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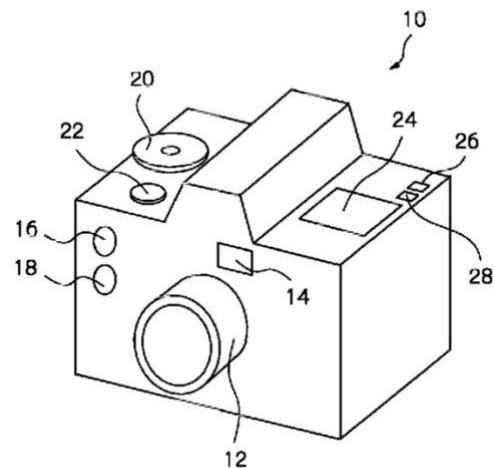
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(54) [Title of the Invention] Image Capturing Device

(57) [Abstract]

[Problem] To perform photography simply and reliably using voice audio input in cases where the photographer is the subject.

[Solution] Voice audio registration mode is set using a mode dial 20, and a first voice audio pattern for focus adjustment and a second voice audio pattern for shutter release are registered in response to voice audio input using a microphone 16. When voice audio photography mode is set, a voice audio recognition process is performed on voice audio input using the microphone 16, with focus adjustment being performed if voice audio corresponding to the first voice audio pattern is recognized, and shutter release control being performed after a prescribed amount of time has elapsed if voice audio corresponding to the second voice audio pattern is recognized.



[Claims]

[Claim 1] An image capturing device which uses a prescribed image capturing means to capture images of a desired subject field which is incident through an optical system including a lens, wherein the device includes a voice audio input means for inputting voice audio from the direction of incidence of the subject field, a voice audio recognition means for recognizing whether the voice audio input by the voice audio input means includes a prescribed voice audio pattern, a time measurement means for measuring a prescribed amount of elapsed time when the voice audio recognition means has recognized a prescribed voice audio pattern, and an image capturing control means for controlling an image capturing operation by the image capturing means of the desired subject field through the optical system when the time measurement means has measured the prescribed amount of elapsed time.

[Claim 2] The image capturing device as claimed in claim 1, wherein the time measurement means has a pre-set desired set time, and the device includes a time adjustment means for variably adjusting the set time.

[Claim 3] The image capturing device as claimed in claim 1, wherein the device includes a voice audio registration means for registering a plurality of voice audio patterns ahead of time, and a focus control means for controlling the optical system to focus on the subject field which is incident into the image capturing means, and the voice audio recognition means includes a first voice audio recognition means which launches the focus control means upon recognizing a first voice audio pattern from the voice audio input means based on the first voice audio pattern registered in the voice audio registration means ahead of time, and a second voice audio recognition means which launches the time measurement means upon recognizing a second voice audio pattern from the voice audio input means based on the second voice audio pattern registered in the voice audio registration means ahead of time.

[Claim 4] The image capturing device as claimed in any one of claims 1 to 3, wherein the device includes an annunciation means for announcing towards the subject field at least whether the voice audio recognition has recognized a prescribed voice audio pattern.

[Claim 5] The image capturing device as claimed in claim 4, wherein the annunciation means includes a light emitting means attached to a front surface of a main device body to which the optical system is provided, and a drive means for driving the light emitting means based on recognition results of the voice audio recognition means, the drive means causing the light emitting means to blink in a first blinking pattern when a prescribed voice audio pattern has been recognized by the voice audio recognition means, and causing the means to blink in a second blinking pattern when a prescribed voice audio pattern has not been recognized.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention] The present invention relates to image capturing devices, and more particularly relates to an image capturing device suitable for application to silver halide film cameras or digital cameras which use electronic control to control image capturing operations, for example.

[0002]

[Prior Art] The number of functions has been increasing in image capturing devices such as single reflex cameras, compact cameras, or digital still cameras, for example, and microcomputers and the like are being used as control units controlling the various functions. High-functionality and high-precision electronics have also been developed for such cameras, and there has been recent progress in voice audio recognition technology, leading to the development of various types of equipment and devices allowing operational control of various parts using voice audio input.

[0003] Conventionally, the cameras described in, for example, JP S64-56428 A, JP H7-84302 A, or JP H7-84311 A, have been proposed as image capturing devices to which such voice audio recognition technology has been applied. In essence, these image capturing devices strive to improve ease and speed of use by using voice audio input to control the various functions needed for photography operations, such as setting the exposure mode of the camera or the like, while the operator is looking into the camera's viewfinder, i.e. while the photographer is holding the camera and looking at the subject.

