).

Independent claims 15, 16, and 17 recite methods that correspond to apparatus claims 1, 5, and 10, respectively. Ex. 1001, 29:47-67 (claim 15), 30:1-11 (claim 16), 30:12-25 (claim 17). The Petition, accordingly, relies on its analysis for those apparatus claims for method claims 15-17. Pet., 33-36. For the reasons set forth above for claims 1, 5, and 10, the Petition also does not show that Luo-250 discloses or renders obvious any of claims 15-17. Ex. 2001, ¶¶112-113.

e. Claim 18

- i. The Petition does not show that Luo-250 discloses or renders obvious a “property acquiring module that acquires the properties of the determined main object image data” (element 18[b]).**

Luo-250 does not disclose “acquir[ing] . . . properties of the determined main object image data.” The “determined main object image data” in this limitation refers to “the main object image data corresponding to the main object characterizing the image” previously recited in claim 18. Ex. 1001, 30:26-31.

Luo-250 does not teach or suggest acquiring “properties” of image data that Luo-250’s system has determined to correspond to a main object, because Luo-250 describes ingesting color values only *before* it creates any belief maps. Ex. 1005, [0032], Fig. 1, [0034]-[0036], Fig. 9. The Petition does not provide any evidence that Luo-250 performs the claimed limitations of determining a main object and then acquiring properties of the main object image data (such as color and statistical values). Pet., 36-37. The Petition does not address the plain claim language that the acquired “properties” are “properties *of the* determined main object image data” and not merely properties of individual pixels within the main object image data. *Id.* The Petition does not assert that Luo-250 teaches or suggest acquiring properties of any image data other than the individual pixel data ingested before constructing the belief map, much less acquiring properties of the

aggregated main object image data, such as color and statistical values, after the main object has been determined. *Id.*

The Petition asserts that “color of the pixels” satisfies this limitation. Pet., 36. But the color values that Luo-250’s system obtains at the outset of its process are individual pixel color values for every pixel in the image, acquired prior to the main object determination. Ex. 1005, [0032], [0034], [0043]. Individual pixel color values are not color values “of the determined main object image *data*,” as claimed. Individual pixel color values represent only individual pixels and not properties of a set of pixels corresponding to any determined object within the image.

As noted above, Luo-250 obtains color values only once—at the very outset of its process—and applies applying a “subject matter detector” to the digital image to produce a “subject matter belief map,” which assigns to each pixel a probability (“belief value”) that it might belong to a “target subject matter.” *Id.*, [0032], [0044]; *see, e.g.*, [0036] (“For each pixel in the input color digital image, the probability that it is a skin-tone pixel is computed.”). Luo-250 does not “acquire[] the properties *of the determined main object image data*,” as claimed—it merely ingests color values at the outset before assigning any probability values.

The Petition does not address that Luo-250’s system obtains color values only before computing probabilities that any pixel belongs to “target subject

matter.” Pet., 36. Instead, the Petition contends that “the device identifies ‘skin-tone colored pixels’ that make up ‘regions of skin tone colors.’” *Id.*, 36 (citing [0034], [0036], [0039], [0079], Fig. 3). The Petition, however, omits material context from Luo-250 showing that this disclosure refers to probability values, not color values. Luo-250 explains that it computes “*probability values* for skin-tone colored pixels” *before* constructing the “belief map” that the Petition satisfies constitutes the “determining the main object” limitation. *Id.*, [0034]; Pet., 22-23, 36. Luo-250 further explains that “regions of skin-tone colors” correspond to “a skin-tone *probability* distribution for the input image.” *Id.*, ¶[0038]. Luo-250 does not teach or suggest that the probability values and distribution contain any color values, and thus could not teach acquiring “properties of the determined main object image data.” *Id.*

Further, despite the claim language requiring that the system “acquire[] properties of the determined main object image data,” the Petition identifies, for “properties,” only the probabilities computed during the same step that it also contends “determines the main object image data.” Pet., 36. The Petition does not identify any separate step of “acquir[ing] properties of the determined main object image data,” because Luo-250 does not teach any such step. *Id.*

