



US 20050270381A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0270381 A1**
(43) **Pub. Date:** **Dec. 8, 2005**

(54) **SYSTEM AND METHOD FOR IMPROVING
IMAGE CAPTURE ABILITY**

Publication Classification

(76) Inventors: **James Owens**, Fort Collins, CO (US);
James S. Voss, Fort Collins, CO (US)

(51) **Int. Cl.⁷** **H04N 5/228**

(52) **U.S. Cl.** **348/222.1**

Correspondence Address:

**HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY
ADMINISTRATION
FORT COLLINS, CO 80527-2400 (US)**

(57)

ABSTRACT

In one embodiment, there is shown a method for improving image capturing ability, such that contemporaneously with the initial capture of an image, metadata contained within the captured image is analyzed to determine which, if any, image capture parameters are in need of adjustment. The images are stored when the metadata contained therein does not yield image capture parameters in need of adjustment.

(21) Appl. No.: **10/861,804**

(22) Filed: **Jun. 4, 2004**

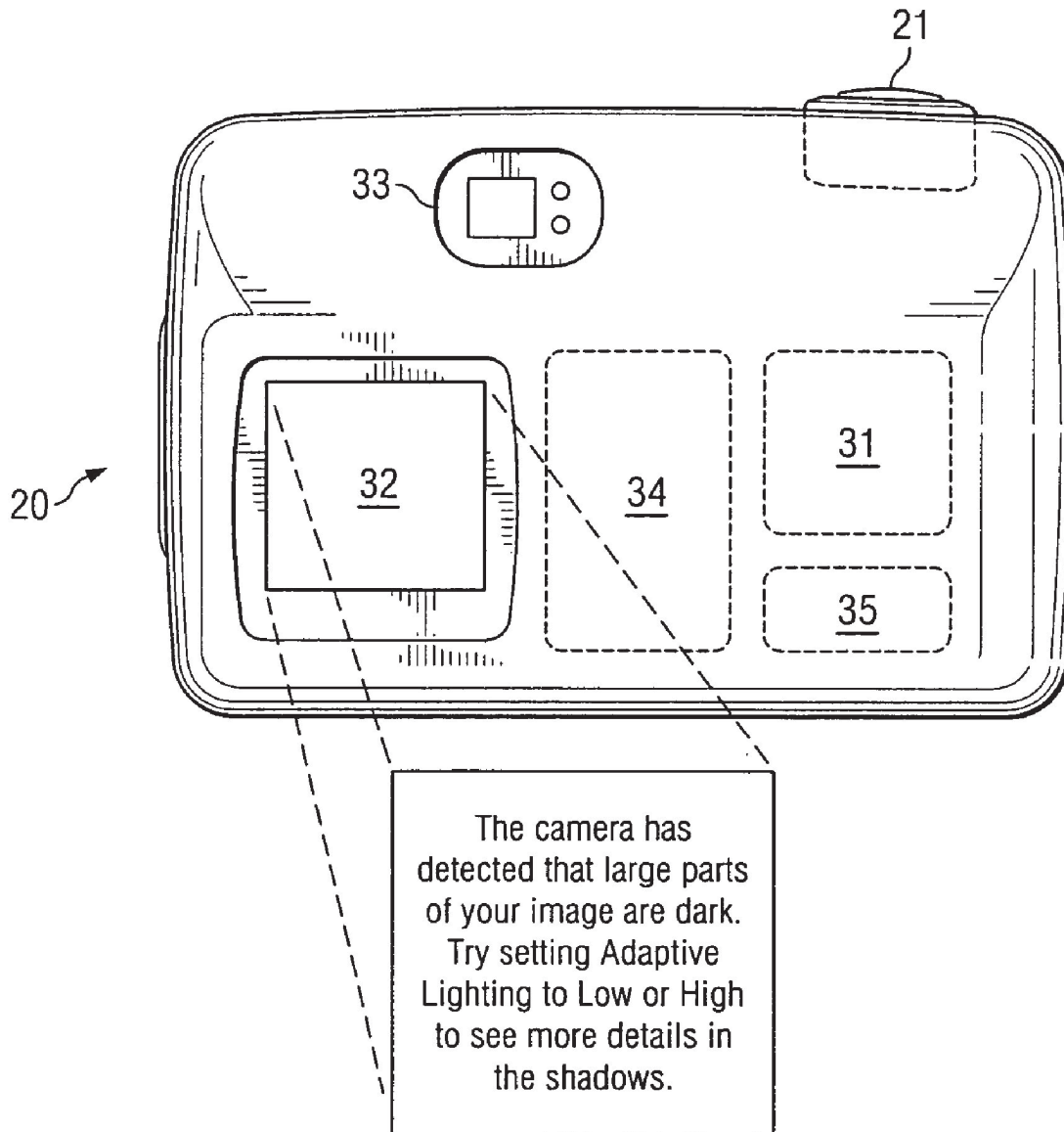


FIG. 1

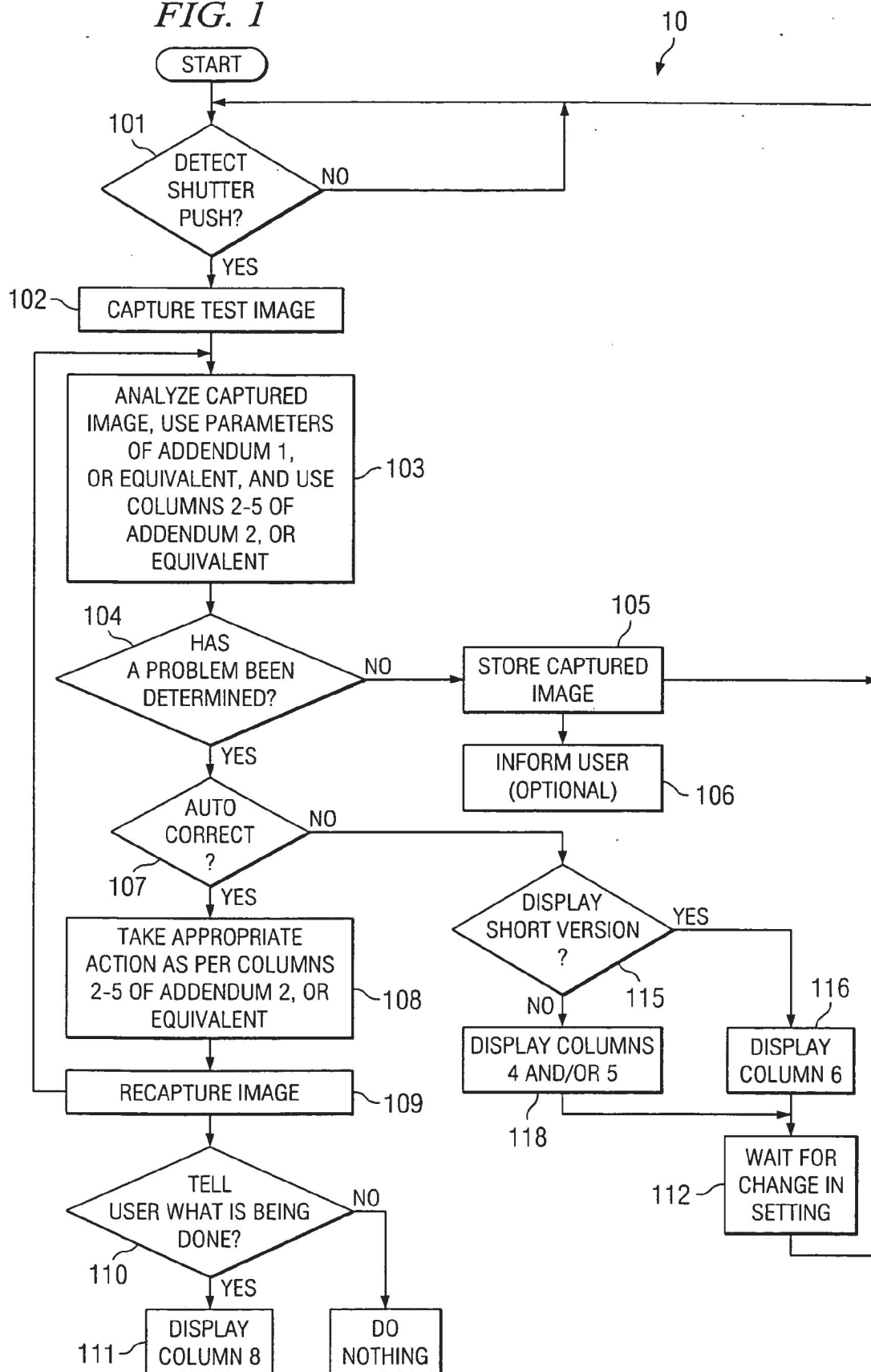


FIG. 2

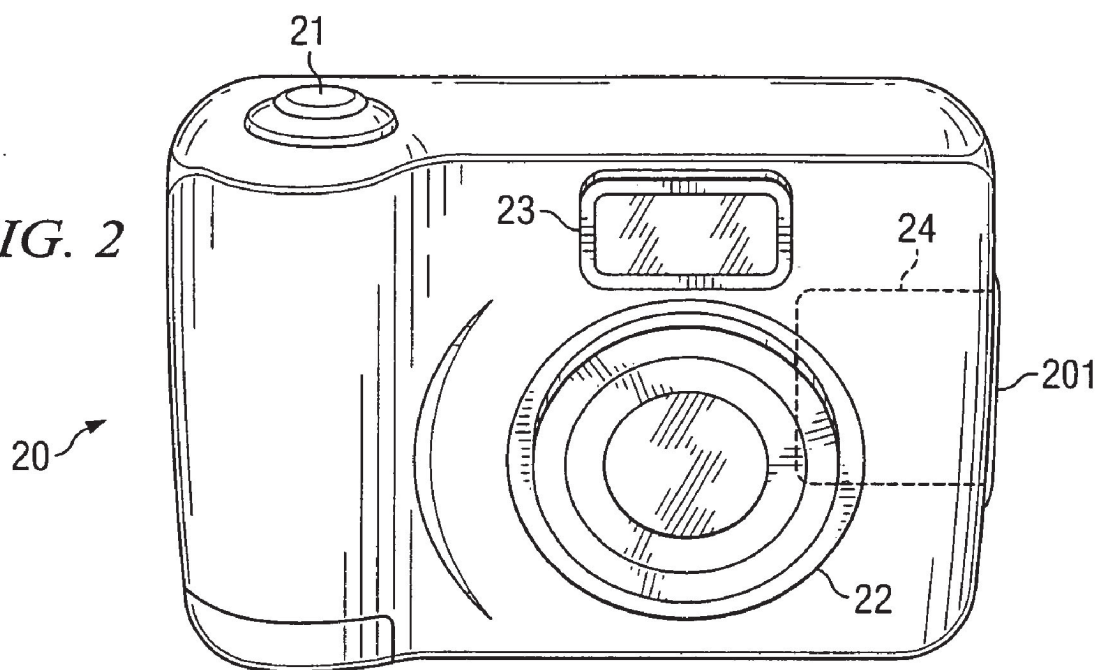


FIG. 3

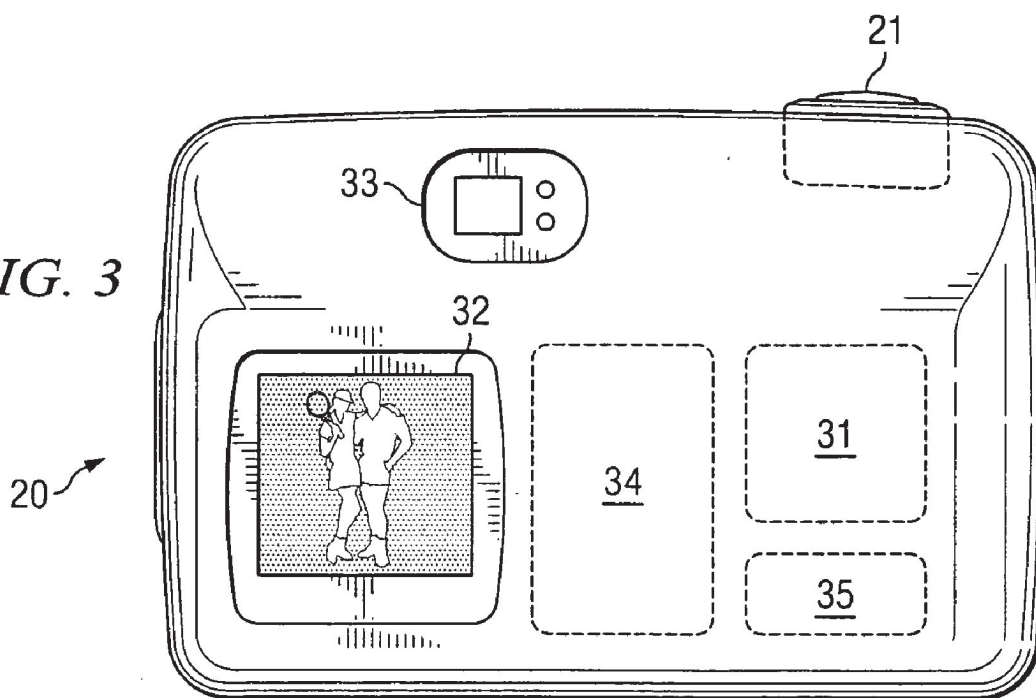
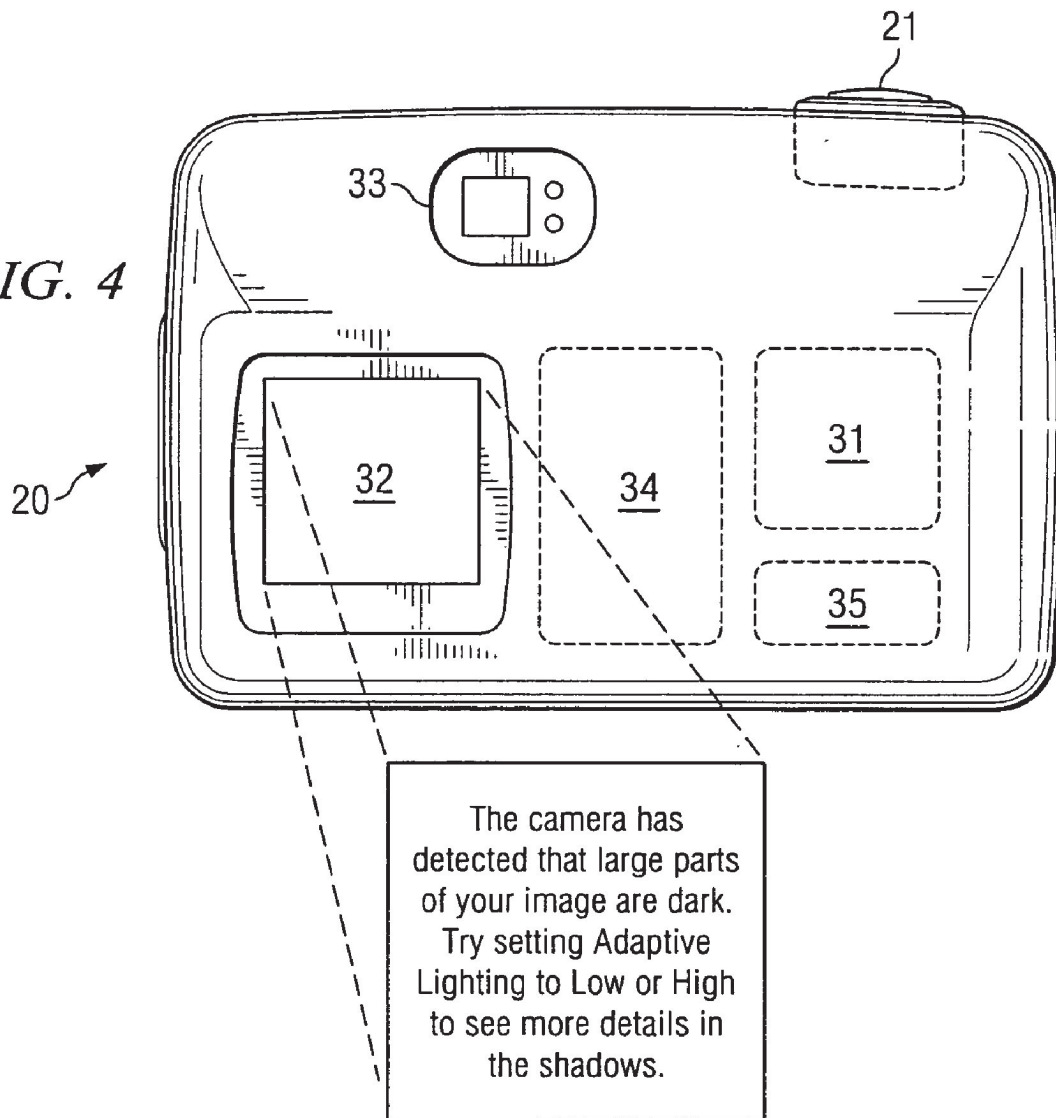


