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(54) **Information recording device and information recording method**

Informationsaufzeichnungsvorrichtung und Verfahren

Dispositif et procede d'enregistrement d'information

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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] This invention relates to an information recording device and method of recording the information for automaticallyrecording the state around a user.

[0002] This application claims priority of Japanese Patent Application No.2003-347446, filed in Japan on October 6, 2003.

Description of Related Art

[0003] Recently, a mobile bio-information sensor or a mobile environmental sensor has been developed, in keeping up with the progress in the field of the sensor and with the reduction in size of information equipment. The bio-information sensor is a sensor used for measuring the bio-information of the user. The bio-information quantitatively specifies the movements of various organs of the living body such as the number of heart beats or the brain wave. A small-sized bio-information sensor may be worn by a user to measure the user's bio-information which may then be analyzed to detect the emotion or changes in the physical state of the user. The environmental sensor is a sensor used for measuring the environment around the user, such as weather, atmospheric temperature or noise. The noise generated or changes in the weather indicate that some change has occurred around the user.

[0004] There has so far been known an information processing device for recording the user's bio-information or the environmental information to aid in the power of memory of the user. For retrieving the target information from the recorded information, a histogram or a distribution curve is generated for the totality of the time period in which the bio-information has been recorded to exploit the meaning in the bio-information sensor parameter in the histogram or in the distribution curve (see for example the Patent Publication 1).

[0005] [Patent Publication 1 Japanese Laid-Open Patent Publication 2002-236698

[0006] The information processing device, stated in the Patent publication 1, records the bio-information or the environmental information at all times, thereby increasing the quantity of the information to be recorded and consumption of the recording resources. On the other hand, if a large quantity of the information is recorded, the processing volume in retrieving the target information is increased to increase the processing load or to prolong the processing access time.

[0007] US 2001/0049471 A1 discloses a life support apparatus comprising a vital information sensor attached to a body to acquire vital information of a user, a behavior information sensor attached to the body to acquire behavior information of the user, a situation recognition device which recognizes a user's situation based on the behavior information acquired by the behavior information sensor and the vital information acquired by the vital information sensor to generate user's situation information, a database which stores stress management information prepared in advance, an information search device which searches the database for stress management information corresponding to the user's situation information, and an information presentation device which presents the stress management information obtained by the information search device to the user.

[0008] US 2002/0024450 A1 discloses a data collection apparatus including a sensing unit for attaching to a structure or live subject for sensing a parameter of the structure or live subject. The apparatus includes a triggering device for modifying the storing of data from a sensor in the sensing unit or for initiating transmission of data from the sensing unit to a control unit. The triggering device is controlled by a real time change in information about the structure or live subject.

[0009] US 2002/0188214 A1 discloses a device and a process for analyzing a medical condition of a user. The device includes a portable information-receiving device, an information processing device and a remote storage and processing device. The device can include a GPS system for locating the user where the user is having an abnormal medical condition.

[0010] EP 0 976 360 A1 discloses an event-driven subject monitoring system and method generally including a host unit and a mobile communication unit. These two units communicate via a communication network and are designed to conserve resources at least by operating an event-driven monitoring mobile communication unit.

[0011] US 6,605,038 B1 discloses a system for detecting, monitoring and report physiological information. The system includes a central monitoring unit that generates analytical status data from at least one of the data indicative of at least one of activity, galvanic skin response and heat flow, derived data, and previously generated analytical status data, and means for establishing electronic communication between the sensor device and the central monitoring unit, and a means for transmitting data to a recipient.

SUMMARY OF THE INVENTION

[0012] In view of the above-depicted problems of the prior art, it is an object of the present invention to provide an information recording method and an information recording device whereby the state around the user may be recorded efficiently.

[0013] The scope of the invention is defined in the appended claims.

[0014] According to an embodiment, the image and/or the sound around the user is recorded when the bio-information and/or the environmental information of the user is changed. Thus, the quantity of the information recorded is decreased compared to that in case the infor-

mation is recorded at all times. The state around the user is recorded when the bio-information and/or the environmental information of the user are changed, so that the impressive information is recorded to a high probability.

[0015] Moreover, according to an embodiment, the timing or the site of the recording of the image or the sound, the person who was the user's company at the time of the recording, and so forth, are recorded, in addition to the image or the speech. Thus, the viewer may readily be reminded of what was going on when the recording was made, and hence may retrieve the targeted information by having reference to the recording.

[0016] By displaying the time or the site of the recording of the information, the person who was the user's company at the time of the recording, the bio-information or the environmental information changed, the user may reflect the happening of the day or may be fortuitously reminded of what he/she forgot.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The invention will be more clearly understood from the following description, given by way of example only, with reference to the accompanying drawings, in which:

Fig.1 is a block diagram showing the structure of an information recording device.

Fig.2 shows an example of a feature space.

Fig.3 shows an example of a display image surface demonstrating the synopsis of stored contents in a list form.

Fig.4 shows an example of a display image surface demonstrating the recording positions of contents on a map.

Fig.5 shows an example of a display image surface demonstrating the recording positions of contents along time axis.

Fig.6 is a block diagram showing the structure of a mobile terminal.

Fig.7 shows an example of an input image surface for inputting the attributes of contents.

Fig. 8 shows an example of an input image surface for inputting the transmission permitting information.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

1. Embodiment of the Information Recording Device

[0018] Referring now to the drawings, an information recording device of the present invention is explained in detail. The information recording device, embodying the present invention, is featured by automatically detecting intrinsic and extrinsic changes in the user to record images or sound around the user responsive to these changes.

[0019] Fig.1 is a block diagram showing the structure of an information recording device 1 according to the present invention. The information recording device 1 includes a bio-information sensor 2, an environment sensor 3 for measuring the environmental information around the user, a change sensor 4 for detecting the intrinsic and extrinsic changes in the user, a video camera 5 for photographing a still image, a still camera 6, a still camera 6 for photographing a still image, a microphone 7 for picking up the sound, a storage unit 8 for storing the image or the speech, a position measurement unit 9 for measuring the user position, a timepiece unit 10 for time-keeping, a display unit 11 for demonstrating the image or the text, and a controller 12 for controlling the information recording device 1.

[0020] The bio-information sensor 2 measures the bio-information of the user. The bio-information is mainly the information indicating the intrinsic state in the user. Of course, the bio-information sensor 2 maybe constructed discretely from the information recording device 1 and mounted to e.g. the bodysurface of the user to transmit the bio-information to the information recording device 1 in the wired or wireless transmission configuration. The bio-information sensor 2 is provided on the surface of the information recording device 1 or within the information recording device 1. The bio-information sensor 2 is provided on the surface of the information recording device 1 or within the information recording device 1. The bio-information maybe enumerated by breathing, blood oxygen saturation, amount of sweat, heart beat, pulsation, breathing, wink, eye-ball movement, gazing time, pupil diameter, blood pressure, brain wave, bodymovement, posture, skin temperature, GSR (galvanic skin response), MV (micro-vibration), EMG (electro-myography) and blood oxygen saturation (SPO2). These data may be measured by cardiographic measurement units, EMG measurement units, head electrical voltage measurement units, infrared image intensity analyses, pressure sensors, temperature sensors or sweating sensors.

[0021] The environment sensor 3 is used for measuring the environmental information around a person carrying out the measurement operations. The environmental information is mainly the information specifying the extrinsic state of the user, and may be enumerated by temperature, humidity, weather, wind speed, time, lightness, smell, altitude, sound volume, atmospheric pollution, latitude, longitude, movement speed, acceleration, age of the moon, gravityor amount of vibration. These may be measured by lightness meters, gas sensors, thermometers, barometers, rain drop sensors, altimeters, timepieces, noise sensors, atmospheric pollution sensors, or GPS (global positioning system). Similarly to the bio-information sensor 2, the environment sensor 3 maybe provided to the main body unit of the information recording device 1 or provided as a discrete component.