The Petition therefore has not established a reasonable likelihood that Luo-250 discloses a “property acquiring module that acquires the properties of the

determined main object image data,” as claimed. Ex. 2001, ¶¶114-120. The

Petition does not contend that Luo-250 renders this limitation obvious. Pet., 36-37.

ii. The Petition does not show that Luo-250 discloses or renders obvious a “correction condition acquiring module that acquires correction conditions corresponding to the properties [of the determined main object image data] that have been acquired” (element 18[c]).

Luo-250 does not disclose “acquir[ing] correction conditions corresponding to the properties [of the determined main object image data] that have been acquired.” First, because Luo-250 does not disclose “acquir[ing] properties of the determined main object image data,” as discussed for element 18[b], Luo-250 also does not disclose “acquir[ing] correction conditions corresponding to” such properties. Second—and a fundamental difference from the ’365 invention’s solution to deficient correction of “main objects”—Luo-250 does not describe using color values or any other properties to acquire “correction conditions corresponding to” those values. Rather, Luo-250 uses predetermined standard image operations based solely on belief that a pixel corresponds to a coarse type of “target subject matter,” such as “sky.” Ex. 1005, [0045], [0064]-[0066]..

The Petition relies on Luo-250’s description of a “memory” color function (called “color re-mapping”) to satisfy the claimed “correction conditions.” Pet. 37 (citing Ex. 1005, [0049]). Luo-250 does not, however, describe how to choose a

“color re-mapping” operation—or any other “image enhancement operation”—based on the properties of determined main object image data. *Id.*, [0049]. In fact, Luo-250 explicitly states that these operations are based, at most, on a predetermined function for coarse categories of target subject matter, and not based on the properties of any determined main object image data. *Id.* The Petition therefore fails to show what the claim requires—a “correspon[ce]” between “properties” and the alleged “correction conditions.” Ex. 1001, 30:32-34.

Moreover, Luo-250 utilizes the inferior technique of using standardized adjustment processes described in the Background of the ’365 patent. *Id.*, 1:30-40.

After Luo-250’s belief maps are generated, an “image enhancement operation” is selected, but the selection does not correspond to any “properties” of “determined main object image data.” Ex. 1005, [0045]. Luo-250 does not disclose or suggest, as the Petition asserts, that the “image enhancement operation” is selected on the basis of properties of the region to be enhanced—Luo-250 discloses only that the image enhancement operation is selected “from a collection of pre-determined image enhancement operations” relating to general types of target subject matter. *Id.*

Because it does not disclose the ’365 claim limitations of acquiring “properties” of main object image data and corresponding “correction conditions,” Luo-250 does not provide a benefit of differentiating among “target subject matter”

of the same type—like faces of different colors—based on their unique characteristics. Rather, Luo-250 merely accumulates probabilities that individual pixels correspond to broad “target subject matter” categories such as “human flesh, sky, lawn grass, snow field, [and] water body” and performs standardized picture quality adjusting processes. *Id.*, [0079].

Luo-250 thus suffers from the problem identified in the background of the ’365 patent: it performs adjustments using “a standardized picture quality adjusting process.” Ex. 1001, 1:30-40. Because Luo-250 does not associate “correction conditions” with main object “properties,” “[i]t is therefore inherently impossible to carry out a picture quality adjusting process that takes advantage of the subtle characteristics of the main object, and it is not always possible to output a more attractive main object.” *Id.*

The Petition, consistent with Luo-250’s lack of disclosure linking any image properties to selecting an “image enhancement operation,” does not explain how Luo-250 teaches that any alleged memory color “correction conditions” “*correspond[] to*” acquired color values or other properties of the image, as required by the claim. Pet., 37. No portion of Luo-250 discloses how Luo-250 selects a “color re-mapping” operation to apply. Ex. 1005, [0049], [0051].

