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For (Title): IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

By (Inventors): Toshinori NAGAHASHI

☒ Formal drawings (Figs. 1-10; 8 sheets) are attached.
☐ Use Figure _____ for front page of Publication.
☐ A Declaration and Power of Attorney is filed herewith.
☐ This application claims benefit of Provisional Application No. _____ filed _____.
(A Preliminary Amendment is attached to reflect this claim in the Specification if not already present.)
☒ This patent application is assigned to SEIKO EPSON CORPORATION.
☐ The executed Assignment is filed herewith.
☒ An Information Disclosure Statement is filed herewith.
☐ Entitlement to small entity status is hereby asserted.
☒ A Preliminary Amendment is filed herewith.
☒ Priority of foreign application No. 2003-020805 filed January 29, 2003 in Japan is claimed (35 U.S.C. §119).
☒ A certified copy of the above corresponding foreign application(s) is filed herewith.
☐ This application is NOT to be published under 35 U.S.C. 122(b). The undersigned attorney or agent hereby certifies that the invention disclosed in this application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing.
☒ The filing fee is calculated below:

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BASIC FEE				$ 385	OR		$ 770
TOTAL CLAIMS	12 - 20	= 0*	x 9 =	$	OR	x 18	$
INDEP CLAIMS	3 - 3	= 0*	x 43 =	$	OR	x 86	$
☐ MULTIPLE DEPENDENT CLAIMS PRESENTED			+ 145 =	$	OR	+ 290	$
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Respectfully submitted,

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GOOGLE EXHIBIT 1002

IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

Priority is claimed on Japanese Patent Application No. 2003-20805 filed January 29, 2003, the content of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an image retrieving device for classifying and retrieving a digital image, a method for adding keywords in the image retrieving device, and a computer program therefor. In particular, the present invention relates to an image retrieving device for classifying and retrieving a digital image, a method for adding keywords in the image retrieving device, and a computer program therefor such that it is possible to add keywords to the image efficiently by detecting an object (for example, a human) in the image during retrieving and classifying the image.

Description of Relate Art

Recently, digital cameras are prevailing so popular that it is often that digital images which is formed by taking pictures (hereinafter, called an image for short) is stored in a PC (personal computer) and displayed on a display of the PCs later so as to view for pleasure. Also, it is often that the stored images are clipped out so as to be edit on a display of the PCs and collect them as a photo album electronically.

In such a case, it is necessary to clip out necessary images among numerous images by retrieving the digital images which are stored in the PCs. For an efficient

retrieval for the digital images, it is necessary to add anything like keywords to the images which is stored (registered) for a retrieving purpose.

For general cases, an ordinary user of a digital camera takes pictures of humans such as her, or his family. In such a case, it is useful to store the images while adding keywords for specifying the human (object) whose picture is taken.

However, it needs experience and skill as a background for expertise in adding and classifying keywords and retrieving the images efficiently; thus, such categorization and retrieval have been difficult and disturbing for ordinary users.

For such storage and retrieval for the images, several prior arts have been disclosed as follows so as to deal with the above problems.

(1) External information (such as place, date, and contents which are pictured) are added to the images in advance which are supposed to be retrieved; thus, the external information is used for the retrieval.

(2) Also, a product has been released marketwise by which a quantitative characteristics in the image are (such as color and shape) utilized such that the user may retrieve the image efficiently by disposing the object image above a three-dimensional space according to the quantitative characteristics of the image.

(3) Also, there is a prior art for "Method for hierarchically classifying image and device for classifying and retrieving picture and recording medium with program for executing the method recorded thereon" which is disclosed in Japanese Unexamined Patent Application, First Publication No. 2001-160057.

The invention which is disclosed in Japanese Unexamined Patent Application, First Publication No. 2001-160057 relates to a technique in which images are classified and retrieved interactively and hierarchically while using an image dictionary which is produced in advance. In this invention, a system proposes major classifying points such

as an area color, a line, an object, and an image dictionary for a group of image to the user during the navigation. When the user selects the image dictionary, the system proposes classifying points such as a "face of a human", "sky", and "roof". When the user selects the "face of human", the system proposes a group of image for picture of human. Similarly, minor classifying points such as the area color, a liner line, an object and an image dictionary are proposed to the user for a group of the image; thus, a classifying operation is performed by selecting the classifying points. Such a navigation history is useful for classifying the image DB; therefore, the navigation history is saved in the system as a classifying tree information. It is possible to view a general view of the image DB by browsing an entire image of the saved classifying tree by using the keywords and synthesized images.

