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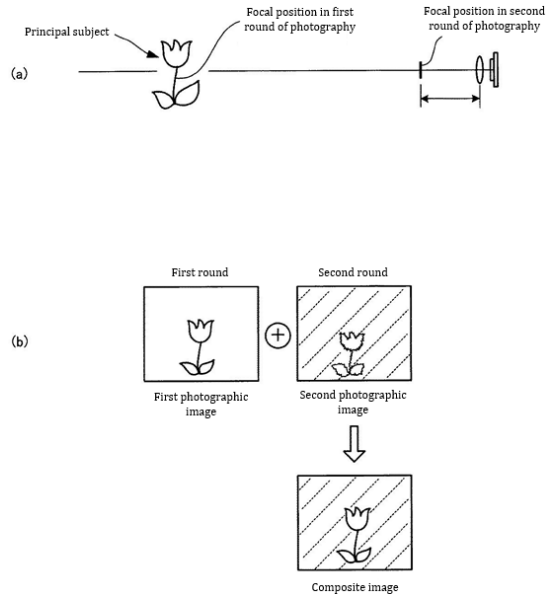
(54) [Title] Photographic Device

(57) [Abstract]

[Problem] To provide a photographic device that, while being a photographic device equipped with an imaging element of a small area, can obtain an image having similar *bokeh* to an image photographed by a silver halide camera.

[Solution] First, in a first round of photography, a first image is obtained that is focused on a principal subject. In a second round of photography, a second image is obtained that is focused at a shorter distance than the principal subject, is more wide-angle than the first image, and has the principal subject and a background blurred. Compositing is performed by cutting out the principal subject in the first image and replacing a region of the second image identical to the principal subject cut out from the first image with this principal subject cut out from the first image. This generates an image having similar *bokeh* to an image photographed by a silver halide camera.

[Selected FIG.] FIG. 4



[Claims]

[Claim 1]

A photographic device that forms an image of a subject on an imaging element by a photographic optical system and generates an image representing the subject, comprising:
an image generation means for generating a first image, which is focused on a principal subject, and a second image, which has the principal subject and a background blurred and is more wide-angle than the first image, the first image and the second image being of the same subject; and

10 an image compositing means for generating a composite image by cutting out the principal subject in the first image and replacing a region of the second image identical to the principal subject cut out from the first image with the principal subject cut out from the first image.

[Claim 2]

The photographic device of claim 1, wherein the photographic optical system is a photographic optical system having a focal-length adjustment function and a focus adjustment function, and
the image generation means obtains, by photographing the same subject, a first photographic image, which is focused on the principal subject, and a second photographic image, which is more on a wide-angle side than the first photographic image and is focused at a shorter distance than a distance to the principal subject, and defines the first photographic image as the first image and the second photographic image as the second image.

20 [Claim 3]

The photographic device of claim 1, wherein the photographic optical system has a focal-length adjustment function and a focus adjustment function, and
the image generation means obtains, by photographing the same subject, a first photographic image, which is focused on the principal subject, and a second photographic image, which is focused on the principal subject but is more on a wide-angle side than the first photographic image, and defines the first photographic image as the first image and, upon generating a blurred image by subjecting the second photographic image to a blurring process, the blurred image as the second image.

[Claim 4]

30 The photographic device of claim 2 or 3, further comprising: an emission means for emitting a photography auxiliary light; and an emission control means for emitting the photography auxiliary light in photographing the first photographic image and not emitting the photography auxiliary light in photographing the second photographic image.

[Claim 5]

The photographic device of claim 1, wherein the photographic optical system has a focus adjustment function, and
the image generation means obtains, by photography, a first photographic image focused on the principal subject; subjects the first photographic image to an enlarging process corresponding to a photographic image more on a telephoto side than the first photographic image to obtain an enlarged image; and defines the enlarged image as the first image and, upon subjecting the photographic image prior to the enlarging process to a blurring process to generate a blurred image, the blurred image as the second image.

40 [Claim 6]

The photographic device of claim 1, further comprising: a through-the-lens-image display means for displaying a moving image of the subject prior to a photography instruction; wherein the through-the-lens-image display means displays a frame guide for a head and shoulder shot of the principal subject together with the moving image of the subject.

[Claim 7]

The photographic device of claim 1, further comprising: a blurring-level setting means for setting an extent of blurring in the second image; wherein
the image generation means generates a second image having blurring of a level set by the blurring-level setting means.

50 [Description]

[Field]

[0001]

The present invention relates to a photographic device that forms an image of a subject on an imaging element by a photographic optical system and generates image data representing the subject.

