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Murashita

(54) IMAGE DATA STORING SYSTEM AND METHOD, IMAGE OBTAINING APPARATUS, IMAGE DATA STORAGE APPARATUS, MOBILE TERMINAL, AND COMPUTER-READABLE MEDIUM IN WHICH A RELATED PROGRAM IS RECORDED

(75) Inventor: **Kimitaka Murashita**, Kawasaki (JP)

Correspondence Address:
**STAAS & HALSEY LLP**
**700 11TH STREET, NW**
**SUITE 500**
**WASHINGTON, DC 20001 (US)**

(73) Assignee: **Fujitsu Limited**, Kawasaki (JP)

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(57) **ABSTRACT**

A system is provided which facilitates management and classification of image data obtained by a digital camera. The system includes an image obtaining apparatus, a storage means for storing the image data obtained by the image obtaining apparatus, a means for obtaining site information representing a site at which the image data has been obtained, a means for obtaining subject information identifying the subject of the image data, and a means for labeling the image data, which is to be stored into the storage means, with both the site information and the subject information. The invention is applicable to a system which stores digital image data obtained by a digital still camera.

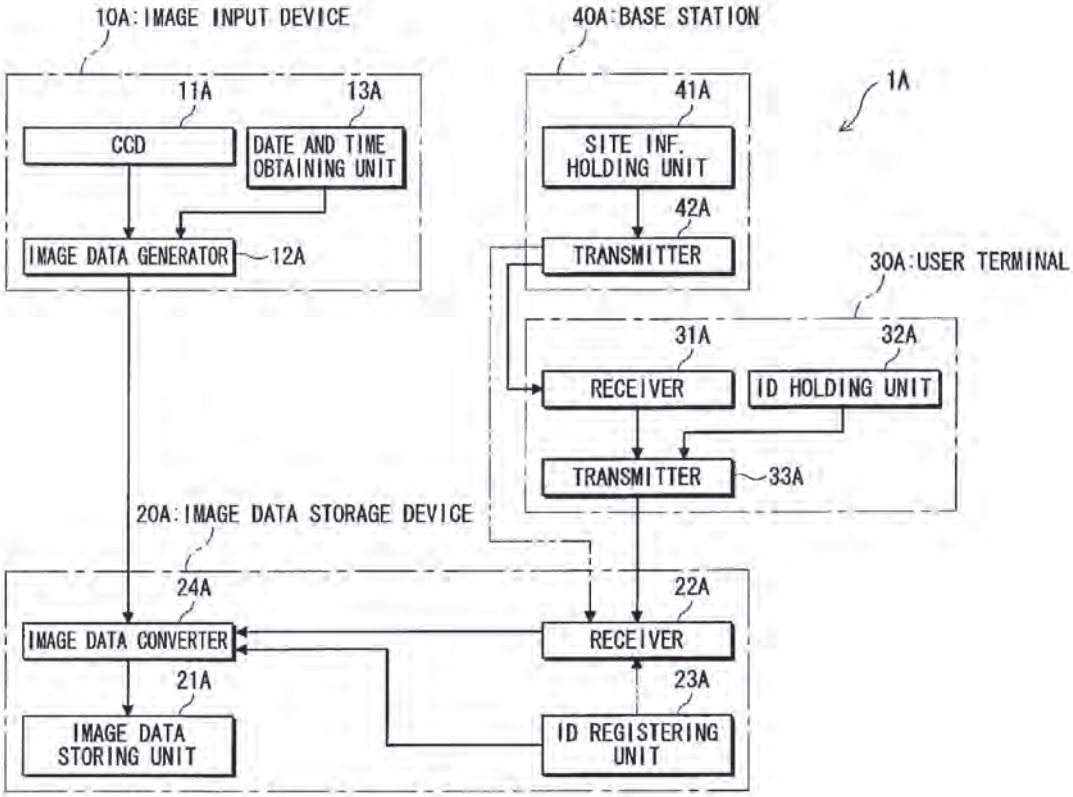


FIG. 1

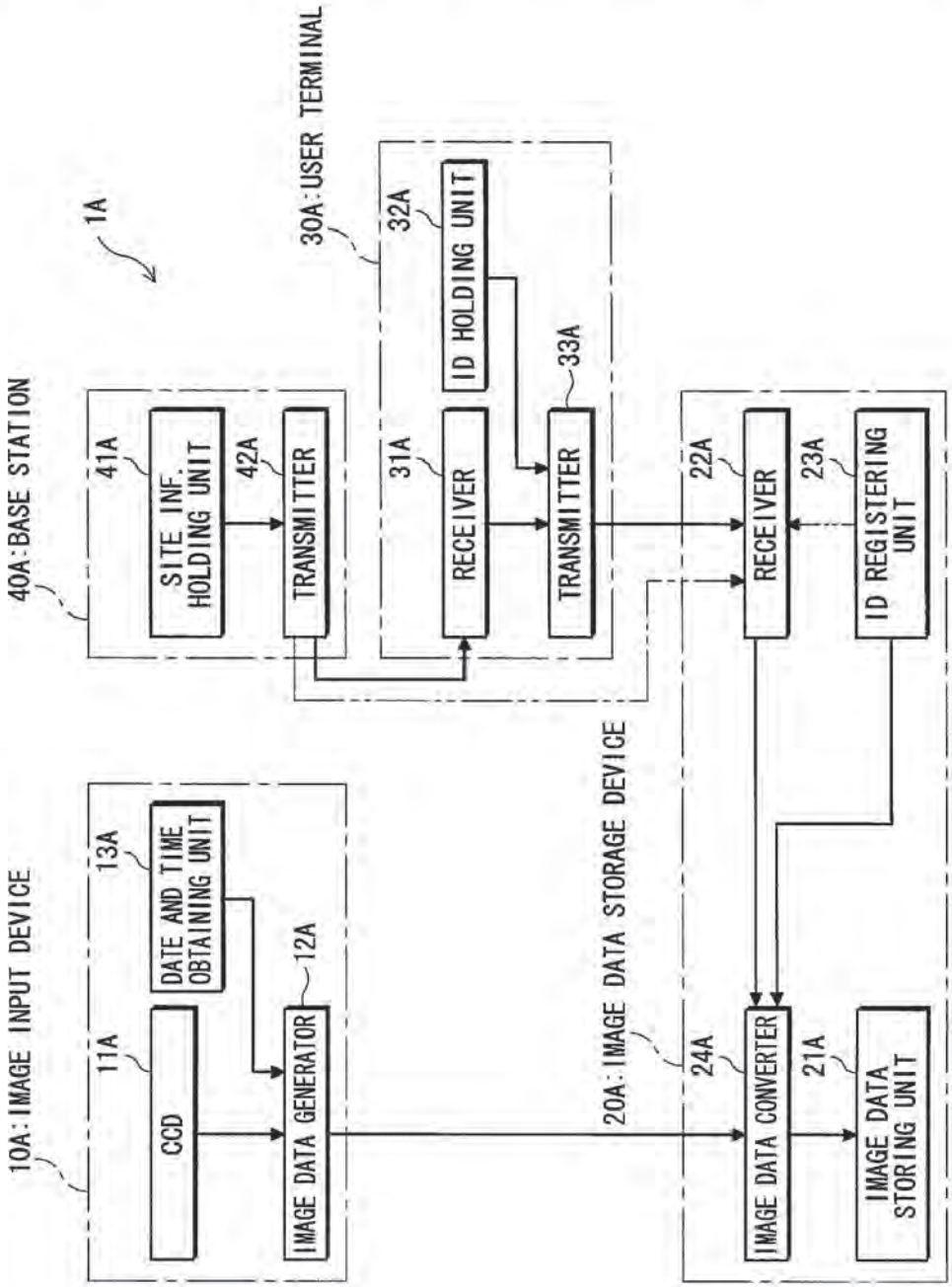

1A
10A: IMAGE INPUT DEVICE
11A
CCD
13A
DATE AND TIME OBTAINING UNIT
12A
IMAGE DATA GENERATOR
40A: BASE STATION
41A
SITE INF. HOLDING UNIT
42A
TRANSMITTER
30A: USER TERMINAL
31A
RECEIVER
32A
ID HOLDING UNIT
33A
TRANSMITTER
20A: IMAGE DATA STORAGE DEVICE
22A
RECEIVER
23A
ID REGISTERING UNIT
24A
IMAGE DATA CONVERTER
21A
IMAGE DATA STORING UNIT

FIG. 2

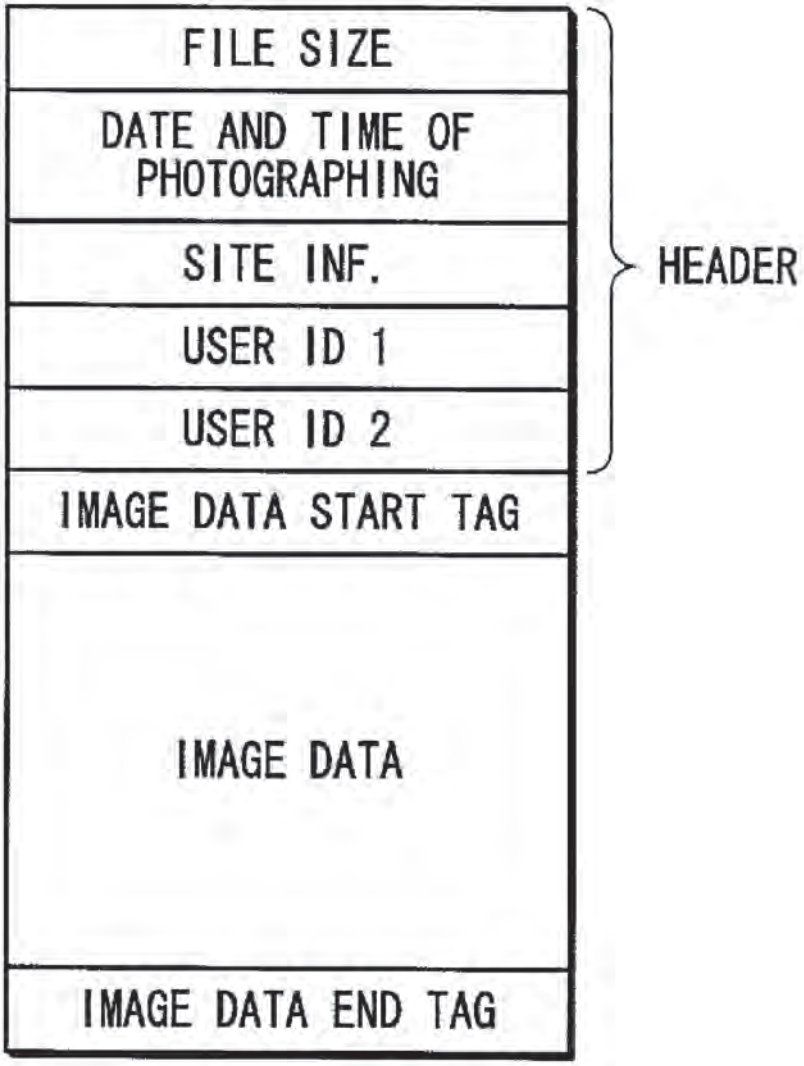

FILE SIZE
DATE AND TIME OF PHOTOGRAPHING
SITE INF.
USER ID 1
USER ID 2
IMAGE DATA START TAG
IMAGE DATA
IMAGE DATA END TAG
HEADER

FIG. 3

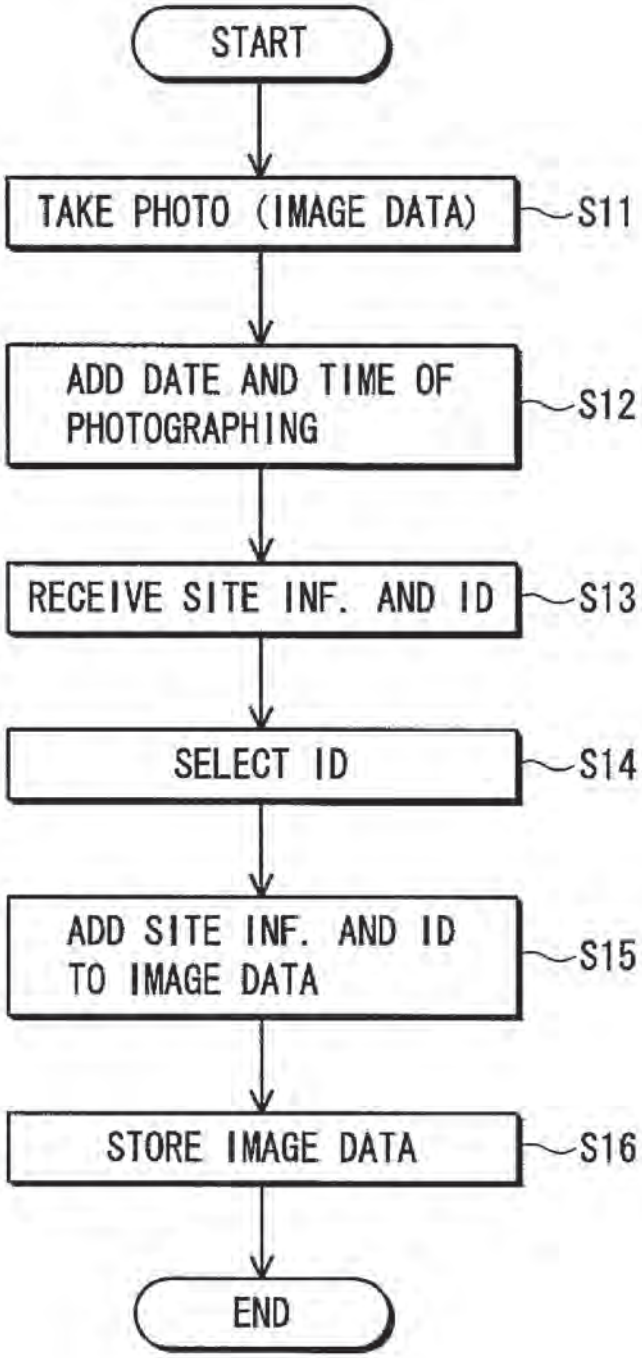

START
TAKE PHOTO (IMAGE DATA)
S11
ADD DATE AND TIME OF PHOTOGRAPHING
S12
RECEIVE SITE INF. AND ID
S13
SELECT ID
S14
ADD SITE INF. AND ID TO IMAGE DATA
S15
STORE IMAGE DATA
S16
END

FIG. 4

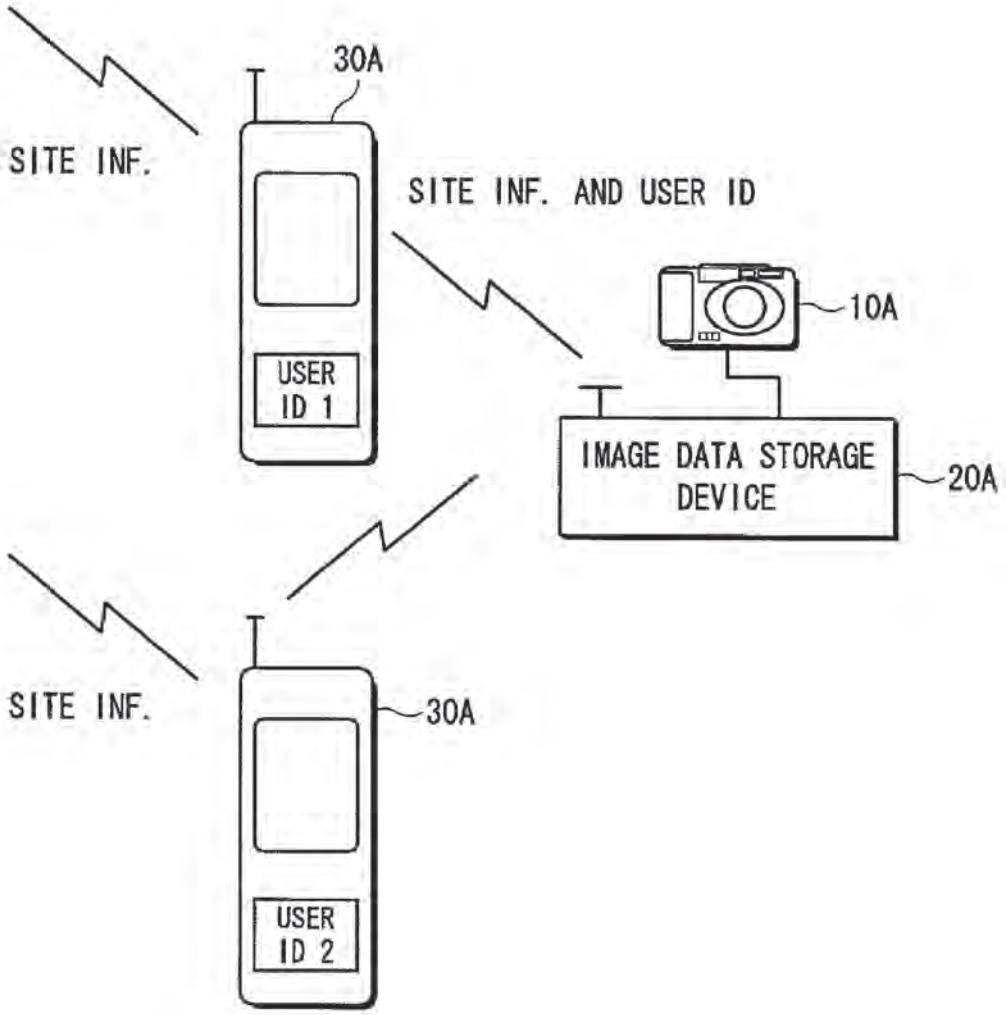

30A
SITE INF.
SITE INF. AND USER ID
10A
USER ID 1
IMAGE DATA STORAGE DEVICE
20A
SITE INF.
30A
USER ID 2

FIG. 5

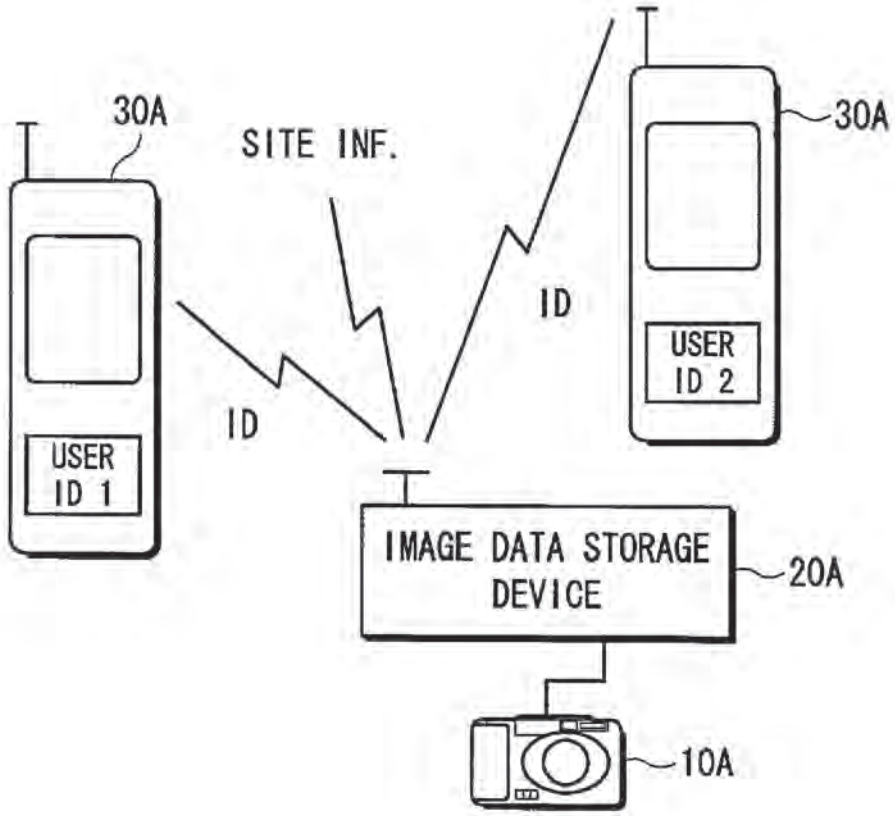

30A
SITE INF.
30A
ID
USER
ID 2
ID
USER
ID 1
IMAGE DATA STORAGE
DEVICE
20A
10A

FIG. 6

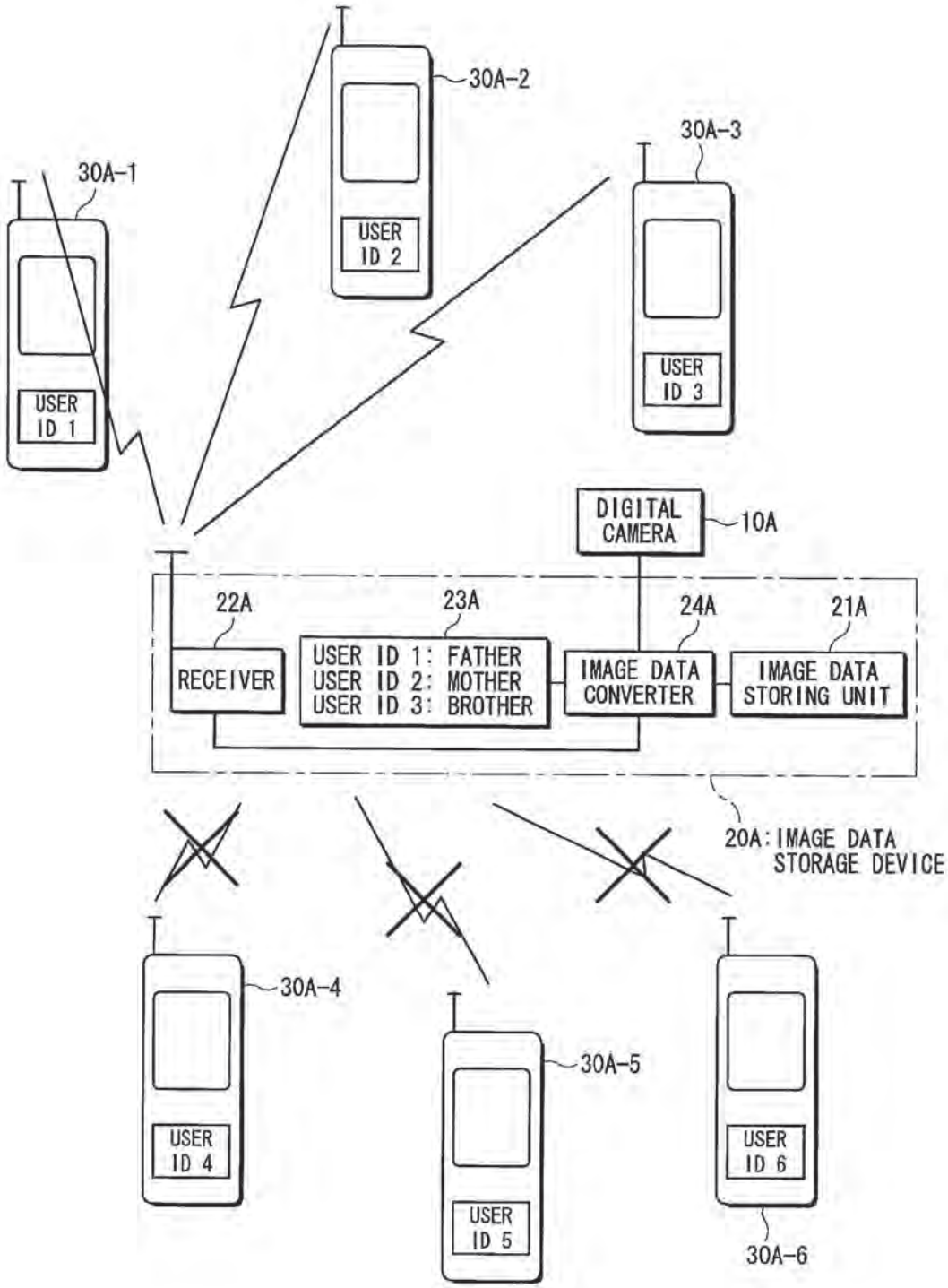

30A-1
USER ID 1
30A-2
USER ID 2
30A-3
USER ID 3
DIGITAL CAMERA
10A
22A
RECEIVER
23A
USER ID 1: FATHER
USER ID 2: MOTHER
USER ID 3: BROTHER
24A
IMAGE DATA CONVERTER
21A
IMAGE DATA STORING UNIT
20A: IMAGE DATA STORAGE DEVICE
30A-4
USER ID 4
30A-5
USER ID 5
USER ID 6
30A-6