[0004] JP S64-56428 A, for example, describes mounting a voice audio recognition device on a camera, connecting the voice audio recognition device to the camera using microwave, ultrasonic, or other communication means, or incorporating the voice audio recognition device inside the camera. When the voice audio recognition device is built into the camera or mounted thereon, a voice audio input microphone is provided to the rear surface of the camera, allowing the photographer to use voice audio input through that microphone to control photographic functions or operations such as flash, zoom, exposure correction, self timer, continuous photography, and single-shot photography, etc. Alternately, when the voice audio recognition device is connected to the camera using the communication means, the same type of control as described above can be performed via remote control for a plurality of cameras based on voice audio input recognized by the voice audio recognition device.

[0005] On the other hand, in the camera described in JP H7-84302 A, a vibration detection sensor which detects vibrating waves produced by voice audio transmitted through the skin or bones of the photographer's face is provided around the viewfinder in order to reliably detect the photographer's voice; an earphone-type microphone which detects voice audio vibrations transmitted by the photographers years is connected; and a voice audio input microphone like the one in JPS 64-56428 A is provided to the rear surface of the camera body. In this manner, if the photographer emits voice audio while holding the camera, the voice audio is detected by the vibration detection sensor, the earphone, or the microphone, or any combination thereof, to control various photographic functions or operations.

[0006] With the camera described in JP H7-84311 A, a voice audio input microphone is provided on the rear surface of the camera body, in the middle lower section or along the top edge, allowing input of voice audio depending on how the camera is being held. For example, if the camera is being held in an ordinary horizontal attitude, the voice audio is input using the microphone in the middle lower section of the rear surface, but if the camera is held in a vertical attitude, the voice audio is input using the microphone along the top edge, thereby allowing control of photographic functions and operations.

[0007]

[Problem to Be Solved by the Invention] However, with these conventional technologies, photographic functions and operations are controlled via voice audio input through a microphone provided, for example, to the rear surface of the camera while the camera is being held by the photographer, meaning that if the photographer him or herself is the subject, such as for commemorative photographs or the like, photography via voice audio operation is difficult, which is a drawback.

[0008] Let us assume, for example, that a photographer looks through the viewfinder with the camera in a fixed position, imagines the location in which he or she is to be photographed, adjusts the focus and so forth for that location, and otherwise configures photographic functions in the camera in that fixed location. When the photographer then moves to the location to be photographed, he or she must carry out a shutter release operation. Although the photographer can configure the exposure and almost all other photographic functions using voice audio input with the camera in the fixed position, the problem arises that it is impossible to tell whether the focus is on the actual location to be photographed if there is nothing in that location. It is conceivable for the photographer to combine use of the self timer to carry out the shutter release operation, use voice audio input to give the camera the instruction to take the picture with the camera in the fixed position, and then go to the location to be photographed, but this requires the photographer to give the instruction orally near the rear surface of the camera, in which case ordinary button operation would be more convenient. It is also conceivable for the photographer to give the camera the instruction to take the picture by saying something from the location to be photographed, thereby triggering the shutter release operation, but since the voice audio input microphone is on the rear surface of the camera, it is uncertain whether the voice audio input would be accurately recognized, which is a problem. In this case, even if the voice audio from the photography location is recognized by the camera, the shutter release operation would occur immediately, meaning the photographer would be photographed while speaking, making it impossible for him or her to be photographed with the desired facial expression or pose, which is a problem.

[0009] The present invention eliminates these drawbacks in the prior art and has as an object to provide an image capturing device which allows simple and reliable photography operations via voice audio input when the photographer is the subject.

[0010]

[Means for Solving the Problem] In order to solve this problem, the present invention is an image capturing device which uses a prescribed image capturing means to capture images of a desired subject field which is incident through an optical system including a lens, wherein the device includes a voice audio input means for inputting voice audio from the direction of incidence of the subject field, a voice audio recognition means for recognizing whether the voice audio input by the voice audio input means includes a prescribed voice audio pattern, a time measurement means for measuring a prescribed amount of elapsed time when the voice audio recognition means has recognized a prescribed voice audio pattern, and an image capturing control means for controlling an image capturing operation by the image capturing means of the desired subject field through the optical system when the time measurement means has measured the prescribed amount of elapsed time.