[Background]

[0002]

Conventional art is proposed for obtaining an aesthetic image ("*bokeh*" hereinbelow) on film that is intentionally blurred by performing multiple exposure while moving a focus lens in silver halide camera photography (for example, see patent literature 1).

[0003]

Furthermore, recent art also includes art that, by taking advantage of digital cameras being equipped with an image signal processing circuit, performs continuous photography (continuous shooting) while shifting a focal position and composites images obtained by the continuous shooting by this image signal processing unit in an attempt to obtain a *bokeh* image (for example, see patent literature 2).

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[0004]

Furthermore, recent art also includes art that, by making use of labs being equipped with a printing device that performs digital exposure, subjects an image to a blurring process or the like by this printing device when printing an image from a negative on photographic paper in an attempt to obtain a *bokeh* image (for example, see patent literature 3).

[0005]

Now, a size of a photosensitive surface of an imaging element is considerably smaller than a size of a photosensitive surface of film (for example, 24 mm × 36 mm in 35 mm film). Because of this, when a subject is photographed by a silver halide camera using a lens with a bright *f* value, an image with a *bokeh* background is obtained, but when the same subject is photographed by a digital camera, in contrast to the conventional photographic image from the silver halide camera, an image is obtained that, due to the difference in the size of the photosensitive surface, has the background and a principal subject all in focus, without a blurred background.

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[0006]

Using an imaging element having a photosensitive surface of the same size as the photosensitive surface of the above film in the digital camera prevents the above situation, but this makes the digital camera large in size.

[Patent Literature 1] JP H5-313060 A

[Patent Literature 2] JP 2003-209727 A

[Patent Literature 3] JP H10-233919 A

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[Summary]

[Technical Problem]

[0007]

In view of these circumstances, the present invention has as an object to provide a photographic device that, while being a photographic device equipped with an imaging element of a small area, can obtain an image having similar *bokeh* to an image photographed by a silver halide camera.

[Solution to Problem]

[0008]

A photographic device of the present invention that achieves the above object is a photographic device that forms an image of a subject on an imaging element by a photographic optical system and generates image data representing this subject, provided with:

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an image generation means of generating a first image, which is focused on a principal subject, and a second image, which has the principal subject and a background blurred and is more wide-angle than the first image, the first image and the second image being of the same subject; and

an image compositing means of generating a composite image by cutting out the principal subject in the first image and replacing a region of the second image identical to the principal subject cut out from the first image with this principal subject cut out from the first image.

[0009]

According to the photographic device of the present invention, the image generation means generates the first image and the second image, and the image compositing means cuts out the principal subject in the first image and replaces the region of the second image identical to the principal subject cut out from the first image with the principal subject cut out from the first image.

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[0010]

Here, by making the second image an image that is more wide-angle than the first image, a size of the principal subject in the second image is made smaller than the principal subject in the first image. Then, the background of the principal subject in the second image is blurred, and the region of this second image with

the blurred background identical to the principal subject cut out from the first image is replaced with the principal subject cut out from the first image.

[0011]

That is, when the background of the principal subject in the second image is blurred, a contour periphery of the principal subject also undergoes *bokeh*, widening the contour periphery. As such, the principal subject in the second image is made smaller and replaced with the first principal subject, and afterward, the *bokeh* of the contour periphery of the principal subject in the second image is made to not appear in a periphery of the principal subject so the *bokeh* effect only appears in a portion other than the principal subject. By doing so, the *bokeh* effect only appears in the portion other than the principal subject, which is at a focal position, such that a *bokeh* image substantially similar to an image photographed by a silver halide camera is obtained.

10

[0012]

As described above, this realizes a photographic device that, while being a photographic device equipped with an imaging element of a small area, can obtain an image having similar *bokeh* to an image photographed by a silver halide camera.

[0013]

Here, the photographic optical system may be a photographic optical system having a focal-length adjustment function and a focus adjustment function, and

the image generation means may obtain, by photography, a first photographic image, which is focused on the principal subject, and define this as the first image and define a second photographic image, which is more on a wide-angle side than this first photographic image and is focused at a shorter distance than a distance to the principal subject, as the second image.

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Alternatively, the photographic optical system may have a focal-length adjustment function and a focus adjustment function, and

the image generation means may obtain, by photographing the same subject, a first photographic image, which is focused on the principal subject, and a second photographic image, which is focused on this principal subject but is more on a wide-angle side than this first photographic image, and define this first photographic image as the first image and, upon generating a blurred image by subjecting the second photographic image to a blurring process, this blurred image as the second image.

