

(19) [Issuing Country] Japan Patent Office (JP)
 (12) [Publication Name] Gazette of Unexamined Patent Applications (A)
 (11) [Publication Number] 2004-212544 (P2004-212544A)
 (43) [Publication Date] July 29, 2004 (2004.7.29)

(51) [Int.Cl.⁷] **G10L 15/10**
A01K 67/00
G06F 3/16
G10L 13/00
G10L 15/00

[FI] G10L 3/00 531N
 A01K 67/00 D
 G06F 3/16 320H
 G06F 3/16 330K
 G10L 3/00 551A

[Theme Codes (Reference)] 2B102
 5D015
 5D045

[Examination Request] Not Yet Received

[Number of Claims] 17

[Application Format] Online (OL)

[Total Number of Pages] 33

Continued on last page

(21) [Application Number] 2002-380727 (P2002-380727)

(22) [Filing Date] December 27, 2002 (2002.12.27)

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[F Terms (Reference)]

2B102 AA13 AA15 AC20 AD05 AD22 AD35 BD10

5D015 AA06 BB02 HH13 KK01 KK04 LL05 LL06

5D045 AB04 AB26 AB30

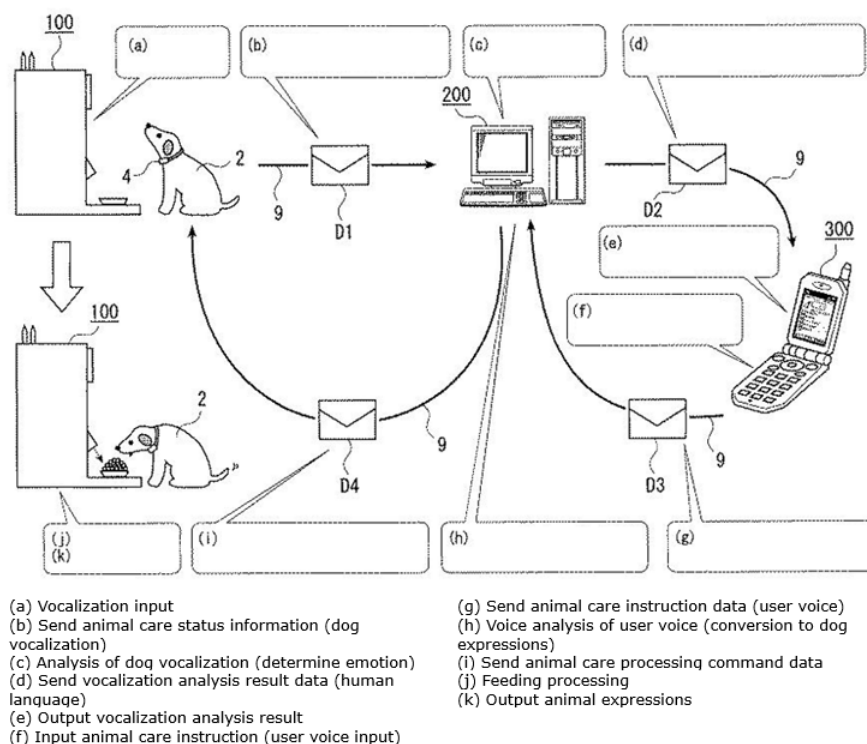
(54) [Title of the Invention] **Vocalization Analysis Result Transmitting Device, Animal Terminal Device, Vocalization Analysis Result Display Device, and Program**

(57) [Abstract]

[Problem] To ensure that even when a human and animal are at separate locations, the human can discern the emotions of the animal and carry out appropriate care.

[Solution] An animal care terminal 100 transmits the vocalizations of a dog 2 to a management server 200 as animal care status data D1. The management server 200 determines the emotion in the vocalization data of the dog 2 and transmits the corresponding expression in a human language to a user terminal 300 as vocalization analysis result data D2. The user terminal 300 outputs the expression in a human language of the vocalization analysis result data D2. The user terminal 300 is used to send animal care instruction data D3 to the management server 200. The management server 200 retrieves the animal expression corresponding to the animal care instruction data D3 and transmits it together with an animal care instruction to the animal care terminal 100 as animal care processing command data D4. The animal care terminal 100 performs an animal care process such as feeding based on the animal care instruction in the animal care processing command data D4, and outputs an animal expression audibly.

[Selected Drawing] Fig. 2



[Claims]

[Claim 1]

A vocalization analysis result transmitting device that transmits, to a human terminal device, analysis results corresponding to a vocalization sent from an animal terminal device having an animal vocalization inputting means for inputting a vocalization of an animal, the vocalization analysis result transmitting device comprising:
an animal vocalization receiving means for receiving the vocalization inputted by the animal vocalization inputting means from the animal terminal device;
an analyzing means for analyzing the vocalization received by the animal vocalization receiving means; and
an analysis result transmitting means for transmitting the analysis results analyzed by the analyzing means to a human terminal device.

[Claim 2]

A vocalization analysis result transmitting device that communicates with an animal terminal device having an animal vocalization inputting means for inputting a vocalization of an animal and an animal care processing means for operating and controlling a predetermined animal care device, and a human terminal device having instruction inputting means for inputting animal care instructions from the vocalization analysis result transmitting device comprising:
an animal audio receiving means for receiving audio input by said animal audio input means from said animal terminal device;
an analyzing means for analyzing the vocalization received by the animal vocalization receiving means;
an analysis result transmitting means for transmitting the analysis results analyzed by the analyzing means to the human terminal device;
an animal care instruction receiving means for receiving animal care instructions inputted by the instruction inputting means from the human terminal device after the analysis results have been transmitted by the analysis results transmitting means; and
a processing command transmitting means for transmitting a processing command for the animal care processing means to the animal terminal device based on animal care instructions received by the animal care instruction receiving means.

[Claim 3]

The vocalization analysis result transmitting device according to claim 2, wherein
the animal terminal device has an animal expression outputting means for outputting sounds as animal expressions, and
the processing instruction transmitting means has an animal expression transmitting means for selecting an animal expression corresponding to the animal care instruction received by the animal care instruction receiving means from among pre-recorded animal expressions, and transmitting the selected animal expression to the animal terminal device.

[Claim 4]

The vocalization analysis result transmitting device according to any one of claims 1 to 3, wherein the analyzing means is an emotion identifying means for analyzing a vocalization by determining the emotion contained in the vocalization by comparing the received vocalization pattern with pre-recorded reference vocalization patterns.

[Claim 5]

The vocalization analysis result transmitting device according to any one of claims 1 to 4, wherein the analysis results of the analyzing means are composed of information expressed in a human language.

[Claim 6]

The vocalization analysis result transmitting device according to any one of claims 1 to 5, wherein the analysis result transmitting means comprises a determining means for determining whether or not the vocalization received by the animal vocalization receiving means or the analysis results of the analyzing means satisfy predetermined transmission determination conditions, and a conditional transmitting means for transmitting the analysis results to the human terminal device when it has been determined by the determining means that the conditions have been met.

[Claim 7]

The vocalization analysis result transmitting device according to any one of claims 1 to 6, wherein the vocalization analysis result transmitting device further comprises a timekeeping means, and the analysis result transmitting means has a time information transmitting means for transmitting time information kept by the timekeeping means.

[Claim 8]

The vocalization analysis result transmitting device according to any one of claims 1 to 7, wherein the animal terminal device has an imaging means for capturing images of the animal, the animal vocalization receiving means has an image receiving means for receiving images captured by the imaging means from the animal terminal device, and the analysis result transmitting means has an image transmitting means for transmitting images received by the image receiving means to the human terminal device.

[Claim 9]

An animal terminal device that operates and controls a predetermined animal care device and that is connected to a server via a predetermined communication line, the animal terminal device comprising:

- an animal vocalization inputting means for inputting a vocalization of an animal;
- an animal vocalization transmitting means for transmitting the vocalization inputted by the animal vocalization inputting means to the server;
- a processing command receiving means for receiving from the server a processing command in response to the vocalization transmitted by the animal vocalization transmitting means; and
- an animal care processing means for operating and controlling the animal care device based on the processing command received by the processing command receiving means.

[Claim 10]

The animal terminal device according to claim 9, further comprising: a selecting means for selecting words in a human language word corresponding to a processing command received by the processing command receiving means from among pre-recorded words in a human language; and a human language sound outputting means that outputs the words selected by the selecting means in a human language.

[Claim 11]

The animal terminal device according to claim 9 or 10, wherein the animal vocalization inputting means is provided on an attachment unit to the animal.

[Claim 12]

The animal terminal device according to any one of claims 9 to 11, wherein the animal terminal device further comprises an imaging means for capturing images of the animal, and the animal vocalization transmitting means has an image transmitting means for transmitting images captured by the imaging means to the server.

[Claim 13]

A vocalization analysis result display device that communicates with a server that communicates with an animal terminal device that operates and controls a predetermined animal care device via a predetermined communication line, the vocalization analysis result display device comprising:

- an analysis result receiving means for receiving from the server analysis results in which the vocalizations of the animal transmitted from the animal terminal device have been analyzed by the server;

- a display means for displaying and outputting in a human language the analysis results received by the analysis result receiving means;

- an instruction selecting means for selecting a pre-registered animal care instruction as a response to the analysis results displayed and outputted by the display means; and

- an animal care instruction transmitting means for transmitting to the server an animal care instruction selected by the instruction selecting means.

[Claim 14]

A program causing a computer to realize:

- an animal vocalization receiving function that receives a vocalization sent from an animal terminal device having an animal vocalization inputting means for inputting a vocalization of an animal;

- an analysis function that analyzes the vocalization received by the animal vocalization receiving function; and

- an analysis result transmission function that transmits the analysis results analyzed by the analysis function to a human terminal device.

[Claim 15]

A program causing a computer to realize:

- an animal vocalization receiving function that receives a vocalization inputted by an animal vocalization inputting means from an animal terminal device having the animal vocalization inputting means and an animal care processing means for operating and controlling a predetermined animal care device;

- an analysis function that analyzes the vocalization received by the animal vocalization receiving function;

- an analysis result transmitting function that transmits the analysis results analyzed by the analysis means to a human terminal device having an instruction inputting means for inputting animal care instructions;

an animal care instruction receiving function that receives an animal care instruction inputted by the instruction inputting means from the human terminal device; and
a processing command transmitting function that transmits a processing command to the animal terminal device for the animal care processing means based on the animal care instruction received by the animal care instruction receiving function.

[Claim 16]

A program causing a computer, in an animal terminal device connected to a server via a predetermined communication line that controls the operation of a predetermined animal care device, to realize:

an animal vocalization inputting function that inputs a vocalization of an animal;
an animal vocalization transmitting function that transmits to the server the vocalization inputted by the animal vocalization inputting function;
a processing command receiving function that receives a processing command from the server in response to the vocalization transmitted by the animal vocalization transmitting function;
and
an animal care processing function that operates and controls the animal care device based on the processing command received by the processing command receiving function.

[Claim 17]

A program causing a computer, in a vocalization analysis result display device that communicates via a predetermined communication line with a server that communicates with an animal terminal device that operates and controls a predetermined animal care device, to realize:

an analysis result receiving function that receives from the server analysis results in which the vocalizations of the animal transmitted from the animal terminal device have been analyzed by the server;
a display function for displaying and outputting in a human language the analysis results received by the analysis result receiving function;
an instruction selecting function for selecting a pre-registered animal care instruction as a response to the analysis results displayed and outputted by the display function; and
an animal care instruction transmitting function for transmitting to the server an animal care instruction selected by the instruction selecting function.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

The present invention relates to a vocalization analysis result transmitting device, an animal terminal device, a vocalization analysis result display device, and a program, which are useful when applied to a device, etc. that analyzes a vocalization of an animal and transmits the results of the vocalization analysis to an external device.

[0002]

[Prior Art]

[0003]

For those who keep dogs, cats, and other animals as pets, pets are members of the family. They want to understand the animal's feelings and intentions and to care for them as they wish to be cared for at all times.

[0004]

In order to realize this desire, they need to be able to accurately understand the emotions and desires of the animal. In recent years, with technological advances in vocalization analysis technology (especially in voiceprint analysis), it has become possible to determine that which corresponds to emotions and intentions (hereinafter referred to simply as "emotions") contained in animal vocalizations. Specifically, vocalizations produced by animals such as pets and livestock are analyzed to obtain patterns (for example, sonographs) from which their characteristics are extracted. The animal's emotion is then determined by comparing the vocalization to reference vocalization patterns analyzed beforehand from an animal behavioral analysis perspective.

[0005]

A device has been proposed based on vocalization analysis technology that, for example, inputs the vocalizations of an animal and images showing the animal's behavior (gestures), determines the animal's emotion by comparing the vocalizations and gestures with vocalization and gesture data that have been analyzed beforehand in terms of animal behavior, and displays the vocalizations and gestures as text and images that humans can understand (see, for example, Patent Document 1; all claims). Such a device would allow an owner to know the animal's emotions to some extent and to understand the animal's requests, if any, so that he or she can care for the animal in a more appropriate manner.

[0006]

[Patent Document 1] JP H10-3479 A

[0007]

[Problem to Be Solved by the Invention]

However, because the device described above is a stand-alone unit, this objective cannot be realized unless the animal and human are in close proximity to the device. Therefore, when the human is away from home, the animal cannot be seen and cared for, which is an inconvenience.

[0008]

The present invention was devised in light of this problem. The object of the present invention is to enable a human to know the emotions of an animal and to perform appropriate animal care even when the human and animal are at separate locations.

[0009]

[Means for Solving the Problem]

In order to solve this problem, the present invention according to claim 1 is a vocalization analysis result transmitting device (for example, the management server 200 in Fig. 1 and the home server 500 in Fig. 23) that transmits, to a human terminal device (for example, the user terminal 300 in Fig. 2), analysis results corresponding to a vocalization sent from an animal terminal device (for example, the animal care terminal 100 in Fig. 1) having an animal vocalization inputting means for inputting a vocalization of an animal (for example, the microphone unit 102 and mobile microphone unit for dogs 4 in Fig. 1, the vocalization input unit 110 and mobile vocalization input unit 116 in Fig. 3, and the microphone 12 in Fig. 23), the vocalization analysis result transmitting device comprising:

an animal vocalization receiving means for receiving the vocalization inputted by the animal vocalization inputting means from the animal terminal device (for example, the communication unit 270 in Fig. 4, step S210 in Fig. 17); an analyzing means for analyzing the vocalization received by the animal vocalization receiving means (for example, the CPU 220 in Fig. 4, step S212 in Fig. 17); and an analysis result transmitting means for transmitting the analysis results analyzed by the analyzing means to a human terminal device (for example, the communication unit 270 in Fig. 4, steps S214 to S216 in Fig. 17).

[0010]

The invention according to claim 14 is a program causing a computer to realize: an animal vocalization receiving function that receives a vocalization sent from an animal terminal device having an animal vocalization inputting means for inputting the vocalization of an animal (for example, step S210 in Fig. 17); an analysis function that analyzes the vocalization received by the animal vocalization receiving function (for example, step S212 in Fig. 17); and an analysis result transmission function that transmits the analysis results analyzed by the analysis function to a human terminal device (for example, steps S214 to S216 in Fig. 17).

[0011]

In the invention according to claim 1 or 14, the vocalization analysis result transmitting device can receive vocalizations from the animal terminal device and transmit analysis results of the received vocalizations to the human terminal device. Therefore, even when the animal and the human (owner) are at separate locations, the human can learn the results of a vocalization analysis performed on vocalizations by the animal.

[0012]

The invention according to claim 2 is a vocalization analysis result transmitting device that communicates with an animal terminal device having an animal vocalization inputting means for inputting the vocalization of an animal and an animal care processing means for operating and controlling a predetermined animal care device, and a human terminal device having instruction inputting means for inputting animal care instructions from the vocalization analysis result transmitting device comprising:

an animal audio receiving means for receiving audio input by said animal audio input means from said animal terminal device (for example, the communication unit 270 in Fig. 4, step S210 in Fig. 17); an analyzing means for analyzing the vocalization received by the animal vocalization receiving means (for example, the CPU 220 in Fig. 4, step S212 in Fig. 17); an analysis result transmitting means for transmitting the analysis results analyzed by the analyzing means to the human terminal device (for example, the communication unit

270 in Fig. 4, steps S214 to S216 in Fig. 17); an animal care instruction receiving means for receiving animal care instructions inputted by the instruction inputting means from the human terminal device after the analysis results have been transmitted by the analysis results transmitting means (for example, the communication unit 270 in Fig. 4, step S238 in Fig. 19); and a processing command transmitting means for transmitting a processing command for the animal care processing means to the animal terminal device based on animal care instructions received by the animal care instruction receiving means (for example, the communication unit 270 in Fig. 4, the animal care processing command data D4 in Fig. 16(d), step S246 in Fig. 19).

[0013]

The invention according to claim 15 is a program causing a computer to realize: an animal vocalization receiving function that receives a vocalization inputted by an animal vocalization inputting means from an animal terminal device having the animal vocalization inputting means and an animal care processing means for operating and controlling a predetermined animal care device (for example, the communication unit 270 in Fig. 4, step S210 in Fig. 17); an analysis function that analyzes the vocalization received by the animal vocalization receiving function (for example, the CPU 220 in Fig. 4, step S212 in Fig. 17); an analysis result transmitting function that transmits the analysis results analyzed by the analysis means to a human terminal device having an instruction inputting means for inputting animal care instructions (for example, the communication unit 270 in Fig. 4, steps S214 to S216 in Fig. 17); an animal care instruction receiving function that receives an animal care instruction inputted by the instruction inputting means from the human terminal device (for example, the communication unit 270 in Fig. 4, step S238 in Fig. 19); and a processing command transmitting function that transmits a processing command to the animal terminal device for the animal care processing means based on the animal care instruction received by the animal care instruction receiving function (for example, the communication unit 270 in Fig. 4, the animal care processing command data D4 in Fig. 16(d), step S246 in Fig. 19).

[0014]

In the invention according to claim 2 or 15, the vocalization analysis result transmitting device can receive vocalizations from the animal terminal device and transmit analysis results of the received vocalizations to the human terminal device. Therefore, even when the animal and the human are at separate locations, the human can learn the results of a vocalization analysis performed on vocalizations by the animal.