[0022] The change sensor 4 detects intrinsic changes or extrinsic changes in the user, with the aid of pattern recognition. The pattern recognition is the processing of classifying the subjects of recognition into plural classes, mapping the values being observed in a feature space

by coordinate plotting, and associating the subject of recognition with one of the plural classes. The classes are generated by learning from previously collected observed values. The methods for mapping and classifying the observed values will be explained subsequently

[0023] When the change sensor 4 has detected changes, the controller 12 actuates at least one of the video camera 5, still camera 6 and the microphone 7 to record prevailing output values of the respective sensors, in the storage unit 8, along with the images or sound, specifying the status around the user when the changes have occurred. The controller 12 also acquires the user's position and the current time from the position measurement unit 9 and from the timepiece unit 10, respectively to record the so acquired data in the storage unit 8 along with the images and the sound. The position measurement unit 9 may also acquire the position information not by the aforementioned method of acquiring the position information by the GPS, but by a method consisting in connecting to access points for wireless communication, also termed hot spots,. Moreover, if the present device has the function as the mobile phone, the device is able to acquire the position information, which may then be used. The recorded image or speech recorded is referred to below as contents.

[0024] The display unit 11 demonstrates the image or the sound, recorded bythe storage unit 8, under control by the controller 12, in order to permit the user to monitor the image or the sound. The display unit 11 is also used to demonstrate the operating information of various sorts or the control information.

[0025] A record contents outputting unit 13 is responsive to the user's command, entered by an operating unit, not shown, to output the recorded contents in a preset format. The outputting format will be explained subsequently

[0026] In the bio-information and the environmental information, the wink, eye-ball movements, gaze time, pupil diameter, bodymovements, posture, lightness or the sound volume may be acquired from the video camera 5 or the microphone 7. If these are the subjects for observation, the bio-information sensor 2 or the environment sensor 3 may be omitted.

[0027] With the information recording device 1 of the present embodiment, made up by the above blocks, the bio-information of the user is observed by the bio-information sensor 2, the environmental information around the user is observed by the environment sensor 3, the observed values are mapped by the change sensor 4 on the feature space, and signals from an input device, such as the video camera 5, still camera 6 or the microphone 7, are recorded on the storage unit 8 in case it is detected that the observed values have been transferred from a given class to another class. Since the user position as well as the recording time is recorded simultaneously, retrieval at the time of the subsequent reproduction may be carried out extremely readily.

[0028] If it is desired to record the image or the sound, as from the time immediately before and inclusive of the time of detection of changes in the observed value of the bio-information or the environmental information, it is sufficient to record the image or the sound previous to the time point of change of the observed value at all times in a ring buffer type memory to transfer the image or the sound to the storage unit 8 for recording the image or the sound therein. This memory may be provided within the controller 12 or formed as an area reserved in the storage unit 8.

1-1 Mapping and Classification of Observed Values

[0029] Fig.2 shows an example of mapping the three sort of the bio-information, that is, the beat of heart, GSR (galvanic skin response) and the skin temperature difference, as observed values in the three-dimensional feature space. Here, a class C0, denotes the usual state of the user, and three classes C1 to C3 denote other states. It is assumed that, for simplicity of explanation, and for convenience in formulating the drawings, the number of classes is four, with the classes being spaced apart sufficiently from one another. However, the classes maybe close to one another, or four or more sorts of the classes maybe used. In Fig.2, the newly measured bio-information may belong to one of these four classes C0 to C3, or of a class different from any of these classes.

[0030] Each time a new observed value is entered, the change sensor 4 verifies to which of the classes C0 to C3 belongs this observed value. The change sensor 4 compares the class to which belongs the new observed value and the class to which belongs the observed value entered ahead of the new observed value. If these classes differ from each other, the change sensor 4 verifies that the user state has changed. Moreover, if the observed value belongs to none of the classes, the change sensor 4 verifies that the user state has changed. That is, if the feature space area, not belonging to the classes C0 to C3, is also a class, the change sensor verifies that the user state has changed when the new observed value is entered and mapped in the feature space, and when the observed value has shifted from the class to which it belonged to another class.

[0031] The change sensor 4 allocates the observed value to the class and learns the relationship of correspondence between the observed value and the class as knowledge. By repetition of this learning, it is possible to generate the feature space suited to the user. For example, if the skin temperature is the observed value, the area of the observed values during the normal time period, termed the cool fever, may be defined as class C0. However, this normal value not onlydiffers from user to user, but also is changed, even with the same user, depending on time of measurement and season. There are also occasions where accidental noise is introduced into the observed values, depending on the sensor type or the method for mounting the sensor. These noises are preferably not used as the subject of observation. Thus,

when the observed values are plotted on the feature space, by way of mapping, it is desirable to find the state of distribution of the observed values, that is, the density or variance, during a certain time period, and to re-define and update the area of high density as a class.

[0032] Although the status change is detected with the values of the three sort of the bio-information as observed values, the feature space mayalso be formed with other sorts of the bio-information or the environmental information as observed values. It is also possible to change the number of the observed values to generate the feature space with the different number of the dimensions, such as seven-dimensional or eight-dimensional feature space. In addition, a large number of the feature spaces may be generated simultaneously.

[0033] The change sensor 4, embodying the present invention, roughly classifies the intrinsic state and the extrinsic state of the user, depending on the distribution of the observed values, and records the image or the sound, with the state transition from a given class to another class as a trigger. Since the purport of the present invention resides in recording the state around the user, with the change in the status as a trigger, such as to record necessary scenes efficaciously, there is no necessity of analyzing what is the current status of the user.

1-2 Other Method for Change Detection

[0034] Two other change detection methods are hereinafter explained. With the first method, the same observed values, as obtained at different time points, are compared to each other, and a change is detected when the difference between the observed values exceeds a preset threshold value. In case the observation is carried out at a preset time interval, the difference or offset between the last observed value and the outstanding observed value, is found, such that, in case the difference is large, a decision is given that the state of the user has changed. Of course, if the observed value is an analog value, its difference or partial difference may be found. If, for example, the video camera 5 or the microphone 7 is actuated when the heart beat has changed, it is possible to acquire an image when the user is doing exercise or when the user is in tension.

[0035] However, the body temperature, lightness or the altitude is an observed value changed only gradually. If such observed value, changed only gradually, is compared at a short time interval, it is impossible to detect changes. Thus, the time interval for change detection is set, and a status change is deemed to have occurred when the difference between the current value of measurement and the value obtained the preset time duration before is larger than a threshold value. The time duration or the threshold value may be fixed or updated by learning.

[0036] With the second method, the change in the user is detected depending on whether or not the observed value exceeds a preset threshold value. For example, the human does not gaze at a subject in which he/she is not interested. If the gaze time duration of the user is long, it is highly likely that the user's attention is concentrated in some subject. Thus, if the video camera 5 or the still camera 6 is actuated in case the gazing time exceeds the preset time, the subject which is of interest for the user may be imaged. On the other hand, no unusually large sound is generated during the normal life of the human being. Thus, if the large sound is produced, the probability is high that some accident or happening has occurred. Hence, if a sound larger than a preset threshold value is produced, the video camera 5 or the still camera 6 may be actuated to image a scene of bung-ho in a banquet or the site of accident. The threshold value need not be fixed and may be changed from user to user.

1-3 Method for Outputting Record Contents

[0037] The configuration of recording the information around the user has so far been explained. The ensuing description is directed to the method of outputting the recorded information in a state which will facilitate the retrieval by the user. The record contents outputting unit 13 outputs the recorded contents in a preset form in keeping with the command by the user. Fig.3 depicts an image surface 41 output in a list form. In the instant example, the time and the place of the contents recording, and the sorts of the measured value changed, are displayed. If the contents are a moving picture or the sound, the recording start time and the recording end time may be displayed, or the recording start time and the recording time, may be displayed. This list is an image surface for notifying for the user which contents are stored, and is also an input image surface accepting a command to output the stored data. The user specifies the contents for display, by actuation of a pointing device or a cross-key. The record contents outputting unit 13 then outputs the specified contents. Of course, the specified contents maybe demonstrated on the display unit 11.