FIG. 7

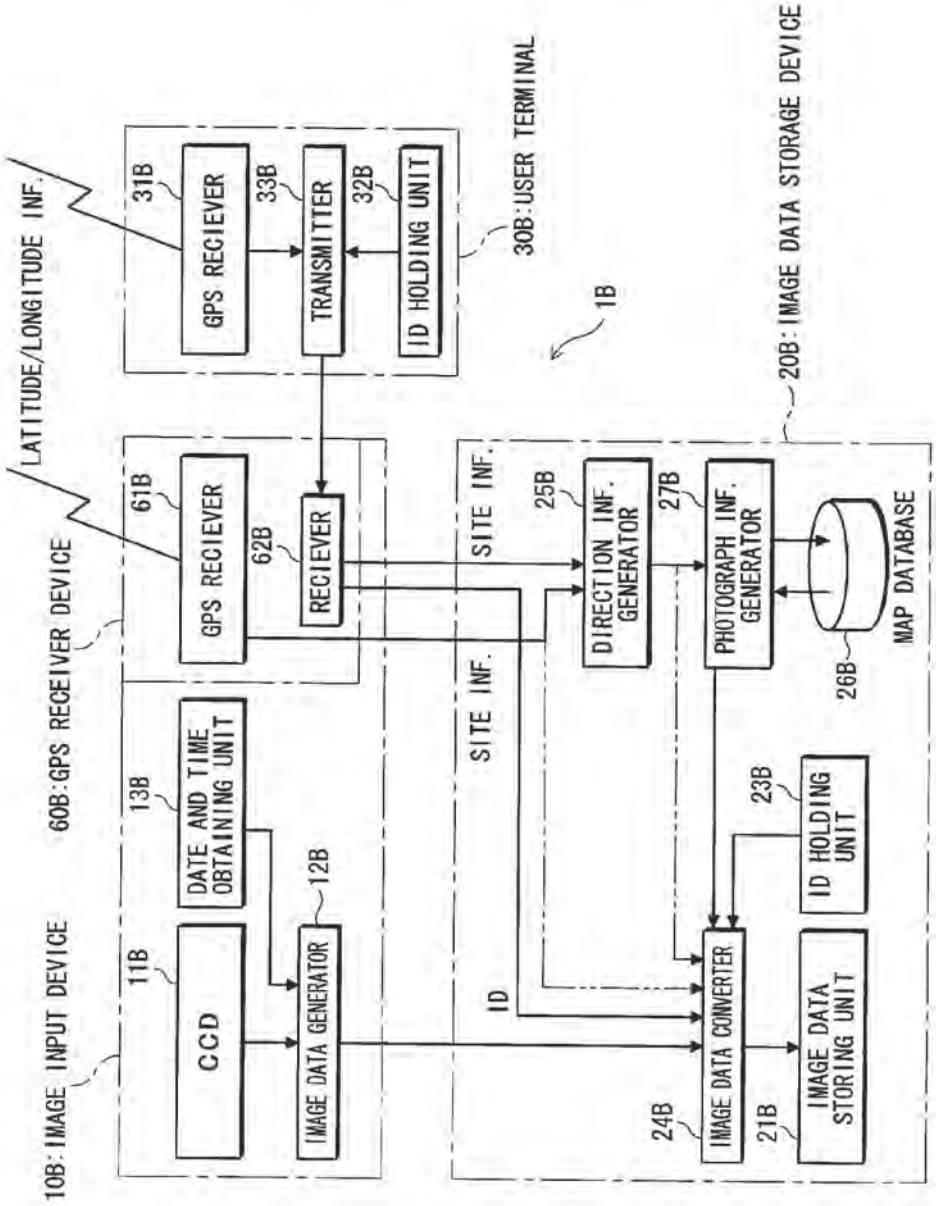

LATITUDE/LONGITUDE INF.
31B
GPS RECIEVER
33B
TRANSMITTER
32B
ID HOLDING UNIT
30B:USER TERMINAL
1B
20B:IMAGE DATA STORAGE DEVICE
60B:GPS RECEIVER DEVICE
61B
GPS RECIEVER
62B
RECIEVER
SITE INF.
25B
DIRECTION INF. GENERATOR
27B
PHOTOGRAPH INF. GENERATOR
MAP DATABASE
26B
13B
DATE AND TIME OBTAINING UNIT
12B
23B
ID HOLDING UNIT
10B:IMAGE INPUT DEVICE
11B
CCD
IMAGE DATA GENERATOR
ID
IMAGE DATA CONVERTER
24B
21B
IMAGE DATA STORING UNIT

FIG. 8

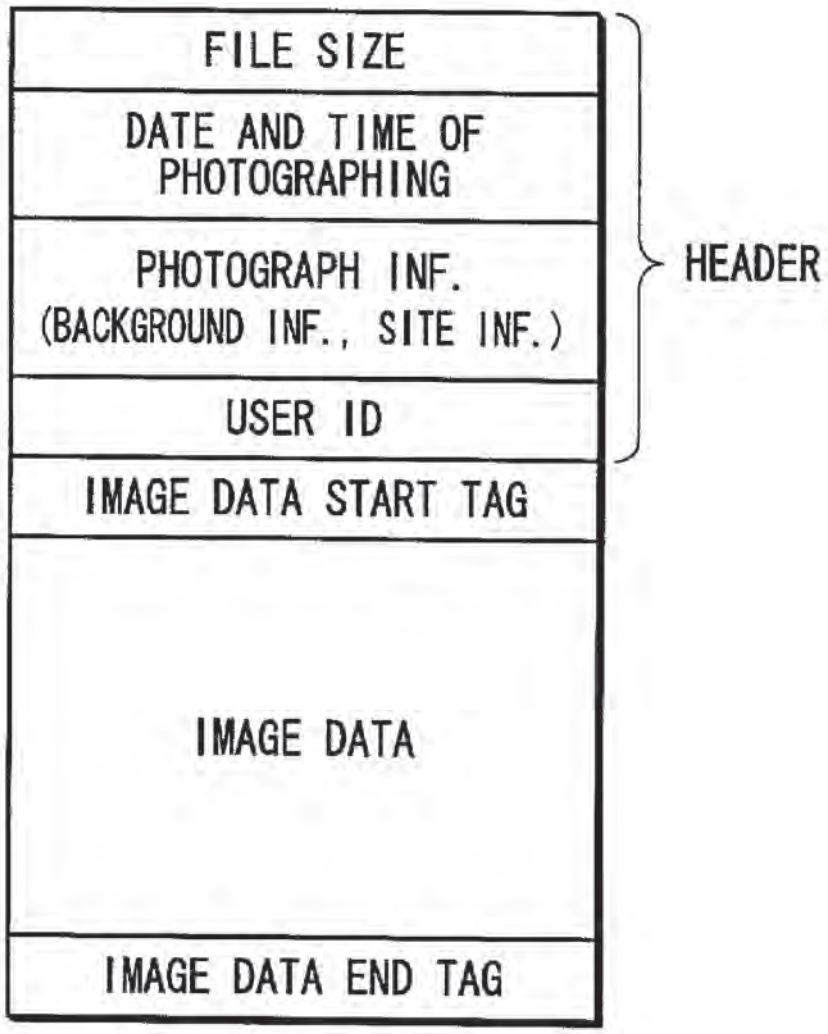

FILE SIZE
DATE AND TIME OF PHOTOGRAPHING
PHOTOGRAPH INF. (BACKGROUND INF., SITE INF.)
USER ID
IMAGE DATA START TAG
IMAGE DATA
IMAGE DATA END TAG
HEADER

FIG. 9

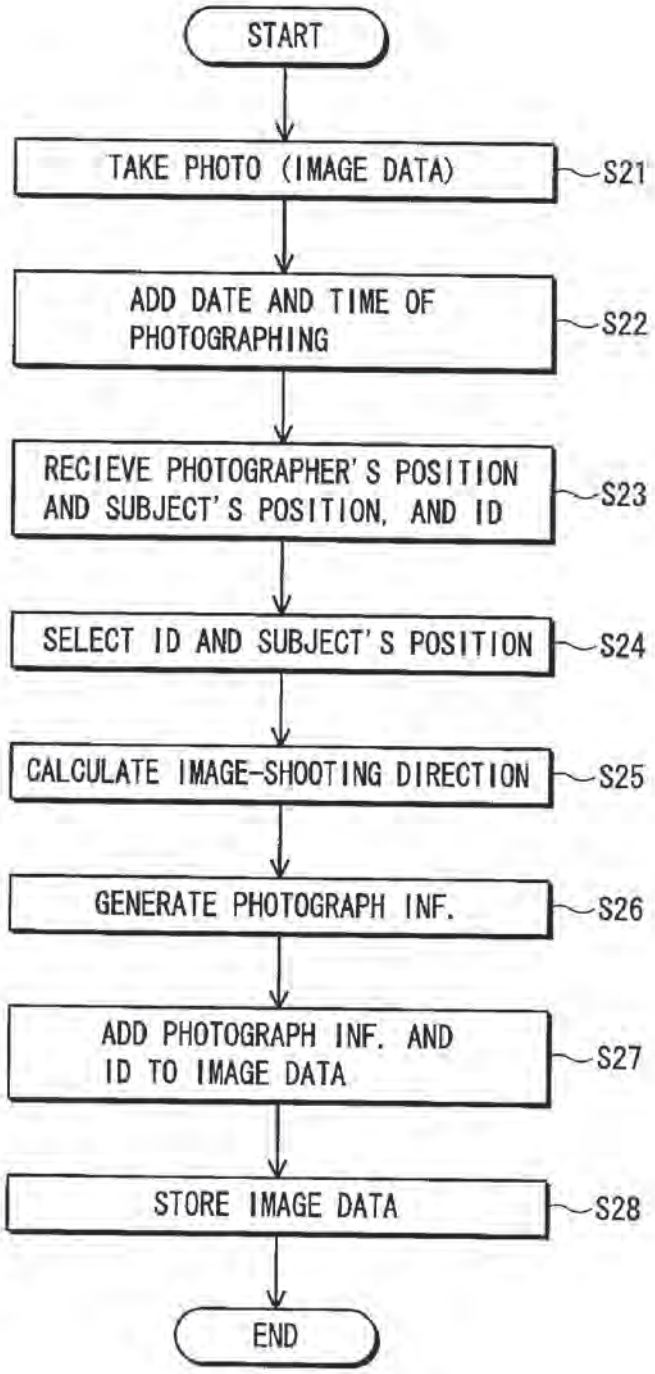

START
TAKE PHOTO (IMAGE DATA)
S21
ADD DATE AND TIME OF PHOTOGRAPHING
S22
RECIEVE PHOTOGRAPHER'S POSITION AND SUBJECT'S POSITION, AND ID
S23
SELECT ID AND SUBJECT'S POSITION
S24
CALCULATE IMAGE-SHOOTING DIRECTION
S25
GENERATE PHOTOGRAPH INF.
S26
ADD PHOTOGRAPH INF. AND ID TO IMAGE DATA
S27
STORE IMAGE DATA
S28
END

FIG. 10

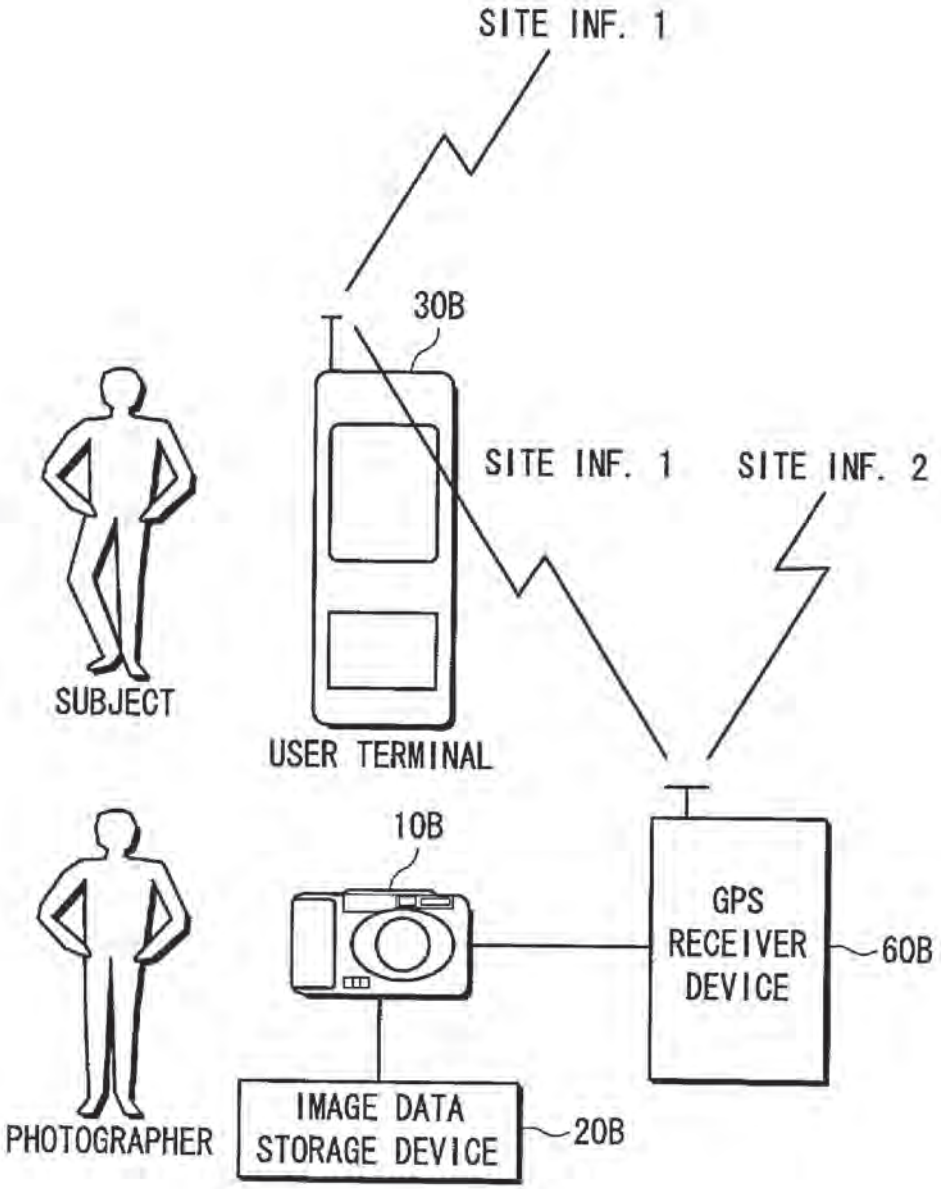

SITE INF. 1
30B
SITE INF. 1
SITE INF. 2
SUBJECT
USER TERMINAL
10B
GPS
RECEIVER
DEVICE
60B
PHOTOGRAPHER
IMAGE DATA
STORAGE DEVICE
20B

FIG. 11

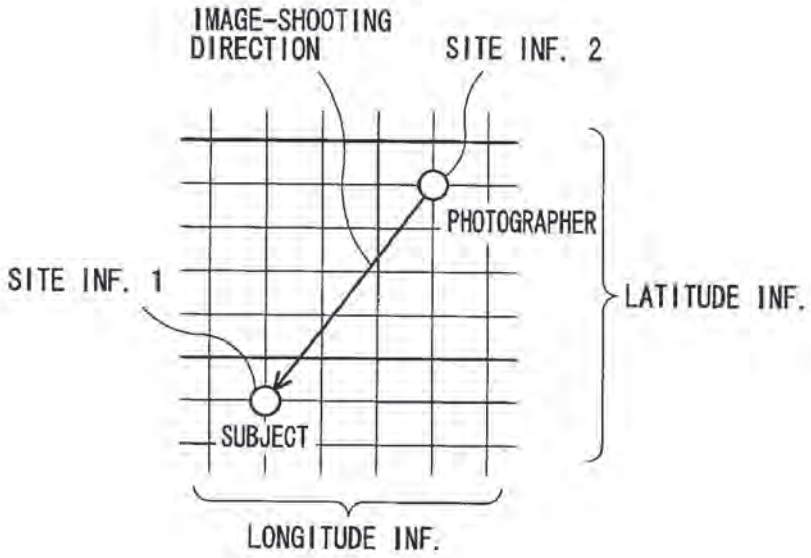


IMAGE-SHOOTING DIRECTION
SITE INF. 2
PHOTOGRAPHER
SITE INF. 1
LATITUDE INF.
SUBJECT
LONGITUDE INF.

FIG. 12

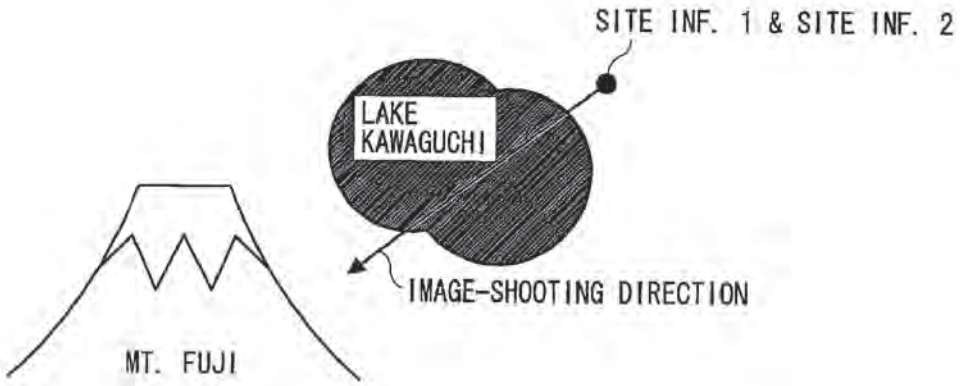

SITE INF. 1 & SITE INF. 2
LAKE KAWAGUCHI
IMAGE-SHOOTING DIRECTION
MT. FUJI

FIG. 13

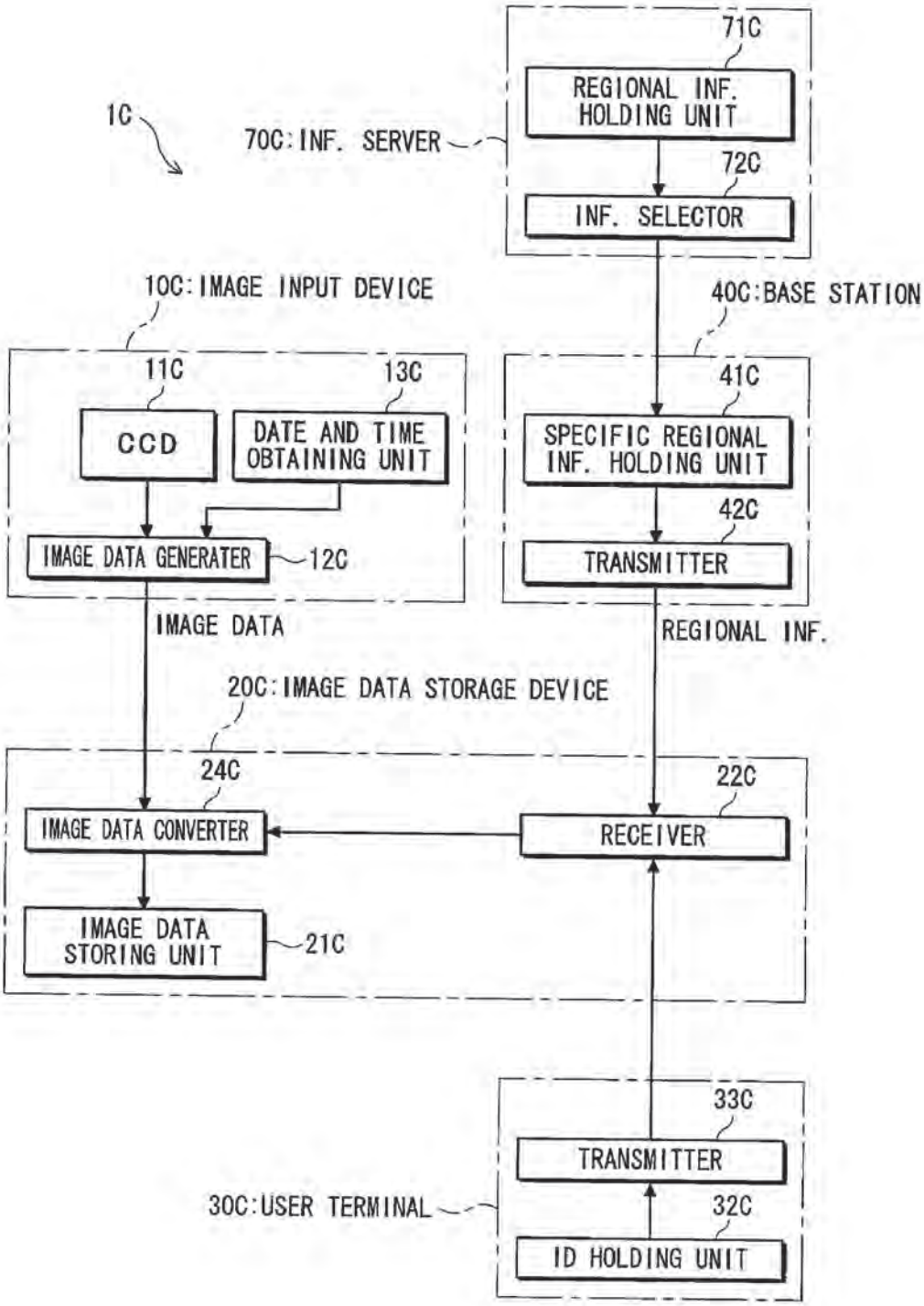

1C
70C: INF. SERVER
71C
REGIONAL INF. HOLDING UNIT
72C
INF. SELECTOR
10C: IMAGE INPUT DEVICE
40C: BASE STATION
11C
CCD
13C
DATE AND TIME OBTAINING UNIT
IMAGE DATA GENERATER
12C
41C
SPECIFIC REGIONAL INF. HOLDING UNIT
42C
TRANSMITTER
IMAGE DATA
REGIONAL INF.
20C: IMAGE DATA STORAGE DEVICE
24C
IMAGE DATA CONVERTER
22C
RECEIVER
IMAGE DATA STORING UNIT
21C
33C
TRANSMITTER
30C: USER TERMINAL
32C
ID HOLDING UNIT

FIG. 14

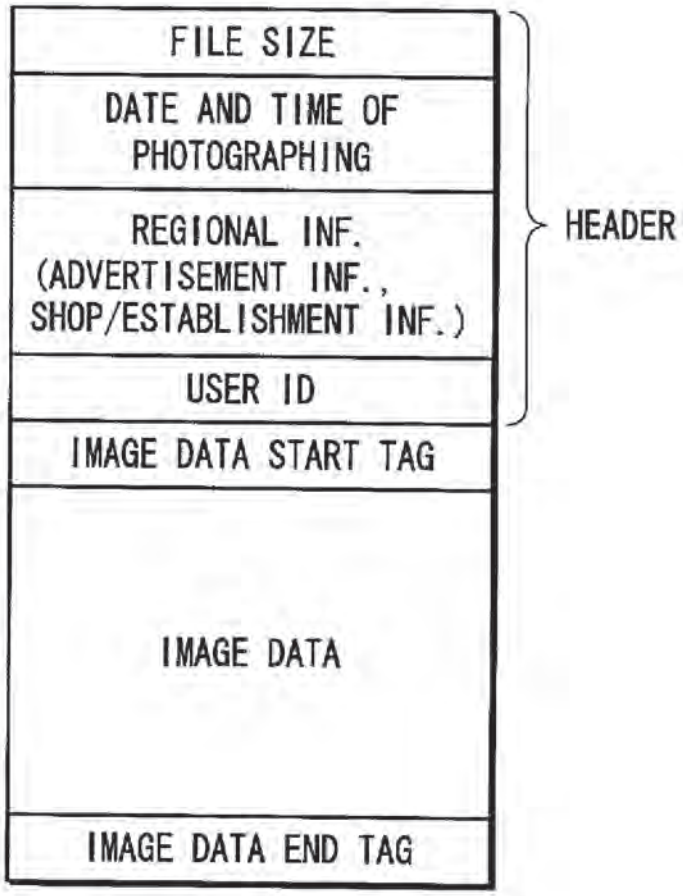

FILE SIZE
DATE AND TIME OF PHOTOGRAPHING
REGIONAL INF. (ADVERTISEMENT INF., SHOP/ESTABLISHMENT INF.)
USER ID
IMAGE DATA START TAG
IMAGE DATA
IMAGE DATA END TAG
HEADER

