

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. IPR2024-00956

U.S. Patent No. 8,355,574

PETITION FOR *INTER PARTES* REVIEW

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Ex. 1001	U.S. Patent No. 8,355,574 to Imai (“the ’574 patent”)
Ex. 1002	File History of U.S. Patent No. 8,355,574
Ex. 1003	Expert Declaration of Kenneth Parulski (“Parulski”)
Ex. 1004	Curriculum Vitae of Kenneth A. Parulski
Ex. 1005	U.S. Patent Application Publication No. 2003/0108250 to Luo et al. (“Luo-250”)
Ex. 1006	Certified English Translation of Japanese Patent Publication No. JP2003-248825 to Hibi et al. (“Hibi”)
Ex. 1007	U.S. Patent Application Publication No. 2004/0239963 to Terashita (“Terashita”)
Ex. 1008	U.S. Patent No. 7,358,994 to Yano (“Yano”)
Ex. 1009	U.S. Patent No. 5,710,833 to Moghaddam et al. (“Moghaddam”)
Ex. 1010	Bernd Heisele et al., <i>Face Detection in Still Gray Images</i> , MIT Artificial Intelligence Lab, A.I. Memo No. 1687, C.B.C.L Paper No. 187 (May 2000) (“Heisele”)
Ex. 1011	U.S. Patent No. 7,013,042 to Yamada et al. (“Yamada”)
Ex. 1012	Japanese Patent Publication No. JP2003-248825 to Hibi et al.
Ex. 1013	Kenneth A. Parulski et al., <i>A High-Performance Digital Color Video Camera</i> , SPIE Vol. 1448 Camera and Input Scanner Systems, pp. 45-57 (1991) (“Parulski 1991”)
Ex. 1014	Adobe Photoshop version 5.0 User Guide (1998) (“Photoshop 5.0”)
Ex. 1015	Ken Parulski and David Lewis, <i>Digital, Still-Optimized Architecture for Electronic Photography</i> , IS&T’s 47th Annual Conference, pp. 665-67 (1994) (“Parulski 1994”)

Ex. 1016	U.S. Patent No. 2,571,697 to Evans (“Evans”)
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Ex. 1018	U.S. Patent No. 7,454,056 to Hayaishi (“Hayaishi”)
Ex. 1019	U.S. Patent No. 6,301,440 to Bolle et al. (“Bolle”)
Ex. 1020	<i>Longitude Licensing Ltd. v. Google LLC</i> , No. 23-cv-03046-VC, Dkt. 46 (N.D. Cal. Oct. 27, 2023).
Ex. 1021	<i>Longitude Licensing Ltd. v. Google LLC</i> , No. 23-cv-03046-VC, Dkt. 1 (N.D. Cal. Jun. 21, 2023).
Ex. 1022	<i>Longitude Licensing Ltd. v. Google LLC</i> , No. 23-cv-03046-VC, Dkt. 50 (N.D. Cal. Nov. 15, 2023).
Ex. 1023	<i>Longitude Licensing Ltd. v. Google LLC</i> , No. 23-cv-03046-VC, Dkt. 51 (N.D. Cal. Nov. 15, 2023).

I. PRECISE RELIEF REQUESTED

Petitioner Google LLC (“Petitioner”) requests review under 35 U.S.C. § 311 of claims 1-12 (“challenged claims”) of U.S. Patent No. 8,355,574 (“the ’574 patent”) (Ex. 1001) and cancellation of the challenged claims under pre-AIA 35 U.S.C. § 103 based on the following prior art references and unpatentability grounds:

Prior art:

Ex. 1005	U.S. Patent Application Publication No. 2003/0108250 (“Luo-250”), filed December 10, 2001, and published June 12, 2003. Prior art to the ’574 patent at least under pre-AIA 35 U.S.C. § 102(a)-(b), (e).
Exs. 1006 & 1012 (certified translation and original, respectively)	Japanese Patent Publication No. JP2003-248825 (“Hibi”), published September 5, 2003. Prior art to the ’574 patent at least under pre-AIA § 102(a)-(b).

Ex. 1007	U.S. Patent Application Publication No. 2004/0239963 (“Terashita”), filed May 29, 2003, and published December 2, 2004. Prior art to the ’574 patent at least under pre-AIA § 102(e).
Ex. 1008	U.S. Patent No. 7,358,994 (“Yano”), filed July 16, 2003, and issued April 15, 2008. Prior art to the ’574 patent at least under pre-AIA § 102(e).

Unpatentability Grounds:

Ground 1	Luo-250 and Hibi render obvious claims 1, 3, 5, 7, 9, and 11.
Ground 2	Luo-250, Hibi, and Terashita render obvious claims 2, 4, 6, 8, 10, and 12.
Ground 3	Yano and Terashita render obvious claims 1-12.

II. BACKGROUND

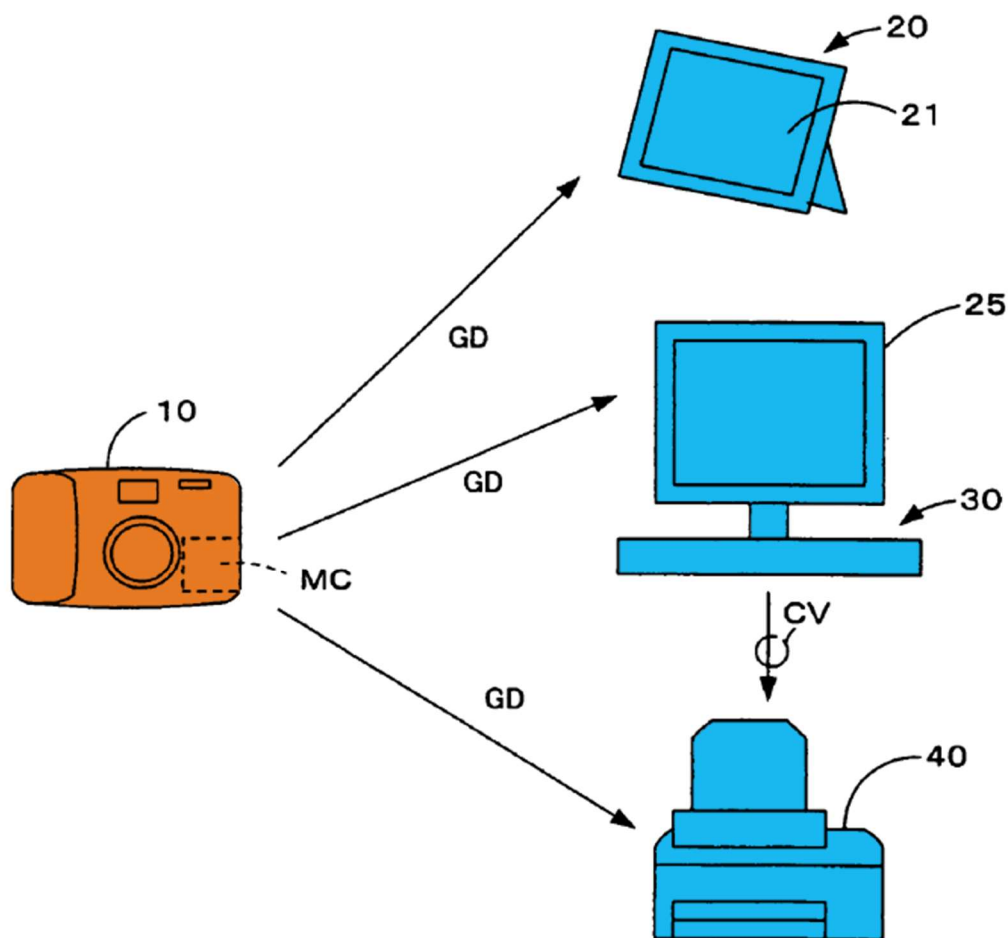
A. The ’574 Patent

The ’574 patent relates to “determin[ing] the main object characterizing an image” and “adjust[ing] the picture quality of the image data.” Ex. 1001, 1:16-18; Parulski ¶¶78-84. The ’574 patent states that techniques for adjusting picture

quality assumed “that the main object characterizing the image has been correctly determined,” so improperly determining the main object can “result in poor picture quality.” Ex. 1001, 1:28-32. The ’574 patent purportedly seeks “to properly identify the main object” and improve its picture quality. *Id.*, 1:52-56.

An image processing system, depicted below, includes “a digital still camera 10 as an image data generating device” and an “image processing device” (e.g., display device 20, personal computer 30, and color printer 40) for processing the generated image data. *Id.*, 6:2-59, 14:1-4.

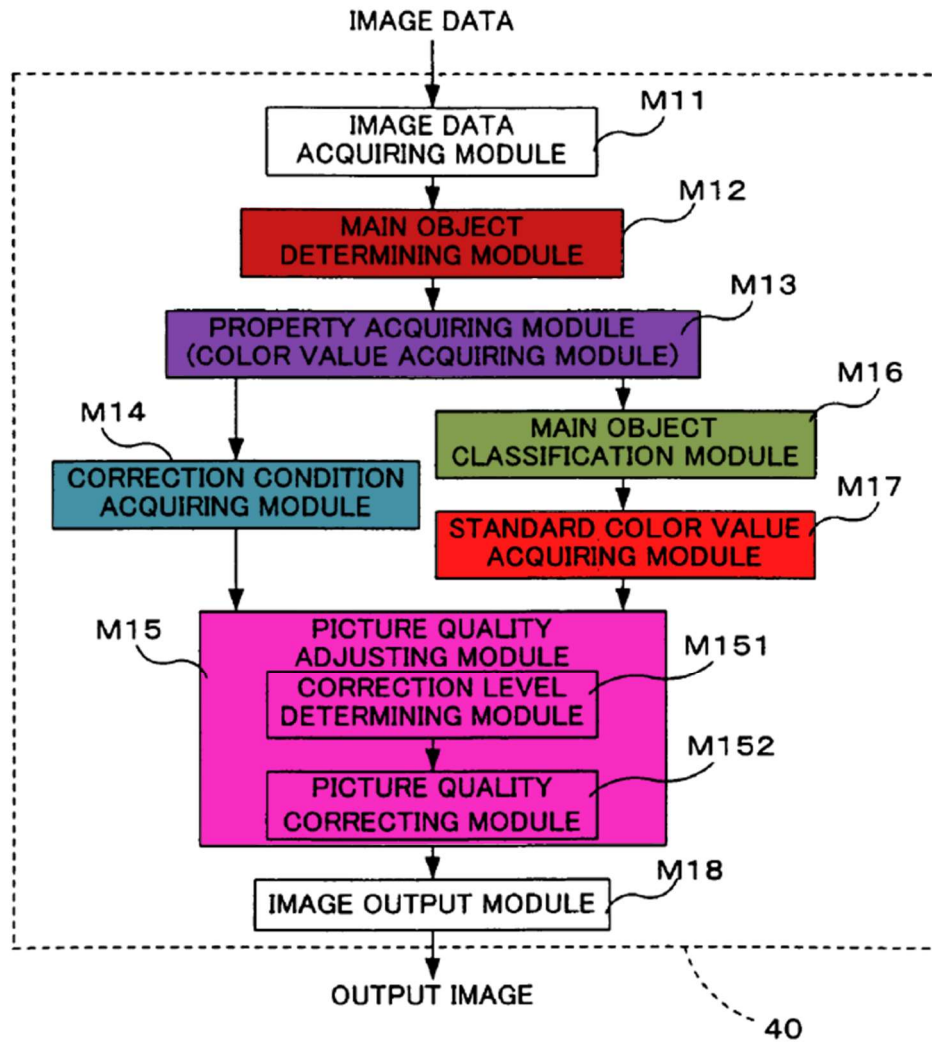
Fig.1



Id., FIG. 1 (annotated).

Figure 13, below, depicts “functional modules realized by” an image processing device in one embodiment. *Id.*, 14:28-35.

Fig.13



Id., FIG. 13 (annotated).

Here, acquired image data is passed to a **main object determining module M12**, which “determines the image data areas corresponding to the ma[i]n object characterizing the image, that is, the main object image data,” using, for example, color range data and position data for image areas. *Id.*, 14:36-46. “The main object(s) can be one or more main objects that are the same or different among the

image.” *Id.*, 14:47-48. Main objects that may be determined include “[s]ky,” “‘people (faces),’ ‘vegetation,’ and the like.” *Id.*, 18:63-65.

A “property acquiring module M13” acquires properties of the main object (e.g., statistical values and color values). *Id.*, 14:49-52. From here, the processing may proceed to a “correction condition acquiring module M14,” which acquires correction conditions (e.g., correction standard values) corresponding to the acquired properties of the main object. *Id.*, 14:49-56, 14:66-15:5. Alternatively, the processing may proceed to a “main object classification module M16,” which uses the main-object data “to classify the main object in greater detail, such as clear sky, ordinary sky, and dark sky.” *Id.*, 15:10-15. Then, a “standard color value acquiring module M17” acquires standard color values for the classified main object. *Id.*, 15:16-20.

Both paths converge into a picture quality adjusting module M15, which adjusts the picture quality of the main object by determining and applying a “correction level so as to eliminate or reduce color range differences between” the acquired correction standard values/standard color values and the main-object property values. *Id.*, 14:60-15:5, 15:21-33. The correction standard values/standard color values are the “ideal” values for the main object. *Id.*, 15:18-20, 16:19-21. “When different types of main object image data” are determined, the applied

correction level may take them into consideration to make the image “more harmonious.” *Id.*, 18:49-62.

“The picture quality adjusting ... process is carried out on picture quality parameters such as shadow, highlight, brightness, contrast, color balance, and memory color correction” *Id.*, 16:48-53. Figures 15 and 16, below, depict tables “storing correction standard values and classification color values,” and “storing standard color values,” respectively, either of which may be used in the picture quality adjusting process, for when the main object is sky. *Id.*, 15:49-52, 18:23-25.

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.

Fig.16

CLASSIFIED MAIN OBJECT	STANDARD COLOR VALUE
BRIGHT SKY	Hrefsb, Srefsb, Brefsb
ORDINARY SKY	Hrefsn, Srefsn, Brefsn
DARK SKY	Hrefsd, Srefsd, Brefsd

Id., FIG. 16.

B. Prosecution History

During prosecution of the '574 patent, the Examiner initially rejected the claims as directed to ineligible subject matter under 35 U.S.C. § 101 and as anticipated by U.S. Patent No. 6,301,440 (“Bolle”). Ex. 1002, 482-487.

