

JPH11275512A DIGITAL CAMERA

Applicants: SANYO ELECTRIC CO

Inventors: SHIOJI MASAHIRO

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DIGITAL CAMERA

Abstract

PROBLEM TO BE SOLVED: To provide a digital camera that can easily edit an image. SOLUTION: An operator uses various buttons 11-13 to select an image being an edit point among the moving images of edit objects displayed on an LCD 10 of a digital camera. Then, the operator selects icons displayed on the LCD 10 to delete/divide or the like the moving image on the basis of the edit point. Thus, the image is easily edited without using a personal computer or the like.

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[0001] BACKGROUND OF THE INVENTION 1. Field of the Invention The present invention relates to a digital camera, and more particularly to a digital camera having a moving image shooting mode for shooting a moving image of a subject and an editing mode for editing the shot moving image.

[0002] 2. Description of the Related Art Conventionally, a digital camera has been provided with a CCD imager, an image memory, a liquid crystal display (hereinafter referred to as LCD), and the like. In the reproduction mode, the image read from the image memory is displayed on the LCD.

[0003] In addition, by connecting the digital camera to a personal computer (hereinafter referred to as a personal computer), the image data is read out to the hard disk and then the image is displayed on the large display screen of the monitor device, the image is edited, the printer is used. It is also possible to print by.

[0004] However, the conventional digital camera has a problem that an image can be edited only by a person who has a personal computer or the like and is familiar with the operation of the personal computer. ... In particular, there is a great need for editing functions in digital cameras capable of shooting moving images.

[0005] Therefore, a main object of the present invention is to provide a digital camera capable of easily editing an image.

[0006] According to a first aspect of the present invention, there is provided a digital camera having a moving image photographing mode for photographing a moving image of a subject and an editing mode for editing the photographed moving image. , Image display means, first selection means, and editing means. The storage means stores the moving image captured in the moving image capturing mode. The image display means displays the moving image read from the storage means in the edit mode. The first selection unit selects a moving image to be edited from the moving images displayed by the image display unit. The editing means edits the moving image selected by the first selecting means.

[0007] In the invention according to claim 2, the editing means of the invention according to claim 1 includes second selecting means and erasing means. The second selecting unit selects a desired image from the plurality of images included in the moving image selected by the first selecting unit. The erasing means erases an image before or after the image selected by the second selecting means among the moving images stored in the storage means and selected by the first selecting means.

[0008] In the invention according to claim 3, the editing means of the invention according to claim 1 includes a second selecting means and a dividing means. The second selecting unit selects a desired image from the plurality of images included in the moving image selected by the first selecting unit. The dividing unit divides the moving image stored in the storage unit and selected by the first selecting unit into two moving images with the image selected by the second selecting unit as a boundary.

[0009] In the invention according to claim 4, the first selecting means of the invention according to claim 1 selects two moving images to be edited, and the editing means is stored in the storage means and selected by the first selecting means. The two moving images thus created are connected.

[0010] 1(a) is a perspective view showing the external configuration of a digital camera according to an embodiment of the present invention as seen from the front side (lens side), and FIG. 1(b) is seen from the rear side. FIG.

[0011] 1A and 1B, a lens 1, a power switch interlocking lens cover 2, an optical finder 3, a flash 4 and a self-timer LED 5 are provided on the front side of this digital camera, and the top and side surfaces thereof are provided. A shutter button 6, a three-point type main switch 7, a macro switching lever 8 and a terminal 9 are provided in the. An LCD 10, a mode button 11, a set button 12, a direction instruction button 13 and a microphone 14 are provided on the rear surface of the digital camera.

[0012] The main switch 7 is used to switch between three modes: a shooting mode with the LCD 10 turned on, a shooting mode with the LCD 10 turned off, and a playback mode. In the shooting mode in which the LCD 10 is turned on, a through image is displayed on the LCD 10 and the through image is recorded. In the shooting mode in which the LCD 10 is turned off, shooting is performed using the optical finder 3 as in a normal silver-salt camera. In the reproduction mode, the LCD 10 is turned on and the reproduced image is displayed on the LCD 10. The LCD 10 also displays various icons (characters) indicating recording conditions, reproduction functions, etc., in addition to the through image and the reproduced image.