[0011] In this case the time measurement means advantageously has a pre-set desired set time, and the device includes a time adjustment means for variably adjusting the set time.

[0012] Furthermore, the device includes a voice audio registration means for registering a plurality of voice audio patterns ahead of time, and a focus control means for controlling the optical system to focus on the subject field which is incident into the image capturing means, and the voice audio recognition means includes a first voice audio recognition means which launches the focus control means upon recognizing a first voice audio pattern from the voice audio input means based on the first voice audio pattern registered in the voice audio registration means ahead of time, and a second voice audio recognition means which launches the time measurement means upon recognizing

a second voice audio pattern from the voice audio input means based on the second voice audio pattern registered in the voice audio registration means ahead of time.

[0013] Furthermore, the device preferably includes an annunciation means for announcing towards the subject field at least whether the voice audio recognition has recognized a prescribed voice audio pattern.

[0014] In this case, the annunciation means advantageously includes a light emitting means attached to a front surface of a main device body to which the optical system is provided, and a drive means for driving the light emitting means based on recognition results of the voice audio recognition means, the drive means causing the light emitting means to blink in a first blinking pattern when a prescribed voice audio pattern has been recognized by the voice audio recognition means, and causing the means to blink in a second blinking pattern when a prescribed voice audio pattern has not been recognized.

[0015]

[Embodiments] One embodiment of an image capturing device according to the present invention will be described in detail next, with reference to the attached drawings. Figures 1 and 2 show an embodiment of an image capturing device according to the present invention. The image capturing device according to the present embodiment is a camera which takes photographs by exposing on silver halide film a subject field entering through an optical system including a lens. The present embodiment is described using as an example an electronically controlled camera in which electronic control is used to control photographic functions such as exposure settings and focus and photographic operations such as shutter release. In particular, a principal feature of the image capturing device according to the present embodiment is the inclusion of a voice audio recognition photography function with which photographic operations are carried out using voice audio input in cases where the photographer is the subject. Note that Figures 1 and 2 omit parts which are not directly related to the present invention, and descriptions thereof are omitted in the following.

[0016] An outer configuration of the image capturing device according to the present invention is first described in greater detail with reference to Figure 1. The image capturing device according to the present embodiment comprises a camera body 10 formed having a substantially box-like shape, to which is attached a lens barrel 12 of an optical system including a lens, a diaphragm, and a shutter, protruding outward from the front surface in a location near the center, with a rangefinder window 14 for autofocus provided nearby, above or diagonally. To the side of the lens barrel 12 are provided a forward directional microphone 16 for inputting voice audio emitted from the direction of the subject, and a light-emitting diode (LED) 18 which turns on and off according to prescribed blinking patterns during voice audio recognition.

[0017] A shutter release button 22, which is pressed to drive the shutter when in ordinary manual photography mode, and a mode dial 20 for selecting manual photography mode, voice audio photography mode, and voice audio pattern registration mode are provided to one side on the top surface of the camera body 10, and a liquid crystal display 24 which displays function configurations, and a plus (+) adjustment button 26 and a minus (-) adjustment button 28 for scrolling the display and for configuring settings are provided to the other side.

[0018] A circuit configuration of a control system of the image capturing device according to the present embodiment is described next, with reference to Figure 2. A control system of the image capturing device according to the present embodiment includes a switch detection circuit 100, a timer circuit 102, a flash drive circuit 104, a voice audio pattern registration circuit 106, a display control circuit 108, a light measurement circuit 110, an LED drive circuit 112, an autofocus (AF) circuit 114, a lens barrel drive circuit 116, a film feed circuit 118, a shutter drive circuit 120, a voice audio input circuit 122, and a voice audio recognition circuit 124, these circuits 100 to 124 being connected to a main control circuit (CPU (central processor unit)) 126 and configured so as to drive and control various parts of the camera.

[0019] To describe the various parts in greater detail, the switch detection circuit 100 is a detection circuit which detects switching of the mode dial 20, pressing of the shutter release button 22, and pressing of the adjustment buttons 26 and 28, and sends the results thereof to the main control circuit 126.

[0020] The timer circuit 102 is a time measurement circuit which measures the time set by the self timer in manual photography mode using the shutter release button 22 and a prescribed shutter release standby time in voice audio photography mode. In the present embodiment, a prescribed amount of time is set ahead of time for voice audio photography mode, but this set amount of time can be adjusted to be variably longer or shorter by operating the adjustment buttons 26 and 28.