[0038] Fig.4 depicts an image surface 42 demonstrated as a map. On the map of Fig.4, there is entered a symbol indicating the record locations for the contents. The symbol may also be the name of the contents, the time of recording the contents, the number of contents recorded or the sort of the observed value changed. When the user has selected the symbol on the map, the record contents outputting unit 13 outputs contents 43 corresponding to the positions on the map.

[0039] Fig.5 depicts an image surface 42 when displayed in the map form. On the map of Fig.4, a symbol indicating the contents record location is displayed. The symbol may also be the name of the contents, the time of recording the contents, the number of contents recorded or the sort of the observed value changed. When the user has selected the symbol on the time axis, the corresponding contents are displayed. The time-axis type display may also be an image surface on a calendar or on a timepiece.

[0040] It is noted that, when outputting the sort of the observed value, the record contents outputting unit 13 converts the output into a term more intelligible for the user and outputs the resulting term. For example, if the amount of the breathing by the user is high, the state is not expressed simply as 'breathing' but as 'deep breathing'. Such terms as 'angry' or 'surprised' may also be used for expression, responsive to the user's emotion as detected from the state of change of the observed value or the state of class-to-class transition.

As described above, the information recording device 1 according to the present invention is featured by the fact that the image or the sound around the user is recorded when the intrinsic or extrinsic state of the user has been changed. Since the present information recording device 1 records the information at preset timing, the recording capacity as needed is smaller than that in case of continuous recording. Moreover, data retrieval is facilitated by recording only the needed contents.

[0041] In addition, since the information recording device 1 records the time and date of contents recording and the contents recording location, along with the contents, it becomes possible to use the contents as index for retrieval or for putting the contents in order.

2. Embodiment of Mobile Terminal

[0042] A mobile terminal 20, embodying the present invention, is hereinafter explained. This mobile terminal 20 is designed to provide the aforementioned information recording device 1 with the function of exchanging the information with another mobile terminal 20.

[0043] Fig.6 depicts a block diagram showing the configuration of the mobile terminal 20. Similarly to the information recording device 1, the mobile terminal 20 includes a bio-information sensor 21 for measuring the user's bio-information, an environment sensor 22 for measuring the environmental information around the user, a change sensor 23 for detecting the intrinsic and extrinsic changes in the user, a still camera 25 for photographing a still image, a video camera 24 for photographing a moving picture, a microphone 26 for picking up the sound, a storage unit 27 for storing the image or the speech, a position measurement unit 28 for measuring the user position, a timepiece unit 29 for time-keeping, a displayunit 30 for outputting the recorded contents, and a controller 31 for controlling the information recording device 20 in its entirety These blocks perform the same operations as those of the corresponding blocks of the information recording device 1 and hence the explanation thereof is omitted for simplicity

[0044] The mobile terminal 20 also includes an editing unit 32 for editing the recorded information and an information exchange unit 33 for exchanging the information with other mobile terminals 20.

[0045] The editing unit 32 records contents attributes, such as names of the contents recorded, or names of persons recorded in the contents. The contents attributes, entered automatically, as explained later, may also be entered by the user.

[0046] The information exchange unit 33 includes communication means designed in accordance with the near-distance wireless technique, such as Bluetooth. If users in possession of the mobile terminals 20 of the same sort are close to each other, the mobile terminals 20 may be interconnected wirelessly to enable e.g. P2P communication. That is, the contents or various information sorts, recorded in other mobile terminals 20, may automatically be acquired on the side of the mobile terminal 20.

[0047] In the storage unit 27, the private information of the user, as the owner of the mobile terminal 20, is recorded, in addition to the aforementioned image or sound. Examples of the recordable private information include the name, age, mail address, telephone number or the face image.

[0048] An instance of inputting contents attributes is now explained. The contents of Fig.7 show how a banquet is going on. In this mobile terminal 20, an image or the speech is recorded responsive to status changes in the user. For example, the images or the sound on the site is recorded, with the sound of the bung-ho as a trigger. Since the mobile terminals 20, owned byplural users, are close to one another, these terminals are wirelessly interconnected by communication means of the information exchange unit 33. Thus, the private information of the users, recorded in the respective mobile terminals 20, or the recorded contents, are exchanged. The private information transmitted is correlated with the image or the sound recorded and is recorded in the so correlated state in the storage unit 27.

[0049] In the exchange of the private information or the contents, it is not desirable to transmit any information irrespective of the counterpart of communication. Thus, the information exchange unit 33 is provided with the exchange permission information for limiting the information transmission. The information exchange unit 33 is supplied with the exchange permission information for users and executes information exchange with other users in accordance with the exchange permission information. This exchange permission information states the person who supplies the information and the sort of the information supplied. The exchange permission information is entered by the user and recorded in e.g. a preset area of the storage unit 27. In an input image surface of the exchange permission information, there is displayed a person selecting zone 61 for selecting the person allowed for transmission, as shown in Fig.8. When the user selects the person, allowed for transmission, an item selection zone 62 for selecting the items of transmission permission is displayed. When the user has selected the person allowed for transmission, the item selection zone 62 for selecting the items that can be transmitted, such as name, age, mail address, telephone number, facial image, contents or text, is displayed. The contents are those recorded in the mobile terminal 20, while the text

is that stating e.g. a message the user imparts to the user of the destination of the transmission. The user selects the information of transmission from the item selection zone 62.

[0050] The information exchange unit 33 verifies whether or not there is anyperson around the user to whom the information is to be transmitted. If a relevant person is found, the private information of the user is sent to the mobile terminal 20 of the relevant person. The information exchange unit 33 is supplied with the information, specifying the owner, transmitted by a terminal owned by each person, and specifies the person who is on the spot, based on the so received information. The information exchange unit 33 records the private information of other users, received from the other mobile terminal 20, along with the contents. By simultaneously recording the contents and the person in the near-bysite, recorded in the contents, the manner in which the contents have been recorded may be recorded in detail. The information exchange unit 33 is also able to transmit the information by broadcasting to all of the persons on the spot.

[0051] In the above-described embodiment, the counterpart of the near-distance communication is specified based on the private information of the persons registered in advance in the mobile terminal 20. If a person has not been registered, the user may input it by the editing unit 32, or may have the counterpart party transmit the private information to record the so transmitted information in association with the recorded contents. Alternatively, bio-metrics may be used to specify a person from the features of the face image or the voice print.

[0052] With the mobile phone, according to the present invention, described above, in which the contents, the attributes of the contents and the information pertinent to the person who was in the near-by place when the contents were recorded, are recorded in correlation to one another, the user maybe reminded of the scene of the recording of the contents.

[0053] In the above-described embodiments, the ecological information (living-body information) pertaining to the user is acquired. The present invention is, however, not limited to this embodiment. For example, the living-body information of the person being imaged may be acquired by the information recording device, operated by the user, or a by a video camera, provided to the mobile terminal.

Claims

1. An information recording device (1) comprising
acquisition means (5, 6, 7) for acquiring information;
measurement means (2, 3) for measuring bio-information of a person and/or environmental information around said person;
change detection means (4) for detecting changes in said bio-information or the environmental information, as measured by said measurement means (2, 3);
recording controlling means (12) for causing recording means (8) to record the information, acquired by said acquisition means (5, 6, 7), when said change detection means (4) has detected changes in said bio-information or the environmental information; and position measurement means (9) for measuring the position of a person,
said change detection means (4) is configured to form classes in a feature space having values of said bio-information and/or the environmental information, and detect changes in said bio-information and/or the environmental information, as measured by said measurement means (2, 3), when the class to which belongs the bio-information and/or the environmental information currently measured and the class to which belongs the bio-information and/or the environmental information as measured in the past differ from each other; and **characterized in that**:

said information acquired by said acquisition means (5, 6, 7) comprises an image and/or sound around the person; and
said recording controlling means (12) is configured to cause the recording means (8) to record the image and/or sound around the person, as acquired by said acquisition means (5, 6, 7), at a timing when the bio-information and/or the environmental information has changed.