[0013] By lightly pressing each of the left direction indicator 13a, the right direction indicator 13b, the upward direction indicator 13c, and the downward direction indicator 13d at the four corners of the direction instruction button 13 with the finger, the reproduction image is sent/returned and the recording condition is set. It is possible to make settings and select playback functions.

[0014] FIG. 2 is a circuit block diagram showing the configuration of the image recording/reproducing circuit 20 incorporated in this digital camera.

[0015] Referring to FIG. 2, in the image recording/reproducing circuit 20, the system controller 41 includes a lens cover 2, a shutter button 6, a main switch 7, a macro switching lever 8, a mode button 11, a set button 12, and a direction instruction button 13. In response to this signal, various control signals are given to the CPU 42 at a predetermined timing. The CPU 42 controls the memory control circuit 27 and the flash memory control circuit 47 according to the control signal given from the system controller 41.

[0016] The memory control circuit 27 controls the first signal processing circuit 24, the second signal processing circuit 29, the JPEG circuit 44, the buffers 25, 28, 43 and the SDRAM 26. Writing/reading of image data of the SDRAM 26 is performed via the buffers 25, 28 and 43. The transfer speed (write/read speed) of the buffers 25, 28, 43 and the SDRAM 26 is higher than the data transfer speed of the buffers 25, 28, 43 and the first signal processing circuit 24, the second signal processing circuit 29, and the JPEG circuit 44. It is possible to operate these circuits 24, 29, 44 almost simultaneously by increasing the speed.

[0017] Further, the memory control circuit 27 controls the character generator 30 and the switch 31 to replace a part of the image data with the character image data, thereby overwriting the through image and the reproduced image with the character image.

[0018] The flash memory control circuit 47 controls the buffer 45 and the flash memory 46, writes the image data compressed by the JPEG circuit 44 into the flash memory 46 via the buffer 45, and reads the data read from the flash memory 46 into the buffer 45. To the JPEG circuit 44 via

[0019] In the shooting mode, the light image incident from the lens 1 is applied to the CCD imager 21 via a complementary color filter (not shown). The CCD imager 21 outputs an electric signal (progressive scan signal) of each pixel in accordance with progressive scan (pixel sequential scanning). The progressive scan signal from the CCD imager 21 is given to the CDS/AGC circuit 22.

[0020] The CDS/AGC circuit 22 performs well-known noise removal and level adjustment on the progressive scan signal, and the progressive scan signal subjected to such processing is converted into digital data (image data) by the A/D converter 23. The first signal processing circuit 24 performs well-known white balance adjustment and gamma correction on the image data output from the A/D converter 23, and then supplies the image data to the SDRAM 26 via the buffer 25.

[0021] The memory control circuit 27 writes the image data in the SDRAM 26 and then reads the image data by interlaced scanning. Therefore, the odd-numbered field image data and the even-numbered field image data are alternately output from the SDRAM 26. The image data output from the SDRAM 26 is input to the second signal processing circuit 29 via the buffer 28 and to the JPEG circuit 44 via the buffer 43.

[0022] The second signal processing circuit 29 performs processing such as color interpolation on the input image data, and the image data output from the second signal processing circuit 29 is given to the D/A converter 32 via the switch 31. The D/A converter 32 converts the image data into an analog signal (image signal), outputs the image signal via the output terminal 33, and gives it to the LCD 10. Therefore, as shown in FIG. 3A, a real-time moving image (through image) 48 is displayed on the LCD 10.

[0023] When the mode button 11 is pressed in this state, as shown in FIG. 3B, various icons 50 to 59 indicating recording conditions are displayed on the edge of the LCD 10. In FIG. 3B, each icon is shown as a simple white square or a shaded square for simplification of the drawing, but it is actually a symbol indicating the corresponding recording condition. The icons 50 to 59 are for performing still image shooting mode setting, continuous shooting mode setting, moving image shooting mode setting, resolution setting, voice memo setting, self timer setting, macro mode display, exposure correction setting, and digital zoom setting, respectively. Is.