Applicant amended the method claims to require “wherein each operation of the method of image processing is executed by a computer” and added similar computer-related features to the apparatus and computer-program-product claims, arguing these amendments overcame the § 101 rejection. *Id.*, 499-502. Applicant argued that Bolle does not anticipate the claims because it discloses “a technique regarding camera controls performed *before* and *when shooting*,” rather than “a technique for allowing an image processing apparatus to adjust the image quality of a shot image.” *Id.*, 503-504.

The Examiner rejected the claims as anticipated by Bolle two more times. *Id.*, 523-524, 544-545. Each time, Applicant amended the claims and argued that Bolle’s processing in a camera “at the time of image shooting” and before there is a “shot image” was different from the amended claims. *Id.*, 531-536, 549-552, 554-555.

The Examiner then issued a notice of allowance. *Id.*, 564.

III. OVERVIEW OF PRIOR ART

A. Luo-250

Luo-250, like the '574 patent, discloses enhancing an image “depending on detecting different objects or subject matters contained within the image.”

Luo-250, [0016]-[0017], [0030]; Parulski ¶¶91-93. Luo-250 identifies the same problem as the '574 patent, namely, that “[f]ailure to reliably detect the presence of primary subject matters ... may lead to failures in the downstream applications,” and provides “a more robust primary subject detection method.” Luo-250, [0041].

Luo-250’s image processing method includes applying a “subject matter detector” that generates “a map of detected subject matter regions,” called a “subject matter belief map.” Luo-250, [0032], [0042]. This map is generated by “assigning to each pixel a belief value” that it belongs to a target subject matter region “based on color and texture features,” “forming spatially contiguous candidate subject matter regions by thresholding the belief values,” and analyzing whether each region belongs to the subject matter “based on one or more unique characteristics of the subject matter.” *Id.* In one example, the target subject matter is “human faces.” Luo-250, [0040].

Once the subject matter is determined, “various image operations can be performed.” Luo-250, [0046]-[0051]. For example, Luo-250 discloses modifying “the color of skin regions in an image” towards “a pre-determined ‘preferred’ or

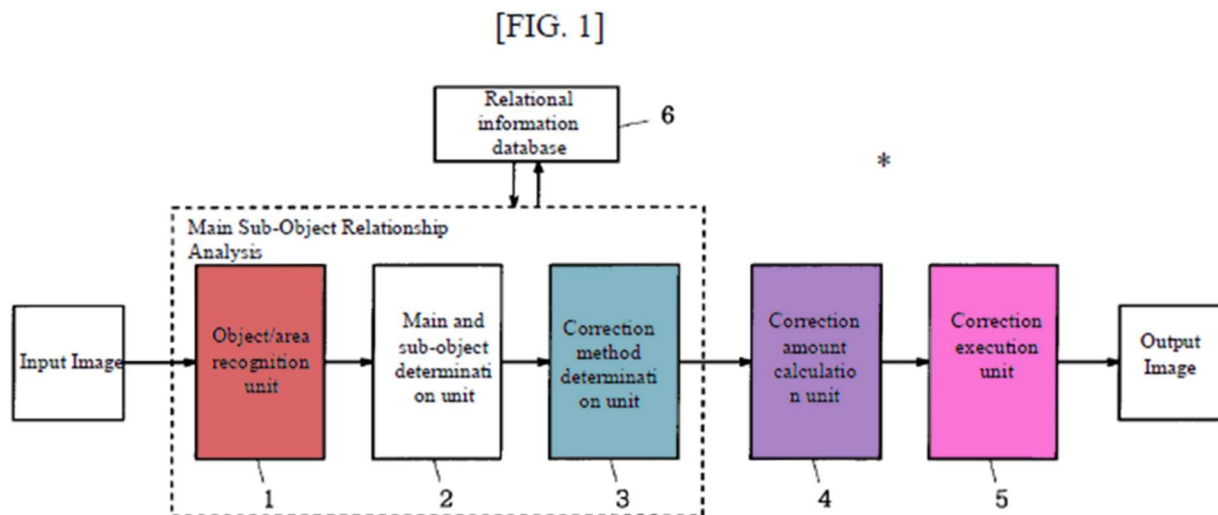
‘memory’ color of the skin (e.g., tanned skin)” and adjusting “the scene balance (brightness and color balance) based on the color and brightness of certain target subject matters,” like “the skin (face) region.” Luo-250, [0049]-[0050].

B. Hibi

Hibi, like the ’574 patent, discloses image processing, where “a plurality of objects are recognized from an image, and a correction method is determined for those objects based on the recognition results of the scene of the image.”

Hibi, [0010], [0014]; Parulski ¶¶94-96. Hibi’s image processing “can be realized in a personal computer ... that provides such image processing” on an image “taken with a digital camera.” Hibi, [0014], [0048].

Figure 1, below, depicts one embodiment of Hibi’s image processing device. Hibi, [0015].



Hibi, FIG. 1 (annotated).

Hibi's "object/area recognition unit 1" recognizes a plurality of objects from the entered images," such as "people and faces." Hibi, [0015]. From the recognized objects, a "main and sub-object determination unit 2 determines the main object and the sub-object." Hibi, [0016]. A "correction method determination unit 3" "recognizes the scene" and "determines a correction method" based on the result. Hibi, [0017]. Using the correction method, a "correction amount calculation unit 4" extracts a specified object's "feature amount" and calculates a "correction amount" from the feature amount. Hibi, [0018], [0046]. A "correction execution unit 5 performs the actual correction processing." Hibi, [0019].

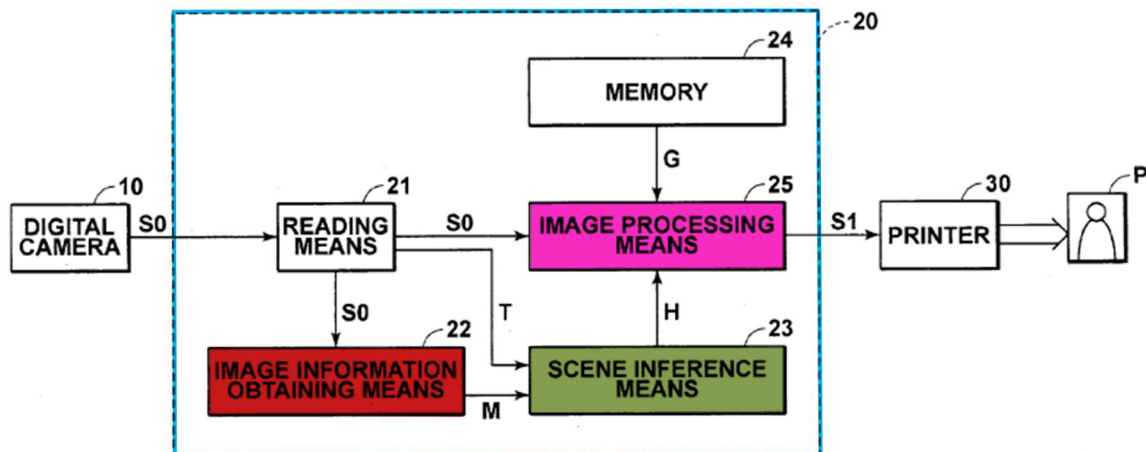
C. Terashita

Terashita discloses "carrying out image processing on image data obtained by a digital camera" based on the scene. Terashita, [0002], [0032]; Parulski ¶¶97-101. Terashita discloses that image-processing techniques based only on photography information "attached as tag information to image data obtained by a digital camera" could not accurately determine "an appropriate condition for the image processing" if the type of subject in an image varied or if the user erroneously set the photography mode. Terashita, [0005]-[0008]. Terashita sought to improve the image processing condition by basing it on a photography scene inferred using "photography information attached to the image data" *and*

“image information regarding the image represented by the image data.” Terashita, [0032].

Figure 1, below, depicts an “image processing apparatus 20” that “carr[ies] out various kinds of image processing on image data S0 obtained by photography of a subject with a digital camera 10.” Terashita, [0038]. The apparatus “comprises reading means 21, **image information obtaining means 22**, **scene inference means 23**, a memory 24, and **image processing means 25**.” Terashita, [0039].

FIG.1



Terashita, FIG. 1 (annotated).

Image information obtaining means 22 reads image data S0 and “obtains image information M,” including a determination of the “presence or absence of a human face in the image.” Terashita, [0039], [0042]. “More specifically, a skin-color area is extracted from the image data S0 and the image is judged to include a human face if an area of the skin-color area is not smaller than a predetermined

threshold value.” Terashita, [0042]. Image information M may also include other information determined from the image data. Terashita, [0043]-[0046].

Scene inference means 23 “infer[s] a photography scene, based on the image information M and photograph[y] information T included in tag information attached to the image data S0,” and “outputs the scene information H representing the inferred photography scene to the **image processing means 25**.” Terashita, [0039], [0049]. Figure 2, below, provides one example of a table stored in the **scene inference means** and used to infer a scene. Terashita, [0047]. If a main part, such as a face, was determined to be present, a portrait scene may be inferred. Terashita, [0020], [0047]-[0048], FIG. 2. Depending on other information, the inferred scene may be a portrait in normal lighting or a portrait outdoors at nighttime, indicated by the highlighted rows below. Terashita, [0047]-[0048], FIG. 2.

FIG.2

NO	MAIN PART INFORMATION	SUBJECT DISTANCE	MAGNIFICATION	SUBJECT BRIGHTNESS	FLASH INFORMATION	OTHER INFORMATION	INFERRED SCENE	IMAGE PROCESSING
1	AVAILABLE		$> \beta 1$	$> B1$	OFF	BACKGROUND INFORMATION	NORMAL LIGHTING, PORTRAIT	1
2	AVAILABLE		$> \beta 2$	$> B2$	OFF	BACKGROUND INFORMATION	BACK LIGHTING, PORTRAIT	2
3	NOT AVAILABLE	∞		$> B3$	OFF	FREQUENCY INFORMATION	DISTANT VIEW (SCENERY,BUILDING)	3
4	NOT AVAILABLE	$< K4$	$> \beta 4$	$> B4$	OFF	BRIGHTNESS AT THE POINT OF FORCUS	NORMAL LIGHTING, STILL OBJECT/ANIMAL	4
5	NOT AVAILABLE	$< K5$	$> \beta 5$	$> B5$	OFF	BRIGHTNESS AT THE POINT OF FORCUS	BACKLIGHT, STILL OBJECT/ANIMAL	5
6	NOT AVAILABLE	$K61 < K62$	$> \beta 6$	$> B6$	OFF	HISTOGRAM INFORMATION	MIDDLE-DISTANCE VIEW (LOW-KEY TONES)	6
7	NOT AVAILABLE	$K61 < K62$	$> \beta 7$	$> B7$	OFF	HISTOGRAM INFORMATION	MIDDLE-DISTANCE VIEW (HIGH-KEY TONES)	7
8	AVAILABLE	$< K8$	$> \beta 8$	$> B8$	ON		DAYTIME SYNCHRONOUS PHOTOGRAPHY,PORTRAIT	8
9	NOT AVAILABLE	$< K9$	$> \beta 9$	$> B9$	ON		DAYTIME SYNCHRONOUS PHOTOGRAPHY,STILL OBJECT	9
10	AVAILABLE	$< K10$	$> \beta 10$	$< B10$	ON		NIGHTTIME OUTDOOR, PORTRAIT	10
11	AVAILABLE	$< K11$	$> \beta 11$	$B111 < B112$	ON		INDOOR, PORTRAIT	11
12	NOT AVAILABLE	∞		$< B12$	OFF	SHUTTER SPEED $< S11$	NIGHT VIEW	12
13	NOT AVAILABLE	∞		$< B13$	OFF	SHUTTER SPEED $> S12$	FIREWORKS/NIGHT VIEW	13
14	NOT AVAILABLE	∞		$B151 < B152$	OFF	COLOR TEMPERATURE	SUNSET VIEW	14
15	AVAILABLE	$K161 < K162$				SHUTTER SPEED $< S16$	MOVING OBJECT	15
16	NOT AVAILABLE			$B171 < B172$		IMAGE INFORMATION (COLOR)	IN WATER	16

Terashita, FIG. 2 (annotated).

Image processing means 25 “reads a corresponding set of the image processing conditions in accordance with the scene information H,” referred to as “image processing conditions G,” “from the memory 24” and carries out “image processing on the image data S0 according to the image processing conditions G that have been read.” Terashita, [0039]. If “scene information H represents a portrait in normal lighting,” image processing conditions 1 are selected, which “cause highlight tones to be soften[ed] so that black hair color can be sharpened” and “cause only the skin color to have a preferable hue.” Terashita, [0050]. Scene

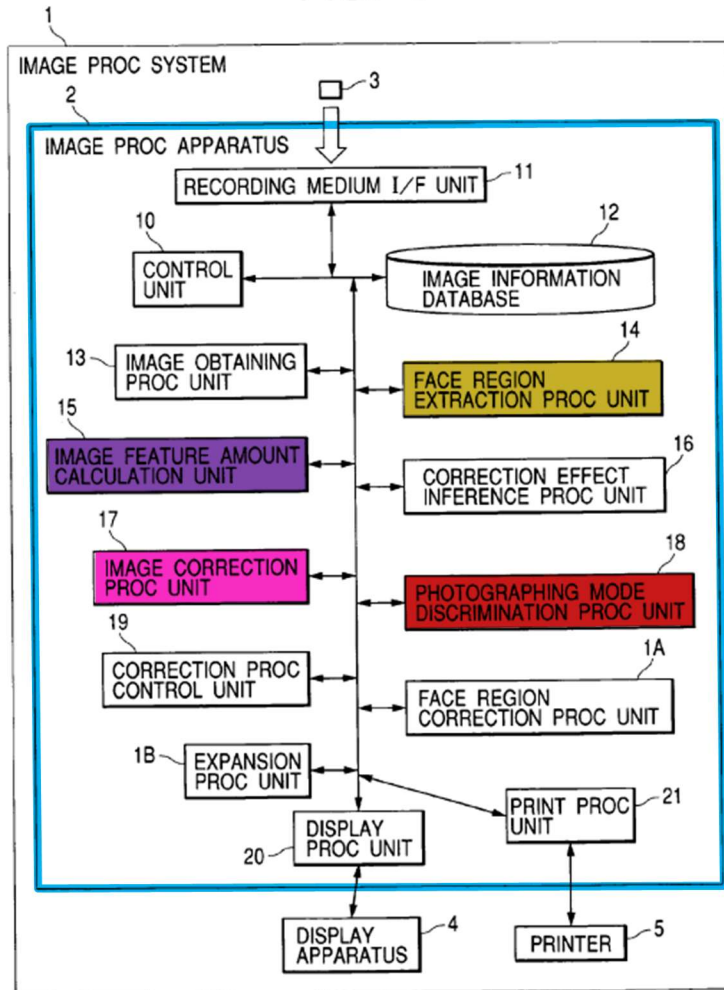
information H representing a portrait at nighttime outdoors corresponds to a different set of image processing conditions, image processing conditions 10.