FIG. 4



SYSTEM AND METHOD FOR IMPROVING IMAGE CAPTURE ABILITY

FIELD OF THE INVENTION

[0001] This invention relates generally to image capturing and more particularly to systems and methods improving the users image capture ability by analyzing metadata associated with the digital images during the image capturing process.

BACKGROUND OF THE INVENTION

[0002] Digital image capture devices, such as a digital camera, allow a user a great deal of flexibility in their use. This flexibility arises during the image capture process and extends through all aspects of image viewing and image storing. One feature now often taken advantage of during image capture is the ability of the user to instantly review the captured, or about to be captured, image. This review then allows the user (or in some situations, allows the image capture device without human intervention) to adjust the image capture parameters before storing an image.

[0003] When an image is captured by a digital image capture device, metadata is often retained within the image. This metadata can comprise a very rich information source and may be associated with the capture device, the capture image, and can include image capture device settings and measurements. In general, metadata is any data associated with a file other than the data normally visible to the user of that file. Many modern digital cameras utilize the "Exchangeable image file (Exif) format for digital still cameras: as shown in Exif version 2.2 published by the Standard of Japan Electronics and Information Technology Industries Association, which publication is hereby incorporated by reference herein. Exif version 2.2 allows for the association of a rich metadata, herein referred to as image capture parameters, with each image.

[0004] The user may employ a software application to access the metadata for additional uses. For example, the metadata may contain global positioning system (GPS) information, and a user may then organize the images, store the images, or search the images using this GPS information. Further, if the user detects problems with captured images, or wishes to make image enhancements, the user may reference the metadata contained within the image to make corrections in the images. The time stamp metadata could be used, for example, to find an image (or set of images) captured on a certain date. As discussed above, this metadata is often stored in a standard format called Exif 2.2, as shown in Addendum 1.

BRIEF SUMMARY

[0005] In one embodiment, there is shown a method for improving image capturing ability, such that contemporaneously with the initial capture of an image, metadata contained within the captured image is analyzed to determine which, if any, image capture parameters are in need of adjustment. The images are stored when the metadata contained therein does not yield image capture parameters in need of adjustment.

[0006] According to another embodiment, there is shown a system for providing image improvement assistance for images having associated therewith metadata pertaining to

certain image capture parameters. The system comprises analyzation capability for examining the metadata associated with an image that is in the process of being stored, and reporting image improvement assistance for an image to a user based upon the analyzation of the metadata associated with that image.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 shows a flow chart of one embodiment of a process for controlling image capture;

[0008] FIGS. 2 and 3 show an embodiment of an image capture device; and

[0009] FIG. 4 shows one embodiment of a display message.

DETAILED DESCRIPTION

[0010] Turning now to FIG. 1, there is shown flow chart 10 of one embodiment of a process for providing image analyzation while the image is being captured and initially stored. Process 101 detects a shutter push and in conjunction with process 102 captures an image. This image will have associated with it metadata pertaining to any number of parameters, as detailed in the above-referenced Exif 2.2 specification, as shown in Addendum 1 hereof. Addendum 1 is but one example of the types of metadata that are available, and many other types of data could be established. If desired, the particular parameters that are analyzed can be selected by users.

[0011] Some of the parameters that could be examined can be, for example, use of image width, image height, number of bits per component, compression scheme, pixel composition, orientation of image, number of components, image data arrangement, subsampling ratio of Y to C, Y and C positioning, image resolution in width direction, image resolution in height direction, unit of X and Y resolution; image data location, number of rows per strip, bytes per compressed strip, offset to JPEG SOI, bytes of JPEG data, transfer function, white point chromaticity, chromaticities of primaries, color space transformation matrix coefficients, pair of black and white reference values, file change date and time, image title, image input equipment manufacturer, image input equipment model, software used, person who created the image, copyright holder.

[0012] Process 103 analyzes the captured image and the metadata contained therein using columns 1 and 2 of the chart attached hereto as Addendum 2.

[0013] Process 104 uses logic well-known to those skilled in the art and based on the detected image capture parameters (as contained in the imbedded metadata) compared against known acceptable image capture parameters to determine whether a "problem" is present with the image. If there is no problem, then the image is stored under control of process 105. If desired, the user is so informed under control of process 106. If, however, a problem has been determined, then process 104 calls upon process 107 to determine whether auto recapture (correct) should occur. Note that a problem in the context discussed herein is not necessarily a faulty image but rather an image, the quality of which the system has determined could perhaps be improved upon by a change of a device or image parameter. For example, a correction might be to use a flash or by changing

the settings or the image capture speed. Also note that in the context of process **105**, storage is the type of storage that would occur when an image is to be saved, at least semi-permanently. This is opposed to temporary image storage during the capture process itself. Also note that the reporting of the image improvement information is done contemporaneously with the image storage, i.e., during or directly following the storage of the image.