[0024] Selection of the icons 50 to 59 is performed by the direction instruction button 13. The selected icon (51 in the figure) among the icons 50 to 59 is displayed in a positive state (white square), and the other icons are displayed in a negative state (hatched square). When the set button 12 is pressed in this state, the condition indicated by the selected icon (50 in this case) (in this case, the single still image shooting mode) is set. When the mode button 11 is pressed after setting the recording conditions, the icons 50 to 59 disappear and the state returns to the state of FIG.

[0025] When the operator presses the shutter button 6, the JPEG circuit 44 is activated, the image data read from the SDRAM 26 and input to the JPEG circuit 44 via the buffer 43 is compressed according to the JPEG format, and the compressed data is passed via the buffer 45. It is written in the flash memory 46.

[0026] In the continuous shooting mode, up to 15 still images are continuously shot at 10 frames/second. In the moving image shooting mode, if 320×240 pixels, a moving image of 10 frames/second for a maximum of 5 seconds is taken, and if 160×120 pixels, a moving image of 10 frames/second for a maximum of 10 seconds is taken.

[0027] Further, the memory control circuit 27 thins out the images temporarily held in the buffer 43 to generate reduced images (thumbnail images) for 9-screen multi-playback. In the single still image shooting mode and the continuous shooting mode, a reduced image is created for each still image. In the moving image shooting mode, a reduced image is created only for the image of the first frame for each moving image shooting. The reduced image data is written in the flash memory 46 as index data of the corresponding image data.

[0028] FIG. 4 is a diagram showing a file management method of this digital camera. Referring to FIG. 4, in this digital camera, a camera image folder 60 and a moving image folder 65 are formed in the memory area of the flash memory 46, and the moving image folder 65 is stored in the camera image folder 60.

[0029] In the single still image shooting mode, the image data of the shot still image is stored as an image file 61 in the camera image folder 60. The image data of the reduced image of the still image serves as an index of the corresponding image file 61. The voice data blown from the microphone 14 in the voice memo mode is stored in the camera image folder 60 as a voice file 62.

[0030] In the continuous shooting mode, a continuous shooting image folder 63 is formed for each continuous shooting, and each of a plurality of still images shot in one continuous shooting is stored in the corresponding folder 63 as an image file 64. To be done. The reduced image data of each still image serves as an index of the corresponding image file 64. The continuously shot image folder 63 is stored in the camera image folder 60 together with the image file 61 created in the still image shooting mode.

[0031] In the moving image shooting mode, images of a plurality of frames shot in one moving image shooting are stored in the moving image folder 65 as the moving image file 66 together with the audio data obtained from the microphone 14. The image data of the reduced image of the first frame of the images of the plurality of frames included in each moving image file 66 becomes an index of the corresponding moving image file 66.

[0032] Returning to FIG. 2, in the reproduction mode, the compressed data read from the flash memory 46 is input to the JPEG circuit 44 via the buffer 45. The JPEG circuit 44 decompresses the input compressed data and gives it to the SDRAM 26 via the buffer 43. The memory control circuit 27 writes the image data in the SDRAM 26 and then reads the image data by interlaced scanning.

[0033] The image data read from the SDRAM 26 is given to the D/A converter 32 via the buffer 28, the second signal processing circuit 29, and the switch 31, and is converted into an analog image signal. The analog image signal is output to the outside through the output terminal 33 and is also given to the LCD 10. Therefore, as shown in FIG. 5A, the reproduced image 70 is displayed on the LCD 10. In this state, pressing the left direction indicator 13a of the direction instruction button 13 reproduces the image recorded before the reproduced image, and pressing the right direction indicator 13b reproduces the image recorded after the reproduced image. It

Therefore, a desired image can be selected and reproduced. In the moving image reproduction mode, when the set button 12 is further pressed, the file including the image displayed at that time is reproduced as a moving image.

[0034] Further, when the mode button 11 is pressed in this state, various icons 71 to 78 indicating the reproduction function are displayed at the end of the LCD 10 as shown in FIG. 5B. The icons 71 to 78 are for selecting a reproduction mode, multi-reproduction, reproduction zoom, protect, delete, edit, card operation, and date/time setting. When a desired icon among the icons 71 to 78 is selected by the direction indicating button 13 and the set button 12 is pressed, the function indicated by the icon is selected. When the mode button 11 is pressed without pressing the set button 12, the state shown in FIG.