Terashita, [0050], FIG. 2.

D. Yano

Yano, like the '574 patent, discloses “using an image processing apparatus which displays and prints a person image photographed (or shot) by a digital camera” to “automatically correct image data and thus output the person image of an optimum characteristic.” Yano, 1:65-2:2; Parulski ¶¶102-106. Figure 1, below, depicts “the functional structure” of an [image processing apparatus](#). Yano, 2:15-19.

FIG. 1

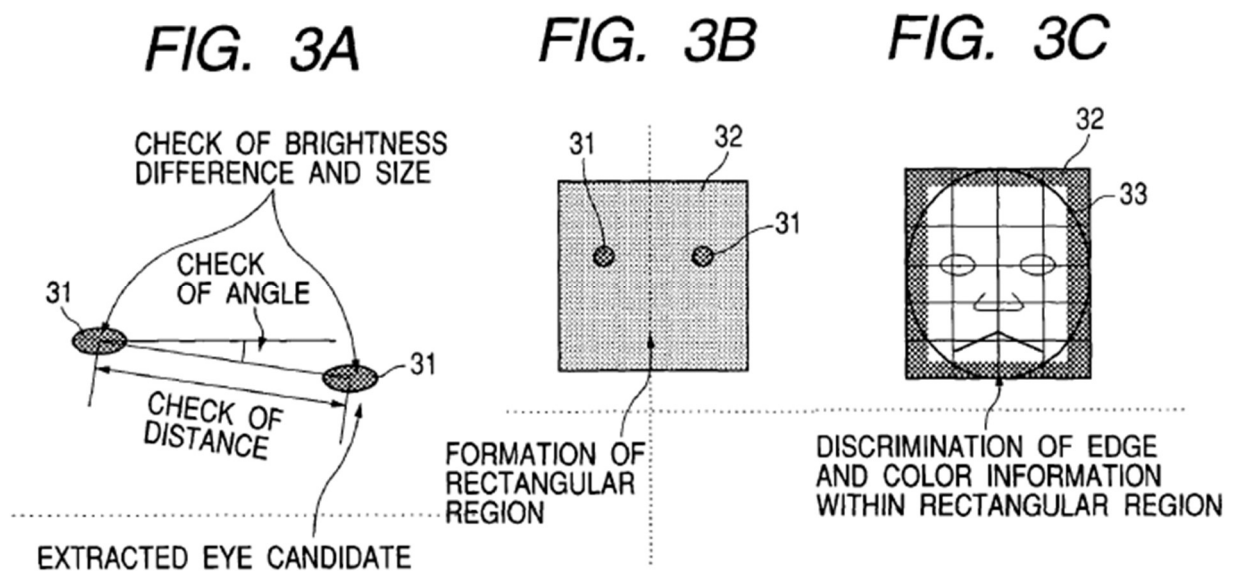


Yano, FIG. 1 (annotated).

Yano's **image processing apparatus** includes a "**photographing mode discrimination processing unit 18**" that determines whether "the image data was photographed and obtained in [a digital camera's] person mode" based on photographing information. Yano, 7:33-38. Yano's **image processing apparatus** only performs its image processing when the photographing mode indicates the person mode "to avoid erroneously applying the correction process to a landscape

image or the like.” Yano, 12:23-28. Alternately, Yano discloses using “various methods of discriminating that a person (particularly a face portion of the person) is included in the image data.” Yano, 7:47-54.

If photographed in the person mode, “face region extraction processing unit 14 extracts the face region 33 as shown in FIG. 3C from the image data.” Yano, 7:55-58. Portions of a process for extracting face region 33 are shown in Figures 3A-3C. Yano, 6:4-60.



Yano, FIGS. 3A-3C.

Image feature amount calculation unit 15 calculates a “feature amount” of the extracted face region 33. Yano, 7:58-62. This feature amount includes, for example, “the lightness and hue histograms in regard to each pixel, the average

value, the distribution value, and the total number of pixels included in the face region 33.” Yano, 10:43-61.

Image correction processing unit 17 “obtains the parameters for the color correction from the image feature amount of the feature region 33, and then actually performs” an image correction process. Yano, 10:62-11:61. This process includes obtaining the “center value and distribution value” of “a range of hue of the flesh color that human beings feel desirable” that are “stored in the **image correction processing unit 17**” and using them to obtain corrected pixel values for either the image as a whole or just face region 33. Yano, 11:36-61, 12:30-35.

E. Luo-250, Hibi, Terashita, and Yano Are Analogous Art

Luo-250, Hibi, Terashita, and Yano are analogous art to the ’574 patent because they are in the same field of endeavor, namely, image-processing techniques that determine a main object in an image and adjust picture quality of the image. Ex. 1001, 1:16-18; Luo-250, [0001], [0043]-[0051]; Hibi, [0010]; Terashita, [0042], [0047]-[0052]; Yano, 6:4-60, 7:11-11:67; Parulski ¶107. Luo-250, Hibi, Terashita, and Yano are also analogous art to the ’574 patent because they are reasonably pertinent to the problems of accurately identifying a main object of the image and accounting for the main object when adjusting the image, which the ’574 patent purports to solve. Ex. 1001, 1:28-48;

Luo-250, [0041]-[0051]; Hibi, [0013], [0041]-[0042]; Terashita, [0008]; [0042], [0047]-[0052]; Yano, 6:4-60, 7:11-11:67; Parulski ¶107.

IV. LEVEL OF ORDINARY SKILL IN THE ART

Based on the relevant factors, *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995), a person of ordinary skill in the art (“POSITA”) would have had a bachelor’s degree or equivalent in electrical engineering, computer science, or a related field, in addition to three years in research, design, or development in digital image processing. Parulski ¶68.

V. CLAIM CONSTRUCTION

No terms need to be construed under 37 C.F.R. § 42.100(b) to resolve unpatentability. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those [claim] terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”). The plain meaning of each term should apply for the purpose of this IPR.¹

¹ Petitioner reserves the right to argue that certain limitations in the challenged claims are indefinite and/or require construction to resolve controversies in other forums.

VI. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Ground 1: Luo-250 and Hibi Would Have Rendered Obvious Claims 1, 3, 5, 7, 9, and 11

1. Independent Claim 1

a. [1.pre]: “A method of image processing, the method comprising:”

If limiting, Luo-250 discloses or suggests [1.pre]. Parulski ¶¶108-109.

Luo-250 discloses “a method for processing a digital color image,” including “applying image enhancement to the digital image by varying the control signal” according to “a belief map indicating the degree of belief that pixels in the image belong to target subject matter.” Luo-250, [0017]; Parulski ¶109. Figure 1, below, illustrates a method of image processing “to obtain an enhanced output image.” Luo-250, [0030].

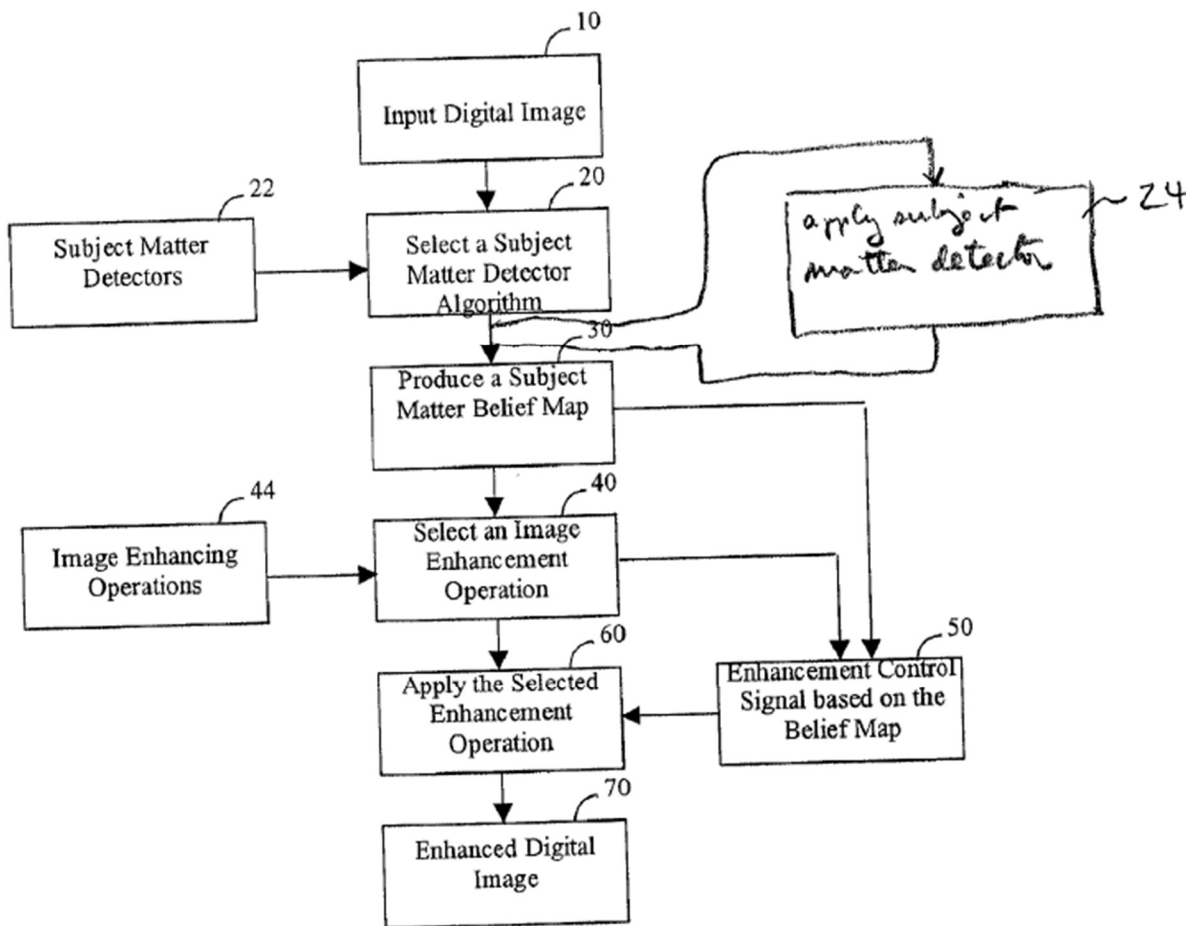


FIG. 1

Luo-250, FIG. 1.

- b. [1.a]: “determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face;”

Luo-250 and Hibi render obvious [1.a]. Parulski ¶¶110-118.

Luo-250 discloses obtaining “a digital color image” and applying a “subject matter detector” to identify a “primary,” or “target,” subject matter in the image

(determining a main object in an image). Luo-250, [0032], [0041]-[0042]; Parulski

¶111. Luo-250's subject matter detector detects the primary/target subject matter by

assigning to each pixel a belief value as belonging to the subject matter region based on color and texture features, forming spatially contiguous candidate subject matter regions by thresholding the belief values, analyzing the spatially contiguous regions based on one or more unique characteristics of the subject matter to determine the probability that a region belongs to the subject matter, and generating a map of detected subject matter regions and associated probability that regions belong to the subject matter.

Luo-250, [0041]-[0042]; Parulski ¶111.

“[A] collection of target subject matters can be pre-determined,” one of which may be a human face (the main object includes at least a human face).

Luo-250, [0032], [0038], [0040]; Parulski ¶112. For example, Luo-250 discloses using a face detection algorithm “to find human face regions in the input color digital image” and then extracting “[r]egions of skin-tone colors.” Luo-250, [0038] (stating that Exhibit 1009, U.S. Patent No. 5,710,833, describes “a face detection method”). Luo-250 also discloses that “human faces” may be the target subject matter and that automated techniques for detecting a human face are “described in

many articles.” Luo-250, [0032], [0040] (identifying Exhibit 1010 (“Heisele”) as an example); Parulski ¶112; *see* Heisele, Abstract (disclosing “system for detecting frontal and near-frontal views of faces in still gray images”); Hibi, [0015] (recognizing faces “using known techniques, such as detecting skin color areas and facial structures”); Yano, 6:4-60. These face-detection techniques teach that “the determining of the main object is implemented by determining whether the image includes the human face,” as recited in claim 1. Luo-250, [0032], [0038], [0040]; Parulski ¶112.

Luo-250’s determining whether the image includes the human face is further apparent by Luo-250’s disclosure that the image-enhancement amount is “determined by the subject matter(s) or objects within the image.”

Luo-250, [0030]; Parulski ¶113. “[S]mall faces are sharpened less than large faces, both of which are sharpened less than non-face regions.” Luo-250, [0076].

Accordingly, Luo-250 discloses implementing the determining of the main object by determining whether the image includes the human face so that it determines the appropriate amount of image enhancement for when the image includes a face. Parulski ¶113.

Luo-250 does not explicitly disclose where the “digital color image” that is subjected to processing is generated. Hibi discloses determining a main object in an image generated by a digital camera. Parulski ¶114.

Hibi discloses a “personal computer” executing image processing via an image processing program on an image “taken with a digital camera.” Hibi, [0014], [0047]-[0048]. Like Luo-250’s subject matter detector, Hibi’s image processing includes an “object/area recognition unit 1 [that] recognizes a plurality of objects from the entered images,” including “people and faces,” by applying “known techniques, such as detecting skin color areas and facial structures.” Hibi, [0015]; Parulski ¶115.

A POSITA would have found it obvious to apply Luo-250’s image processing, including its main-object determination, to an image generated by a digital camera (image generating apparatus) in view of Hibi. Parulski ¶116. Digital cameras were well-known image generating apparatuses at the time widely used for generating digital color images. Parulski ¶116. A POSITA would have been motivated to apply Luo-250’s image processing to an image generated by a digital camera because such images were ubiquitous at the time, and applying Luo-250’s image processing would have improved the image enhancement “depending on detecting different objects or subject matters contained within the image.” Luo-250, [0016]-[0017]; Parulski ¶116.

