**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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SAMSUNG ELECTRONICS CO., LTD. and
SAMSUNG ELECTRONICS AMERICA, INC.
Petitioners,

v.

SNAPAID, LTD.
Patent Owner

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**U.S. PATENT NO. 12,250,452**

Case PGR2025-TBD

# PETITION FOR POST-GRANT REVIEW OF U.S. PATENT NO. 12,250,452

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## LIST OF EXHIBITS[1]

| Exhibit No. | Description |
|---|---|
| **1001** | U.S Patent No. 12,250,452 |
| **1002** | File History of U.S Patent No. 12,250,452 |
| **1003** | *Curriculum Vitae* of [Expert Name] |
| **1004** | Declaration of Dan Schonfeld |
| **1005** | U.S. Patent No. 8,508,622 ("Anon") |
| **1006** | U.S. Pat. App. Pub. No. 2010/0149361 ("Takeuchi") |
| **1007** | U.S. Pat. App. Pub. No. 2004/0012682 ("Kosaka") |
| **1008** | U.S. Pat. App. Pub. No. 2009/0296989 ("Ramesh") |
| **1009** | U.S. Pat. App. Pub. No. 2011/0150447 ("Li") |
| **1010** | U.S. Pat. App. Pub. No. 2012/0133746 ("Bigioi") |
| **1011** | Tsung-Jung Liu and Wei Lin, "*Image Quality Assessment Using Multi-Method Fusion*," IEEE Transactions on Image Processing, Vol. 22, No. 5, May 2013 ("Liu") |
| **1012** | U.S. Pat. App. Pub. 2011/0222724 ("Yang") |
| **1013** | Provisional Application No. 61/717,216, filed on October 23, 2012 |
| **1014** | Provisional Application No. 61/759,643, filed February 1, 2013 |
| **1015** | U.S. Pat. App. Pub. 2013/0076856 ("Wakabayashi") |
| **1016** | Excerpts from Hector Garcia-Molina et al., "DATABASE SYSTEMS The Complete Book," 2009 ("Garcia-Molina") |
| **1017** | U.S. Pat. App. Pub. No. 2005/0270381 ("Owens") |

[1] Unless otherwise specified, citations are to the original page, column, and line numbers in exhibits, and all emphasis is added unless otherwise noted.

# I. INTRODUCTION

Petitioners Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (together, "Petitioner" or "Samsung") respectfully request post-grant review of claims 1-12 ("Challenged Claims") of U.S. Patent No. 12,250,452 ("the '452 Patent"), assigned to Snapaid Ltd. ("Patent Owner"). As explained in this Petition, it is more likely than not that at least one of the Challenged Claims is unpatentable as obvious, indefinite, lacking written description, and/or for claiming unpatentable subject matter.

Although the '452 Patent claims priority to two provisional applications filed prior to March 16, 2013—the earliest possible priority date for eligibility for post-grant review under the America Invents Act—none of the Challenged Claims are entitled to those priority dates, as discussed in Section III.B below. The '452 Patent's earliest possible priority date is ***after*** March 16, 2013. The '452 Patent is therefore eligible for post-grant review.

# II. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED

Petitioner requests cancellation of the Challenged Claims as unpatentable under 35 U.S.C. § 103 and for failure to comply with §§112 and 101 as follows:

| Ground | Claims | Proposed Statutory Rejection |
|---|---|---|
| I.A | 1, 2 | Obvious under § 103 in view of Anon, Takeuchi, and Garcia-Molina |

| Ground | Claims | Proposed Statutory Rejection |
|---|---|---|
| I.B | 3 | Obvious under § 103 in view of Anon, Takeuchi, Garcia-Molina, and Kosaka |
| I.C | 4 | Obvious under § 103 in view of Anon, Takeuchi, Garcia-Molina, and Li |
| I.D | 5, 10 | Obvious under § 103 in view of Anon, Takeuchi, Garcia-Molina, Bigioi, and Wakabayashi |
| I.E | 6 | Obvious under § 103 in view of Anon, Takeuchi, Garcia-Molina, and Ramesh |
| I.F | 7 | Obvious under § 103 in view of Anon, Takeuchi, Garcia-Molina, Ramesh, Bigioi, and Wakabayashi |
| I.G | 8 | Obvious under § 103 in View of Anon, Takeuchi, Garcia-Molina, Ramesh, Bigioi, Wakabayashi, and Kosaka |
| I.H | 9 | Obvious under § 103 in view of Anon, Takeuchi, Garcia-Molina, and Liu |
| I.I | 11, 12 | Obvious under § 103 in view of Anon, Takeuchi, Garcia-Molina, and Yang |
| II | 5-8 | Invalid as indefinite under § 112 |
| III | 4 | Invalid for lack of written description under § 112 |
| IV | 1-12 | Invalid for claiming unpatentable subject matter under § 101 |

Grounds I.A-I.I are based on the following prior art references:

1. U.S. Patent No. 8,508,622 ("Anon") (EX1005) was filed on January 18, 2011, issued on August 13, 2013, and is prior art under at least 35 U.S.C § 102(a)(1) and 102(a)(2).

2. U.S. Pat. App. Pub. No. 2010/0149361 ("Takeuchi") (EX1006) was filed October 14, 2009, published June 17, 2010, and is prior art under at least 35 U.S.C § 102(a)(1) and 102(a)(2).

3. U.S. Pat. App. Pub. No. 2004/0012682 ("Kosaka") (EX1007) was filed July 2, 2003, published January 22, 2004, and is prior art under at least 35 U.S.C § 102(a)(1) and 102(a)(2).

4. U.S. Pat. App. Pub. No. 2009/0296989 ("Ramesh") (EX1008) was filed May 28, 2009, published December 3, 2009, and is prior art under at least 35 U.S.C § 102(a)(1) and 102(a)(2).

5. U.S. Pat. App. Pub. No. 2011/0150447 ("Li") (EX1009) was filed December 21, 2009, published June 23, 2011, and is prior art under at least 35 U.S.C § 102(a)(1) and 102(a)(2).

6. U.S. Pat. App. Pub. No. 2012/0133746 ("Bigioi") (EX1010) was filed November 29, 2011, published May 31, 2012, and is prior art under at least 35 U.S.C § 102(a)(1) and 102(a)(2).

7. Tsung-Jung Liu and Wei Lin, "*Image Quality Assessment Using Multi-Method Fusion*," IEEE Transactions on Image Processing, Vol. 22, No. 5, May 2013 ("Liu") (EX1011), was published in May 2013, and is prior art under at least 35 U.S.C § 102(a)(1). As discussed below in Section III.B, because the '452 Patent is

not entitled to a priority date prior to October 22, 2013, Liu is prior art to the '452 patent.

8. U.S. Pat. App. Pub. No. 2011/0222724 ("Yang") (EX1012) was filed May 31, 2010, published September 15, 2011, and is prior art under at least 35 U.S.C § 102(a)(1) and 102(a)(2).

9. U.S. Pat. App. Pub. No. 2013/0076856 ("Wakabayashi") (EX1015) was filed November 20, 2012, published March 28, 2013, and is prior art under at least 35 U.S.C § 102(a)(1) and 102(a)(2). As discussed below in Section III.B, because the '452 Patent is not entitled to a priority date prior to October 22, 2013, Wakabayashi is prior art to the '452 patent.

10. Hector Garcia-Molina *et al.*, "DATABASE SYSTEMS The Complete Book," 2009 ("Garcia-Molina") (EX1016), is a textbook published in 2009 on database design, and is prior art under 35 U.S.C § 102(a)(1).

## III. THE '452 PATENT

### A. Specification

The '452 Patent is entitled "Real Time Assessment of Picture Quality." The '452 Patent was filed as U.S. Patent Application No. 18/139,368 ("'368 Application") on April 26, 2023. The '452 Patent describes a method and system for on-board assessment of picture quality in camera devices. EX1001, Abstract. Multiple sensors (*e.g.,* accelerometers, lens modules) are used to determine a

plurality of quality indicators (QIs) for the images. *Id.*, 2:24-46. The quality of captured images is evaluated by combining various quality indicators (QIs), as shown below in Figure 4.

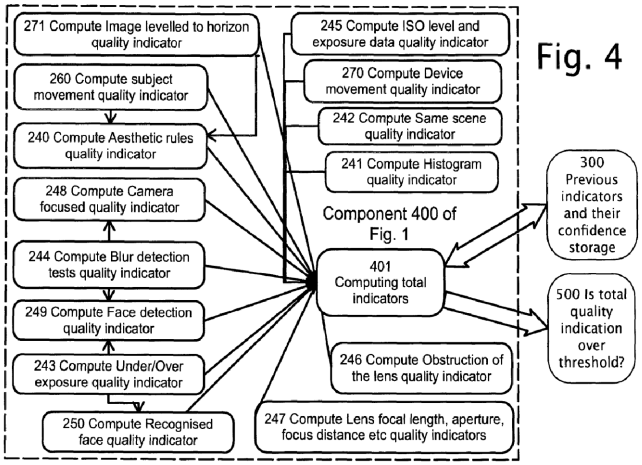



Fig. 4

The system provides real-time feedback to users by offering suggestions for improving photo quality based on the quality indicators. *Id.*, 3:28-32.

The ’452 Patent admits the “[p]rior art has used certain independent quality indicators” and “quantif[ed] the quality by means of a total quality indicator.” EX1001, 2:47-65. The ’452 Patent purports to distinguish the prior art by asserting that in its invention, “the weight of one indicator will take into account data from other quality indicator[s].” *Id.*, 3:1-16. But this weighting feature is not found in any of the asserted claims, and in any event was known in the prior art, for example in the Anon reference discussed below.

### B. Priority Date

The true priority date of the '452 Patent is ***after*** March 16, 2013, and the '452 Patent is therefore eligible for PGR. EX1004, ¶¶35-38. The '452 Patent claims priority to Provisional Application No. 61/717,216, filed on October 23, 2012, and Provisional Application No. 61/759,643, filed February 1, 2013. EX1013, EX1014. Neither provisional application, however, provides support for all the limitations of any Challenged Claim, and therefore the '452 Patent is not entitled to these priority dates. EX1004, ¶¶35-38. *Studiengesellschaft Kohle, M.B.H. v. Shell Oil Co*., 112 F.3d 1561, 1564 (Fed. Cir. 1997) ("35 U.S.C. § 120 requires an applicant to meet the disclosure requirement of § 112, ¶ 1 in a single parent application in order to obtain an earlier filing date for individual claims."). For example, neither provisional application discloses "selecting based on the total quality indicator at least one appropriate suggestion from a pre-stored table of suggestions," which is required by all Challenged Claims. *See* EX1013, EX1014. This claim limitation is new matter not contained in the provisional applications, and the disclosures of the provisional applications fail to reasonably convey to a POSITA the inventors had possession of this claim limitation as of the filing dates of the provisional applications. EX1004, ¶38. Nor do the provisional applications disclose "calculating an aesthetic quality indicator QI2 that uses a background blurring test of said face or object." This claim limitation is also new matter not contained in the provisional applications, and the

disclosures of the provisional applications fail to reasonably convey to a POSITA the inventors had possession of this claim limitation as of the filing dates of the provisional applications. EX1004, ¶37. The provisional applications also do not support any of the dependent claims, which all claim new matter. EX1004, ¶37. Therefore, the '452 Patent is not entitled to either an October 23, 2012, or February 1, 2013, priority date. *See* 35 U.S.C. § 119(e), 37 CFR § 1.78(a)(3)-(4); *see also Droplets, Inc. v. E*TRADE Bank*, 887 F.3d 1309, 1316 (Fed. Cir. 2018). Thus, Liu and Wakabayashi, which were published prior to the '452 Patent's non-provisional priority date of October 22, 2013, are prior art to the '452 patent under 35 U.S.C. §102(a)(1).