Because the Petition has provided no evidence that Luo-250 describes “acquir[ing] correction conditions *corresponding to* [image] properties,” it has not

established a reasonable likelihood that Luo-250 discloses a “correction condition acquiring module that acquires correction conditions corresponding to the properties [of the determined main object image data] that have been acquired.”

Ex. 2001, ¶¶121-127. The Petition does not contend that Luo-250 renders the missing aspects of this limitation obvious. Pet., 37.

iii. The Petition does not show that Luo-250 discloses or renders obvious a “picture quality adjusting module that adjusts the picture quality of the main object image data using the acquired correction conditions” (element 18[d]).

Luo-250 performs the inferior “standardized picture quality adjusting process” described in the Background of the ’365 patent. Ex. 1001, 1:30-40. Luo-250 does not “adjust[] the picture quality of the main object image data using the acquired correction conditions [corresponding to the properties of the determined main object image data],” as claimed. The Petition therefore does not establish a reasonable likelihood that Luo-250 discloses claim element 18[d], for the reasons discussed above for claim elements 18[b] and 18[c]. Ex. 2001, ¶128. The Petition does not contend that Luo-250 renders the missing aspects of this limitation obvious. Pet., 37-38.

f. Claim 23

- i. The Petition does not show that Luo-250 discloses or renders obvious a “color value acquiring module that acquires the color value of the specified main object image data” (element 23[b]).**

As discussed for element 18[b], does not acquire any “properties,” including color values, of data determined to have a probability of being associated with any “target subject matter.” Luo-250 instead calculates probability values and modifies its standard image adjustment operations accordingly. *Id.* Luo-250 has no need to, and therefore does not, acquire color values after identifying any “target subject matter.”

For the reasons discussed above in element 18[b], the Petition does not establish a reasonable likelihood that Luo-250 discloses or renders obvious element 23[b]. Ex. 2001, ¶¶129-130.

- ii. The Petition does not show that Luo-250 discloses or renders obvious a “standard color value acquiring module that acquires standard color values corresponding to the classified main object” (element 23[d]).**

As discussed for element 18[c], Luo-250 does not disclose any correspondence between “properties,” including color values, of data with probabilities associated with a “target subject matter” and image adjustment operations, including standard color values. For those reasons, the Petition does not

establish a reasonable likelihood that Luo-250 discloses or renders obvious element 23[d]. Ex. 2001, ¶131.

- iii. **The Petition does not show that Luo-250 discloses or renders obvious a “picture quality adjusting module that adjusts the picture quality of the main object image data using the acquired color values and standard color values” (element 23[e]).**

Luo-250 performs the inferior “standardized picture quality adjusting process” described in the Background of the ’365 patent. Ex. 1001, 1:30-40. It does not “adjust[] the picture quality of the main object image data using the acquired color values [of the specified main object image data] and standard color values [corresponding to the specified main object],” as claimed. *Id.*, 31:4-13. The Petition therefore does not establish a reasonable likelihood that Luo-250 discloses claim element 23[e], for the reasons discussed above for claim elements 18[b] and 18[c]. Ex. 2001, ¶132. The Petition does not contend that Luo-250 renders the missing aspects of this limitation obvious. Pet., 43.

g. Claim 32

- i. **The Petition does not show that Luo-250 discloses or renders obvious “acquiring the properties of the determined main object image data” (element 32[b]).**

The Petition relies solely on its analysis of element 18[b] for element 32[b]. Pet., 51. For the reasons discussed above for element 18[b], the Petition does not

establish a reasonable likelihood that Luo-250 discloses or renders obvious element 32[b]. Ex. 2001, ¶133.

- ii. The Petition does not show that Luo-250 discloses or renders obvious “acquiring correction conditions corresponding to the properties that have been acquired” (element 32[c]).**

The Petition relies solely on its analysis of element 18[c] for element 32[c]. Pet., 51. For the reasons discussed above for element 18[c], the Petition does not establish a reasonable likelihood that Luo-250 discloses or renders obvious element 32[c]. Ex. 2001, ¶134.