Luo-250 already discloses “detecting subject matter regions in a digital color image” using “a computer program having instructions for controlling one or more computers.” Luo-250, [0042], [0090]. Hibi discloses a similar “image processing

program that allows” a “personal computer” to execute image processing.

Hibi, [0014]; Parulski ¶117. Given Hibi’s disclosure of a personal computer performing image processing on an image “taken with a digital camera” and the similarity between Luo-250’s and Hibi’s face detection, using a personal computer to apply Luo-250’s image processing to a digital color image taken with a digital camera would have been an obvious combination of familiar elements according to known methods to yield predictable results. Hibi, [0014], [0047]-[0048]; Parulski ¶117.

A POSITA would have reasonably expected success in applying Luo-250’s image processing to images generated by image generating apparatuses like digital cameras. Parulski ¶118. Both personal computers and digital cameras were widely available, and digital cameras were commonly used to generate digital color images that are the subject of Luo-250’s image processing. Parulski ¶118.

Combining Luo-250 and Hibi to process images generated by a digital camera would have required applying only conventional techniques for transferring image data from a digital camera to a personal computer (e.g., using a memory card) that were well within the skill of a POSITA. Parulski ¶118; Terashita, [0004], [0038]-[0039].

c. [1.b]: “acquiring properties of the determined main object;”

Luo-250 discloses or suggests [1.b]. Parulski ¶¶119-122.

Luo-250 discloses acquiring various properties of the determined main object, depending on the image processing, including color, brightness, contrast, and tone scale. For example, Luo-250 discloses “automatically determin[ing] the amount of image enhancement for each region in an image based on the subject matter content of the region.” Luo-250, [0018]. Such image enhancement includes “modify[ing] the colors (color re-mapping) of certain target subject matters.” Luo-250, [0045], [0049]. When the determined main object is a face, this involves modifying “the color of skin regions ... in the direction of a pre-determined ‘preferred’ or ‘memory’ color of the skin (e.g., tanned skin).” Luo-250, [0049]. A POSITA would have understood that modifying “the color of skin regions ... in the direction of a pre-determined ‘preferred’ or ‘memory’ color of the skin” teaches acquiring the color properties of those regions so that they are modified in the desired direction. Parulski ¶120. Such color properties include the hue, lightness, and/or saturation of a color. Luo-250, [0049]; Parulski ¶120.

Such image enhancement also includes adjusting “the scene balance (brightness and color balance) based on the color and brightness of certain target subject matters.” Luo-250, [0045]-[0046], [0050]. Luo-250 discloses using “the

color and brightness of the skin (face) region ... to determine the overall scene balance or local scene balance if there are multiple light sources.” Luo-250, [0050]. A POSITA would have understood that this teaches acquiring the color and brightness properties of the face region for use in determining the overall or local scene balance. Parulski ¶121.

Such image enhancement also includes modifying “the contrast and tone scale of face regions ... in the direction of a predetermined ‘preferred’ or ‘memory’ tone scale of faces (e.g., that of studio portraits).” Luo-250, [0045], [0051]. A POSITA would have understood that this teaches acquiring the contrast and tone scale properties of the face regions so that they are modified in the desired direction. Parulski ¶122.

d. [1.c]: “acquiring correction conditions corresponding to the acquired properties; and”

Luo-250 discloses or suggests [1.c]. Parulski ¶¶123-126.

Luo-250 discloses acquiring various correction conditions, depending on the image processing, including a memory color, brightness, color balance, contrast, and tone scale. For example, Luo-250 discloses several types of image enhancements that may be applied, including “modify[ing] the colors (color re-mapping) of certain target subject matters.” Luo-250, [0045], [0049]. When the determined main object is a face, this involves modifying “the color of skin regions

... in the direction of a pre-determined ‘preferred’ or ‘memory’ color of the skin (e.g., tanned skin).” Luo-250, [0049]. A POSITA would have understood that modifying “the color of skin regions ... in the direction of a pre-determined ‘preferred’ or ‘memory’ color of the skin” teaches acquiring the pre-determined memory color of the skin (correction conditions) corresponding to the color properties of the skin regions (acquired properties) to determine how to modify the skin regions towards the memory color. Parulski ¶124. Such color properties include the hue, lightness, and/or saturation of a color. Luo-250, [0049]; Parulski ¶124.

As another example, Luo-250 discloses adjusting “the scene balance (brightness and color balance) based on the color and brightness of certain target subject matters.” Luo-250, [0045]-[0046], [0050]. Luo-250 discloses using “the color and brightness of the skin (face) region ... to determine the overall scene balance or local scene balance if there are multiple light sources.” Luo-250, [0050]. A POSITA would have understood that this teaches acquiring the desired brightness and color balance (correction conditions) corresponding to the color and brightness properties of the face region (acquired properties) to determine how to adjust the overall or local scene balance towards the desired brightness and color balance. Parulski ¶125.

As another example, Luo-250 discloses modifying “the contrast and tone scale of face regions ... in the direction of a predetermined ‘preferred’ or ‘memory’ tone scale of faces (e.g., that of studio portraits).” Luo-250, [0045], [0051]. A POSITA would have understood that this teaches acquiring the desired contrast and tone scale (correction conditions) corresponding to the contrast and tone scale properties of the face regions (acquired properties) to determine how to modify the face regions towards the desired contrast and tone scale. Parulski ¶126.

- e. **[1.d]: “adjusting image quality of the main object using the acquired correction conditions, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color, and”**

Luo-250 discloses or suggests [1.d]. Parulski ¶¶127-131.

Luo-250 discloses that, “[b]ased on the selected image enhancement operation, an enhancement control signal 50 is generated for controlling the amount of selected enhancement appropriate for the target subject matter and the background subject matters.” Luo-250, [0045]. “The selected image enhancement according to the controlling signal is applied 60 to the input digital image 10 to produce an enhanced image 70” (adjusting image quality of the main object). *Id.*; Parulski ¶128.

Luo-250 discloses several types of image enhancements that may be applied, including “modify[ing] the colors (color re-mapping) of certain target subject

matters.” Luo-250, [0045]-[0046], [0049]. When the determined main object is a face, this involves modifying “the color of skin regions ... in the direction of a predetermined ‘preferred’ or ‘memory’ color of the skin (e.g., tanned skin).”

Luo-250, [0049]. A POSITA would have understood that this teaches adjusting the image quality of the face using the acquired memory color of the skin (the acquired correction conditions), wherein a parameter used in adjusting the image quality is memory color. Parulski ¶129.

As another example, Luo-250 discloses adjusting “the scene balance (brightness and color balance) based on the color and brightness of certain target subject matters.” Luo-250, [0045], [0050]. Luo-250 discloses using “the color and brightness of the skin (face) region ... to determine the overall scene balance or local scene balance if there are multiple light sources.” Luo-250, [0050]. A POSITA would have understood that this teaches adjusting the image quality of the face using the acquired desired brightness and color balance (the acquired correction conditions), wherein parameters used in adjusting the image quality are brightness and color balance. Parulski ¶130.

As another example, Luo-250 discloses modifying “the contrast and tone scale of face regions ... in the direction of a predetermined ‘preferred’ or ‘memory’ tone scale of faces (e.g., that of studio portraits).” Luo-250, [0045], [0051]. A POSITA would have understood that this teaches adjusting the image

quality of the face using the acquired desired contrast and tone scale (the acquired correction conditions), wherein a parameter used in adjusting the image quality is contrast. Parulski ¶131.

- f. **[1.e]: “wherein each operation of the method of image processing is executed by one of a personal computer, a printer, or a display device.”**

Luo-250 and Hibi render obvious [1.e]. Parulski ¶¶132-137.

Luo-250 discloses implementing its image processing method “in a computer program product,” which may include any “physical device or media employed to store a computer program having instructions for controlling one or more computers to practice the method.” Luo-250, [0017], [0090]. Luo-250 does not explicitly disclose what kind of computer to use, so a POSITA would have looked to Hibi for implementation details. Parulski ¶133.

Hibi discloses a similar image processing method that recognizes “a plurality of objects” from an image and corrects the image “according to the surrounding situation.” Hibi, [0010]; Parulski ¶134. Like Luo-250, Hibi discloses “an image processing program that allows a computer to execute the[] image processing method.” Hibi, [0014]; Parulski ¶134. Hibi discloses that this image processing program “can be realized in a personal computer ... that provides such image processing.” Hibi, [0014]; Parulski ¶134.

A POSITA would have found it obvious to implement Luo-250's computer program product on a personal computer in view of Hibi. Parulski ¶135. Luo-250 already discloses executing each step of its image processing method on a "computer" based on instructions provided by the computer program product. Luo-250, [0017], [0090]; Parulski ¶135. Personal computers were well-known types of computers used for processing images. Parulski ¶135.

A POSITA would have been motivated to execute each step of its image processing method on a personal computer because these were commonly owned by photographers desiring to adjust their images captured via a camera and would have provided a convenient and user-friendly device for these photographers to use. Hibi, [0002]-[0004]; Parulski ¶136. Accordingly, implementing Luo-250's computer program product on a personal computer would have made its image processing method widely accessible to photographers, particularly those who would otherwise struggle to manually correct parameters of an image. Hibi, [0002]-[0004]; Parulski ¶136. A POSITA would have seen implementing Luo-250's image processing on a personal computer as desirable because personal computers commonly provided a display, allowing users to see the results of the image processing and determine whether any further processing is desired. Parulski ¶136.

A POSITA would have reasonably expected success in implementing Luo-250's image processing on a personal computer. Parulski ¶137. Personal computers included the type of "storage media" and processor needed to store and execute Luo-250's computer program product, so implementing Luo-250's computer program product on Hibi's personal computer would have required applying only conventional techniques for storing and executing a program on a computer that were well within the skill of a POSITA. Parulski ¶137.

2. Independent Claim 3

a. [3.pre]: "A method of image processing, the method comprising:"

If limiting, Luo-250 discloses or suggests [3.pre] for the reasons explained for [1.pre]. *Supra* § VI.A.1.a; Parulski ¶138.

b. [3.a]: "determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face; and"

Luo-250 and Hibi render obvious [3.a] for the reasons explained for [1.a]. *Supra* § VI.A.1.b; Parulski ¶139.

- c. **[3.b]: “adjusting image quality of the main object using correction conditions corresponding to properties of the determined main object, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color, and”**

Luo-250 discloses or suggests [3.b] for the reasons explained for [1.b]-[1.d].

Supra §§ VI.A.1.c-VI.A.1.e; Parulski ¶140.

- d. **[3.c]: “wherein each operation of the method of image processing is executed by one of a personal computer, a printer, or a display device.”**

Luo-250 and Hibi render obvious [3.c] for the reasons explained for [1.e].

Supra § VI.A.1.f; Parulski ¶141.

3. Independent Claim 5

- a. **[5.pre]: “An image processing apparatus comprising:”**

If limiting, Luo-250 discloses or suggests [5.pre]. Parulski ¶¶142-143.

As explained for [1.pre], Luo-250 discloses an image processing method.

Supra § VI.A.1.a; Parulski ¶143. Luo-250 discloses implementing this image processing method “in a computer program product,” which includes any “physical device or media employed to store a computer program having instructions for controlling one or more computers to practice the method.” Luo-250, [0017], [0090]. Such a computer discloses an image processing apparatus. Parulski ¶143.

b. [5.a]: “one or more processors;”

Luo-250 discloses or suggests or Luo-250 and Hibi render obvious [5.a].
Parulski ¶¶144-146.

Luo-250 discloses “a computer program product,” which includes any
“physical device or media employed to store a computer program having
instructions for controlling one or more computers to practice the method.”
Luo-250, [0017], [0090]. These instructions may be stored on RAM or ROM, for
example. Luo-250, [0090]. A POSITA would have understood that Luo-250’s
disclosure of “one or more computers” that execute the instructions of a computer
program stored on RAM or ROM teaches “one or more processors” because
processors were known to execute instructions stored in storage media.
Luo-250, [0090]; Parulski ¶145.

To the extent Patent Owner contends or the Board finds otherwise, Luo-250
and Hibi render obvious [5.a]. Parulski ¶146. As explained for [1.e], it would have
been obvious to combine Luo-250 and Hibi to implement Luo-250’s computer
program product on a personal computer. *Supra* § VI.A.1.f; Parulski ¶146. Such
personal computers were well understood to include one or more processors, such
as a CPU, for executing instructions according to computer programs stored
thereon. Parulski ¶146; *e.g.*, Yano, 2:36-43, 6:61-7:1 (disclosing a “PC” executing
“an image process based on an application program installed” thereon using a

CPU); U.S. Patent No. 7,013,042 (“Yamada”) (Ex. 1011), 2:62-3:4 (disclosing a personal computer that includes a CPU executing “a program stored in a ROM 101 ... using a RAM 103 ... as a work memory”). At a minimum, a POSITA would have been motivated to incorporate such a processor in the personal computer to allow the personal computer to execute a wide variety of computer programs, making the computer more customizable and improving user experience. Parulski ¶146. A POSITA would have reasonably expected success in implementing a processor in a personal computer because these were ubiquitous at the time, so a POSITA would have needed to apply only conventional knowledge and techniques for providing a general-purpose processor to execute instructions stored in a storage medium. Parulski ¶146.

c. [5.b]: “memory;”

Luo-250 discloses or suggests [5.b]. Parulski ¶¶147-148.

Luo-250 discloses that its “computer program product may include one or more storage media” (memory), including RAM or ROM. Luo-250, [0090]; Parulski ¶148.

- d. **[5.c]: “a determining module configured to determine a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining module determines whether the image includes the human face;”**

Luo-250 and Hibi render obvious [5.c]. Parulski ¶¶149-151.

As explained for [1.a], Luo-250 and Hibi render obvious determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face. *Supra* § VI.A.1.b; Parulski ¶150. A POSITA would have found it obvious to implement this determining step as a determining module, such as a subject matter detector that determines a human face in the image, that forms part of Luo-250’s computer program product or the “equivalent of such software ... constructed in hardware.” Luo-250, [0029], [0032], [0038], [0040], [0090]; Parulski ¶150; *see* Ex. 1001, 14:32-35 (disclosing that the modules “can be realized in terms of the CPU 411 alone or the control circuit 41, and can be realized by either hardware or software”).