FIG. 15

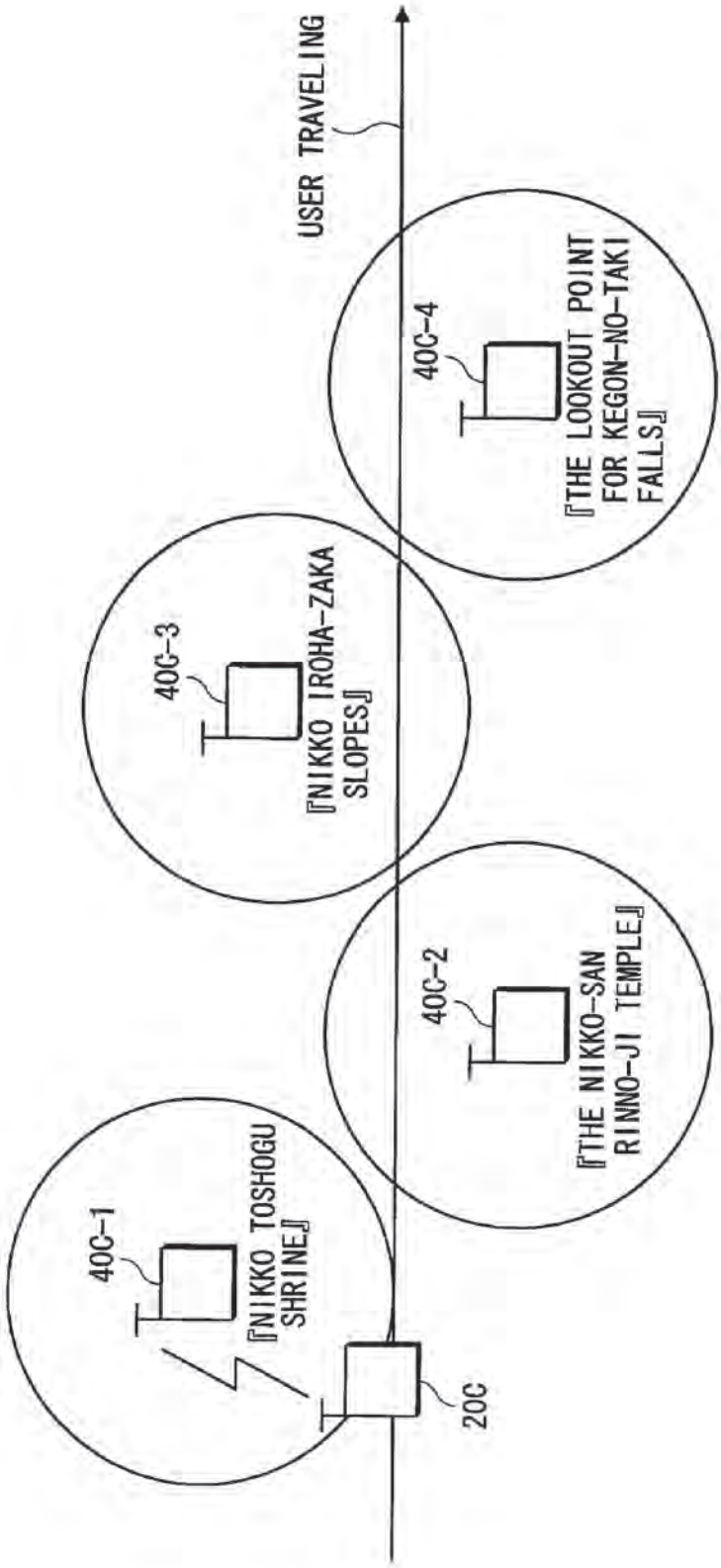

USER TRAVELING
40C-1
『NIKKO TOSHOGU SHRINE』
40C-2
『THE NIKKO-SAN RINNO-JI TEMPLE』
40C-3
『NIKKO IROHA-ZAKA SLOPES』
40C-4
『THE LOOKOUT POINT FOR KEGON-NO-TAKI FALLS』
20C

FIG. 16

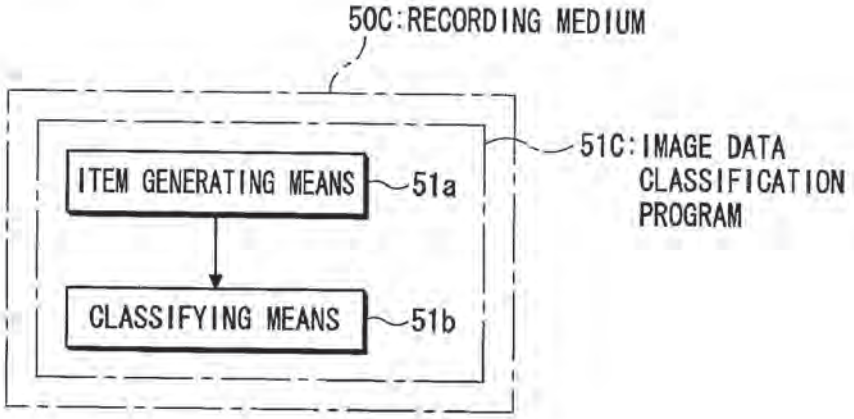

50C:RECORDING MEDIUM
ITEM GENERATING MEANS
51a
CLASSIFYING MEANS
51b
51C:IMAGE DATA CLASSIFICATION PROGRAM

FIG. 17

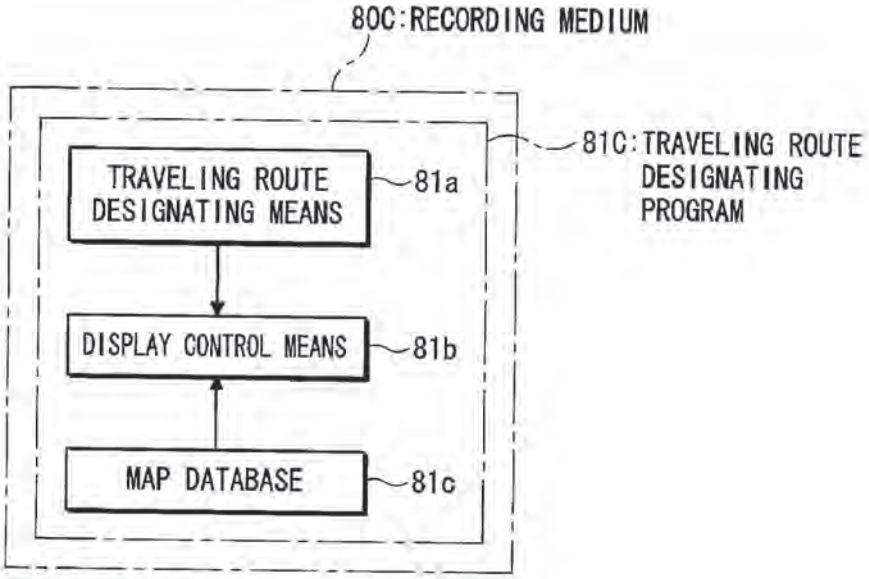

80C:RECORDING MEDIUM
TRAVELING ROUTE DESIGNATING MEANS
81a
DISPLAY CONTROL MEANS
81b
MAP DATABASE
81c
81C:TRAVELING ROUTE DESIGNATING PROGRAM

FIG. 18

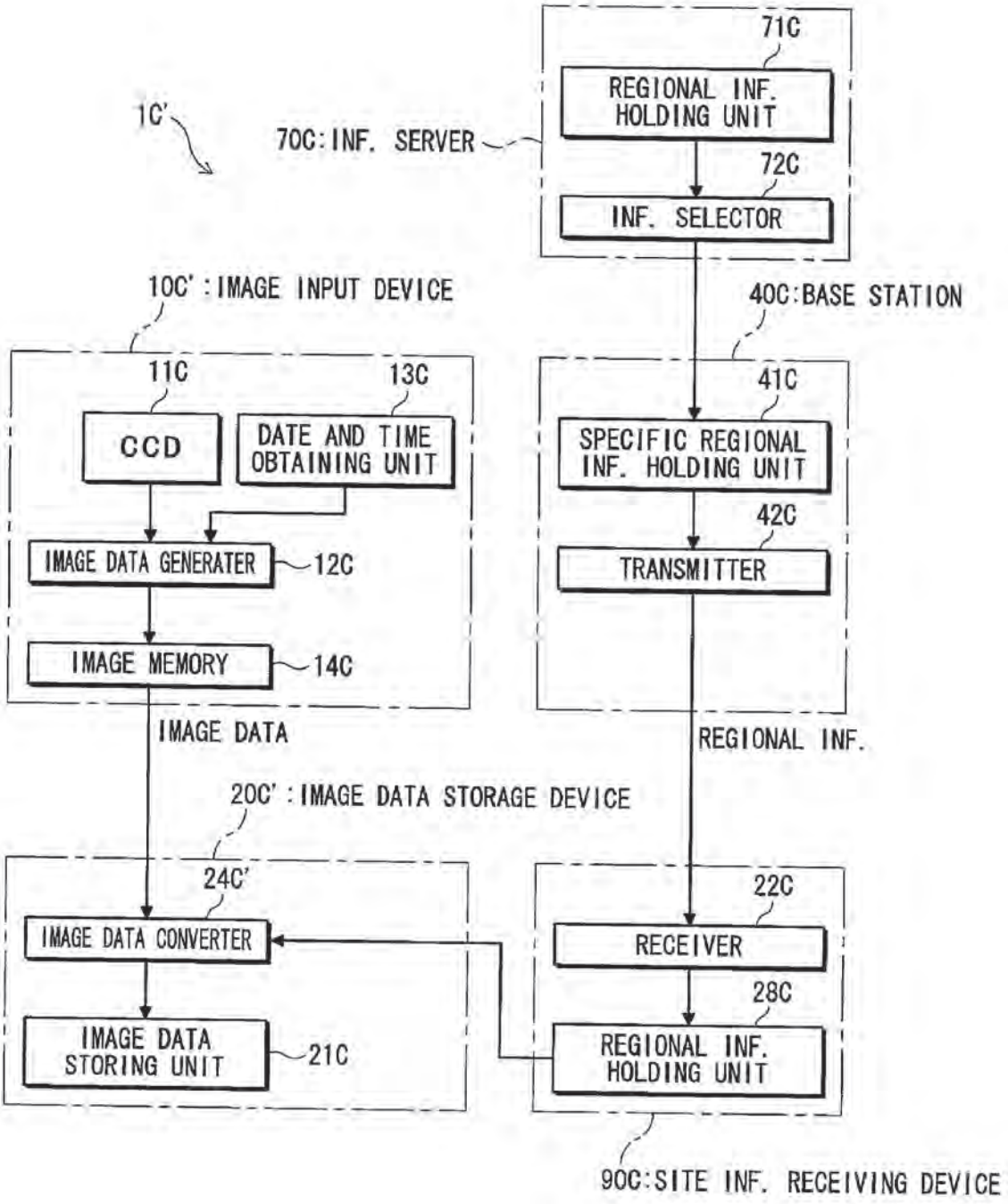

71C
REGIONAL INF. HOLDING UNIT
1C'
70C: INF. SERVER
72C
INF. SELECTOR
10C' : IMAGE INPUT DEVICE
40C: BASE STATION
11C
13C
CCD
DATE AND TIME OBTAINING UNIT
41C
SPECIFIC REGIONAL INF. HOLDING UNIT
42C
IMAGE DATA GENERATER
12C
TRANSMITTER
IMAGE MEMORY
14C
IMAGE DATA
REGIONAL INF.
20C' : IMAGE DATA STORAGE DEVICE
24C'
22C
IMAGE DATA CONVERTER
RECEIVER
28C
IMAGE DATA STORING UNIT
21C
REGIONAL INF. HOLDING UNIT
90C: SITE INF. RECEIVING DEVICE

FIG. 19

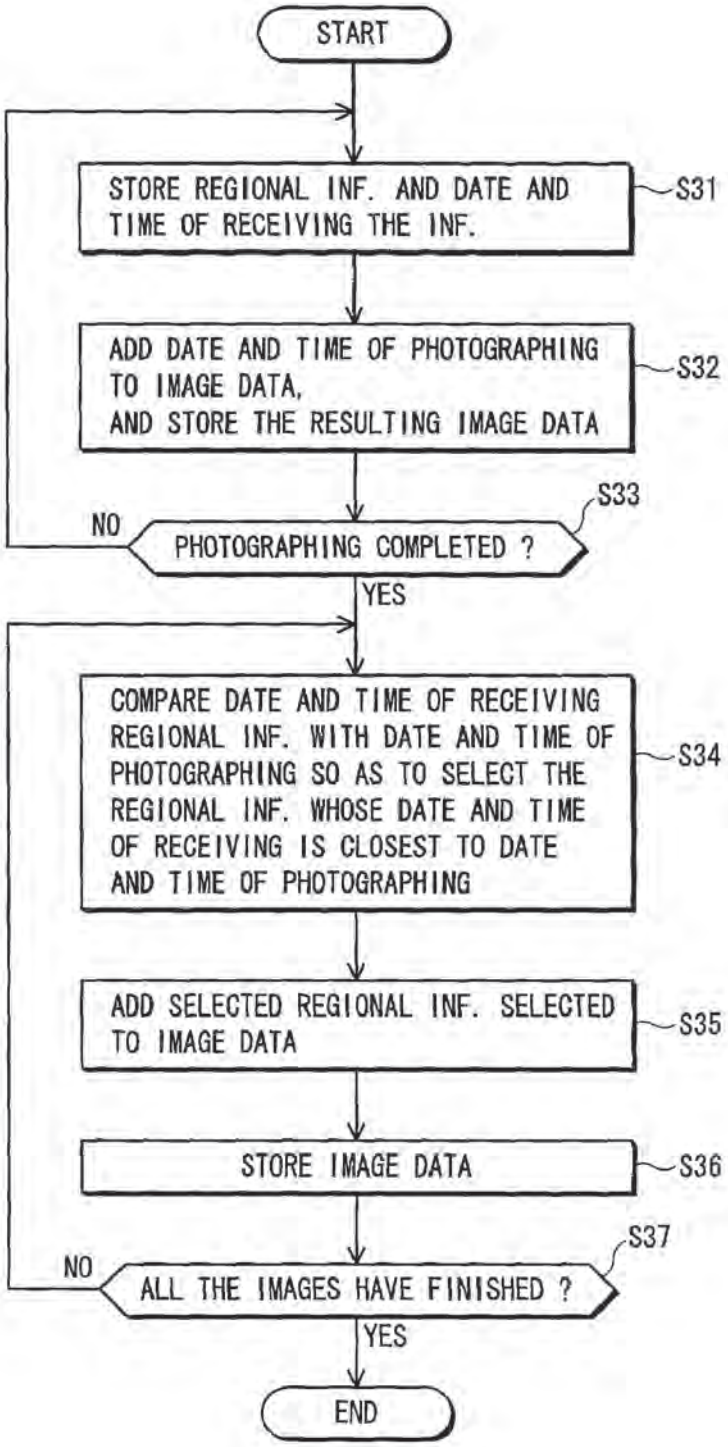

START
STORE REGIONAL INF. AND DATE AND TIME OF RECEIVING THE INF.
S31
ADD DATE AND TIME OF PHOTOGRAPHING TO IMAGE DATA, AND STORE THE RESULTING IMAGE DATA
S32
S33
NO
PHOTOGRAPHING COMPLETED ?
YES
COMPARE DATE AND TIME OF RECEIVING REGIONAL INF. WITH DATE AND TIME OF PHOTOGRAPHING SO AS TO SELECT THE REGIONAL INF. WHOSE DATE AND TIME OF RECEIVING IS CLOSEST TO DATE AND TIME OF PHOTOGRAPHING
S34
ADD SELECTED REGIONAL INF. SELECTED TO IMAGE DATA
S35
STORE IMAGE DATA
S36
S37
NO
ALL THE IMAGES HAVE FINISHED ?
YES
END

FIG. 20

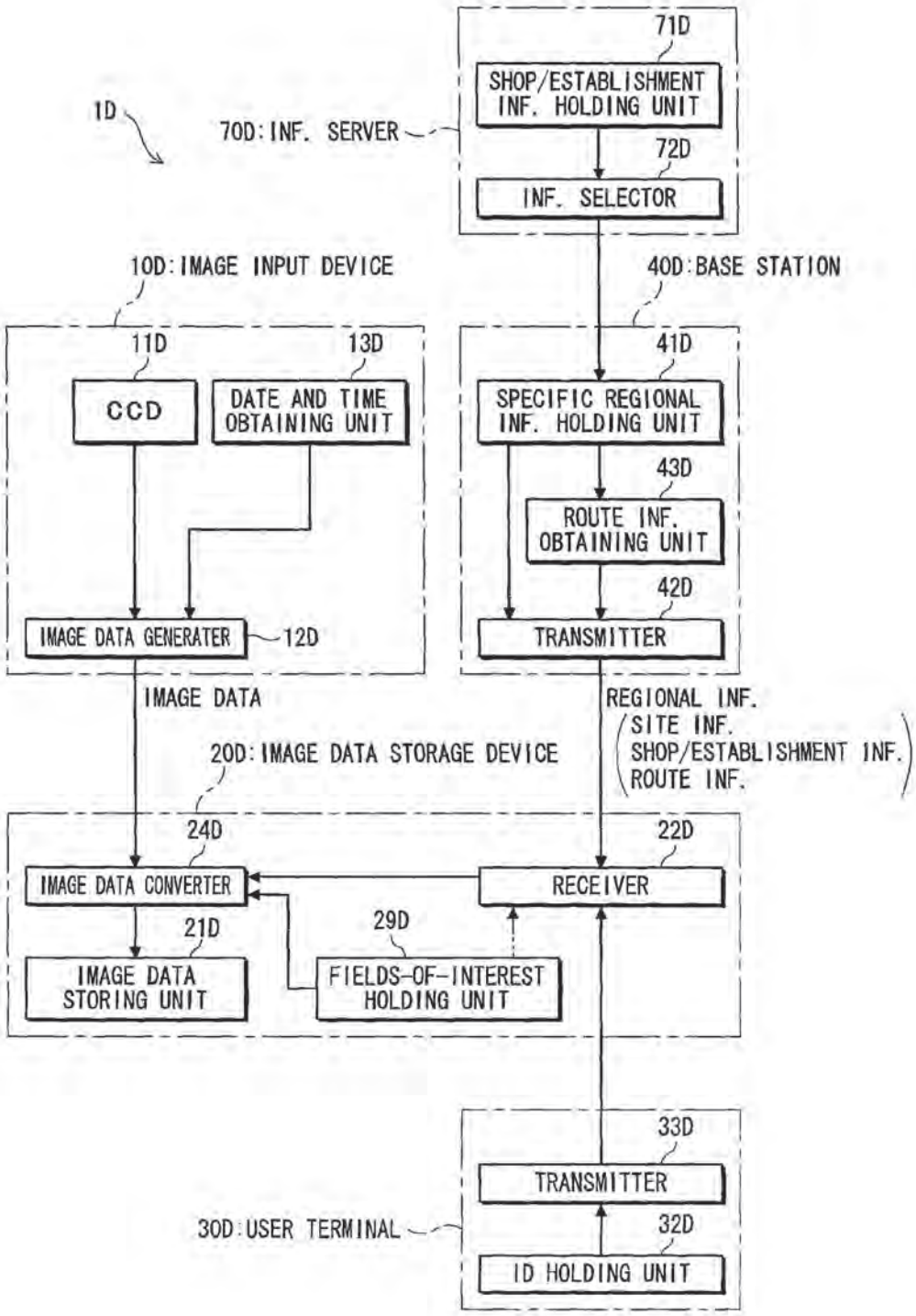

1D
70D: INF. SERVER
71D
SHOP/ESTABLISHMENT INF. HOLDING UNIT
72D
INF. SELECTOR
10D: IMAGE INPUT DEVICE
40D: BASE STATION
11D
CCD
13D
DATE AND TIME OBTAINING UNIT
41D
SPECIFIC REGIONAL INF. HOLDING UNIT
43D
ROUTE INF. OBTAINING UNIT
42D
TRANSMITTER
IMAGE DATA GENERATER
12D
IMAGE DATA
REGIONAL INF.
(SITE INF.
SHOP/ESTABLISHMENT INF.
ROUTE INF.)
20D: IMAGE DATA STORAGE DEVICE
24D
IMAGE DATA CONVERTER
22D
RECEIVER
21D
IMAGE DATA STORING UNIT
29D
FIELDS-OF-INTEREST HOLDING UNIT
33D
TRANSMITTER
30D: USER TERMINAL
32D
ID HOLDING UNIT

FIG. 21

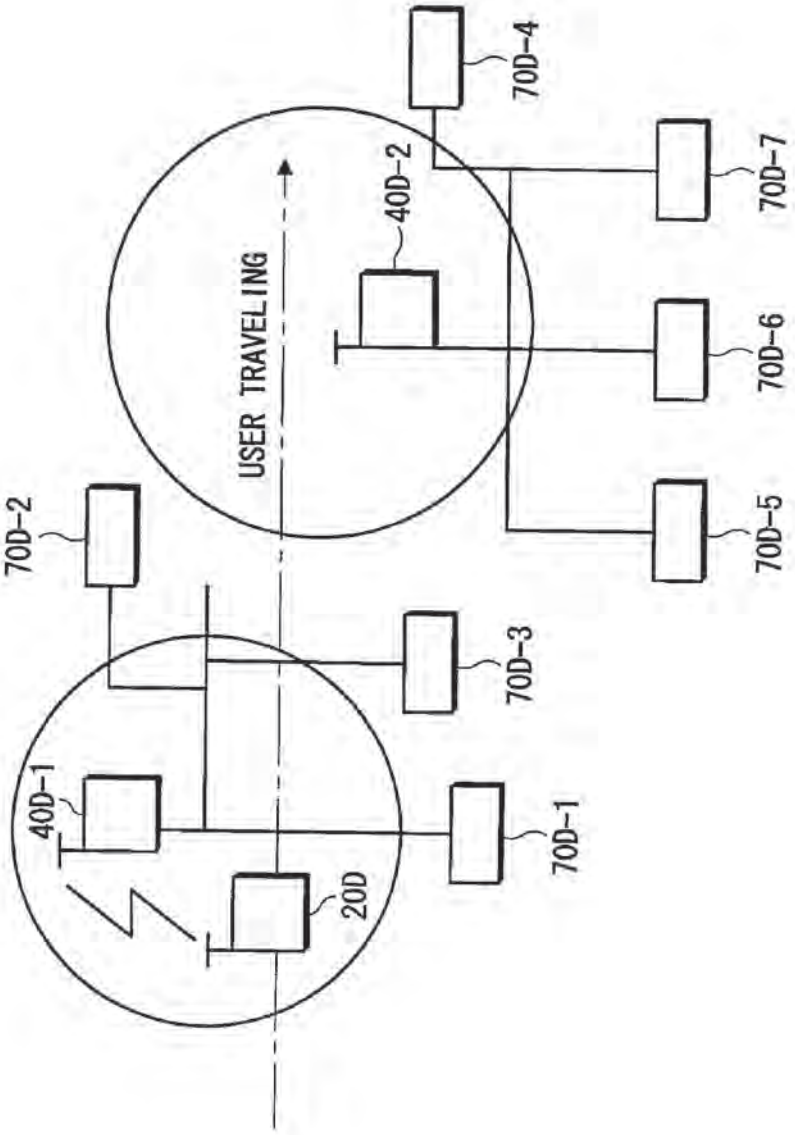

USER TRAVELING
40D-1
20D
70D-1
70D-2
70D-3
40D-2
70D-4
70D-5
70D-6
70D-7

FIG. 22

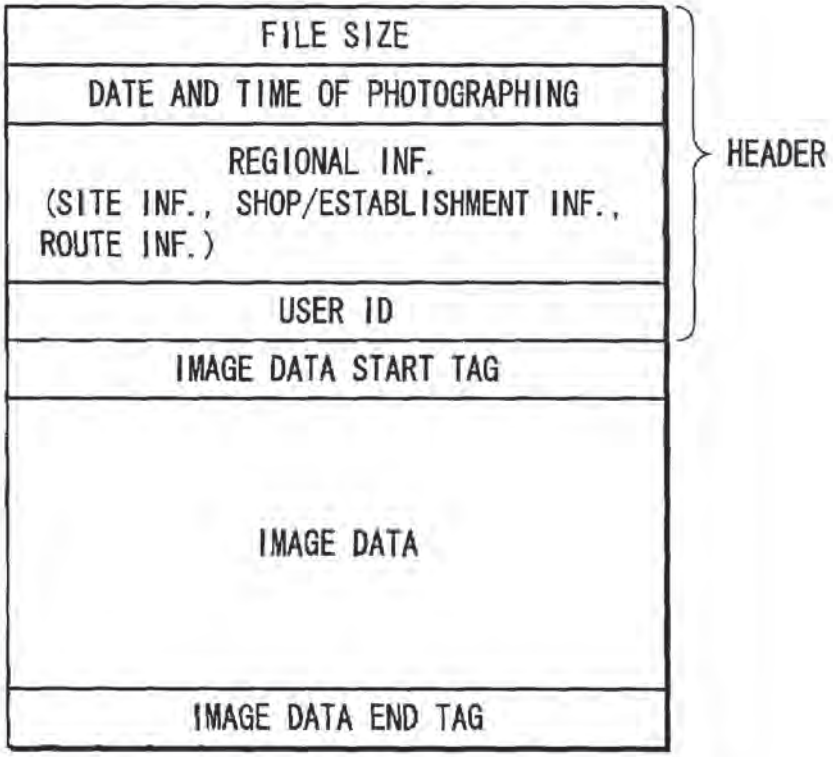

FILE SIZE
DATE AND TIME OF PHOTOGRAPHING
REGIONAL INF.
(SITE INF., SHOP/ESTABLISHMENT INF., ROUTE INF.)
USER ID
HEADER
IMAGE DATA START TAG
IMAGE DATA
IMAGE DATA END TAG