2. The information recording device (1) according to claim 1, wherein
said recording controlling means (12) is configured to cause the recording means (8) to record the position of the person at a timing when the bio-information and/or the environmental information has changed.

3. The information recording device (1) according to claim 1 or 2, wherein
said change detection means (4) is configured to compare the values of the bio-information and/or the environmental information measured at different time points to find a difference and detect changes in the bio-information and/or the environmental information when the difference exceeds a preset threshold value.

4. The information recording device (1) according to claim 1, 2 or 3, wherein
said change detection means (4) is configured to compare the value of the bio-information and/or the environmental information to a threshold value representing a standard value of the bio-information and/or the environmental information and detect changes in the bio-information and/or the environmental information when the bio-information and/or

the environmental information exceeds said threshold value.

5. The information recording device (1) according to any one of claims 1 to 4, further comprising time-keeping means (10);
said recording controlling means (12) being configured to cause said recording means (8) to record the timing when the bio-information and/or the environmental information has changed.

6. The information recording device (20) according to any one of claims 1 to 5, further comprising private information storage means (27) for storing the private information of the user; storage means (27) for storing the identification information of a particular person; specifying means (32) for specifying a person around a user; and
transmitting means (33) for transmitting the private information of the user to an information communication terminal owned by a person specified to be in a near-by site of the user by said specifying means (32) when said person is a person stored in said storage means (27).

7. A recording method comprising the steps of
a measurement step of measuring bio-information of a person and/or environmental information around said person;
a change detection step of detecting changes in said bio-information and/or said environmental information;
a recording step of recording the bio-information and/or the environmental information when said change detection step has detected changes in said bio-information and/or the environmental information; and
a position measurement step for measuring the position of a person, and **characterized in that**:

> said change detection step comprises forming classes in a feature space having values of said bio-information and/or the environmental information, and detecting changes in said bio-information and/or the environmental information, as measured in said measurement step, when the class to which belongs the bio-information and/or the environmental information currently measured and the class to which belongs the bio-information and/or the environmental information as measured in the past differ from each other; and

said recording step comprises a step of recording an image and/or sound around the person at a timing when the bio-information and/or the environmental information has changed.

8. The information recording method according to claim 7 wherein
said change detection step forms classes in a feature space having values of said bio-information or the environmental information as observed values, and verifies the classes to which belong the bio-information or the environmental information as measured in said measurement step to detect changes in said bio-information and/or the environmental information when the classes to which belong the bio-information or the environmental information as measured at different time points differ from each other.

9. The information recording method according to claim 7 or 8, further comprising a time-keeping step; and a step of recording the time when the change is detected by said change detection step.

10. The information recording method according to any one of claims 7 to 9, further comprising
a specifying step of specifying a person around a user; and
a transmitting step of transmitting the private information of the user to an information communication terminal owned by a person specified to be in a near-by site of the user in said specifying step.

Patentansprüche

1. Informationsaufzeichnungseinrichtung (1), welche umfasst:

> eine Erwerbseinrichtung (5, 6, 7) zum Erwerben von Information;
> eine Messeinrichtung (2, 3) zum Messen von Bio-Information einer Person und/oder von Umgebungsinformation in der Nähe der Person;
> eine Änderungserfassungseinrichtung (4) zum Erfassen von Änderungen bezüglich der Bio-Information oder der Umgebungsinformation, wie durch die Messeinrichtung (2, 3) gemessen;
> eine Aufzeichnungssteuereinrichtung (12), um zu veranlassen, dass die Aufzeichnungseinrichtung (8) die Information aufzeichnet, welche durch die Erwerbseinrichtung (5, 6, 7) erworben wurde, wenn die Änderungserfassungseinrichtung (4) Änderungen bezüglich der Bio-Information oder der Umgebungsinformation erfasst hat; und
> eine Positionsmesseinrichtung (9) zum Messen der Position einer Person,
> wobei die Änderungserfassungseinrichtung (4) konfiguriert ist, Klassen in einem Merkmalszeitraum zu bilden, der Werte der Bio-Information und/oder der Umgebungsinformation hat, und um Änderungen der Bio-Information und/oder der Umgebungsinformation zu erfassen, wie

durch die Messeinrichtung (2, 3) gemessen, wenn die Klasse, zu welcher die Bio-Information und/oder die Umgebungsinformation, die aktuell gemessen wird, gehört, und die Klasse, zu welcher die Bio-Information und/oder die Umgebungsinformation gehört, wie in der Vergangenheit gemessen, voneinander verschieden sind, und

dadurch gekennzeichnet, dass

die, Information, welche durch die Erwerbsinformation (5, 6, 7) erworben wurde, ein Bild und/oder einen Ton in der Nähe der Person aufweist; und

die Aufzeichnungssteuereinrichtung (12) konfiguriert ist, zu veranlassen, dass die Aufzeichnungseinrichtung (8) das Bild und/oder den Ton in der Nähe der Person aufzeichnet, wie durch die Erwerbseinrichtung (5, 6, 7) erworben, in einem Zeitpunkt, wenn die Bio-Information und/oder die Umgebungsinformation sich geändert hat.

2. Informationsaufzeichnungseinrichtung (1) nach Anspruch 1, wobei

die Aufzeichnungssteuereinrichtung (12) konfiguriert ist, zu verlassen, dass die Aufzeichnungseinrichtung (8) die Position der Person, in einem Zeitpunkt aufzeichnet, wenn sich die Bio-Information und/oder die Umgebungsinformation geändert hat.

3. Informafionsaufzeichnungseinrichtung (1) nach Anspruch 1 oder 2, wobei

die Änderungserfassungseinrichtung (4) konfiguriert ist, die Werte der Bio-Information und/oder der Umgebungsinformation, welche in verschiedenen Zeitpunkten gemessen wurde, zu vergleichen, um einen Unterschied herauszufinden und um Änderungen bezüglich der Bio-Information und/oder der Umgebungsinformation zu erfassen, wenn der Unterschied einen vorher festgelegten Schwellenwert übersteigt.

4. Informationsaufzeichnungseinrichtung (1) nach Anspruch 1, 2 oder 3, wobei

die Ändemugserfassungseinrichtung (4) konfiguriert ist, den Wert der Bio-Information und/oder der Umgebungsinformation mit einem Schwellenwert zu vergleichen, der einen Standardwert der Bio-Information und/oder der Umgebungsinformation zeigt, und um Änderungen bezüglich der Bio-Information und/oder der Umgebungsinformation zu erfassen, wenn die Bio-Information und/oder die Umgebungsinformation den Schwellenwert übersteigt.

5. Informationsaufzeichnungseinrichtung (1) nach einem der Ansprüche 1 bis 4, welche außerdem umfasst:

eine Zeiterfassungseinrichtung (10);

wobei die Aufzeichnungssteuereinrichtung (12) konfiguriert ist, zu veranlassen, dass die Aufzeichnungseinrichtung (8) den Zeitpunkt aufzeichnet, wenn sich die Bio-Information und/oder die Umgebungsinformation geändert hat.

6. Informationsaufzeichnungseinrichtung (1) nach einem der Ansprüche 1 bis 5, welche außerdem umfasst:

eine private Informationsspeichereinrichtung (27), um die private Information des Benutzers zu speichern;

eine Speichereinrichtung (27), um die Identifikation einer bestimmten Person zu speichern;

eine Spezifizierungseinrichtung (32), um eine Person in der Nähe eines Benutzers zu spezifizieren; und

eine Übertragungseinrichtung (33), um die private Information des Benutzers zu einem Informationskommunikations-Endgerät zu übertragen, welches einer Person gehört, welche spezifiziert ist, an einer nahe gelegenen Stelle des Benutzers zu sein, durch die Spezifierungseinrichtung (32), wenn die Person eine Person ist, welche in der Speichereinrichtung (21) gespeichert wurde.