[0021] The flash drive circuit 104 is a drive circuit which drives light emission by the flash under the control of the main control circuit 126. In the present embodiment, light emission by the flash is driven based on light measurement results from the light measurement circuit 110 when the flash has been turned on using the liquid crystal display, for example.

[0022] The voice recognition pattern registration circuit 106 is a storage circuit which stores voice recognition patterns input from the voice recognition input circuit 122 when the mode dial 20 has been switched to the position indicating voice audio registration mode, and has a non-volatile storage element such as an EEPROM or the like. In particular, in the present embodiment, a first voice audio pattern for focus adjustment, e.g., a voice audio pattern of

the phrase "adjust the focus" or the like, and a second voice audio pattern for taking a photograph, e.g., a voice audio pattern of the photographer saying "take the picture" or the like, are registered ahead of time in the storage element as instruction patterns in voice audio photography mode.

[0023] The display control circuit 108 is a control circuit which drives the liquid crystal display (LCD) 24 and controls screen display therein, text data and symbols of various modes, etc., from the main control circuit 126 being displayed in the liquid crystal display 24.

[0024] The light measurement circuit 110 is a computational circuit for finding the amount of light entering the optical system under the control of the main control circuit 126, advantageously being able to switch among a variety of light measurement settings such as multi-pattern, central weighted, and spot measurement, for example. The light measurement results are supplied to the main control circuit 126 and used as indicative quantities for determining exposure and whether to turn the flash on.

[0025] The LED drive circuit 112 is a drive circuit that causes the light-emitting diode 18 on the front of the camera to blink in prescribed blinking patterns under the control of the main control circuit 126 when in voice audio photography mode. In the present embodiment, the LED drive circuit 112 is a recognition results annunciation circuit which instructs the photographer to input voice audio by turning on the light emitting diode 18 when in voice audio photography mode, causing the light-emitting diode 18 to blink in a first blinking pattern if voice audio is input and recognition thereof is successful, and causing the light-emitting diode 18 to blink in a second blinking pattern if recognition has failed.

[0026] The autofocus circuit 114 is a computational circuit for measuring the distance to the subject and finding the focal position thereof. In the present embodiment, the autofocus circuit 114 is launched when the first voice audio pattern has been recognized in voice audio photography mode, and finds the focal position of the subject. The computational results are sent to the main control circuit 126. The lens barrel drive circuit 116 is a drive circuit which drives the lens barrel 12 to a focal position found by the autofocus circuit 114 under the control of the main control circuit 126 to make the lens position match the focal position.

[0027] The film feed circuit 118 is a drive circuit for driving winding of the film under the control of the main control circuit 126. In the present embodiment, the film feed circuit 118 is advantageously an Advanced Photo System (APS)-compatible circuit which winds the film one frame at a time every time the shutter is released and rewinds the entirety of the film back into the cartridge once photography has ended at the end of the film.

[0028] The shutter drive circuit 120 is a drive circuit which opens and closes the shutter under the control of the main control circuit 126. In the present embodiment, the shutter drive circuit 120 drives the shutter in response to pressing of the shutter release button 22 when in manual photography mode, and drives the shutter once the timer circuit 102 has measured the release standby time following recognition of the second voice audio pattern when in voice audio photography mode.

[0029] The voice audio input circuit 122 is an input circuit for converting analog voice audio signals from the microphone 16 into digital signals and inputting digital signals, registering the digital signals in the voice audio pattern registration circuit 106 via the main control circuit 126 when in voice audio registration mode, and sending the digital signals to the voice audio recognition circuit 124 via the main control circuit 126 when in voice audio photography mode.

[0030] The voice audio recognition circuit 124 is a pattern detection circuit for detecting whether or not the voice audio signals from the voice audio input circuit 122 include the prescribed voice audio patterns in voice audio photography mode. In the present embodiment, the voice audio recognition circuit 124 is a voice audio cross-referencing circuit which sequentially cross-references the voice audio patterns input under the control of the main control circuit 126 with the first and second voice audio patterns registered ahead of time in the voice audio pattern registration circuit 106.