[0015]

The vocalization analysis result transmitting device can also receive animal care instructions from the human terminal device and transmit processing commands for the received animal care instructions to the animal terminal device. Upon receipt of this processing command, the animal terminal device can execute animal care processing in which an animal care device is operated and controlled. In this way, the human can learn the results of an analysis performed on a vocalization by the animal even when he or she is at a separate location from the animal, and can provide the animal with appropriate care based on the situation. The expression "animal care" herein refers to actions required to care for an animal, such as feeding the animal, providing the animal with water, providing the animal with medication, turning on the air conditioning, adjusting ambient light and sounds, and talking to the animal.

[0016]

The invention according to claim 3 is the vocalization analysis result transmitting device according to claim 2, wherein the animal terminal device has an animal expression outputting means for outputting sounds as animal expressions (for example, the speaker unit 104 in Fig. 1, the sound output unit 150 in Fig. 3) and the processing instruction transmitting means has an animal expression transmitting means (for example, the CPU 230 and the communication unit 270 in Fig. 4, and steps S244 to S246 in Fig. 19) for selecting an animal expression (for example, the synthesized vocalization data 249d and high-frequency vocalization data 249e in Fig. 14) corresponding to the animal care instruction received by the animal care instruction receiving means from among pre-recorded animal expressions, and transmitting the selected animal expression to the animal terminal device.

[0017]

The invention according to claim 3 has the same effects as the invention according to claim 2, but can also transmit, to the animal terminal device, animal expressions corresponding to animal care instructions received from the human terminal device. The animal terminal device that receives the animal expression can output these animal expressions as sounds. "Animal expressions" refer to vocalization patterns used by animals of the same species and group to communicate intentions and convey emotions. By listening to these vocalization patterns, animals can understand the emotions, etc. that other animals have toward them. This enables animals to express themselves and humans to convey messages to animals.

[0018]

The invention according to claim 4 is the vocalization analysis result transmitting device according to any one of claims 1 to 3, wherein the analyzing means is an emotion identifying means for analyzing a vocalization by determining the emotion contained in the vocalization by comparing the received vocalization pattern with pre-recorded reference vocalization patterns (for example, the CPU 220 in Fig. 4, the animal vocalization analysis processing in Fig. 20).

[0019]

The invention according to claim 4 has the same effects as the invention according to any one of claims 1 to 3, but can also determine the emotion contained in vocalizations by an animal received from the animal terminal device. In this way, the human can understand the emotions of the animal.

[0020]

The invention according to claim 5 is the vocalization analysis result transmitting device according to any one of claims 1 to 4, wherein the analysis results of the analyzing means is composed of information expressed in a human language (for example, the text data 247c and image data 247d in Fig. 13).

[0021]

The invention according to claim 5 has the same effects as the invention according to any one of claims 1 to 4, but the vocalization analysis result transmitting device can also transmit vocalization analysis results of an animal's vocalization in human language such as text or

images whose meaning can be understood by humans. In this way, the results of a vocalization analysis can be more easily understood by humans.

[0022]

The invention according to claim 6 is the vocalization analysis result transmitting device according to any one of claims 1 to 5, wherein the analysis result transmitting means comprises a determining means (for example, the CPU 220 in Fig. 24, step S106 in Fig. 25) for determining whether or not the vocalization received by the animal vocalization receiving means or the analysis results of the analyzing means satisfy predetermined transmission determination conditions, and a conditional transmitting means for transmitting the analysis results to the human terminal device when it has been determined by the determining means that the conditions have been met.

[0023]

The invention according to claim 6 has the same effects as the invention according to any one of claims 1 to 5, but the vocalization analysis result transmitting device also transmits vocalization analysis results only when vocalization analysis results of an animal vocalization satisfy predetermined conditions. This makes it possible to avoid a situation in which vocalization analysis results are sent to the human terminal device each time animal vocalizations are inputted.

[0024]

The invention according to claim 7 is the vocalization analysis result transmitting device according to any one of claims 1 to 6, wherein the vocalization analysis result transmitting device further comprises a timekeeping means (for example, the timekeeping unit 114 in Fig. 24), and the analysis result transmitting means has a time information transmitting means for transmitting time information kept by the timekeeping means (for example, the communication unit 270 in Fig. 24, the vocalization analysis result data D2, step S216 in Fig. 25).

[0025]

The invention according to claim 7 has the same effects as the invention according to any one of claims 1 to 6, but the vocalization analysis result transmitting device can transmit time information along with vocalization analysis results. This makes it possible to inform a human when vocalization analysis results were received.

[0026]

The invention according to claim 8 is the vocalization analysis result transmitting device according to any one of claims 1 to 7, wherein the animal terminal device has an imaging means for capturing images of the animal (for example, the camera unit 106 in Fig. 1, the imaging unit 112 in Fig. 3), the animal vocalization receiving means has an image receiving means for receiving images captured by the imaging means from the animal terminal device (for example, the communication unit 270 in Fig. 4, the actual situation image data 133 in Fig. 16 (a), step S210 in Fig. 17), and the analysis result transmitting means has an image transmitting means for transmitting images received by the image receiving means to the human terminal device (for example, the communication unit 270 in Fig. 4, the actual situation image data 133 in Fig. 16 (b), step S216 in Fig. 17).

[0027]

The invention according to claim 8 has the same effects as the invention according to any one of claims 1 to 7, but the vocalization analysis result transmitting device can also transmit images taken by the animal terminal device to the human terminal device.

[0028]

The invention according to claim 9 is an animal terminal device (for example, the animal terminal 100 in Fig. 1) that operates and controls a predetermined animal care device (for example, the automatic replenisher 103 in Fig. 1) and that is connected to a server via a predetermined communication line, the animal terminal device comprising: an animal vocalization inputting means for inputting the vocalization of an animal (for example, the microphone unit 102 in Fig. 1, the mobile microphone unit for dogs 4, the microphone unit 402, the vocalization input unit 110 in Fig. 3, the mobile vocalization input unit 116); an animal vocalization transmitting means for transmitting the vocalization inputted by the animal vocalization inputting means to the server (for example, the long-distance communication unit 109 in Fig. 1, the communication unit 170 in Fig. 3, the animal vocalization data 132 in Fig. 16 (a), step S108 in Fig. 17); a processing command receiving means for receiving from the server a processing command in response to the vocalization transmitted by the animal vocalization transmitting means (for example, the long-distance communication unit 109 in Fig. 1, the communication unit 170 in Fig. 3, the animal care processing command data D4 in Fig. 16 (d), step S148 in Fig. 19); and an animal care processing means for operating and controlling the animal care device based on the processing command received by the processing command receiving means (for example, the CPU 120 in Fig. 3, step S150 in Fig. 19).

[0029]

The invention according to claim 16 is a program causing a computer, in an animal terminal device connected to a server via a predetermined communication line that controls the operation of a predetermined animal care device, to realize: an animal vocalization inputting function that inputs the vocalization of an animal (for example, the microphone unit 102, the mobile microphone unit for dogs 4, the microphone unit 402 in Fig. 1, the vocalization input unit 110, the mobile vocalization input unit 116 in Fig. 3); an animal vocalization transmitting function that transmits to the server the vocalization inputted by the animal vocalization inputting function (for example, the long-distance communication unit 109 in Fig. 1, the communication unit 170 in Fig. 3, the animal vocalization data 132 in Fig. 16 (a), and step S108 in Fig. 17); a processing command receiving function that receives a processing command from the server in response to the vocalization transmitted by the animal vocalization transmitting function (for example, the long-distance communication unit 109 in Fig. 1, the communication unit 170 in Fig. 3, the animal care processing command data D4 in Fig. 16 (d), step S148 in Fig. 19); and an animal care processing function that operates and controls the animal care device based on the processing command received by the processing command receiving function (for example, the CPU 120 in Fig. 3, step S150 in Fig. 19).

[0030]

In the invention according to claim 9 or 16, the animal terminal device can transmit the vocalizations by an animal to the server, receive processing commands corresponding to the transmitted animal vocalizations, and execute animal care processing. In this way, the animal can be given care appropriate to its condition without a human having to be present.

[0031]

The invention according to claim 10 is the animal terminal device according to claim 9, further comprising: a selecting means for selecting words in a human language word corresponding to a processing command received by the processing command receiving means from among pre-recorded words in a human language (for example, the CPU 120 in Fig. 3, the human language registry data 137, registered voice data 137b in Fig. 8, step S152 in Fig. 19); and a human language sound outputting means that outputs the words selected by the selecting means in a human language (for example, the speaker unit 104 in Fig. 1, the sound output unit 150 in Fig. 3, step S152 in Fig. 19).

[0032]

The invention according to claim 10 has the same effects as the invention according to claim 9, but also allows the animal to hear a human voice corresponding to the animal care processing command.

[0033]

The invention according to claim 11 is the animal terminal device according to claim 9 or 10, wherein the animal vocalization inputting means (for example, the mobile microphone unit 4 for dogs, the microphone unit 402 in Fig. 1) is provided on an attachment unit to the animal (for example, the mobile microphone unit for dogs 4, the belt 406 in Fig. 1).

[0034]

The invention according to claim 11 has the same effects as the invention according to claim 9 or 10, and the animal terminal device is always in close proximity to the animal and can input the animal's vocalizations without missing any of them.

[0035]

The invention according to claim 12 is the animal terminal device according to any one of claims 9 to 11, wherein the animal terminal device further comprising an imaging means for capturing images of the animal (for example, the camera unit 106 in Fig. 1, the imaging unit 112 in Fig. 3, step S104 in Fig. 17), and the animal vocalization transmitting means has an image transmitting means for transmitting images captured by the imaging means to the server (for example, the long-distance communication unit 109 in Fig. 1, the CPU 120, the communication unit 170 in Fig. 3, the actual situation image data 133 in Fig. 16 (a), step S108 in Fig. 17).

[0036]

The invention according to claim 12 has the same effects as the invention according to any one of claims 9 to 11, but the animal terminal device can also transmit images of the animal.

[0037]

The invention in claim 13 is a vocalization analysis result display device (for example, the user terminal 300 in Fig. 1) that communicates with a server that communicates with an animal terminal device that operates and controls a predetermined animal care device via a predetermined communication line, the vocalization analysis result display device comprising:

an analysis result receiving means for receiving from the server analysis results in which the vocalizations of the animal transmitted from the animal terminal device has been analyzed by the server (for example, the long-distance communication unit 309 in Fig. 1, the communication unit 370 in Fig. 5, the vocalization analysis result data D2 in Fig. 16 (b), step S318 in Fig. 17); a display means for displaying and outputting in a human language the analysis results received by the analysis result receiving means (for example, the monitor unit 302 in Fig. 1, the display unit 350 in Fig. 5, and step S322 in Fig. 18); an instruction selecting means for selecting a pre-registered animal care instruction as a response to the analysis results displayed and outputted by the display means (for example, the monitor unit 302 and key input unit 304 in Fig. 1, the selection column 5e in Fig. 22, steps S326 to S332 in Fig. 18); and an animal care instruction transmitting means for transmitting to the server an animal care instruction selected by the instruction selecting means (for example, the communication unit 370 in Fig. 5, the animal care instruction data D3 in Fig. 16 (c), S336 in Fig. 19).

[0038]

The invention in claim 17 is a program causing a computer, in a vocalization analysis result display device that communicates via a predetermined communication line with a server that communicates with an animal terminal device that operates and controls a predetermined animal care device, to realize: an analysis result receiving function that receives from the server analysis results in which the vocalizations of the animal transmitted from the animal terminal device has been analyzed by the server (for example, the long-distance communication unit 309 in Fig. 1, the communication unit 370 in Fig. 5, the vocalization analysis result data D2 in Fig. 16 (b), step S318 in Fig. 17); a display function for displaying and outputting in a human language the analysis results received by the analysis result receiving function (for example, the monitor unit 302 in Fig. 1, the display unit 350 in Fig. 5, step S322 in Fig. 18); and an instruction selecting function for selecting a pre-registered animal care instruction as a response to the analysis results displayed and outputted by the display function (for example, the monitor unit 302 and key input unit 304 in Fig. 1, the selection column 5e in Fig. 22, steps S326 to S332 in Fig. 18); and an animal care instruction transmitting function for transmitting to the server an animal care instruction selected by the instruction selecting function (for example, the communication unit 370 in Fig. 5, the animal care instruction data D3 in Fig. 16 (c), S336 in Fig. 19).

[0039]

In the invention according to claim 13 or 17, the vocalization result display device can display the results of an analysis of a vocalization by an animal in human language and select animal care instructions to be sent to the server. In this way, even if the human is away from the animal, he or she can monitor the animal's condition and give appropriate animal care instructions to the animal terminal device.

[0040]

[Embodiments of the Invention]

(First Embodiment)

A first embodiment of the present invention will now be described in detail with reference to Fig. 1 to Fig. 22.

[0041]

[Description of Configuration]

Fig. 1 shows an example of a configuration in the present embodiment. As shown in the figure, the first embodiment has an animal care terminal 100, a management server 200, and a user terminal 300. In the present embodiment, the kept animal is a dog 2, but the present invention is not limited to dogs. Other animals are acceptable, such as cats, parrots, and even dolphins.

[0042]

The animal care terminal 100 is a device with an automatic replenisher 103 that is installed in the user's home 1 or other location where the dog 2 is kept and that can automatically replenish food and water. The animal care terminal 100 in the present invention has a microphone unit 102 and mobile microphone unit for dogs 4 for inputting the vocalizations of the dog 2, a speaker unit 104 for playing various sounds to the dog 2, a camera unit 106 that captures images of the dog 2, a short-distance communication unit 108 that can communicate with other external devices that are within a relatively short distance (within the user's home 1 in the present embodiment), and a long-distance communication unit 109 for communicating with devices outside the user's home 1 via a communication line 9.

[0043]

Here, communication line 9 refers to a communication path that is capable of sending and receiving data. In other words, communication line 9 refers not only to a dedicated line (dedicated cable) for a direct connection or a LAN using Ethernet (registered trademark), etc., but also telephone communication networks, cable networks, the Internet, and other communication networks, whether the communication method is wired or wireless.

[0044]

The short-distance communication unit 108 is realized by a device that supports a short-distance wireless communication technology such as Bluetooth (registered trademark) or IrDA. In the present embodiment, the short-distance communication unit 108 is used to exchange data with an air conditioner 3 installed in the user's home 1 and the mobile microphone unit for dogs 4 worn by the dog 2.

[0045]

The air conditioner 3 is equipped with a short-distance communication unit 32 that uses a short-distance wireless communication technology and can be remotely operated from the animal care terminal 100.

[0046]

The mobile microphone unit for dogs 4 is equipped with a microphone unit 402, a short-distance wireless communication unit 404 using a short-distance wireless communication technology, a belt 406 for attaching the mobile microphone unit to the dog 2, and a power supply such as a battery (not shown). The mobile microphone unit for dogs 4 can transmit vocalizations by the dog 2, such as barking, detected by (inputted to) the microphone unit 402 to the animal care terminal 100 via the short-distance communication unit 404.

[0047]

The long-distance communication unit 109 can be realized, for example, by a device for connecting to a communication line 9 such as a cellular phone network, PHS network, general phone line network, ISDN network, or LAN. In the present embodiment, the long-distance communication unit 109 connects to a base station 902 of a cellular phone network to realize data transmission and reception with the management server 200.

[0048]

The management server 200 is a server installed, for example, in a company that provides services. It can be realized, for example, by a server device or personal computer. In the present embodiment, the management server 200 exchanges data with an animal care terminal 100 and a user terminal 300 via a communication line 9 and is equipped with a function for analyzing and processing vocalization data received from the animal care terminal 100 and the user terminal 300.

[0049]

The user terminal 300 is a communication terminal device possessed by the user 6, and can be realized, for example, using a multifunctional cell phone, PDA (personal digital assistant), portable laptop computer, portable gaming device, or wristwatch-type information terminal device. The user terminal 300 is a multifunctional cell phone in the present embodiment, and has a function for connecting to the Internet to send, receive, and view e-mail, as well as displaying images and videos attached to e-mail.

[0050]

User terminal 300 has a monitor unit 302 for outputting and displaying text, images, etc., a key input unit 304 for inputting various operations, a microphone unit 306 for voice input, a speaker unit 308 for voice output, and a long-distance communication unit 309 for connection to a communication line 9.

[0051]

The user terminal 300 can exchange data with a management server 200, which is registered in advance via a communication line 9. Information received from the management server 200 is then displayed on the monitor unit 302. The user 6 can check the information displayed on the monitor unit 302 and enter instructions using the key input unit 304. For example, the user can select information or scroll through displayed information with a directional key 304a, select something using a selection key 304b, and cancel input using a function key 304c. The correspondence between operation input and keys can be freely set.

[0052]

Fig. 2 is a diagram used to explain the concept of animal care in the present embodiment. As shown in the figure, when vocalization by a dog 2 is first inputted (a), the animal care terminal 100 creates animal care status data D1 including vocalization data and sends the data to the management server 200 via a communication line 9 (b).

[0053]

The management server 200 receives the animal care status data D1 and analyzes the vocalization data from the dog 2 included in the animal care status data D1 by vocalization analysis to determine the emotion included in the vocalization data (c). The management server 200 then creates vocalization analysis result data D2 including human language (text, images, and sounds that humans can use to understand the meaning of the content) corresponding to the vocalization analysis result, and sends this to the user terminal 300 via a communication line 9 (d).

[0054]

The user terminal 300 receives the vocalization analysis result data D2 and outputs the human language contained in the vocalization analysis result data D2 (e). The user 6 then learns of the emotion of the dog 2 left at the user's home 1 through human language output. As a response, the user inputs animal care instructions to the animal care terminal 100 or talks to (calls out to) the dog 2 (f). The user terminal 300 creates animal care instruction data D3, including animal care instructions and user voice data, and sends the data to the management server 200 via a communication line 9 (g).

[0055]

The management server 200 receives the animal care instruction data D3 and searches for the animal expression (vocalization patterns whose meaning can be understood by the dog 2) corresponding to the animal care instructions contained in the animal care instruction data D3 (h). Then, animal care processing command data D4 including the animal care instructions and the retrieved animal expression is created and sent to the animal care terminal 100 via a communication line 9 (i).

[0056]

The animal care terminal 100 receives the animal care processing command data D4 and performs, for example, feeding operations such as supplying food and water and remotely operates the air conditioner 3 according to the animal care instructions contained in the animal care processing command data D4 (j). It also outputs the animal expression contained in the received animal care processing command data D4 (k). In this way, the user 6 understands the emotions of dog 2 away from the user's home 1 and carries out appropriate animal care.