7. Aufzeichnungsvorfahren, welches folgende Schritte umfasst:

einen Messschritt zum Messen von Bio-Information einer Person und/oder von Umgebungsinformation in der Nähe der Person;

einen Änderungserfassungsschritt zum Erfassen von Änderungen bezüglich der Bio-Information und/oder der Umgebungsinformation;

einen Aufzeichnungsschritt zum Aukfzeichnen der Bio-Information und/oder der Umgebungsinformation, wenn der Änderuregserfassungsschritt Änderungen in Bezug auf die Bio-Information und/oder die Umgebungsinformation erfasst hat; und

einen Positionsmessschritt zum Messen der Position einer Person, und **dadurch gekennzeichnet, dass**:

der Änderungserfassungsschritt das Bilden von Klassen in einem Merkmalszeitraum umfasst, der Werte der Bio-Information und/oder der Umgebungsinformation hat, und das Erfassen von Änderungen bezüglich der Bio-Information und/oder der Umgebungsinformation wie in dem Messschritt gemessen, wenn die Klasse, zu welcher die Bio-Information und/oder die Umgebungsinformation, die aktuell gemessen wurde,

gehört, und die Klasse, zu welcher die Bio-Information und/oder die Ungebungsinformation gehört, wie in der Vergangenheit gemessen, voneinander verschieden sind; und
der Aufzeichnungsschritt einen Schritt zum Aufzeichnen eines Bilds und/oder Tons in der Nähe einer Person in einem Zeitpunkt umfasst, wenn die Bio-Information und/oder die Umgebungsinformation geändert wurde.

8. Informationsaufchnungsverfahren nach Anspruch 7, wobei
der Änderungserfassungsschritt Klassen in einem Merkmalszeitraum bildet, der Werte der Bio-Information und/oder der Umgebungsinformation als Beobachtungswerte hat, und die Klassen verifiziert, zu welchen die Bio-Information und/oder die Umgebungsinformation, wie in dem Messschritt gemessen, gehört, um Änderungen bezüglich der Bio-Information und/oder der Umgebungsinformation zu erfassen, wenn die Klassen, zu denen die Bio-Information und/oder die Umgebungsinformation, wie bei unterschiedlichen Zeitpunkten gemessen, gehört, voneinander verschieden sind.

9. Informationsaufzeichnungsverfahren nach Anspruch 7 oder 8, welches außerdem einen Zeiterfassungsschnitt umfasst; und
einen Schritt zum Aufzeichnen der Zeit, wenn die Änderung durch den Änderungserfassungsschritt erfasst wird.

10. Informationsaufzeichnungsverfahzen nach einem der Ansprüche 7 bis 9, welches außerdem umfasst:

einen Spezifizierangsschritt zum Spezifizieren einer Person in der Nähe eines Benutzers; und
einen Übertragungsschritt zum Übertragen der privaten Information des Benutzers, an ein Informationskommunikations-Endgerät, welches einer Person gehört, welche spezifiziert ist, an einer nahe gelegenen Stelle des Benutzers im Spezifizierungsschritt zu sein.

Revendications

1. Dispositif (1) d'enregistrement d'information comprenant :

un moyen (5, 6, 7) d'acquisition destiné à acquérir de l'information ;
un moyen (2, 3) de mesure destiné à mesurer de la bio-information d'une personne et/ou de l'information de l'environnement autour de ladite personne ;
un moyen (4) de détection de changement destiné à détecter des changements dans ladite bio-information ou dans l'information d'environnement, telles que mesurées par ledit moyen (2, 3) de mesure ;
un moyen (12) de commande d'enregistrement destiné à faire qu'un moyen (8) d'enregistrement enregistre l'information, acquise par ledit moyen (5, 6, 7) d'acquisition, lorsque ledit moyen (4) de détection de changement a détecté des changements dans ladite bio-information ou dans l'information d'environnement ; et
un moyen (9) de mesure de position destiné à mesurer la position d'une personne ;
ledit moyen (4) de détection de changement étant constitué pour former des classes dans un espace spécial ayant des valeurs de ladite bio-information et/ou de l'information d'environnement, et pour détecter des changements dans ladite bio-information et/ou dans l'information d'environnement, telles que mesurées par ledit moyen (2, 3) de mesure, lorsque la classe à laquelle appartiennent la bio-information et/ou l'information d'environnement actuellement mesurées et la classe à laquelle appartiennent la bio-information et/ou l'information d'environnement telles que mesurées dans le passé diffèrent l'une de l'autre ; et
caractérisé :

en ce que ladite information acquise par ledit moyen (5, 6, 7) d'acquisition comprend une image et/ou du son autour de la personne ; et
en ce que ledit moyen (12) de commande d'enregistrement est constitué pour faire que le moyen (8) d'enregistrement enregistre l'image et/ou le son autour de la personne, tels qu'ils ont été acquis par ledit moyen (5, 6, 7) d'acquisition, à un instant ou la bio-information et/ou l'information d'environnement ont changé.

2. Dispositif (1) d'enregistrement d'information selon la revendication 1, dans lequel ledit moyen (12) de commande d'enregistrement est constitué pour faire que le moyen (8) d'enregistrement enregistre la position de la personne à un moment où la bio-information et/ou l'information d'environnement ont changé.

3. Dispositif (1) d'enregistrement d'information selon la revendication 1 ou 2, dans lequel ledit moyen (4) de détection de changement est constitué pour comparer les valeurs de la bio-information et/ou de l'information d'environnement mesurées à des instants différents pour trouver une différence et détecter des changements dans la bio-information et/ou dans l'in-

formation d'environnement lorsque la différence excède une valeur de seuil préétablie.

4. Dispositif (1) d'enregistrement d'information selon la revendication 1, 2 ou 3, dans lequel ledit moyen (4) de détection de changement est constitué pour comparer la valeur de la bio-information et/ou de l'information d'environnement à une valeur de seuil représentant une valeur standard de la bio-information et/ou de l'information d'environnement et pour détecter des changements dans la bio-information et/ou dans l'information d'environnement lorsque la bio-information et/ou l'information d'environnement excèdent ladite valeur de seuil.

5. Dispositif (1) d'enregistrement d'information selon l'une quelconque des revendications 1 à 4, comprenant en outre :

un moyen (10) de chronométrage ;
ledit moyen (12) de commande d'enregistrement étant constitué pour faire que ledit moyen (8) d'enregistrement enregistre l'instant où la bio-information et/ou l'information d'environnement ont changé.

6. Dispositif (20) d'enregistrement d'information selon l'une quelconque des revendications 1 à 5, comprenant en outre :

un moyen (27) de mémorisation d'information privée destiné à mémoriser l'information privée de l'utilisateur ;
un moyen (27) de mémorisation destiné à mémoriser l'information d'identification d'une personne particulière ;
un moyen (32) de spécification destiné à spécifier une personne autour d'un utilisateur ; et
un moyen (33) de transmission destiné à transmettre l'information privée de l'utilisateur à un terminal de communication d'information détenu par une personne spécifiée, par ledit moyen (32) de spécification, comme étant dans un site à proximité de l'utilisateur lorsque ladite personne est une personne mémorisée dans ledit moyen (27) de mémorisation.

7. Procédé d'enregistrement comprenant les étapes :

une étape de mesure consistant à mesurer de la bio-information d'une personne et/ou de l'information de l'environnement autour de ladite personne;
une étape de détection de changement consistant à détecter des changements dans ladite bio-information et/ou dans l'information d'environnement ;
une étape d'enregistrement consistant à enregistrer la bio-information et/ou l'information d'environnement lorsque ladite étape de détection de changement a détecté des changements dans ladite bio-information ou dans l'information d'environnement; et
et une étape de mesure de position consistant à mesurer la position d'une personne, et **caractérisé :**

en ce que ladite étape de détection de changement comprend la formation de classes dans un espace spécial ayant des valeurs de ladite bio-information et/ou de l'information d'environnement, et la détection de changements dans ladite bio-information et/ou dans l'information d'environnement, telles que mesurées à ladite étape de mesure, lorsque la classe à laquelle appartiennent la bio-information et/ou l'information d'environnement actuellement mesurées et la classe à laquelle appartiennent la bio-information et/ou l'information d'environnement telles que mesurées dans le passé différent l'une de l'autre ; et
en ce que ladite étape d'enregistrement comprend une étape consistant à enregistrer une image et/ou du son autour de la personne à un instant où la bio-information et/ou l'information d'environnement ont changé.