### C. Prosecution History

During prosecution, the Examiner issued a non-final rejection on January 16, 2024, rejecting all then-pending claims 1-20 as obvious in view of the Misawa, Robinson, and Koh references. EX1002, 86-92. In response, Patent Owner amended the claims on May 15, 2024, replacing the claims with a new set of claims. On August 13, 2024, the Examiner refused to enter these new claims as being drawn to a non-elected invention. *Id*., 350-351. In response, on October 8, 2024, Patent Owner filed an amendment amending claim 1 and adding new claims 2-12 seeking to obviate the pending prior-art rejection. *Id*., 355-360. The Examiner issued a Notice of Allowance on December 9, 2024, quoting verbatim claim 1 and merely

asserting that the prior art does not teach claim 1. *Id*., 361-367. No other explanation was provided in the Notice of Allowance.

### D. Person of Ordinary Skill in the Art

As Dr. Schonfeld explains in his Declaration, a POSITA at the time of the '452 Patent would have had a bachelor's degree in electrical engineering, computer engineering, computer science, or a related field, and at least two years of experience with image processing and analysis. Individuals with different education and experience could still be of ordinary skill in the art if additional experience compensates for a deficit in their education, and vice versa. EX1004, ¶¶40-42.

## IV. CLAIM CONSTRUCTION

Claims in an PGR are interpreted and construed under *Phillips v. AWH Corp*., 415 F.3d 1303 (Fed. Cir. 2005). For purposes of this proceeding only, terms in the Challenged Claims need not be construed. If PO raises claim construction arguments, Petitioner reserves the right to respond.

## V. OVERVIEW OF THE PRIOR ART

### A. Anon

Anon discloses "[a]n image capturing device" that can "determine a plurality of image-based characteristics for a proposed image," including "a likely quality of a composition and/or recommendations for improvement usable while the image or video is being taken." EX1005, Abstract, 2:64-3:1. Anon explains that "the photographer is provided with real time feedback as to composition and

recommendations, or can be provided with such feedback after the fact." *Id.*, 3:22-26. Anon's system is illustrated below:

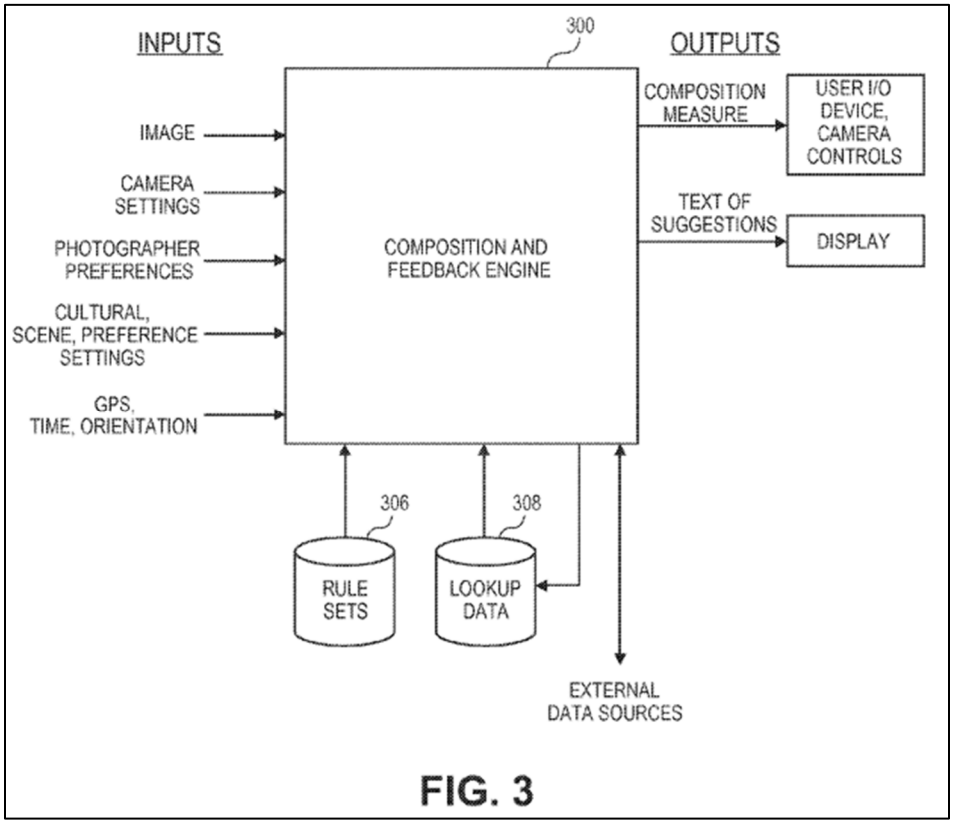



FIG. 3

The composition and feedback engine performs its evaluation using a "weighted, combination of parameters." *Id.*, 8:32-35. Anon's composition and feedback engine 300 can make use of inputs from the image capturing device, such as the image itself, the device settings, and metadata, combine it with rule sets 306 and lookup data 308, and output recommendations to improve image quality. EX1004, ¶¶ 45-46.

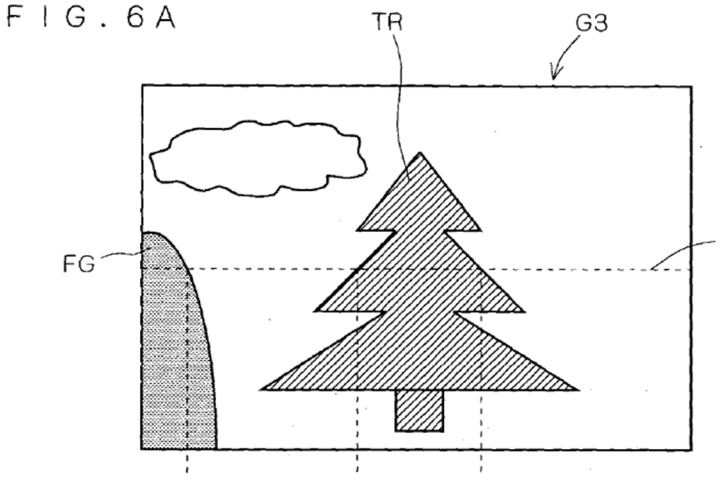
**B. Takeuchi**

Takeuchi relates to an "image evaluation apparatus and camera which are capable of evaluating an image which is comprehensively good." EX1006, Abstract.

Like Anon, Takeuchi's system provides a comprehensive evaluation of image quality, including, for example, background and foreground blur analysis. *See e.g., id*., ¶¶[0142]-[0145], [0291]. Takeuchi also teaches using a "total evaluation result" for an image using a weighted combination of different quality evaluation methods. *Id*. at ¶[0269]; EX1004, ¶47.

### C. Kosaka

Kosaka discloses a digital camera system that detects whether a user's finger is unintentionally obstructing the lens before an image is captured. *See e.g.*, EX1007, Fig. 6A.




Kosaka's system operates by analyzing a series of live view images (or images for autofocus) in real time, prior to the actual image capture. *See, e.g.*, *id.*, Figs. 4A-8 and ¶¶[0074], [0075]. Kosaka teaches that the camera will notify the user of such an obstruction before the image is taken, allowing the user to correct the issue and avoid capturing an image with a finger or other object blocking the lens. *See id.*, Figs. 9-

10, 23-25 and ¶[0089] ("Examples of the notifying operation are, concretely, indication of a note by characters of 'Note: finger is in' on the display 7 or a predetermined figure and output of sound of a note from a speaker or voice"). EX1004, ¶¶48-49.

**D. Ramesh**

Ramesh describes a computer vision system for detecting and tracking multiple objects (*e.g.,* people in crowds) using a probabilistic framework. EX1008, Abstract; Fig. 1; ¶[0039]. Ramesh estimates the number of people in a scene by using a "weighted sum of partial evidences." *Id*., ¶[0034]. Ramesh teaches that the estimate may be described by a "probability distribution function." *Id*., ¶[0039]. The "objects location and attributes are updated using online uncertainty estimation 110." *Id*., ¶[0025]. Ramesh teaches that "less certain guesses are weighted less." *Id*., ¶[0030]; EX1004, ¶50.

**E. Li**

Li discloses an autofocus system that uses, among other parameters, depth of field in determining focus. Li explains that a "depth of field increases as the focusing moves from intermediate distances out toward 'infinity' (e.g., capturing images of distant mountains, clouds and so forth)." EX1009, ¶[0015]. Li's system estimates subject distance and depth by "capturing object images, (c)(ii) estimating depth between captured image pairs," ¶[0026] and "[t]he focus distances at which the

pictures are taken and the amount of the blur difference between these two pictures can be used to estimate the actual subject distance, or depth." *Id*., ¶[0062]; EX1004 ¶51.

**F. Bigioi**

Bigioi discloses a digital camera that performs 3D face detection and provides a 3D portrait mode. Bigioi contemplates the use of two lenses and sensor modules to create a 3D portrait. Bigioi uses stereographic images to create the 3D portrait. EX1010, ¶¶[0016], [0023]; EX1004, ¶52.

**G. Liu**

Liu discloses a methodology for objective image quality assessment that it refers to as multi-method fusion, or MMF. MMF uses a combination of multiple image assessment algorithms to assess image quality. As Li explains, image quality is determined based on "the nonlinear combination of scores from multiple methods with suitable weights obtained by a training process." EX1011, 1793; EX1004, ¶53.

**H. Yang**

Yang discloses a computer implemented method that determines personal characteristics from an image using one or more convolutional neural networks, or CNNs. EX1012, ¶[0006]. As Yang explains, "[c]onvolutional neural networks are a class of deep learning approaches in which multiple stages of learned feature extractors are applied directly to the raw input images and the entire system can be trained end-to-end in a supervised manner." *Id*., ¶[0014]; EX1004; ¶53.

### I. Wakabayashi

Wakabayashi discloses an image capture device for capturing 3D images using stereoscopic techniques. To capture stereoscopic images, Wakabayashi's device contains left and right lens/image sensor pairs: " as with the first imaging unit L, the second imaging unit R is provided with a shooting optical system including a second focus lens FLB, a second focus lens driving unit (hereinafter referred to as a second F lens driving unit) 104B for moving the second focus lens FLB in a direction of an optical axis, and a second imaging element 111B for receiving subject light obtained by forming an image of the subject in the second shooting optical system and creating an image signal representing that subject." EX1015, ¶[0094]; EX1004, ¶55.

