PATROLL Winning Submission

U.S. Patent 7,995,116

U.S. Patent 7,995,116 ("*Monument Peak*" or the "patent-at-issue") was filed on March 22, 2010. According to the paragraph in the specification entitled "Cross Reference to Related Applications," the patent-at-issue is a divisional of prior U.S. Ser. No. 11/434,482, filed on May 15, 2006 now abandoned, by Bruce H. Pillman et al, which is a continuation-in-part of application Ser. No. 11/399,076 filed on Apr. 6, 2006 now abandoned by Bruce H. Pillman et al. each of which is incorporated herein by reference in its entirety. Claim 1 of the patent-at-issue generally relates to varying camera self-determination based on subject motion. The method is specifically for setting a camera based on the assessment of the characteristics of initial evaluation images. The assessed characteristics include subject motion vectors. When the subject motion vectors are greater than a predetermined threshold, an immediate capture of a final image is enabled, and when it is less than the predetermined threshold, another assessment is made. The result of the assessment is presented to a user for approval of the final capture state.

The primary reference, U.S. Patent 7,546,026 ("*Pertsel*"), was filed on October 25, 2005, and claims priority on the same date. The patent discloses a method of operating an electronic imaging device. The method includes motion detection from pre-capture images of a scene. Motion detection is based on calculated vectors and parameters are automatically set based on predetermined thresholds. Adjustments on the settings are made based on whether the motion vectors are above or below the threshold prior to capturing the data of the final image of the scene.

The secondary reference, U.S. Patent 7,995,852 ("*Nakamaru*"), was filed on November 23, 2005, and claims priority on November 29, 2004. The patent is directed to an imaging device and method for preventing image quality deterioration. The method involves motion estimation based on images of a subject. Motion vectors are obtained by a motion estimating device and may be used by an image correction part. The correction effects can be shown to a user for selection of the preferred image.

A sample claim chart comparing claim 1 of *Monument Peak* to *Pertsel* and *Nakamaru* is provided below.

US7995116 (“*Monument Peak*”)	**A. US7546026** (*“Pertsel”*) **B. US7995852** (*“Nakamaru”*)
1. A **method for setting a camera for image capture**, said method comprising the steps of:	**A. US7546026** 1. A method of **operating an electronic imaging device as a camera**, comprising: . . . . *Pertsel* at claim 1 “According to the present invention, motion is detected and the exposure **parameters are set, in advance of capturing data of the image**, to levels that enhance the captured image based on the amount of motion of the scene relative to the image frame within the camera.” *Pertsel* at col. 2:36-40 **B. US7995852** “The fifth aspect of the present invention is configured in accordance with any one of the first to fourth aspects, further comprising **an imaging conditions setting device** which sets shutter speed, diaphragm, sensitivity, light emission conditions and other imaging conditions based on the motion of the subject and the motion of the imaging device which were estimated by the motion estimating device.” *Nakamaru* at col. 3:32-38 "Centralized control of the camera 10 is performed by a central processing unit (CPU) 12. More specifically, the CPU 12 performs motion estimating processing that estimates the motion of the main subject and the camera 10, **imaging conditions setting processing that sets imaging conditions for the camera** 10 . . . ." *Nakamaru* at col. 6:60-65
1.a. **capturing an initial set of two or more evaluation images**;	**A. US7546026** “Motion is preferably measured by calculating motion quantities from data of **two or more images prior to capturing data of the final image (pre-capture images)**.” *Pertsel* at col. 2:49-51 1. A method of operating an electronic imaging device as a camera, comprising: repetitively acquiring data of **two or more images of a scene**, ... *Pertsel* at claim 1 **B. US7995852** 1. An imaging device, comprising: **an image pickup device which images a subject**; and . . . . *Nakamaru* at claim 1