8. Procédé d'enregistrement d'information selon la revendication 7, dans lequel ladite étape de détection de changement forme des classes dans un espace spécial ayant des valeurs de ladite bio-information ou de l'information d'environnement en tant que valeurs observées, et vérifie les classes auxquelles appartiennent la bio-information ou l'information d'environnement telles que mesurées à ladite étape de mesure pour détecter des changements dans ladite bio-information et/ou dans l'information d'environnement lorsque les classes auxquelles appartiennent la bio-information et l'information d'environnement telles que mesurées à des instants différents diffèrent l'une de l'autre.

9. Procédé d'enregistrement d'information selon la revendication 7 ou 8, comprenant en outre :

une étape de chronométrage ; et
une étape d'enregistrement de l'heure à laquelle le changement est détecté par ladite étape de détection de changement.

10. Procédé d'enregistrement d'information selon l'une quelconque des revendications 7 à 9, comprenant en outre :

une étape de spécification consistant à spécifier une personne autour d'un utilisateur ; et
une étape de transmission consistant à transmettre l'information privée de l'utilisateur à un terminal de communication d'information détenu par une personne spécifiée, à ladite étape de spécification, comme étant dans un site à proximité de l'utilisateur.

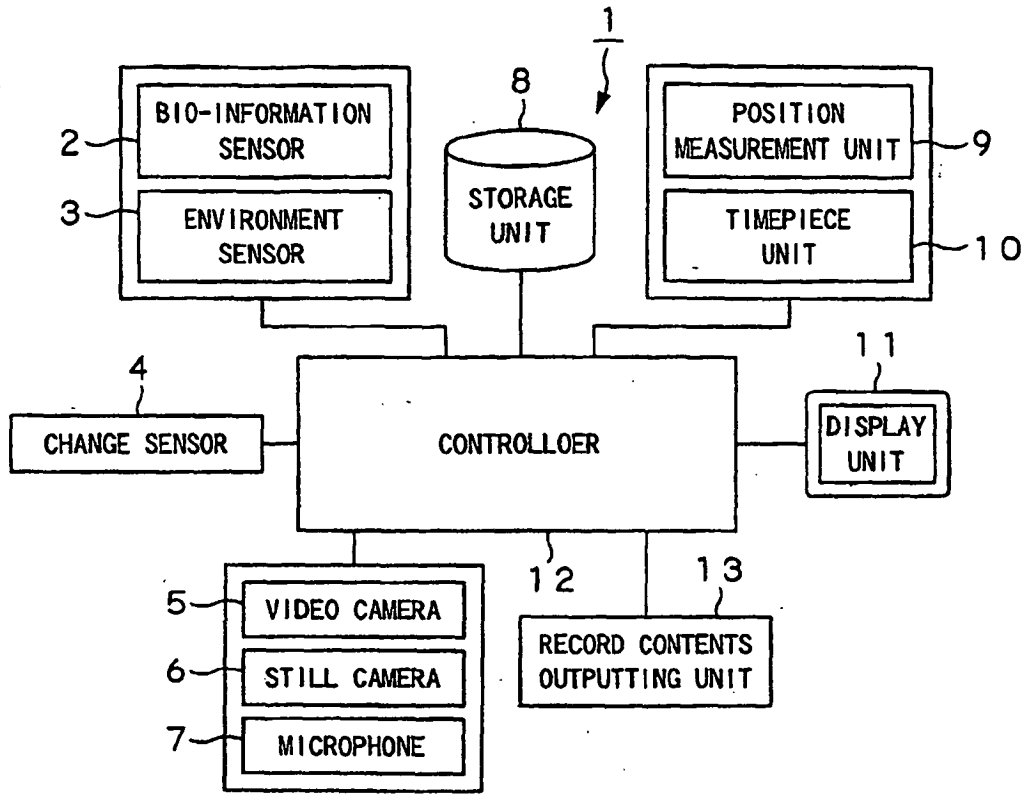
1
8
BIO-INFORMATION SENSOR
2
ENVIRONMENT SENSOR
3
STORAGE UNIT
POSITION MEASUREMENT UNIT
9
TIMEPIECE UNIT
10
11
4
CHANGE SENSOR
CONTROLLOER
DISPLAY UNIT
12
13
5
VIDEO CAMERA
6
STILL CAMERA
7
MICROPHONE
RECORD CONTENTS OUTPUTTING UNIT

FIG.1

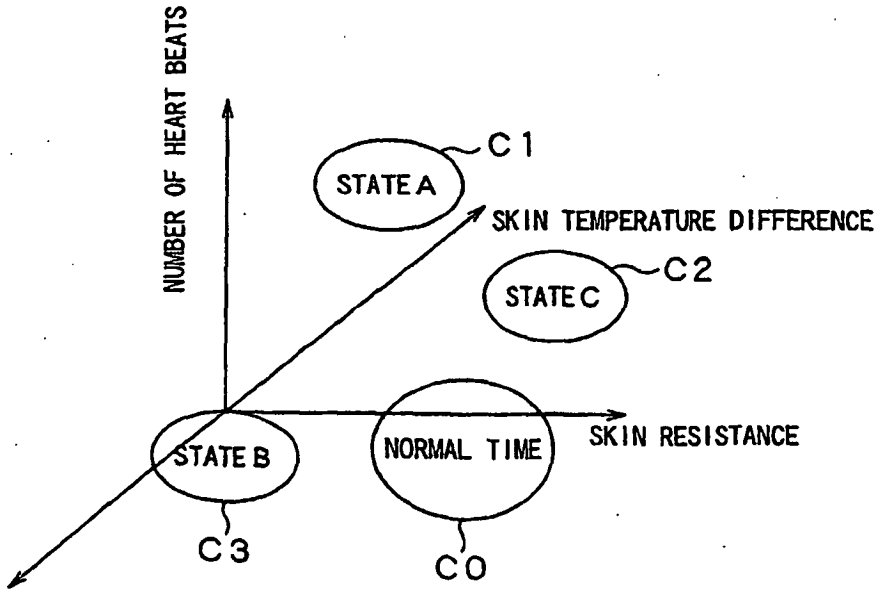
NUMBER OF HEART BEATS
C1
STATE A
SKIN TEMPERATURE DIFFERENCE
C2
STATE C
STATE B
NORMAL TIME
SKIN RESISTANCE
C3
C0