### J. Garcia-Molina

Garcia-Molina is a textbook on database design, and confirms that tables were the prevalent database structure prior to the filing of the '452 patent. Garcia-Molina confirms that the table is "the most important model of data." EX1016, 17; EX1004, ¶56.

## VI. SPECIFIC GROUNDS FOR PETITION UNDER 37 C.F.R. § 42.204(B)

### A. Ground I: The Challenged Claims Are Invalid As Obvious under § 103

#### 1. Ground I.A: Claims 1 and 2 are Obvious under § 103 in

**view of Anon, Takeuchi, and Garcia-Molina**

**a. Claim 1**

i. *[1.pre.] "A method for presenting suggestion to a user of a device to move the device to a different location, where the device comprises at least one digital camera module that comprises at least one optical lens and an image sensor coupled to said optical lens for capturing an image, and at least one processor coupled to the image sensor or digital camera for receiving data therefrom, the method by the processor comprising:*"

To the extent the preamble is limiting, Anon discloses an image capturing device, such as a digital camera that, among other functionality, presents a suggestion to a user of a device to move the device to a different location in order to take a better photograph. EX1005, 7:21-29; 7:44-50; 7:64-8:13; 9:19-22. This location-suggestion functionality is the subject of the entirety of claim limitation [1.c], and is discussed in detail below in Section 1.a.iv, which is incorporated by reference. EX1004, ¶¶ 59-63.

***Digital camera module that comprises at least one optical lens and an image sensor coupled to said optical lens for capturing an image.*** As shown in Figure 1 and as described by Anon, Anon's image capture device in a main embodiment is a digital camera (camera 100) "with a composition and feedback engine." EX1005, 5:53-54. Anon's digital camera is the claimed "digital camera module." Anon's digital camera includes an optical lens such as lens 102, and Anon describes that "light passing through lens 102 impinges on CCD 104 to form a digital,

electronically readable image." *Id.*, 5:54-56. As Dr. Schonfeld explains, a CCD is a Charge-Coupled-Device, a well-known type of image sensor. EX1004, ¶59; *see also* EX1006, ¶[0083] (recognizing that a CCD is an image sensor). Thus, Anon discloses a digital camera 100 with at least one optical lens (lens 102) and an image sensor couped to the lens for capturing an image (CCD 104). Anon's camera is a digital camera module because it is a single, integrated unit and "[i]n a typical operation, the photographer uses a device that is either a camera (e.g., point-and-shoot, DSLR, SLR) or a multi-purpose device that includes a camera (such as a mobile telephone with a camera)." EX1005, 3:14-17. A POSITA would have understood from this that Anon's camera components are housed within a single enclosure, as is standard for digital cameras and camera-equipped mobile devices, and thus form a module. *See e.g.*, *id*., Fig. 1 and 3:11-14; EX1004, ¶60.

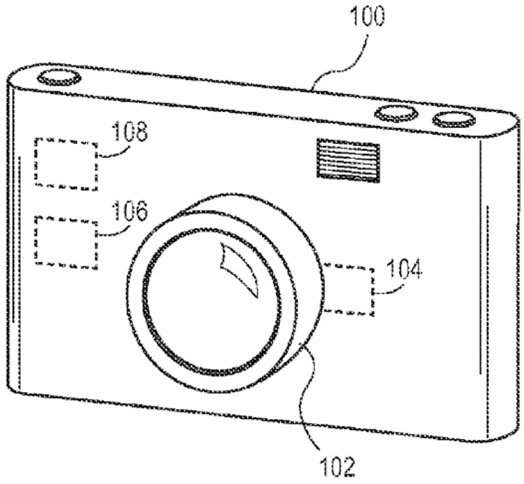



FIG. 1

***At least one processor coupled to the image sensor or digital camera for receiving data therefrom.*** Anon describes that its camera "is equipped with a processor 106 [and] may include memory for variable storage and/or programming instructions storage (not shown) and a composition and feedback engine ('engine') 108. Processor 106 might be used to manage adjusting camera settings, responding to user inputs, and other conventional camera operations." EX1005, 5:56-61. Because Anon's processor is part of Anon's digital camera, it is coupled to it. EX1004, ¶¶61-63.

Anon's processor works with "a composition and feedback engine" (hereinafter "CFE"), which in one embodiment is "implemented as … software elements executed on a processor …." EX1005, 6:33-41; EX1004, ¶63. Figure 3, below, shows that the engine has various inputs including an image, camera settings, and GPS, time, and orientation inputs, illustrating that as implemented on a processor, e.g., processor 106, that processor is coupled to at least one image sensor and to the digital camera for receiving data therefrom. *Id.*, 3:53-60, cl. 9 ("a processor, coupled to the image sensor"). A POSA would have understood that, to receive an image as an input, the engine comprises a processor coupled to the image sensor and the camera itself.

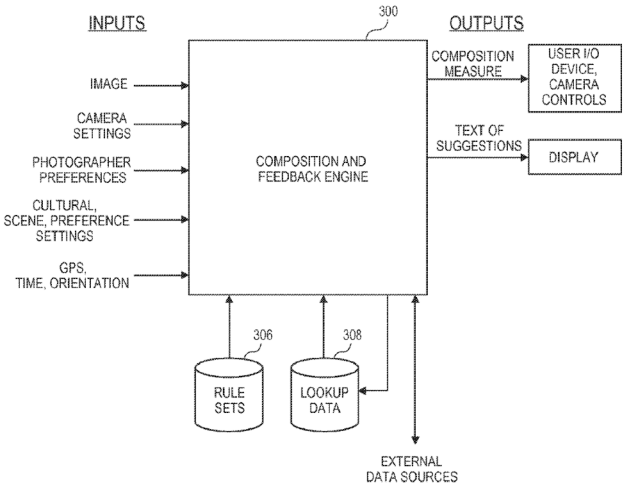



FIG. 3

Running the CFE, the processor performs calculations relating to image processing and evaluation and, based on an assortment of different metrics, makes suggestions to the camera use to improve image quality. For example, Anon discloses a method for estimating image quality by analyzing multiple image-based characteristics from a plurality of images, calculating a composition measure (informed by external and contextual data), and providing real-time feedback and suggestions to the user. EX1005, 2:9-14; 2:16-28; 2:33-38; 3:14-26. Among such suggestions is moving the camera to a different location, as discussed in detail in Section 1.a.iv below; EX1004, ¶¶62-63.

ii. *[1.a] "calculating from an image received by at least one sensor and lens, a quality indicator QI1 of a face or object, and calculating an aesthetic quality indicator QI2 that uses a background blurring test of said face or object, and calculating a total quality indicator that is based at least*

*partially on at least one of QI1 and QI2"*

Anon teaches that its processor, running the CFE, calculates from an image received by the camera lens and CCD image sensor, either before or the photograph is taken, various quality indicators—include the claimed quality indicator QI1 of a face or object and aesthetic quality indicator QI2—that are then combined to calculate an overall or total quality indicator, which Anon refers to as a "composition measure." EX1004, ¶¶64-74. As Anon explains, its "image capturing device includes an image sensing device, a processor, and a memory. Using this, the device can determine a plurality of image-based characteristics for a proposed image, compute a composition measure for the proposed image and the given settings that depends from at least two of the plurality of image-based characteristics of the proposed image, output an indication of the composition measure to a user." EX1005, Abstract. Because these parameters are determined by the processor running the CFE software, these parameters are calculated by the processor—processors, of course, perform calculations on data. EX1004, ¶67.

***Calculating from an image received by at least one sensor and lens.*** Anon's composition measure, and the image-based characteristics from which it is determined, are calculated from a digital image provided by Anon's lens and CCD sensor. EX1004, ¶64. As Anon explains, "light passing through lens 102 impinges on CCD 104 to form a digital, electronically readable image." EX1005, 5:54-56; *see*

*also* 3:54-55. Anon further explains that its CFE "[o]utputs a composition measure, which provides rating of the composition of an image that is a 'proposed' image not yet captured by the camera, but visible through the lens." EX1005, 6:42-45. Because the image is analyzed by the CFE, which in a main embodiment is software running on the processor, the image has been received by Anon's lens and image sensor as claimed.

***Calculating from an image received by at least one sensor and lens, a quality indicator QI1 of a face or object.*** Anon's composition measure is used by Anon's digital-camera user to make adjustments before taking the photograph based on suggestions provided by the camera. This composition measure is a "total quality indicator" as claimed, because it gives an overall rating (quality) of the image. Anon further discloses that many different quality indicators may be used to determine the composition measure (total quality indicator). Anon refers to its quality indicators as parameters or characteristics. As Anon explains, "the characteristics that are used to judge a properly composed image often depend upon the type of image that is sought to be captured. In other words, the characteristics that define what is 'a good image' are highly dependent upon the photographer's intent." EX1005, 8:15-19; *see also id*. 8:17-9:67; EX1004, ¶¶62, 64.

One parameter/characteristic that Anon's CFE calculates to determine the composition measure is a quality indicator of a face or object (the claimed QI1).

EX1004, ¶65. For example, using a photograph of a person standing in front of the Eiffel Tower as an example, Anon explains that "if a photographer is taking a picture of a person in front of an object, such as the Eiffel Tower, a 'good' shot is typically judged when the Eiffel Tower is positioned to not be directly behind the subject's head (so that it doesn't appear to be growing out of the subject), the subject is in focus, the subject's eyes are open, and the energy of the light, color, lines, and subject's position are in a middle range (so the image is not flat and boring or overwhelmingly detailed). In such embodiments, parameters from the camera may be used to make the judgment, such as the orientation of the camera, where the camera is focused-upon, where within the scene is a face recognized, and the like." EX1005, 8:19-31.

One such parameter/characteristic that Anon discloses in this Eiffel Tower example is "where within the scene is a face recognized." EX1005, 8:27-31. This parameter is a quality indicator QI1 of a face or object as claimed, because it is evaluating whether the face is in a suitable location in the image. EX1004, ¶65. As Anon explains, "if a photographer is taking a picture of a person in front of an object, such as the Eiffel Tower, a 'good' shot is typically judged when the Eiffel Tower is positioned to not be directly behind the subject's head (so that it doesn't appear to be growing out of the subject)." EX1005, 8:19-24.

***Calculating an aesthetic quality indicator QI2 that uses a background blurring test of said face or object.*** Another parameter/characteristic that Anon's camera calculates based on image data provided by the image sensor is "where the camera is focused-upon." EX1005, 8:27-31; *see also id.*, 2:10 (one input to CFE is "focus characteristic"). This parameter is an aesthetic quality indicator QI2 as claimed, because it evaluates whether the camera properly focused on the subject of the image, such that the photograph will be aesthetically pleasing to the eye. EX1004, ¶66. As Anon explains in the Eiffel Tower example, a good shot is when "the subject is in focus" and the subject's position is in "in a middle range (so the image is not flat and boring or overwhelmingly detailed)." EX1005, 8:21-27. Anon also discloses the use of cultural aesthetic indicators: "instead of attempting to provide a measure of some universal aesthetic, the engine can provide a measure of an aesthetic based on Japanese aesthetics, Chinese aesthetics, maritime aesthetics, mountaineering aesthetics, children aesthetics, urban aesthetics, etc." *Id*., 7:4-14.