[0035] For example, when the reproduction mode selection icon 71 is selected and set in the state of FIG. 5B, as shown in FIG. 6, the characters and the icon 81 indicating the single-shot still image reproduction mode, and the continuous shooting still image are displayed. Characters and icons 82 indicating the image reproduction mode and characters and icons 83 indicating the moving image reproduction mode are displayed on the LCD 10. When any one of the three kinds of reproduction modes is selected and set by the direction instruction button 13 and the set button 12, the set reproduction mode is executed.

[0036] Further, when the multi-playback icon 72 is selected and set in the state of FIG. 5B, nine reduced images P1 to P9 are displayed as shown in FIG. The contents of the reduced images P1 to P9 are shown by letters A to I of the alphabet in FIG. 7 for simplification of the drawing. Image numbers 1 to 9 are displayed at the lower right of each of the reduced images P1 to P9. The selection mark M is displayed on any one of the reduced images P1 to P9 (P1 in the figure).

[0037] By operating the direction instruction button 13, the selection mark M can be moved to each reduced image. When the selection mark M is moved outside the display range (for example, on the right side of the reduced image P9), only the reduced image of the first line is left and a reduced image of two lines is newly displayed. When the selection mark M is positioned on a desired reduced image and the set button 12 is pressed, the reduced image is enlarged and displayed on the entire surface of the LCD 10.

[0038] At this time, in the circuit of FIG. 2, nine pieces of reduced image data are sequentially read from the flash memory 46 and written in the SDRAM 26 via the buffer 45, the JPEG circuit 44 and the buffer 43. The memory control circuit 27 reads the nine reduced image data written in the SDRAM 26 so that the nine reduced images P1 to P9 form a still image for one screen. As a result, nine reduced images P1 to P9 are displayed on the LCD 10. When one of the nine reduced images P1 to P9 displayed on the LCD 10 is selected, the regular still image data corresponding to the reduced image is read from the flash memory 46 and the still image is displayed on the entire surface of the LCD 10. To be done.

[0039] In single-shot still image playback mode, multi-playback is displayed only when multi-playback mode is selected and set, but in continuous shooting still-image playback mode and movie playback mode, if each mode is selected and set, multi-playback is performed. Even if the mode is not selected, the reduced images of the representative images of each image group are multi-reproduced and displayed. Here, the image group refers to a series of images shot by one shot in the continuous shooting mode and the moving image shooting mode.

[0040] Further, when the editing icon 76 is selected and set in the state of FIG. 5B, the character and icon 85 indicating “scissors” and the character and icon 86 indicating “paste” as shown in FIG. And are displayed on the LCD 10. When the icon 85 is selected and set, as shown in FIG. 9, a character and an icon 87 indicating the deletion of the first half of the moving image file 66, a character and an icon 88 indicating the deletion of the latter half of the moving image file 66, and the division of the moving image file 66. Is displayed on the LCD 10. When a desired icon among the icons 87 to 89 is selected and set, the mode corresponding to the icon is executed. When the icon 86 is selected and set in FIG. 8, two moving image files 66 are linked.

[0041] Hereinafter, the edit mode, which is a characteristic part of the present application, will be described in detail. The edit mode starts with selection of the moving image file 66 to be edited in the moving image reproduction mode. That is, after selecting and setting the reproduction mode icon 71 in the state of FIG. 5B, the moving image reproduction mode icon 83 is selected and set in the state of FIG.

[0042] As shown in FIG. 10, the CPU 42 multi-reproduces and displays the reduced image which is the index of the moving image file 66 in step S1, and selects the desired reduced image in accordance with the instruction of the operator in step S2, thereby selecting the desired moving image file 66. select. Next, the CPU 42 waits for

the set button 12 to be pressed in step S3, and in response to the press of the set button 12, the CPU 42 fully displays the top image of the moving image file 66 on the LCD 10 in step S4. At this point, the operator selects the image to be the edit point in the moving image file 66 by sending/returning the image using the direction instruction button 13.