(4) Also, there is a prior art for "a face image model retrieval processing method" which is disclosed in Japanese Unexamined Patent Application, First Publication No. Hei 8-221547.

An object of the invention which is disclosed in Japanese Unexamined Patent Application, First Publication No. Hei 8-221547 is to provide a simple face image model retrieval processing method in which it is possible to extract characteristics of the face area very accurately and effectively in a high speed from the object as a written datum. Consequently, a face area mosaic characteristics extracting section forms a variable density image which includes the face area in a mosaic manner; thus, the face area is extracted as a face area mosaic characteristics datum by making use of a fact that such a mosaic pattern is different between an inside and the outside of the face area. Next, a face image classification retrieving section retrieves a class in the categorized classification. By doing this, it is possible to extract and retrieve the face area very accurately in high speed not by using an edge section in the object for extracting the face

area but by using a density pattern in the object area. Also, it is possible further to classify the categorized classification for the retrieval operation.

(5) Also, there is a prior art for "retrieving keyword determining method, its device, document retrieving device, and recording medium" which is disclosed in Japanese Unexamined Patent Application, First Publication No. Hei 10-307849.

An object of the invention which is disclosed in the Japanese Unexamined Patent Application, First Publication No. Hei 10-307849 is to specify only necessary keywords in a document retrieving device in which it is possible to perform a thesaurus retrieving operation by using a plurality of keywords which relate each other. In addition, in a keyword determining device, nominated keywords which are supposed to be added to the inputted keywords are retrieved from a thesaurus dictionary. Simultaneously, a document for explaining the nominated keywords is retrieved from an explanatory document file. Consequently, a score which corresponds to a relating degree to the inputted keywords and the nominated keywords is added to the explanatory documents; thus, the score is displayed n a display device so as to expedite the user to determine whether or not for adding the nominated keywords. If the user's decision is analyzed, and if it is determined that the keywords are not necessary to be added, only the inputted keywords are used for the retrieving operation.

If it is necessary to add the nominated keywords, such nominated keywords are added for the retrieving operation.

However, the above conventional methods have following problems.

In the method which is explained in the above paragraph (1) for adding the external information to the image, it is necessary to add the external image to all images preferably. However, it is a very disturbing operation to add the external information (keywords) to the image so as to realize a retrieving operation in variable forms; thus,

such an operation is not realistic.

In the method which is explained in the above paragraph (2) for using a quantitative characteristics of the image itself, a plurality of images which have equal quantitative characteristics are displayed on the display device according to a certain law so as to extract a desirable image therefrom. Therefore, the object of the invention which is explained in the above paragraph (2) is different from the object (for example, a human) of the present invention for performing an efficient retrieving operation for the objects in the image.

The object in the method in the above paragraph (3) which is disclosed in Japanese Unexamined Patent Application, First Publication No. 2001-160057 is to perform classify and retrieve the image interactively in a hierarchically by using the image dictionary which is produced in advance. The object of the present invention is to add the keywords efficiently by detecting the object (for example, a human) in the image; therefore, the object and the structure in the present invention is different from the object and the structure in the invention which is disclosed in Japanese Unexamined Patent Application, First Publication No. 2001-160057.

The object in the method in the above paragraph (4) which is disclosed in Japanese Unexamined Patent Application, First Publication No. 8-221547 is to categorize the categorized classification by forming a variable density image of the face image. An object for the present invention is to add keywords efficiently by detecting the object (such as a human) in the image; thus the object ant the structure in the invention which is disclosed in Japanese Unexamined Patent Application, First Publication No. 8-221547 are different from those in the present invention.