While Anon discloses the use of edge analysis to determine whether an image is in focus (*id.*, 3:53-57), Anon does not specifically discuss the use of a background blurring test of the photograph's subject as part of its focus analysis. But this would have been obvious to a POSITA in view of Takeuchi. EX1004, ¶68. Takeuchi, like Anon, relates to an "image evaluation apparatus and camera which are capable of evaluating an image which is comprehensively good." EX1006, Abstract. And also

like Anon, Takeuchi teaches using a "total evaluation result" for an image using a weighted combination of different quality evaluation methods. *Id*., ¶[0269].

One quality evaluation method that Takeuchi uses is a blur/focus test, to determine how well the subject of the photograph is in focus. *See e.g.,* EX1006, ¶¶[0140]-[0145]; EX1004, ¶69. As part of the blur/focus test, Takeuchi teaches evaluating whether the background is focused: "The body side microcomputer 21 judges that an image has back focus if the portion which is in focus is distributed more towards the infinite distance side than the position of the main subject." EX1006, ¶[0143]; *see also* ¶[0291]. When the background is more in focus than the object itself, *i.e.*, the subject is blurred relative to the background, then no points are added to the overall quality determination. EX1004, ¶70. In other words, in Takeuchi a determination that the background is not blurred, i.e., is in focus, indicates a lower quality image. This is precisely in line with the '452 patent's teaching that background blur may be desirable in certain instances. EX1001, 14:1-2.

Given Anon's goal of ensuring that photographs taken with Anon's digital camera are of high quality and Anon's express concern that photographs be in focus, a POSITA would have naturally been motivated to incorporate Takeuchi's blur/focus test, including evaluation of background focus/blur, with Anon's focus analysis discussed above. Use of such a focus/blur test would help ensure that the

subject of the photograph is in focus (as opposed to the background), thereby increasing the overall quality of the photograph and making it pleasing to the eye. Use of Takeuchi's blur/focus test would have been nothing more than use of a known technique to improve similar devices in the same way and applying a known technique to a known device ready for improvement to yield predictable results. EX1004, ¶¶71-74.

***Calculating a total quality indicator that is based at least partially on at least one of QI1 and QI2.*** Anon teaches the calculation of a total quality indicator—Anon's composition measure—by Anon's CFE from various quality indicators, including the face and aesthetic quality indicators discussed above. As Anon explains, "these parameters may be input into a fuzzy logic set, or the like, and an evaluation, e.g. weighted, combination of parameters may be performed by the composition and feedback engine." EX1005, 8:32-35. Anon further explains that its camera "can determine a plurality of image-based characteristics for a proposed image [and] compute a composition measure for the proposed image and the given settings that depends from at least two of the plurality of image-based characteristics of the proposed image." *Id*., Abstract; *see also id.,* 1:59-2:48; EX1004, ¶64.

iii. [1.b] "*selecting based on the total quality indicator at least one appropriate suggestion from a pre-*

*stored table of suggestions;*"

Anon discloses that after determining a composition measure (total quality indicator) of a photograph, the CFE will provide suggestions to the user on how to improve the image. EX1004, ¶¶75-77. For example, Anon explains that after the CFE "compute[s] a composition measure for the proposed image," it "output[s] an indication of the composition measure to a user, in the form of simple indicators, more complex indicators/displays, and/or ***provide suggestions for altering at least one characteristic of the proposed image***." EX1005, Abstract; *see also id*., 1:59-2:4. To determine the suggestions that should be made based on compositional measures, Anon discloses the use of rule sets 306. These rule sets are data structures that contain user suggestions for improving photographs. As Anon explains, the CFE "can also take into account rule sets stored in rule set storage 306 and lookup data stored in lookup data storage 308. Examples of rules are used throughout this disclosure, and it should be understood that engine 300 operates on data structures that represent those rules, possibly in combination with lookup data 308 that may be relevant to a particular rule." *Id*., 7:15-21. Anon goes on to provide the following example: "a rule in rule set storage 306 might indicate that for landscape images of large bodies of water, adjust the camera settings so that a pleasing amount of light would come from the water relative to the sky, and another rule in ***rule set storage 306 might indicate that when standing close to a famous monument, suggest to***

***the photographer where good viewing locations are***, and the lookup data 308 might include data for some commonly widely photographed monuments." *Id*., 7:21-29 (emphasis added). Anon provides other examples as well: "a camera image type setting might be set to a 'portrait image' mode, an image capture device (or the engine itself) might identify the head and/or eyes of the subject to be photographed, the engine would then consider the image type setting, the current lens aperture, etc. and ***suggest movement or recomposition based on one or more rules from the rule set***." *Id*., 7:44-50 (emphasis added). In another example, "the engine might consider that the mode is set to 'landscape image' mode, the focal-length of the lens, and the horizon line of in the image itself ***and, based on one or more rules, suggest changes***." *Id*., 7:50-54 (emphasis added).

Anon does not specifically disclose that its rules are organized as "tables," but does disclose that its rules are organized in "data structures." *Id*., 7:15-21. Anon further discloses that its rules may operate in combination with look up data. *Id*. As Dr. Schonfeld explains, a POSITA would have understood and found obvious that a table, which is comprised of rows and columns, was a common and easily implemented data structure that facilitated efficient storage, retrieval (look up), and manipulation of data. Indeed, Garcia-Molina, a leading textbook on database design from 2009, confirms that the two-dimensional table is "the most important model of data." EX1016, 17; *see generally* EX1016, Chapter 2. Thus, it would have at least

been obvious to store Anon's rule sets in table form including in view of Takeuchi's complementary teachings as it would have been use of a known technique to improve similar devices in the same way and applying a known technique to a known device ready for improvement to yield predictable results. EX1004, ¶¶75-79.

iv. [1.c] "*suggesting to the user to move the device to different location; and*"

One of the numerous possible suggestions for improving a photograph taught by Anon is moving the camera to a different location. EX1004, ¶¶80-81. For example, Anon discloses that one possible suggestion from the rule set "might be to ***move*** or reorient the camera." EX1005, 7:64-8:13. As another example, "rule set storage 306 might indicate that when standing close to a famous monument, ***suggest to the photographer where good viewing locations are***, and the lookup data **308** might include data for some commonly widely photographed monuments." *Id*., 7:21-29. Similarly, "a camera image type setting might be set to a 'portrait image' mode, an image capture device (or the engine itself) might identify the head and/or eyes of the subject to be photographed, the engine would then consider the image type setting, the current lens aperture, etc. and ***suggest movement*** or recomposition based on one or more rules from the rule set." *Id*., 7:44-50. Anon also provides the example that "the camera may suggest where the faces are within the image, suggest that the user zoom-in or out from the subjects, suggest that the ***user shift left or right*** (e.g., via arrows), or the like." *Id*., 9:19-22; see also *id*., 3:32-34, 5:47-51, 7:25-27,

8:12-13, and 10:38-42; *see also id*., 2:9-14, 2:16-28, 2:33-38, 3:14-26, 7:44-50, and 9:29-34.

v. [1.d] "*presenting the suggestion to the user*."

Anon discloses multiple different ways that suggestions, including the suggestion to move to a different location, can be presented to the user. EX1004, ¶¶80-81. For example, Anon explains that "text (or possibly other formats) of suggestions [are] provided to a display to allow the photographer to make adjustments based on those suggestions prior to capturing an image." EX1005, 6:47-50. These suggestions "might be presented in a viewfinder display (not shown)." *Id*., 6:7-8. Anon discloses presenting suggestions using other formats besides texts. For example, Anon explains that "[i]n some variations, suggestions are provided to signal to the user changes that could improve the composition measure, including one or more of icons, arrows or indicators for some change, some indication that the image capturing device will automatically make the change, and/or some language indicator explaining suggestions to the user in a visual, audio and/or tactile display of the image capturing device. In some instances, the indication is presented by templates, or samples, wherein the user is provided with example images that have high composition measures, possibly also in context (*i.e.*, when the camera determines that the user is attempting a desert landscape image capture, present known good template images of desert landscapes)." *Id.*, 2:29-44.

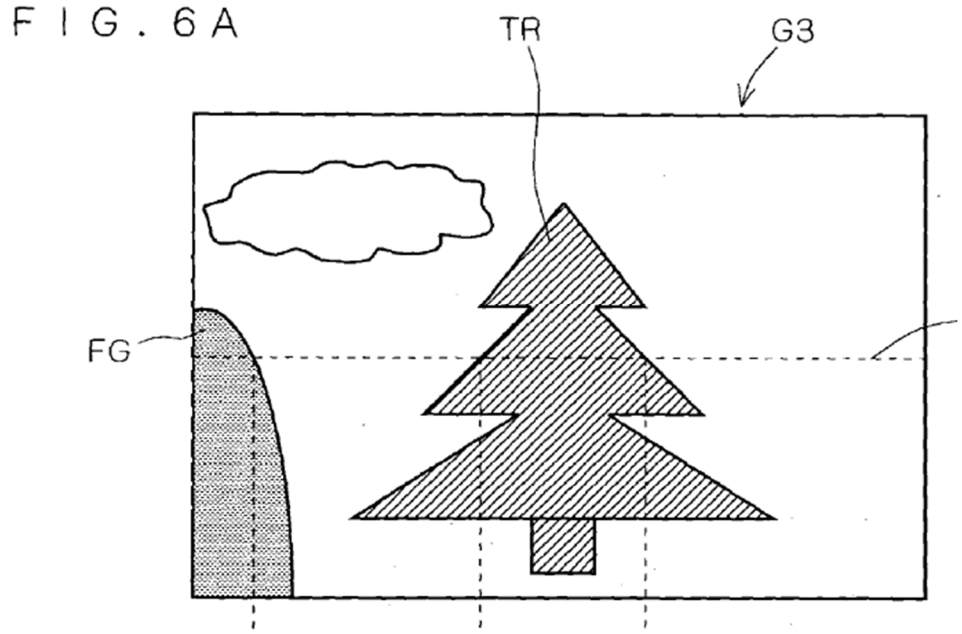
**b. Claim 2**

Claim 2 depends from claim 1 and further recites "wherein the background blurring test is based at least partially on data from at least one of, the sensor, lens, lens aperture or any combination thereof." Anon discloses using data from an image sensor to determine photographic characteristics including focus/blur. As Anon explains, "[t]he inputs that the engine has to work with can include image inputs, such as the values of the pixels currently being sensed by a charge-coupled diode array of the camera, higher-level aspects of the image being sensed (e.g., the lack of sharp edges that might indicate a lack of appropriate focus), as well as camera settings (F-stop, aperture, shutter speed, film speed, detectors, color optimizers, etc.)." EX1005, 3:53-59; *see also id*. 5:53-56; *see also* EX1004, ¶82. ※

**2. Ground I.B: Claim 3 is Obvious in View of Anon, Takeuchi, Garcia-Molina, and Kosaka**

Claim 3 depends from claim 1 and further recites "wherein the total quality indicator also comprises of testing the obstruction of at least one lens."