[0057]

In the present embodiment, data transmission between the animal care terminal 100 and the management server 200, and between the management server 200 and the user terminal 300, are performed by sending and receiving e-mail with the target data attached. Therefore, "sending (or receiving) data" here means exchanging data with the target terminal or server by sending or receiving data to or from an e-mail related device such as an SMTP server or POP server. The exchange of data between the animal care terminal 100, the management server 200, and the user terminal 300 is not limited to the e-mail format, and can also be configured, for example, to set a fixed IP address for each device to directly access and transmit data based on that address.

[0058]

[Description of Functional Blocks of Animal Care Terminal]

Next, the functional configuration of the present embodiment will be described in detail.

Fig. 3 is a functional block diagram showing an example of a functional configuration for the animal care terminal 100. The animal care terminal 100 has a vocalization input unit 110, an imaging unit 112, a timekeeping unit 114 that records the current date and time, a CPU 120 that integrally controls the animal care terminal 100 via arithmetic processing, a RAM 130 that allows the CPU 120, etc. to temporarily store programs and data, a ROM 140 that stores programs and data enabling the CPU 120 to realize various functions, a sound output unit 150, a feeding unit 152, a water supplying unit 154, an information storage medium reading unit 160, a communication unit 170, and a data bus 190.

[0059]

The vocalization input unit 110 is realized using, for example, a microphone, an analog-to-digital converter, and a noise filter, and inputs vocalizations by the dog 2. The vocalization inputted by the vocalization input unit 110 can be, for example, subjected to noise reduction and analog-to-digital conversion and stored in the RAM 130 as animal vocalization data 132. In Fig. 1, this applies to microphone unit 102 and microphone unit 402.

[0060]

The imaging unit 112 is realized using an imaging device such as a CCD camera, for example, and captures images of the dog 2. The images captured by the imaging unit 112 are stored in the RAM 130 as actual situation image data 133. In Fig. 1, this corresponds to the camera unit 106.

[0061]

The timekeeping unit 114 can be realized by, for example, a quartz crystal or a counter and records the current date and time. Time data 134 indicating the current date and time is stored in the RAM 130.

[0062]

The CPU 120 integrally controls the animal care terminal 100 by realizing various functions through arithmetic processing. Programs and data provided for the arithmetic processing are stored in the RAM 130 and the ROM 140.

[0063]

The RAM 130 is an IC memory that can temporarily store programs and data, and includes, for example, an animal vocalization data storage area 132, actual situation image data storage area 133, time data storage area 134, transmission condition data storage area 135, setting data storage area 136, and human language registry data storage area 137. When referring to data stored in each data storage area below, the reference number attached to each data storage area will be used to explain the data.

[0064]

The transmission condition data stored in the transmission condition data storage area 135 sets the conditions for determining whether or not the animal care terminal 100 will transmit animal care status data D1 to the management server 200.

[0065]

Fig. 6 is a diagram showing an example of transmission condition data 135 in the present embodiment. As shown in the figure, for example, a volume reference value 135a, which is conditional based on the loudness of a vocalization of the dog 2, a frequency reference value 135b, which is conditional on the frequency of a vocalization of the dog 2, and a time reference value 135c, which is conditional on the amount of time that has elapsed, are stored. The transmission condition data 135 can be set in advance by the user 6 using a predetermined procedure (for example, a utility realized by the CPU 120 for executing a predetermined program) before using the animal care terminal 100.

[0066]

The setting data stored in the setting data storage area 136 stores settings related to the conditions of use. Fig. 7 shows an example of setting data 136. As shown in the figure, for example, the management server 200, etc. stores a user ID 136a used to identify the user 6, an animal ID 136b used to identify the dog 2, and an animal name 136c used to enter the name of the dog 2. The configuration data 136 can be pre-set by the user 6 via a predetermined procedure before using the animal care terminal 100.

[0067]

The human language registry data stored in the human language registry data storage area 137 is information that the user 6 registers in advance via a predetermined procedure before using the animal care terminal 100. Fig. 8 is a diagram showing an example of human language registry data 137. As shown in the figure, the human language registry data 137, for example, associates and stores an animal care code 137a, which is information that classifies the animal care and registered voice data 137b, which is the voice of user 6 corresponding to the animal care code 137a.

[0068]

This animal care code 137a is information corresponding to the animal care instructions selected and entered by the user 6 using the user terminal 300. For example, an animal care code 137a of "004" indicates the animal care for a dog 2 who complains of hunger, and the registered voice data 137b is voice data saying "Just wait a little longer and you will be fed." By having the animal care terminal 100 output this voice data, the dog 2 can be encouraged to be patient and be disciplined. "Taro (the name of the dog 2)! It's time to eat!" can be associated with the animal care code 137a for feeding, and this can be outputted to inform the dog 2 that the food has been supplied.

[0069]

The ROM 140 stores programs and data used to realize various functions via arithmetic processing performed by CPU 120. In particular, the present embodiment is provided with (1) an animal care terminal control program area 141 that stores an animal care terminal control program used to control the entire animal care terminal 100, (2) an animal care status

transmission program storage area 142 that stores an animal care status transmission program to enable the management server 200 to transmit and receive animal care status data D1, and (3) an animal care processing command reception program storage area 143 that stores an animal care processing command reception program to enable the reception of animal care processing command data D4 from the management server 200. The programs stored in each program storage area will be described below using the reference codes attached to the program storage areas to refer to the program.

[0070]

More specifically, by executing the animal care status transmission program 142, the animal care terminal 100 creates an e-mail containing animal care status data D1 and sends the e-mail to the management server 200 by accessing the SMTP server of a given ISP (internet service provider). By executing the animal care processing command reception program 143, a POP server is accessed to receive e-mails containing animal care processing command data D4 from the management server 200. Then, by executing the animal care terminal control program 141, feeding the dog, supplying water to the dog, outputting sound, and controlling the air conditioning, etc. can be performed based on the animal care instructions included in the animal care processing command data D4.

[0071]

The ROM 140 is also provided with an animal care processing correspondence TBL (table) storage area 146 that stores an animal care processing correspondence TBL as data, and a management server address information storage area 147 that stores management server address information indicating the address for sending data to the management server 200. When referring to the data stored in each data storage area below, the reference number attached to each data storage area will be used to explain the data.

[0072]

Fig. 9 shows an example of an animal care processing correspondence TBL 146. The animal care processing correspondence TBL 146 associates and stores an animal care code 146a, which is information indicating the classification of the animal care, the control target 146b, which indicates the control target, and a control command 146c, which is information causing the control target 146b to perform predetermined processing. For example, by having the CPU 120 execute the control command 146c corresponding to the animal care code 146a of "001," the CPU 120 can cause the feeding unit 152 to replenish enough food for a single predetermined meal. Similarly, by executing the control command 146c corresponding to the animal care code 146a of "003," the CPU 120 can turn on the air conditioner 3 to perform air conditioning.

[0073]

The management server address information 147 is information indicating the destination of the animal care status data D1. In the present embodiment, this information is e-mail address information, but it may include, for example, a fixed IP address, telephone number, password, or encryption key, depending on the form of data transmission.

[0074]

The sound output unit 150 is realized by a sound output device such as a speaker, for example, so that the dog 2 can hear sound. In Fig. 1, this corresponds to the speaker unit 104.

[0075]

The feeding unit 152 and water supplying unit 154 can replenish food and supply more drinking water for the dog 2 as pre-set in the animal care terminal 100. Multiple feeding units 152 and water supplying units 154 may be provided, which can be used to store and replenish items other than food and drinking water, such as medicine and toys. In Fig. 1, this applies to the automatic replenisher 103.

[0076]

The information storage medium reading unit 160 reads information from and writes information to the information storage medium 162. The information storage medium 162 can be, for example, a hard disk, MO, DVD-RAM, memory card, or CD-ROM, and can store the information recorded in the RAM 130 and ROM 140.

[0077]

The communication unit 170 establishes communication with external devices to exchange data. This can be realized, for example, by Bluetooth (registered trademark), IrDA, a modem, TA, or radio, etc. In Fig. 1, this applies to the short-distance communication unit 108 and the long-distance communication unit 109. In the present embodiment, data exchanges with the near-field communication unit 32 in the air conditioner 3 and the near-field communication unit 404 in the mobile microphone unit for dogs 4 are carried out via the communication unit 170.

[0078]

The animal care status data D1 sent from the animal care terminal 100 to the management server 200 includes information indicating the current status of the dog 2. Fig. 16 (a) shows an example of animal care status data D1 transmitted from the animal care terminal 100 to the management server 200. As shown in the figure, the animal care status data D1 includes, for example, the user ID 136a, animal vocalization data 132, actual situation image data 133, and time data 134.

[0079]

[Description of Functional Blocks of Management Server]

Fig. 4 is a functional block diagram showing an example of a functional configuration for the management server 200. The management server 200 includes a CPU 220 that controls the management server 200 in an integrated manner via arithmetic processing, a RAM 230 in which the CPU 220, etc. can temporarily store programs and data, a ROM 240 that stores programs, data, etc. causing CPU 220 to perform various functions, an information storage medium reading unit 260 that reads and writes information to and from an information storage medium 262, a communication unit 270 that connects to a communication line 9 to carry out communication with external devices, and a data bus 290.

[0080]

The CPU 220 integrally controls the management server 200 by performing various functions via arithmetic processing. Programs and data provided for arithmetic processing are stored in the RAM 230 and the ROM 240.

[0081]

The RAM 230 is an IC memory that can temporarily store programs and data, and includes, for example, an animal care status data storage area 232 for storing animal care status data D1 from the animal care terminal 100, a vocalization analysis result storage area 234 that stores voice analysis results, which are the results of vocalization analysis performed on the animal vocalization data 132 included in the animal condition status data D1, and a user registry data storage area 236 for storing user registry data. When referring to data stored in each data storage area below, the reference number attached to each data storage area will be used to explain the data.

[0082]

Fig. 10 is a diagram showing an example of user registry data 236. As shown in the figure, in the user registry data 236, a human attribute code 236b, which is information indicating attributes of the user 6 (for example, country, age, gender, language used, etc.), an animal ID 236c, an animal name 236d, an animal attribute code 236e, which is information indicating animal attributes (for example, animal type, gender, age, etc.), user terminal address information 236f, which is information indicating the destination of vocalization analysis result data D2, and animal care terminal address information 236g, which is information indicating the destination of animal care processing command data D4 are associated and stored for each user ID 236a.

[0083]

The ROM 240 is provided with (1) an animal vocalization analysis program storage area 241 for storing an animal vocalization analysis program that causes the CPU 220 to realize a function for vocalization analysis processing on animal vocalizations, (2) a vocalization analysis result transmission program storage area 242 that stores a vocalization analysis result transmission program to realize the function for receiving animal care status data D1 from the animal care terminal 100 and transmitting the vocalization analysis results of the animal vocalization data 132 to the user terminal 300, (3) an animal care processing command transmission program storage area 243 that stores an animal care processing command transmission program to realize the function of receiving animal care processing instruction data D3 from user terminal 300, searching for animal expressions corresponding to the content of the animal care processing instruction data D3, creating animal care processing command data D4, and transmitting this data to the animal care terminal 100, and (4) a human voice analysis program storage area 244, which stores a human voice analysis program that enables the CPU 220 to perform the function of analyzing and processing the human voice. When the programs stored in each program storage area are described below, the reference number attached to each program storage area will be used to refer to the program.

[0084]

More specifically, by executing the animal vocalization analysis program 241, the CPU 220 can, for example, convert the features of the animal vocalization data 132 into a predetermined vocalization pattern (for example, a sonograph) that is easy to extract, which is then compared and matched with reference vocalization patterns to determine the emotions contained in the animal vocalization data 132. The determined emotions are classified by emotion identification codes (246b in Fig. 11 and 248b in Fig. 12). Similarly, the human voice analysis program 244 can be executed to determine the emotions in a human voice.

[0085]

By executing the vocalization analysis result transmission program 242, the management server 200 accesses the POP server at a predetermined ISP (internet service provider) to receive an e-mail containing the animal care status data D1 from the animal care terminal 100, create vocalization analysis result data D2 including a vocalization analysis result 234, and access the SMTP server to send an e-mail containing the vocalization analysis result data D2 addressed to the user terminal 300.

[0086]

The ROM 240 is also provided with a human reference voice pattern storage area 248 that stores animal reference vocalization patterns 246 that are referenced during the vocalization analysis processing and human reference voice patterns, an animal expression to human language conversion TBL storage area 247 that stores an animal expression to human language conversion TBL corresponding to the results of vocalization analyses of the vocalizations of a dog 2 (dog expressions), and a human language to animal expression conversion TBL storage area 249 that stores a human language to animal expression conversion TBL that contains dog expressions corresponding to animal care instructions and the voice of the user 6 (human language). When referring to data stored in each data storage area below, the reference number of each data storage area will be used to explain the data.

[0087]

Fig. 11 is a diagram showing an example of the data configuration of animal reference voice patterns 246. As shown in the figure, animal reference vocalization patterns 246 consist of information prepared in advance for each animal attribute code 246a, which is information indicating the species of the animal, and associates and stores an emotion identification code 246b classifying the animal's emotion with a reference vocalization pattern 246c for an animal expression used to convey this emotion. The reference voice patterns 246c can be, for example, sonographic data. An animal expression is a vocalization pattern that facilitates communication within the same genus or group as the animal.

[0088]

An animal reference vocalization pattern 246 is information obtained using a statistical method and analyzed in terms of animal behavior. Animal reference vocalization patterns 246 that match the target animal are retrieved based on the animal attribute code 246a, and animal vocalization data 132 received from the animal control terminal 100 can be patterned and matched with a reference vocalization pattern 246c to determine the emotion of the animal in a vocalization.

[0089]

A human reference voice pattern 248 is information that serves as a reference for determining an emotion in the voice of user 6, and is prepared beforehand based on applicable human attributes. Human attributes herein are, for example, classifications that use language, gender, and age as parameters.

[0090]

Fig. 12 is a diagram showing an example of the data configuration for human reference voice patterns 248 in the present embodiment. As shown in the figure, a human reference voice pattern 248 includes a human attribute code 248a, which is information indicating the applicable human attribute, an emotion identification code 248b, which is information classifying a human emotion, and the corresponding human reference voice pattern 248c.

[0091]

Reference voice patterns 248c are statistically determined and analyzed characteristic voice patterns or speech patterns in which words expressing emotion are pronounced, such as sonograph data. Therefore, by searching for the human reference voice pattern 248 with the human attribute code 248a that matches user 6, patterning voice data received from user terminal 300, and determining the match with a reference voice pattern 248c, the emotion of the user 6 contained in his or her voice can be determined. The data included in a human reference voice pattern 248 is not limited to what is described above, but may also include other data required for determining a match, such as the speed of the pronunciation of words, strength of the voice, etc.

[0092]

The animal expression to human language conversion TBL 247 contains information corresponding to dictionary data that stores the correspondence between animal emotions and human language, and the human language to animal expression conversion TBL 249 contains information that stores the correspondence between human emotion and animal expressions.

[0093]

Fig. 13 is a diagram showing an example of the animal expression to human language conversion TBL 247 in the present embodiment. As shown in the figure, an animal expression to human language conversion TBL 247 is prepared for each human attribute code 247a, and associates and stores emotion identification codes 247b determined by analyzing vocalizations by the dog 2, corresponding human-understandable text data 247c, and image data 247d for displaying an image of the animal. The image data 247d can be still images or video for displaying animation, etc.

[0094]

Fig. 14 is a diagram showing an example of a human language to animal expression conversion TBL 249. As shown in the figure, a human language to animal expression conversion TBL 249 is prepared for each animal attribute code 249a, which indicates the species of animal being targeted, and associates and stores emotion identification codes 249b determined by analyzing the voice of the user 6, synthesized vocalization data 249d that is the artificially synthesized sound of the animal (in this case, a dog), and high-frequency vocalization data 249e which is outside the human audible range. Synthesized vocalization data 249d is a sound whose meaning the dog 2 can understand and corresponds to an animal expression. High-frequency vocalization data 249e corresponds to a "dog whistle" sound, for example, and can be used give instructions to the dog 2.

[0095]

The information storage medium reading unit 260 reads information from and writes information to an information storage medium 262. The information storage medium 262 can be, for example, a hard disk, MO, DVD-RAM, memory card, or CD-ROM, and can store information that is stored in the RAM 230 or the ROM 240.

[0096]

The communication unit 270 conducts data exchanges with external devices. This can be realized, for example, by Bluetooth (registered trademark), IrDA, a modem, TA, a radio, etc.

[0097]

Fig. 16 (b) is a diagram showing an example of vocalization analysis result data D2. As shown in the figure, the vocalization analysis result data D2 includes, for example, a user ID 136a, animal vocalization data 132, actual situation image data 133, time data 134, the animal's name 236d, text data 247c, and image data 247d.

[0098]

Fig. 16 (d) is a diagram showing an example of animal care processing command data D4. As shown in the figure, the animal care processing command data D4 includes, for example, a user ID 344a, an animal care code 344b, user voice data 322, synthesized vocalization data 249d, and high frequency vocalization data 249e.

[0099]

[Description of the Functional Blocks in the User Terminal]

Fig. 5 is a functional block diagram showing an example of a functional configuration for the user terminal 300. The user terminal 300 includes a voice input unit 310 for inputting the voice of the user 6, an operation input unit 312 for inputting operations such as selections, etc., a CPU 320 that controls the user terminal 300 in an integrated manner via arithmetic processing, a RAM 330 that can temporarily store programs and data for the CPU 320, etc., a ROM 340 that stores programs and data to make the CPU 320 realize various functions, a display unit 350 that displays and outputs text and images, a sound output unit 352 that outputs sound, an information storage medium reading unit 360 that reads information from and writes information to an information storage medium 362, a communication unit 370 that connects to a communication line 9 to communicate with an external device, and a data bus 390.

[0100]

The sound input unit 310 is realized by, for example, a microphone, analog-to-digital converter, and noise filter, etc., and inputs the voice of the user 6. The voice inputted by the voice input unit 310 can be, for example, subjected to noise reduction and analog-to-digital conversion before being stored in the RAM 330 as user voice data 332. In Fig. 1, this corresponds to the microphone unit 306.

[0101]

The operation input unit 312 can be realized using, for example, buttons, directional keys, dials, trackpads, touch panels, levers, trackballs, keyboards, and joysticks to input operations such as selections. In Fig. 1, this corresponds to the key input unit 304.

[0102]

The CPU 320 realizes various functions via arithmetic processing and integrally controls the user terminal 300. Programs and data for arithmetic processing are stored in the RAM 330 and the ROM 340.