- iii. The Petition does not show that Luo-250 discloses or renders obvious “adjusting the picture quality of the main object image data using the acquired correction conditions” (element 32[d]).**

The Petition relies solely on its analysis of element 18[d] for element 32[d]. Pet., 51. For the reasons discussed above for element 18[d], the Petition does not establish a reasonable likelihood that Luo-250 discloses or renders obvious element 32[d]. Ex. 2001, ¶135.

h. Claim 33

- i. The Petition does not show that Luo-250 discloses or renders obvious “acquiring the color value of the specified main object image data” (element 33[b]).**

The Petition relies solely on its analysis of element 23[b] for element 33[b]. Pet., 51. For the reasons discussed above for element 23[b], the Petition does not establish a reasonable likelihood that Luo-250 discloses or renders obvious element 33[b]. Ex. 2001, ¶136.

- ii. The Petition does not show that Luo-250 discloses or renders obvious “acquiring standard color values corresponding to the classified main object” (element 33[d]).**

The Petition relies solely on its analysis of element 23[d] for element 33[d]. Pet., 51. For the reasons discussed above for element 23[d], the Petition does not establish a reasonable likelihood that Luo-250 discloses or renders obvious element 33[d]. Ex. 2001, ¶137.

- iii. The Petition does not show that Luo-250 discloses or renders obvious “adjusting the picture quality of the main object image data using the acquired color values and standard color values” (element 33[e]).**

The Petition relies solely on its analysis of element 23[e] for element 33[e]. Pet., 51. For the reasons discussed above for element 23[e], the Petition does not

establish a reasonable likelihood that Luo-250 discloses or renders obvious element 33[e]. Ex. 2001, ¶138.

B. Ground 2: The Petition Does Not Establish a Reasonable Likelihood that Luo-250 and Hibi Render Obvious Claims 2, 20, 23, and 28.

The Petition does not assert that Hibi discloses or renders obvious any of the independent claim elements absent from Luo-250, discussed above for Ground 1. Pet., 53-61. The Petition therefore does not establish a reasonable likelihood of success that the combination asserted in Ground 2 renders obvious any of the challenged claims. Ex. 2001, ¶139.

C. Ground 3: The Petition Does Not Establish a Reasonable Likelihood that Luo-250 and Luo-668 Render Obvious Claim 4.

The Petition does not assert that Luo-668 discloses or renders obvious any of the independent claim elements absent from Luo-250, discussed above for Ground 1. Pet., 62-64. The Petition therefore does not establish a reasonable likelihood of success that the combination asserted in Ground 3 renders obvious any of the challenged claims. Ex. 2001, ¶140.

D. Ground 4: The Petition Does Not Establish a Reasonable Likelihood that Luo-250 and Miyano Render Obvious Claims 24, 25, and 29.

The Petition does not assert that Miyano discloses or renders obvious any of the independent claim elements absent from Luo-250, discussed above for Ground

1. Pet., 64-68. The Petition therefore does not establish a reasonable likelihood of success that the combination asserted in Ground 4 renders obvious any of the challenged claims. Ex. 2001, ¶141.

VII. CONCLUSION

The Petition does not establish a reasonable likelihood that any of the challenged claims are unpatentable. The Board should deny institution.

Date: October 11, 2024

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION

I certify that this Patent Owner's Preliminary Response complies with the word count limit and contains 10,022 words in 14-point Times New Roman font as calculated by the word count feature of Microsoft Office, in compliance with 37 C.F.R. § 42.24(a)(1)(i). This word count is inclusive of all text and footnotes but does not include the table of contents, table of authorities, certificate of service or word count, or appendix of exhibits or claim listing.

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CERTIFICATE OF SERVICE

I certify that on October 11, 2024, a copy of Patent Owner's Preliminary Response, including exhibits, was served in its entirety by electronic mail to Petitioner's counsel at the following addresses indicated in Petitioner's Mandatory Notices:

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