The object in the method in the above paragraph (5) which is disclosed in Japanese Unexamined Patent Application, First Publication No. Hei 10-307849 is to select

the nominated keywords which are supposed to be added to the inputted keywords from the thesaurus dictionary. The object of the present invention is to add the keywords efficiently by detecting the object (such as a human) in the image; thus, thus the object ant the structure in the invention which is disclosed in Japanese Unexamined Patent Application, First Publication No. Hei 10-307949 are different from those in the present invention.

SUMMARY OF THE INVENTION

The present invention was made in consideration of these problems. An object of the present invention is to provide an image retrieving device, a method for adding keywords in the image retrieving device, and a computer program therefore so as to detect an object (such as a human) in the image when the image is classified and add keywords to the image efficiently by preparing templates for the retrieving operation in advance and retrieve the image mainly with reference to the objects.

An image retrieving device in the present invention for classifying and retrieving an image by detecting an object in the image and adding a keyword comprises an image storing section for storing the image which is supposed to be classified and retrieved together with the keyword in a database, an object acknowledging section for acknowledging a predetermined object in the image which is inputted, a keyword proposing section for proposing the keyword which relates to the object which is acknowledged by the object acknowledging section, and an object information inputting section for confirming, adding, and correcting the keyword which is proposed by the keyword proposing section.

The images which are supposed to be classified and detected are saved in the database together with the keywords by the image storing section in such a structure.

Consequently, a new predetermined object which is inputted in the image (such as a human or a car) is acknowledged (detected) by the object acknowledging section. If a predetermined object is detected by the object acknowledging section, the keywords which relate to the object are proposed to the user by the keyword proposing section. Also, in this aspect of the present invention, an object information inputting section is disposed for confirming, adding, and correcting the proposed keywords by the user.

By doing this, it is possible to add the keywords to the image efficiently by detecting the inputted objects in the image in the detecting/classifying device for the image. Also, the keywords which relate to the object in the image is added; thus, it is possible to retrieve the image which contains a specific object among numerous images accurately and efficiently.

Also, in the image retrieving device in the present invention, the object acknowledging section comprises a human detection condition inputting section for setting up conditions for determining whether or not the image contains a human, a face image detecting section for detecting a face image in the image, and a face image similarity determining section for detecting a face image which is detected by the face image detecting section so as to detect a similar face image stored in the database according to the detected face imaged.

In such a structure, an object which is supposed to be acknowledged (detected) should be a human. Consequently, a condition (for example, for detecting a skin color area) for determining whether or not a human is contained in the image is set up by a human detection condition inputting section. Consequently, a face image is detected in the newly inputted image by the face image detecting section. Also, when the face image is detected by the face image detecting section, a similar face image is detected with reference to the database by the image similarity determining section according to the

detected face image. Consequently, if the similar face image is detected, the keyword which relates to the face image is proposed to the user so that the user may confirm, add, or correct the keyword.

By doing this, it is possible to add the keywords to the image efficiently by detecting the human in the inputted image in the retrieving/classifying device for the image. Also, the keywords which relate to the human in the image; thus, it is possible to retrieve the image which contains a specific person accurately and efficiently among numerous images.

In the image retrieving device of the present invention, the object information inputting section serves as a personal information inputting section for confirming, adding, and correcting a personal information.

In such a structure, an object which is supposed to be acknowledged (detected) is a human such that the keyword (human information) is confirmed for the detected human and the keyword is inputted for the human if a human is detected in the image.

By doing this, the human in the inputted image is detected and the keywords (human information) which relate to the human in the image is added; thus, it is possible to add the keywords accurately.

Also, in the image retrieving device of the present invention, a skin color area detecting section for detecting a skin color area in the image is used when the human is detected.

By doing this, the human is detected by the skin color detecting section in addition to a function for detecting the human by using the face image detecting section.

By doing this, it is possible to detect the human in the image more reliably and effectively.

Also, the image retrieving device of the present invention further comprising a

keyword proposing section for proposing the keyword to the image which is inputted last in a case in which the similar face image is not detected by the face image similarity determining section.

In such a structure, if a similar face image is not detected by the face image similarity determining section, there is a high possibility in that an image for the same human according to the same kind (same theme) may be inputted; therefore, the keywords which are added to the image which is inputted last are proposed.

By doing this, it is possible to increase the possibility for adding the keywords in a case in which the similar image is not detected.