[0103]

The RAM 330 is an IC memory that can temporarily store programs and data, and may include, for example, a user voice data storage area 332 that stores user voice data that is the voice of user 6, and a voice analysis result data storage area 334 that stores vocalization analysis result data D2 from the management server 200. When referring to data stored in each data storage area below, the reference number attached to each data storage area will be used to explain the data.

[0104]

The ROM 340 includes (1) a vocalization analysis result reception program storage area 341 that stores a vocalization analysis result reception program to realize the function of receiving vocalization analysis result data D2 from the management server 200, (2) an animal care instruction input program storage area 342 that stores an animal care instruction input program to realize the function of displaying text and images included in the received vocalization analysis result data D2 on the display unit 350 so the user can select and input an animal care instruction as a response, and (3) an animal care instruction transmission program storage area 343 that stores an animal care instruction transmission program to realize the function of transmitting animal care instruction data D3 including selected and inputted animal instructions to the management server 200. The programs stored in each program storage area will be described below using the reference codes attached to the program storage areas to refer to the program.

[0105]

More specifically, by executing the vocalization analysis result reception program 341, the user terminal 300 accesses the POP server of a given ISP to receive an e-mail containing vocalization analysis result data D2 from the management server 200. By executing the animal care instruction input program 342, text and images indicating the emotion of the dog 2 contained in the vocalization analysis result data D2 are displayed, and predetermined animal care instructions are displayed as responses, which are selected and inputted by the user 6. The owner's voice calling the dog 2 can be captured using the voice input unit 310. The captured owner's voice is stored in the RAM 330 as user voice data 332.

By executing the animal care instruction transmission program 343, an e-mail containing animal care instruction data D3 can be created and sent to the management server 200 by accessing the SMTP server at a given ISP.

[0106]

The ROM 340 also has an animal care instruction TBL (table) storage area 344 that stores the animal care instruction TBL. When referring to data stored in a data storage area below, the explanation will use the reference code attached to the data storage area.

Fig. 15 is a diagram showing an example of an animal care instruction TBL 344. As shown in the figure, the animal care instruction TBL 344 stores the user ID 344a and associates and stores animal care content 344b indicating the content of the animal care to be performed by the animal care terminal 100 with an animal content code 344b that is information indicating the animal care content 344b.

[0107]

The display unit 350 is realized by, for example, an LCD (liquid crystal display), ELD (electronic luminescent display), PDP (plasma display panel), CRT (cathode ray tube), or head-mounted display, and outputs text, graphics, and images. In Fig. 1, this corresponds to the monitor unit 302.

[0108]

The information storage medium reading unit 360 reads information from and writes information to an information storage medium 362. The information storage medium 362 can be, for example, a hard disk, MO, DVD-RAM, memory card, CD-ROM, etc., and can store and replace information stored in the RAM 330 and the ROM 340.

[0109]

The communication unit 370 exchanges data with external devices. This can be realized, for example, by Bluetooth (registered trademark), IrDA, a modem, TA, or radio. In Fig. 1, this corresponds to the long-distance communication unit 309.

[0110]

Fig. 16 (c) is a diagram showing an example of animal care instruction data D3. As shown in the figure, the animal care instruction data D3 includes, for example, a user ID 344a, an animal care content code 344b, and user voice data 332.

[0111]

[Explanation of the Processing Flow]

Fig. 17 is a flowchart showing the processing flow for the transmission of information from the animal care terminal 100 to the user terminal 300. The processing in this figure is realized by CPU 120 executing the animal care status transmission program 142 in the animal care terminal 100, the CPU 220 executing the vocalization analysis result transmission program 242 in the management server 200, and the CPU 320 executing the vocalization analysis result reception program 341 in the user terminal 300.

[0112]

If a vocalization by the dog 2 is inputted by the microphone unit 102 or the mobile microphone unit for dogs 4 in the animal care terminal 100 (step S102), the animal care terminal 100

stores the vocalization by the dog 2 as animal vocalization data 132 in the RAM 130. Then, the camera unit 106 captures images of the dog 2 and stores them in the RAM 130 as actual situation image data 133 (step S104).

[0113]

Here, the animal control terminal 100 determines whether the conditions have been satisfied by referring to the transmission condition data 135. If the conditions have been met (step S106; YES), an e-mail containing the animal care status data D1 is created and the e-mail sent to the destination indicated in the management server address information 147 (step S108). If the conditions in the transmission condition data 135 have not been met (step S106; NO), the animal care status data D1 is not transmitted.

[0114]

The management server 200 receives the e-mail including the animal care status data D1 from the animal care terminal 100 (step S210). Next, the animal vocalization data 132 in the animal care status data D1 is subjected to vocalization analysis processing to determine the emotion of the dog 2 contained in the vocalizations (step S212).

[0115]

Fig. 20 is a flowchart used to explain the flow in the vocalization analysis processing. This vocalization analysis processing is realized by the CPU 220 in the management server 200 executing the animal vocalization analysis program 241.

[0116]

The management server 200 converts the voice data (in this case, the animal vocalization data 132) into a format suitable for analysis (step S402). For example, it can be converted into a sonographic format. Next, the animal attribute code 236e for dog 2 is referenced from the user registry data 236 corresponding to the user ID 136a in the animal care status data D1 (step S404), and the reference vocalization pattern 246c among the animal reference vocalization patterns 246 that matches the animal attribute code 236e is compared and matched with the vocalization data converted in step S402 (step S406).

[0117]

Here, if there is a reference vocalization pattern 246c with matching features (step S408; YES), the management server 200 includes the emotion identification code 246b corresponding to the matching reference vocalization pattern 246c in the vocalization analysis result 234 and stores the result in the RAM 230 (step S410). The animal vocalization analysis processing is then terminated and the flow returns to the flow in Fig. 17.

[0118]

In the flow of Fig. 17, the management server 200 next references the human attribute code 236b of the user 6 from the user registry data 236 corresponding to the user ID 136a included in the animal care status data D1, and the human language corresponding to the determined emotion identification code 246b is retrieved from the animal expression to human language conversion TBL 247 corresponding to the human attribute code 236b. In other words, the text data 247c and image data 247d corresponding to the determined emotion identification code

246b are retrieved (step S214). The retrieved text data 247c and image data 247d are included in the vocalization analysis result 234, which is stored in the RAM 230.

[0119]

Then, the management server 200 creates an e-mail containing the vocalization analysis result data D2 and sends the vocalization analysis result data D2 to the user terminal 300 based on the destination in the user terminal address information 236f in the user registry data 236 (step S216). The user terminal 300 receives the e-mail containing the vocalization analysis result data D2 from the management server 200 (step S318).

[0120]

If the user terminal 300 has received vocalization analysis result data D2, it executes the input process for an animal care instruction.

[0121]

Fig. 18 is a flowchart used to explain the flow of the animal care instruction input processing. This processing is realized by the CPU 320 in the user terminal 300 executing the animal care instruction input program 342.

[0122]

First, the user terminal 300 determines whether or not the user's ID is in the e-mail. If the e-mail does not contain the user's ID (step S320; NO), it determines that the e-mail is a general e-mail and terminates the process.

[0123]

If the e-mail contains the user's ID (step S320; YES), the text data 247c and image data 247d in the vocalization analysis result data D2 are displayed in the monitor unit 302 (step S322). The actual situation image data 133 included in the vocalization analysis result data D2 is displayed in the monitor unit 302, and the animal vocalization data 132 is played on the speaker unit 308 (step S324). By seeing and hearing the output results, the user 6 can ascertain the status of the dog 2.

[0124]

Next, the user terminal 300 displays the animal care contents 344b of the animal care instruction TBL 344 on the monitor unit 302 for selection (step S326). The user 6 selects from the displayed animal care content 344b that is considered appropriate based on the status of the dog 2 using the key input unit 304 (step S328). The user terminal 300 stores the animal care content code 344b corresponding to the selected animal care content 344b in the RAM 330.

[0125]

If "call the dog (human voice input)" is selected for the animal care content 344b (step S330; YES), the user terminal 300 records the voice of the user 6 from the microphone unit 306 and stores it in the RAM 330 as user voice data 332 (step S332). In other words, the user 6 can input his or her voice to call the dog 2. This concludes the animal care instruction input processing.

[0126]

Fig. 22 is a diagram showing an example of a vocalization analysis result display screen on the user terminal 300. As shown in Fig. 22(a), the title display 5a on the vocalization analysis result display screen 5 indicates that the message is from the dog 2 to the user 6. In this case, the animal's name 236d (the pet's name) can be included in the vocalization analysis result data D2 on the display, such as "A message has been received from (Taro)." This gives the user 6 an intimate feeling.

[0127]

The text data 247c and image data 247d are displayed on text display unit 5b and the image display unit 5c, respectively. The text display unit 5b is more suitable, for example, if displayed inside a speech bubble in the image display unit 5c. The time data 134 is displayed in the time display unit 5d.

[0128]

The actual situation image data 133 is switched to the window W for image playback and displayed as shown in Fig. 22 (b) by performing a predetermined key operation (for example, operating a function key 304c or direction key 304a). In this situation, it is suitable if the animal vocalization data 132 is simultaneously outputted from the speaker unit 308.

[0129]

Selection columns 5e for animal care instructions are displayed at the bottom of the vocalization analysis result display screen 5. If all of the selection columns 5e cannot be displayed on the screen at one time, they can be scrolled through using the directional keys or some other means. A number 5f is displayed adjacent to each selection column 5e, and the corresponding number 5f is selected by entering the number with a dial number key 304d on the key input unit 304.

[0130]

Fig. 19 is used to explain the processing flow for the transmission of information from the user terminal 300 to the animal care terminal 100. The processing in this drawing is realized by the CPU 320 executing the animal instruction transmission program 343 in the user terminal 300, the CPU 220 executing the animal care processing command transmission program 243 in the management server 200, and the CPU 120 executing the animal care processing order reception program 143 in the animal care terminal 100.

[0131]

First, the user terminal 300 creates an e-mail containing the animal care instruction data D3 and sends the e-mail to the destination in the management server address information 345 (step S336).

[0132]

The management server 200 receives the animal care instruction data D3 from the user terminal 300 (step S238). If the received animal care instruction data D3 includes user voice

data 332 (step S240; YES), the management server 200 performs human voice analysis processing (step S242).

[0133]

Fig. 21 is a flowchart used to explain the human voice analysis processing in the present embodiment. The human voice analysis processing is realized by the CPU 220 executing the human voice analysis program 244.

[0134]

As shown in the figure, the management server 200 converts the voice data (in this case, user voice data 332) into a format suitable for analysis (step S502). For example, it can be converted to a sonographic format. Next, the human attribute code 236b is referenced from the user registry data 236 corresponding to the user ID 344a included in the animal care instruction data D3 (step S504), and the reference voice pattern 248c in the human reference voice patterns 248 that matches the human attribute code 236b is compared with the voice data converted in step S502 for matching (step S506).

[0135]

If there is a reference voice pattern 248c with matching characteristics (step S506; YES), the management server 200 retrieves the emotion identification code 248b corresponding to the matching reference voice pattern 248c and stores it in the RAM 230 (step S508). The human voice analysis processing is then completed.

[0136]

In the flow shown in Fig. 19, the management server 200 then references having instruction inputting means for inputting animal care instructions from the vocalization analysis result transmitting device the animal attribute code 236e from the user registry data 236 corresponding to the user ID 344a included in the animal care instruction data D3, and the human language corresponding to the determined emotion identification code 246b is retrieved from the human language to animal expression conversion TBL 249 corresponding to the animal attribute code 236e. In other words, the synthesized vocalization data 249d and high-frequency vocalization data 249e corresponding to the determined emotion identification code 248b are retrieved (step S244). The retrieved synthesized vocalization data 249d and high-frequency vocalization data 249e are then stored in the RAM 230.

[0137]

Next, the management server 200 creates an e-mail containing the animal care processing command data D4 and sends the e-mail based on the breeding terminal address information 236g in the user registry data 236 corresponding to the user ID 344a included in the animal care instruction data D3 (step S246).

[0138]

The animal care terminal 100 receives the animal care processing command data D4 (step S148). Then, the control command 146c corresponding to the processing content code 344c included in the animal care processing command data D4 is executed from the animal care processing correspondent TBL146 to execute the animal care processing desired by the user 6 (step S150). For example, if the animal care content code 344b is "003," the air

conditioner 3 is turned on and air conditioning is performed, and if the animal care content code 344b is "005," the user voice data 332 in the animal care processing command data D4 is outputted from the speaker unit 104.

[0139]

Next, the registered voice data 137b corresponding to the processing content code 344c is retrieved from the human language registry data 137, and the synthesized vocalization data 249d and high-frequency vocalization data 249e included in the animal care processing command data D4 are outputted from the speaker unit 104 (step S154).

[0140]

By performing this series of operations, when the dog 2 vocalizes, the emotion of the dog 2 can be determined and the user 6 at a separate location can be notified by e-mail. The user 6 can then select the animal care content that seems appropriate for the status of the dog 2 from the vocalization analysis result, and the animal care content can be executed by the animal care terminal 100. In this way, the user 6 can understand the emotions of the dog 2 at a distant location and provide the appropriate care.

[0141]

Although the processing operations above were described as starting with vocalization by the dog 2, the processing is not limited to this example. For example, the user 6 can execute the animal care instruction input process on the user's terminal 300 at any time and have the animal care terminal 100 execute the animal care processing.

[0142]

(Second Embodiment)

Next, a second embodiment will be explained with reference to Fig. 23 to Fig. 25. Components similar to those in the first embodiment are denoted by the same number, and further description of these components has been omitted.

[0143]

[Description of the Configuration]

Fig. 23 is a diagram showing an example of the configuration for the present embodiment. As shown in the figure, the second embodiment is characterized in that the functions of the animal care terminal 100 and the management server 200 in the first embodiment are integrated into a home server 500.

[0144]

The home server 500 is realized by, for example, a server device or a personal computer, and can exchange data with the user terminal 300 via a communication line 9 using the long-distance communication unit 109. The short-distance communication unit 108 can exchange data with the air conditioner 3, camera 10, microphone 12, automatic feeder 14, speaker 16, and mobile microphone unit for dogs 4 installed in the user's home 1. More specifically, the air conditioner 3, camera 10, microphone 12, automatic feeder 14, and speaker 16 each have their own independent power source and are configured to exchange data with the home

server 500 using a short-distance wireless technology such as Bluetooth (registered trademark) or IrDA. The air conditioner 3 and automatic feeder 14 in particular can be controlled remotely from the home server 500.

[0145]

The automatic feeder 14 is a device equipped with an automatic replenisher 103 that can automatically resupply food and water to the dog 2, as well as exchange data with the home server 500. The automatic feeder 14 does not transmit animal care status data D1 as the animal care terminal 100 does in the first embodiment.

[0146]

The air conditioner 3, camera 10, microphone 12, automatic feeder 14, and speaker 16 can each be wired to communicate with the home server 500.

[0147]

[Description of the Functional Blocks]

Fig. 24 is a diagram showing an example of a functional configuration for the home server 500.

[0148]

The vocalization input device 510 inputs vocalization data to the home server 500 via a communication unit 270. In Fig. 23, this is the microphone 12 and the mobile microphone unit for dogs 4. The imaging device 512 captures images and inputs image data to the home server 500 via the communication unit 270. In Fig. 23, this corresponds to the camera 10. The sound output device 514 outputs sound. In Fig. 23, this corresponds to the speaker 16.

[0149]

The feeding device 552 and water supplying device 554 correspond to the automatic feeder 14 in Fig. 23. The air conditioning device 556 corresponds to the air conditioner 3 in Fig. 23.

[0150]

The animal care instruction reception program 245 stored in the ROM 240 is a program to make the CPU 220 realize the function of receiving animal care instruction data D3 from the user terminal 300.

[0151]

[Explanation of the Processing]

Fig. 25 is a flowchart used to explain the processing flow in the present embodiment. The processing flow in the present embodiment is basically the same as the processing flow in the first embodiment. The present embodiment is characterized in that the processing in the animal care terminal 100 in the first embodiment and the processing in the management server 200 are integrated into the home server 500.

[0152]

Therefore, as shown in the figure, the processing related to the transmission and reception of the animal care status data D1 (steps S108 and S210 in Fig. 17) and the processing related to the transmission and reception of the animal care processing command data D4 (steps S246 and S148 in Fig. 19) in the first embodiment are omitted.

[0153]

[Description of Modified Examples]

First and second embodiments of the present invention were described above. However, application of the present invention is not limited to these embodiments, and components may be changed, added, or deleted as appropriate, as long as there is no departure from the scope and spirit of the present invention.

[0154]

For example, the vocalization analysis processing is performed by the management server 200 and the home server 500 above, but it can also be performed by the user terminal 300. In this case, the animal vocalization analysis program 241 and the human voice analysis program 244 and the animal reference vocalization patterns 246, the animal expression to human language conversion TBL 247, the human reference voice patterns 248, and the human language to animal expression conversion TBL 249 are stored in the ROM 340 of the user terminal 300. The animal care terminal 100 transmits animal care status data D1 to the user terminal 300, and the user terminal 300 analyzes the animal vocalization data 132 in the animal care status data D1 by vocalization analysis and outputs the vocalization analysis result to the monitor unit 302. If the animal care instruction is inputted by the user 6, the user terminal 300 executes voice analysis of the user voice data 332, retrieves the animal expression corresponding to the voice analysis results, and sends animal processing command data D4 to the animal care terminal 100.

[0155]

Items that can be controlled remotely from the animal care terminal 100 are not limited to the air conditioner 3, but may also include other home appliances such as indoor lights, televisions, and videos.

[0156]

[Effects of the Invention]

In the present invention, the vocalization analysis result transmitting device can receive the vocalizations by the animal from the animal care terminal device and transmit the analysis results of the received vocalization to the human terminal device. In this way, even if the animal and human are at different locations, the human can know the results of the analysis of vocalizations by the animal.

[0157]

The vocalization analysis result transmitting device can also receive an animal care instruction from the human terminal device and transmit a processing command for the received animal care instruction to the animal terminal device. Upon receipt of the processing command, the

animal terminal device can execute animal care processing that operates and controls the animal care device. As a result, the human can know the results of an analysis of the animal's vocalizations even when the human is far away from the animal, and can provide the animal with appropriate care based on its condition.