FIG. 23

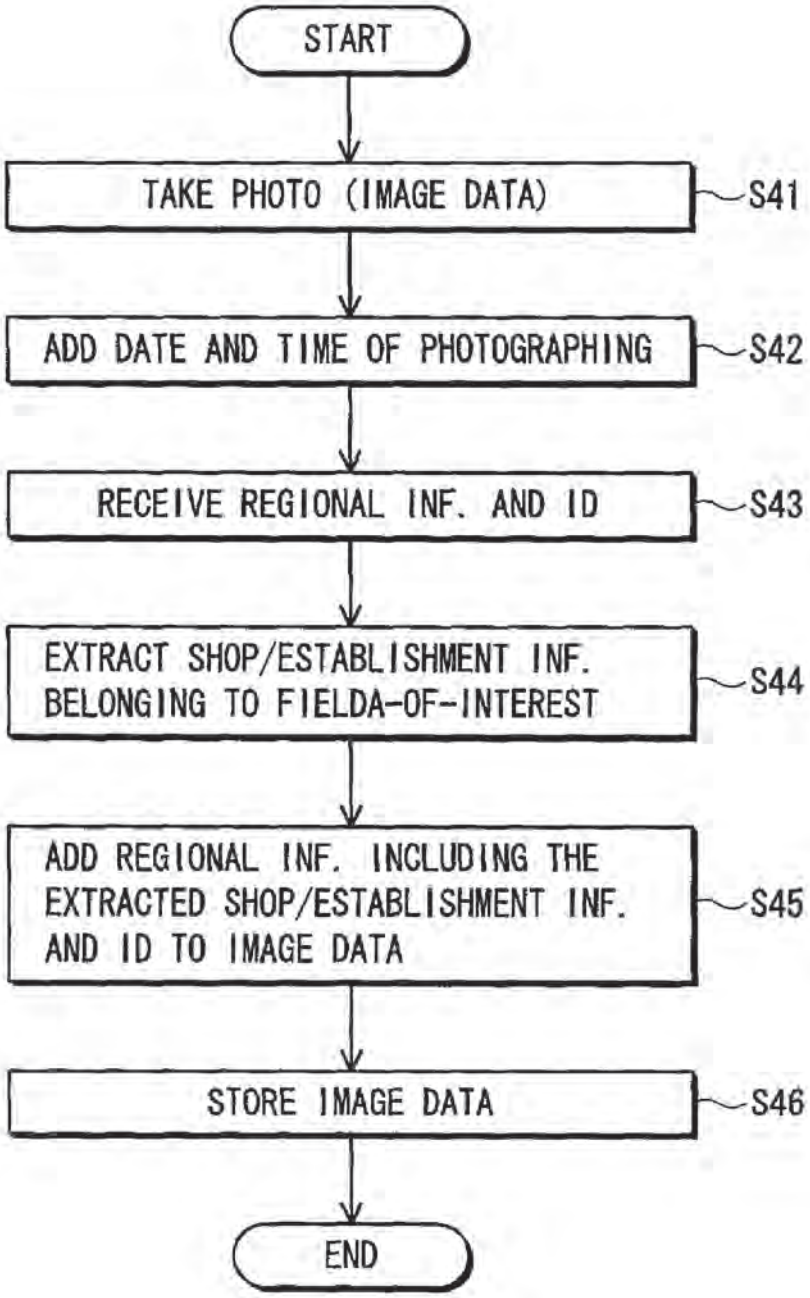

START
TAKE PHOTO (IMAGE DATA)
S41
ADD DATE AND TIME OF PHOTOGRAPHING
S42
RECEIVE REGIONAL INF. AND ID
S43
EXTRACT SHOP/ESTABLISHMENT INF. BELONGING TO FIELDA-OF-INTEREST
S44
ADD REGIONAL INF. INCLUDING THE EXTRACTED SHOP/ESTABLISHMENT INF. AND ID TO IMAGE DATA
S45
STORE IMAGE DATA
S46
END

FIG. 24

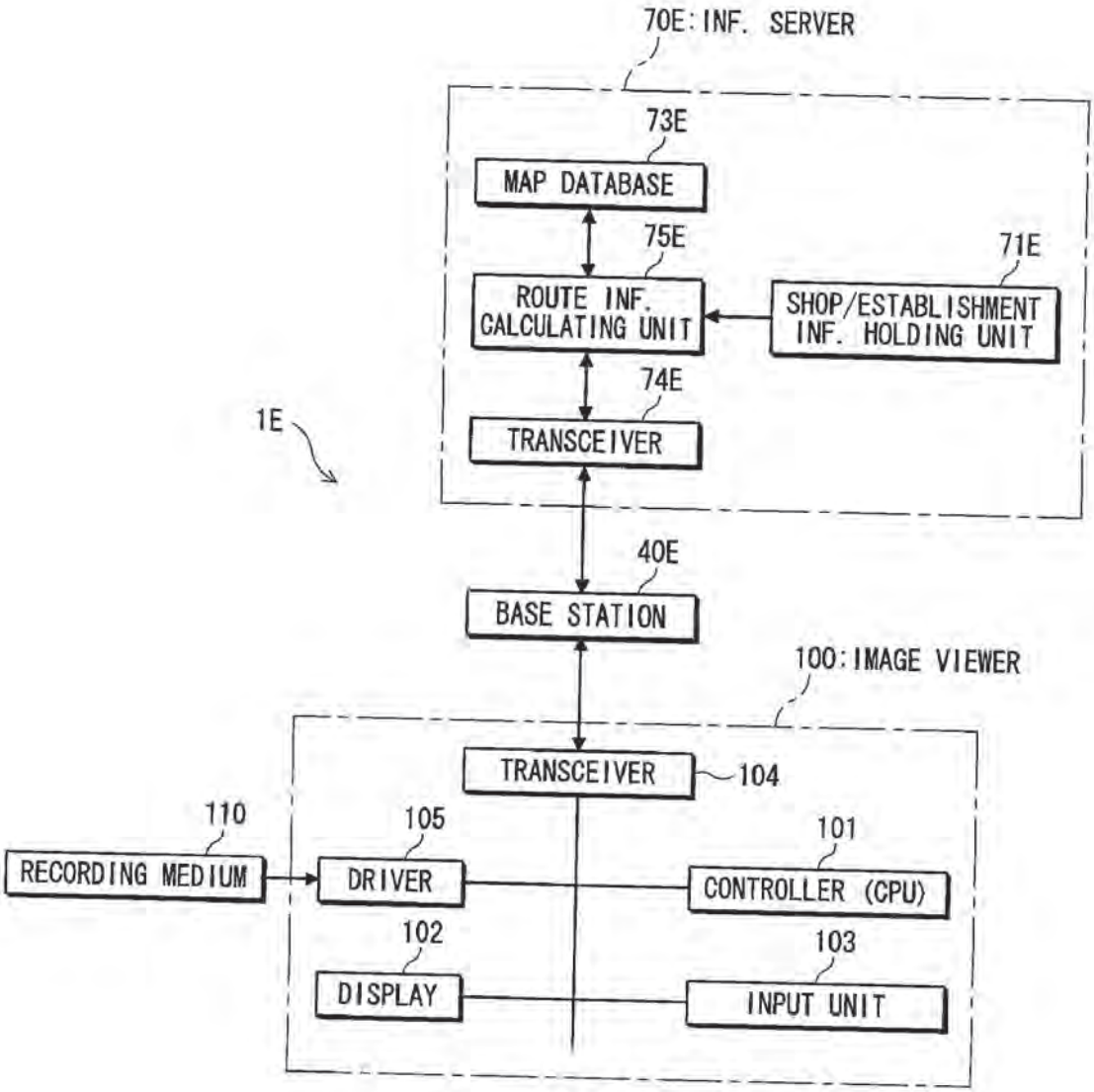

70E: INF. SERVER
73E
MAP DATABASE
75E
71E
ROUTE INF. CALCULATING UNIT
SHOP/ESTABLISHMENT INF. HOLDING UNIT
74E
1E
TRANSCEIVER
40E
BASE STATION
100: IMAGE VIEWER
TRANSCEIVER
104
110
105
101
RECORDING MEDIUM
DRIVER
CONTROLLER (CPU)
102
103
DISPLAY
INPUT UNIT

FIG. 25

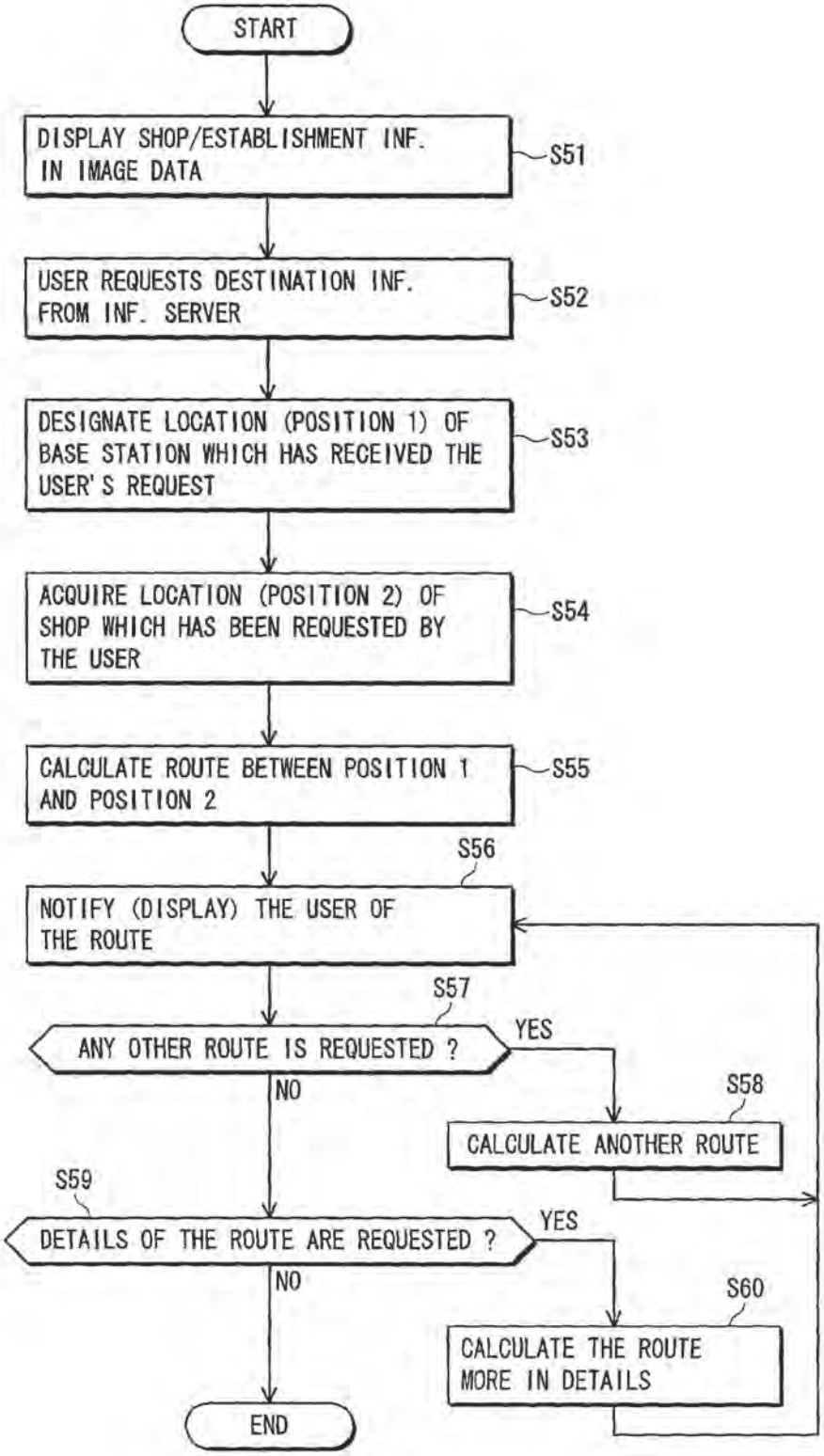

START
DISPLAY SHOP/ESTABLISHMENT INF. IN IMAGE DATA
S51
USER REQUESTS DESTINATION INF. FROM INF. SERVER
S52
DESIGNATE LOCATION (POSITION 1) OF BASE STATION WHICH HAS RECEIVED THE USER'S REQUEST
S53
ACQUIRE LOCATION (POSITION 2) OF SHOP WHICH HAS BEEN REQUESTED BY THE USER
S54
CALCULATE ROUTE BETWEEN POSITION 1 AND POSITION 2
S55
S56
NOTIFY (DISPLAY) THE USER OF THE ROUTE
S57
ANY OTHER ROUTE IS REQUESTED ?
YES
NO
S58
CALCULATE ANOTHER ROUTE
S59
DETAILS OF THE ROUTE ARE REQUESTED ?
YES
NO
S60
CALCULATE THE ROUTE MORE IN DETAILS
END

FIG. 26

RELATED ART

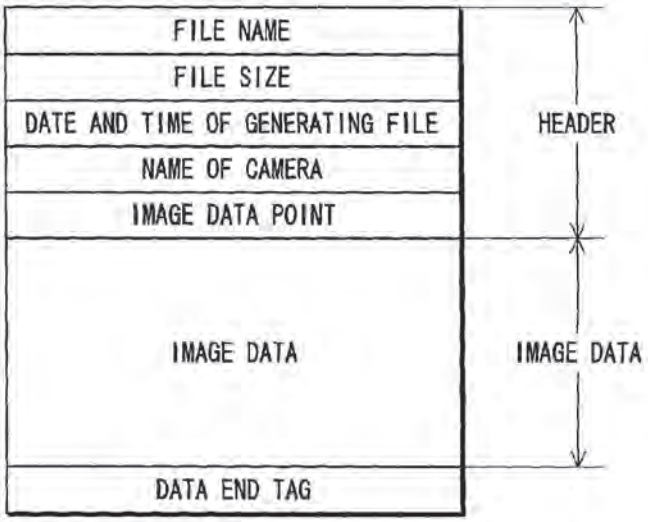
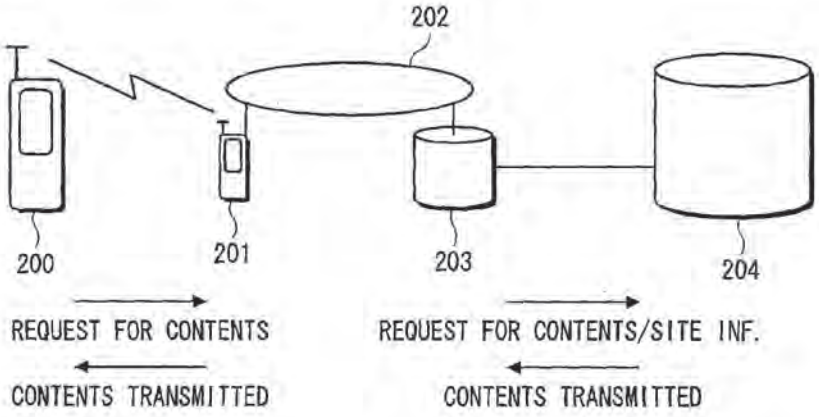



FIG. 27

RELATED ART



# IMAGE DATA STORING SYSTEM AND METHOD, IMAGE OBTAINING APPARATUS, IMAGE DATA STORAGE APPARATUS, MOBILE TERMINAL, AND COMPUTER-READABLE MEDIUM IN WHICH A RELATED PROGRAM IS RECORDED

## BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a system and method for storing digital image data obtained by, for example, a digital still camera (hereinafter simply called a digital camera). The invention also relates to equipment used in the system and to recording media in which the system-related programs are recorded. In particular, the invention relates to a technique for providing users with information effective for managing and classifying the image data and with any other useful information.

[0003] 2. Description of the Related Art

[0004] With recent widespread use of digital cameras, digital images have been becoming increasingly popular among users. A digital camera obtains an image of a subject with a CCD (Charge Coupled Device), and the reflected light the CCD receives is converted into digital data. Recent digital images are normally in full color, and in such a full color image, 8 bits are used to represent each of the primary colors (Red, Green, and Blue: RGB). Every pixel of a full color image thus has a size of 3 bytes, and a single full color image obtained by a digital camera of 3,000,000-pixel resolution has a file size of as much as 9 MB.

[0005] In view of this, image data obtained by a digital camera is normally stored in a JPEG (Joint Photographic Experts Group): JPEG is an international standard for still picture image compression method developed in cooperation between the ISO (International Organization for Standardization) and the CCITT {Consultative Committee for International Telegraph and Telephone; the CCITT is called the ITU-T (International Telecommunications Union-Telecommunication Standardization Sector), now}.

[0006] The JPEG uses ADCT (Adaptive Discrete Cosine Transform), linear quantization, and variable-length coding to remove redundancies, thereby compressing the size of image data. The compression ratio in JPEG depends upon what a subject of image data is, yielding a ratio of 10:1 or lower for landscape images, and a ratio of 20:1 or lower for portrait images. Thus, a landscape image obtained by a digital camera of 3,000,000-pixel resolution has a file size of 900 KB or so; and a portrait image, a file size of 450 KB or so.

[0007] TIFF (Tagged Image File Format) is another format commonly used for storing image data obtained by digital cameras. Some of the digital cameras that are now being distributed in the market are allowed to use these formats selectively. JPEG should be employed when a picture image is to be compressed, while TIFF should be employed when a picture image is not to be compressed. JPEG is advantageous in that it realizes a high compression ratio resulting from removal of redundancies in image data. The removal, however, would cause deteriorated image quality, such as block noises, mosquito noises, and pseudo-contours. If such image degradation is not acceptable, users should select TIFF, which is free from any image compression.

[0008] A JPEG image file and a TIFF image file, as shown in **FIG. 26**, have not only a storage area for storing image data itself but also another area (header) for storing various items of information relating to the image data. Such a header of image data normally stores a file name, a file size, the date and time the image data was generated, a device name (camera name) that generated the image data, an image data pointer, and others. By referring to the header, users are able to check when the image data was obtained. In conventional cameras, the date and time a picture was taken (hereinafter also called the date and time of photographing) is printed in the corner of the picture, thereby making it possible for a user to recognize when the picture was taken. In digital cameras, however, since information stored in the header of image data is stored separately from the image data itself, it is impossible for a user, even if the image data is merely shown on a display, to know the date and time of photographing, unless the user refers to the header.

[0009] Digital cameras normally operate in the following way. A user takes a picture image of a subject with a digital camera in the same way as when using an existing film-type camera (hereinafter called a conventional camera). The image data thus obtained is stored not in a film but in a non-volatile memory medium (CompactFlash™, SmartMedia™, and so on) built in the digital camera. Because such a memory medium has only a small amount of capacity and is more expensive than a film, a user has to move the image data into some storage medium (for example, a hard disc drive (HDD) of a PC) having a great amount of capacity, when necessary.

[0010] In comparison with conventional cameras, the above-mentioned digital cameras and image data obtained by such digital cameras guarantee the following features:

[0011] (a1) it is easy to process image data;

[0012] (a2) it is easy to delete image data;

[0013] (a3) it is possible to obtain a great amount of image data with use of a memory having a great amount of capacity;

[0014] (a4) it is easy to duplicate and distribute image data;

[0015] (a5) picture images will never deteriorate with time.

[0016] (a6) a memory medium built in a digital camera can be used repetitively;

[0017] (a7) image data stored in the memory medium can be browsed on a personal computer (hereinafter also called a PC), so that only the required image data can be selectively printed out; and

[0018] (a8) since image data that is not required can be deleted immediately after being obtained, it is possible for a user to keep only the image data he wishes to.

[0019] With the widespread use of information communications devices in Japan, positioning services have been started in which the current position of a user is provided by radio: for example, GPS (Global Positioning System) and a PHS (Personal Handyphone System) positioning services such as mopera™ of NTT Docomo, Inc.

[0020] Here, GPS is a satellite-based positioning system. Using an information communications device, a user receives latitude and longitude information sent out from GPS satellites, thereby being notified of his current position on the earth.

[0021] Referring now to **FIG. 27**, in a positioning service, such as mopera™ of NTT Docomo, Inc., a user makes a contents request from mobile terminal **200**, which he carries, to network server **203** via base station **201** and communications network **202**. Upon receipt of the contents request, network server **203** transmits both the request and the user's current position information to contents server **204**.

[0022] Contents server **204** selects the information that matches the user's contents request and also corresponds to the user's current position. The resulting selected information is transmitted to mobile terminal **200** via network server **203**, communications network **202**, and base station **201**. For example, mopera™ of NTT Docomo, Inc. offers a variety of community information, a railway connections guide, a bus guide, spot news, and others.

[0023] In the meantime, the above-described features (a6) through (a8) are effective in reducing the cost of pictures (running cost). With a digital camera, since no additional cost would be caused unless picture images that have been taken are printed out, a user is likely to obtain a great amount of image data, for example, during a trip. If a user goes on a trip with a 3,000,000-pixel digital camera and a memory medium of a capacity of 64 MB, 70 picture images or more can be obtained. At that time, the number of picture images the user can obtain is increased as the compression ratio in the JPEG is increased, or as the resolution of picture images is lowered.

[0024] With such a great amount of image data, a user would be faced with difficulties in managing and classifying the image data. In the case of picture images taken with a conventional camera, a user normally asks a DPE (Development, Printing, Enlargement) shop to develop the pictures. Taking a look at the developed pictures, the user recognizes when and in what situation the picture was taken.

[0025] Meanwhile, in order to recognize what picture images are contained in some digital data, the images must be shown on a display of a PC or the like.

[0026] Accordingly, the user first shows picture images on a display to recognize when, where, with whom, and in what situation the pictures were taken. After that, for the purpose of managing the picture images, the user may give any suitable file names to the pictures before storing them, or may store the picture images under a directory given a suitable directory name. Additionally, a database software tool could be utilized to manage the picture images. In that case, image data to be stored therein must be associated with the classification items prepared in the database software, such as "cherry-blossom viewing", "honeymoon", and "sports day", and this associating must be carried out by the user himself.

[0027] In this manner, a digital camera is advantageous in that a great amount of digital image data can be obtained at a reasonable cost. However, the management of such a huge amount of data would be troublesome to a user. Hence it is hoped that an easy way to manage the great amount of image data generated by digital cameras is provided, so that users are freed from the troublesome management of image data.

[0028] There have already been proposed methods for facilitating image data classification in which position information representing where image data was obtained is stored. The following are publicly known examples: "Image Recording Apparatus and Image Reproducing Apparatus", Japanese Unexamined Patent Application Publication No. HEI 5-110972; "Electronic Still Camera", Japanese Unexamined Patent Application Publication No. HEI 5-207408; "Still Camera Which Records Direction Information and Reproduction Method", Japanese Unexamined Patent Application Publication No. HEI 11-69280; "Image Recording/Reproducing Apparatus", Japanese Unexamined Patent Application Publication No. HEI 9-252454; "Electronic Camera", Japanese Unexamined Patent Application Publication No. HEI 9-322109; "Image Data Reproduction Method and Image Data Management Method", Japanese Unexamined Patent Application Publication No. HEI 10-233985; and "Information Processing Apparatus", Japanese Unexamined Patent Application Publication No. HEI 11-17908.

[0029] In the techniques disclosed in HEI 5-110972, HEI 5-207408, and HEI 9-252454, position information is received from an external apparatus, and then stored in a recording medium together with image data. That is, since the position information received from the an external apparatus is directly stored as it is, it is impossible to add any other information, such as "with whom the image data was obtained". Accordingly, a user is notified merely of where the image data was obtained, and any other information about the image data cannot be provided to the user.

[0030] In the techniques disclosed in HEI 9-322109, HEI 10-233985, and HEI 11-17908, GPS is employed to obtain a user's current position. The current position or some information calculated from the current position is utilized as position information. Using GPS or a map database, "calculation of the current position" and "cooperation with a map database" are realized. Like the above-cited publicly known examples, it is possible to label the image data with the information relating to the current position but not with any other information. Further, GPS signals transmitted from GPS satellites have only latitude and longitude data. Hence, in order to identify what is located at some latitude and longitude, a map database is separately required.

[0031] Furthermore, in the technique disclosed in HEI 11-69280, direction information, which represents in what direction image data was obtained, is obtained by a direction sensor. As such direction sensors are large and expensive, they seem to be inferior in practicality.

[0032] Meanwhile, as described above, a positioning service, such as mopera™ of NTT Docomo, Inc., selects the information that matches a user's contents request and that also corresponds to the user's current position, and the selected information is then provided to the user. This service, however, would make no contribution to facilitating management and classification of a great amount of image data.