Also, in the image retrieving device of the present invention, the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

By such a structure, a retrieving template is prepared in advance which is formed by the keywords having a hierarchical structure; thus, the keywords which are contained in the retrieving template are proposed to the user. Thus, it is expedited for the keywords to be added.

By doing this, it is possible to add the keywords by a simple operation by using the template. Also, the retrieving template is formed according to the category such that the keywords are disposed hierarchically. Therefore, it is possible to classify and retrieve the images efficiently. Also, for example, it is possible to use the retrieving template which is prepared in advance so as to have a correctable described human relationship; therefore, it is possible to retrieve the image easily according to the human information.

Also, a method in the present invention for adding keywords in an image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword comprises the steps for storing the image which is supposed

to be classified and retrieved together with the keyword in a database, acknowledging a predetermined object in the image which is inputted, proposing the keyword which relates to the object which is acknowledged by the object acknowledging section, and confirming, adding, and correcting the keyword which is proposed by the keyword proposing section.

By such steps, the images which are supposed to be classified and retrieved are saved in the database together with the keywords in the image storing step. Consequently, a specific object (such as a human or a car) in the newly inputted image is acknowledged (detected) in the object acknowledging step. In addition, if a specific object is detected in the object acknowledging step, the keywords which relate to the object are proposed to the user in the keyword proposing step. Also, the user confirms, adds, or corrects the proposed keywords in the object information inputting step.

By doing this, the object in the inputted image is detected in the retrieving/classifying device for the image; thus, it is possible to add the keywords to the image efficiently. Also, the keywords which relate to the object in the image are added; therefore, it is possible to retrieve the images which contain specific objects among numerous images accurately and efficiently.

Also, a computer program in the present invention for a computer in an image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword comprises commands for storing the image which is supposed to be classified and retrieved together with the keyword in a database, acknowledging a predetermined object in the image which is inputted, proposing the keyword which relates to the object which is acknowledged by the object acknowledging section, and confirming, adding, and correcting the keyword which is proposed by the keyword proposing section.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram for explaining a structure of a device which is provided in an image retrieving device of the present invention.

FIG. 2 is a block diagram for explaining a structure of a device in case an object is a human.

FIG. 3 is a view for explaining an example for a display for expediting an inputting operation for a human information.

FIG. 4 is a view for showing a first example for a method for proposing a human information which is supposed to be a keyword.

FIG. 5 is a view for showing a second example for a method for proposing a human information which is supposed to be a keyword.

FIG. 6 is a view for showing an example for a record which is recorded in a database.

FIG. 7 is a view for explaining an example for a retrieving template which describes a human relationship.

FIG. 8 is a flow chart for explaining processing steps for detecting a human and adding the keywords.

FIG. 9 is a flow chart for explaining processing steps for a case in which a detecting operation is operated.

FIG. 10 is a block diagram for explaining an example for a structure of an image retrieving device.

DETAILED DESCRIPTION OF THE INVENTION

Next, embodiments of the present invention are explained with reference to drawings as follows.

[Basic Concept for an Image Retrieving Device according to the Present Invention]

In the image retrieving device of the present invention, the object (such as a human) in the image is detected. A template for the keywords are prepared in advance; thus, the keywords are added to the image easily in which the keyword is detected. By doing this, it is possible to retrieve the object by using the keywords effectively.

In addition, the keywords are provided with following characteristics.

(1) When an object (such as a human) in the image is detected, a keyword for specifying the object is added to the image. In such a case, a keyword which is prepared in advance is proposed such that a system inquires the user which category the image belongs to. If there is an item coincides the keyword in the proposed category, the user selects such a keyword.

(2) The keyword is used for retrieving an image which contains a human. Such keywords can be set up in a hierarchical structure. For example, if an object is a human, a "family" and "relative" may be keywords for superior concept. Furthermore, it is possible to name "eldest brother", "eldest sister", and "maternal relative" for a subordinate concept.

(3) Basic keywords which are formed in a hierarchical structure are prepared for the retrieving template so as to be correctable (such as an additional keywords).

In the image retrieving device of the present invention, it is possible to add the keywords to the image simply in the above manner.