[0014] Further, if the image is deemed unacceptable through analysis of the metadata and/or analysis of the image itself, the system would optionally provide instructions to the user for improving a subsequent image. Additionally, if the image is deemed unacceptable, the user could select an option for the camera to automatically adjust one or more image capture settings and recapture one or more images until the captured image is deemed satisfactory.

[0015] If auto correct has been established, then process **108** takes the appropriate action, for example, as per column 3 of Addendum 2, and process **109** recaptures the image. By way of example, and referring to Addendum 2, line 1, and using logic well-known to those skilled in the art, assume that it has been determined (based on imbedded metadata) that an image is a high contrast scene. Under this scenario, the action contemplated by line 1, column 3 would electronically occur thereby resulting in adaptive lighting being used during the image recapture process. Note that adaptive lighting in digital photography is a technique similar to "dodge and burn" in traditional film photography. If desired, processes **110** and **111** control the display of the "correction" message to the user.

[0016] Once the image is recaptured, processes **103**, **104**, **107** are followed until such time as process **104** determines that further parameter adjustments are not likely to improve image quality. Then process **105** stores the image as discussed above.

[0017] If process **107** determines that auto correct is not on, this then would imply that the user desires to maintain

control over the capturing of images, and process **115** optionally determines whether a short version (column 6) or a longer version (column 4 or 5) of the instructions is to be provided to the user. This, of course, is an option and only one version need be provided.

[0018] Assuming the long version is to be provided, then the message from Addendum 2 row 1, column 5 is displayed. This is shown on display **32** (**FIG. 4**). Processes **115** and **118** (**FIG. 1**) control the display of the graphical user interface (GUI) version of the message to the user. The system would then wait for the user to make the parameter changes suggested, or to make any other changes the user desires. The image would then be recaptured and the system would be operated as discussed above until such time as "problems" have been eliminated from the image. Note that the message to the user could be text, graphics, or verbal, as desired.

[0019] **FIG. 2** shows the front view of one embodiment of image capture device **20**. In this situation, the device is a digital camera having shutter control button **21**, lens **22**, alternate viewer **23**, and memory card **24** inserted in slot **201**. The image capture device could be a video camera, a PDA, cell phone or any device that captures image data.

[0020] **FIG. 3** shows the back view of camera **20** having display **32** for showing captured (or about to be captured) images to the user. Inside the camera there is at least one sensor **34** that can be a charge-couple device (CCD) or other type of sensor for capturing the image. There is also shown the back portion **33** of the auxiliary window, as well as processor **31** and memory **35**. Memory **35** could, if desired, be separate from memory card **34**. Processor **31** could be used, if desired, to run the processes discussed above with respect to **FIG. 1**, as well as many other image control processes. Power for camera **20**, such as a battery, is not shown.

ADDENDUM 1

Tag Name	Field Name	Tag ID			Count
		Dec	Hex	Type	
<u>(A) Tags relating to image data structure</u>					
Image width	ImageWidth	256	100	SHORT or LONG	1
Image height	ImageLength	257	101	SHORT or LONG	1
Number of bits per component	BitsPerSample	258	102	SHORT	3
Compression scheme	Compression	259	103	SHORT	1
Pixel composition	Compression	262	106	SHORT	1
Orientation of image	PhotometricInterpretation	274	112	SHORT	1
Number of components	SamplesPerPixel	277	115	SHORT	1
Image data arrangement	PlanarConfiguration	284	11C	SHORT	1
Subsampling ratio of Y to C	YCbCrSubSampling	530	212	SHORT	2
Y and C positioning	YcbCrPositioning	531	213	SHORT	1
Image resolution in width direction	XResolution	282	11A	RATIONAL	1
Image resolution in height direction	Yresolution	283	11B	RATIONAL	1
Unit of X and Y resolution	ResolutionUnit	296	128	SHORT	1
<u>(B) Tags relating to recording offset</u>					
Image data location	StripOffsets	273	111	SHORT or LONG	*S
Number of rows per strip	RowsPerStrip	278	116	SHORT or LONG	1
Bytes per compressed strip	StripByteCounts	279	117	SHORT or LONG	*S

-continued

ADDENDUM 1

Tag Name	Field Name	Tag ID			Count
		Dec	Hex	Type	
Offset to JPEG SOI	JPEGInterchangeFormat	513	201	LONG	1
Bytes of JPEG data		514	202	LONG	1
JPEGInterchangeFormatLength					
(C) Tags relating to image data characteristics					
Transfer function	TransferFunction	301	12D	SHORT	3 * 256
White point chromaticity	WhitePoint	318	13E	RATIONAL	2
Chromaticities of primaries	PrimaryChromaticities	319	13F	RATIONAL	6
Color space transformation matrix coefficients	YCbCrCoefficients	529	211	RATIONAL	3
Pair of black and white reference values	ReferenceBlackWhite	532	214	RATIONAL	6
(D) Other tags					
File change date and time	DateTime	306	132	ASCII	20
Image title	ImageDescription	270	10e	ASCII	Any
Image input equipment manufacturer	Make	271	10f	ASCII	Any
Image input equipment model	Model	272	110	ASCII	Any
Software used	Software	305	131	ASCII	Any
Person who created the image	Artist	315	13b	ASCII	Any
Copyright holder	Copyright	33432	8298	ASCII	Any

*S Chunky format: StripsPerImage

Planar format: SamplesPerImage * StripsPerImage

StripsPerImage = floor((ImageLength + RowsPerStrip - 1)/RowsPerStrip)