[0031] The main control circuit 126 is an image capturing control circuit for controlling a sequence of photographic operations in accordance with whichever mode of the mode dial 20 is detected by the switch detection circuit 100, and includes a central processing circuit (CPU) 120, ROM (read only memory) 130 storing data ahead of time for programs and the like for running the central processing circuit, including sequence programs for manual photography mode, voice audio photography mode, and voice audio registration mode, and RAM (random access memory) 132 storing various data including text data for displaying various mode settings and data used when computing exposures and focus.

[0032] Next, operation of the image capturing device according to the present embodiment is described, with reference to Figures 3 to 5. First, before taking any pictures, the photographer registers the first voice audio pattern for adjusting focus and the second voice audio pattern for taking a picture. Specifically, the photographer sets the mode dial 20 to voice audio registration mode, which is detected by the control system using the switch detection circuit 100, and the result is sent to the main control circuit 126. The main control circuit 126 then write-enables the voice audio pattern registration circuit 106 and waits for voice audio input from the microphone 16. While this is

happening, the main control circuit 126 launches the LED drive circuit 112 and turns on the light-emitting diode 18, for example.

[0033] The photographer speaks a phrase such as, for example, "adjust focus" as the first voice audio pattern. That audio signal is input from the microphone 16 into the voice audio input circuit 122 and converted into a digital signal which is written to the voice audio pattern registration circuit 106. While this is happening, the main control circuit 126 drives the LED drive circuit 112 to cause the light-emitting diode 18 to blink while the first voice audio pattern is being written. When writing is done, the light-emitting diode 18 is once again illuminated. Next, the photographer speaks a phrase such as, for example, "take a picture" as the second voice audio pattern, and the second voice audio pattern for taking pictures is registered in the voice audio pattern registration circuit 106 as described above. Photography using voice audio input is thus made possible.

[0034] Operation during photography is described next, with reference to Figure 3. First, the photographer turns the main power of the camera on in step S10. The main control circuit 126 then detects the state of various circuits and initializes various parts in step S12. Next, in step S14, the photographer operates the mode dial 20 and the adjustment buttons 26 and 28 while looking at the liquid crystal display 24 to select or set the photography mode and photography conditions, etc.

[0035] Once the photography mode, photography conditions, and so forth have been set, the main control circuit 126 moves to step S16 and determines whether voice audio photography mode has been selected. If manual photography mode has been selected, the main control circuit 126 moves to step S18 and executes the ordinary photography sequence triggered by pushing the shutter release button 22. If voice audio photography mode has been selected, the main control circuit 126 launches the voice audio input circuit 122, moves to step S20, and waits for the first voice audio input. At this point, the LED drive circuit 112 is driven and the light-emitting diode 18 is turned on. The photographer then fixes the camera 10 in a prescribed position, turns the camera towards the location to be photographed where the photographer him or herself will be the subject, and then moves to the location to be photographed. Once the photographer is at the location to be photographed, he or she speaks the phrase "adjust focus" which has been registered ahead of time, the voice audio is input from the microphone 16 into the voice audio input circuit 12, and the voice audio, which is now a digital signal, is sent sequentially to the voice audio recognition circuit 124.

[0036] The main control circuit 126 now reads out the first voice audio pattern from the voice audio pattern registration circuit 106 in step S22 and sends it to the voice audio recognition circuit 124. The voice audio patterns are cross-referenced with each other in the voice audio recognition circuit 124. More specifically, as shown in Figure 4 for example, the voice audio recognition circuit 124 extracts frequency patterns of the input voice audio and the registered voice audio in step S102, cross-references the frequency patterns in step S104, and sends the results to the main control circuit 126 in step S106.

[0037] The main control circuit 126, having received the recognition results from the voice audio recognition circuit 124, determines whether or not a voice audio pattern has been recognized in step S24 shown in Figure 3. If the determination result is "no," the main control circuit 126 moves to step S26 and instructs the LED drive circuit 112 to use the second blinking pattern indicating that the voice audio has not been recognized. As a result, when the LED drive circuit 112 causes the light-emitting diode 18 to blink in the second blinking pattern, the photographer sees the blinking pattern and understands that the voice audio could not be recognized. Next, the main control circuit 126 once again illuminates the light-emitting diode 18 and returns to step S20. The photographer then once again speaks the first voice audio pattern, and steps S20 to S24 are repeated. Once the voice pattern has been successfully recognized in step S22, the main control circuit 126 moves from step S24 to step S28 and instructs the LED drive circuit 112 to use the first blinking pattern indicating that the voice audio has been recognized. The light-emitting diode 18 thus blinks in the first blinking pattern.