[Specific Structure of the Image Retrieving Device of the Present Invention]

FIG. 1 is a block diagram for a structure in a device which is provided in the image retrieving device of the present invention. In the FIG. 1, only sections which relate to the present invention are shown. Sections which are provided in the image retrieving device shown in FIG. 1 have following functions.

(1) Image Inputting Detecting Section 101

The image inputting detecting section 100 detects a fact that a new image is contained in the image detecting section 100.

(2) Image reading device 102

The image reading device 102 reads values (such as RGB values) for pixels which form the image.

(3) Still Picture Generating Section 103

The still picture generating section 103 generates a still picture from a motion picture if the image is a motion picture.

(4) Object Acknowledging Section 104

The object acknowledging section 104 acknowledges whether of not a specific object is contained in an image by analyzing the image. For a specific example, a case in which an object is a "human" is explained later.

(5) Keyword Proposing Section 105

The keyword proposing section 105 extracts a keyword which relates to an object by referring to a database when the object is detected so as to propose the keywords to the user. For a specific example, a case in which an object is a "human" is explained later.

(6) Object Information Inputting Section 106

The object information inputting section 106 serves for a user to select an object information among the proposed keywords or to input/update the keywords. For a specific example, a case in which an object is a "human" is explained later.

(7) Retrieving Condition Inputting Section 107

The retrieving condition inputting section 107 serves for inputting a retrieving condition for the image which is supposed to be retrieved. For example, if an object which is supposed to be retrieved is a human, retrieving conditions (keywords) such as

selecting among "family", and "friend" are inputted.

(8) Displaying Section 108

The displaying section 108 displays a retrieved result.

(9) Printing Section 109

The printing section 109 prints the retrieved result.

Here, a retrieving template 121 for adding the keywords and data for a motion picture 122 and a still picture 123 which are related to the keywords (retrieving template) are stored in a database (image storing section) 120.

Next, more detail of the image retrieving device of the present invention is explained with reference to an example in which an object which is supposed to be detected is a "human".

FIG. 2 is a block diagram for explaining an example of a structure in an image retrieving device shown in FIG. 1 for a case in which an object which is supposed to be detected is a "human". The object acknowledging section 104 shown in FIG. 1 realizes functions for a human detecting condition inputting section 111, a face image detecting section 112, a face color area detecting section 113, and a face image similarity determining section 114 which are shown in FIG. 2. Also, the object information inputting section 106 shown in FIG. 1 serves for a human information inputting section 115 shown in FIG. 2. The rest of the sections are the same as each other between FIGS. 1 and 2.

Hereinafter, sections shown in FIG. 2 are explained. Hereinafter, the same reference numerals are applied to corresponding members as shown in FIG. 2 so as to omit the repeated explanation thereof.

(1) Human Detecting Condition Inputting Section 111

The human detecting condition inputting section 111 sets up a condition for

determining whether or not a human is contained in an image. The human detecting condition inputting section 111 not only detects the face image but also inputs conditions for detecting the face color area and determining whether or not a human is contained in the image.

(2) Face Image Detecting Section 112

The face image detecting section 112 detects the fact for whether or not a face image is contained in the image by analyzing the image. There are various methods for detecting the face image such that patterns for the face images are stored in advance, or frequency analysis is performed for the image pattern. It may be acceptable if any one of these methods is performed. Also, it is possible to employ a method which is disclosed in Japanese Unexamined Patent Application, First Publication No. Hei 8-221547. Here, it may be acceptable if the face image detecting section 112 uses a face color area detecting section 113 which is explained in a next paragraph compatibly so as to perform a human detecting operation.

(3) Face Color Area Detecting Section 113

There are various methods for detecting a human by using not only a face image, but also an edge information and a template. Here, the face color is used. The face color area detecting section 113 determines whether or not the pixel which is read out is within a range of a skin color. For detecting such a skin color, it is possible to use a method which is disclosed in a document such as "Detecting a face not by depending on a background and a direction of a face, and inferring a direction of a face / Araki, Shimada, Shirai, TECHNICAL REPORT OF IEICE, INFORMATION AND COMMUNICATION ENGINEERS, PRMU2001-217 pp87-94 (2002-01)".