[0158]

In addition, the vocalization analysis result transmitting device sends an animal expression corresponding to the animal care instructions received from the human terminal device to the animal terminal device, so that the animal terminal device that receives the animal expression can output the expression as sound, allowing the animal to hear the animal expression which conveys a message from human to animal.

[0159]

In addition, by analyzing the emotions contained in the animal's vocalization received from the animal terminal device by the vocalization analysis result transmitting device, a human can understand the animal's emotions.

[0160]

In addition, the vocalization analysis result transmitting device transmits the vocalization analysis results of the animal's vocalization in human language, such as text or images, whose meaning can be understood by a human, so that the vocalization analysis results can be more easily understood by a human.

[0161]

In addition, by having the vocalization analysis result transmitting device transmit vocalization analysis results only when the vocalization analysis results of the animal's vocalizations meet predetermined conditions, a situation can be avoided in which vocalization analysis results are transmitted to the human terminal device each time an animal vocalization is inputted.

[0162]

In addition, the vocalization analysis result transmitting device transmits time information along with the vocalization analysis results, so that a human can know what time the vocalization analysis results were received.

[0163]

The vocalization analysis result transmitting device can also transmit images taken by the animal terminal device to the human terminal device.

[0164]

In the present invention, the vocalization analysis result transmitting device can transmit the animal vocalizations to a server and receive processing commands corresponding to the transmitted animal vocalization to execute the animal care process. In this way, an animal can be given care appropriate to its condition without a human having to be present.

[0165]

In addition, the animal terminal device can get the animal to listen to a human voice corresponding to the processing command for animal care by selecting the human language expression corresponding to the processing command received from the server from among human language expressions stored in advance.

[0166]

In addition, the vocalization input means of the animal terminal device is in part attached to the animal, so that it is always in close proximity to the animal and enables input of animal vocalizations without missing any.

[0167]

The animal terminal device is also provided with a means for imaging the animals and an image transmission means for transmitting the images taken by the imaging means to the server.

[0168]

In the present invention, the vocalization result display device can display the results of an analysis of the animal's vocalization in human language so the human can select animal care instructions to be sent to the server. In this way, even if the human is at a separate location from the animal, he or she can monitor the animal's situation and give appropriate animal care instructions to the animal terminal device.

[Brief Description of the Drawings]

[Fig. 1] Fig. 1 shows an example of a configuration for the first embodiment, in which (a) is an overall view of the configuration, (b) is an enlarged view of the mobile microphone unit for dogs, and (c) is an enlarged view of the user terminal.

[Fig. 2] Fig. 2 is a diagram used to explain the concept of animal care in the first embodiment.

[Fig. 3] Fig. 3 is a functional block diagram of an example of a functional configuration for the animal care terminal in the first embodiment.

[Fig. 4] Fig. 4 is a functional block diagram of an example of a functional configuration for the management server in the first embodiment.

[Fig. 5] Fig. 5 is a functional block diagram of an example of a functional configuration for the user terminal in the first embodiment.

[Fig. 6] Fig. 6 shows an example of transmission conditions data.

[Fig. 7] Fig. 7 shows an example of setting data.

[Fig. 8] Fig. 8 shows an example of human language registry data.

[Fig. 9] Fig. 9 shows an example of a TBL corresponding to an animal care process.

[Fig. 10] Fig. 10 shows an example of user registry data.

[Fig. 11] Fig. 11 shows an example of the data structure for an animal reference vocalization pattern.

[Fig. 12] Fig. 12 shows an example of the data structure for a human reference voice pattern.

[Fig. 13] Fig. 13 shows an example of an animal expression to human language conversion TBL.

[Fig. 14] Fig. 14 shows an example of a human language to animal expression conversion TBL.

[Fig. 15] Fig. 15 shows an example of an animal care instruction TBL.

[Fig. 16] In Fig. 16, (b) shows an example of vocalization analysis result data D2 in the present embodiment.

[Fig. 17] Fig. 17 is a flowchart used to explain the processing flow for the transmission of information from the animal care terminal to the user terminal in the first embodiment.

[Fig. 18] Fig. 18 is a flowchart used to explain the flow for the animal care instruction input process in the first embodiment.

[Fig. 19] Fig. 19 is a flowchart used to explain the processing flow for the transmission of information from the user terminal to the animal care terminal in the first embodiment.

[Fig. 20] Fig. 20 is a flowchart used to explain the processing flow for the vocalization analysis in the first embodiment.

[Fig. 21] Fig. 21 is a flowchart used to explain the processing flow for human voice analysis in the first embodiment.

[Fig. 22] Fig. 22 shows an example of the vocalization analysis result display screen on the user terminal in the first embodiment.

[Fig. 23] Fig. 23 shows an example of a configuration for the second embodiment.

[Fig. 24] Fig. 24 shows an example of a functional configuration for the home server in the second embodiment.

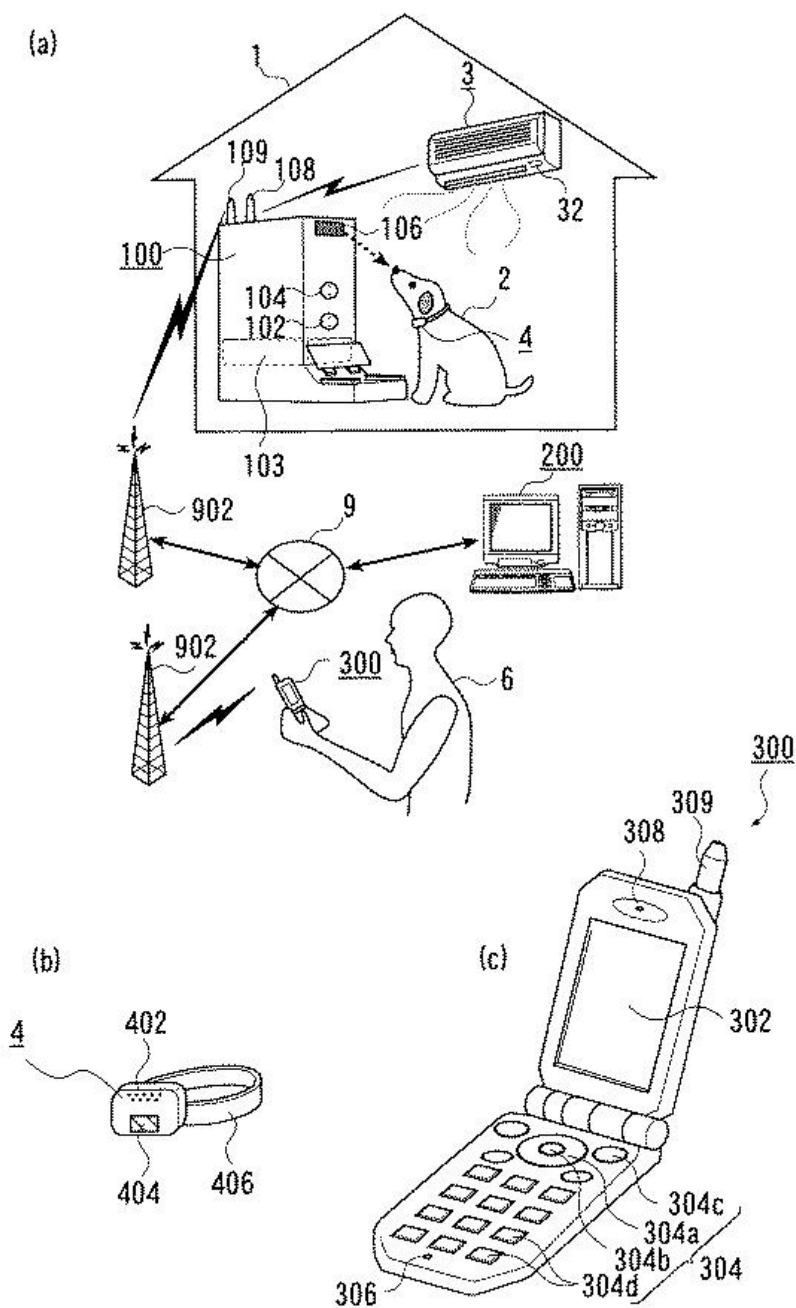
[Fig. 25] Fig. 25 is a flowchart used to explain the processing flow in the second embodiment.

[Reference List]

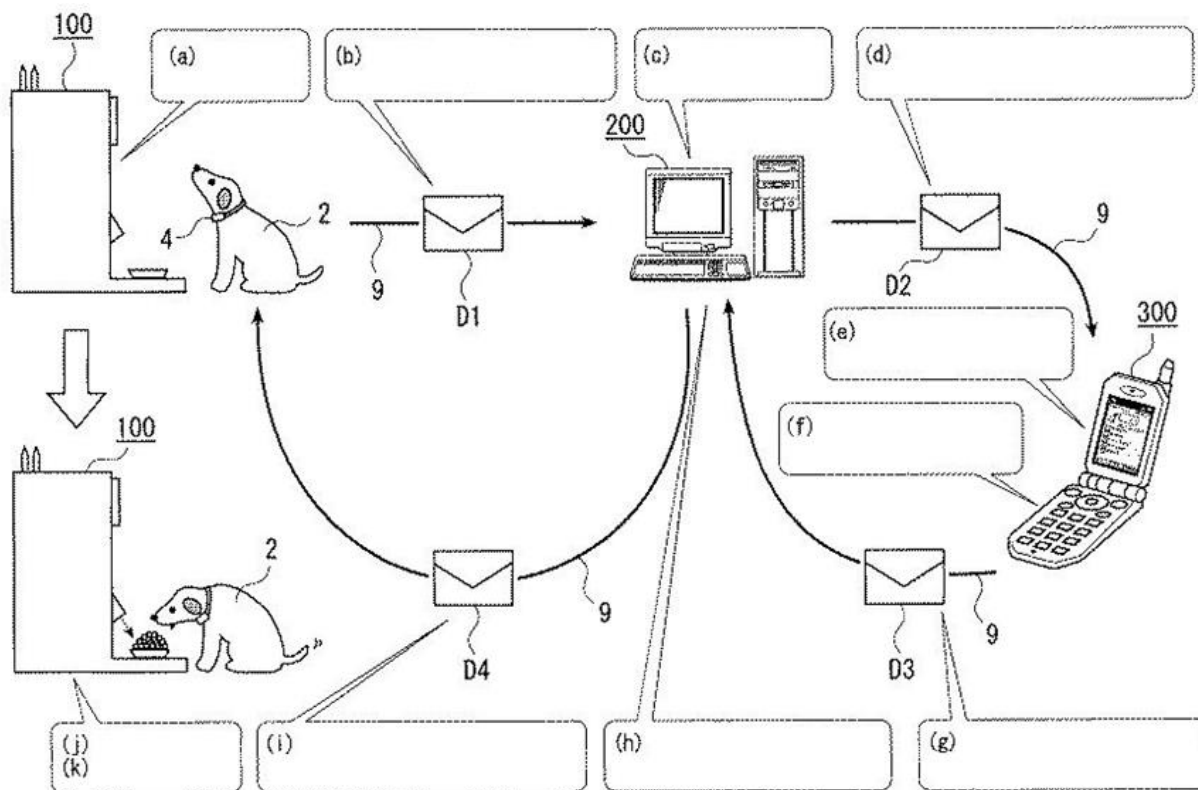
2: Dog
3: Air conditioner
4: Mobile microphone unit for dogs
402: Microphone unit
404: Short-distance communication unit
406: Belt unit
6: User
14: Automatic feeder
100: Animal care terminal

102: Microphone unit
103: Automatic replenisher
104: Speaker unit
106: Camera unit
130: RAM
132: Animal vocalization data storage area
133: Actual situation image data storage area
135: Transmission conditions data storage area
137: Human language registry data storage area
140: ROM
141: Animal care terminal control program storage area
142: Animal care status transmission program storage area
143: Animal care processing command reception program storage area
170: Communication unit
200: Management server
230: RAM
236: User registry data storage area
240: ROM
241: Animal vocalization analysis program storage area
242: Vocalization analysis result transmission program storage area
243: Animal care processing command transmission program storage area
244: Human voice analysis program storage area
245: Animal care instruction reception program storage area
246: Animal reference vocalization pattern storage area
247: Animal expression to human language conversion TBL (table) storage area
248: Human reference voice pattern storage area
249: Human language to animal expression conversion TBL storage area
270: Communication unit
300: User terminal
320: RAM
332: User voice data storage area
340: ROM
341: Vocalization analysis result reception program storage area
342: Animal care instruction input program storage area
343: Animal care instruction transmission program storage area
345: Management server address information storage area
500: Home server
510: Vocalization input device
512: Imaging device
514: Sound output device
552: Feeding device
554: Water supplying device
556: Air conditioning device
D1: Animal care status data
D2: Vocalization analysis result data
D3: Animal care instruction data
D4: Animal care processing command data

[Fig. 1]

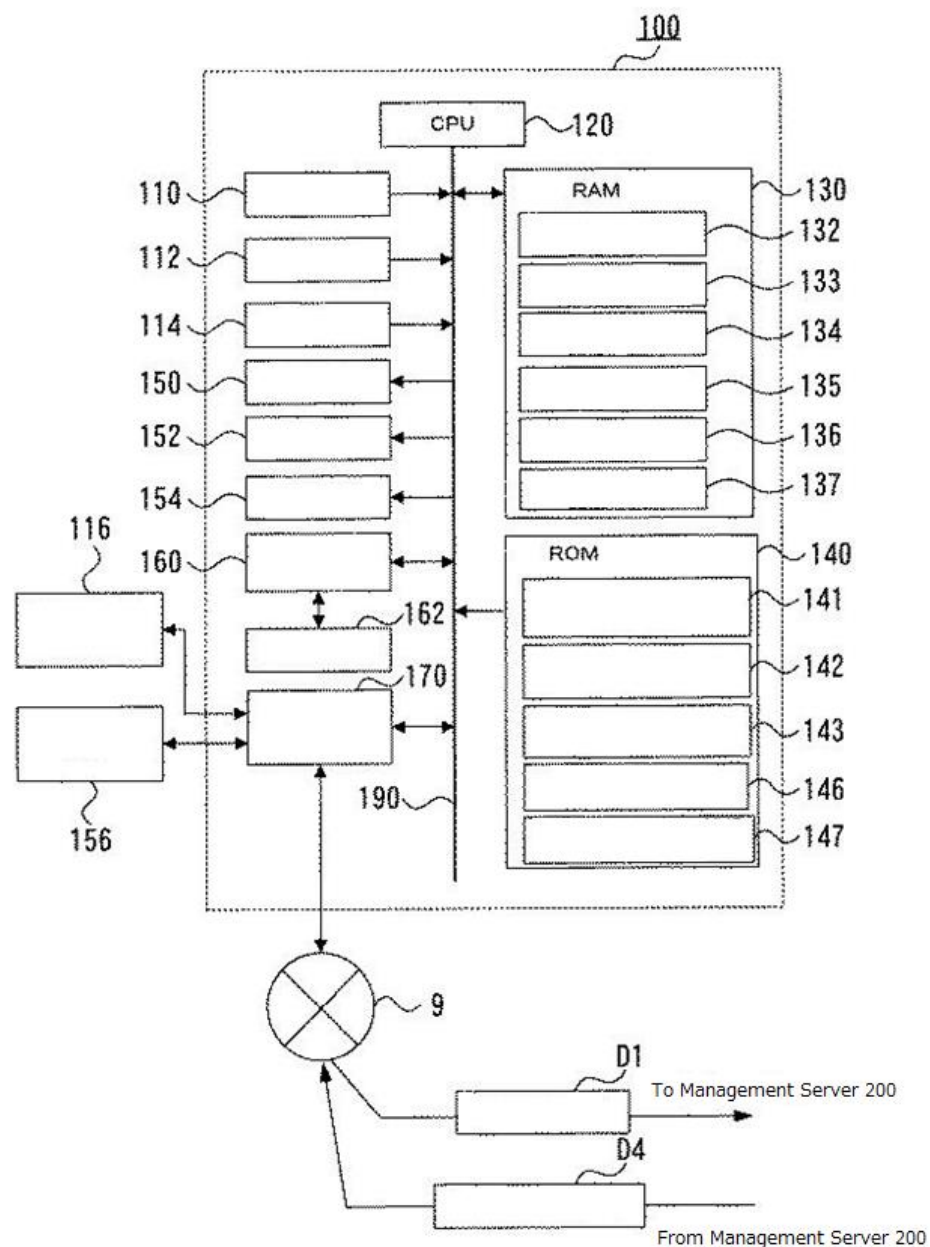


[Fig. 2]



- (a) Vocalization input
 (b) Send animal care status information (dog vocalization)
 (c) Analysis of dog vocalization (determine emotion)
 (d) Send vocalization analysis result data (human language)
 (e) Output vocalization analysis result
 (f) Input animal care instruction (user voice input)
 (g) Send animal care instruction data (user voice)
 (h) Voice analysis of user voice (conversion to dog expressions)
 (i) Send animal care processing command data
 (j) Feeding processing
 (k) Output animal expressions

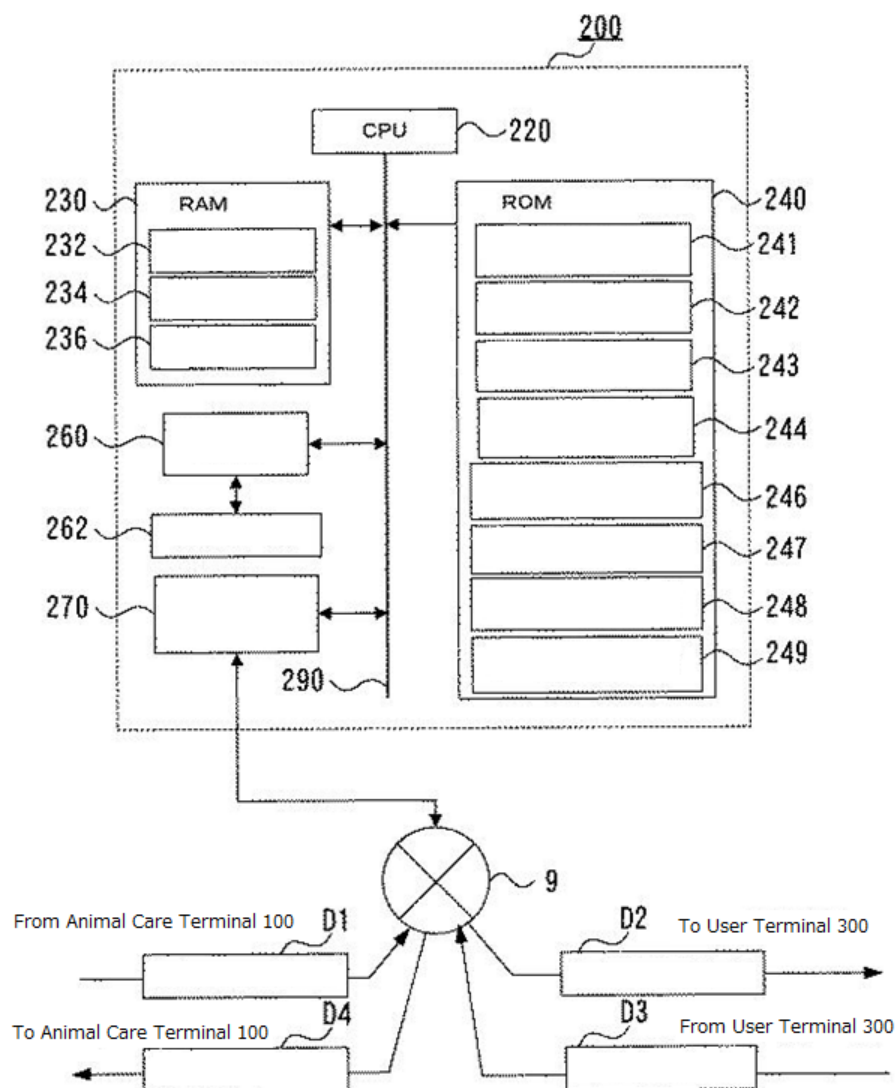
[Fig. 3]