Anon does not discuss obtaining a value responsive to obstruction of at least one optical lens. Kosaka, however, discloses a digital camera system that is designed to detect whether a user's finger is unintentionally obstructing the lens before an image is captured. *See e.g.*, EX1007, Fig. 6A; EX1004, ¶85.




Kosaka's system operates by analyzing a series of live view images (or images for autofocus) in real time, prior to the actual image capture. The determination part of the camera examines changes over time in the position of low-brightness areas within these images. If a low-brightness area remains stationary while other areas shift due to camera shake or reframing, the system identifies this stationary area—especially if it is located at the periphery of the image—as a potential finger obstruction (*i.e.,* a lens obstruction). *See, e.g.*, EX1007, Figs. 4A-8 and ¶¶[0074], [0075]; EX1004, ¶¶86-87.

Kosaka further explains that the camera can notify the user of such an obstruction before the image is taken, allowing the user to correct the issue and avoid capturing an image with a finger or other object blocking the lens. In some embodiments, the system can even generate a corrected image by deleting the

obstructed area or prevent the image from being recorded if an obstruction is detected. *See* EX1007, Figs. 9-10, 23-25 and ¶[0089] ("Examples of the notifying operation are, concretely, indication of a note by characters of 'Note: finger is in' on the display 7 or a predetermined figure and output of sound of a note from a speaker or voice"). EX1004, ¶88.

According to Kosaka, the system analyzes the brightness (luminance) of pixels along a line or within an area of the image. A "low-brightness area" is defined as a region where the pixel value is lower than a predetermined threshold (referred to as "TH1" by Kosaka). For example, in the description of FIG. 4B, the system identifies areas where the brightness is below threshold TH1 as potential obstructions (such as a finger or a tree). EX1007, ¶[0069]; EX1004, ¶87.

As Dr. Schonfeld explains, A POSITA would have been motivated to use Kosaka's obstruction-detection functionality with Anon's camera. EX1004, ¶¶89-90. Anon and Kosaka are both concerned with improving the quality of captured images and automating the process of identifying and selecting "good" photographs. Kosaka teaches that finger obstruction is a significant and common cause of poor image quality, especially in small digital cameras. See EX1007, ¶¶[0006], [0007]. Anon's system is designed to identify images with technical or compositional flaws. Integrating a finger obstruction detection signal from Kosaka would allow Anon's system to recommend to users to correct this defect, improving the quality of images.

These approaches are complementary: Kosaka detects a specific, common image flaw, while Anon offers a flexible, extensible framework for integrating such inputs into a comprehensive quality assessment. Anon's system is designed to accept a variety of image-based characteristics as inputs to its quality/composition measure, including "higher-level aspects of the image being sensed" and "image-based characteristics". *See* EX1005, 2:9-15, 3:53-57. Kosaka's output—a determination of whether a finger is obstructing the image—fits naturally as a binary or weighted input to Anon's quality scoring engine. EX1004, ¶¶88-89.

As Dr. Schonfeld explains, use of Kosaka's finger-detection functionality would have been nothing more than use of known technique to improve similar devices in the same way, and applying a known technique to a known device ready for improvement to yield predictable results. A POSITA would have had a reasonable expectation of success in implementing this combination. Anon's system is designed to accept and combine multiple, diverse image-based inputs using weighted combinations, and Kosaka's output is simply another input to be weighted alongside other quality factors (focus, exposure, subject detection, etc.). The addition of Kosaka's finger obstruction detection would have been a straightforward extension of this approach using routine processing techniques, and would have been expected to yield predictable, desirable results (*i.e.*, making recommendations to a user how to improve an image). EX1004, ¶¶88-89.

### 3. Ground I.C: Claim 4 is Obvious in View of Anon, Takeuchi, Garcia-Molina, and Li

Claim 4 depends from claim 1 and recites "wherein at least one of a focus distance or lens aperture is used to determining a depth of field of the image, wherein the depth of field is computed, based on a movement of the device in the z axis, wherein the z axis is the direction to the object in a scene, may be included in the total quality indicator."

Anon explains that low-level characteristics may be input into the CFE in determining compositional measure: "In some cases, such as a purely abstract shot, many of the rules will have to be discarded or not considered and the engine can simply consider an overall measure of the energy (or visual intensity) of the proposed image based on ***low-level characteristics of the proposed image***." EX1005, 9:56-60 (emphasis added). Anon further identifies depth of field as an example of a "low level characteristic": "As a fall-back, of course, the camera can just default to optimizing ***low-level characteristics*** (e.g., light, focus, aperture, ***depth of field***, etc.) each separately when there is not enough information to work with." *Id*., 9:64-67 (emphasis added). EX1004, ¶93. Anon, however, does not discuss how depth of field is determined.

Li, however, provides a detailed discussion of how depth of field may be determined in a digital camera. EX1004, ¶¶94-95. In one embodiment, for example, Li discloses determining depth of field by capturing two images of an object at

different focus distances. The focus distances and the blur difference between photographs are then used to estimate the depth of field. For example, Li explains that:

> [o]ne embodiment of the invention is an apparatus for controlling automatic focus, comprising: (a) a computer processor configured for controlling an imaging device and associated focus control element; (b) memory coupled to the computer processor; (c) programming on the memory which is executable by the computer processor for carrying out autofocusing steps comprising: (c)(i) capturing object images, (c)(ii) estimating depth between captured image pairs, (c)(iii) determining the weighted mean of depth and variance across both present and previous collected image pairs for this image, (c)(iv) adjusting focus in response to the weighted mean of the depth, and (c)(v) repeating the above steps until the variance reaches a value indicating that sufficient confidence in proper focus has been attained.

EX1009, ¶[0026]. As Li further explains, changing the focus distance is achieved by moving the lens closer to or further from the subject of the photograph, *i.e.*, along the z axis: "When the subject is in focus, the captured image is the sharpest (has the highest contrast). It becomes blurrier (less contrast) as the lens moves away from the in-focus position. Generally, when two pictures are taken at two different focus distances, the one taken closer to the subject distance is sharper than the other. The focus distances at which the pictures are taken and the amount of the blur difference between these two pictures can be used to estimate the actual subject distance, or

depth." *Id*., ¶[0062]. Because the lens is part of the camera, moving the lens means the camera (the claimed device) is also moved. Claim 4 defines the direction towards the photograph subject to me the z axis.

As Dr. Schonfeld explains, given Anon's express disclosure of depth of field as a possible input to the CFE, but with no specific disclosure on how to calculate the depth of field, it would have been obvious to use Li's depth-of-field determination technique with Anon. A POSITA would have been motivated to use Li's technique with Anon, it use of Li's technique would have been nothing more than applying a known technique to a known device ready for improvement to yield predictable results. EX1004, ¶96.

#### 4. Ground I.D: Claims 5 and 10 Are Obvious in View of Anon, Takeuchi, Garcia-Molina, Bigioi, and Wakabayashi

##### a. Claim 5

Claim 5 depends from claim 1 and further recites "wherein a separate QI2 is calculated for each lens and a sensor module the device has, wherein QI2 of QI_total or both are based on at least two QI1 from 2 such lenses and sensor modules." The phrase "QI2 of QI_total or both" is unintelligible and renders claim 5 indefinite, as discussed in Ground II below.

If Patent Owner were to seek to amend claim 5 such as by changing "QI2 of QI_total or both" to "QI2 or QI_total or both," claim 5 would be obvious. EX1004, ¶¶99-104. Anon does not specifically disclose the use of more than one lens and

sensor module. Anon, however, does disclose that its camera may be used for 3D photography. EX1005, 3:2-10. Bigioi teaches the uses of two lenses/image sensors to create a 3D photographic image through the use of stereoscopic images. *See, e.g.*, EX1010, ¶¶[0016]-[0026]. As Dr. Schonfeld explains, a POSITA would understand that stereoscopic images are taken with two lenses/image sensors. EX1004, ¶100. For example, Wakabayashi discloses a stereoscopic image device that has two lenses and two sensors, one pair for left and one pair right: "as with the first imaging unit L, the second imaging unit R is provided with a shooting optical system including a second focus lens FLB, a second focus lens driving unit (hereinafter referred to as a second F lens driving unit) 104B for moving the second focus lens FLB in a direction of an optical axis, and a second imaging element 111B for receiving subject light obtained by forming an image of the subject in the second shooting optical system and creating an image signal representing that subject." EX1015 , ¶[0094]; EX1004, ¶101.

Bigioi explains how a 3D photograph is created using stereographic images. "In the present example embodiment at least two images at an optimal stereoscopic displacement are used. The stereo displacement depends on the distance to the face (which can be determined with sufficient accuracy from the face size) and for most realistic generation of a 3D stereoscopic portrait it is ideally or approximately equal to the separation of the eyes in a person. However. it may be desirable to capture at

a greater separation to emphasize the 3D portrait. It is also generally desirable to capture a plurality of stereoscopic pairs in case the subject is blinking, twitching, moving, blurred, being partially occluded or otherwise providing an unsatisfactory face in one image of a pair and not in the other." EX1010, ¶[0023]. The camera then "selects at least one 'good' stereo pair (i.e., images captured during periods when no warnings were made to user)" from which the 3D photograph is created. *Id*. ¶[0024]; see also *id*. ¶¶ [0024], [0028]- [0029]; EX1004, ¶100.

As Dr. Schonfeld explains, given Anon's disclosure of 3D photography, it would have been obvious to a POSITA to incorporate Bigioi's stereoscopic technique into Anon's camera in order to generate high quality 3D photographs. Use of Bigioi's stereoscopic technique would have been nothing more than use of known technique to improve similar devices in the same way, and applying a known technique to a known device ready for improvement to yield predictable results. EX1004, ¶102. To the extent Patent Owner argues that Bigioi does not disclose two lenses and two image sensors, use of two lens/sensor pairs would have further been obvious in view of Wakabayashi. Given that both Anon and Bigioi concern 3D images, use of Wakabayashi's left and right lens/sensor pairs designed for capturing images in 3D would have been use of known technique to improve similar devices in the same way, and applying a known technique to a known device ready for improvement to yield predictable results. EX1004, ¶103.

As Dr. Schonfeld also explains, because QI2 may be based on where the camera lens is focused-upon as described above with regard to claim 1, it would have been obvious to calculate QI2 for both lens/image sensor pairs and use both QI2's to in calculating the overall composition measure (QI_total) as taught by Anon. It would have also been obvious to calculate a separate value of QI1 for each lens/image sensor pair for the same reason, and to use those values of QI1 in calculating the corresponding QI_total. Indeed, Anon discloses that the inputs to the CFE are based on the digitally readable output of the image sensor. EX1005, 5:53-56; *see also* Figure 3 (showing individual image as an input into the CFE). Thus, when two separate image sensors are employed, it would have been obvious to determine quality indicators on a per-image basis, and this is how Anon's system is designed to work. EX1004, ¶104.

**b. Claim 10**

Claim 10 depends from claim 1 and further recites "further comprising building at least a partial reconstruction of a 3D scene according to the images from the camera module; wherein the suggestion is further based on the 3D scene reconstruction." Claim 10 is obvious in view of Bigioi. EX1004, ¶¶105-107.