In an item 2.1 in the above document, it is disclosed that a range of a skin color can be detected according to following formulae.

$0.333<r<0.664$, $r>g$

$0.246<g<0.398$, $g \geqq 0.5-0.5r$

Here, there are relationships such as $r=R/(R+G+B)$, $g=G/(R+G+B)$. Here, R, G, and B indicate RGB values for the pixel.

(4) Face Image Similarity Determining Section 114

The face image similarity determining section 114 refers to the database 120 so as to check whether or not a similar face image to the detected face image is contained. Here, it is possible to employ a method which is disclosed in Japanese Unexamined Patent Application, First Publication No. Hei. 8-221547 for determining such a similarity by forming a density image of a face so as to classify the category.

(5) Human Information Inputting Section 115

The human information inputting section 115 serves for a user such that the user may select the human information according to the keyword information which is proposed by the image retrieving section 100 or input/update the keywords.

FIG. 3 is a view for showing an example for a display for inputting the human information. Here, when a new image is contained in the image retrieving device 100, the image retrieving device 100 tries to detect a human in the contained image. If a human is detected, the image retrieving device 100 expedites a user to input the human information by a display form which is shown in FIG. 3.

In such a case, it is possible to use various methods for proposing the human information. For example, it is possible to propose keyword information to the user by a following priority so as to increase an operability for the users.

·If it is determined that the face image coincides to the face image which is contained previously or that the face image is very similar to the face image which is contained previously, the information for such a human is proposed so as to expedite the user to

confirm.

·The information for a human which is contained in an image which is inputted last, an updated human information, or a keyword is displayed. This is because the images for the same human tend to be input continuously for a case in which family photographs are taken in cases for a school entrance ceremony or an athletic meet.

FIG. 4 is a view for a first example for a method for proposing human information which is supposed to be a keyword. As shown in FIG. 4, keywords such as "an eldest brother", "a family", "a relative", or "a friend" are registered for the human information in advance. That is, FIG. 4 is an example in which these keywords are proposed according to the above priority. If there is an item which coincides the priority, the user selects such an item. If there is not an item which coincides the priority, the user can select an option for "making a new human information" or "making a new human category"; thus, the user can add new item.

FIG. 5 is a view for an example for a second method for proposing the human information which is supposed to be the keyword. FIG. 5 is an example in which a keyword which has the superior priority (eldest brother) is disposed. If the image does not relate to the eldest brother, a coincident keyword via a pull-down menu.

FIG. 6 is a view for an example for a record which is stored in the database 120. The keywords are recorded in the database 120 in two-layer hierarchical structure which has a superior keyword 1 and a subordinate keyword 2. For example, the superior keyword 1 indicates a "family". The subordinate keyword 2 is a "second eldest brother" such that a first name is "jiro" who was born on "January 1, 2003". Here, three images 1, 2, and 3 are saved.

FIG. 7 is a view for showing an example for the retrieving template which is used for showing the human relationship. The retrieving template is prepared in the database

120 in advance. Consequently, if a record which is shown in FIG. 6 is added such that images which relate to the "second eldest brother" are contained, it is necessary to produce a keyword for the "second eldest brother" as a subordinate keyword under the superior keyword "family". Such operations are performed by the operations which are shown in FIGS. 3, 4, and 5.

Next, the processing steps in the image retrieving device of the present invention are explained with reference to the flow chart.

FIG. 8 shows the processing steps for detecting a human and adding the keywords in the image retrieving device of the present invention. In this flow chart, the processing steps for detecting the human in the image and registering the keywords are shown. Hereinafter, the processing steps are explained with reference to FIG. 8.

(1) Step S1: A newly inputted image is detected by the image inputting detecting section 101.

(2) Step S2: It is tried out whether or not a face image can be detected from the image which is inputted by the face image detecting section 112. The image data is read by the image reading section 102. Also, when a motion picture is inputted, a still picture is produced by the still picture generating section 103 according to a predetermined rule such that the still pictures should be generated every certain period of time interval so as to proceed the steps thereafter.

(3) Step S3: It is checked whether or not the face image is detected.