[0038] Next, the main control circuit 126 moves to step S30 shown in Figure 4, launches the autofocus circuit 114, finds the focal distance of the subject, drives the lens barrel drive circuit 116 based on that result to adjust the lens position, and focuses on the subject. This operation is repeated several times until the subject is in focus, at which point the main control circuit 126 drives the LED drive circuit 112 so that the light-emitting diode stops blinking in the first pattern and is illuminated. The photographer thus understands that the focus has been adjusted and speaks the phrase "take a picture," which is the second voice audio pattern, in step S32. This voice audio is sent from the microphone 16 to the voice audio recognition circuit 124 via the voice audio input circuit 122 as described above and is cross-referenced with the second voice audio pattern registered ahead of time in the voice audio pattern registration circuit 106 as described above in step S34. The determination result is sent to the main control circuit 126 as described above where a determination is made as to whether or not the voice audio has been recognized in step S36.

[0039] In step S36, if the voice audio has not been recognized, then the light-emitting diode 18 is caused to blink in the second blinking pattern in step S38 and the process returns to step S32, once again standing by for input of the second voice audio pattern. When the voice audio is recognized in step S36, the main control circuit 126 moves from

step S36 to step S40, causes the light-emitting diode 18 to blink in the first blinking pattern as described above and launches the timer circuit 102. The timer circuit 102 then begins measuring a prescribed set time or an adjusted set time, and once that amount of time has elapsed, sends the result to the main control circuit 126. While this is happening, the camera 10 is standing by to take the photograph. The photographer, who is the subject in this case, sees that the light-emitting diode 18 is blinking in the first blinking pattern and understands that the voice audio has been recognized, and therefore adjusts his or her facial expression from having spoken the voice audio to a state ready to be photographed and waits for the camera shutter to be released.

[0040] Next, the main control circuit 126 receives the time measurement result from the timer circuit 102, cancels the photography standby state, and launches the shutter drive circuit 120 in step S42 to drive the shutter release, at which point an image of the subject is captured. Once the image of the subject has been captured, the main control circuit 126 drives the film feed circuit 118 in step S44 to wind the film, once again illuminates the light-emitting diode 18, and ends the photographic operation. To take another picture in the same location, the photographer can speak the second voice audio pattern again to take another picture, in which case steps S32 to S44 are repeated. If the location to be photographed is moved forward or back, the photographer can move to that location and speak the first voice audio pattern to adjust the focus, after which he or she can speak the second voice audio pattern to trigger the shutter release and take a photograph as described above.

[0041] With the image capturing device according to the present embodiment as described above, the voice audio input microphone 16 is provided to the front of the camera body 10 and the voice audio, which is emitted from the same direction as the subject entering the optical system, is input, enabling accurate input the voice audio and recognition of the voice audio when the photographer him or herself is the subject. During voice audio recognition, the light-emitting diode 18 which is provided to the front of the camera body 10 is caused to blink, letting the photographer know whether or not the voice audio has been recognized, enabling the photographer to continuously operate the camera using voice audio input without moving from that location. Inputting the first voice audio pattern adjusts the focus, and inputting the second voice audio pattern takes the picture, making it possible to accurately focus on the photographer, who is acting as the subject, by means of the photographer speaking the first voice audio pattern in the location to be photographed, and take the picture. Recognition of the second voice audio pattern launches the timer circuit 102 and releases the shutter after a prescribed amount of time has elapsed, giving the photographer time to adjust his or her facial expression and pose during that time. This makes it possible to be photographed accurately with the desired facial expression and while not in the middle of speaking.

[0042] Note that with the present embodiment, voice audio photography mode is set, the first voice audio pattern is recognized, and the autofocus circuit 114 is launched, but in order to shorten the focus adjustment time, it is also possible, for example as shown in Figures 6 and 7, to launch the autofocus circuit 114 in step S50 when voice audio photography mode has been set, carry out focus adjustment to find the right focus, and then re-focus in step S30 upon input of the first voice audio pattern (step S20) and lock the focus at this point.

[0043] Furthermore, the present embodiment has been described using as an example a case in which the present invention is applied to a camera using silver halide film, but it goes without saying that the present invention may also be applied to digital cameras using charge coupled devices (CCDs) as the image capturing means.