110: Sound input unit
 112: Imaging unit
 114: Timekeeping unit
 116: Mobile sound input unit
 132: Animal vocalization data storage area
 133: Actual situation image data storage area
 134: Time data storage area
 135: Transmission conditions data storage area
 136: Setting data storage area
 137: Human language registry data storage area
 141: Animal care terminal control program storage area
 142: Animal care status transmission program storage area

143: Animal care processing command reception program storage area
 146: Animal care process correspondence TBL storage area
 147: Management server address information storage area
 150: Sound output unit
 152: Feeding unit
 154: Water supplying unit
 156: Air conditioning unit
 160: Information storage medium reading unit
 162: Information storage medium
 170: Communication unit
 D1: Animal care status data
 D4: Animal care processing command data

[Fig. 4]

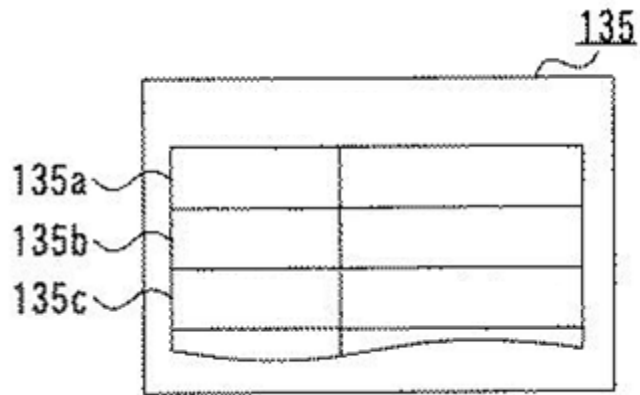


232: Animal care status data storage area
 234: Vocalization analysis result storage area
 236: User registry data storage area
 241: Animal vocalization analysis program storage area
 242: Vocalization analysis result transmission program storage area
 243: Animal care processing command transmission program storage area
 244: Human voice analysis program storage area
 246: Animal reference vocalization pattern storage area
 247: Animal expression to human language conversion TBL storage area

248: Human reference voice pattern storage area
 249: Human language to animal expression conversion TBL storage area
 260: Information storage medium reading unit
 262: Information storage medium
 270: Communication unit
 D1: Animal care status data
 D2: Vocalization analysis result data
 D3: Animal care instruction data
 D4: Animal care processing command data

344: Animal care instruction TBL storage area
345: Management server address information storage area
350: Display unit
352: Sound output unit
360: Information storage medium reading unit
362: Information storage medium
370: Communication unit
D2: Vocalization analysis result data
D3: Animal care instruction data

[Fig. 6]



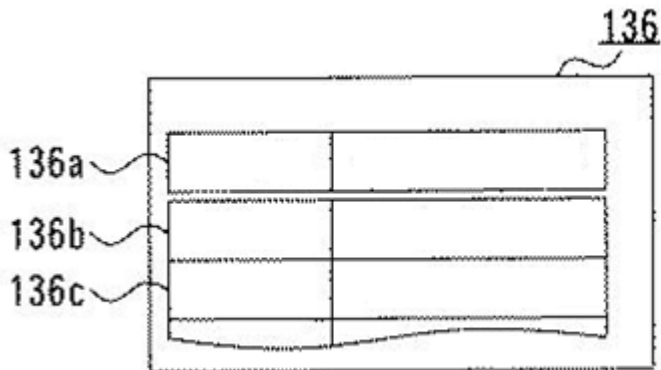
135: Transmission Conditions Data

135a: Volume Reference Value | 20 dB or higher

135b: Frequency Reference Value | 2 or more times/10 minutes

135c: Time Reference Value | Every 30 minutes

[Fig. 7]



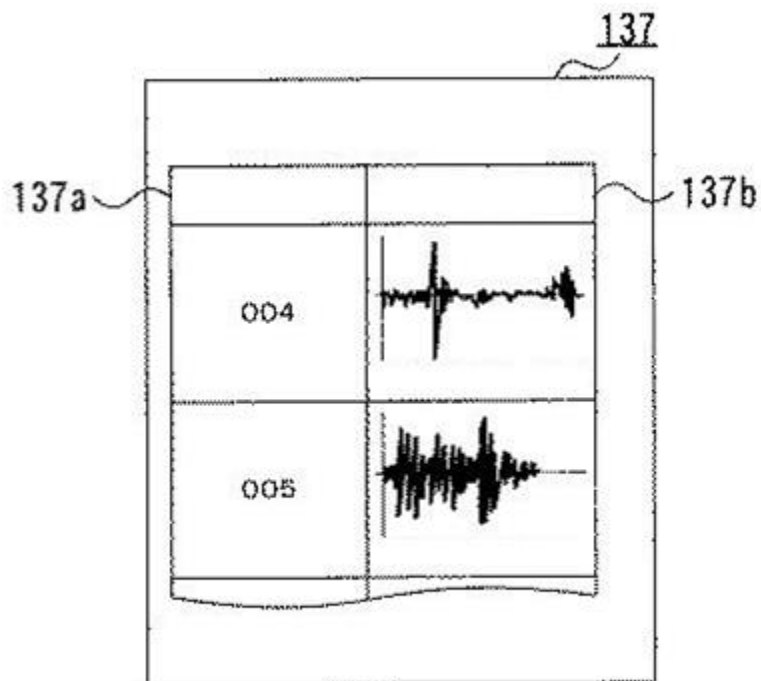
136: Setting Data

136a: User ID | J01-749-300

136b: Animal ID | DM001

136c: Animal Name | Taro

[Fig. 8]



137: Human Language Registry Data

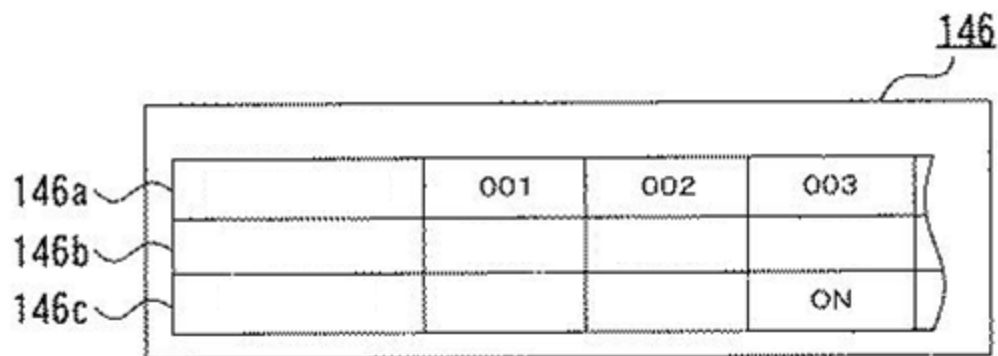
137a: Animal Care Code

137b: Registered Voice Data

004 (You'll be fed in a minute.)

005 (Quiet down.)

[Fig. 9]



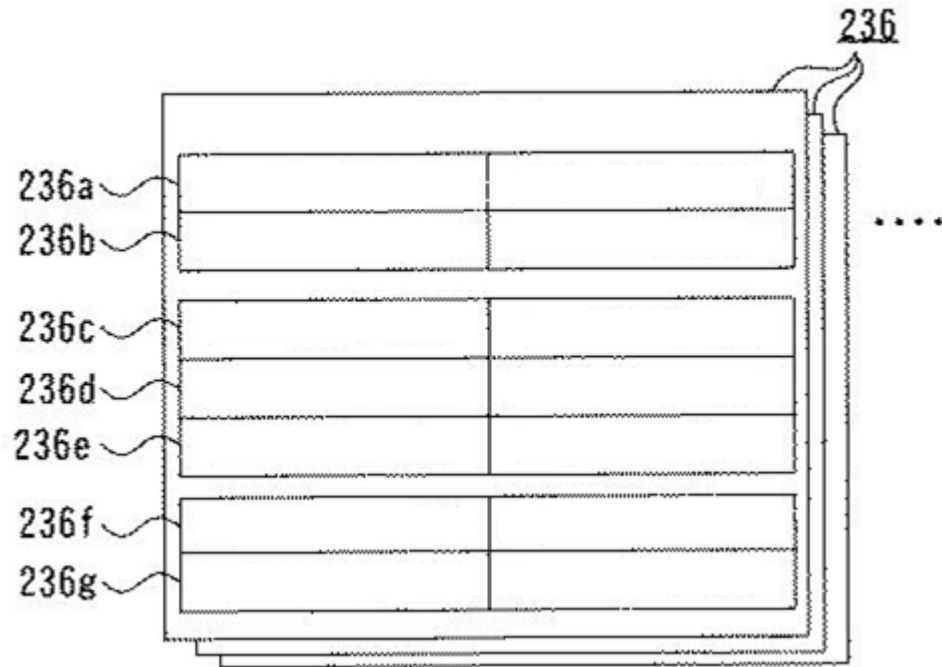
146: Animal Care Process Correspondence TBL

146a: Animal Care Code | 001 | 002 | 003

146b: Control Target | Food Replenisher | Water Replenisher | Air Conditioning Unit

146c: Control Command | Replenish for 1 Meal | Replenish with 100 cc | ON

[Fig. 10]



236: User Registry Data

236a: User ID | J01-749-300

236b: Human Attribute Code | 01 (Japanese)

236c: Animal ID | DM001

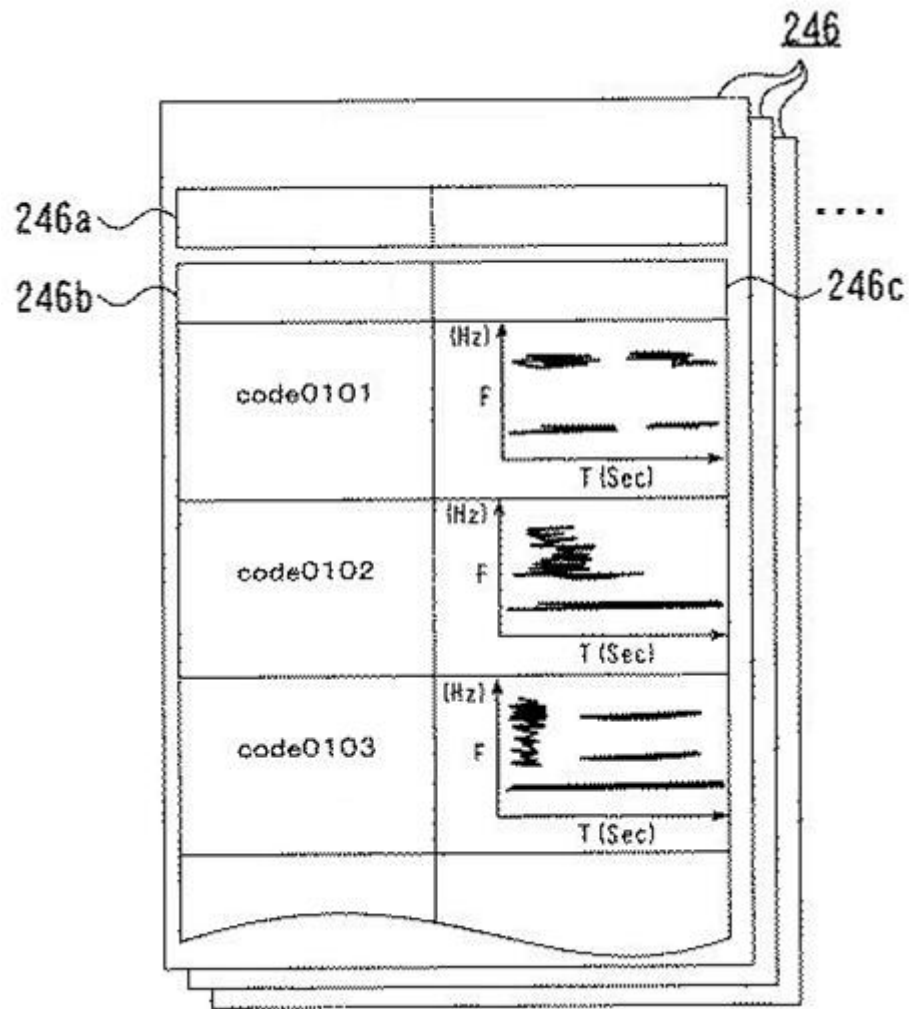
236d: Animal Name | Taro

236e: Animal Attribute Code | 01 (Akita Dog)

236f: User Terminal Address Information | sinnosuke.ga1@ca.ne.jp

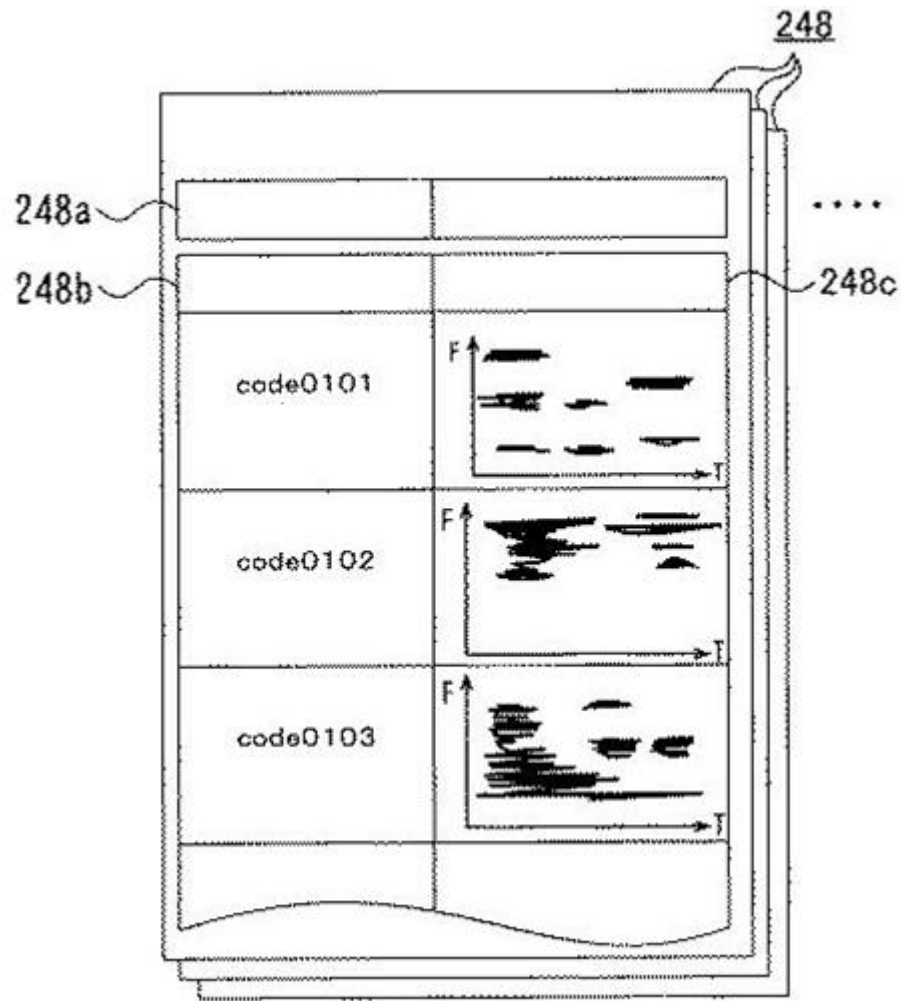
236g: Animal Care Terminal Address Information | gohan.gc3@ca.ne.jp

[Fig. 11]



246: Animal Reference Vocalization Patterns
 246a: Animal Attribute Code | 01 (Akita Dog)
 246b: Emotion Identification Code
 246c: Reference Vocalization Pattern
 code 0101 (Lonely)
 code 0102 (Happy)
 code 0103 (Menacing)

[Fig. 12]



248: Human Reference Voice Patterns
 248a: Human Attribute Code | 01 (Japanese)
 248b: Emotion Identification Code
 248c: Reference Voice Pattern
 code 0101 (Lonely)
 code 0102 (Happy)
 code 0103 (Menacing)

[Fig. 13]

247

247a		
247b	247c	247d
code0101		
code0102		
code0103		

....