[0043] Next, the CPU 42 selects an image serving as an edit point in the moving image file 66 in accordance with the operator's instruction in step S5. At this point, the operator operates various buttons 11 to 13 to select the desired edit mode shown in FIGS. 8 and 9. Next, the CPU 42 determines whether or not the edit mode is selected in step S6, and proceeds to step S7 if it is not selected and proceeds to step S8 if it is selected. In step S7, the CPU 42 determines whether or not the mode button 11 has been pressed. If it is not pressed, the process returns to step S5, and if it is pressed, the edit mode ends.

[0044] In step S8, the CPU 42 determines which of "scissors" and "paste" is selected. When "scissors" is selected, the process proceeds to step S10 of FIG. 11, and when "paste" is selected, the process of FIG. 10 proceeds to step S20. In step S10, the CPU 42 determines which one of the first half erasing mode, the second half erasing mode, and the split mode is selected in the scissors mode.

[0045] When the first half erasing mode is selected, in step S11, the CPU 42 overwrites and saves only the portion after the edit point selected in step S5 of FIG. 10. At this time, in the circuit of FIG. 2, after the moving image data to be edited is read from the flash memory 46 to the SDRAM 26, only the moving image data after the editing point is written to the original address of the flash memory 46.

[0046] When the second half erasing mode is selected, in step S12, the CPU 42 overwrites and saves only the portion before the editing point selected in step S5 of FIG. 10. At this time, in the circuit of FIG. 2, after the moving image data to be edited is read from the flash memory 46 to the SDRAM 26, only the moving image data before the editing point is written to the original address of the flash memory 46.

[0047] When the division mode is selected, the CPU 42 overwrites and saves the portion after the edit point in step S13, and searches for the file number in the moving image folder 65 in step S14. Next, the CPU 42 creates a new file in step S15, sets the file name to the file name of the first half, and saves the part before the edit point in the new file in step S16. At this time, in the circuit of FIG. 2, after the moving image data to be edited is read from the flash memory 46 to the SDRAM 26, only the moving image data after the editing point is written at the original address of the flash memory 46. The previous moving picture data is written in another address of the flash memory 46.

[0048] When "glue" is selected in step S8 of FIG. 10, the CPU 42 multi-reproduces and displays the reduced image that is the index of the moving image file 66 in step S20 of FIG. 12, and the desired reduction is performed according to the operator's instruction in step S21. A desired moving image file 66 is selected by selecting an image.

[0049] Next, the CPU 42 concatenates the file to be played 66 (the file 66 selected in step S2) and the selected file 66 (the file 66 selected in step S21) in step S22 by overwriting and saving the selected file. 66 is deleted in step S23.

[0050] At this time, in the circuit of FIG. 2, after the moving image data of the file 66 to be reproduced and the moving image data of the selected file 66 are read from the flash memory 46 to the SDRAM 26, the two moving image data are connected to each other in the flash memory 46. It is written in the address of the moving image data of the file 66 to be reproduced. The moving image data of the selected file 66 is erased in the flash memory 46.

[0051] It should be understood that the embodiments disclosed this time are exemplifications in all points and not restrictive. The scope of the present invention is shown not by the above description but by the claims, and is intended to include meanings equivalent to the claims and all modifications within the scope.

[0052] As described above, according to the first aspect of the invention, in the edit mode, the first moving image is selected from the moving images read from the storage means and displayed on the image display means. The selecting means and the editing means for editing the selected moving image are provided. Therefore, the moving image can be easily edited with the digital camera alone.

[0053] In the invention according to claim 2, the editing means of the invention according to claim 1 is the second selecting means for selecting a desired image from the selected moving images and the moving image selected from the moving images. Erasing means for erasing an image before or after the image. In this case, a part of the moving image can be selectively erased.

[0054] In the invention according to claim 3, the editing means of the invention according to claim 1 is a second selecting means for selecting a desired image from the selected moving images, and an image for which the moving image is selected. And a dividing unit that divides into two at a boundary. In this case, the moving image can be divided into two at any division point.

[0055] In the invention according to claim 4, the first selecting means of the invention according to claim 1 selects two moving images, and the editing means connects the two moving images. In this case, any two moving images can be easily connected.