(4) Step S4: It is checked whether or not a face image which is similar to a face image which is pre-registered by the face image similarity determining section 114 exists in the database 120.

(5) Step S5: A human information which corresponds to the similar face image is selected from the database 120.

(6) Step S6: If there is not a pre-registered keyword, a new keyword which indicates a human is produced.

(7) Step S7: The selected human information is displayed by the displaying section 108 so as to expedite the user to select the human information (selection of the keyword) and input the necessary information.

(8) Step S8: The database 120 which contains the human information is updated.

(9) Step S9: If the face image is not detected in the step S3, the processing step goes to the step S9 in which a skin color area is detected from the inputted image by the skin color area detecting section 113.

(10) Step S10: It is checked whether or not the skin color exits.

(11) Step S11: If the skin color area is not detected in the Step S10, the human information which is inputted/updated last.

Also, FIG. 9 is a flow chart for explaining processing steps for a retrieving operation.

(1) Step S21: Retrieving condition is inputted by a retrieving condition inputting section 107.

For example, following retrieving conditions are inputted.

·All the Photographs which relate to Jiro contained in the database 120.

·Photographs for all friends who belong to a certain community or a certain society which are taken in year 2003.

(2) Step S22: Keywords are set up according to the designated retrieving condition so as to access the database 120.

(3) Step S23: All the images which correspond the retrieving condition are selected.

(4) Step S24: The selected images are displayed by the displaying section 108, or printed by the printing section 109.

According to the above processing steps, it is possible to register the keywords to the images and retrieve the images.

Also, FIG. 10 is a block diagram for explaining an example for a structure of the image retrieving device in which the object which is supposed to be retrieved is a human such that only sections which relate to the present invention are shown. In FIG. 10, reference numeral 100 indicates an image retrieving device. Reference numeral 1 indicates a communication network such as Internet. Reference numeral 131 indicates a communication interface which connects the image retrieving device and the communication network 1. Reference numeral 132 indicates a controlling section which controls an entire image retrieving device integrally. Reference numeral 140 indicates a processing program section. Here, it is acceptable if a PC (personal computer) is used for the image retrieving device 100.

Also, following processing sections are contained in the processing program section 140.

·Image Inputting Detecting Processing Section 141

The image inputting detecting processing section 141 detects a fact that a new image is contained in the image retrieving device 100.

·Image Reading Processing Section 142

The image reading processing section 142 reads out various values (such as the RGB values) for each pixel which forms the image.

·Still Image Generating Processing Section 143

The still image generating processing section 143 generates a still picture from the motion picture if the image is a motion picture.

·Human Detecting Condition Inputting Processing Section 144

The human detecting condition inputting processing section 144 sets up a

condition for determining whether or not a human in contained in the image. Here, conditions for determining is inputted whether or not a human is contained in the image not only by detecting the face image but also by detecting the skin color in the image.

·Face Image Detecting Processing Section 145

The face image detecting processing section 145 detects a fact for whether or not the face image is contained in the image by analyzing the image. There are various methods for detecting the face image such that patterns for the face images are stored in advance, or frequency analysis is performed for the image pattern. It may be acceptable if any one of these methods is performed. Also, it is possible to employ a method which is disclosed in Japanese Unexamined Patent Application, First Publication No. Hei 8-221547. Here, it may be acceptable if the face image detecting processing section 145 may detect a human by using a skin color area detecting processing section 146 compatibly which is explained in following paragraphs.

·Skin Color Area Detecting Processing Section 146

The skin color area detecting processing section 146 determines whether or not the values in the read-out pixel is within a range for the skin color. For detecting such a skin color, it is possible to use a method which is disclosed in a document such as "Detecting a face not by depending on a background and a direction of a face, and inferring a direction of a face / Araki, Shimada, Shirai, TECHNICAL REPORT OF IEICE, INFORMATION AND COMMUNICATION ENGINEERS, PRMU2001-217 pp87-94 (2002-01)".

·Face Image Similarity Determining Processing Section 147

The face image similarity determining processing section 147 performs a checking operation for whether or not a face image which is similar to the detected face image is contained with reference to the database 120. For such a determining operation

for the similarity, it is possible to employ a method which is disclosed in Japanese Unexamined Patent Application, First Publication No. Hei 8-221547 in which a mosaic pattern of the face image is formed so as to classify the category.