Anon expressly discloses that its digital camera may be used for 3D photography: "what is explained about a photographer using a camera to capture a photograph can equally apply, unless otherwise indicated, to a videographer using a

video camera to capture a video sequence, ***or possibly also 3D photography*** and 3d videography." EX1005, 3:2-10 (emphasis added). Thus, Anon's CFE and the suggestions supplies apply to 3D photographs as well as 2D photographs.

Anon does not discuss the details of its 3D photography, but Bigioi provides such details, as described above with regard to claim 5, including re-creating aa scene with the 3D Bokeh effect, which is a high quality 3D image with background blur that gives the photograph a strong sense of depth and dimension. EX1004, ¶107. Bigioi explains, for example, that "the camera is caused to automatically capture and store a series of images while the user moves around a concave path centred on the face of one of the human subjects to be imaged," and further details that "the background blur may be refined by separating the facial images and foreground region of each image in the stereo pair from the respective background ... [t]he two background regions may then be initially aligned and disparity and depth map calculations may be used to more selectively determine near and far background regions. Both background regions may then be selectively un-aligned or selectively blurred or both, based on the determined pixel disparities and or depth maps to provide a more convincing 3D Bokeh effect." EX1010, ¶¶[0015], [0026]; see also *id*. ¶¶[0016]-[0029]. Bigioi thus teaches the creation of a 3D scene from two different images. A POSITA would have been motivated to combine Bigioi's and

Wakabayashi's 3D functionality with Anon for the same reasons described above with regard to claim 5. EX1004, ¶107.

### 5. Ground I.E: Claims 6 is Obvious in View of Anon, Takeuchi, Garcia-Molina, and Ramesh

Claim 6 depends from claim 2 and further recites "wherein a confidence level of a subject detection is calculated based on the object detection, and used in calculation of QI_total." Claim 6 is invalid as indefinite for the reasons described in Ground II below—there is no antecedent basis for "the object detection."

To the extent Patent Owner seeks to amend claim 6 to change "the object detection" to "the subject detection," claim 6 would be obvious. EX1004, ¶¶108-113. Anon discloses the detecting of a photographic subject. For example, Anon explains that inputs into the CFE may include "an indication of where in the image the subject is (e.g., find faces and draw a rectangle around the most prominent face in the image, find an object with a defined border that has a color distribution that is wildly different from the histogram of the rest of the image, as might be the case when photographing a red and yellow bird with a background of green and brown of the surrounding trees)." EX1005, 3:62-4:2. Anon further discloses that inputs to the CFE can be weighted when determining an overall composition measure: "In various embodiments, these parameters may be input into a fuzzy logic set, or the like, and an evaluation, e.g. weighted, combination of parameters may be performed

by the composition and feedback engine." *Id*., 8:32-35. Anon does not specifically discloses assigning a "confidence level" to an input to the CFE, but this would be obvious to a POSITA in view of Ramesh. EX1004, ¶¶108-113.

Ramesh describes a computer vision system for detecting and tracking multiple objects (*e.g.,* people in crowds) using a probabilistic framework. EX1008, Abstract; Fig. 1; ¶[0039]. Ramesh estimates the number of a people in a scene by using a "weighted sum of partial evidences." *Id*., ¶[0034]. An "object[']s location and attributes are updated using online uncertainty estimation 110," which is a confidence level. *Id*., ¶[0025]. Ramesh teaches that "less certain guesses" (*i.e.*, guesses with greater error) "are weighted less." *Id*., ¶[0030]. Ramesh's uncertainty estimations are confidence levels, because they are used to determine how much weight should be given to a particular piece of evidence, where a higher weight indicates greater confidence. EX1004, ¶112.

In Anon's real-time image evaluation system, the reliability of image characteristics can vary due to noise, ambiguous scenes, or changing conditions. EX1004, ¶113. Indeed, Anon teaches that "what characteristics are used to determine what is a 'good' image are very flexible and can be enhanced or changed completely over time." EX1005, 10:47-50. A POSITA would thus understand that Anon's composition engine is meant to modified and improved. Ramesh's probabilistic approach provides a principled way to quantify and propagate

uncertainty (error) in such situations. Associating a confidence interval with each weight would have allowed Anon's system to adaptively adjust the weight of each characteristic based on its reliability and combine output values from multiple sources in a statistically optimal way. The combination of Anon and Ramesh is thus the application of a known technique (weighting parameters with confidence levels, as disclosed by Ramesh) to a known device (Anon) ready for improvement to yield predictable results (an optimized composition engine). EX1004, ¶113.

### 6. Ground I.F: Claim 7 is Obvious in View of Anon, Takeuchi, Garcia-Molina, Ramesh, Bigioi, and Wakabayashi

Claim 7 depends from claim 6 and further recites "wherein a confidence level of a subject focus is calculated based on a correlation between each QI2, and the confidence level is used in computation of QI_total." Claim 7, however, is invalid for indefiniteness because there is no antecedent basis for "each QI2." Multiple QI2s do not appear in claim 6, or in claim 1 from which claim 6 depends. Claim 7 is also invalid as indefinite for the same reason claim 6 is indefinite.

To the extent Patent Owner argues that claim 7 was meant to depend from claim 5, that does not cure claim 7's invalidity. EX1004, ¶¶114-116. Should Patent Owner seek to amend claim 7 to change the dependency of claim 7 to claim 5 (and also amend claim 5 as discussed above with regard to claim 5), then claim 7 would be invalid as obvious. As discussed above in Ground I.D, claim 5 is obvious. Further, as discussed above with regard claim 6, the use of confidence levels with

Anon's quality metrics would have been obvious in view of Ramesh. It would also have been obvious to calculate the confidence level based on the correlation between both values of QI2. Anon expressly teaches that the estimation of one characteristic (*e.g.*, object detection, location, and characteristics such as focus) influences the determination of the weights attached to other characteristics. EX1005, 3:53-4:3. Given this express teaching of correlating different characteristics to determine weight, it would have been obvious to use the same type of correlation to determine confidence level in view of Ramesh. *Id*., ¶116.

### 7. Ground I.G: Claims 8 Is Obvious in View of is Obvious in View of Anon, Takeuchi, Garcia-Molina, Ramesh, Bigioi, Wakabayashi, and Kosaka

Claim 8 depends from claim 7 and further requires "wherein the total quality indicator also comprises of testing an obstruction of at least one lens." Claim 8 is invalid as indefinite, because it depends from claim 7, which is invalid as indefinite due to lack of antecedent basis as discussed in Ground I.E above and Ground II below. To the extent Patent Owner seeks to amend claim 7 (and claim 5), the additional limitation of claim 8 is obvious in view of Kosaka for the same reasons discussed for claim 3 of Ground I.B above. EX1004, ¶¶117-119.

### 8. Ground I.H: Claim 9 Is Obvious in View of Anon, Takeuchi, Garcia-Molina, and Liu

Claim 9 depends from claim 1 and further requires "wherein the analyzing of the captured image comprises applying multiple algorithms selected from a group

consisting of an aesthetic algorithm, an artificial neural network employing deep learning algorithm, a corner detection algorithm, a blur detecting algorithm, and Peak Signal-to-Noise Ratio (PSNR) calculation, and the method further comprising obtaining a respective third value (QI2i) associated with each of multiple algorithms, and calculating or estimating the second value (QI2) based on the multiple third values (QI2i) from the multiple algorithms."

As discussed above for Ground I.A, Anon teaches the calculation of different quality indicators referred to as parameters or characteristics, which Anon weighs together to determine an overall quality score referred to as a composition measures. For example, Anon discloses determining "a measure of an aesthetic based on Japanese aesthetics, Chinese aesthetics, maritime aesthetics, mountaineering aesthetics, children aesthetics, urban aesthetics, etc." EX1005, 7:4-14. Anon further explains that "there might be some cultures for which different colors have different meanings and some color combinations conflict, whereas in other cultures, the colors combinations are seen as harmonious. In such cases, the engine might send a signal or a message when the processing performed by the engine suggests that the colors seen in the potential photograph are too 'energetic' when it takes into account that there are also many lines in the image and takes into account a set of cultural-specific external inputs." EX1005, 7:7-14; *see also id*. 4:42-51. Thus, Anon discloses the use of an "aesthetic algorithm" as claimed to evaluate an image. Anon also discloses a

"blur detection algorithm" as claimed: "[t]he inputs that the engine has to work with can include image inputs, such as the values of the pixels currently being sensed by a charge-coupled diode array of the camera, ***higher-level aspects of the image being sensed (e.g., the lack of sharp edges that might indicate a lack of appropriate focus)***." *Id*., 3:35-57 (emphasis added). Further, as discussed above with regard to claim 1 in Ground 1.A, which is incorporated herein by reference, it would have been obvious to incorporate Takeuchi's background blur/focus algorithm into Anon's system for determination of QI2.

Anon, however, does not appear to discuss using the results of multiple algorithms to arrive at a single quality indicator as an input to the CFE. But that would have been obvious in view of Liu. EX1004, ¶¶120-125. Like Anon, Liu discloses a method for image quality assessment that involves the use of multiple algorithms, which Liu refers to as multi-method fusion, or MMF. Recognizing that any one quality assessment could be inaccurate, Liu proposes combining multiple quality measures into a single assessment to provide better accuracy. As Liu explains, "[a] new methodology for objective image quality assessment (IQA) with multi-method fusion (MMF) is presented in this paper. The research is motivated by the observation that there is no single method that can give the best performance in all situations. To achieve MMF, we adopt a regression approach. The new MMF score is set to be the nonlinear combination of scores from multiple methods with

suitable weights obtained by a training process." EX1011, 1793. As Dr. Schonfeld explains, it would have been obvious to a POSITA to incorporate Liu's MMF technique into Anon, in order to increase the accuracy of the inputs to Anon's composition measure, such as QI2. Use of Liu's MMF technique with Anon would have been nothing more than use of known technique to improve similar devices in the same way, and applying a known technique to a known device ready for improvement to yield predictable results. EX1004, ¶¶124-125.

### 9. Ground I.I: Claims 11 and 12, are Obvious in View of Anon, Takeuchi, Garcia-Molina, and Yang

Claims 11 depends from claim 1, and claim 12 depends from claim 2, and both claims contain the same additional requirement: "wherein the analyzing of at least one images for detecting or recognizing one or more objects uses algorithms of a deep learning." Anon teaches the use of an object detection algorithm, but does not disclose a specific algorithm for doing so: "Other inputs might include an indication of where in the image the subject is (e.g., find faces and draw a rectangle around the most prominent face in the image, find an object with a defined border that has a color distribution that is wildly different from the histogram of the rest of the image, as might be the case when photographing a red and yellow bird with a background of green and brown of the surrounding trees)." EX1005, 3:62-4:3. The use of a deep learning algorithm as claimed would have been obvious to a POSITA in view of Yang. EX1004, ¶¶126-130.