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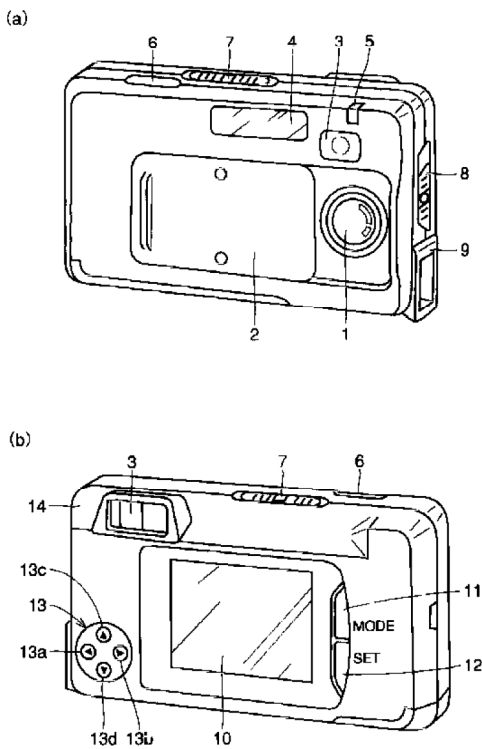
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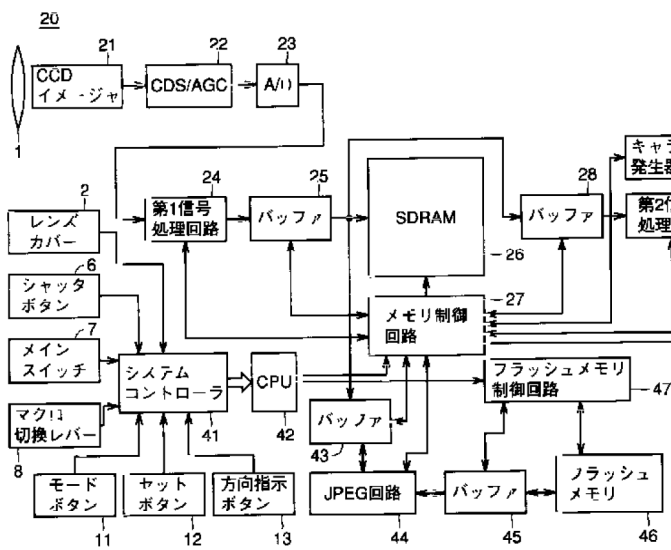
1. A digital camera having a moving image shooting mode for shooting a moving image of a subject and an editing mode for editing the shot moving image, the storage means storing the moving image shot in the moving image shooting mode, and the editing mode. An image display unit for displaying the moving image read from the storage unit; a first selecting unit for selecting a moving image to be edited from the moving images displayed by the image display unit; A digital camera, comprising: editing means for editing the moving image selected by the first selecting means.
2. The editing means includes a second selecting means for selecting a desired image from a plurality of images included in the moving image selected by the first selecting means, and the first storing means which is stored in the storage means. The digital camera according to claim 1, further comprising: an erasing unit that erases an image before or after the image selected by the second selecting unit among the moving images selected by the selecting unit.
3. The editing means includes a second selecting means for selecting a desired image from a plurality of images included in the moving image selected by the first selecting means, and the first storing means which is stored in the storage means. The digital camera according to claim 1, further comprising: a dividing unit that divides the moving image selected by the selecting unit into two moving images with the image selected by the second selecting unit as a boundary.
4. The first selecting unit selects two moving images to be edited, and the editing unit connects the two moving images stored in the storage unit and selected by the first selecting unit. Item 1. The digital camera according to Item 1.