(cont.) 1.a. **capturing an initial set of two or more evaluation images**;	"In order to achieve the above object, the first aspect of the present invention comprises an image pickup device which images a subject, and a motion estimating device which estimates a motion of the subject and a motion of the imaging device based on a dynamic image or **a plurality of still images which are imaged to include the subject prior to actual imaging of a still image of the subject** by the image pickup device." *Nakamaru* at col. 2:59-65
1.b. **assessing a plurality of characteristics of said initial set of evaluation images to provide a first assessment**, **said characteristics including subject motion vectors between at least two of said initial set of evaluation images**;	**A. US7546026** "The **pre-capture images may also be used to determine an amount of motion of objects within the scene being photographed and the exposure time and level** can be calculated to enhance the image based on the amount of such motion." *Pertsel* at col. 4:30-34 1. A method of operating an electronic imaging device as a camera, comprising: repetitively acquiring data of two or more images of a scene, **calculating at least one quantity of motion of at least a portion of the scene relative to the camera from the acquired data of said two or more images** such that the quantity of relative motion is independent of another quantity of total motion that is determined along each directional vector and which is calculated separately from a vector for acquiring data from at least the portion of the scene, and wherein the separate calculation of each directional vector further provides a velocity and an acceleration of the total motion; **preliminarily setting, from luminescence information within the data of said two or more images, parameters including a duration for capturing data of a final image of the scene** without regard to the at least one quantity of relative motion; **in response to said at least one quantity of relative motion being below a first threshold, adjusting the preliminarily set parameters by at least increasing the duration of exposure; in response to said at least one quantity of relative motion being above a second threshold, adjusting the preliminarily set parameters by decreasing at least the duration of exposure;** and thereafter capturing data of the final image of the scene by use of the adjusted duration and at least one other adjusted exposure parameter selected from a group comprising aperture size and gain. *Pertsel* at claim 1

(cont.) 1.b. **assessing a plurality of characteristics of said initial set of evaluation images to provide a first assessment**, **said characteristics including subject motion vectors between at least two of said initial set of evaluation images**;	"Although the presence of motion blur can be detected from data of a single image, the **calculation of motion vectors from two or more pre-capture images** is more precise and leads to better control of the exposure parameters used to subsequently capture the image." *Pertsel* at col. 2:62-66 **B. US7995852** "**Centralized control of the camera 10 is performed by a central processing unit (CPU)** 12. More specifically, the **CPU 12 performs motion estimating processing that estimates the motion of the main subject** and the camera 10, **imaging conditions setting processing that sets imaging conditions for the camera** 10, image correction processing that corrects images that were imaged, image display control processing that controls the display of imaged images, image recording control processing that controls recording of imaged images, as well as other kinds of control processing." *Nakamaru* at col. 6:60-7:2 "Therefore, in order to recognize the imaging situation the **CPU 12 first performs control to detect the motion vector of the main subject** and motion vector of the camera **by acquiring a plurality of still images prior to actual imaging of a still image**." *Nakamaru* at col. 13:13-17
1.c. when **said subject motion vectors are in excess of a predetermined threshold**, **setting a final capture state of said camera responsive to said first assessment and enabling immediate capture of a final image without further assessment**;	**A. US7546026** "The parameter adjustment example of FIG. 7 shows several **motion thresholds** between the sets 105-108 of adjustments. For **any motion above the threshold** between the sets 106 and 107, **the parameters are individually adjusted in a single direction, and when the motion is below that threshold, the parameters are adjusted in the opposite direction**. As a variation of this single threshold, two motion thresholds can be defined. When the **motion is above the higher of the two thresholds**, the **parameters are individually adjusted in one direction and individually adjusted in the opposite direction when below the lowest threshold**. For motion values between the thresholds, no adjustment of the preliminary parameters would be made." *Pertsel* at col. 11:1-13 20. An apparatus arranged to operate as a camera, comprising: . . . preliminarily setting, from luminescence information within the data of said two or more images, parameters

(cont.) 1.c. when **said subject motion vectors are in excess of a predetermined threshold**, **setting a final capture state of said camera responsive to said first assessment and enabling immediate capture of a final image without further assessment**;	including a duration for capturing data of a final image of the scene without regard to the at least one quantity of total notion; **in response to the at least one quantity of total motion being below a first threshold, adjusting the preliminarily set parameters by at least increasing the duration of exposure; in response to the at least one quantity of total motion being above a second threshold, adjusting the preliminarily set parameters by decreasing at least the duration of exposure; and capturing data of the final image of the scene by use of the adjusted duration and at least one other adjusted exposure parameter selected from a group comprising aperture size and gain**. *Pertsel* at claim 20 **B. US7995852** "When single image imaging (actual imaging) is performed along with through image imaging or pre-imaging in the manner described above, **a still image that was actually imaged is corrected on the basis of the detected motion vector of the main subject** and motion vector of the camera (S32). The still image after correction and still image before correction are then displayed (in some cases the still image before correction may not be displayed) on the display panel 28 (S33), after which the CPU 12 waits for the user to input a selection instruction by operating the key 24 (S34), and records a still image that was actually imaged on the recording medium 32 in accordance with the user's selection instruction (S35)." *Nakamaru* at col. 21:64-22:9
1.d. when **said subject motion vectors are less than said predetermined threshold**:	**A. US7546026** "The parameter adjustment example of FIG. 7 shows several **motion thresholds** between the sets 105-108 of adjustments. For **any motion above the threshold** between the sets 106 and 107, **the parameters are individually adjusted in a single direction, and when the motion is below that threshold, the parameters are adjusted in the opposite direction.** As a variation of this single threshold, two motion thresholds can be defined. When the **motion is above the higher of the two thresholds**, the **parameters are individually adjusted in one direction and individually adjusted in the opposite direction when below the lowest threshold**. For motion values between the thresholds, no adjustment of the preliminary parameters would be made." *Pertsel* at col. 11:1-13 20. An apparatus arranged to operate as a camera, comprising:

	. . . preliminarily setting, from luminescence information within the data of said two or more images, parameters including a duration for capturing data of a final image of the scene without regard to the at least one quantity of total notion; **in response to the at least one quantity of total motion being below a first threshold, adjusting the preliminarily set parameters by at least increasing the duration of exposure; in response to the at least one quantity of total motion being above a second threshold, adjusting the preliminarily set parameters by decreasing at least the duration of exposure; and capturing data of the final image of the scene by use of the adjusted duration and at least one other adjusted exposure parameter selected from a group comprising aperture size and gain**. *Pertsel* at claim 20
1.d. (a) **providing a second assessment of the evaluation images**;	**A. US7546026** 20. An apparatus arranged to operate as a camera, comprising: . . . preliminarily setting, from luminescence information within the data of said two or more images, parameters including a duration for capturing data of a final image of the scene without regard to the at least one quantity of total notion; **in response to the at least one quantity of total motion being below a first threshold, adjusting the preliminarily set parameters by at least increasing the duration of exposure; in response to the at least one quantity of total motion being above a second threshold, adjusting the preliminarily set parameters by decreasing at least the duration of exposure; and capturing data of the final image of the scene by use of the adjusted duration and at least one other adjusted exposure parameter selected from a group comprising aperture size and gain**. *Pertsel* at claim 20
1.d. (b) **analyzing the second assessment**; and when said subject motion is less than said predetermined threshold, (i) **presenting results of said analyzing to a user as a simple choice between offered alternatives, based on said analyzing**; and (ii) **accepting user choice input following said presenting**; and	**B. US7995852** "When single image imaging (actual imaging) is performed along with through image imaging or pre-imaging in the manner described above, **a still image that was actually imaged is corrected on the basis of the detected motion vector of the main subject and motion vector of the camera** (S32). The **still image after correction and still image before correction are then displayed** (in some cases the still image before correction may not be displayed) on the display panel 28 (S33), after which the CPU 12 waits for the **user to input a selection instruction** by operating the key 24 (S34), and records a still image that was actually imaged on the recording

(cont.) 1.d. (b) **analyzing the second assessment**; and when said subject motion is less than said predetermined threshold, (i) **presenting results of said analyzing to a user as a simple choice between offered alternatives, based on said analyzing**; and (ii) **accepting user choice input following said presenting**; and	medium 32 in accordance with the user's selection instruction (S35)." *Nakamaru* at col. 21:64-22:9 "According to this configuration the **correction effects can be easily notified to a user and the user can select a preferred image**." *Nakamaru* at col. 4:37-39
1.d. (c) **setting said final capture state of said camera responsive to said user input**.	**A. US7546026** 20. An apparatus arranged to operate as a camera, comprising: . . . preliminarily setting, from luminescence information within the data of said two or more images, parameters including a duration for capturing data of a final image of the scene without regard to the at least one quantity of total notion; **in response to the at least one quantity of total motion being below a first threshold, adjusting the preliminarily set parameters by at least increasing the duration of exposure; in response to the at least one quantity of total motion being above a second threshold, adjusting the preliminarily set parameters by decreasing at least the duration of exposure; and capturing data of the final image of the scene by use of the adjusted duration and at least one other adjusted exposure parameter selected from a group comprising aperture size and gain**. *Pertsel* at claim 20 **B. US7995852** "When continuous imaging is selected with the mode selection key, the CPU 12 estimates the motion of the main subject and motion of the camera 10 during continuous imaging. Further, during continuous imaging the **CPU 12 performs imaging conditions setting processing which sets imaging conditions including the shutter speed, diaphragm, sensitivity and light emission conditions of the electronic flash** 70 in accordance with the estimated motion of the main subject and motion of the camera 10." *Nakamaru* at col. 10:11-19