## SUMMARY OF THE INVENTION

[0033] With the foregoing problems in view, a subject of the present invention is to realize a service that facilitates

management and classification of image data obtained by a digital camera, and that also provides a user with various types of information relating to a place where the image data has been obtained.

[0034] In order to accomplish the above subject, according to the present invention, there is provided an image data storing system comprising: an image obtaining apparatus for obtaining image data of a subject; a storage means for storing the image data, which has been obtained by the image obtaining apparatus; a means for obtaining site information representing a site at which the image data has been obtained by the image data obtaining apparatus; a means for obtaining subject information identifying the subject of the image data; and an information adding means for adding both the site information and the subject information to the image data, which is to be stored into the storage means.

[0035] As one preferred feature, the image data storing system further comprises a means for calculating an image-shooting direction, in which shooting of an image of a subject has been carried out by the image obtaining apparatus, based on both first position information, representing a position in which the image obtaining apparatus is located, and second position information, representing a position in which the subject of the image data is located, both of which first position information and the second position information are obtained by the site information obtaining means, as the site information, when the image data of the subject has been obtained, and the information adding means is operable to add the calculated image-shooting direction to the image data, which is to be stored into the storage means.

[0036] As another preferred feature, the image data storing system further comprises: a means for transmitting add-on information; and a means for receiving the add-on information from the add-on information transmitting means in the vicinity of the site at which the image data of the subject has been obtained, and the information adding means is operable to add the add-on information, which has been received by the add-on information receiving means, to the image data, which is to be stored into the storage means.

[0037] As still another preferred feature, the add-on information may be regional information relating to a site at which the image data is obtained, and the site information obtaining means serves also as the add-on information receiving means to receive and obtain the regional information as the site information. Further, the regional information may include shop/establishment information about one or more shops and/or establishments in the vicinity of the site at which the image data has been obtained.

[0038] The present invention guarantees the following advantageous results.

[0039] (1) Since image data obtained by image data obtaining apparatus is stored in a storage means with position information (the place where the image data has been obtained) and subject information having been added thereto, it is possible to provide users with such useful information for managing/classifying the image data. Hence the users are allowed to use the position information and the subject information added to the image data to manage/classify a great amount of image data obtained by an image obtaining apparatus such as a digital camera, with significant ease. Further, the added subject information would help the users recognize with whom the image data has been obtained. Furthermore, it would also be possible to classify the image data automatically, based on such position information and subject information, using a dedicated software tool.

[0040] (2) Since the date and time when the image data was obtained is added to the image data, it is not only possible to facilitate managing/classifying a huge amount of image data based on the date and time, but it is also possible to realize an advanced-quality of classification of the image data, based on the date and time, the position information, and the subject information.

[0041] (3) Since an image-shooting direction, which has been calculated based on the position of an image obtaining apparatus and the position of a subject of image data, is added to image data, it is possible to provide a user with information about along which direction (where is viewed from where) the image data has been obtained. Further, since the image-shooting direction is determined according to these two items of position information, any geomagnetism-employed direction sensor is no longer be required, which necessitates expensive and large-scaled circuits, for obtaining the image-shooting direction. Furthermore, by employing a latitude/longitude calculation system of high accuracy, such as GPS, it would be possible to obtain an accurate image-shooting direction with an inexpensive, mobile, construction.

[0042] (4) Background information is identified based on the thus obtained image-shooting direction, the position information, and geographic data, and is then added to the image data. It is thus possible for a user to obtain information about the background of the image data, which information is useful for classifying/managing the image data, with no need for performing any particular operation.

[0043] (5) Since add-on information sent out in the vicinity of the place where image data has been obtained is received and then added to the image data, it is possible to provide a user (a person who takes picture images) with various kinds of useful information (for example, advertisement information relating to a place where the image data has been obtained, and shop/establishment information in the vicinity of the place). Accordingly, an information sender (service provider) sends out shop/establishment information as well as company ads and event ads of particular companies and organizations in such a manner that the sent-out information can travel a limited distance to reach the users who are staying in that limited area, so that the service provider can charge the companies, organizations, and shops/establishments for such information transmission.

[0044] (6) If such add-on information is regional information relating to the place where the image data has been obtained, the regional information may be used as position information representing a place where the image data has been obtained. It is thus

possible to obtain the position information merely by receiving such regional information, with no need for using any latitude/longitude calculation system such as GPS or any existing positioning service. At that time, since the regional information may contain advertisement information relating to the place where the image data has been obtained or information about shops/establishments in the vicinity of the place, the regional information is useful for a user (a person who takes picture images) not only to obtain the position information, as described above, but also to obtain the advertisement information and the shop/establishment information.

[0045] (7) Generally speaking, because a nonvolatile memory medium built in a digital camera (an image obtaining apparatus) has small capacity for its high price, it is necessary to move the image data being temporarily held in the nonvolatile memory medium (storage means) to an external recording medium having a great amount of capacity. As a result, a time lag would be caused between when image data is obtained and when the data is stored into the storage medium. Accordingly, both the date and time the image data was obtained and the date and time the regional information was received should be stored. On the basis of these dates and times, the appropriate one, whose date of receipt corresponds to the date and time the image data was obtained, is selected from plural items of regional information so as to be added to the image data. As a result, even if the above-mentioned time lag occurs, it is still possible to add the most appropriate regional information having been received in the vicinity of the place where the image data was obtained to the image data, that is, an accurate item of position information corresponding to the place where the image data has been obtained can be added to the image data.

[0046] (8) Since not only shop/establishment information but also route information about a route, from where image data has been obtained (the site at which photographing has been carried out) to the shop or establishment, is added to the image data, it is always possible to show a user the way to the shop or establishment from where the image data has been obtained. Further, it is also possible to show a user the way to the shop/establishment, not only at the time the image data is actually obtained but also at the time the user revisits the place where the image data has been obtained, thereby making the shop/establishment more appealing to the user.

[0047] (9) Since image data stored in an storage medium is displayed on a browsing means (image viewer) together with various types of information added to the image data, it is possible for a user to use the image viewer to browse the image data and various types of information added to the image data.

[0048] (10) In response to a request from a user, route information about a route from a browsing place, where image data is being browsed with the browsing means (a current position of the image viewer), to a shop or establishment whose information is displayed on the browsing means, is notified to the browsing means and is displayed thereon. It is thus possible for a user, while browsing some shop/establishment information on the browsing means, to obtain route information about a route from the browsing place to the shop or establishment. As a result, the shop or establishment would be more appealing to the user.

[0049] (11) Since the kind of information a user demands is previously registered in such a manner that only the shop/establishment information that matches the registered information kind is extracted, it is possible to selectively add the information that is useful to the user (for example, information belonging to the user's fields of interest) to the image data, which is then provided to the user.

[0050] (12) Partly since a person who is to be a subject of a picture image carries a mobile terminal that transmits a identification information (ID) unique to the person, and partly since the ID received from the mobile terminal is then added to the image data as subject information at the time the image data is obtained, it is possible to significantly easily obtain an ID (subject information) which identifies the subject of the image data. At that time, IDs of the persons who are to be the subjects of the images to be taken by an image obtaining apparatus are previously registered in such a manner that only the registered IDs are extracted from IDs having been received, so as to be added to the image data. It is thus possible to prevent, with certainty, erroneous adding of third parties' IDs having no relationship with the image data.

[0051] (13) Since the above functions of a mobile terminal may be equipped to a mobile telephone, thereby eliminating the necessity of a user to buy any dedicated mobile terminal separately, it is possible to realize a means for obtaining subject information (IDs), with significant ease.

[0052] (14) Since position information representing a position where the image data is obtained may be acquired as latitude/longitude provided by the GPS, it is possible to obtain highly accurate position information with significant ease, even with an inexpensive, portable construction.

[0053] (15) Since such position information may be obtained by receiving any positioning service through a mobile telephone, thereby making it possible to obtain the position information significantly easily, even with an inexpensive, portable construction.

[0054] (16) Since both the function for adding position information and subject information to image data and the function for storing the thus added information may be provided to an image obtaining apparatus such as a digital camera, it is possible to realize like effects and profits to those of the above-described item (1).

[0055] (17) Since both the function for adding position information and subject information to image data and the function for storing the thus added information may be provided to an image data stor-

ing device such as a hard disc unit, it is possible to realize like effects and profits to those of the above-described item (1).

[0056] (18) Since a mobile terminal, which is carried by a person who is to be a subject of a picture to be taken by an image obtaining apparatus, has a means for holding ID information unique to the person, and also has a means for transmitting the ID information, it is possible for the mobile terminal to notify a subject information obtaining means of the ID information as subject information. Further, since the mobile terminal may have a means for obtaining its current position and also a means for transmitting this current position, it is possible for the mobile terminal to notify a position information obtaining means of the terminal's current position as position information representing a place where image data has been obtained.

[0057] (19) An image data classification program instructs a computer to function as the following: a means for generating a plurality of classification items in terms of at least one selected from the group consisting of the regional information, the subject information, and the date and time of obtaining image data, all of which are added to respective items of image data; and a means for assigning the items of image data to the respective classification items, which have been generated by the above-mentioned item-generating means, in terms of at least one selected from the group consisting the regional information, the subject information, and the date and time of obtaining image data. Accordingly, the computer executes the image classification program to automatically classify plural items of image data, each of which is labeled with the regional information, the subject information, and the date and time when the image data was obtained. This would facilitate creation of image databases (personal albums, or the like), one for each subject of the image data, separately.

[0058] (20) A background information designating program instructs a computer to function as the following: a means for calculating an image-shooting direction, in which shooting of an image of a subject has been carried out by an image obtaining apparatus of an image data storing system to obtain image data, based on both first site information, representing a site at which the image obtaining apparatus is located and second site information, representing a site at which the subject of the image data is located, when the image data has been obtained; and a means for determining a background subject, which presumably appears in the background of the image data, as background information, based on the image-shooting direction, which has been calculated by the image-shooting-direction calculating means, and the first site information and/or the second site information. It is thus possible for the computer, given the position information of the image obtaining apparatus and of the subject of the image data, to automatically designate the background information by executing the background information designating program.

[0059] (21) A traveling route designating program instructs a computer to function as the following: a means for determining a user's traveling route, along which the user has traveled while obtaining a plurality of items of image data at different sites using an image obtaining apparatus, among a plurality of traveling routes, based on both site information representing a site at which an individual item of image data has been obtained and the date and time when the individual item of image data has been obtained, both of which have been added to the individual item of image data; and a display control means for performing a control process on a display section, which is associated with the computer, to display the traveling route determined by the traveling route determining means, along with surrounding geographic data in such a manner that the traveling route superimposes over the surrounding geographic data. By executing the program, accordingly, it is possible for the computer to automatically designate a user's traveling route along which the user has traveled while obtaining a series of items of image data, according to those items of image data, each of which is labeled with the site information and the date and time of obtaining the image data. In addition, it is also possible for the computer to show on a display the thus designated traveling route together with its surrounding geographic data.

[0060] Other subjects and further features of the present invention will be apparent from the following detailed description when read in conjunction with the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0061] **FIG. 1** is a block diagram schematically showing an image data storing system of a first embodiment of the present invention;

[0062] **FIG. 2** is a diagram depicting an example of a data structure (format) of digital image data of the first embodiment;

[0063] **FIG. 3** is a flowchart illustrating a procedure carried out by an image data storing system of the first embodiment;

[0064] **FIG. 4** through **FIG. 6** are diagrams each depicting operation of an image data storing system of the first embodiment;

[0065] **FIG. 7** is a block diagram schematically showing an image data storing system of a second embodiment of the present invention;

[0066] **FIG. 8** is a diagram depicting an example of data structure (format) of digital image data of the second embodiment;

[0067] **FIG. 9** is a flowchart illustrating a procedure carried out by an image data storing system of the second embodiment;

[0068] **FIG. 10** through **FIG. 12** are diagrams each depicting operation of an image data storing system of the second embodiment;

[0069] **FIG. 13** is a block diagram schematically showing an image data storing system of a third embodiment of the present invention;

[0070] **FIG. 14** is a diagram depicting an example of data structure (format) of digital image data of the third embodiment;

[0071] **FIG. 15** is a view for describing a process executed by a traveling route designating program of the third embodiment;

[0072] **FIG. 16** is a diagram for describing an image data classification program executed in the third embodiment;

[0073] **FIG. 17** is a diagram for describing a traveling route designating program executed in the third embodiment;

[0074] **FIG. 18** is a block diagram schematically showing a modified example of an image data storing system of the third embodiment;

[0075] **FIG. 19** is a flowchart illustrating a procedure carried out by the image data storing system of **FIG. 18**;

[0076] **FIG. 20** is a block diagram schematically showing an image data storing system of a fourth embodiment of the present invention;

[0077] **FIG. 21** is a block diagram depicting an overview of an image data storing system of the fourth embodiment;

[0078] **FIG. 22** is a diagram depicting an example of data structure (format) of digital image data of the fourth embodiment;

[0079] **FIG. 23** is a flowchart illustrating a procedure carried out by an image data storing system of the fourth embodiment;

[0080] **FIG. 24** is a block diagram schematically showing an image data storing system of a fifth embodiment of the present invention;

[0081] **FIG. 25** is a flowchart illustrating a procedure carried out by an image data storing system of the fifth embodiment;

[0082] **FIG. 26** is a diagram depicting a common example of data structure (format) of digital image data; and

[0083] **FIG. 27** is a view for describing a concept of a common positioning service.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0084] Digital image data obtained by an image obtaining apparatus (image input device) such as a digital camera, is normally constituted of not only the image data itself but also its file size and the date and time (file-generating date and time) when the image data was generated, as shown in **FIG. 26**. Only with such information, however, it is not possible for a user to recognize where and in what situation, and with whom the image data has been obtained.

[0085] Accordingly, as will be described later in a first and a second embodiment, the present invention adds (labels) and stores in image data various types of information, that is, information (site information) about where the image data has been obtained, event information, and information (subject information) of the subject of image data), together with the date and time when the image data was obtained, thereby making it possible for a user to know "when", "with whom", and "in what situation" the image data was obtained.

[0086] Additionally, as will be described later in the third through fifth embodiments, the present invention realizes a brand-new service, in which transmitting means for transmitting label information (add-on information) including various types of information are installed where many photos would be taken (tourist spots, for example), and such information is added (hereinafter also called "labeled") to the image data obtained by the users.

[0087] More precisely, a company (service provider) that provides the above-mentioned service receives advertisement contracts (for providing company publicity and event ads) from advertisers (companies, stores, and shops neighboring tourist spots), and transmits their advertisements. The service provider sends out information containing such advertisements, and the information is automatically labeled to/stored in image data obtained by users, when the image data is stored on the user side. As a result, it is possible for the service provider to earn charges for the advertisement transmission, while it is possible for users to receive such useful advertisement information and also to receive information that would help them in classifying the image data they have obtained.

[0088] Various embodiments of the present invention will now be described with reference to the relevant accompanying drawings.

[0089] [1] First Embodiment:

[0090] **FIG. 1** depicts a construction of an image data storing system of a first embodiment of the present invention. Image data storing system **1A** of the first embodiment includes image input device **10A**, image data storage device **20A**, user terminal **30A**, and base station **40A**.

[0091] Image input device (image obtaining apparatus) **10A**, for example, a digital camera carried by a user, generates/obtains image data in response to users' operations. Image input device (hereinafter called a digital camera) **10A** includes CCD **11A**, image data generator **12A**, and date and time obtaining unit **13A**.

[0092] CCD **11A** receives light reflected from a subject to convert the light into digital data. Image data generator **12A** generates image data from the digital data output from CCD **11A**, and outputs the image data in the form of an image file.

[0093] Date and time obtaining unit (date and time obtaining means) **13A**, which is realized by a built-in clock function of digital camera **10A**, obtains the data and time when image data is generated/obtained by CCD **11A** and image data generator **12A**. Image data generator **12A** converts digital data, which has been obtained by CCD **11A**, to a JPEG, and also serves as a means for labeling the date and time obtained by date and time obtaining unit **13A** to the image data (image file), as the date and time when the image data was obtained (file-generating date and time; hereinafter also called "the date and time of photographing").

[0094] Image data storage device **20A**, which is connected with digital camera **10A** via a cable supporting USB (Universal Serial Bus) so as to store image data obtained by digital camera **10A**, is carried by a photographer (user) together with digital camera **10A**. In use, image data storage

device **20**A can be provided in the form of a hard disc unit, for example, and includes image data storing unit **21**A, receiver **22**A, ID holding unit **23**A, and image data converter **24**A.

[**0095**] Image data storing unit (storage means) **21**A, or a hard disc itself, for example, stores image data (image file) obtained by digital camera **10**A.

[**0096**] Receiver **22**A, which is for receiving signals from user terminal **30**A (or base station **40**A), serves as a site information obtaining means for obtaining site information representing a site at which the image data has been obtained, and also serves as a subject information obtaining means for obtaining subject information {identification information (ID)} identifying the subject of the image data (described later). In the present description, "site information" is also called "position information" without making a distinction between them.

[**0097**] ID registering unit (means for registering ID information) **23**A, which is realized in use by RAM (Random Access Memory), previously registers IDs of persons (users) who are to be the subjects of pictures to be taken by digital camera **10**A, and holds the IDs in the form of a table.

[**0098**] Image data converter (information adding means) **24**A carries out an image data converting process, in which position information and subject information (ID), having been received by receiver **22**A, are both added in a header area of image data input from digital camera **10**A. The resulting converted (or such information-added) image data is stored in image data storing unit **21**A.

[**0099**] At that time, image data converter **24**A serves also as an ID information extracting means to extract the IDs which coincide with those registered in the user table of ID registering unit **23**A, among the IDs having been received and acquired by receiver **22**A. Image data converter **24**A labels the thus extracted IDs (by an ID information extracting means) to the image data. In this instance, receiver **22**A, as an alternative to image data converter **24**A, might serve as the above-mentioned ID information extracting means to refuse the IDs that are not registered in the user table.

[**0100**] User terminal **30**A is a mobile terminal carried by a person (user) who is to be the subject of pictures taken by digital camera **10**A. User terminal **30**A transmits an ID unique to the user, and is realized in use by, for example, a mobile telephone (including a PHS terminal).

[**0101**] User terminal **30**A includes receiver **31**A, ID holding unit **32**A, and transmitter **33**A.

[**0102**] Receiver (means for obtaining current position) **31**A obtains the current position of user terminal **30**A. In the first embodiment, receiver **31**A receives and obtains the position information from the one of base stations **40**A, which is located closest to user terminal **30**A, as the current position of user terminal **30**A. At that time, in a case where user terminal **30**A is a mobile telephone, it would be possible to utilize a positioning service, say, mopera™ of NTT Docomo, Inc., as a method for receiving and obtaining site information from base station **40**A.

[**0103**] ID holding unit (ID information holding means) **32**A holds the above-mentioned ID (personal data, user information, authorized user information) unique to a user.

[**0104**] Transmitter **33**A serves as a means for transmitting ID information, which transmits the ID (subject information) held in ID holding unit **32**A to image data storage device **20**A, and also as a means for transmitting the current position (site information) of user terminal **30**A, which has been received and obtained by receiver **31**A.

[**0105**] Both the subject information (ID) and the site information (current position) transmitted from transmitter **33**A are received by receiver **22**A of image data storage device **20**A. More precisely, at the time digital camera **10**A takes a photo of a user who is carrying user terminal **30**A, receiver **22**A receives subject information (ID) and site information (current position) from user terminal **30**A, thereby serving both as a means for obtaining site information representing a site at which the image data is obtained and as a means for obtaining subject information identifying the subject of the image data.

[**0106**] Base stations **40**A, each of which includes site information holding unit **41**A and transmitter **42**A, are previously installed in predetermined regions. Site information holding unit **41**A previously holds position information corresponding to a region in which base station **40**A is installed, and transmitter **42**A always sends out (broadcasts) such position information held in site information holding unit **41**A in such a way that the position information travels in the corresponding predetermined region.

[**0107**] In the above example, though position information is transferred, as current position information, from base station **40**A to image data storage device **20**A via user terminal **30**A, it might alternatively be possible to allow receiver **22**A of image data storage device **20**A to directly receive/obtain the position information transmitted from base station **40**A as the current position information (shown by the double-dotted chain line in **FIG. 1**).

[**0108**] Further, transmitter **33**A and receiver **22**A communicate with one another through the communications function of a mobile telephone, or otherwise, it might be possible to utilize an interface (say, a Bluetooth™ connector) dedicated to short-haul radio communications, which is equipped to a mobile telephone. Furthermore, instead of the use of a USB cable in the above example for realizing communications between digital camera **10**A and image data storage device **20**A, the communications can be carried out by wireless.

[**0109**] **FIG. 2** shows an example of a data structure (format) of digital image data of the first embodiment. Digital image data (image file) stored in image data storing unit **21**A of image data storage device **20**A is formed of not only an area (sandwiched between image data start tag and an image data end tag) recording the image data itself but also another area (header) recording various types of information relating to the image data.

[**0110**] Referring now to **FIG. 2**, the header stores a file size and the date and time of photographing, as is done in conventional techniques, and in the first embodiment, there are additionally stored position information about a site at which photographing is carried out and also one or more user IDs (a couple of IDs are stored in **FIG. 2**), both of which have been added by image data converter **24**A. Here, user IDs to be added to image data are limited to those that

are previously registered in ID registering unit **23A** by image data converter **24A**, which serves as the above-mentioned ID information extracting means.

**[0111]** In accordance with the flowchart (step **S11** through step **S16**) of **FIG. 3**, making reference to **FIG. 4** through **FIG. 6**, a description will be made hereinbelow of a procedure executed by image data storing system **1A** of the first embodiment. Here, **FIG. 4** through **FIG. 6** illustrate operations of the system of the first embodiment.

**[0112]** If a photographer takes a picture of a person (subject), who carries user terminal **30A**, with digital camera **10A** (step **S11**), date and time obtaining unit **13A** obtains the date and time of photographing, which is then added by image data generator **12A** in the header of the image data received from CCD **11A** (step **S12**). The image data thus labeled with the date and time of photographing is then input from digital camera **10A** to image data storage device **20A** via a USB or the like.

**[0113]** At that time, receiver **22A** of image data storage device **20A** receives/obtains position information of the subject person, that is, position information of user terminal **30A** which the subject person carries and also the subject person's user ID (subject information) (step **S13**).

**[0114]** Among plural user IDs having been received, image data converter **24A** extracts/selects an ID which is registered in ID registering unit (user table) **23A** (step **S14**). After that, the selected ID and the received position information are then written in the header of the image data received from digital camera **10A** (step **S15**), which image data is then stored into image data storing unit **21A** (step **S16**).

**[0115]** In the first embodiment, the header of the image data stores the position information and the subject information (user information), thereby making it possible to label the image data with not only the date and time of photographing but also information about the site at which the picture was obtained and information about the subject of the picture. That is, it is now possible for a user to recognize "when", "where", and "with whom" the image data was obtained.

**[0116]** Referring now to **FIG. 4**, for example, the photographer and the accompanying person (hereinafter both called "users") carry user terminals **30A**, one for each user, for transmitting user IDs unique to the respective users. At the time of storing image data, such user IDs (user information) are received along with the position information, and then stored into the header of the image data.

**[0117]** In the example of **FIG. 4**, there are shown two user terminals **30A**. In such a case, the two users, who carry the user terminals **30A**, might be a pair of a photographer and an accompanying person, or otherwise, might be a couple of persons who are to be subjects of pictures to be taken. In this case, two items of position information are received, one from each user terminal **30A**. Both of the items might be labeled to the image data, or otherwise, either one of them might be selected to be labeled to the image data.

**[0118]** Referring now to **FIG. 5**, this example depicts a case where only the user ID (user information) is sent out by user terminal **30A**. In the example, position information is received by receiver **22A** of image data storage device **20A** directly from base station **40A** or GPS, with no intervening user terminal **30A** (see double-dotted chain line of **FIG. 1**).

**[0119]** In image data storage device **20A**, user IDs are previously registered in ID registering unit **23A** in the form of a user table. Only the IDs that coincide with those which are registered in ID registering unit **23A** are extracted/selected to be labeled to the image data. Accordingly, IDs that are not registered in ID registering unit **23A** can never be stored into the header of the image data, thereby preventing any third party's information from being stored erroneously.

**[0120]** Referring now to **FIG. 6**, there are previously registered in the user table (ID registering unit **23A**) three IDs, ID **1**, ID **2**, and ID**3**, for the photographer's father, mother, and brother, respectively. As a result, provided a picture of these three persons, carrying user terminals **30A-1** through **30A-3**, is taken in the presence of third parties (ID **4** through ID **6**) carrying user terminals **30A-4** through **30A-6**, which sends out ID **4** through ID **6**, such unregistered IDs (ID **4** through ID **6**), even if received by receiver **22A** of image data storage device **20A**, would never be labeled to the image data.