247: Animal vocalization to Human Language Conversion TBL

247a: Human Attribute Code | 01 (Japanese)

247b: Emotion Identification Code

247c: Text Data

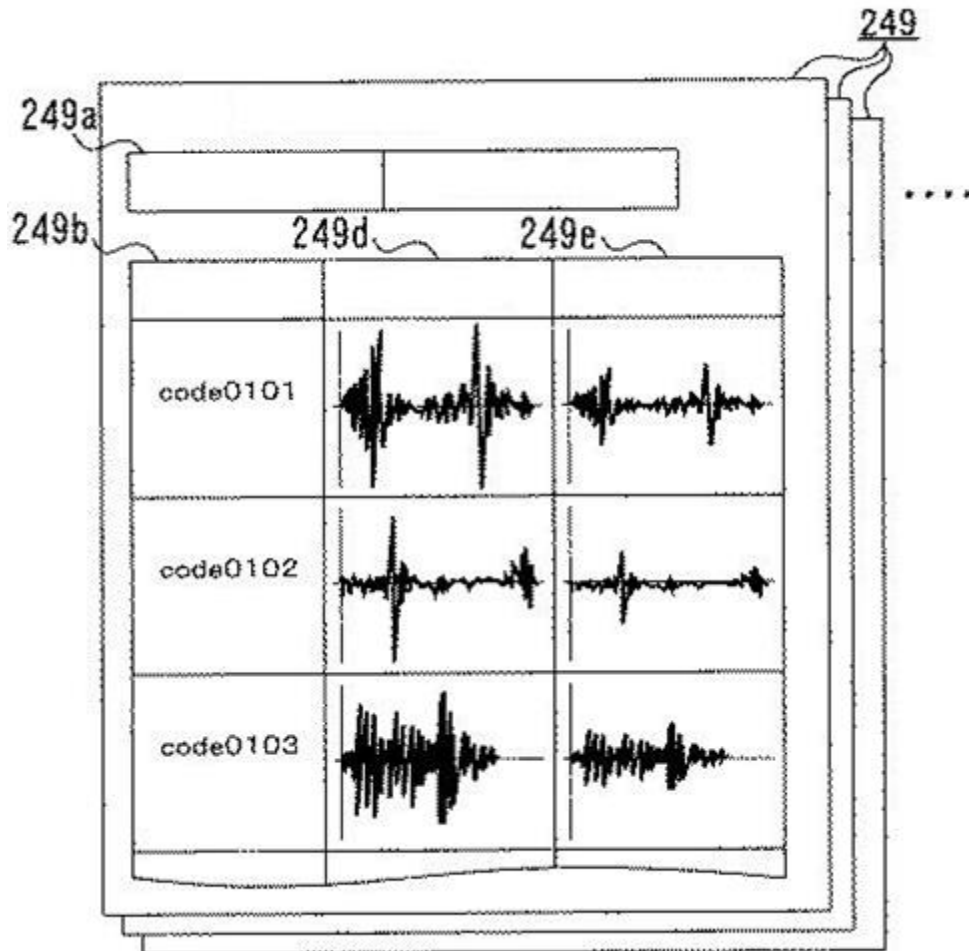
247d: Image Data

code 0101 (Lonely) | "I'm so lonely."

code 0102 (Happy) | "I'm really happy!"

code 0103 (Menacing) | "I'm really angry!!"

[Fig. 14]



249: Human Language to Animal vocalization Conversion TBL

249a: Animal Attribute Code | 01 (Akita Dog)

249b: Emotion Identification Code

249d: Synthesized Vocalization data

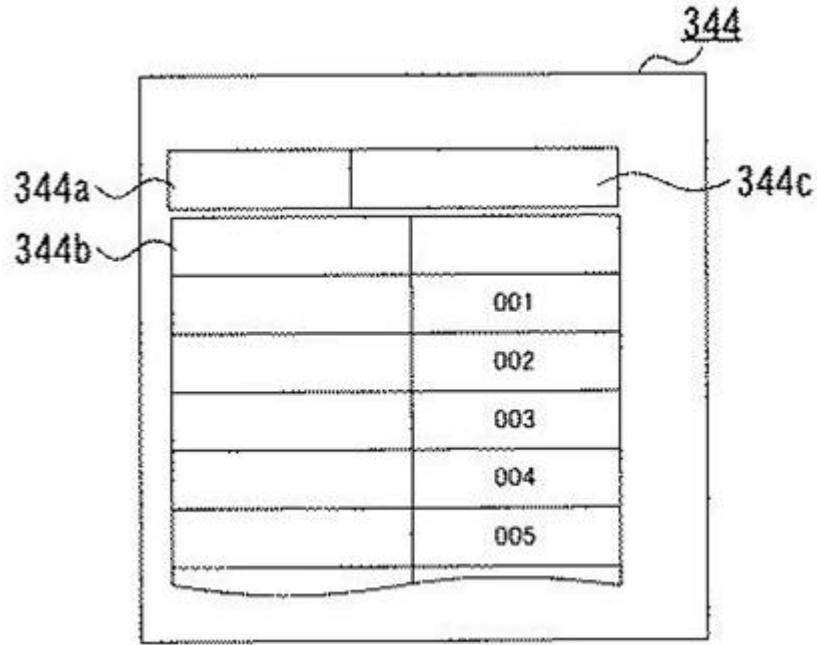
249e: High-Frequency Vocalization data

code 0101 (Lonely)

code 0102 (Happy)

code 0103 (Menacing)

[Fig. 15]



344: Animal Care Instruction TBL

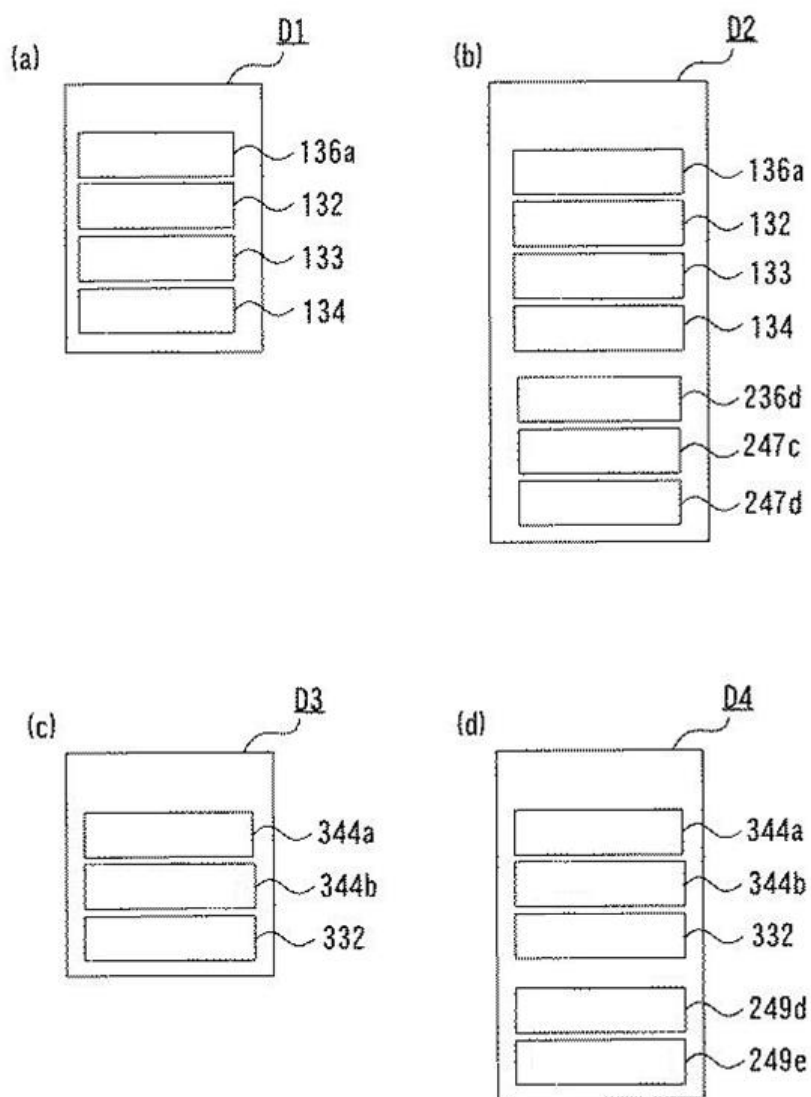
344a: User ID

344b:

Animal Care Details	Animal Care Code
Replenish Food	001
Replenish Water	002
Turn On AC	003
Turn Off AC	004
Say Words of Encouragement	005

344c: J01-749-300

[Fig. 16]



(a)

D1: Animal care status data

136a: User ID

132: Animal vocalization data storage area

133: Actual situation image data storage area

134: Time data

(c)

D3: Animal care instruction data

344a: User ID

344b: Animal care code

332: User voice data

(b)

D2: Vocalization analysis result data

136a: User ID

132: Animal vocalization data storage area

133: Actual situation image data storage area

134: Time data

236d: Animal name

247c: Text data

247d: Image data

(d)

D4: Animal care processing command data

344a: User ID

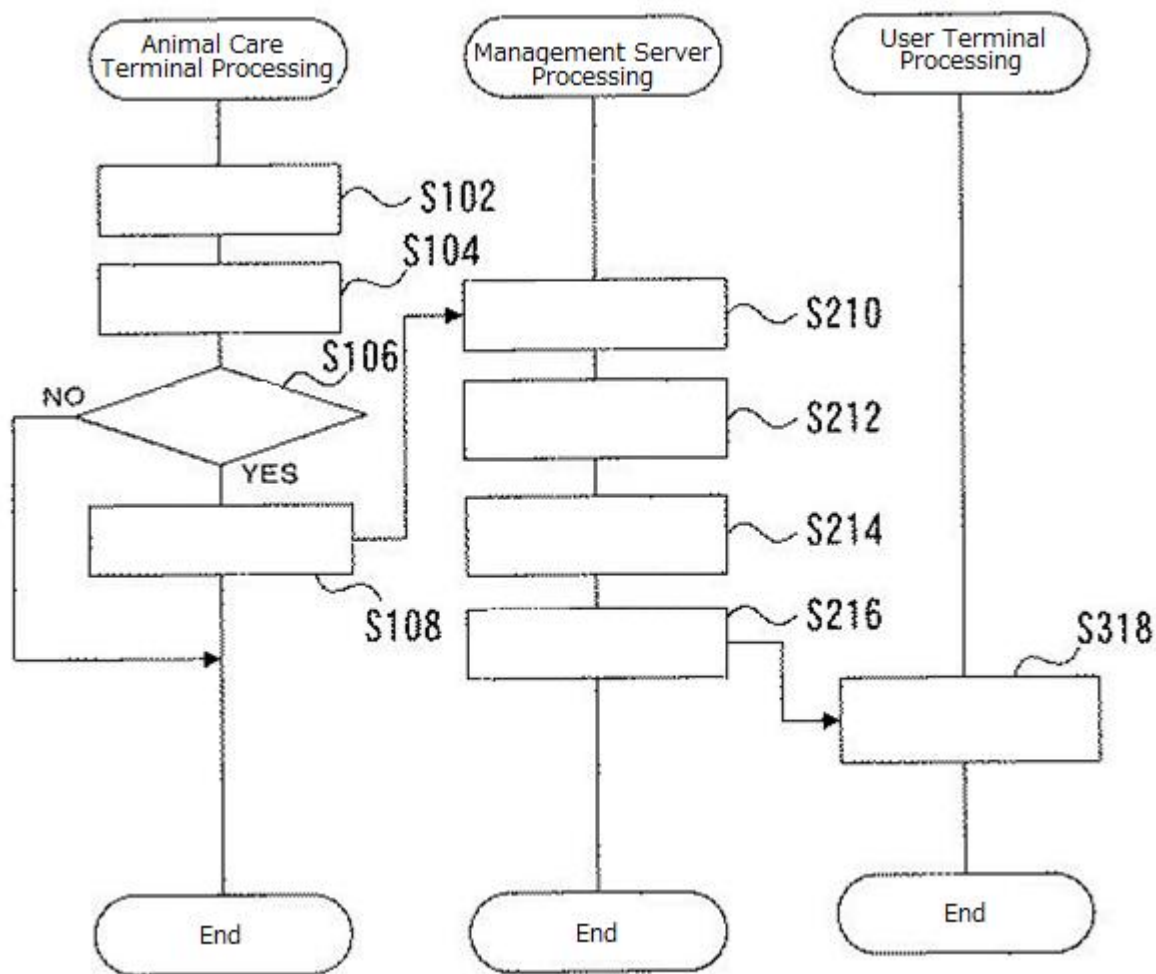
344b: Animal care code

332: User voice data

249d: Synthesized vocalization data

249e: High-Frequency vocalization data

[Fig. 17]

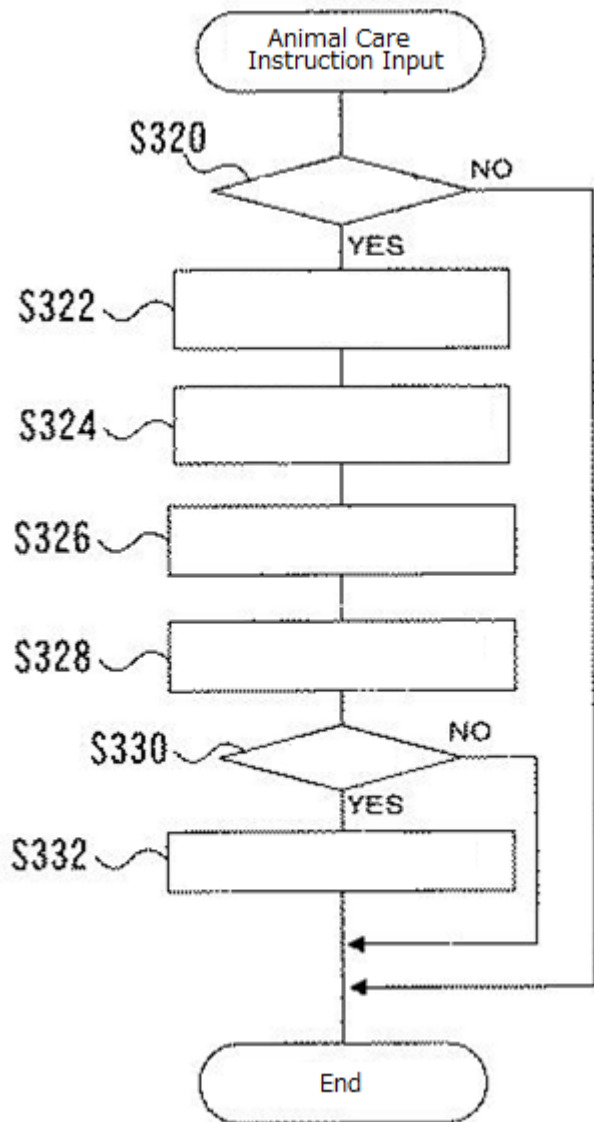


S102: Detect animal vocalizations
 S104: Capture live video
 S106: Are transmission conditions satisfied?
 S108: Transmit animal care status data

S210: Receive animal care status data
 S212: Perform vocalization analysis on animal vocalization data
 S214: Retrieve human language corresponding to vocalization analysis result
 S216: Transmit vocalization analysis result data

S318: Receive vocalization analysis result data

[Fig. 18]



S320: Is there a user ID?

S322: Display text data and image data

S324: Display actual situation image data and output animal vocalization data

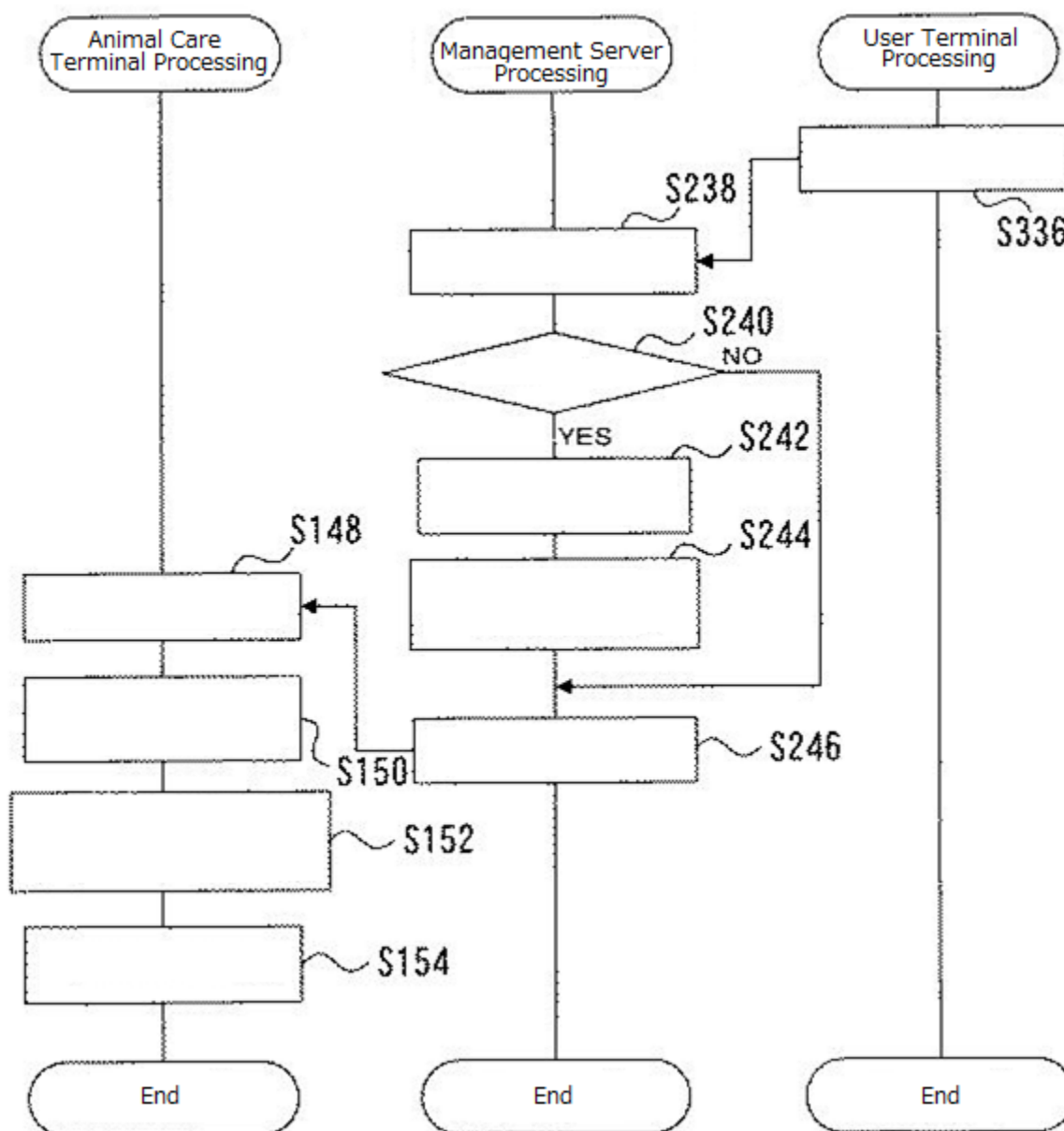
S326: Display selectable animal care specifics

S328: Select animal care specifics

S330: Voice inputted?