アイコン

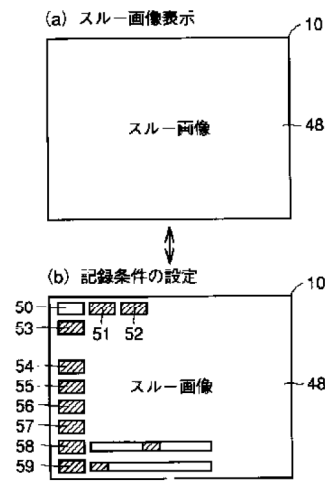
【図1】



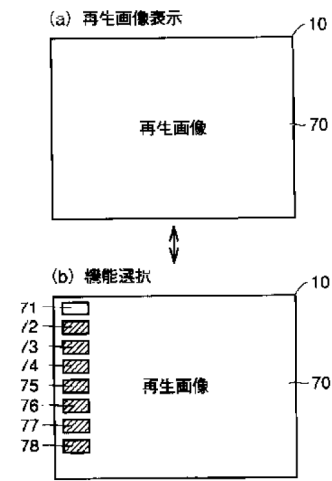
【図2】



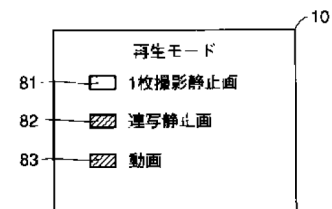
【図3】



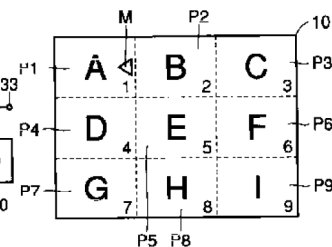
【図5】



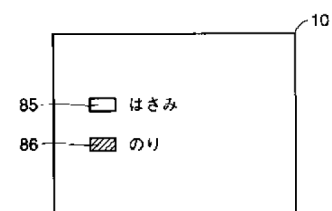
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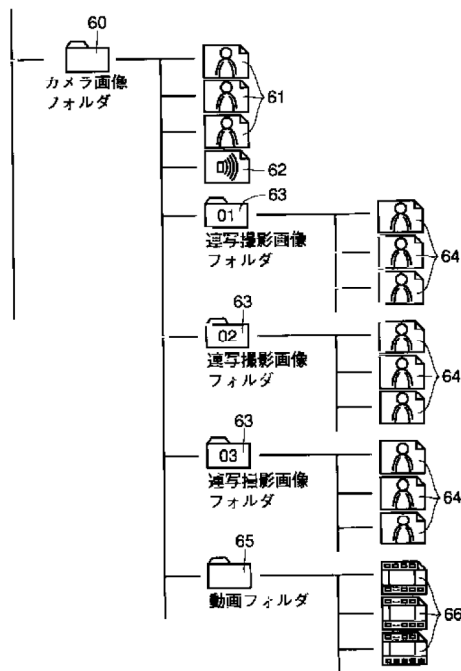
【図7】



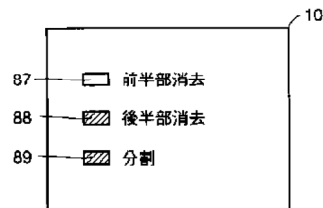
【図8】



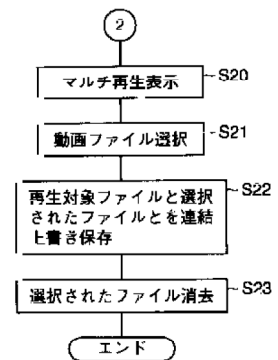
【図4】



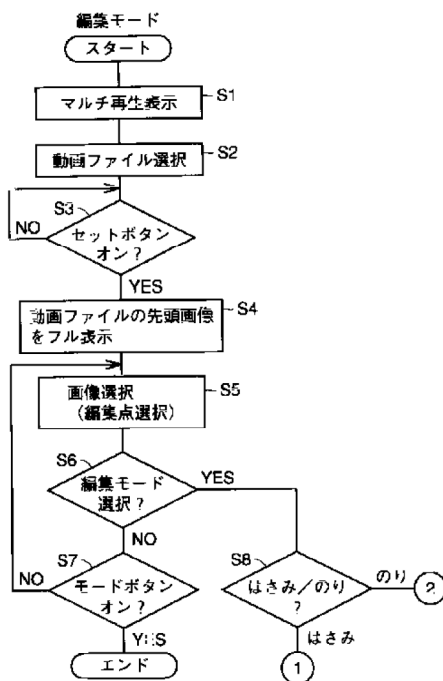
【図9】



【図12】



【図10】



【図11】