Yang teaches the use of convolutional neural networks, or CNNs, for detecting and recognizing faces: "In one aspect, a computer implemented method determines personal characteristics from images by generating a baseline gender model and an age estimation model using one or more convolutional neural networks (CNNs); capturing correspondences of faces by face tracking, and applying incremental learning to the CNNs and enforcing correspondence constraint such that CNN outputs are consistent and stable for one person." Yang further explains that its system "includes performing face detection and tracking; aligning the detected faces; normalizing the faces to a plurality of patches; and sending the normalized faces to the CNNs to estimate gender and age." EX1012, ¶¶[0006], [0007].

Yang further explains that a CNN is a form of a deep learning algorithm: "Convolutional neural networks are a class of deep learning approaches in which multiple stages of learned feature extractors are applied directly to the raw input images and the entire system can be trained end-to-end in a supervised manner." EX1012, ¶[0014]; see also EX1001, 10:13-15 (recognizing that neural networks use deep learning). Anon also discloses that neural networks, or deep learning, can be used in Anon's to train the CFE: "In various embodiments, the engine might execute a learning process based on a training set of pre-determined 'good' photographs. This training set might be determined by professional photographers and the process

distilled to a set of rules or the coding of a neural network or fuzzy logic set." EX1005, 8:44-48.

As Dr. Schonfeld explains, given Anon's express teaching of deep learning as well as the use of face detection algorithms, it would have been obvious to use a face-detection CNN as taught by Yang with Anon's system in order to improve Anon's face detection capabilities. Such a combination of Anon and Yang would be the application of a known technique (use of deep learning algorithms for image detection) to a known device (Anon) ready for improvement to yield predictable results (an optimized composition engine). EX1004, ¶¶128-130.

### B. Ground II: Claims 5, 6, 7, and 8 are Invalid for Indefiniteness Under §112

Claim 5 depends from claim 1 and contains the phrase "wherein ***QI2 of QI_total or both*** are based on at least two QI1 from 2 such lenses and sensor modules." Petitioner submits that Claim 5's use of the term "or both" renders this wherein clause unintelligible. EX1004, ¶132. Further, nothing in the specification or prosecution history provides any clarification. *Id.* Claim 5 is therefore indefinite because it fails to inform a POSITA of the scope of claim 5 with reasonable certainty in view of the specification and prosecution history. *Id.* Petitioner notes that claim 5 matches the claims submitted to the Patent Office by Patent Owner, and there is no typographical error on the part of the Patent Office. EX1002, 357.

Claim 6 depends from claim 2, which in turn depends from claim 1, and contains the clause "wherein a confidence level of a subject detection is calculated based on ***the object detection***, and used in calculation of QI_total." The term "the objection detection," however, contains no antecedent basis—it is not contained in claim 1, claim 2, or claim 6. "Subject" and "object" are different words with different meanings, and nothing in the specification or prosecution history provides any clarification. EX1004, ¶133. Claim 6 is therefore indefinite because it fails to inform a POSITA of the scope of claim 6 with reasonable certainty in view of the specification and prosecution history. *Id*. Petitioner notes that claim 6 matches the claim submitted to the Patent Office by Patent Owner, and there is no typographical error on the part of the Patent Office. EX1002, 357.

Claim 7 depends from claim 6 and is indefinite because claim 6 is indefinite. Additionally, claim 7 includes the clause "wherein a confidence level of a subject focus is calculated based on a ***correlation between each QI2***, and the confidence level is used in computation of QI_total." But there is no antecedent basis for "each QI2." Further, nothing in the specification or prosecution history provides any clarification. EX1004, ¶134. Claim 7 is therefore indefinite because it fails to inform a POSITA of the scope of claim 7 with reasonable certainty in view of the specification and prosecution history. *Id*. Petitioner notes that claim 7 matches the

claims submitted to the Patent Office by Patent Owner, and there is no typographical error on the part of the Patent Office. EX1002, 357.

Claim 8 depends from claim 7, and is invalid as indefinite for the same reasons claim 7 is indefinite.

### C. Ground III: Claim 4 Lacks Written Description

Claim 4 is also invalid for failure to satisfy the written description requirement. Claim 4 depends from claim 1 and requires "wherein at least one of a focus distance or lens aperture is used to determining a depth of field of the image, wherein the depth of field is computed, based on a movement of the device in the z axis, wherein the z axis is the direction to the object in a scene, may be included in the total quality indicator." The '452 specification, however, contains no disclosure of computing depth of field based on movement of the device in the z-axis, and there is no indication in '452 specification that the inventors had possession of claim 4. EX1004, ¶133. Claim 4 is therefore invalid for lack of written description. *See, e.g.*, *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (written description requirement not satisfied where possession of full scope of claimed invention not demonstrated by patent specification).

### D. Ground IV: The Challenged Claims Are Invalid for Failure to Claim Patentable Subject Matter under § 101

The Challenged Claims are invalid under the two-step framework in *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208 (2014) for determining patent eligibility

under 35 U.S.C. § 101. Under the *Alice* framework, it must first be determined whether a claim is directed to an abstract idea. *Id.* at 217, 221. Second, if the claim is directed to an abstract idea, it must be determined whether the claim includes an "inventive concept," that is, some additional element or combination of elements "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself." *Id.* at 217-18. If the claim lacks an inventive concept "sufficient to 'transform' the claimed abstract idea into a patent-eligible application," it is invalid under § 101. *Id.* at 221.

### 1. *Alice* Step One

The Challenged Claims are directed to a patent-ineligible concept—namely, the abstract idea of assessing picture quality and suggesting that the photographer take another picture from a different location. EX1004, ¶¶137-143. The MPEP lists three "groupings of abstract ideas," one of which is "[m]ental processes - concepts performed in the human mind (including an observation, evaluation, judgment, opinion)." MPEP 2106.04(a). If a claim falls within this grouping, "it is reasonable to conclude that the claim recites an abstract idea." *Id.* Here, the Challenged Claims are directed to a process that photographers conduct in their minds—assessing a picture's quality and then taking a new picture to try to get a better picture—which places them squarely within the MPEP's "mental processes" group and renders them abstract under Federal Circuit case law holding that "methods which can be

performed mentally, or which are the equivalent of human mental work, are unpatentable abstract ideas—the 'basic tools of scientific and technological work' that are open to all." *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1371 (Fed. Cir. 2011) (quoting *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)); *PersonalWeb Techs. LLC v. Google LLC*, 8 F.4th 1310, 1316 (Fed. Cir. 2021) (functions that are "mental processes that 'can be performed in the human mind'" are "a telltale sign of abstraction").

To determine what the claims are directed to for purposes of step one, the Federal Circuit instructs to examine "what the patent asserts to be the focus of the claimed advance over the prior art," focusing on the claims as viewed in light of the specification. *Yu v. Apple*, 1 F.4th 1040, 1043 (Fed. Cir. 2021); *see also Broadband iTV, Inc. v. Amazon.com*, Inc., 113 F.4th 1359, 1367 (Fed. Cir. 2024), cert. denied, 145 S. Ct. 1924 (2025) ("The step one inquiry often turns to the question of what the patent asserts as the claimed advance over the prior art."); *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 768 n.2 (Fed. Cir. 2019) ("At step one, we look to what the specification describes as the invention only to help understand the focus of the claims.").

According to the '452 patent's specification, the purported invention seeks to solve the problem of cameras that "still rely on the camera user to assess a picture's quality, either at the time of taking the picture, or at a later stage." EX1001, 1:37-40.

It explains that at the time of the purported invention, to get a better picture, "[m]any users simply take more than one picture, say 5-6 pictures, so they will be able to choose a good one." *Id.*, 1:41-43. The specification describes an alleged solution that "utilize[s] camera hardware . . . to evaluate pictures taken in real time, and actively assist in obtaining the best picture given the circumstances at hand." *Id.*, 2:24-28. For example, by "provid[ing] detailed suggestions on how to take a better picture, if possible." *Id.*, 3:27-32. One such suggestion may be for the photographer "to move from his current location to another location." *Id.*, 16:8-9. In other words, the patentee sought to address the purported problem identified in the '452 patent of taking a low-quality picture by assessing that picture and suggesting that the photographer move to a different location to take an improved picture.

The '452 patent's claims are similar to claims that the Federal Circuit has previously found to be directed to unpatentable abstract ideas. For example, with respect to assessing picture quality, in *Longitude Licensing Ltd. v. Google LLC*, the Federal Circuit found claims directed to "improving image quality by adjusting various aspects of an image based on features of the main object in the image" were "an approach previously undertaken by humans" and unpatentably abstract. No. 2024-1202, 2025 WL 1249136, at *2 (Fed. Cir. Apr. 30, 2025). Similarly, in *Yu v. Apple Inc.*, the Federal Circuit found claims directed to "taking two pictures

(which may be at different exposures) and using one picture to enhance the other in some way" were unpatentably abstract.1 F.4th at 1043.

The Federal Circuit has also routinely found that claims directed to analyzing information and providing recommendations to the user, like the claims of the '452 patent, to be directed to abstract ideas. For example, in *Broadband iTV, Inc. v. Amazon.com*, *Inc.*, the Federal Circuit found claims directed to "collecting and using viewing history data to recommend categories of video content" were unpatentably abstract. 113 F.4th at 1371. Likewise, in *USC IP P'ship, L.P. v. Meta Platforms, Inc.*, the Federal Circuit found claims directed to "a method for determining the intent of a visitor to a webpage and using that intent to select and recommend webpages to the visitor" were unpatentably abstract. No. 2022-1397, 2023 WL 5606977, at *2 (Fed. Cir. Aug. 30, 2023).

Further, the '452 patent implements the abstract idea of assessing picture quality to suggest taking a new picture from a different location by relying on purely conventional camera components—an "optical lens," an "image sensor," and a "processor." EX1001, Cl. 1. The specification confirms that these are conventional components. *Id.*, 6:31-33 ("Any suitable input device, such as but not limited to a sensor, may be used …"); *id.,* 6:36-37 ("Any suitable processor may be employed to compute or generate information as described herein …"). This further shows that the claims are abstract. *See Yu*, 1 F.4th at 1043 (claims in which only "conventional

camera components are recited to effectuate the resulting 'enhanced' image" were abstract).

Further, as claimed, these conventional components perform their basic functions, for example, "calculating from an image received by at least one sensor and lens . . . a quality indicator," an "aesthetic quality indicator," and a "total quality indicator," "selecting . . . at least one appropriate suggestion from a pre-stored table," "suggesting to the user to move the device to different location," and "presenting the suggestion to the user," and are set forth at a high degree of generality. *See* Yu, 1 F.4th at 1043 (claims to "conventional components" that "perform only their basic functions" were abstract). The step of "calculating" generic "quality indicator[s]" does not change the abstract nature of the claims. *See In re Bd. of Trs. of Leland Stanford Junior Univ.*, 991 F.3d 1245, 1250 (Fed. Cir. 2021) ("These generic steps of ***implementing and processing calculations*** with a regular computer do not change the character of claim 1 from an abstract idea into a practical application." (emphasis added)). Nor does using "a pre-stored table." *See Braemar Mfg., LLC v. ScottCare Corp.*, 816 F. App'x 465, 470 (Fed. Cir. 2020) (method claims that operate "based on a simple lookup table" and "require only basic data processing" are abstract). As in *Yu*, "[w]hat is claimed is simply a generic environment in which to carry out the abstract idea." *Id.* at 1043-44 (citing *In re TLI Commc'ns LLC Pat. Litig.*, 823 F.3d 607, 611 (Fed Cir. 2016) ("The recited physical components merely

provide a generic environment in which to carry out the abstract idea of classifying and storing digital images in an organized manner.")).