FIG.2

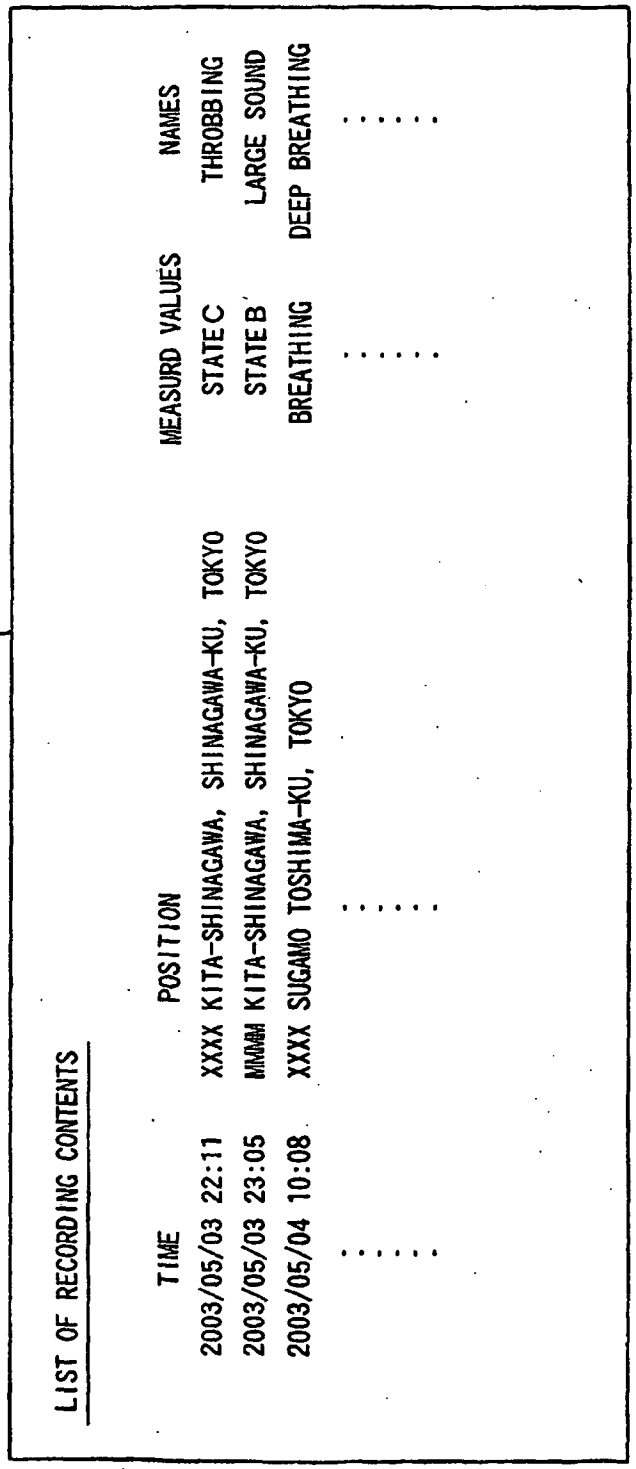
41
LIST OF RECORDING CONTENTS
TIME
POSITION
MEASURD VALUES
NAMES
2003/05/03 22:11
XXXX KITA-SHINAGAWA, SHINAGAWA-KU, TOKYO
STATE C
THROBBING
2003/05/03 23:05
MMMM KITA-SHINAGAWA, SHINAGAWA-KU, TOKYO
STATE B
LARGE SOUND
2003/05/04 10:08
XXXX SUGAMO TOSHIMA-KU, TOKYO
BREATHING
DEEP BREATHING

FIG.3

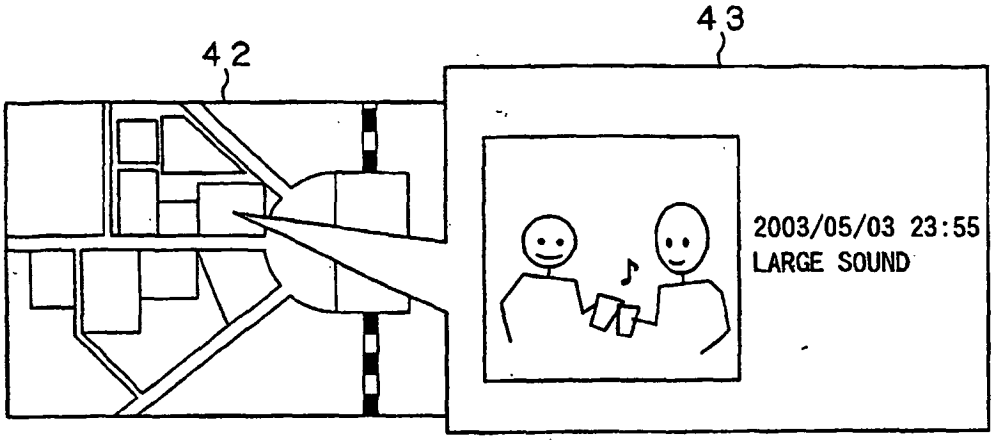
42
43
2003/05/03 23:55
LARGE SOUND

FIG.4

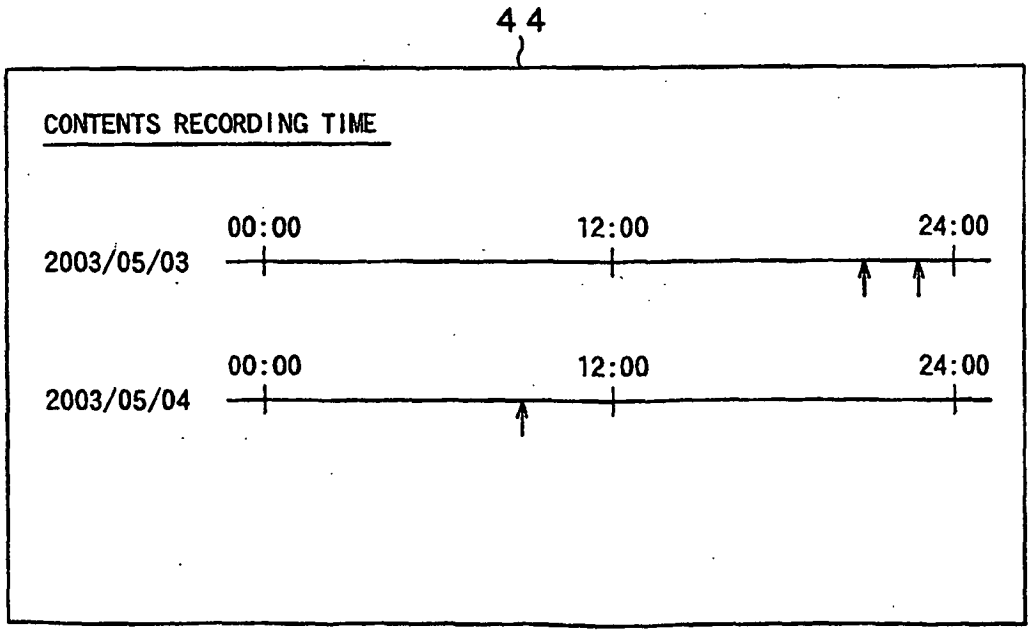
44
CONTENTS RECORDING TIME
00:00
12:00
24:00
2003/05/03
00:00
12:00
24:00
2003/05/04