**[0121]** At that time, image data storage device **20A** and user terminal **30A** can be integrated into one device (not shown).

**[0122]** Further, each user might carry image data storage device **20A** so as to store the user's image data obtained by digital camera **10A** therein. If two or more users are in one picture, the image data is stored separately in each of the individual users' image data storage devices **20A**. Upon storing the image data, image data storage device **20A** or digital camera **10A** receives position information, so that both the position information and the user ID held in image data storage device **20A** are stored in the header of the image data. In this manner, when every user carries image data storage device **20A** of the user's own, the device would be able to serve as the user's personal album.

**[0123]** In addition, image data storage device **20A** is communicably connected with another image data storage device **20A**, thereby making it possible to transfer image data therebetween. In such a case, at the transfer of the image data, IDs or position information in the header of the image data should not be rewritten, so that the date and time of photographing and user IDs, once recorded in original image data in image data storage device **20A**, is never changed. Likewise, image data received from another user's image data storage device **20A** can maintain its date and time of photographing and the other user's ID, having been written therein. As a consequence, it is possible to prevent image data from being labeled with any position information or IDs having no relationship to the image data, and it is also possible for users to distinguish the image data which has been taken by themselves from that which has been given by someone else. It is still possible to accurately recognize where the image data has been obtained and who is the subject of the image data.

**[0124]** In this manner, with image data storing system **1A** according to the first embodiment of the present invention, since image data obtained by digital camera **10A** is stored in image data storing unit **21A** with position information and IDs being labeled thereto, it is possible to provide users with such useful information for managing/classifying the image data.

[0125] Hence, users are allowed to use the position information and the IDs added to the image data to manage/classify a great amount of image data obtained by digital camera **10**A, with significant ease. Further, the added IDs would help the users to recognize with whom the image data has been obtained. Furthermore, as will be described later in a third embodiment, it would be possible to use a dedicated software tool for realizing an automatic classification of image data based on position information and IDs.

[0126] Moreover, since digital camera **10**A labels image data with the date and time of photographing (the date and time when the image data is obtained), it is possible not only to manage/classify a huge amount of image data with ease, based on the date and time of photographing, but also to realize an advanced-quality of classification, based on the date and time of photographing, position information, and IDs. As has already been described above, in a well-known technique (Japanese Unexamined Patent Application Publication No. HEI 5-207408) for identifying a position where an image is obtained, the site information is calculated as an item of management information at the time photo-taking is carried out. With this technique, it is possible to identify where the image data is obtained using GPS, but it is still impossible to recognize when and by whom the image is obtained. In comparison with such a technique, in image data storing system **1**A of the first embodiment of the present invention, IDs of the persons (users) who are subjects of a picture image are labeled to the image data, and based on these IDs, the date and time of photographing, position information, and an advanced grade of classification can be realized.

[0127] In the present embodiment, additionally, a person who is to be a subject of an image carries user terminal **30**A that transmits a user ID unique to the person, and the ID received from user terminal **30**A is then labeled to the image data as subject information at the time the image data is obtained, thereby making it possible to significantly easily obtain an ID (subject information) which identifies the subject of the image data. At that time, IDs of the persons who are to be subjects of the images to be taken by digital camera **10**A are previously registered in ID registering unit **23**A. Since only such registered IDs are extracted among IDs having been received, so as to be labeled to the image data, it is possible to prevent, with certainty, erroneous labeling of third parties' IDs having nothing to do with the image data.

[0128] Further, since the function of user terminal **30**A can be equipped to a mobile telephone, thereby eliminating the necessity of a user buying any dedicated user terminal separately, it is possible to realize a means for obtaining subject information (IDs), with significant ease.

[0129] Still further, since position information representing a position where the image data is obtained can be acquired as latitude/longitude provided by GPS, it is possible to obtain highly accurate position information significantly easily, even with an inexpensive, portable construction. Otherwise, such position information can be obtained by receiving any positioning service through a mobile telephone, thereby making it possible to obtain the position information with significant ease, even with an inexpensive, portable construction.

[0130] In the above description of the first embodiment, digital camera **10**A is connected with image data storage device **20**A via a USB. Digital camera **10**A and image data storage device **20**A can be integrated instead, thereby providing digital camera **10**A with the function of image data storage device **20**A (the functions of image data storing unit **21**A, receiver **22**A, ID registering unit **23**A, and image data converter **24**A).

[0131] [2] Second Embodiment:

[0132] **FIG. 7** depicts a construction of an image data storing system of a second embodiment of the present invention. Image data storing system **1**B of the second embodiment includes image input device **10**B, image data storage device **20**B, user terminal **30**B, and GPS receiver device **60**B.

[0133] Like image input device **10**A of the first embodiment, image input device (image obtaining apparatus) **10**B, for example, a digital camera carried by a user, generates/obtains image data in response to users' operations. Image input device (hereinafter called a digital camera) **10**B includes CCD **11**B, image data generator **12**B, and date and time obtaining unit **13**B, which carry out functions similar to those of CCD **11**A, image data generator **12**A, and date and time obtaining unit **13**A, respectively, and detailed descriptions of these are thus omitted here.

[0134] Digital Camera **10**B of the second embodiment, as distinct from digital camera **10**A of the first embodiment, has GPS receiver device **60**B, which includes GPS receiver **61**B and receiver **62**B. At the time digital camera **10**B obtains image data, GPS receiver (means for obtaining current position) **61**B receives/obtains information about an accurate current position (latitude/longitude) of digital camera **10**B from GPS satellites, and transfers the received information to image data storage device **20**B. Receiver **62**B, which executes functions similar to those of receiver **22**A of the first embodiment, receives various types of information from user terminal **30**B, and transfers the information to image data storage device **20**B. In this instance, GPS receiver device **60**B might be built in image input device **10**B, or alternatively, might be realized by a GPS-equipped mobile telephone.

[0135] User terminal **30**B is a mobile terminal carried by a person (user), who is to be a subject of pictures taken by digital camera **10**B. User terminal **30**B transmits an ID unique to the user, and is realized in the second embodiment by, for example, a GPS receiver or a GPS-equipped mobile telephone.

[0136] User terminal **30**B includes receiver **31**B, ID holding unit **32**B, and transmitter **33**B.

[0137] GPS receiver **31**B executes a function roughly the same as that of receiver **31**A of the first embodiment, with the exception that GPS receiver **31**B of the second embodiment receives/obtains an accurate current position (latitude/longitude) of a user from an artificial satellite at the time the image of the user is obtained by digital camera **10**B.

[0138] ID holding unit (means for holding ID information) **32**B and transmitter (means for transmitting ID information, means for transmitting current position) **33**B execute similar functions to those of ID holding unit **32**A and transmitter **33**A of the first embodiment, respectively, and their detailed descriptions are thus omitted here. When digital camera **10**B takes a picture of a person carrying user terminal **30**B,

subject information (an ID) and position information (current position) of the subject person, both which have been transmitted from transmitter **33**B, are received by receiver **62**B of GPS receiver device **60**B.

[0139] Image data storage device **20**B, which is connected with digital camera **10**B via a USB cable so as to store image data obtained by digital camera **10**B, is carried by a user together with digital camera **10**B. In practical use, image data storage device **20**B can be provided in the form of, for example, a hard disc unit. It receives not only the image data obtained by digital camera **10**B, but also current positions and IDs of a photographer and a subject person of the image data, which are received by GPS receiver device **60**B, and their IDs, via digital camera **10**B and a USB.

[0140] Further, image data storage device **20**B has image data storing unit **21**B, ID registering unit **23**B, image data converter **24**B, direction information generator **25**B, map database **26**B, and photograph information generator **27**B.

[0141] Image data storing unit (storage means) **21**B, like image data storing system **21**A of the first embodiment, is a hard disc itself, for example, which stores image data (image file) obtained by digital camera **10**B.

[0142] ID registering unit (means for registering ID information) **23**B, like ID registering unit **23**A of the first embodiment, is realized in use by RAM, and previously registers IDs of persons (users) who are expected to be the subjects of pictures to be taken by digital camera **10**B, and holds the IDs in the form of a table.

[0143] Image data converter (information adding means) **24**B carries out an image data converting process, in which subject information (ID), having been received by receiver **62**B of GPS receiver device **60**B, and position information, direction information (image-shooting direction), and photograph information (background information), all of which will be described later in detail, are added in the header area of the image data input from digital camera **10**B. The resulting converted (or such information-added) image data is stored in image data storing unit **21**B.

[0144] At that time, image data converter **24**B, like image data converter **24**A of the first embodiment, serves also as an ID information extracting means for extracting the IDs, which coincide with those registered in the user table of ID registering unit **23**B, among IDs having been received and acquired by receiver **62**B. Image data converter **24**B labels the thus extracted IDs (by an ID information extracting means) to the image data.

[0145] Direction information generator (means for calculating an image-shooting direction) **25**B, as will be described later with reference to **FIG. 10** and **FIG. 11**, obtains an image-shooting direction, in which the image data has been shot, based on position information (latitude/longitude) of digital camera **10**B, which information is obtained by GPS receiver **61**B, and position information of a subject of the image, which information is received from user terminal **30**B.

[0146] Map database **26**B stores geographic data in correspondence with longitude/latitude information.

[0147] Photograph information generator (means for identifying a background subject) **27**B, as will be described later in detail with reference to **FIG. 12**, identifies where {eg. place name (photograph information)} image data is obtained, based on a photo-shooting direction calculated by direction information generator **25**B, position information (latitude/longitude) of digital camera **10**B or that of a subject of the image, and geographic data stored in map database **26**B. Photograph information generator **27**B may identify a background subject dominating the background of the image data, as background information (photograph information).

[0148] Image data converter **24**B adds the resulting photograph information (the site at which the image data is obtained and background information), identified by photograph information generator **27**B, in a header area of the image data received from digital camera **10**B. At that time, image data converter **24**B can add the photo-shooting direction (direction information) calculated by direction information generator **25**B, and the position information (latitude/longitude) of digital camera **10**B or that of the subject of the image, into the header area.

[0149] The above-described direction information generator **25**B and photograph information generator **27**B are realized by dedicated software (a background information designating program). Such a background information designating program is recorded in a computer-readable recording medium, such as a flexible disc, CD-ROM, and others. In the second embodiment, image data storage device **20**B has a ROM (Read Only Memory) in which a background information designating program is previously stored, and the CPU (not shown) of image data storage device **20**B reads out the program to execute, thereby realizing the functions of direction information generator **25**B and photograph information generator **27**B.

[0150] At that time, the background information designating program may be alternatively recorded in a storage device (recording medium), such as a magnetic disc, optical disc, and magneto-optical disc, and in that case, the program is provided from the storage device to a computer via a communications path. Further, the program might be constructed in such a way as to contain map database **26**B storing geographic data.

[0151] User terminal **30**B communicates with digital camera **10**B (GPS receiver device **60**B) by radio, while communications between digital camera **10**B and image data storage device **20**B may be carried out through a USB cable, as described above, or by radio.

[0152] **FIG. 8** shows an example of a data structure (format) of digital image data of the second embodiment. As in the first embodiment of **FIG. 2**, digital image data (image file) stored in image data storing unit **21**B of image data storage device **20**B is formed of not only an area recording the image data itself but also a header recording various types information relating to the image data.

[0153] Referring now to **FIG. 8**, the header stores a file size and the date and time of photographing, as in conventional techniques, and in the second embodiment, there is additionally stored photograph information, including background information and position information, and also a user ID of a subject of the image data, both of which have been added by image data converter **24**B. Here, user IDs to be added to the image data are limited to those that are previously registered in ID registering unit **23**B by image data converter **24**B, which serves as the above-mentioned ID information extracting means.

[0154] In accordance with the flowchart (step S21 through step S28) of **FIG. 9**, making reference to **FIG. 10** through **FIG. 12**, a description will be made hereinbelow of a procedure executed by image data storing system **1**B of the second embodiment. In this instance, **FIG. 10** through **FIG. 12** illustrate operations of the system of the second embodiment.

[0155] If a photographer takes a picture of a person (subject), who carries user terminal **30**B, with digital camera **10**B (step S21), date and time obtaining unit **13**B obtains the date and time of photographing, which is then added by image data generator **12**B into the header of the image data input from CCD **11**B (step S22). The image data thus labeled with the date and time of photographing is then input from digital camera **10**B to image data storage device **20**B via a USB or the like.

[0156] At that time, in GPS receiver device **60**B, as shown in **FIG. 10**, GPS receiver **61**B receives/obtains, from GPS satellites, position information (latitude/longitude) 2 of digital camera **10**B (a photographer) at the time of photographing, and also, receiver **62**B receives/obtains, from user terminal **30**B carried by a person who is the subject of the image, both position information 1 (or position information of user terminal **30**B) at the time of photographing and an ID (subject information) unique to the person (step S23).

[0157] Among user IDs having been received, image data converter **24**B extracts/selects a user ID which is registered in ID registering unit (user table) **23**B. Accompanying this, among plural items of position information 1 that have been received, the position information received from user terminal **30**B together with an ID that is registered in ID registering unit **23**B is extracted/selected (step S24) to be used for calculating direction information.

[0158] Referring now to **FIG. 11**, direction information generator **25**B calculates an image-shooting direction {direction (vector) from the photographer's position to the subject's position} based on the following two items of position information (step S25): position information (latitude/longitude) 1 is the current position of digital camera **10**B; and position information (latitude/longitude) 2 is the subject's current position received from user terminal **30**B. At that time, if two or more items of position information 2 exist, one of the plural items of position information 2 is selected, or the barycenter of the positions is calculated, to represent those plural positions.

[0159] On the basis of the thus obtained position information 1, position information 2, and image-shooting direction, and also of geographic data in map database **26**B, photograph information generator **27**B identifies the place where (a place name or the like) image data has been obtained and a background subject dominating the background of the image data, as background information (step S26).

[0160] That is, in accordance with geographic data of map database **26**B, (position information 1 and position information 2) the image data that has been obtained is determined, and what geographic feature lies along the image-shooting direction in terms of the thus determined position information 1 and position information 2, is also determined. The thus determined information is output from map database **26**B to photograph information generator **27**B. On the basis of this information received from map database **26**B, photograph information generator **27**B generates photograph information (including position information and background information) to be stored in the image data, and outputs the photograph information to image data converter **24**B.

[0161] Assuming that a picture is taken in the situation of **FIG. 12**, photograph information generator **27**B generates concrete photograph information such as "viewing Mt. Fuji from Lake Kawaguchi". This photograph information includes both the site, "Lake Kawaguchi", at which the image data is obtained and the background subject, "Mt. Fuji", making it possible for a user to understand what the background subject of the picture image is. As another example, assuming that a picture of a user carrying user terminal **30**B is taken at the viewing platform of Mt. Hodakadake with Mt. Yarigatake in the background, photograph information generator **27**B generates photograph information such as "photographed at the viewing platform of Mt. Hodakadake with Mt. Yarigatake in the background".

[0162] After that, image data converter **24**B then writes the ID, which has been selected in step S24, and the photograph information, which has been generated in step S26, into the header of the image data (step S27), which is then stored in image data storing unit **21**B (step S28).

[0163] Instead of such photograph information, the header may store direction information calculated by direction information generator **25**B and two items of position information (position information 1 and position information 2) obtained by GPS receiver **31**B and GPS receiver **61**B. Otherwise, the header may store the direction information, position information 1, and position information 2, together with the photograph information (see the double-dotted chain line of **FIG. 7**).

[0164] Otherwise, only position information 1 and position information 2 may be written in the header. In that case, when a user performs image data processing on a personal computer, the above-described background information designating program is activated on the computer to determine background information based on the two times of position information.

[0165] In this manner, with image data storing system **1**B of the second embodiment, like effects and profits to those of the first embodiment can be obtained. In addition, it is possible to utilize GPS of very high accuracy, which allows positioning accurate to within several meters, to obtain the latitude and longitude of the two positions, thereby making it possible to identify an image-shooting direction.

[0166] As a well-known technique for identifying the direction, Japanese Unexamined Patent Application Publication No. HEI 11-69280 discloses that, in addition to position information received from GPS, direction information is obtained by a geomagnetism-employed direction sensor. Meanwhile, in image data storing system **1**B of the second embodiment, both a photographer and a subject of a picture image to be taken carry their own GPS receiver devices **60**B and user terminals **30**B, in such a manner that the difference in latitude and longitude between the two is used to calculate the direction information. As a result, such a direction sensor as in the above well-known technique is no longer required. In comparison with the geomagnetism-

employed direction sensor, which is expensive and requires large-scaled circuits, image data storing system **1**B of the present embodiment only needs user terminal **30**B and GPS receiver device **60**B, thus making it possible to obtain an accurate position information significantly easily with an inexpensive, mobile construction, so that an accurate image-shooting direction can be resultantly obtained.

**[0167]** Further, an image-shooting direction is added to image data, thereby making it possible to provide a user with the information about along which direction (where is being viewed from where) the image data has been obtained.

**[0168]** Still further, photograph information, including background information and site information of a place where image data has been obtained, is determined by the above-described background information designating program, based on the thus obtained image-shooting direction, position information, and geographic data, and the photograph information is then added to the image data. It is thus possible for a user to obtain information about the background of the image data and about the site where the image data has been obtained, which information is useful for classifying/managing the image data, with no need to perform any particular operation.

**[0169]** As in the first embodiment, IDs of the persons who are to be subjects of picture images taken by digital camera **10**B are previously registered in ID registering unit **23**B. Since only such registered IDs are extracted from IDs having been received so as to be labeled to the image data, it is possible to prevent, with certainty, erroneous labeling of third parties' IDs having no relationship with the image data. There is a possibility that digital camera **10**B (GPS receiver device **60**B) receives longitude/latitude (position information) from third parties' user terminals. Even in that case, however, digital camera **10**B is capable of extracting/selecting, with certainty, only the specific position information (the subject's position information), which has been received from user terminal **30**B along with one of the registered IDs that are registered in ID registering unit **23**B.

**[0170]** In the above description of the second embodiment, digital camera **10**B is connected with image data storage device **20**B via a USB. Digital camera **10**B and image data storage device **20**B may be integrated instead, thereby providing digital camera **10**B with the function of image data storage device **20**B (the functions of image data storing unit **21**B, ID registering unit **23**B, image data converter **24**B, direction information generator **25**B, map database **26**B, photograph information generator **27**B, and GPS receiver device **60**B).

**[0171]** [3] Third Embodiment:

**[0172]** **FIG. 13** depicts a construction of an image data storing system of a third embodiment of the present invention. Image data storing system **1**C of the third embodiment includes image input device **10**C, image data storage device **20**C, user terminal **30**C, base station **40**C, and information server **70**C.

**[0173]** Like image input device **10**A of the first embodiment, image input device (image obtaining apparatus) **10**C, for example, a digital camera carried by a user, generates/obtains image data in response to the user's operations. Image input device (hereinafter called a digital camera) **10**C includes CCD **11**C, image data generator **12**C, and date and time obtaining unit **13**C, which carries out like functions to those of CCD **11**A, image data generator **12**A, and date and time obtaining unit **13**A, respectively, and so, detailed descriptions of those elements are omitted here.

**[0174]** User terminal **30**C is a mobile terminal carried by a person (user) who is to be a subject of pictures taken by digital camera **10**C. User terminal **30**C transmits an ID unique to the user, and is realized in use by, for example, a mobile telephone (including a PHS terminal). User terminal **30**C includes ID holding unit **32**C and transmitter **33**C. ID holding unit **32**C and transmitter **33**C carry out like functions to those of ID holding unit **32**A and transmitter **33**A, so detailed descriptions are omitted here.

**[0175]** User terminal **30**C, as distinct from user terminal **30**A of the first embodiment, does not have to be equipped with the function of obtaining position information (for example, the function of receiver **31**A of the first embodiment), because the position information about a site where an image has been obtained is received from base station **40**C as regional information. Transmitter **33**C of the third embodiment serves as a means for transmitting ID information, which transmits IDs (subject information) held in ID holding unit **32** to image data storage device **20**C.

**[0176]** Base station **40**C serves as a means for transmitting label information (add-on information), which transmits regional information relating to a site at which image data has been obtained (a region where base station **40**C is installed) as label information to user (image data storage device **20**C). Base station **40**C includes specific regional information holding unit **41**C, which previously registers and holds regional information relating to the region where base station **40**C is installed, and transmitter **42**C for sending out the regional information held in specific regional information holding unit **41**C.

**[0177]** Here, transmitter **42**C, which is realized in practical use by PHS or Bluetooth™, sends out such regional information by wireless toward users who stay inside a limited area. An electronic wave from PHS would travel 100 m from base station **40**, while that from Bluetooth™ would travel several to ten-odd meters.

**[0178]** Information server **70**C, which has regional information holding unit **71**C and information selector **72***c*, transmits regional information relating to a region where base station **40**C is installed to base station **40**C so as to register the regional information in specific regional information holding unit **41**C. Regional information holding unit **71**C previously holds varying items of regional information to be delivered to base stations **40**C which are installed in various places. Information selector **72**C selects the one of the plural items of regional information in regional information holding unit **71**C, which corresponds to the region where base station **40**C is installed, so as to transmit the selected information to the corresponding base station **40**C.

**[0179]** The regional information stored in regional information holding unit **71**C includes advertisement information relating to the sites at which image data is obtained, and also shop/establishment information about one or more shops and/or establishments in the vicinity of the sites. Concrete examples are as follows: names of tourist spots (for example, character strings such as "Nikko Toshogu Shrine") at which base stations **40**C are installed, and data of various

types of establishments (overnight accommodations, eating places, tourist attractions, transport facilities, and others) in the vicinity of the tourist spots.

[0180] The regional information may be transmitted from information server **70**C to base station **40**C to be registered/stored previously in specific regional information holding unit **41**C. Base station **40**C may be connected with information server **70**C via a LAN (Local Area Network), so that the regional information stored in specific regional information holding unit **41**C is downloaded to base station **40**C for updating. The downloading may be carried out in real time, at regular intervals, or upon receipt of a request from information server **70**C. Information server **70**C is thereby allowed to offer users varying regional information depending upon the time of year (season) or weather, while users are always allowed to receive updated information in real time.

[0181] Image data storage device **20**C, which is connected with digital camera **10**C via a USB cable so as to store image data obtained by digital camera **10**C, is carried by a photographer (user) together with digital camera **10**C. In use, image data storage device **20**C is provided as a hard disc unit, for example, and includes image data storing unit **21**C, receiver **22**C, and image data converter **24**C.

[0182] Like image data storing unit **21**A, image data storing unit (storage means) **21**C, or a hard disc itself, for example, store image data (image file) obtained by digital camera **10**C.

[0183] Receiver **22**C, which is for receiving signals from user terminal **30**C and base station **40**C, serves as a subject information obtaining means for receiving/obtaining an ID (subject information), which identifies the subject of image data, from user terminal **30**C at the time the image data is obtained, and also serves as a label information receiving means (add-on information receiving means) for receiving regional information (position information identifying a place where image data is obtained), which is transmitted from base station **40**C in the vicinity of the place where the image data is obtained, at the time the image data is obtained.

[0184] Image data converter (information adding means) **24**C carries out an image data converting process, in which IDs and regional information, having been received by receiver **22**C, are added in the header area of the image data input from digital camera **10**C. The resulting converted (or such information-added) image data is stored in image data storing unit **21**C. At that time, image data converter **24**C, like image data converter **24**A of the first embodiment, may extract the IDs, which coincide with those registered in the user table, from IDs having been received and acquired by receiver **22**C. Image data converter **24**C labels the thus extracted IDs to the image data.

[0185] **FIG. 14** shows an example of a data structure (format) of digital image data of the third embodiment. As in the first embodiment of **FIG. 2**, digital image data (image file) stored in image data storing unit **21**C of image data storage device **20**C is formed of not only an area recording the image data itself but also a header recording various types of information relating to the image data. As shown in **FIG. 14**, the header stores a file size and the date and time of photographing, as in conventional techniques, and in the third embodiment, there is additionally stored regional information (position information) and also a user ID of a subject of the image data, both of which have been added by image data converter **24**C.

[0186] A description will be made hereinbelow of an operation of image data storing system **1**C of the third embodiment.

[0187] In image data storage device **20**C of the third embodiment, like that in the first embodiment, receiver **22**C receives position information and an ID, both of which are written by image data converter **24**C in the header of image data received from digital camera **10**C, and the resulting image data is stored in image data storing unit **21**C. In the third embodiment, as distinct from the first embodiment, the position information thus labeled to the image data is regional information, which has been transmitted from base station **40**C in the vicinity of a place where the image data is obtained.

[0188] In addition, in the third embodiment, using a dedicated software tool {image data classification program (described later)} that is capable of reading-in various types of information (the date and time of photographing, IDs, and regional information) labeled in the header of image data, an automatic classification of the image data is realized.