[0021]

ADDENDUM 2

Problem (1)	How Problem Detected (2)	Scene/Device (3)	GUI String (4)	Advice (5)	Short Version (6)
(1) Picture is a high-contrast scene	Use metadata to determine if the scene is high-contrast and suggest using Adaptive Lighting.	High contrast scene, back-lit subject, such as subject in shade with bright background. Confirm focus lock. Capture image. (Wide & Tele)	HINT: This image is of a scene with very bright and very dark regions. For a more even look and to see more detail in the dark regions, try setting Adaptive Lighting to Low or High.	The camera has detected that large parts of your image are dark. Try setting Adaptive Lighting to low or high to see more details in the shadows.	USE__ ADAPTIVE__ LIGHTING
(2) Picture is taken with the strobe using Night mode	Detect if strobe is set to night mode.	Set camera to Night flash on. Average indoor lighting or dimmer scene. Confirm focus lock. Capture image.	HINT: This image was taken using the Night flash setting, which typically results in a long exposure. Long exposures often cause images to be blurry because it is hard to hold the camera still for more than 1/60 of a second. To make sure that the images don't come out blurry, use a tripod when taking pictures with the Night flash setting.	Your camera strobe is set to night mode. Longer exposure may cause your image to appear blurry. Stabilize the camera using a tripod to avoid motion blur. Not the correct wording. Murray, what should we say(?)	Enum = NIGHT__ USE__TRIPOD
(3) Picture of people is taken using the	Detect if strobe is set to a redeye	1) Set camera to Portrait mode, with	HINT: This image may have people	The strobe fired in a in a scene where	Enum = USE__ REDEYE__

-continued

ADDENDUM 2

Problem (1)	How Problem Detected (2)	Scene/Device (3)	GUI String (4)	Advice (5)	Short Version (6)
strobe. Suggest using camera redeye correction if not already done.	mode or if camera is set to portrait mode and the strobe fired.	flash on. (Wide & Tele) 2) Set camera to Normal mode, with redeye flash on. (Wide & Tele) Subject should be a portrait of one or more persons, (try camera at ~30 degree angle to subject(s). Confirm focus lock. Capture image. Run Image Advisor to view message. Run redeye correction	with red eyes. If the red eyes need to be removed, you can use Remove Red Eyes in the Playback menu to correct the image.	your subject may have red eyes. You may consider selecting the Remove Red Eyes enhancement in the playback menu.	CORRECTION
(4) The user enables macro. It is highly possible to get many out of focus or blurry picture even when the BV is bright enough. Therefore, I suggest we encourage the user to get in the habit of using a tripod as much as possible when shooting in macro.	Detect to see if the macro range is being used.	Set camera to Macro mode. Mid-day, full-sun, any subject in macro range. Confirm focus lock. Capture image.	HINT: This picture was taken with the Macro focus setting. Focus is very sensitive in Macro, so small movements toward or away from the subject can make the image out of focus and blurry. For sharpest focus in Macro mode, use a tripod to hold the camera still.	Image blur is more likely to happen in macro. Although, not totally necessary unless the camera indicates the need for flash, we would recommend the use of a tripod whenever you use macro images. Your images will improve in focus and sharpness.	Enum = MACRO__USE__TRIPOD
(5) If the user places the camera in Portrait mode we can assume that they are taking pictures of people and can offer image improvements	We would detect the portrait mode, and if the flash did not fire, and if we know that there was a fair degree of successful pushdown, we could deduce that this could be a high dynamic range scene that may benefit from Retinex or forced flash	Set camera to Portrait mode, set flash off. High-contrast scene, such as subject in shadow with bright light in background. Confirm focus lock. Capture image. (Wide & Tele)	HINT: This image was taken in Portrait mode and may have shadows across the subject. To create the appearance of more even lighting, use the Flash On setting or set Adaptive Lighting to Low.	In portraits that are contrasty or may be backlit it may help to use force the flash on or even use the low Adaptive Lighting setting	Enum = PORTRAIT__ADAPTIVE__LIGHTING__LOW
(6A) Picture is taken using combinations of the high setting for contrast saturation sharpness and adaptive lighting	We would detect the saturation, sharpness and contrast settings to determine if there were all set to high	Set camera contrast, sharpness & saturation to high. Mid-day, full-sun, any subject. Confirm focus lock. Capture image.	HINT: This image was taken with Contrast, Saturation, and Sharpness all set to High. This can result in unrealistic looking images. For a more natural look, try setting at least one of these settings to Medium.	Contrast saturation and sharpness are all set to high. This will in most cases produce images that look unrealistic. For a more natural look you may want to consider leaving some settings on their normal state, which ones will depend on what you are photographing.	Enum = MANUAL__SETTINGS__HIGH
(6B)		Set camera contrast, sharpness, saturation, and adaptive lighting to high. Mid-day, full-sun, any subject. Confirm focus lock. Capture image.	HINT: This image was taken with Contrast, Saturation, Sharpness all set to High. Using ALT. This can result in unrealistic looking images. For a more natural look, try	Contrast, saturation, sharpness are all set to high using ALT. This will in most cases produce images that look unrealistic.	MANUAL__SETTINGS__HIGH_PLUS__ALT