A POSITA would have been motivated and found it obvious to do so because Luo-250 envisions the computer program product being implemented through any “physical device or media employed to store a computer program

having instructions for controlling one or more computers to practice the method.” Luo-250, [0090]; Parulski ¶151. Likewise, Luo-250 teaches that its method is “a method implemented as a software program,” which commonly included modules. Luo-250, [0029]; Parulski ¶151. Accordingly, incorporating this determining step into the computer program product as a determination module configured to perform this determining step would have merely required the use of known software techniques to predictably implement Luo-250’s image processing method. Parulski ¶151. A POSITA would have reasonably expected success in doing so because it would have required a POSITA to apply only conventional techniques for implementing software. Luo-250, [0029] (“all software implementation[s]” of Luo-250’s image processing method are “conventional and within the ordinary skill in such arts”); Parulski ¶151.

e. [5.d]: “a property acquirer configured to acquire properties of the determined main object;”

Luo-250 renders obvious [5.d]. Parulski ¶¶152-154.

As explained for [1.b], Luo-250 discloses acquiring properties of the determined main object. *Supra* § VI.A.1.c; Parulski ¶153.

A POSITA would have been motivated and found it obvious to implement this acquiring step as a property acquirer in a computer program product that is configured to perform this acquiring step because Luo-250 envisions the computer

program product being implemented through any “physical device or media employed to store a computer program having instructions for controlling one or more computers to practice the method.” Luo-250, [0090]; Parulski ¶154.

Likewise, Luo-250 teaches that its method is “a method implemented as a software program.” Luo-250, [0029]; Parulski ¶154. Accordingly, incorporating this acquiring step into the computer program product as software configured to perform the acquiring step would have merely required the use of known software techniques to predictably implement Luo-250’s image processing method. Parulski ¶154. A POSITA would have reasonably expected success in doing so because it would have required a POSITA to apply only conventional techniques for implementing software. Luo-250, [0029]; Parulski ¶154.

f. [5.e]: “a correction condition acquirer configured to acquire correction conditions corresponding to the acquired properties; and”

Luo-250 renders obvious [5.e]. Parulski ¶¶155-157.

As explained for [1.c], Luo-250 discloses acquiring correction conditions corresponding to the acquired properties. *Supra* § VI.A.1.d; Parulski ¶156.

A POSITA would have been motivated and found it obvious to implement this acquiring step as a correction condition acquirer in a computer program product that is configured to perform this acquiring step because Luo-250 envisions the computer program product being implemented through any “physical

device or media employed to store a computer program having instructions for controlling one or more computers to practice the method.” Luo-250, [0090];

Parulski ¶157. Likewise, Luo-250 teaches that its method is “a method implemented as a software program.” Luo-250, [0029]; Parulski ¶157.

Accordingly, incorporating this acquiring step into the computer program product as software configured to perform the acquiring step would have merely required the use of known software techniques to predictably implement Luo-250’s image processing method. Parulski ¶157. A POSITA would have reasonably expected success in doing so because it would have required a POSITA to apply only conventional techniques for implementing software. Luo-250, [0029]; Parulski ¶157.

- g. [5.f]: “an image quality adjuster configured to adjust image quality of the main object using the acquired correction conditions, wherein a parameter used by the image quality adjuster to adjust image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color, and”**

Luo-250 renders obvious [5.f]. Parulski ¶¶158-160.

As explained for [1.d], Luo-250 discloses adjusting image quality of the main object using the acquired correction conditions, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color. *Supra* § VI.A.1.e; Parulski ¶159.

A POSITA would have been motivated and found it obvious to implement this adjusting step as an image quality adjuster in a computer program product that is configured to perform this adjusting step because Luo-250 envisions the computer program product being implemented through any “physical device or media employed to store a computer program having instructions for controlling one or more computers to practice the method.” Luo-250, [0090]; Parulski ¶160. Likewise, Luo-250 teaches that its method is “a method implemented as a software program.” Luo-250, [0029]; Parulski ¶160. Accordingly, incorporating this adjusting step into the computer program product as software configured to perform the adjusting step would have merely required the use of known software techniques to predictably implement Luo-250’s image processing method. Parulski ¶160. A POSITA would have reasonably expected success in doing so because it would have required a POSITA to apply only conventional techniques for implementing software. Luo-250, [0029]; Parulski ¶160.

h. [5.g]: “wherein the image processing apparatus is either a personal computer or a printer or a display device.”

Luo-250 and Hibi render obvious [5.g] for the reasons explained for [1.e].
Supra § VI.A.1.f; Parulski ¶161.

4. Independent Claim 7

a. [7.pre]: “An image processing apparatus comprising:”

If limiting, Luo-250 and Hibi render obvious [7.pre] for the reasons explained for [5.pre]. *Supra* § VI.A.3.a; Parulski ¶162.

b. [7.a]: “one or more processors;”

Luo-250 discloses or suggests or Luo-250 and Hibi render obvious [7.a] for the reasons explained for [5.a]. *Supra* § VI.A.3.b; Parulski ¶163.

c. [7.b]: “memory;”

Luo-250 discloses or suggests [7.b] for the reasons explained for [5.b]. *Supra* § VI.A.3.c; Parulski ¶164.

d. [7.c]: “a determining module configured to determine a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining module determines whether the image includes the human face; and”

Luo-250 and Hibi render obvious [7.c] for the reasons explained for [5.c]. *Supra* § VI.A.3.d; Parulski ¶165.

- e. **[7.d]: “an image quality adjuster configured to adjust image quality of the main object using correction conditions corresponding to properties of the determined main object, wherein a parameter used by the image quality adjuster to adjust image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color, and”**

Luo-250 renders obvious [7.d] for the reasons explained for [5d]-[5.f]. *Supra* §§ VI.A.3.e-VI.A.3.g; Parulski ¶166.

- f. **[7.e]: “wherein the image processing apparatus is either a personal computer or a printer or a display device.”**

Luo-250 and Hibi render obvious [7.e] for the reasons explained for [1.e]. *Supra* § VI.A.1.f; Parulski ¶167.

5. Independent Claim 9

- a. **[9.pre]: “A computer program product for image processing comprising:”**

If limiting, Luo-250 discloses or suggests [9.pre]. Parulski ¶¶168-169.

As explained for [1.pre], Luo-250 discloses an image processing method. *Supra* § VI.A.1.a. Luo-250 discloses implementing this image processing method “in a computer program product,” which includes any “physical device or media employed to store a computer program having instructions for controlling one or more computers to practice the method.” Luo-250, [0017], [0090]; Parulski ¶169.

- b. [9.a]: “a non-transitory computer readable medium storing computer readable code therein for execution by either a personal computer or a printer or a display device, the computer readable code comprising:”**

Luo-250 and Hibi render obvious [9.a]. Parulski ¶¶170-171.

Luo-250 discloses that its “computer program product may include one or more storage media,” including an optical disk or ROM (a non-transitory computer readable medium) storing “a computer program having instructions for controlling one or more computers to practice the” image processing method (storing computer readable code therein for execution). Luo-250, [0017], [0090]; Parulski ¶171. For the reasons explained for [1.e], it would have been obvious to combine Luo-250 and Hibi to have a personal computer execute the instructions according to the computer program. *Supra* § VI.A.1.f; Parulski ¶171.

- c. [9.b]: “computer readable code for determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face;”**

Luo-250 and Hibi render obvious [9.b]. Parulski ¶¶172-173.

As explained for [1.a], Luo-250 and Hibi render obvious determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main

object is implemented by determining whether the image includes the human face.

Supra § VI.A.1.b; Parulski ¶173. Luo-250 discloses implementing its image processing method in a “computer program product” including “a computer program having instructions for controlling one or more computers to practice the method.” Luo-250, [0017], [0090]. A POSITA would have understood that instructions for controlling one or more computers disclose computer readable code. Parulski ¶173. Accordingly, Luo-250 teaches implementing this determining step as computer readable code. *Id.*

d. [9.c]: “computer readable code for acquiring properties of the determined main object;”

Luo-250 discloses or suggests [9.c]. Parulski ¶¶174-175.

As explained for [1.b], Luo-250 discloses acquiring properties of the determined main object. *Supra* § VI.A.1.c; Parulski ¶175. For the same reasons explained for [9.b], Luo-250 teaches implementing this acquiring step as computer readable code. *Supra* § VI.A.5.c; Parulski ¶175.

e. [9.d]: “computer readable code for acquiring correction conditions corresponding to the acquired properties; and”

Luo-250 discloses or suggests [9.d]. Parulski ¶¶176-177.

As explained for [1.c], Luo-250 discloses acquiring correction conditions corresponding to the acquired properties. *Supra* § VI.A.1.d; Parulski ¶177. For the

same reasons explained for [9.b], Luo-250 teaches implementing this acquiring step as computer readable code. *Supra* § VI.A.5.c; Parulski ¶177.

- f. **[9.e]: “computer readable code for adjusting image quality of the main object using the acquired correction conditions, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color.”**

Luo-250 discloses or suggests [9.e]. Parulski ¶¶178-179.

As explained for [1.d], Luo-250 discloses adjusting image quality of the main object using the acquired correction conditions, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color. *Supra* § VI.A.1.e; Parulski ¶179. For the same reasons explained for [9.b], Luo-250 teaches implementing this adjusting step as computer readable code. *Supra* § VI.A.5.c; Parulski ¶179.

6. Independent Claim 11

- a. **[11.pre]: “A computer program product for image processing comprising:”**

If limiting, Luo-250 discloses or suggests [11.pre] for the reasons explained for [9.pre]. *Supra* § VI.A.5.a; Parulski ¶180.

- b. **[11.a]: “a non-transitory computer readable medium storing computer readable code therein for execution by either a personal computer or a printer or a display device, the computer readable code comprising:”**

Luo-250 and Hibi render obvious [11.a] for the reasons explained for [9.a].

Supra § VI.A.5.b; Parulski ¶181.

- c. **[11.b]: “computer readable code for determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face; and”**

Luo-250 and Hibi render obvious [11.b] for the reasons explained for [9.b].

Supra § VI.A.5.c; Parulski ¶182.

- d. **[11.c]: “computer readable code for adjusting image quality of the main object using correction conditions corresponding to properties of the determined main object, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color.”**

Luo-250 discloses or suggests [11.c] for the reasons explained for [9.c]-

[9.e]. *Supra* §§ VI.A.5.d-VI.A.5.f; Parulski ¶183.

B. Ground 2: Luo-250, Hibi, and Terashita Would Have Rendered Obvious Claims 2, 4, 6, 8, 10, and 12

Luo-250 and Hibi render obvious independent claims 1, 3, 5, 7, 9, and 11 for the reasons explained in Section VI.A. For the reasons explained below, Luo-250,

Hibi, and Terashita render obvious the additional limitation, “wherein the correction conditions are different when the main object is determined as a night time scene and a human face and when the main object is determined as a human face,” which appears in each of dependent claims 2, 4, 6, 8, 10, and 12. Parulski ¶¶184-191.

1. Dependent Claims 2, 4, 6, 8, 10, and 12

- a. [2], [4], [6], [8], [10], [12]: “wherein the correction conditions are different when the main object is determined as a night time scene and a human face and when the main object is determined as a human face.”**

Luo-250, Hibi, and Terashita render obvious “wherein the correction conditions are different when the main object is determined as a night time scene and a human face and when the main object is determined as a human face” in each of claims 2, 4, 6, 8, 10, and 12. Parulski ¶¶185-191.

Terashita discloses an image processing apparatus containing a scene inference means 23 that “infers the photography scene based on the image information M and the photography information T.” Terashita, [0039], [0047], FIG. 1. The image information M includes an indication of whether the image includes “a main part like a human face.” Terashita, [0020], [0042]. If the image information M indicates the presence of a face, then the scene may be inferred as a portrait in normal lighting or a portrait at nighttime outdoors (the main object is

determined as a human face and the main object is determined as a night time scene and a human face, respectively), depending on whether other criteria determined from the photography information attached to the image data are met, as depicted in Figure 2, below.² Terashita, [0039], [0047]-[0048], FIG. 2; Parulski ¶186.

² Terashita discloses that “the photography information does not include information on a photography mode,” such as “night view/fireworks mode,” because it determines a nighttime scene from other information. Terashita, [0018], [0047]-[0048], FIG. 2; Parulski ¶186 n.1.

FIG.2

NO	MAIN PART INFORMATION	SUBJECT DISTANCE	MAGNIFICATION	SUBJECT BRIGHTNESS	FLASH INFORMATION	OTHER INFORMATION	INFERRED SCENE	IMAGE PROCESSING
1	AVAILABLE		$> \beta 1$	$> B1$	OFF	BACKGROUND INFORMATION	NORMAL LIGHTING, PORTRAIT	1
2	AVAILABLE		$> \beta 2$	$> B2$	OFF	BACKGROUND INFORMATION	BACK LIGHTING, PORTRAIT	2
3	NOT AVAILABLE	∞		$> B3$	OFF	FREQUENCY INFORMATION	DISTANT VIEW (SCENERY,BUILDING)	3
4	NOT AVAILABLE	$< K4$	$> \beta 4$	$> B4$	OFF	BRIGHTNESS AT THE POINT OF FOCUS	NORMAL LIGHTING, STILL OBJECT/ANIMAL	4
5	NOT AVAILABLE	$< K5$	$> \beta 5$	$> B5$	OFF	BRIGHTNESS AT THE POINT OF FOCUS	BACKLIGHT, STILL OBJECT/ANIMAL	5
6	NOT AVAILABLE	$K61 < K62$	$> \beta 6$	$> B6$	OFF	HISTOGRAM INFORMATION	MIDDLE-DISTANCE VIEW (LOW-KEY TONES)	6
7	NOT AVAILABLE	$K61 < K62$	$> \beta 7$	$> B7$	OFF	HISTOGRAM INFORMATION	MIDDLE-DISTANCE VIEW (HIGH-KEY TONES)	7
8	AVAILABLE	$< K8$	$> \beta 8$	$> B8$	ON		DAYTIME SYNCHRONOUS PHOTOGRAPHY,PORTRAIT	8
9	NOT AVAILABLE	$< K9$	$> \beta 9$	$> B9$	ON		DAYTIME SYNCHRONOUS PHOTOGRAPHY,STILL OBJECT	9
10	AVAILABLE	$< K10$	$> \beta 10$	$< B10$	ON		NIGHTTIME OUTDOOR, PORTRAIT	10
11	AVAILABLE	$< K11$	$> \beta 11$	$B111 < B112$	ON		INDOOR, PORTRAIT	11
12	NOT AVAILABLE	∞		$< B12$	OFF	SHUTTER SPEED $< S11$	NIGHT VIEW	12
13	NOT AVAILABLE	∞		$< B13$	OFF	SHUTTER SPEED $> S12$	FIREWORKS/NIGHT VIEW	13
14	NOT AVAILABLE	∞		$B151 < B152$	OFF	COLOR TEMPERATURE	SUNSET VIEW	14
15	AVAILABLE	$K161 < K162$				SHUTTER SPEED $< S16$	MOVING OBJECT	15
16	NOT AVAILABLE			$B171 < B172$		IMAGE INFORMATION (COLOR)	IN WATER	16

Terashita, FIG. 2 (annotated).