[0044] Furthermore, in the present embodiment, only the focus is adjusted as the photographic function setting triggered by voice audio input from the location to be photographed, but it is also possible in the present invention to use voice audio input from the location to be photographed to control exposure by means of the aperture and shutter speed, and to configure other photographic function settings such as zoom control as well. It is also possible to set the shutter release standby time to an amount of time corresponding to the results of a voice audio recognition process.

[0045] Furthermore, in the present embodiment, the photographer is notified of the voice audio recognition results by the blinking of the light emitting diode 18, but it is also possible in the present invention to provide a voice audio synthesizer circuit to the control system, for example, to emit the voice audio recognition results through the voice audio synthesizer.

[0046]

[Effects of the Invention] With the image capturing device according to the present invention, a voice audio input means is provided for inputting voice audio from the same direction as the direction of incidence of the subject field into the optical system, a recognition process is carried out to determine whether or not voice audio input from the voice audio input means includes prescribed voice audio patterns, and, if a prescribed voice audio pattern has been recognized, an image is captured of the subject field after measuring that a prescribed amount of time has elapsed. Therefore, in cases where the photographer is the subject, the photographer is able to photograph him or herself accurately with the correct facial expression by inputting voice audio accurately from the location to be photographed.

[Brief Description of the Drawings]

FIG. 1 is an oblique view showing one embodiment of an image capturing device according to the present invention.
 FIG. 2 is a block diagram showing a configuration of a control system of the image capturing device according to the embodiment in FIG. 1.

FIG. 3 is a flowchart for describing operation when in voice audio photography mode in the image capturing device according to the embodiment in FIG. 1.

FIG. 4 is a flowchart for describing operation when in voice audio photography mode in the image capturing device according to the embodiment in FIG. 1.

FIG. 5 is a flowchart for describing operation during voice audio recognition in the image capturing device according to the embodiment in FIG. 1.

FIG. 6 is a flowchart for describing operation during voice audio recognition in the image capturing device according to the embodiment in FIG. 1.

FIG. 7 is a flowchart for describing another operational example in the image capturing device according to the embodiment in FIG. 1.

[Explanation of the Reference Numerals]

10 Camera body
 12 Lens barrel
 16 Microphone
 18 Light-emitting diode
 20 Mode dial
 22 Shutter release button
 24 Liquid crystal display
 26, 28 Adjustment buttons
 102 Timer circuit
 106 Voice audio pattern registration circuit
 122 Voice audio input circuit
 124 Voice audio recognition circuit

FIG. 2

100 Switch detection circuit
 102 Timer circuit
 104 Flash circuit
 106 Voice audio pattern registration circuit
 108 Display control circuit
 110 Like measurement circuit
 112 LED drive circuit
 114 Autofocus circuit
 116 Lens barrel drive circuit
 118 Film feed circuit
 120 Shutter drive circuit
 122 Voice audio input circuit
 124 Voice audio recognition circuit
 126 Main control circuit
 128 CPU
 130 ROM
 132 RAM

FIG. 3

Start
 S10 Turn on power
 S12 Initialize
 S14 Select photography mode and photography conditions
 S16 Select voice audio photography mode
 S18 Ordinary photography sequence
 S20 Input first voice audio
 S22 Cross reference voice audio patterns
 S24 Voice pattern 1?

S26 LED blinking pattern 2
S28 LED blinking pattern 1

FIG. 4

S30 Autofocus
S32 Input second voice audio
S34 Cross reference voice audio patterns
S36 Voice audio pattern 2?
S38 LED blinking pattern 2
S40 Standby for predetermined amount of time (LED blinking)
S42 Release shutter
S44 Feed film
Return

FIG. 5

Start
S20 (S32) Input voice audio
S102 Extract frequency pattern
S104 Cross reference frequency pattern
S106 Return cross reference results
End

FIG. 6

Start
S10 Turn on power
S12 Initialize
S14 Select photography mode and photography conditions
S16 Select voice audio photography mode
S18 Ordinary photography sequence
S50 Autofocus
S20 Input first voice audio
S22 Cross reference voice audio patterns
S24 Voice pattern 1?
S26 LED blinking pattern 2
S28 LED blinking pattern 1

FIG. 7

S30 Focus lock
S32 Input second voice audio
S34 Cross reference voice audio patterns
S36 Voice audio pattern 2?
S38 LED blinking pattern 2
S40 Standby for predetermined amount of time (LED blinking)
S42 Release shutter
S44 Feed film
Return

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H04N 5/225		G10L 3/00	551G
5/232			561H
//H04N 101:00			561C