The dependent claims simply recite additional generic limitations regarding the "quality indicator[s]," the "suggestions," or generic "algorithms." Claim 2 recites that the "background blurring test" used to determine the "aesthetic quality indicator" is based on generic "data" from the "sensor, lens, or lens aperture." Claims 3 and 8 recite that the "total quality indicator" simply include whether the lens has an "obstruction," which the specification explains "may occur as a result of putting the finger partly or fully on the lens." EX1001, 14:56–58. Claim 4 recites "determining a depth of field," which the specification admits is one known "photographic parameter[]" among a non-limiting list of ten known photographic parameters that characterize or are generated by a known "[l]ens/sensor module 200 such as OmniVision OM886," *id.*, 7:46–64, and includes such determination in the "total quality indicator." Claim 5 recites additional quality indicators based on the use of two lenses; but two-lens cameras were well-known in the art (*e.g.*, Wakabayashi), and such narrowing does not change the claim's focus. *See BSG Tech*, 899 F.3d at 1287 n.1 (holding dependent claims were abstract that "require the user to add certain types of information to the database or require providing the user with a classification system to post data" because "although these claims cover a

narrower range of data input than claim 1,the claims' focus remains on the abstract idea of considering historical usage information while inputting data")

Claims 6 and 7 recite calculating a generic "confidence level of a subject detection" or "confidence level of a subject focus" to determine the generic quality indicator, without any specifics about how to calculate that confidence level. Similarly, claim 9 recites using generic "algorithms" to calculate the quality indicator and claims 10 and 11 utilize generic "algorithms" for "analyzing" the image. Such generic "calculations" do not change the abstract nature of the claims. *See Leland Stanford Junior Univ.*, 991 F.3d at 1250. Finally, claim 10 recites the generic step of "building at least a partial reconstruction of a 3D scene" to provide the claimed "suggestion," with no information about how to accomplish that reconstruction, rendering it a "results-oriented abstract idea." *Broadband iTV*, 113 F.4th at 1368.

In all instances, each claim's focus remains directed to the same abstract idea of assessing the quality of a picture and suggesting where to take a new picture based on that assessment without specifically describing how that result is achieved, rendering them all abstract. *Longitude*, 2025 WL 1249136, at *5 (addressing dependent claims and similar claims of related patents and holding "that each claim actually is directed to ***the same abstract idea*** of using data to identify an image's

subject and modifying image data based on that subject" (emphasis added)); *see also BSG Tech*, 899 F.3d at 1287 n.1. EX1004, ¶¶137-143.

### 2. *Alice* Step Two

The question at *Alice* step two is "whether the claims include 'an element or combination of elements' that transforms the claims into something 'significantly more' than a claim on the patent-ineligible concept itself." *Broadband iTV*, 113 F.4th at 1370 (quoting *Alice*, 573 U.S. at 217-18. Neither "[t]he patent-ineligible concept itself" nor "claim elements or combinations of claim elements that are routine, conventional or well-understood" can "transform the invention into something significantly more than that concept." *Broadband iTV*, 113 F.4th at 1370 (quoting *BSG Tech LLC v. Buyseasons, Inc*., 899 F.3d 1281, 1290-91. If the specification "'describes the components and features listed in the claims generically,' it 'supports the conclusion that these components and features are conventional.'" *Broadband iTV*, 113 F.4th at 1370 (quoting *Weisner v. Google LLC*, 51 F.4th 1073, 1083-84 (Fed. Cir. 2022)).

The '452 patent claims lack an inventive concept. EX1004, ¶¶144-147. As discussed above, they recite only conventional camera components, such as an "optical lens," an "image sensor," and a "processor," which are "merely a conduit for the abstract idea." *In re TLI*, 823 F.3d at 612. That these components are known and conventional is further demonstrated by their disclosure in the prior art, as

described above. *See supra* Section V (Overview of the Prior Art). For example, as described above, Anon describes that a digital camera with an optical lens 102, an image sensor 104, and a processor 106, were known in the prior art. *Supra* VI.A.1.i.

These routine and conventional components perform the claimed steps of "calculating," "selecting" "suggesting" and "presenting." These are the generic steps of assessing the picture quality and presenting a suggestion to the photographer, which are "nothing more than the abstract idea itself." *Broadband iTV*, 113 F.4th at 1370. Further, the specification confirms that these are the generic functions of a generic processor. *See* EX1001, 5:64-6:13 (describing that terms such as "processing," "selecting," "calculating," and "producing" "or the like, refer to the action and/or processes of a computer or computer system, or processor or similar electronic device"). Thus, the claims fail at step two because they are "recited at a high level of generality and merely invokes well-understood, routine, conventional components to apply the abstract idea." *Yu*, 1 F.4th at 1045; EX1004, ¶¶144-148.

The claims' recitation of generic "quality indicators" do not supply an inventive concept. EX1004, ¶146. The specification expressly describes that "quality indicators," including a "total quality indicator," are known in the "[p]rior art," EX1001, 2:47-50, making them an existing technology that cannot supply an inventive concept. *See Mobile Acuity Ltd. v. Blippar Ltd.*, 110 F.4th 1280, 1294 (Fed. Cir. 2024) (no inventive concept based on the use of "interest points" where

"[m]ethods of mapping interest points to compare images ***is expressly described in the specification as existing in the prior art***" (emphasis added)); *Weisner v. Google LLC*, 51 F.4th 1073, 1083 (Fed. Cir. 2022) (explaining it is appropriate to "rel[y] on statements in the specification . . . to conclude that the claims rely on the use of existing technology") (internal quotation marks omitted).

The dependent claims also do not recite any inventive concept. EX1004, ¶147. As discussed above, they simply recite additional limitations regarding the "quality indicator[s]," the "suggestions," or additional generic "algorithms." The "quality indicators" are admittedly known in the prior art, and also conventional and known in the prior art, as described above in Anon, (*supra* VI.A.1.ii), Kosaka (*supra* VI.A.2), Li (*supra* VI.A.3), Bigoi, and Wakabayashi (*supra* VI.A.4.a, VI.A.7), and Ramesh (VI.A.5, VI.A.6). The claimed "algorithms" are generically claimed as an "aesthetic algorithm," "a corner detection algorithm," "a blur detecting algorithm," and "algorithms of deep learning." *See* EX1001, Cls. 9, 11-12. They are also described in the prior art and known and conventional as described above in Liu (*supra* VI.A.8) and Yang (VI.A.9).

Claim 10's recitation of "a partial reconstruction of a 3D scene" does not say *how* to do that and thus also cannot supply an inventive concept. *See Broadband iTV*, 113 F.4th at 1372 (dependent method claim lacks inventive concept where it "does not include any requirements for *how* the desired result is achieved"). EX1004,

¶147. Such "narrowing does not supply an inventive concept" and does not make the '452 dependent claims eligible for patenting. *BSG Tech*, 899 F.3d at 1291. It is also a known function described in the prior art, as described *supra* VI.A.4b. In sum, there is nothing recited in any of the claims that transforms them into something "significantly more" than a claim on the patent-ineligible concept itself. *Alice*, 573 U.S. at 217-18.

## VII. SECONDARY CONSIDERATIONS

Petitioner is unaware of any evidence of alleged secondary indicia that would support non-obviousness of the '452 Patent. To the extent Patent Owner subsequently presents such evidence, Petitioner respectfully requests the right to respond. EX1004, ¶148.

## VIII. MANDATORY NOTICES

As set forth below and pursuant to 37 C.F.R. § 42.8(a)(1), the following mandatory notices are provided as part of this Petition.

### A. Time for Filing (37 C.F.R. § 42.202)

The '452 Patent issued on March 11, 2025. This Petition is being filed by the nine-month deadline of December 11, 2025.

### B. Real Party in Interest Under 37 C.F.R. § 42.8(b)(1)

Petitioner identifies the following as the real parties-in-interest: Samsung Electronics Co., Ltd., Samsung Electronics America, Inc.

### C. Related Matters

*SnapAid, Ltd. v. Samsung Electronics Co., Ltd. et al*., No. 2-25-cv-00378 (E.D. Tex.) (alleging infringement of the '452 Patent) ("E.D. Texas Litigation").

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

Pursuant to 37 C.F.R. § 42.8(b)(3), Petitioner provides the following designation of counsel:

| **Lead Counsel** | **Back-Up Counsel** |
|---|---|
| Robert A. Appleby (Reg. No. 40,897)<br>Kirkland & Ellis LLP<br>601 Lexington Avenue<br>New York, NY 10022<br>Telephone: 212.446.4800<br>Facsimile: 212.446.4900 | W. Todd Baker (Reg. No. 45,265)<br>Kirkland & Ellis LLP<br>1301 Pennsylvania Avenue, N.W.<br>Washington, D.C. 20004<br>Telephone: 202.389.3135<br>Facsimile: 202.389.5200 |

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

Petitioner concurrently submits a Power of Attorney, 37 C.F.R. § 42.10(b), and consents to electronic service by email at Samsung-IPR-SnapAid@kirkland.com.

## IX. PAYMENT OF FEES UNDER 37 C.F.R. § 42.203

The undersigned authorizes the Office to charge the fees set forth in 37 C.F.R. § 42.15(b) for this Petition to Deposit Account No. 506092, consistent with the requested review of 12 claims, and any additional fees that may be due in connection with this Petition to be charged to the above-referenced deposit account.

## X. GROUNDS FOR STANDING UNDER 37 C.F.R. § 42.204(A)

Petitioner certifies pursuant to 37 C.F.R. § 42.204(a) that the '452 Patent is available for post-grant review and that Petitioner is not barred or estopped from requesting an PGR of the Challenged Claims on the grounds identified herein.

## XI. CONCLUSION

Petitioner requests institution of PGR and cancellation of the Challenged Claims.

Dated: September 8, 2025

Respectfully submitted,

*/s/ Robert A. Appleby*

**Robert A. Appleby**
**Counsel For Petitioner**
**Reg. No. 40,897**

## CERTIFICATE OF COMPLIANCE

This Petition complies with the type-volume limitations as mandated in 37 C.F.R. § 42.24, totaling 13,618 words. Counsel has relied upon the word count feature provided by Microsoft Word.

/*Robert A. Appleby*/
Robert A. Appleby (Reg. No. 40,897)

## CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing document with accompanying exhibits was served on September 8, 2025, via overnight delivery directed to Patent Owners, SnapAid, Ltd., at the following address:

May Patents Ltd.
c/o Dorit Shem-Tov (131926)
P.O.B. 7230
Ramat-Gan 5217102
Israel

A copy was also served via electronic mail on the attorneys of record listed below for the following related matters:

*SnapAid, Ltd. v. Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc. (Case 2:25-cv-00378-RWS-RSP, E.D. Tex)*

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