[0189] For example, a transmitter (transmitter **42**C) that covers a rather small area (for example, to a distance of 100 m or shorter) is equipped to base station **40**C previously installed. When a user takes a picture with digital camera **10**C, regional information is received from base station **40**C, and image data storage device **20**C then stores the received regional information in the header of the image data. As described above, the regional information transmitted from base station **40**C is, for example, a name of a tourist spot ("Nikko Toshogu Shrine", or other) in a case where a base station **40**C is installed in any tourist spot. The regional information might additionally include other tourist attractions and overnight accommodations in the vicinity of the tourist spot, and also the route to such facilities from the place where the user takes the picture. This regional information is stored in the header of the image data, and a dedicated software tool (for example, a dedicated program to realize image viewer **100** of **FIG. 24**) renders the information to be shown, together with the image data itself, on a display of a processor device such as a personal computer.

[0190] **FIG. 16** is a diagram for describing an image data classification program used in the third embodiment. Image data classification program **51**C is recorded in a computer-readable recording medium **50**C, such as a flexible disc, CD-ROM, and others to be provided to users. The image data classification program may be alternatively recorded in a storage device (recording medium), such as a magnetic disc, optical disc, and magneto-optical disc. In that case, the program is provided from the storage medium to a computer via a communications path.

[0191] Image data classification program **51**C instructs a processor device, such as a computer, to automatically classify two or more items of image data which image data storage device **20**C has labeled with regional information, IDs, and the date and time of photographing. The CPU of the processor device reads out and executes image data classification program **51**C previously stored in a ROM in the

device, thereby realizing the functions of item generating means **51***a* and classifying means **51***b* as follows.

**[0192]** Item generating means **51***a* generates two or more classification items, according to at least one of regional information, IDs, and the date and time of photographing, all of which are labeled to two or more pieces of image data. Classifying means **51***b* assigns each of the plural pieces of image data to at least one of the classification items generated by item generating means **51***a*, based on the regional information, IDs, and the date and time of photographing, labeled to the individual image data.

**[0193]** A detailed description will be made hereinbelow of a technique for automatically classifying image data, realized by image data classification program **51**C. Here will be shown an example where the following five pieces of image data, image data 1 through image data 5, which are labeled with date and time of photographing, place at which the image data has been obtained (regional information), and user IDs (participants' information), are subjected to an automatic classification.

**[0194]** Image data 1

**[0195]** Date and Time: Nov. 23, 1999

**[0196]** Place: Nikko Toshogu Shrine

**[0197]** IDs: authorized user (authorized user of digital camera **10**C), the user's father, mother, and brother

**[0198]** Image data 2

**[0199]** Date and Time: Nov. 23, 1999

**[0200]** Place: Nikko Toshogu Shrine

**[0201]** IDs: authorized user, the user's father and mother

**[0202]** Image data 3

**[0203]** Date and Time: Nov. 24, 1999

**[0204]** Place: the Kegon-no-taki Falls

**[0205]** IDs: authorized user, the user's father, mother, and brother

**[0206]** Image data 4

**[0207]** Date and Time: Dec. 24, 1999

**[0208]** Place: Minato-Mirai 21

**[0209]** IDs: authorized user and friend A

**[0210]** Image data 5

**[0211]** Date and Time: Jan. 1, 2000

**[0212]** Place: Heian Jingu Shrine

**[0213]** IDs: authorized user

**[0214]** A processor device for executing image data classification program **51**C serves as item generating means **51***a* to automatically generate, for example, the following three classification items: "tour in Nikko"—"Nikko" is a tourist spot in Japan internationally renowned for many historic buildings and other showplaces, and hills of great natural beauty—; "Christmas Eve"; "Hatsumode of the year 2000"—"hatsumode" is a traditional Japanese custom: people go for the first temple or shrine visit of the year and pray for health and happiness in the new year—. Image data classification program **51**C serves also as classifying means **51***b* to assign image data 1, image data 2, and image data 3 to "tour in Nikko"; image data 4, to "Christmas Eve"; image data 5, to "Hatsumode of the year 2000".

**[0215]** Image data classification program **51**C previously assigns position keywords, such as "Nikko Toshogu Shrine", "Kegon-no-taki Falls", "Lake Chuzenji-ko" and "Tachiki Kannon" (these are famous tourist attractions in Nikko), to the classification item "Tour in Nikko", and instructs a processor device (computer) to function in such a way as to assign the pieces of image data, whose dates and times of photographing are in close proximity to each other and whose position keywords agree with the above-mentioned keywords, to the classification item "Tour in Nikko". Likewise, since image data 4 is obtained on the 24th of December, or Christmas Eve, item generating means **51***a* automatically generates a classification item "Christmas Eve", to which image data 4 is then assigned. Since image data 5 is obtained at a shrine on the 1st of January, it is assumed that the data contains a picture image obtained at hatsumode. Item generating means **51***a* thus creates an item "Hatsumode of the year 2000" to assign the image data 5 thereto.

**[0216]** Since image data 1 through image data 5 store IDs as well as the place where the image data has been obtained and the date and time of photographing, it is possible for image data classification program **51**C to carry out the assigning of image data separately for each user (participant). That is, image data classification program **51**C automatically generates classification items, "authorized user", "father", "mother", "brother", and "friend A", thereby functioning as an item generating means **51***a*, and also assigns image data 1 through image data 5 to the classification item of "authorized user"; image data 1 through image data 3, to both the classification items of "father" and "mother"; image data 1 and image data 3, to the classification item of "brother"; and image data 4, to the classification item of "friend A", thereby functioning as classifying means **51***b*. As a result it is possible for image data classification program **51**C to easily create image databases (personal albums), one for each user separately.

**[0217]** Instead of the above-mentioned regional information (the site where the image data has been obtained), latitude and longitude can be labeled to image data, as position information, as shown in the first and second embodiments. In that case, image data classification program **51**C instructs a processor device (computer) to function as a place name designating means for designating a place name corresponding to the latitude and longitude according to a map database. In this case, item generating means **51***a* uses the thus obtained place name to automatically generate classification items in such a manner as described above.

**[0218]** **FIG. 17** is a diagram for describing a traveling route designating program. As shown in **FIG. 17**, traveling route designating program **81**C is recorded in a computer-readable recording medium **80**C, such as a flexible disc, CD-ROM, and others. The traveling route designating program **81**C may be alternatively recorded in a storage device (recording medium), such as a magnetic disc, optical disc, and magneto-optical disc, and in that case, the program is provided from the storage device to a computer via a communications path.

[0219] Traveling route designating program **81**C instructs a processor device such as a computer to determine a user's traveling route, along which the user has traveled while obtaining a plurality of items of image data at different sites using digital camera **10**C. The CPU of the processor device reads out and executes traveling route designating program **81**C previously stored in a ROM in the device, thereby realizing the functions of a traveling route designating means **81***a* and a display control means **81***b* as follows. Here, traveling route designating program **81**C is structured in such a way as to contain map database **81***c* that stores geographic data.

[0220] Traveling route designating means **81***a* reads out both position information, representing a place where a picture has been taken (a place where image data has been obtained), and the date and time when the picture was taken (the date and time when the image data was obtained), based on both of which the user's traveling route is then determined. Display control means **81***b* instructs a display of the processor device to display the traveling route determined by traveling route designating means **81***a*, along with surrounding geographic data read out from map database **81***c* in such a manner that the traveling route is superimposed over the surrounding geographic data.

[0221] Referring now to **FIG. 15**, there will be described hereinafter in detail a method for determining a user's traveling route by traveling route designating program **81**C. **FIG. 15** depicts a procedure carried out by traveling route designating program **81**C according to the third embodiment.

[0222] In **FIG. 15**, base stations **40**C-**1** through **40**C-**4** perform like functions to those of base station **40**C. Specific regional information holding unit **41**C equipped to each of base stations **40**C-**1** through **40**C-**4** holds regional information corresponding to the place where each of the base stations **40**C-**1** through **40**C-**4** is installed, which information (for example, place names such as "Nikko Toshogu Shrine", "the Nikko-san Rinno-ji Temple", "Nikko Iroha-zaka Slopes", and "the lookout point for Kegon-no-taki Falls") has been registered therein from information server **70**C. The circles surrounding base stations **40**C-**1** through **40**C-**4** of **FIG. 15** indicate areas within which regional information sent out from base stations **40**C-**1** through **40**C-**4** can travel.

[0223] It is now assumed that a user passes by base stations **40**C-**1** through **40**C-**4**, while taking pictures in the vicinity of them, and also that the following regional information (the site where the pictures have been taken) is labeled to the image data together with the date and time of photographing (or the date and time of receiving the regional information).

| | |
|---|---|
| 11:35, November 23, 1999 | Nikko Toshogu Shrine |
| 12:42, November 23, 1999 | the Nikko-san Rinno-ji temple |
| 14:22, November 23, 1999 | Nikko Iroha-zaka Slopes |
| 15:05, November 23, 1999 | the look out point for Kegon-no-taki Falls |

[0224] At that time, a processor for executing traveling route designating program **81**C serves as traveling route designating means **81***a* to determine that the user visits Nikko Toshogu Shrine, the Nikko-san Rinno-ji temple, Nikko Iroha-zaka Slopes, and the lookout point for Kegon-no-taki Falls, in this sequence. Traveling route designating program **81**C then serves as display control means **81***b* to instruct a display of the processor device to show the determined traveling route along with geographic data of Nikko and its vicinity in such a manner that the traveling route is superimposed over the geographic data from map database **81***c*.

[0225] In the above description, traveling route designating program **81**C determines and displays a traveling route based on the information labeled to the image data about when and where image data was obtained. Traveling route designating program **81**C may also determine such a traveling route based on the following information stored in an information storage device. That is, if the information storage device is adapted to receive regional information from base station **40**C (**40**C-**1** through **40**C-**4**), and to accumulate the received regional information and the time of its receipt as a set (see site information receiving device **90**C of **FIG. 18**, for example), traveling route designating program **81**C can select an item of route information to be shown on the display, based on both the regional information stored in the information storage device and the time the image was received.

[0226] In this manner, since image data storing system **1**C of the third embodiment receives regional information (label information/add-on information) sent out in the vicinity of a place where image data is obtained, and then labels the received information to the image data, it is possible to provide a user (a person who takes picture images) with various kinds of information useful to him (for example, advertisement information relating to the place where the image data has been obtained, and shop/establishment information in the vicinity of the place). Accordingly, an information sender (service provider) sends out shop/establishment information as well as company ads and event ads of particular companies and organizations in such a manner that the sent-out information can travel a limited distance to reach the users who are staying in that limited area, so that the service provider can charge the companies, organizations, and shops/establishments for the information transmission.

[0227] Additionally, the regional information may be used as position information representing a place where the image data has been obtained. It is thus possible to obtain the position information merely by receiving such regional information, with no need for using any latitude/longitude calculation system such as GPS or any existing positioning service.

[0228] At that time, since the regional information contains advertisement information relating to a place where image data has been obtained or information about shops/establishments in the vicinity of the place, the regional information may be useful for users not only as a tool for obtaining position information, as described above, but also as a tool for obtaining the advertisement information and the shop/establishment information.

[0229] Further, since data classification program **51**C is executed by a computer to automatically classify two or more pieces of image data, which have been labeled with

regional information, IDs (subject information), and the date and time of photographing (the date and time when image data of the subject was obtained), into two or more classification items, it is possible to create an image database (a personal album, or the like) separately for each subject of the image data with significant ease.

[0230] Still further, the computer executes traveling route designating program **81**C to automatically identify a user's traveling route, along which the user has traveled while obtaining a plurality of items of image data at different places, based on a series of image data to which regional information (site information/position information) and the dates and times of photographing have been labeled. The thus identified traveling route will be shown on a display associated with the computer, together with surrounding geographic data.

[0231] **FIG. 18** depicts a modified example of an image data storing system of the third embodiment. Image data storing system **1**C', as shown in **FIG. 18**, includes image input device **10**C', image data storage device **20**C', base station **40**C, information server **70**C, and site information receiving device **90**C. In **FIG. 18**, like reference numbers to those having already been described designate similar parts or elements, so their detailed descriptions are omitted here.

[0232] Like image input device **10**A of the first embodiment, image input device (image obtaining apparatus) **10**C', for example, a digital camera carried by a user, generates/obtains image data in response to users' operations. Image input device (hereinafter called a digital camera) **10**C' is constructed the same as image input device **10**C with the exception that image memory **14**C is thoroughly added thereto.

[0233] Image memory **14**C serves as a means for holding the date and time each item of image data was obtained. It temporarily holds the image data, to which image data generator **12**C has labeled the date and time of photographing, before the image data is transferred to image data storage device **20**C.

[0234] Site information receiving device **90**C is carried by a user (photographer) who takes pictures with digital camera **10**C'. Site information receiving device **90**C includes receiver **22**C which is similar to that equipped to image data storage device **20**C, and regional information holding unit **28**C. In image data storing system **1**C', a user carries site information receiving device **90**C, which is reduced in size and weight in comparison with image data storage device **20**C. Here, digital camera **10**C' and site information receiving device **90**C can be integrated.

[0235] Regional information holding unit (regional information holding means) **28**C, which is practically provided as a memory such as a RAM, holds regional information (position information), which has been received by receiver **22**C from base station **40**C, together with the date and time the regional information was received.

[0236] Image data storage device **20**C' is connected with digital camera **10**C' via a USB cable or the like to store image data obtained by digital camera **10**C', and is realized in use by a personal computer. Image data storage device **20**C' includes not only image data storing unit **21**C, which is similar to that equipped to image data storage device **20**C, but also image data converter **24**C'. When image data held in image memory **14**C of digital camera **10**C' is stored into image data storing unit **21**C of image data storage device **20**C', site information receiving device **90**C is connected to image data storage device **20**C' via a USB cable or the like to read the regional information and the date and time the regional information was received, both of which are held in regional information holding unit **28**C, into image data converter **24**C' of image data storage device **20**C'.

[0237] Image data converter **24**C' serves as a regional information selecting means. On the basis of the date and time regional information was received, which date and time is read-in from regional information holding unit **28**C, and of the date and time of photographing (date and time when image data was obtained) labeled to image data received from digital camera **10**C', image data converter **24**C' selects one item of regional information, whose date and time of receipt corresponds to the date and time of photographing labeled to the image data, among plural items of regional information held in regional information holding unit **28**C. Image data converter **24**C' then carries out an image data conversion process, in which the regional information, thus selected by the above-mentioned function as the regional information selecting means, is added into the header of the image data received from digital camera **10**C', as position information. After the conversion, the converted image data, or the label information-added image data, is stored in image data storing unit **21**C.

[0238] In accordance with the flowchart (step **S31** through step **S37**) of **FIG. 19, a** description will be made hereinbelow of a procedure executed by image data storing system **1**C' of a modified example of the third embodiment.

[0239] Here, consideration should be given to a probable time lag between when image data is obtained and when the image data is stored. For example, there should be considered a case where image data is stored in image memory **14**C of digital camera **10**C', and afterward, the image data is stored in image data storage device **20**C' (personal computer, or the like). Generally speaking, because image memory (nonvolatile memory medium) **14**C built in digital camera **10**C' has a small capacity for its high price, it is necessary to move the image data being temporarily held in image memory **14**C to image data storing unit **21**C, which serves as an external recording medium having a great amount of capacity. As a result, a time lag would be caused between when the image data is obtained and when the image data is stored into the recording medium.

[0240] Upon receipt of regional information from base station **40**C, site information receiving device **90**C, which is being carried by a photographer, stores the received regional information and the date and time of receipt, in association with one another, in regional information holding unit **28**C (step **S31**).

[0241] If a photographer obtains image data with digital camera **10**C', date and time obtaining unit **13**C acquires the date and time the image data was obtained, which date and time is then added by image data generator **12**C into the header of the image data input from CCD **11**C. The image data thus labeled with the date and time is then temporarily held in image memory **14**C (step **S32**).

[0242] The procedure of step **S31** and step **S32** will be repeated until digital camera **10**C' finishes photographing (YES route of **S33**).

[0243] When the image data in image memory **14**C is stored into image data storage device **20**C', both digital camera **10**C' and site information receiving device **90**C are connected to image data storage device **20**C'.

[0244] Image data converter **24**C' then compares the date and time of obtaining the image data, which was labeled to the image data when the image data was obtained, with the dates and times of receipt of plural items of regional information in regional information holding unit **28**C, in order to select the most appropriate regional information (that whose date and time of receipt is closest to the date and time of obtaining the image data) as position information. The selected regional information is read out from regional information holding unit **28**C (step S**34**).

[0245] After that, image data converter **24**C' writes the regional information selected in step S**34** into the header of the image data received from digital camera **10**C' (step S**35**), and then stores the image data in image data storing unit **21**B (step S**36**).

[0246] The procedure from step S**34** through step S**36** will be repeated until the procedure is executed on all the image data to be stored from digital camera **10**C' to image data storage device **20**C' (YES route of S**37**).

[0247] In this manner, with image data storing system **1**C' of a modified example of the third embodiment, even if the above-mentioned time lag should occur, it is still possible to label the image data with the most appropriate regional information having been received in the vicinity of the place where the image data was obtained, that is, with an accurate item of position information corresponding to where the image data has been obtained.

[0248] In this instance, in image data storing system **1**C', receiver **22**C of site information receiving device **90**C may receive and obtain IDs (subject information) of the subjects of the image data from user terminal **30**C (see **FIG. 13**) that are being carried by users who are the subjects of the image data. The IDs are stored in a memory together with the date and time the IDs were received. As a result, when the image data obtained by digital camera **10**C' is stored in image data storing unit **21**C, it is possible to read-out the IDs corresponding to the date and time the image data was obtained, from the memory to store them in the header of the image data.

[0249] [4] Fourth Embodiment:

[0250] **FIG. 20** depicts a construction of an image data storing system of a fourth embodiment of the present invention. **FIG. 21** depicts an overview of an image data storing system of the fourth embodiment.

[0251] Image data storing system **1**D of the fourth embodiment includes image input device **10**D, image data storage device **20**D, user terminal **30**D, base station **40**D, and information server **70**D.

[0252] Like image input device **10**A of the first embodiment, image input device (image obtaining apparatus) **10**D, for example, a digital camera carried by a user, generates/obtains image data in response to users' operations. Image input device (hereinafter called a digital camera) **10**D also includes CCD **11**D, image data generator **12**D, and date and time obtaining unit **13**D, which carry out like functions to those of CCD **11**A, image data generator **12**A, and date and time obtaining unit **13**A, respectively, and so, detailed descriptions of those elements are omitted here.

[0253] User terminal **30**D, like user terminal **30**C of the third embodiment, is a mobile terminal carried by a person (user), who is to be a subject of pictures taken by digital camera **10**D. User terminal **30**D transmits an ID unique to the user, and is realized in use by, for example, a mobile telephone (including a PHS terminal). User terminal **30**D includes ID holding unit **32**D and transmitter **33**D. ID holding unit **32**D and transmitter **33**D carry out like functions to those of ID holding unit **32**C and transmitter **33**C of the third embodiment. So, their detailed descriptions are omitted here.

[0254] Base station **40**D serves as a means for transmitting label information, which transmits regional information relating to a site at which image data has been obtained (a region where base station **40**D is installed) as label information, to user (image data storage device **20**D). As distinct from the other embodiments, in the fourth embodiment, the regional information contains shops/establishment information in the vicinity of where the image data was obtained. Base station **40**D of the fourth embodiment includes specific regional information holding unit **41**D, transmitter **42**D and route information obtaining unit **43**D.

[0255] Specific regional information holding unit **41**D previously registers shop/establishment information about shops and/or establishments in the vicinity of a place where specific regional information holding unit **41**D is installed, as regional information. Like the third embodiment, the regional information includes not only such shop/establishment information but also a place name (the name of the tourist spot where the specific regional information holding unit **41**D is installed) which is to be used in an automatic classification of image data. More precisely, regional information of the present embodiment contains not only a concrete place name, such as "Nikko Toshogu Shrine", as positional information but also information about shops and other establishments located within a predetermined distance apart from base station **40**D (this information is called "shop/establishment information" in the present description). More precisely, regional information about "Nikko Toshogu Shrine" includes shops/establishment information, such as overnight accommodations and tourist attractions (for example, "the XXX Hotel", "the XXX Museum", and others) neighboring the Shrine.

[0256] Transmitter **42**D transmits the regional information, including the shop/establishment information, stored in specific regional information holding unit **41**D, together with route information (described later) obtained by route information obtaining unit **43**D. Transmitter **42**D, like transmitter **42**C, transmits shop/establishment information by wireless to users who are staying in a limited area, and is realized in use by a PHS or Bluetooth™.

[0257] Route information obtaining unit (route information obtaining means) **43**D, at transmission of the regional information, obtains route information about a traveling route (access) from the site at which base station **40**D is installed, or where the image data has been obtained, to the shops and establishments contained in the regional information, and then adds the route information to the regional information. A concrete example of this route information is, for example, "five minutes' walk from the entrance approach

to Nikko Toshogu Shrine; in front of the bus stop of XX". Route information obtaining unit **43**D has a traveling route holding means for previously holding varying point-to-point traveling routes on geographic data, and also has a traveling route selecting means for selecting, among the above-described varying traveling routes, the route information about a traveling route from base station **40**D (the site at which the image data has been obtained) to an intended shop or establishment. In this instance, if the shop/establishment information stored in specific regional information holding unit **41**D includes the above-mentioned route information, it would no longer be necessary for route information obtaining unit **43**D to be provided separately.

[**0258**] Information server (shop/establishment server) **70**D, which includes shop/establishment information holding unit **71**D and information selector **72**D, transmits shop/establishment information relating to a region in which base station **40**D is installed to base station **40**D, so as to register the shop/establishment information in specific regional information holding unit **41**D. Shop/establishment information holding unit **71**D previously holds various items of shop/establishment information to be delivered to base stations **40**D installed in various regions. Information selector **72**D selects the one, which corresponds to the location of each base station **40**D, of the items of shop/establishment information held in regional information holding unit **71**D, and then transmits the selected shop/establishment information to the corresponding base station **40**C.

[**0259**] Although image data storing system **1**D of **FIG. 20** has only one information server **70**D that manages plural items of shop/establishment information in an integrated way, plural information servers (shop/establishment servers) **70**D-**1** through **70**D-**7**, one for each shop or establishment, may be prepared instead, as shown in **FIG. 21**. In this case, base stations (add-on information transmitting means) **40**D-**1**, **40**D-**2**, which have the same construction as that of the above-mentioned base station **40**D and are installed in different regions, are communicably connected with information servers **70**D-**1** through **70**D-**7** via a communications network, so that the shop/establishment information is sent out through base stations **40**D-**1**, **40**D-**2**. In **FIG. 21**, base station **40**D-**1** is connected with neighboring shop/establishment servers **70**D-**1** through **70**D-**3**; base station **40**D-**2**, with neighboring shop/establishment servers **70**D-**4** through **70**D-**7**. Otherwise, all the base stations **40**D-**1**, **40**D-**2** and all the information servers **70**D-**1** through **70**D-**7** may be connected via one and the same communications network in such a manner that a hub selects an appropriate one of the information servers **70**D-**1** through **70**D-**7** to connect to base stations **40**D-**1**, **40**D-**2**. As a result, even if shop/establishment information is required to be sent out from two or more base stations, the information to be transmitted from each base station may be controlled with ease by changing the setting of the hub. In **FIG. 21**, the circles surrounding base stations **40**D-**1**, **40**D-**2** indicate the ranges within which the regional information transmitted by base stations **40**D-**1**, **40**D-**2**, respectively, could reach.

[**0260**] Image data storage device **20**D, which is connected with digital camera **10**D via a USB cable so as to store image data obtained by digital camera **10**D, is carried by a photographer (user) together with digital camera **10**D. In use, image data storage device **20**D is provided as a hard disc unit, for example, and includes image data storing unit **21**D, receiver **22**D, image data converter **24**D, and fields-of-interest holding unit **29**D.

[**0261**] Like image data storing unit **21**A, image data storing unit (storage means) **21**D is, for example, a hard disc itself, and stores image data (image file) obtained by digital camera **10**D.

[**0262**] Receiver **22**D, which receives signals from user terminal **30**D and base station **40**D, serves as a subject information obtaining means for receiving/obtaining subject information (ID), which identifies a subject of image data, from user terminal **30**D at the time the image data is obtained. Receiver **22**D also serves as a label information receiving means for receiving regional information (including position information, shop/establishment information, and route information), which is transmitted from base station **40**D located in the vicinity of the place where the image data has been obtained, at the time of obtaining the image data.

[**0263**] Fields-of-interest holding unit (add-on-information-kind holding means) **29**D previously registers the kind of shop/establishment information (label information/add-on information), which is previously registered as demands of a user of image data storage device **20**D (digital camera **10**D), that is, the fields which the user is interested in.