These inferred scenes correspond to different sets of image processing conditions (the correction conditions are different) stored in memory of the image processing apparatus and used to carry out image processing, as indicated by the “Image Processing” column in Figure 2, above. Terashita, [0050]-[0051], FIG. 2; Parulski ¶¶186-187.

A POSITA would have found it obvious to implement Terashita’s use of different image processing conditions, depending on whether the inferred scene is a human face or a human face at nighttime outdoors, in the image processing of

Luo-250 and Hibi discussed for Ground 1. Parulski ¶188. A POSITA would have been motivated to do so to more accurately process the image based on the scene, including whether the image was photographed at night, thus “enabl[ing] reproduction of a high-quality image.” Terashita, [0054]; Parulski ¶188. Luo-250 and Hibi already both disclose determining the image processing based on the objects identified in the image. Parulski ¶188. Luo-250 discloses using multiple target subject matters “as a criterion for selective image enhancement.”

Luo-250, [0046]. Hibi discloses changing “the reproduction method” of an image containing both a mountain and a sky, depending on “whether [a] ‘sky’ is a clear sky or a sunset sky.” Hibi, [0043]. Hibi also discloses changing the target color when “correcting the skin color of a person,” depending on whether only the person is used to determine the correction method or whether “the features of the scene as a whole” are used, such as when a person is photographed by the sea. Hibi, [0020]; Parulski ¶188.

Accordingly, modifying the Luo-250-Hibi combination discussed for Ground 1 to process the face region differently when it is detected in normal light versus in a nighttime scene, as disclosed in Terashita, would have been a combination of familiar elements (e.g., processing an image based on a scene) according to known methods to predictably yield the result of an improved image-processing technique that improves the quality of an image by accounting for

whether the face was photographed in normal conditions or at nighttime outdoors.

Parulski ¶189. A POSITA would have understood from Hibi that determining the correction conditions based on the features of the scene and adjusting the image processing based on lighting differences are beneficial. Hibi, [0043]-[0045];

Parulski ¶189. Terashita would have motivated a POSITA to acquire different correction conditions, depending on whether a person was photographed in normal light or in a nighttime scene, to improve the quality of the image. Terashita, [0050]-[0051], FIG. 2; Parulski ¶189.

A POSITA would have reasonably expected success in such a combination in light of the similarity between Luo-250, Hibi, and Terashita. Parulski ¶190. Additionally, both Hibi and Terashita teach accessing memory to acquire different correction conditions, depending on the scene, so a POSITA would have reasonably expected success in Luo-250's computer program product doing the same to access different image processing conditions, depending on the determination of the scene. Hibi, [0045] (disclosing a "relational information database 6" providing "an attribute value table," where "the feature value calculation data and correction data may be switched based on the attribute values"); Terashita, [0039], [0050]-[0051] (disclosing a memory that "stores various image processing conditions corresponding to the scene information H"); Parulski ¶190. A POSITA would have seen Luo-250, Hibi, and Terashita as

complementary disclosures that could be readily combined with predictable success to improve the image processing depending on the scene determined in the image. Parulski ¶190.

Terashita discloses that the “photography information” used in determining outdoor nighttime conditions was “attached as tag information to image data obtained by a digital camera” according to an image-file standard like Exif and teaches how an image processing apparatus would acquire the photography information. Terashita, [0005], [0018]-[0019], [0039], [0047], FIG. 2.

Accordingly, acquiring the necessary information to make the nighttime determination would have required applying only conventional techniques for reading and analyzing information acquired from an image file, that were well within the skill of a POSITA. Parulski ¶191; Terashita, [0005], [0018]-[0019], [0039], [0047], FIG. 2. Applying Terashita’s scene inference from Figure 2 would have been a straightforward application of known, conventional software operations (comparing photography information and main part information to information in a table) used according to their known functions to yield predictable results (determining the scene). Parulski ¶191.

C. Ground 3: Yano and Terashita Would Have Rendered Obvious Claims 1-12

1. Independent Claim 1

a. [1.pre]

If limiting, Yano discloses or suggests [1.pre]. Parulski ¶¶192-193.

Yano discloses “an image processing apparatus which corrects gradation and color reproduction characteristics of an image photographed (or shot) by a digital camera or the like” and “an image processing method which is applied to the image processing apparatus.” Yano, 1:9-15; Parulski ¶193.

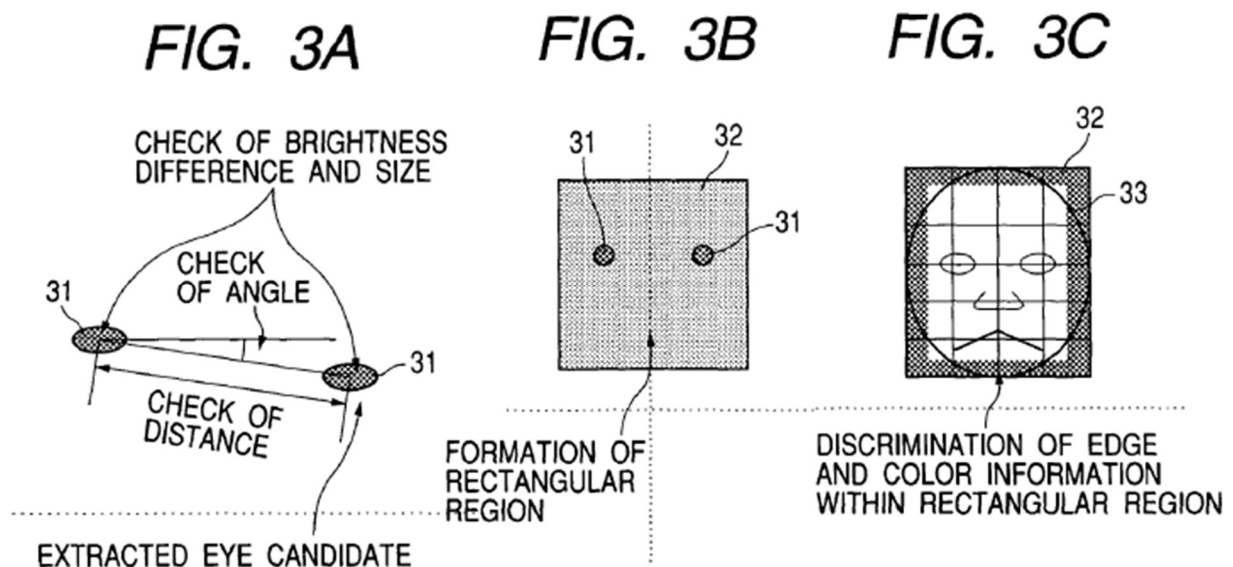
b. [1.a]

Yano and Terashita render obvious this limitation. Parulski ¶¶194-201. Yano’s primary embodiment relies on “the photographing mode” to determine whether a person is in an image but also discloses using other “various methods of discriminating that a person (particularly a face portion of the person) is included in the image data.” Yano, 7:33-54. A POSITA would have found it obvious to implement Terashita’s technique for determining that a face is included in the image data in Yano’s image processing method. Parulski ¶194.

Yano discloses that “image data photographed (or shot) by a digital camera” (an image generated by an image generating apparatus) “is subjected to an image process based on an application program installed in an image processing apparatus such as a PC.” Yano, 2:36-43; Parulski ¶195. Yano’s digital camera used

to shoot the image includes a “person mode.” Yano, 2:46-52. The photographing mode used when the image was shot is included as part of the photographing information that “is recorded as incidental information” to the image data. Yano, 3:25-34, 3:59-4:9; Parulski ¶195.

The image processing apparatus “discriminates whether or not the image data was photographed and obtained in the person mode, by referring to the photographing mode included in the photographing information incidental to the expanded image data.” Yano, 7:33-38. If so, a “face region extraction processing unit 14 extracts the face region 33 as shown in FIG. 3C from the image data.” Yano, 7:38-41, 7:55-58; Parulski ¶196. Figures 3A-3C, below, depict portions of a process for extracting face region 33 from the image data. Yano, 6:4-60, FIGS. 3A-3C; Parulski ¶196.



Yano, FIGS. 3A-3C.

If “the image data was photographed in a mode other than the person mode,” Yano discloses that the above face extraction is not performed, and “another process is performed under the control of the correction process control unit 19 in this case.” Yano, 7:41-47; Parulski ¶197.

Yano’s image processing method “is not limited to” determining whether a person is included in the image by referencing “the information concerning the photographing mode.” Yano, 7:47-51. Yano discloses that “it is preferably possible to use various methods of discriminating that a person (particularly a face portion of the person) is included in the image data” (determining a main object in an image, wherein the determining of the main object is implemented by determining whether the image includes the human face). Yano, 7:51-54; Parulski ¶198. A POSITA would have looked to Terashita for implementation details on one such method. Parulski ¶198.

Terashita discloses an image processing method similar to Yano’s that includes “obtaining image information on an image represented by the image data,” where the image information includes “information on presence or absence of a human face in the image represented by the image data” (determining a main object in an image generated by an image generating apparatus, wherein the determining of the main object is implemented by determining whether the image

includes the human face). Terashita, [0010]-[0015], [0020]-[0021]; Parulski ¶199.

This is carried out by an “image information obtaining means 22” that “judges presence or absence of a human face in the image represented by the image data S0, and includes a result of the judgment in the image information M.”

Terashita, [0042]; Parulski ¶199. “More specifically, a skin-color area is extracted from the image data S0 and the image is judged to include a human face if an area of the skin-color area is not smaller than a predetermined threshold value.”

Terashita, [0042].

A POSITA would have been motivated to combine Yano and Terashita to implement the determination of the main part by determining whether the image includes the human face because doing so would have improved the accuracy of determining that a person is included in the image. Parulski ¶200. Yano only performs its face extraction process when it determines that an image was photographed in the person mode, but Terashita discloses that relying only on the photography mode to determine the image processing may result in an improper image processing condition if the photography mode is set erroneously in the digital camera. Yano, 7:33-45, FIG. 4; Terashita, [0008]; Parulski ¶200. Terashita solves this problem by determining the presence of a face without referencing the photography mode. Terashita, [0008], [0042]; Parulski ¶200. A POSITA would have been motivated to combine Yano and Terashita so that Yano’s image

processing is performed when the image includes a face, regardless of the photography mode set by the photographer, as Terashita discloses that doing so ensures “a high-quality reproduced image.” Terashita, [0009]; Parulski ¶200. Moreover, Yano suggests implementing Terashita’s technique by disclosing that “it is preferably possible to use various methods of discriminating that a person (particularly a face portion of the person) is included in the image data,” motivating a POSITA to combine Yano with Terashita because Terashita discloses details for one such method. Yano, 7:47-54; Parulski ¶200.

A POSITA would have reasonably expected success because Yano already discloses carrying out a similar process. Parulski ¶201. Yano discloses that “when the area of the face region 33 is smaller than a predetermined threshold value, it is inferred that the correction effect of the image cannot be expected.” Yano, 8:13-39. This is because correcting a small face region “to have the optimum lightness does not necessarily bring[] about a desirable image” and because the influence of “noises in the image” may make the calculation of the image feature amount inaccurate. Yano, 8:25-44; Parulski ¶201. Terashita’s process for determining the presence of a face relies on a similar comparison of “an area of skin color” to “a predetermined area after carrying out skin color extraction processing or the like on the image data.” Terashita, [0021]; Parulski ¶201. Implementing Terashita’s process for determining a face’s presence in Yano’s image processing method

would have required applying only known image processing steps that were well within the skill of a POSITA, and were readily combinable with Yano's image processing method, given Yano's method already includes a similar process. Parulski ¶201.

c. [1.b]

Yano discloses or suggests [1.b]. Parulski ¶¶202-203.

Yano's image processing apparatus includes an image feature amount calculation unit 15 that "calculates the image feature amount being the feature amount of the image within the face region 33 extracted by the face region extraction processing unit 14" (acquiring properties of the determined main object). Yano, 7:58-62; Parulski ¶203. The image feature amount may include "histograms," including "the lightness and hue histograms in regard to each pixel"; "average values and distribution values of the lightness, hue and the like in regard to each pixel of the face region 33"; and "the total number of pixels included in the face region 33." Yano, 7:62-8:12, 10:36-61.

d. [1.c]

Yano discloses or suggests [1.c]. Parulski ¶¶204-205.

Yano discloses performing processes to correct the face region to have "optimum lightness" and "an appropriate flesh color that human beings feel desirable." Yano, 8:23-25, 10:14-22; Parulski ¶205. Image correction processing

unit 17 stores the center value and distribution value for both the “range of lightness of the flesh color” and the “range of hue of the flesh color that human beings feel desirable” (correction conditions corresponding to the acquired properties) and uses the center and distribution values for each range to obtain corrected lightness and hue values of the pixels for the image data. Yano, 9:23-57, 11:29-61; Parulski ¶205. To obtain these corrected values, a POSITA would have understood that image correction processing unit 17 first acquires the center and distribution values of each range from memory. Yano, 9:35-49, 11:42-51; Parulski ¶205.

e. [1.d]

Yano discloses or suggests [1.d]. Parulski ¶¶206-210.