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[0014]

Here, preferably, further provided are: an emission means of emitting a photography auxiliary light; and an emission control means of emitting the photography auxiliary light in photographing the first photographic image and not emitting the photography auxiliary light in photographing the second photographic image.

[0015]

This emphasizes the contour of the principal subject in the first photographic image and facilitates the image compositing means cutting out the principal subject.

[0016]

Alternatively, the photographic optical system may have a focus adjustment function, and the image generation means may obtain, by photography, a first photographic image focused on the principal subject; subject this first photographic image to an enlarging process corresponding to a photographic image more on a telephoto side than this first photographic image to obtain an enlarged image; and define this enlarged image as the first image and, upon subjecting the photographic image prior to the enlarging process to a blurring process to generate a blurred image, this blurred image as the second image.

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[0017]

Furthermore, preferably, further provided is: a through-the-lens-image display means of displaying a moving image of the subject prior to a photography instruction; wherein the through-the-lens-image display means displays a frame guide for a head and shoulder shot of the principal subject together with the moving image of the subject.

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[0018]

When the subject is a person, a full shot often causes the person and the background to not match, producing an image where the person seems to be floating. Therefore, during photography, it is favorable to display the frame guide to a photographer to instruct the photographer to shoot a head and shoulder shot to prevent failed photography in advance.

[0019]

Furthermore, more preferably, further provided is: a blurring-level setting means of setting an extent of blurring in the second image; wherein

the image generation means generates a second image having blurring of a level set by the blurring-level setting means.

[0020]

This enables the photographer to photograph upon setting the extent of blurring by the blurring-level setting means so a *bokeh* image of the photographer's preference is obtained.

[Advantageous Effects of Invention]

[0021]

10 As described above, this realizes a photographic device that, while being a photographic device equipped with an imaging element of a small area, can obtain an image having similar *bokeh* to an image photographed by a silver halide camera.

[Description of Embodiments]

[0022]

A digital camera that is one embodiment of a photographic device of the present invention is described below.

[0023]

20 FIG. 1 is an external perspective view of a digital camera 10 that is one embodiment of the photographic device of the present invention as viewed from the front and diagonally above. (a) in FIG. 1 illustrates a view of a front surface of the digital camera 10 as viewed from diagonally above, and (b) in FIG. 1 illustrates a view of a back surface of the digital camera 10 as viewed from diagonally above.

[0024]

This digital camera 10 illustrated in (a) and (b) in FIG. 1 is a photographic device that forms a subject image on an imaging element by a photographic optical system and generates an image signal for recording in response to a release button being pressed.

[0025]

30 A zoom lens barrel 10_1 internally provided with a photographic lens 10_1a that is an optical zoom lens is provided in a central portion of the front surface of the digital camera 10 illustrated in (a) in FIG. 1. Provided above this zoom lens barrel is a flash emission window 10_2 for irradiating a flash light to a subject when a field brightness is low and a flash dimming sensor 10_3 for adjusting a light amount of the flash light emitted toward the subject through the flash emission window 10_2.

[0026]

This flash dimming sensor 10_3 receives a flash light that, when the flash light is irradiated toward the subject through the flash emission window 10_2, strikes the subject, is reflected by the subject, and returns. A control unit inside the digital camera controls automatically stopping irradiation of the flash light when the light amount received by this flash dimming sensor 10_3 increases over time and reaches a predetermined value. Moreover, an optical-finder objective window 10_4 paired with an optical-finder eyepiece window (described below) on a back-surface side is provided next to this dimming sensor 10_3.

[0027]

40 Furthermore, a release button 10_11 is disposed on an upper surface of the digital camera.

[0028]

Furthermore, as illustrated in (b) in FIG. 1, an optical-finder eyepiece window 10_12; a finder lamp 10_13 that turns on when, for example, photography preparation is completed and blinks during photography; a mode switch 10_14 that switches between a photography mode and a playback mode; a zoom button 10_15 that zooms up toward a wide-angle side (wide side) by being pressed or zooms up toward a telephoto side (tele side) by being pressed; and the like are disposed in a back-surface upper portion of the digital camera 10.

[0029]

50 Furthermore, a menu/OK button 10_16, a DISP button 10_17, and a BACK button 10_18 are provided below the zoom button 10_15. This menu/OK button 10_16 is a button for displaying various menus during photography or playback and determining a selected menu. When this menu/OK button 10_16 is pressed and the photography mode is selected when a plurality of selection items including the photography mode is displayed on a liquid-crystal panel 10_30a, a mode referred to as a background blurring mode, indicating a type of the photography mode, is displayed as one of the selection items.

[0030]

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