FIG.5

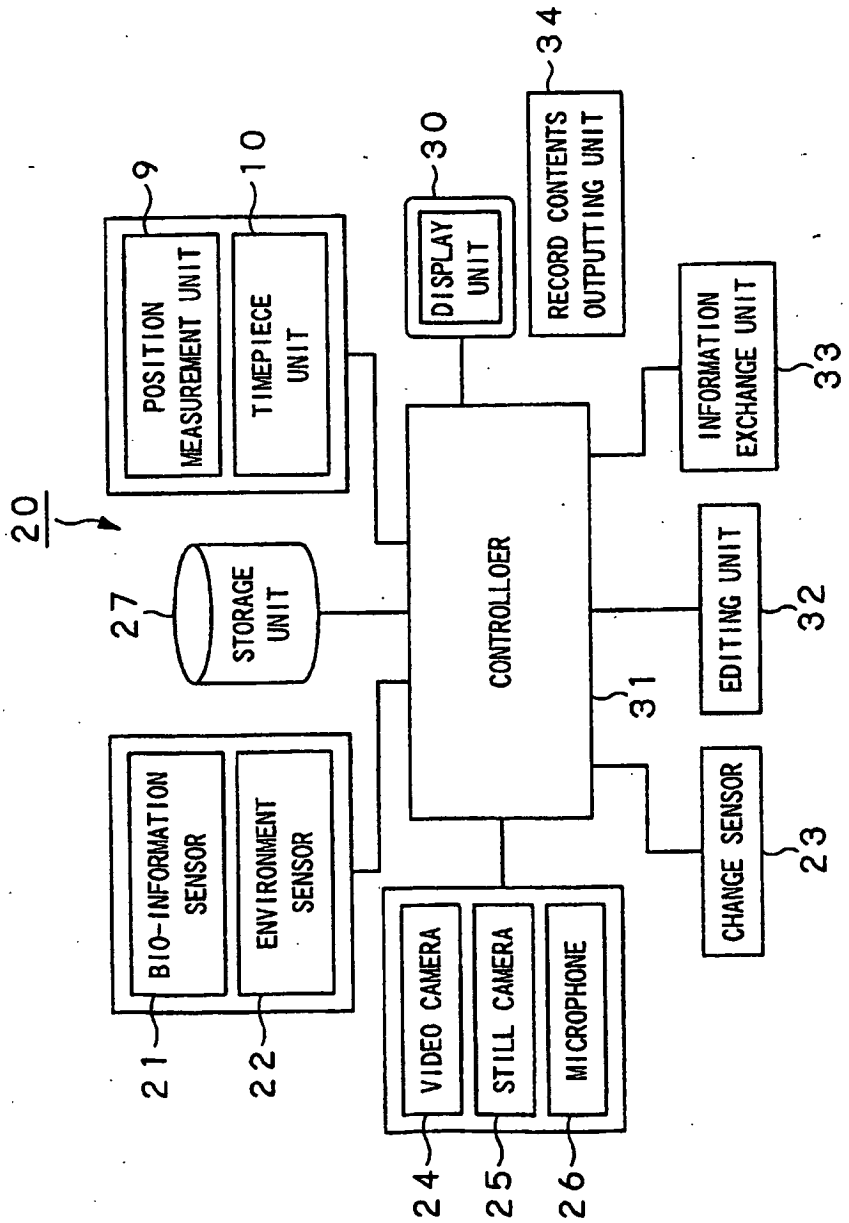
20
POSITION MEASUREMENT UNIT
9
TIMEPIECE UNIT
10
DISPLAY UNIT
30
RECORD CONTENTS OUTPUTTING UNIT
34
INFORMATION EXCHANGE UNIT
33
STORAGE UNIT
27
CONTROLLOER
31
EDITING UNIT
32
BIO-INFORMATION SENSOR
21
ENVIRONMENT SENSOR
22
CHANGE SENSOR
23
VIDEO CAMERA
24
STILL CAMERA
25
MICROPHONE
26

FIG.6

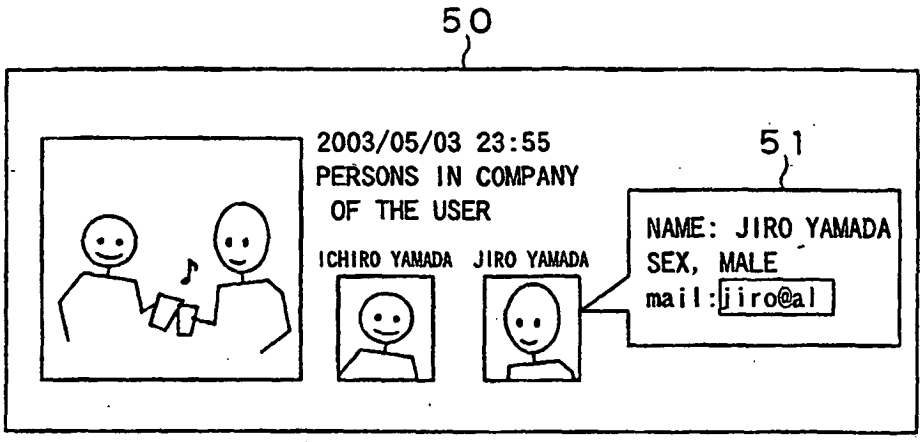
50
2003/05/03 23:55
PERSONS IN COMPANY
OF THE USER
ICHIRO YAMADA
JIRO YAMADA
51
NAME: JIRO YAMADA
SEX, MALE
mail:jiro@al

FIG.7

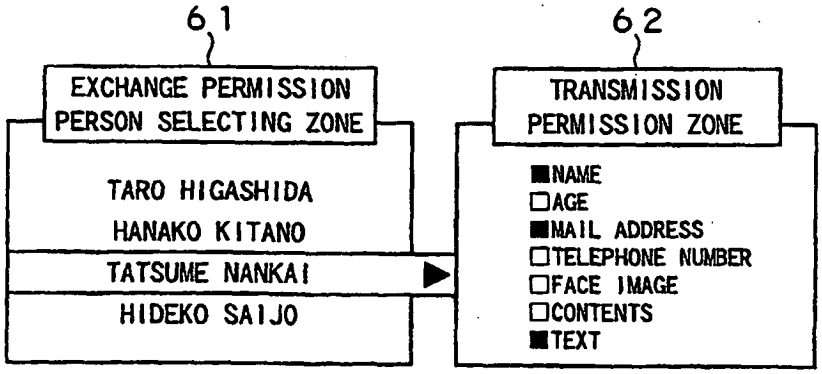
61
EXCHANGE PERMISSION
PERSON SELECTING ZONE
TARO HIGASHIDA
HANAKO KITANO
TATSUME NANKAI
HIDEKO SAIJO
62
TRANSMISSION
PERMISSION ZONE
■NAME
□AGE
■MAIL ADDRESS
□TELEPHONE NUMBER
□FACE IMAGE
□CONTENTS
■TEXT

FIG.8

REFERENCES CITED IN THE DESCRIPTION

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- US 20020188214 A1 **[0009]**
- EP 0976360 A1 **[0010]**
- US 6605038 B1 **[0011]**

专利名称(译)	信息记录装置和信息记录方法		
公开(公告)号	EP1522256B1	公开(公告)日	2010-08-04
申请号	EP2004256129	申请日	2004-10-04
[标]申请(专利权)人(译)	索尼公司		
申请(专利权)人(译)	索尼公司		
当前申请(专利权)人(译)	索尼公司		
[标]发明人	MIYAJIMA YASUSHI		
发明人	MIYAJIMA, YASUSHI		
IPC分类号	A61B5/00 A61B5/024 A61B5/103 G06F3/01		
CPC分类号	A61B5/0002 A61B5/01 A61B5/024 A61B5/441 A61B5/6887 A61B2560/0242 A61B2560/0295 G16H10/20 G16H40/63		
代理机构(译)	尼科尔斯迈克尔·约翰·		
优先权	2003347446 2003-10-06 JP		
其他公开文献	EP1522256A1		
外部链接	Espacenet		

摘要(译)

公开了一种信息记录装置和记录信息的方法，其中可以有效地记录用户周围的状态。变化传感器4在三维特征空间中映射由生物信息传感器2测量的三种生物信息，即心跳数，GSR（皮肤电反应）和皮肤温度差，如所观察到的值，并在三维特征空间上生成类。变化传感器4将属于新测量的观测值的类别与属于过去测量的值的类别进行比较，以在类别彼此不同时检测用户的变化。在通过改变传感器4检测到改变时，控制器12致动摄像机5，静止摄像机6和麦克风6以在用户周围记录图像和声音。

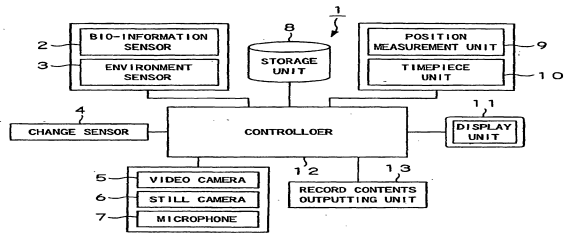

FIG.1

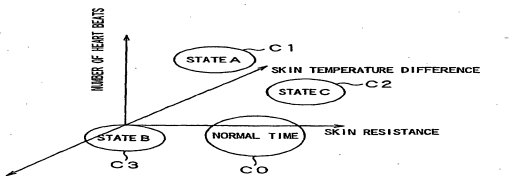

FIG.2