[**0264**] Image data converter (information adding means) **24**D, like image data converter **24**A of the first embodiment, carries out an image data conversion process, in which IDs and regional information, having been received by receiver **22**D, are added in the header area of the image data input from digital camera **10**D. The resulting converted (or such information-added) image data is stored in image data storing unit **21**D.

[**0265**] At that time, image data converter **24**D serves as a label information extracting means (add-on information extracting means) for extracting the items of label information that match the kind of information held in fields-of-interest holding unit **29**D, from the plural items of shop/establishment information included in the regional information which is received by receiver **22**D. Image data converter **24**D labels the regional information that includes the thus extracted shop/establishment information and route information relating to the shop/establishment information, to the obtained image data, along with IDs. At that time, the function of the above-mentioned label information extracting means may be equipped to receiver **22**D, not to image data converter **24**D, so that receiver **22**D refuses the shop/establishment information and the route information which do not match the user's fields of interest registered in fields-of-interest holding unit **29**D.

[**0266**] **FIG. 22** shows an example of a data structure (format) of digital image data of the fourth embodiment. As in the first embodiment of **FIG. 2**, digital image data (image file) stored in image data storing unit **21**D of image data storage device **20**D is formed of not only an area recording the image data itself but also a header recording various types of information relating to the image data. As shown in **FIG. 22**, the header stores a file size and the date and time the image data was obtained, as in conventional techniques. In the fourth embodiment, additionally, there is stored regional information that includes position information,

shop/establishment information, and route information, and also a user ID of a subject of the image data, both of which have been added by image data converter **24**D.

[**0267**] In accordance with the flowchart (step **S41** through step **S46**) of **FIG. 23, a** description will be made hereinbelow of a procedure executed by image data storing system **1**D of the fourth embodiment.

[**0268**] If a photographer takes a picture of a person (subject), who is carrying user terminal **30**D, with digital camera **10**D (step **S41**), date and time obtaining unit **13**D obtains the date and time of photographing, which is then added by image data generator **12**D into the header of the image data input from CCD **11**D (step **S42**). The image data thus labeled with the date and time of photographing is then input from digital camera **10**D to image data storage device **20**D via a USB or the like.

[**0269**] At that time, in image data storage device **20**D, receiver **22**D receives/obtains the subject person's (user's) ID (subject information), which is unique to the user, from user terminal **30**D carried by the user, and also receives/obtains regional information containing position information, shop/establishment information, and route information, from base station **40**D (step **S43**).

[**0270**] Among plural items of shop/establishment information included in the thus received regional information, image data converter **24**D extracts those whose types match the user's fields of interest (information kinds) having been registered previously in fields-of-interest holding unit **29**D, and any other items of shop/establishment information and relevant information are abandoned (step **S44**).

[**0271**] After that, image data converter **24**D then writes both the position information and the regional information containing the shop/establishment information and route information, which have been extracted in step **S44**, into the header of the image data received from digital camera **10**D (step **S45**). The image data is then stored in image data storing unit **21**D (step **S46**).

[**0272**] In the above description, the extracting/selecting of the information is carried out on image data storage device **20**D side as demanded by the user. Otherwise, base station **40**D may transmit only the shop/establishment information that matches the user's demand. In this case, for example, image data storage device **20**D sends information about what fields the user is interested in to base station **40**D, and then, base station **40**D sends back the shop/establishment information that matches the user's fields of interests received from image data storage device **20**D, to image data storage device **20**D.

[**0273**] Here, consideration should be given to a case where base station **40**D sends out shop/establishment information relevant to various kinds of shops and facilities. In such a case, there is a danger that the information might contain shop/establishment information useless to a user. If such useless shop/establishment information, which the user is not interested in at all, was added to image data, it would be irritating for the user. In view of this, in the fourth embodiment, the fields (information kind) in which a user is interested in are previously registered in such a manner that only the shop/establishment information that belongs to those fields can be extracted, so that only such useful information be stored in the header of image data. As good examples, the following fields could be set: "overnight accommodations"; "eating places"; "souvenir shops"; "bars"; and "tourist attractions".

[**0274**] More precisely, class numbers are given, one for every field of interest, and every item of shop/establishment information is labeled with such a class number. Additionally, fields-of-interest holding unit **29**D registers the class numbers of the fields which a user is interested in. Hence, if an item of shop/establishment information whose class number is not registered in fields-of-interest holding unit **29**D is received, the shop/establishment information is either refused or abandoned.

[**0275**] Because regional information can travel only a limited distance from base station **40**D in image data storing system **1**D of the fourth embodiment, as shown in **FIG. 21**, the current position of image data storage device **20**D could be regarded as identical to the location of base station **40**D. If image data is labeled with not only shop/establishment information about a shop or establishment but also with route information about a traveling route from base station **40**D to the shop or establishment, it is possible to show a user the way to the shop or establishment from where the image data has been obtained.

[**0276**] In this manner, with image data storing system **1**D of the fourth embodiment, it would be possible for companies to label their advertisements as shop/establishment information, to image data that tourists can obtain. A service provider, which provides such shop/establishment information, can charge the companies for transmission and storage (labeling) of such advertisement, depending upon, for example, the number of times transmission is carried out.

[**0277**] Meanwhile, digital image data is advantageous in that it is easy to duplicate and transfer. It is thus possible for a user to store such digital image data in a recording medium or to attach the data to an e-mail, so that the image data can be delivered to third parties. It is expected that the image data be delivered to a user's family members and friends through the user's personal network, so that the shop/establishment information stored therein is also delivered through the network. As a result, advertising companies could expect that their advertisements be delivered not only to the user himself but also to the user's family members and friends, at no additional cost for the secondary delivery.

[**0278**] At that time, it is possible to select only the shop/establishment information that is useful to a user (for example, the shop/establishment information of the fields the user is interested in), among various kinds of shop/establishment information, to add to the image data to be provided to the user. In addition, the way to the shop or establishment from the place where the image data was obtained can be always shown as route information. It is thus possible to show a user the way to the shop/establishment, not only at the time the image data was actually obtained but also at the time the user revisits the place where the image data was obtained, thereby making the shop/establishment more appealing to the user.

[**0279**] [5] Fifth Embodiment:

[**0280**] **FIG. 24** depicts a construction of a browsing system of a fifth embodiment of the present invention. Browsing system **1**E of the fifth embodiment includes base station **40**E, information server **70**E, and image viewer **100**.

[0281] Image viewer (image data browsing means) **100** displays image data, which is stored in image data storing system **1**D of the fourth embodiment, along with regional information (shop/establishment information and route information) labeled to the image data. Image viewer **100** is realized in practical use by a mobile processor device, such as a notebook computer, which activates/executes a certain program. Image viewer **100** thus includes controller (CPU) **101**, display **102**, input unit (keyboard, mouse) **103**, transceiver (modem) **104**, and driver **105**, in the same way that processor devices in common use do.

[0282] When image data is browsed on display **102** of image viewer **100**, the image data to which regional information has been added by image data storing system **1**D is input to image viewer **100**. When the image data is input to image viewer **100**, recording medium **110** recording the image data is placed in driver **105** to read out the image data therefrom, or the image data may otherwise be received from an external apparatus through transceiver **104**. Recording medium **110** is, for example, a CD-ROM or a flexible disc.

[0283] Base station **40**E is the one which is located closest to image viewer **100**, and is connected with information server **70**E via a communications network. Image viewer **100** has transceiver **104**, which receives/transmits data from/to information server **70**E via base station **40**E.

[0284] Information server **70**E includes shop/establishment information holding unit **71**E, map database **73**E, transceiver **74**E, and route information calculating unit **75**E.

[0285] Shop/establishment information holding unit **71**E previously holds shop/establishment information (locations of shops and establishments) to be labeled to image data by image data storing system **1**D. Though shop/establishment information holding unit **71**E is equipped to information server **70**E in this example, it may alternatively be included in a shop/establishment server (not shown) installed in every shop or establishment. In this case, such a shop/establishment server and information server **70**E are communicably connected via a communications network, so that information server **70**E can access shop/establishment information holding unit **71**E of each shop/establishment server.

[0286] Map database **73**E previously stores geographic data containing at least locations of shops/establishments and base station **40**E.

[0287] Transceiver **74**E receives/transmits data from/to image viewer **100** via base station **40**E. Transceiver **74**E serves both as a means for obtaining browsing-place information which identifies a place where image data is to be browsed (the current position of image viewer **100**) by image viewer **100** and as a means for notifying image viewer **100** of the obtained route information (described later) to be displayed thereon. In the present embodiment, it is assumed that the current position of image viewer **100** is identical to the location of base station **40**E, and hence the means for obtaining browsing-place information obtains/identifies the location of base station **40**E as the current position of image viewer **100**.

[0288] Route information calculating unit (route information obtaining means) **75**E obtains route information about a traveling route from the place identified by the means for obtaining browsing-place information to a shop/establishment corresponding to the shop/establishment information requested by image viewer **100**. Route information calculating unit **75**E, like route information obtaining unit **43**D of the fourth embodiment, has a traveling route holding means for previously holding varying point-to-point traveling routes on geographic data, and also has a traveling route selecting means for selecting, among the above-described varying traveling routes, the route information about a traveling route from base station **40**E (the current position of image viewer **100**) to an intended shop or establishment. Here, route information calculating unit **75**E obtains the position of a requested shop/establishment from shop/establishment information holding unit **71**E.

[0289] In accordance with the flowchart (step **S51** through step **S60**) of **FIG. 25, a** description will be made hereinbelow of a procedure executed by image data storing system **1**E of the fifth embodiment.

[0290] In the fourth embodiment, route information to be labeled to image data by image data storing system **1**D was, for example, "five minutes' walk from the entrance approach to Nikko Toshogu Shrine; in front of the bus stop of XX". The reference point of this route information is the site where the image data has been obtained, that is, "the entrance approach to Nikko Toshogu Shrine". Generally speaking, however, the browsing of image data and route information is often carried out anywhere else than the place at which the image data has been actually obtained. In that case, even if route information from the place where the image data has been obtained to an intended shop/establishment is displayed, it would often be of no use. From a user's viewpoint, if route information about a traveling route from the place where the image data is now being browsed to an intended shop/establishment is displayed, it would be more convenient. In view of this matter, image data storing system **1**E of the fifth embodiment makes it possible for a user, while he is browsing the image data, to obtain route information (access) about a traveling route from the place where the image data is being browsed (the user's current position) to an intended shop/establishment.

[0291] In image viewer **100**, image data read-out from recording medium **110** and image data received from an external apparatus via transceiver **104** are shown on display **102**. At that time, shop/establishment information labeled to the image data is also displayed at the same time (step **S51**). If a user who is browsing the information of a shop or establishment wishes to know the way from his present position to the shop or establishment, the user makes a request to information server **70**E for route information (destination information) through input unit **103** (step **S52**). This request for the route information is transmitted to information server **70**E via a base station **40**E that is located closest to the image viewer **100**.

[0292] Information server **70**E identifies the location (position 1) of the base station **40**E that has received the user's request, as the user's current position (step **S53**), and obtains the location (position 2) of the shop/establishment requested by the user from shop/establishment information holding unit **71**E (step **S54**).

[0293] After that, route information calculating unit **75**E calculates/selects a route from the above-mentioned position 1 to position 2 (step **S55**), and the thus obtained route is notified from transceiver **74**E of information server **70**E to

image viewer **100** via base station **40**E, as route information, and is then shown on display **102** (step S**56**).

[**0294**] With reference to the displayed route information, the user decides whether to request another route (step S**57**). If the user makes a request for another route through input unit **103** (YES route of step S**57**), the request is notified to information server **70**E via base station **40**E, information server **70**E calculates another route (step S**58**), and the procedure returns to step S**56**.

[**0295**] If the user does not request another route (NO route of step S**57**), the user then decides whether to request the details of the route that has been notified in step S**56** (step S**59**). If the user makes such a request through input unit **103** (YES route of step S**59**), the request is then notified to information server **70**E via base station **40**E, information server **70**E calculates the route more in detail (step S**60**), and the procedure returns to step S**56**. Otherwise, if the user does not request the details of the route (NO route of step S**59**), the procedure ends.

[**0296**] In this manner, with browsing system **1**E of the fifth embodiment, since image data stored by image data storing systems **1**A through **1**D, and **1**C' of the first through fourth embodiments, respectively, is displayed on image viewer **100** together with various types of information labeled to the image data, it is possible for a user to use image viewer **100** to browse the image data and various types of information labeled thereto.

[**0297**] In particular, in browsing system **1**E of the fifth embodiment, a user can obtain a route from the place at which the user is now browsing shop/establishment information to the shop or establishment that is shown on image viewer **100**. Since image viewer **100** displays the way to the shop or establishment from where the user is now, the user can access the shop or establishment very easily, thereby making the shop/establishment more appealing to the user.

[**0298**] [6] Various Other Modifications:

[**0299**] The present invention should by no means be limited to the above-illustrated embodiments, and various changes or modifications may be suggested without departing from the gist of the invention.

[**0300**] For example, in the first through fourth embodiments, a digital camera, **10**A through **10**D, is provided as separate equipment from an image data storage device, **20**A through **20**D, and all the functions equipped to the image data storage device, **20**A through **20**D, may be given to the digital camera, **10**A through **10**D, instead, so that the digital camera, **10**A through **10**D, and the image data storage device, **20**A through **20**D, are integrated into one device.

What is claimed is:

**1**. An image data storing system, comprising:

(a) an image obtaining apparatus for obtaining image data of a subject;

(b) storage means for storing the image data, which has been obtained by said image obtaining apparatus;

(c) means for obtaining site information representing a site at which said image data has been obtained by said image data obtaining apparatus;

(d) means for obtaining subject information identifying the subject of said image data; and

(e) information adding means for adding both said site information and said subject information to said image data, which is to be stored into said storage means.

**2**. An image data storing system according to claim 1, wherein said image obtaining apparatus comprises:

(a-1) means for obtaining date and time when said image data of the subject is obtained; and

(a-2) means for adding said date and time when said image data of the subject is obtained to said image data.

**3**. An image data storing system according to claim 1, further comprising means for calculating an image-shooting direction, in which shooting of an image of a subject has been carried out by said image obtaining apparatus, based on both first position information, representing a position in which said image obtaining apparatus is located, and second position information, representing a position in which the subject of said image data is located, both of said first position information and said second position information being obtained by said site information obtaining means, as said site information, when said image data of the subject has been obtained,

said information adding means being operable to add the calculated image-shooting direction to said image data, which is to be stored into said storage means.

**4**. An image data storing system according to claim 2, further comprising means for calculating an image-shooting direction, in which shooting of an image of a subject has been carried out by said image obtaining apparatus, based on both first position information, representing a position in which said image obtaining apparatus is located, and second position information, representing a position in which the subject of said image data is located, both of said first position information and said second position information being obtained by said site information obtaining means, as said site information, when said image data of the subject has been obtained,

said information adding means being operable to add the calculated image-shooting direction to said image data, which is to be stored into said storage means.

**5**. An image data storing system according to claim 1, further comprising:

means for calculating an image-shooting direction, in which shooting of an image of a subject has been carried out by said image obtaining apparatus, based on both first position information, representing a position in which said image obtaining apparatus is located, and second position information, representing a position in which the subject of said image data is located, when said image data of the subject is obtained, both of said first position information and said second position information being obtained by said site information obtaining means, as said site information, when said image data of the subject has been obtained;

a map database holding geographic data; and

means for identifying a background subject, which has presumably dominated the background of said image data, as background information, based on said image-shooting direction, said site information, and said geographic data,

said information adding means being operable to add said background information to said image data, which is to be stored into said storage means.

**6**. An image data storing system according to claim 2, further comprising:

means for calculating an image-shooting direction, in which shooting of an image of a subject has been carried out by said image obtaining apparatus, based on both first position information, representing a position in which said image obtaining apparatus is located, and second position information, representing a position in which the subject of said image data is located, when said image data of the subject is obtained, both of said first position information and said second position information being obtained by said site information obtaining means, as said site information, when said image data of the subject has been obtained;

a map database holding geographic data; and

means for identifying a background subject, which has presumably dominated the background of said image data, as background information, based on said image-shooting direction, said site information, and said geographic data,

said information adding means being operable to adding said background information to said image data, which is to be stored into said storage means.

**7**. An image data storing system according to claim 2, further comprising:

means for transmitting add-on information; and

means for receiving said add-on information from said add-on information transmitting means in the vicinity of the site at which said image data of the subject has been obtained,

said information adding means being operable to add said add-on information received by said add-on information receiving means to said image data, which is to be stored into said storage means.

**8**. An image data storing system according to claim 7, wherein:

said add-on information is regional information relating to a site at which said image data is obtained; and

said site information obtaining means serves also as said add-on information receiving means to receive and obtain said regional information as said site information.

**9**. An image data storing system according to claim 8, further comprising:

means for holding date and time when each of a plurality items of said image data has been obtained;

means for holding a plurality of items of said regional information, which have been obtained as said site information, along with date and time when each of the plural items of said regional information has been received; and

means for selecting one item, whose date and time of receipt corresponds to the date and time of obtaining, among the plural items of said regional information held in said regional information holding means, based on both said date and time of obtaining and said date and time of receipt;

said information adding means being operable to add the selected one item of regional information to said image data as said site information.

**10**. An image data storing system according to claim 8, wherein said regional information includes advertisement information relating to the site at which said image data has been obtained.

**11**. An image data storing system according to claim 7, wherein said regional information includes shop/establishment information about one or more shops and/or establishments in the vicinity of the site at which said image data has been obtained.

**12**. An image data storing system according to claim 11, further comprising means for obtaining route information about a traveling route from the site at which said image data has been obtained to an intended individual shop or establishment;

said information adding means being operable to add said route information to said image data, which is to be stored into said storage means.

**13**. An image data storing system according to claim 1, further comprising means for browsing said image data, which is stored in said storage means, along with add-on information added to said image data by said information adding means.

**14**. An image data storing system according to claim 11, further comprising:

browsing means for displaying said image data, which is stored in said storage means, along with said shop/establishment information to browse;

means for obtaining browsing-place information which identifies a place where said image data is to be browsed by said browsing means;

means for obtaining route information about a traveling route from said place identified by the obtained browsing-place information to an intended individual browsing place whose information has been displayed on said browsing means; and

means for notifying said browsing means of the obtained route information to be displayed thereon.

**15**. An image data storing system according to claim 7, further comprising:

means for holding the kind of said add-on information, which is previously registered as the user's demand;

means for extracting an item of add-on information, whose kind coincides with said information kind held in said add-on-information-kind holding means, from the plural items of said add-on information received by said add-on information receiving means,

said information adding means being operable to add said add-on information, which has been extracted by said add-on information extracting means, to said image data.

**16**. An image data storing system according to claim 8, further comprising:

means for holding the kind of said add-on information, which is previously registered as the user's demand;

means for extracting an item of add-on information, whose kind coincides with said information kind held in said add-on-information-kind holding means, from the plural items of said add-on information received by said add-on information receiving means,

said information adding means being operable to add said add-on information, which has been extracted by said add-on information extracting means, to said image data with.

**17**. An image data storing system according to claim 11, further comprising:

means for holding the kind of said add-on information, which is previously registered as the user's demand;

means for extracting an item of add-on information, whose kind coincides with said information kind held in said add-on-information-kind holding means, from the plural items of said add-on information received by said add-on information receiving means,

said information adding means being operable to add said add-on information, which has been extracted by said add-on information extracting means, to said image data.

**18**. An image data storing system according to claim 13, further comprising:

means for holding the kind of said add-on information, which is previously registered as the user's demand;

means for extracting an item of add-on information, whose kind coincides with said information kind held in said add-on-information-kind holding means, from the plural items of said add-on information received by said add-on information receiving means,

said information adding means being operable to add said add-on information, which has been extracted by said add-on information extracting means, to said image data with.

**19**. An image data storing system according to claim 14, further comprising:

means for holding the kind of said add-on information, which is previously registered as the user's demand;

means for extracting an item of add-on information, whose kind coincides with said information kind held in said add-on-information-kind holding means, from the plural items of said add-on information received by said add-on information receiving means,

said information adding means being operable to add said add-on information, which has been extracted by said add-on information extracting means, to said image data.

**20**. An image data storing system according to claim 1, further comprising at least one mobile terminal, which is to be carried by a user who is the subject of said image data, for transmitting identification (ID) information identifying the user,

said subject information obtaining means being operable to receive said ID information from said mobile terminal, as said subject information, when said image data is obtained.

**21**. An image data storing system according to claim 20, further comprising:

means for registering a plurality of IDs of a plurality of users whose respective image data might be obtained by said image obtaining apparatus; and

means for extracting a user ID, which coincides with one of the user IDs held in said ID registering means, from said ID information obtained by said subject information obtaining means;

said information adding means being operable to add the extracted user ID to said image data.

**22**. An image data storing system according to claim 20, wherein said mobile terminal is a mobile telephone.

**23**. An image data storing system according to claim 21, wherein said mobile terminal is a mobile telephone.

**24**. An image data storing system according to claim 1, wherein said site information obtaining means obtains latitude and longitude of the site at which said image data has been obtained, as said site information, by Global Positioning System.

**25**. An image data storing system according to claim 22, wherein said site information obtaining means obtains said site information by receiving a service of a site-information provider as said mobile telephone has access to said provider.

**26**. An image data storing system according to claim 23, wherein said site information obtaining means obtains said site information by receiving a service of a site-information provider as said mobile telephone has access to said provider.

**27**. An image obtaining apparatus for obtaining image data of a subject, comprising:

(a) storage means for storing the obtained image data of the subject;

(b) means for obtaining site information representing a site at which said image data of the subject has been obtained;

(c) means for obtaining subject information identifying the subject of said image data; and

(d) information adding means for adding both said site information and said subject information to said image data, which is to be stored into said storage means.

**28**. An image data storing apparatus comprising:

(a) storage means for storing image data of a subject, which image data has been obtained using an image obtaining apparatus;

(b) means for obtaining site information representing a site at which said image data of the subject has been obtained;

(c) means for obtaining subject information identifying the subject of said image data; and

(d) information adding means for adding both said site information and said subject information to said image data, which is to be stored into said storage means.

**29**. A mobile terminal, for use in an image data storing system, which terminal is to be carried by an individual who is a subject of image data to be obtained by an image obtaining apparatus of the image data storing system, said terminal comprising:

(a) means for holding identification (ID) information of said individual; and

(b) means for transmitting said ID information, which is held by said ID information holding means, to first information adding means of the system for adding said ID information to said image data as subject information.

**30**. A mobile terminal according to claim 29, further comprising:

means for obtaining a current position of said mobile terminal; and

means for transmitting said current position, which has been obtained by said current terminal-position obtaining means, as site information representing a site at which said image data of the subject has been obtained using said image obtaining apparatus, to second information adding means of the system for adding said site information to said image data.

**31**. A computer-readable medium in which an image data classification program for classifying a plurality of items of image data is recorded, wherein the plural items of image data have been individually obtained by an image obtaining apparatus, each of the plural items of image data being added thereto regional information relating to a site at which the respective item of image data has been obtained, subject information identifying a subject of the last-named item of image data, and date and time when said respective item of image data is obtained, and wherein said program instructs a computer to function as the following:

(a) means for generating a plurality of classification items in terms of at least one selected from the group consisting of said regional information, said subject information, and said date and time, all of which are added to each of said plural items of image data; and

(b) means for assigning said plural items of image data to the respective classification items, which have been generated by said item generating means, in terms of said at least one selected from the group consisting said regional information, said subject information, and said date and time.

**32**. A computer-readable medium in which a background information designating program is recorded, wherein said program instructs a computer to function as the following:

(a) means for calculating an image-shooting direction, in which shooting of an image of a subject has been carried out by an image obtaining apparatus of an image data storing system to obtain image data, based on both first site information, representing a site at which the image obtaining apparatus is located and second site information, representing a site at which the subject of said image data is located, when said image data has been obtained; and

(b) means for determining a background subject, which presumably appears in the background of said image data, as background information, based on said image-shooting direction, which has been calculated by said image-shooting-direction calculating means, and said first site information and/or said second site information.

**33**. A computer-readable medium in which a traveling route designating program is recorded, wherein said program instructs a computer to function as the following:

(a) means for determining auser's traveling route, along which the user has traveled while obtaining a plurality of items of image data at different sites using an image obtaining apparatus, among a plurality of traveling routes, based on both site information representing a site at which an individual item of image data has been obtained and date and time when the last-named individual item of image data has been obtained, both of which have been added to said last-named individual item of image data; and

(b) display control means for performing a control process on a display section, which is associated with the computer, to display said traveling route determined by said traveling route determining means, along with surrounding geographic data in such a manner that said traveling route superimposes over said surrounding geographic data.

**34**. An image data storing method comprising the steps of:

(a) obtaining image data of a subject by an image obtaining apparatus;

(b) obtaining site information representing a site at which said image data has been obtained;

(c) obtaining subject information identifying the subject of said image data;

(d) adding both said site information and said subject information to said image data; and

(e) storing the resulting image data into a storage device.

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