Yano discloses performing a “lightness correction from the image feature amount of the face region” and “correcting the face region of the person to generate the image of an appropriate flesh color that human beings feel desirable” (adjusting image quality of the main object using the acquired correction conditions, wherein a parameter used in adjusting the image quality is brightness, color balance, or memory color). Yano, 9:23-57, 10:19-22, 11:29-61; Parulski ¶207. For generating the appropriate flesh color, Yano discloses that “[t]he image correction processing unit 17 obtains the parameters for the color correction from the image feature amount of the face region 33, and then actually performs the

following image correction process.” Yano, 11:29-32. To perform this process, the hue of each pixel in “the entire image,” including the face region, is converted to a new value using the following formulas:

$$h' = k_h \times h + i_h' - i_h, \quad k_h = o_h' / o_h$$

Yano, 11:42-61; Parulski ¶207. In these formulas, “hue of the pixel before the correction is h , hue thereof after the correction is h' , average hue of the flesh color in the face region 33 is i_h , a standard deviation (square root of the distribution value) is o_h , the center value of the target value of the hue is i_h' , and a standard deviation thereof is o_h' .” Yano, 11:42-49. Accordingly, this adjusting uses the acquired correction conditions. Parulski ¶¶207-208. Yano discloses a similar process for adjusting lightness using the acquired correction conditions. Yano, 9:23-57; Parulski ¶208.

After determining the corrected hue values, “the image correction processing unit 17 obtains the R, G and B component values in regard to each pixel” such that they maintain the original lightness and saturation values but include the corrected hue value based on the above equation. Yano, 11:56-60; Parulski ¶209. This “process is performed to the entire image.” Yano, 11:60-61. A POSITA would have understood that this adjusting of the hue values of the pixels in the entire image based on a target flesh color discloses using color balance in adjusting the image quality. Parulski ¶209. Additionally, since flesh is a memory color, Yano

discloses using memory color in adjusting the image quality by correcting “the entire image” or only the extracted face region using a target flesh color (memory color). Yano, 12:30-42; Parulski ¶209.

Additionally, a POSITA would have understood that lightness is one way of expressing brightness and that Yano’s lightness correction teaches using brightness in adjusting the image quality. Parulski ¶210.

f. [1.e]

Yano discloses or suggests [1.e]. Parulski ¶¶211-212.

Yano discloses that its image processing is “based on an application program installed in an image processing apparatus such as a PC” (personal computer).

Yano, 2:36-43, 1:17-23; Parulski ¶212.

2. Independent Claim 3

a. [3.pre]

If limiting, Yano discloses or suggests [3.pre] for the reasons explained for [1.pre]. *Supra* § VI.C.1.a; Parulski ¶213.

b. [3.a]

Yano and Terashita render obvious [3.a] for the reasons explained for [1.a]. *Supra* § VI.C.1.b; Parulski ¶214.

c. [3.b]

Yano discloses or suggests [3.b] for the reasons explained for [1.b]-[1.d].

Supra §§ VI.C.1.c-VI.C.1.e; Parulski ¶215.

d. [3.c]

Yano discloses or suggests [3.c] for the reasons explained for [1.e]. *Supra* § VI.C.1.f; Parulski ¶216.

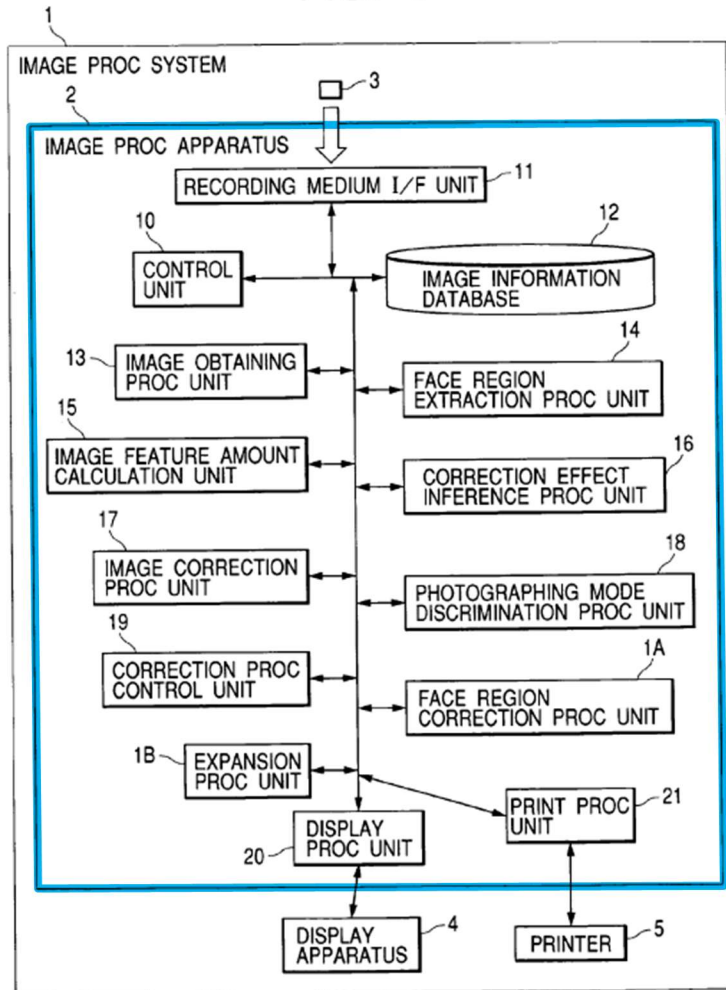
3. Independent Claim 5

a. [5.pre]

If limiting, Yano discloses or suggests [5.pre]. Parulski ¶¶217-218.

Yano discloses “an image processing apparatus,” a block diagram of which is depicted below in blue. Yano, 2:15-19, 2:35-43, FIG. 1; Parulski ¶218.

FIG. 1



Yano, FIG. 1 (annotated).

b. [5.a]

Yano discloses or suggests [5.a]. Parulski ¶¶219-220.

Yano discloses a “CPU” (one or more processors) that executes the image processing program stored in the image processing apparatus. Yano, 6:61-7:7, 2:62-67, FIG. 1; Parulski ¶220.

c. [5.b]

Yano discloses or suggests [5.b]. Parulski ¶¶221-222.

Yano discloses a “memory,” like a hard disk, that stores “a program for achieving the function of each unit” of the image processing apparatus. Yano, 6:61-7:7, 2:62-67, FIG. 1; Parulski ¶222.

d. [5.c]

Yano and Terashita render obvious [5.c]. Parulski ¶¶223-225.

As explained for [1.a], Yano and Terashita render obvious determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face. *Supra* § VI.C.1.b; Parulski ¶224. A POSITA would have found it obvious to implement this determining step as a determining module that forms part of Yano’s image processing program. Yano, 6:62-66; Parulski ¶224; *see* Ex. 1001, 14:32-35 (disclosing that the modules “can be realized in terms of the CPU 411 alone or the control circuit 41, and can be realized by either hardware or software”).

A POSITA would have been motivated and found it obvious to do so because Yano discloses processing an image “based on an application program installed in an image processing apparatus such as a PC.” Yano, 2:35-43; Parulski ¶225. Such application programs commonly included modules. Parulski ¶225.

Indeed, Yano teaches that each step in its image processing method may be structured as “a program for achieving the function” and “may be a part of an application program for the entire image process.” Yano, 6:61-7:1; Parulski ¶225. Accordingly, incorporating this determining step into the application program as a determination module configured to perform this determining step would have merely required the use of known software techniques to predictably implement Yano’s image processing method. Parulski ¶225. A POSITA would have reasonably expected success in doing so because it would have required a POSITA to apply only conventional techniques for implementing software. Yano, 6:61-7:1; Parulski ¶225.

e. [5.d]

Yano renders obvious [5.d]. Parulski ¶¶226-228.

As explained for [1.b], Yano discloses acquiring properties of the determined main object. *Supra* § VI.C.1.c; Parulski ¶227.

A POSITA would have been motivated and found it obvious to implement this acquiring step as a property acquirer in an application program that is configured to perform this acquiring step because Yano teaches that each step in its image processing method may be structured as “a program for achieving the function” and “may be a part of an application program for the entire image process.” Yano, 6:61-7:1; Parulski ¶228. Accordingly, incorporating this acquiring

step into the application program as a property acquirer configured to perform this acquiring step would have merely required the use of known software techniques to predictably implement Yano's image processing method. Parulski ¶228. A POSITA would have reasonably expected success in doing so because it would have required a POSITA to apply only conventional techniques for implementing software. Yano, 6:61-7:1; Parulski ¶228.

f. [5.e]

Yano renders obvious [5.e]. Parulski ¶¶229-231.

As explained for [1.c], Yano discloses acquiring correction conditions corresponding to the acquired properties. *Supra* § VI.C.1.d; Parulski ¶230.

A POSITA would have been motivated and found it obvious to implement this acquiring step as a correction condition acquirer in an application program that is configured to perform this acquiring step because Yano teaches that each step in its image processing method may be structured as “a program for achieving the function” and “may be a part of an application program for the entire image process.” Yano, 6:61-7:1; Parulski ¶231. Accordingly, incorporating this acquiring step into the application program as a correction condition acquirer configured to perform this acquiring step would have merely required the use of known software techniques to predictably implement Yano's image processing method. Parulski ¶231. A POSITA would have reasonably expected success in doing so because it

would have required a POSITA to apply only conventional techniques for implementing software. Yano, 6:61-7:1; Parulski ¶231.

g. [5.f]

Yano renders obvious [5.f]. Parulski ¶¶232-234.

As explained for [1.d], Yano discloses adjusting image quality of the main object using the acquired correction conditions, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color. *Supra* § VI.C.1.e; Parulski ¶233.

A POSITA would have been motivated and found it obvious to implement this adjusting step as an image quality adjuster in an application program that is configured to perform this adjusting step because Yano teaches that each step in its image processing method may be structured as “a program for achieving the function” and “may be a part of an application program for the entire image process.” Yano, 6:61-7:1; Parulski ¶234. Accordingly, incorporating this adjusting step into the application program as an image quality adjuster configured to perform this adjusting step would have merely required the use of known software techniques to predictably implement Yano’s image processing method. Parulski ¶234. A POSITA would have reasonably expected success in doing so because it would have required a POSITA to apply only conventional techniques for implementing software. Yano, 6:61-7:1; Parulski ¶234.

h. [5.g]

Yano discloses or suggests [5.g] for the reasons explained for [1.e]. *Supra* § VI.C.1.f; Parulski ¶235.

4. Independent Claim 7

a. [7.pre]

Yano discloses or suggests [7.pre] for the reasons explained for [5.pre].
Supra § VI.C.3.a; Parulski ¶236.

b. [7.a]

Yano discloses or suggests [7.a] for the reasons explained for [5.a]. *Supra* § VI.C.3.b; Parulski ¶237.

c. [7.b]

Yano discloses or suggests [7.b] for the reasons explained for [5.b]. *Supra* § VI.C.3.c; Parulski ¶238.

d. [7.c]

Yano and Terashita render obvious [7.c] for the reasons explained for [5.c].
Supra § VI.C.3.d; Parulski ¶239.

e. [7.d]

Yano discloses or suggests [7.d] for the reasons explained for [5.d]-[5.f].
Supra §§ VI.C.3.e-VI.C.3.g; Parulski ¶240.

f. [7.e]

Yano discloses or suggests [7.e] for the reasons explained for [1.e]. *Supra* § VI.C.1.f; Parulski ¶241.

5. Independent Claim 9

a. [9.pre]

Yano discloses or suggests [9.pre]. Parulski ¶¶242-243.

As explained for [1.pre], Yano discloses an image processing method. *Supra* § VI.C.1.a; Parulski ¶243. Yano discloses implementing this image processing method as “a program product such as a computer-readable recording medium,” on which a program for performing the image processing method has been recorded. Yano, 12:59-13:34; Parulski ¶243.

b. [9.a]

Yano discloses or suggests [9.a]. Parulski ¶¶244-245.

Yano discloses “a computer-readable recording medium,” such as a ROM or hard disk, storing Yano’s image processing program (a non-transitory computer readable medium storing computer readable code therein) for execution by the CPU of a personal computer. Yano, 2:36-43, 6:61-7:7, 13:4-34; Parulski ¶245.

c. [9.b]

Yano and Terashita render obvious [9.b]. Parulski ¶¶246-247.

As explained for [1.a], Yano and Terashita render obvious determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face. *Supra* § VI.C.1.b; Parulski ¶247. Yano discloses that each function of its program may be stored in computer readable memory and executed by a CPU, which discloses computer readable code. Yano, 6:61-7:7, 12:59-13:34; Parulski ¶247. Accordingly, Yano teaches implementing this determining step as computer readable code. Parulski ¶247.

d. [9.c]

Yano discloses or suggests [9.c]. Parulski ¶¶248-249.

As explained for [1.b], Yano discloses acquiring properties of the determined main object. *Supra* § VI.C.1.c; Parulski ¶249. For the same reasons explained for [9.b], Yano teaches implementing this acquiring step as computer readable code. *Supra* § VI.C.5.c; Parulski ¶249.

e. [9.d]

Yano discloses or suggests [9.d]. Parulski ¶¶250-251.

As explained for [1.c], Yano discloses acquiring correction conditions corresponding to the acquired properties. *Supra* § VI.C.1.d; Parulski ¶251. For the

same reasons explained for [9.b], Yano teaches implementing this acquiring step as computer readable code. *Supra* § VI.C.5.c; Parulski ¶251.

f. [9.e]

Yano discloses or suggests [9.e]. Parulski ¶¶252-253.

As explained for [1.d], Yano discloses “adjusting image quality of the main object using the acquired correction conditions, wherein a parameter used in adjusting the image quality is ... brightness, ... color balance, or memory color.” *Supra* § VI.C.1.e; Parulski ¶253. For the same reasons explained for [9.b], Yano teaches implementing this adjusting step as computer readable code. *Supra* § VI.C.5.c; Parulski ¶253.

6. Independent Claim 11

a. [11.pre]

If limiting, Yano discloses or suggests [11.pre] for the reasons explained for [9.pre]. *Supra* § VI.C.5.a; Parulski ¶254.

b. [11.a]

Yano discloses or suggests [11.a] for the reasons explained for [9.a]. *Supra* § VI.C.5.b; Parulski ¶255.

c. [11.b]

Yano and Terashita render obvious [11.b] for the reasons explained for [9.b]. *Supra* § VI.C.5.c; Parulski ¶256.

d. [11.c]

Yano discloses or suggests [11.c] for the reasons explained for [9.c]-[9.e].

Supra §§ VI.C.5.d-VI.C.5.f; Parulski ¶257.