-continued

ADDENDUM 2

Problem (1)	How Problem Detected (2)	Scene/Device (3)	GUI String (4)	Advice (5)	Short Version (6)	
			setting at least one of these settings to its default value.	or a more natural look you may want to consider leaving some settings on their normal setting, which ones will depend on what you are photographing.		
(6C)		Set camera contrast, sharpness, and adaptive lighting to high. Mid-day, full-sun, any subject. Confirm focus lock. Capture image.	HINT: This image was taken with Contrast, Sharpness, and Adaptive lighting all set to High. This can result in unrealistic looking images. For a more natural look, try setting at least one of these settings to its default value.	Contrast, sharpness, and ALT are all set to high. This will in most cases produce images that look unrealistic. For a more natural look you may want to consider leaving one on the normal setting, which one will depend on what you are photographing.	CONT_SHARP_ ALT_HIGH	
(6D)		Set camera contrast, saturation, & adaptive lighting to high. Mid-day, full-sun, any subject. Confirm focus lock. Capture image.	HINT: This image was taken with Contrast, Saturation, and Adaptive Lighting all set to High. This can result in unrealistic looking images. For a more natural look, try setting at least one of these settings to its default value.	Contrast, saturation, and ALT are all set to high. This will in most cases produce images that look unrealistic. For a more natural look you may want to consider leaving one on the normal setting, which one will depend on what you are photographing.	Enum = CONT_ SAT_ALT_ HIGH	
(6E)		Set camera sharpness, saturation & adaptive lighting to high. Mid-day, full-sun, any subject. Confirm focus lock. Capture image.	HINT: This image was taken with Sharpness, Saturation, and Adaptive Lighting all set to High. This can result in unrealistic looking images. For a more natural look, try setting at least one of these settings to its default value.	Sharpness, saturation and ALT are all set to high. This will in most cases produce images that look unrealistic. For a more natural look you may want to consider leaving one on the normal setting, which one will depend on what you are photographing.	Enum = SHARP_ SAT_ALT_ HIGH	
(7)	User sets Adaptive Lighting to High and ISO to 400	Detect the ISO speed and ALT setting	Set camera ISO speed to 400 and adaptive lighting to high. Mid-day, full-sun, any subject. Confirm focus lock. Capture image.	HINT: This image was taken with ISO Speed set to 400 and Adaptive Lighting set to High. This can result in unrealistic or grainy looking images. For better image quality, try setting one of these settings to its default value.	This image was taken with the ISO Speed set to 400 and Adaptive Lighting set to High. This can result in highly grainy (or noisy) images. For better image quality, try setting one of these settings to its default value.	Enum = ALT_ AND_ISO_ HIGH
(8)	The user leaves the camera on for a long period of time, which results in noisy pictures due to thermal heating.	We will detect the problem by the using temperature data kept by the camera, if the temperature is extreme...45	Plug in AC adapter and turn camera on for 10 minutes (or longer) with LCD on. To allow camera to heat up. Mid-day, full-sun,	HINT: The camera was very warm when this image was captured. Digital cameras that have been on for a long period of time	Digital cameras that have been on for a long period of time will begin to degrade image quality as heat builds up inside the camera. In the future	Enum = WARM_ CAMERA

-continued

ADDENDUM 2

Problem (1)	How Problem Detected (2)	Scene/Device (3)	GUI String (4)	Advice (5)	Short Version (6)
	degrees C or above.	any subject. Set camera to ISO 100. Confirm focus lock. Capture image. Repeat with camera set to ISO 200 & 400.	will begin to degrade image quality as heat builds up inside the camera. For best image quality, keep the camera cool by limiting your use of the Image Display.	You may want to use the EVF instead of the Large LCD, or periodically power off the camera and let it cool between periods of long use. You can save your working settings to expedite your next boot up if you should need to.	
(9A) The user sets uses high digital zoom magnification, which may result in poor print quality Resolution regardless of digital zoom should determine print quality.	Detect the problem by examining the metadata for the size of smallest image that can be printed with acceptable quality for each standard print size	NA	HINT: This image was taken at a low Image Quality setting or with digital zoom, resulting in a lower resolution image. The maximum recommended print size for this image is 13 x 18 cm (5" x 7").	Your quality and digital zoom settings are low enough that you will not get a good 8 x 10 print.	Enum = POOR__ PRINT__QUALITY__ 8 x 10
(9B)		NA	HINT: This image was taken with a low Image Quality setting or with digital zoom, resulting in a low resolution image. The maximum recommended print size for this image is 10 x 15 cm (4" x 6").	Your quality and digital zoom settings are low enough that you will not get a good 5 x 7 print.	Enum = POOR__ PRINT__ QUALITY__5 x 7
(9C)		NA	HINT: This image was taken with a low Image Quality setting and/or with digital zoom, resulting in a low resolution image. The maximum recommended print size for this image is 9 x 13 cm (3.5" x 5").	Your quality and digital zoom settings are low enough that you will not get a good 4 x 6 print.	Enum = POOR__ PRINT__ QUALITY__4 x 6
(10A) Alternate solution for above problem to avoid message always coming up for VGA, add digital zoom parameter	Examine digital zoom metadata info	Set camera resolution to 1 MP and digital zoom to one or two levels under 1000, in Landscape & Portrait orientation.. Mid-day, full-sun, any subject. Confirm focus lock. Capture image.	HINT: This image was taken with digital zoom, resulting in a lower resolution image. The maximum recommended print size for this resolution is 13 x 18 cm (5" x 7").		
(10B)		Set camera resolution to 1 MP and digital zoom to one or two levels below 800, in Landscape & Portrait orientation. Mid-day, full-sun, any subject. Confirm focus lock. Capture image.	HINT: This image was taken with a significant amount of digital zoom, resulting in a low resolution image. The maximum recommended print size for this resolution is 10 x 15 cm (4" x 6").		
(10C)		Set camera resolution to VGA and digital zoom to one or two levels	HINT: This image was taken with a large amount of digital zoom,		

-continued

ADDENDUM 2

Problem (1)	How Problem Detected (2)	Scene/Device (3)	GUI String (4)	Advice (5)	Short Version (6)
		under 600 in Landscape & Portrait orientation.. Mid-day, full-sun, any subject. Confirm focus lock. Capture image.	resulting in a very low resolution image. The maximum recommended print size for this resolution is 9 × 13 cm (3.5" × 5").		