S332: Input Human voice

[Fig. 19]

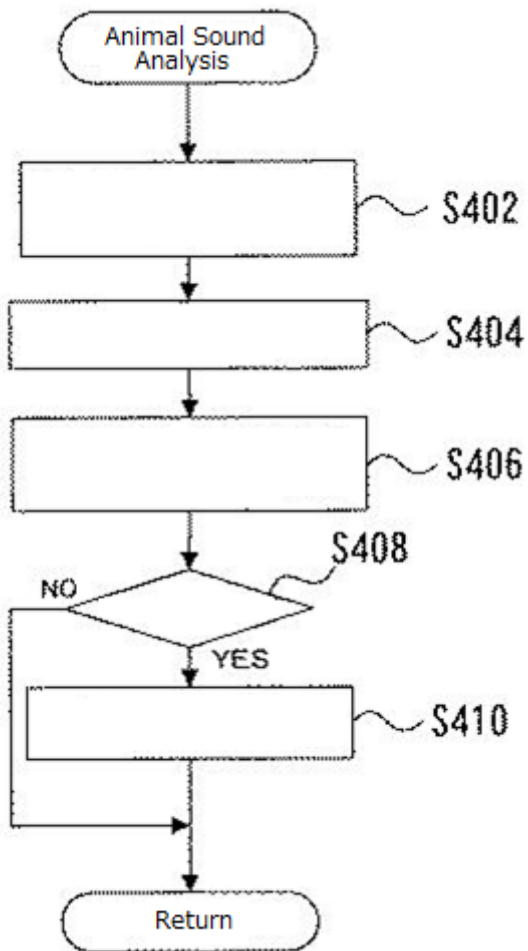


S148: Receive animal care processing data
 S150: Execute animal care processing based on animal care code
 S152: Output audio of user registered in the human language registry data corresponding to the animal care code
 S154: Output animal vocalizations

S238: Receive animal care instruction data
 S240: Is there user voice data?
 S242: Execute vocalization analysis on user voice data
 S244: Output animal expression corresponding to vocalization analysis result
 S246: Transmit animal care processing data

S336: Transmit animal care instruction data

[Fig. 20]



S402: Convert animal vocalization data into an appropriate format for processing

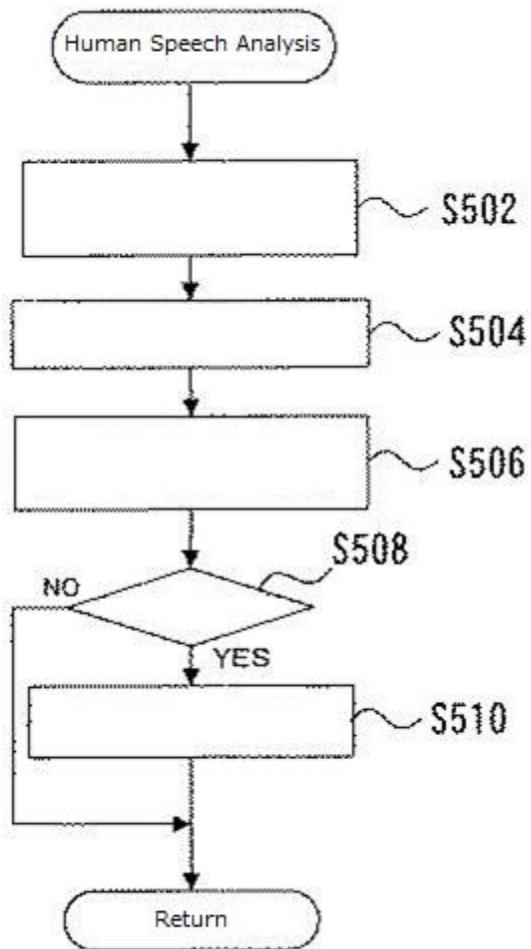
S404: Reference the animal attribute code for the dog 2

S406: Match the animal vocalization data with the animal reference vocalization patterns

S408: Is there a match?

S410: Determine the emotion identification code

[Fig. 21]



S502: Convert Human voice data to format suitable for processing

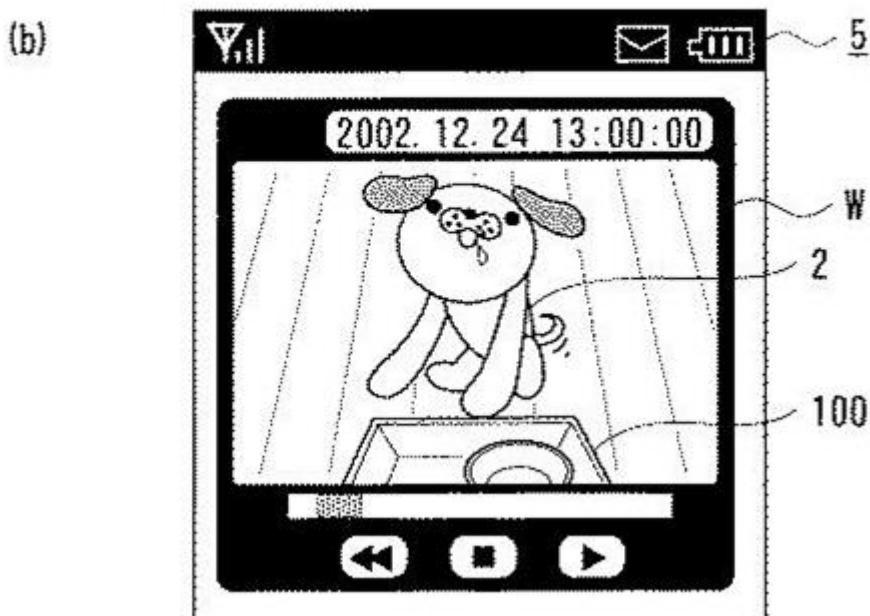
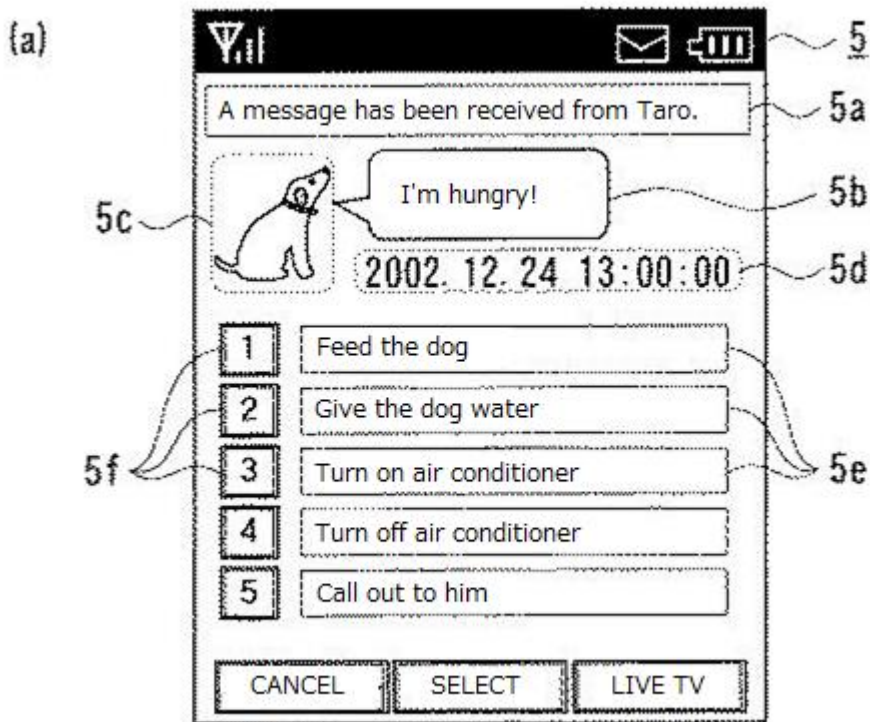
S504: Reference human attribution code of user 6

S506: Match user voice data with human reference voice patterns

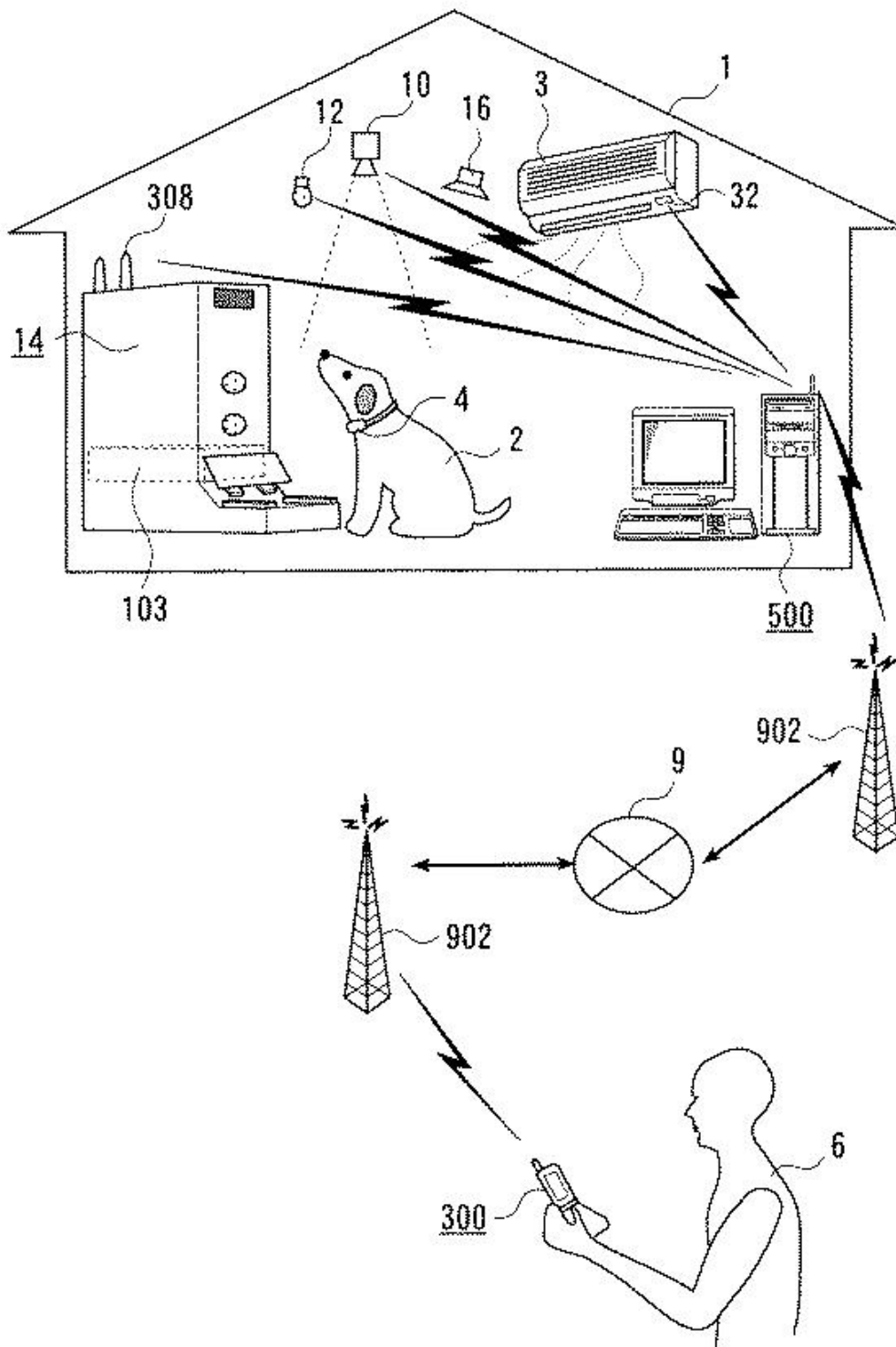
S508: Is there a match?

S510: Determine emotion identification code

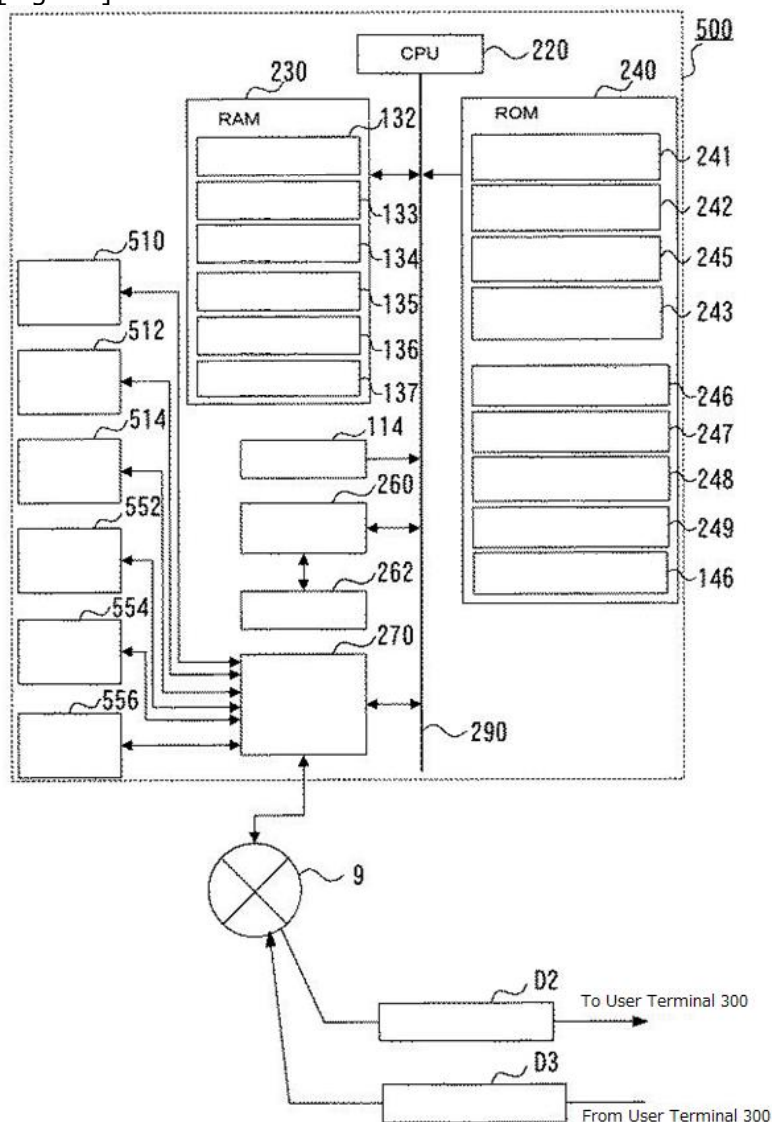
[Fig. 22]



[Fig. 23]



[Fig. 24]

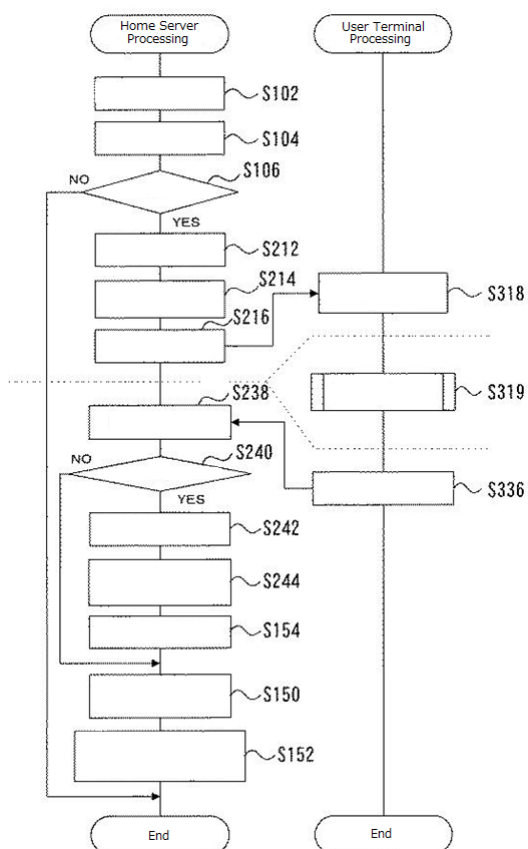


114: Timekeeping unit
 132: Animal vocalization data storage area
 133: Actual situation image data storage area
 134: Time data storage area
 135: Transmission conditions data storage area
 136: Setting data storage area
 137: Human language registry data storage area
 146: Feeding process correspondence TBL storage area
 241: Animal vocalization analysis program storage area
 242: Vocalization analysis result transmission program storage area
 243: Animal care processing command transmission program storage area
 245: Animal care instruction reception program storage area
 246: Animal reference vocalization pattern storage area

247: Animal expression to human language conversion TBL (table) storage area
 248: Human reference voice pattern storage area
 249: Human language to animal expression conversion TBL storage area
 260: Information storage medium reading unit
 262: Information storage medium
 270: Communication unit
 510: Vocalization input device
 512: Imaging device
 514: Sound output device
 552: Feeding device
 554: Water supplying device
 556: Air conditioning device
 D2: Vocalization analysis result data
 D3: Animal care instruction data

[Fig. 25]

S102: Detect animal vocalizations
 S104: Capture live video
 S106: Have transmission conditions been satisfied?
 S212: Perform sound processing on animal vocalization data
 S214: Retrieve human language corresponding to vocalization analysis result
 S216: Transmit vocalization analysis result data
 S238: Receive vocalization analysis result data
 S240: Is there user voice data?
 S242: Perform vocalization analysis on user voice data
 S244: Retrieve animal expression corresponding to vocalization analysis result
 S154: Output animal expression
 S150: Execute feeding process based on feeding code
 S152: Output user voice registered in language registry data corresponding to feeding code



S318: Receive vocalization analysis result data

S319: Animal care instruction input processing

S336: Send animal care instruction data

Continued from front page

(51) [Int.Cl.⁷] G10L 15/22
// A01K 5/00

[FI]	G10L 3/00	551Z
	G10L 3/00	561C
	G10L 3/00	551H
	G10L 3/00	R
	A01K 5/00	Z

[Theme Codes (Reference)]



TRANSLATION CERTIFICATION

Date: June 10, 2024

To whom it may concern:

This is to certify that the attached translation is an accurate representation of the documents received by this office. The translation was completed from:

- Japanese

To:

- English (USA)

The documents are designated as:

- 'JP2004212544A.pdf'
- 'JPH06325291A.pdf'

Jordan Woodard, Project Manager in this company, attests to the following:

"To the best of my knowledge, the aforementioned documents are a true, full and accurate translation of the specified documents."

A handwritten signature in black ink that reads "Jordan Woodard". The signature is written in a cursive style with a horizontal line underneath the name.

Signature of Jordan Woodard

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