7. Dependent Claims 2, 4, 6, 8, 10, and 12

Yano and Terashita render obvious independent claims 1, 3, 5, 7, 9, and 11 for the reasons explained in Sections VI.C.1-VI.C.6. For the reasons explained below, Yano and Terashita also render obvious the additional limitation, “wherein the correction conditions are different when the main object is determined as a night time scene and a human face and when the main object is determined as a human face,” which appears in each of dependent claims 2, 4, 6, 8, 10, and 12. Parulski ¶¶258-264.

a. [2], [4], [6], [8], [10], [12]

Yano and Terashita render obvious “wherein the correction conditions are different when the main object is determined as a night time scene and a human face and when the main object is determined as a human face” in each of claims 2, 4, 6, 8, 10, and 12. Parulski ¶¶259-264.

As explained for the dependent claims in Ground 2, Terashita discloses using different sets of image processing conditions stored in memory of an image processing apparatus, depending on whether the scene is inferred to include a face in normal lighting or at nighttime outdoors (the main object is determined as a

human face and the main object is determined as a night time scene and a human face, respectively). Terashita, [0020], [0039], [0042], [0047]-[0048], FIGS. 1-2; Parulski ¶260; *supra* § VI.B.1.a.

A POSITA would have found it obvious to implement Terashita's use of different image processing conditions, depending on whether the inferred scene is a human face or a human face at nighttime outdoors in the image processing of Yano. Parulski ¶261. A POSITA would have been motivated to do so to more accurately process the image based on the scene, including whether the image was photographed at night, thus "enabl[ing] reproduction of a high-quality image." Terashita, [0054]; Parulski ¶261. Terashita discloses that doing so is advantageous because "the image processing condition can be set with more accuracy" and "in a short time," thus enabling the image processing to "be carried out efficiently" and to reproduce "a high-quality image." Terashita, [0032]-[0033], [0054]. For example, it was known in the art that setting the target color according to "the features of the scene as a whole" when "correcting the skin color of a person" results in correction processing that is more "optimum" compared to when the target color is the same regardless of the scene. Hibi, [0020]. A POSITA would have been motivated to apply this to Yano so that its lightness and flesh-color correction use different target values based on the scene, including whether the scene includes a face at nighttime outdoors. Parulski ¶261.

Accordingly, modifying Yano's image processing to process the face region differently when it is detected in normal light versus in a nighttime scene, as disclosed in Terashita, would have been a combination of familiar elements (e.g., processing an image based on a scene) according to known methods to predictably yield the result of an improved image-processing technique that improves the quality of an image by accounting for whether the face was photographed in normal conditions or at nighttime outdoors. Parulski ¶262. A POSITA would have understood that determining the correction conditions based on the features of the scene and adjusting the image processing based on lighting differences are beneficial. Hibi, [0043]-[0045]; Parulski ¶262. Terashita would have motivated a POSITA to acquire different correction conditions, depending on whether a person was photographed in normal light or in a nighttime scene to improve the quality of the image. Terashita, [0050]-[0051], FIG. 2; Parulski ¶262.

A POSITA would have reasonably expected success in such a combination in light of the similarity between Yano and Terashita. Parulski ¶263. Yano already discloses providing "photographing information" with the image data, similar to Terashita's "photography information" that is provided with the image data. Yano, 3:25-38, 5:10-15; Terashita, [0039]; Parulski ¶263. Accordingly, Yano already discloses the image processing apparatus receiving the same types of information needed to perform Terashita's scene inference, meaning a POSITA would have

needed to apply only conventional techniques for reading and analyzing information acquired from a standard image file, that were well within the skill of a POSITA. Terashita, [0005], [0018]-[0019], [0039], [0047]; Parulski ¶263. A POSITA would have seen Yano and Terashita as complementary disclosures readily combined with predictable success to improve the image processing depending on the features of the scene determined. Parulski ¶263.

Additionally, Terashita teaches accessing memory to acquire different correction conditions, depending on the scene, so a POSITA would have reasonably expected success in Yano’s image processing apparatus doing the same. Terashita, [0039], [0050]-[0051] (disclosing a memory that “stores various image processing conditions corresponding to the scene information H”); Parulski ¶264. Applying Terashita’s scene inference from Figure 2 would have been a straightforward application of known, conventional software operations (comparing photography information and main part information to information in a table) used according to their known functions to yield predictable results (determining the scene). Parulski ¶264.

VII. DISCRETIONARY DENIAL IS NOT WARRANTED

A. 35 U.S.C. § 314(a) Does Not Warrant Discretionary Denial

Apple Inc. v. Fintiv, Inc., IPR2020-00019, Paper 11, at 5-6 (Mar. 20, 2020) (precedential), and the Office’s interim guidelines dated June 21, 2022 (“Guidance

Memo”), do not warrant discretionarily denying institution. There is no active parallel district court litigation. Ex. 1023. The court in *Longitude Licensing Ltd.*³ v. *Google LLC*, No. 3:23-cv-03046 (N.D. Cal.) dismissed the proceeding under Rule 12(b)(6) upon determining that the claims of the ’574 patent (among others) are directed to patent ineligible subject matter under 35 U.S.C. § 101. Ex. 1020. The plaintiff voluntarily dismissed the remaining claims, and the Court entered final judgment and closed the file. Exs. 1022, 1023. No claim construction proceedings were underway, fact discovery had only begun, and the parties had not exchanged any infringement or invalidity contentions (and therefore no § 102/§ 103 issues had been raised or addressed). Although Longitude has appealed the § 101 order, institution is nevertheless appropriate. *See Google LLC v. Geoscope Techs. Pte. Ltd.*, IPR2023-01209, Paper 14, at 10-21 (Feb. 20, 2024) (instituting review where district court determined that the challenged claims were ineligible under § 101 and appeal was pending); *id.*, Paper 22 (denying director review).

Thus, the *Fintiv* factors favor institution because there is no case to stay or trial date (factors 1 and 2); minimal investment by the parties (factor 3); no overlapping issues (factor 4); and the evidence of obviousness is strong (factor 6). Factor 5 is at worst neutral.

³ Longitude Licensing Ltd. “is the exclusive worldwide licensee” of the ’574 patent. Ex. 1021, ¶13.

B. 35 U.S.C. § 325(d) Does Not Warrant Discretionary Denial

Noninstitution under § 325(d) would also be improper based on the factors set forth in *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 17-18 (Dec. 15, 2017) (precedential). Luo-250, Yano, and Terashita were not considered during examination of the '574 patent. *See* Ex. 1001, cover (code (56) (References Cited)). While Applicant identified Hibi in an IDS, Ex. 1002, 240, this reference was never applied in any rejection.

Additionally, Luo-250, Yano, Terashita, and Hibi differ from the prior art involved during examination. As discussed in Section II.B, Applicant overcame an anticipation rejection by distinguishing Bolle's processing in a camera from processing a shot image using "a personal computer, a printer, or a display device." *Id.*, 544-545, 554-555. Applicant also amended the claims to require that "a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color" and specified that the processing is performed by "a personal computer, a printer, or a display device." *Id.*, 549-552. As described above, these features are taught by the prior art asserted here.

Had the Examiner known of the asserted references, he would not have allowed the challenged claims to issue. Accordingly, the Board should decline to exercise its discretion to deny institution under § 325(d).

VIII. MANDATORY NOTICES

A. Real Parties-in-Interest Under 37 C.F.R. § 42.8(b)(1)

Google LLC is the real party-in-interest for this Petition.⁴

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

To the best knowledge of Petitioner, the '574 patent is or has been involved in the following district court litigations:

Name	Number	Court	Filed
<i>Longitude Licensing Ltd. v. Google LLC</i>	3:23-cv-03046-VC	N.D. Cal.	June 21, 2023

The above district court litigation is currently on appeal to the Court of Appeals for the Federal Circuit, No. 24-1202, filed November 28, 2023.

⁴ Google LLC is a subsidiary of XXVI Holdings Inc., which is a subsidiary of Alphabet Inc. XXVI Holdings Inc. and Alphabet Inc. are not real parties-in-interest to this proceeding.

C. Lead and Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Lead Counsel	Back-Up Counsel
<p>Erika Harmon Arner (Reg. No. 57,540) erika.arners@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 1875 Explorer Street Suite 800 Reston, VA 20190-6023 Tel: 571-203-2700 Fax: 202-408-4400</p>	<p>Daniel C. Cooley (Reg. No. 59,639) daniel.cooley@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 1875 Explorer Street Suite 800 Reston, VA 20190-6023 Tel: 571-203-2700 Fax: 202-408-4400</p> <p>Kevin D. Rodkey (Reg. No. 65,506) kevin.rodkey@finnegan.com Robert K. High (Reg. No. 75,786) robert.high@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 271 17th Street, NW Suite 1400 Atlanta, GA 30363-6209 Tel: 404-653-6400 Fax: 202-408-4400</p> <p>Alissa E. Green (Reg. No. 78,501) alissa.green@finnegan.com Safiya Aguilar (Reg. No. 77,212) safiya.aguilar@finnegan.com Grace. K Mills (Reg. No. 66,946) gracie.mills@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 901 New York Avenue, NW Washington, DC 20001-4413 Tel: 202-408-4000 Fax: 202-408-4400</p>

D. Service Information Under 37 C.F.R. § 42.8(b)(4)

Please address all correspondence to lead and back-up counsel at the addresses shown above and Google-Longitude-IPRs@finnegan.com. Petitioner also consents to electronic service by e-mail.

IX. GROUNDS FOR STANDING

Petitioner certifies that the '574 patent is available for IPR and Petitioner is not barred or estopped from requesting IPR to challenge the claims on the grounds above. Petitioner filed this Petition within one year of service of the original complaint against Petitioner in the district court litigation.

X. CONCLUSION

Petitioner has established a reasonable likelihood of prevailing with respect to the challenged claims and requests that the Board institute IPR and cancel each challenged claim as unpatentable.

Date: June 21, 2024

Respectfully submitted,

/Erika H. Arner/

Erika H. Arner, Lead Counsel
Reg. No. 57,540

CERTIFICATE OF COMPLIANCE

The undersigned hereby certifies that the foregoing **Petition for *Inter Partes* Review** contains 13,656 words, excluding those portions identified in 37 C.F.R. § 42.24(a), as measured by the word-processing system used to prepare this paper.

/Erika H. Arner/
Erika H. Arner, Lead Counsel
Reg. No. 57,540

CLAIMS APPENDIX

1. **[1.pre]** A method of image processing, the method comprising:

 [1.a] determining a main object in an image generated by an image
 generating apparatus, wherein the main object includes at least a human
 face, and wherein the determining of the main object is implemented by
 determining whether the image includes the human face;

 [1.b] acquiring properties of the determined main object;

 [1.c] acquiring correction conditions corresponding to the acquired
 properties; and

 [1.d] adjusting image quality of the main object using the acquired
 correction conditions, wherein a parameter used in adjusting the image
 quality is a highlight, a shadow, brightness, contrast, color balance, or
 memory color, and

 [1.e] wherein each operation of the method of image processing is executed
 by one of a personal computer, a printer, or a display device.

2. The method in accordance with claim 1, **[2]** wherein the correction
 conditions are different when the main object is determined as a night time scene
 and a human face and when the main object is determined as a human face.

3. **[3.pre]** A method of image processing, the method comprising:
[3.a] determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face; and
[3.b] adjusting image quality of the main object using correction conditions corresponding to properties of the determined main object, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color, and
[3.c] wherein each operation of the method of image processing is executed by one of a personal computer, a printer, or a display device.
4. The method in accordance with claim 3, **[4]** wherein the correction conditions are different when the main object is determined as a night time scene and a human face and when the main object is determined as a human face.
5. **[5.pre]** An image processing apparatus comprising:
[5.a] one or more processors;
[5.b] memory;

[5.c] a determining module configured to determine a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining module determines whether the image includes the human face;

[5.d] a property acquirer configured to acquire properties of the determined main object;

[5.e] a correction condition acquirer configured to acquire correction conditions corresponding to the acquired properties; and

[5.f] an image quality adjuster configured to adjust image quality of the main object using the acquired correction conditions, wherein a parameter used by the image quality adjuster to adjust image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color, and

[5.g] wherein the image processing apparatus is either a personal computer or a printer or a display device.

6. The image processing apparatus in accordance with claim 5, **[6]** wherein the correction conditions are different when the main object is determined as a night time scene and a human face and when the main object is determined as a human face.

7. [7.pre] An image processing apparatus comprising:
- [7.a] one or more processors;
 - [7.b] memory;
 - [7.c] a determining module configured to determine a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining module determines whether the image includes the human face; and
 - [7.d] an image quality adjuster configured to adjust image quality of the main object using correction conditions corresponding to properties of the determined main object, wherein a parameter used by the image quality adjuster to adjust image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color, and
 - [7.e] wherein the image processing apparatus is either a personal computer or a printer or a display device.
8. The image processing apparatus in accordance with claim 7, [8] wherein the correction conditions are different when the main object is determined as a night time scene and a human face and when the main object is determined as a human face.

9. **[9.pre]** A computer program product for image processing comprising:
- [9.a]** a non-transitory computer readable medium storing computer readable code therein for execution by either a personal computer or a printer or a display device, the computer readable code comprising:
- [9.b]** computer readable code for determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face;
- [9.c]** computer readable code for acquiring properties of the determined main object;
- [9.d]** computer readable code for acquiring correction conditions corresponding to the acquired properties; and
- [9.e]** computer readable code for adjusting image quality of the main object using the acquired correction conditions, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color.
10. The computer program product in accordance with claim 9, **[10]** wherein the correction conditions are different when the main object is determined as a night

time scene and a human face and when the main object is determined as a human face.

11. **[11.pre]** A computer program product for image processing comprising:

[11.a] a non-transitory computer readable medium storing computer readable code therein for execution by either a personal computer or a printer or a display device, the computer readable code comprising:

[11.b] computer readable code for determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face; and

[11.c] computer readable code for adjusting image quality of the main object using correction conditions corresponding to properties of the determined main object, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color.

12. The computer program product in accordance with claim 11, **[12]** wherein the correction conditions are different when the main object is determined as a

night time scene and a human face and when the main object is determined as a human face.

CERTIFICATE OF SERVICE

The undersigned certifies that, in accordance with 37 C.F.R. §§ 42.6(e) and 42.105, the **Petition for *Inter Partes* Review of U.S. Patent No. 8,355,574, the associated Power of Attorney, and Exhibits 1001-1023** were served via FedEx Priority Overnight on the correspondence address of record with the USPTO as follows:

Albert Penilla
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A courtesy copy has also been mailed to litigation counsel for Patent Owner at:

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Dated: June 21, 2024

By: /Lisa C. Hines/
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