What is claimed is:

1. A method for improving image capturing ability, said method comprising:

contemporaneously with the capture of an image, analyzing metadata contained within said captured image to determine which, if any, image capture parameters are in need of adjustment.

2. The method of claim 1 further comprising:

storing images where the metadata contained therein does not yield image capture parameters in need of adjustment.

3. The method of claim 1 further comprising:

providing suggestions to a user contemporaneously with said image capture, said suggestions based upon parameters determined to be in need of adjustment.

4. The method of claim 1 further comprising:

recapturing a given image based upon adjustment of parameters determined to be in need of adjustment, said recapturing and said adjustment occurring without user intervention; and

storing images where the metadata contained therein does not yield image capture parameters in need of adjustment.

5. The method of claim 4 further comprising:

concurrent with said recapturing, providing to a user an explanation of the parameters being adjusted.

6. The method of claim 1 wherein the parameter determined to be in need of adjustment are selected from the list of: use of image width, image height, number of bits per component, compression scheme, pixel composition, orientation of image, number of components, image data arrangement, subsampling ratio of Y to C, Y and C positioning, image resolution in width direction, image resolution in height direction, unit of X and Y resolution; image data location, number of rows per strip, bytes per compressed strip, offset to JPEG SOI, bytes of JPEG data, transfer function, white point chromaticity, chromaticities of primaries, color space transformation matrix coefficients, pair of black and white reference values, file change date and time, image title, image input equipment manufacturer, image input equipment model, software used, person who created the image, copyright holder.

7. A system for providing image improvement assistance, each image having associated therewith metadata pertaining to certain image capture parameters, said system comprising:

analysis capability for examining said metadata associated with an image that is in the process of being stored, and

reporting image improvement assistance for an image to a user based upon said analysis of said metadata associated with said image, said reporting occurring contemporaneously with said storage of said image.

8. The system of claim 7 wherein said image improvement assistance includes suggestions with respect to at least one of the following: use of image width, image height, number of bits per component, compression scheme, pixel composition, orientation of image, number of components, image data arrangement, subsampling ratio of Y to C, Y and C positioning, image resolution in width direction, image resolution in height direction, unit of X and Y resolution; image data location, number of rows per strip, bytes per compressed strip, offset to JPEG SOI, bytes of JPEG data, transfer function, white point chromaticity, chromaticities of primaries, color space transformation matrix coefficients, pair of black and white reference values, file change date and time, image title, image input equipment manufacturer, image input equipment model, software used, person who created the image, copyright holder.

9. The system of claim 7 further comprising:

a processor for controlling the adjustment of at least one parameter associated with said image, said adjustment occurring as a result of an image being examined.

10. The system of claim 9 wherein said processor is further operable for enabling the reimagining of said image in accordance with said adjustment.

11. A system for analyzing a digital image, said system comprising:

a sensor for capturing image data along with metadata pertaining to each captured image;

logic for dynamically analyzing the image data as a function of said metadata pertaining thereto; and

a display for communicating to a user at the time an image is captured suggestions for image improvement, said suggestions based upon the results of said analyzing.

12. The system of claim 11 wherein said metadata comprise both image and device metadata.

13. A method for analyzing a digital image, said method comprising:

dynamically analyzing metadata pertaining to said digital image to determine acceptability of said image; and

communicating to a user possible image corrections for images analyzed to be unacceptable.

14. The method of claim 13 further comprising:

electronically recapturing an image analyzed to be unacceptable, said recapturing occurring after at least one parameter associated with said metadata pertaining to said image has been adjusted.

15. The method of claim 14 wherein said parameter adjustment is performed without user intervention.

16. A digital camera comprising:

means for adjusting a plurality of parameters, said parameters affecting the quality of each image captured by said camera;

said adjusting means operable for receiving metadata associated with each said captured image, said metadata pertaining to said parameters; and

said adjusting means further operable for providing a message to a user when said reviewed metadata determines that an image could have its quality improved upon by an adjustment of at least one of said parameters, said message indicating which parameters are in need of adjusting.

17. The digital camera of claim 16 wherein said adjusting means is further operable for adjusting at least one of said

parameters in need of adjusting and recapturing said image using said readjusted parameters.

18. The digital camera of claim 17 wherein said parameters are selected from the list of: use of image width, image height, number of bits per component, compression scheme, pixel composition, orientation of image, number of components, image data arrangement, subsampling ration of Y to C, Y and C positioning, image resolution in width direction, image resolution in height direction, unit of X and Y resolution; image data location, number of rows per strip, bytes per compressed strip, offset to JPEG SOI, bytes of JPEG data, transfer function, white point chromaticity, chromaticities of primaries, color space transformation matrix coefficients, pair of black and white reference values, file change date and time, image title, image input equipment manufacturer, image input equipment model, software used, person who created the image, copyright holder.

19. The digital camera of claim 16 further comprising:

means for displaying provided ones of said messages.

20. The digital camera of claim 17 wherein said adjusting means continues to adjust said parameters with respect to an image until a determination is made that further adjustments are not likely to improve image quality.

* * * * *