·Keyword Proposing Processing Section 148

The keyword proposing processing section 148 extracts the keyword which relates to the detected object with reference to the database 120 so as to propose the keywords to the user.

·Human Information Inputting Processing Section 149

The human information inputting processing section 149 serves for the use such that the user may select the human information according to the keyword information which are proposed by the image detecting device 100 or the user may input/update the keyword (see FIGS. 3 and 4).

·Retrieving Condition Inputting Processing Section 150

The retrieving condition inputting processing section 150 serves for inputting the retrieving condition for the image which is supposed to be retrieved. Here, for example, the retrieving conditions for selecting "family" or "friend" are inputted.

·Displaying Processing Section 151

The displaying processing section 151 displays the retrieved result.

·Printing Processing Section 152

Also, the retrieving template 121 which adds the keyword to the image and data which relate to the motion picture 122 and the still picture 123 which are related to the keyword (retrieving template) are stored in the database (image storing section) 120 (see FIG. 6).

Here, it is acceptable if the processing program section 140 may be realized by a hardware which is used for the processing program section 140 exclusively. Also, it is

acceptable the processing program section 140 may be formed by a common information processing device such as a memory and a CPU (central processing unit) in which the program (not shown in the drawing) for realizing the functions in the processing section is loaded to the memory and executed. Also, it should be understood that peripheral apparatuses such as an inputting device, a displaying device, and a printing device (neither of which are shown in the drawings) are connected to the image retrieving device 100. Here, a keyboard, a computer mouse can be named for such an inputting device. Also, a CRT (cathode-ray tube) and a liquid displaying device can be named for the displaying device. Also, a laser printer and an inkjet printer can be named for the printing device.

Also, it is acceptable if operations which are necessary for the image retrieving device of the present invention by recording the program for realizing the function in the image retrieving device 100 shown in FIG. 10 in a computer-readable recording medium and loading the program which is recorded in the recording medium into the computer system so as to execute the program. Here, it should be understood that the "computer system" may include an OS (operation system) and a hardware such as a peripheral apparatus.

Also, it should be understood that the "computer system" may contain an environment in which a homepage is provided (or an environment in which a homepage is displayed) under condition that the computer system is a www (world-wide-web) system. Also, a portable medium such as a flexible disc, a optical magnetic disc, a ROM (read-only-memory), a CD-ROM (computer-disc read-only-memory) and a storing device such as a hard disc which is built in a computer system can be named for the "computer-readable recording medium".

Furthermore, it should be understood that, for the "computer-readable recording medium", a communication line (transmitting medium or a transmitting wave) for

transmitting the program via a communication circuitry such as a network like Internet or a telephone line can be named for maintaining a program dynamically for a short period of time. Also, it should be understood that, for the "computer-readable recording medium", a volatile memory which is disposed in a computer system as a server and a client under the above condition may be named for maintaining the program for a certain period of time. Also, the above program may serve for realizing a part of the above functions. Also, the above program may be a differential file (differential program) which can realize the above functions with a combined use of the program which is recorded in the computer system in advance.

Here, in the image retrieving device of the present invention which is explained above, explanations are made for an example in which a keyword is added under condition that the object which is supposed to be classified in the image is a face image (human). However, more importantly, the present invention is not limited to such an example; that is, it is possible to add keywords by detecting the object such as a car and an animal which are supposed to be classified.

The embodiments of the present invention are explained as above. More importantly, the image retrieving device according to the present invention disclosed herein is susceptible to various modifications and alternative forms. It should be understood, however, that the drawings and detailed description thereto are not intended to limit the invention to the particular form disclosed, but on the contrary, the invention is to cover all modifications, equivalents and alternatives falling within the scope of the present invention as defined by the claims.

What is claimed is:

1. An image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword, comprising:

an image storing section for storing the image which is supposed to be classified and retrieved together with the keyword in a database;

an object acknowledging section for acknowledging a predetermined object in the image which is inputted;

a keyword proposing section for proposing the keyword which relates to the object which is acknowledged by the object acknowledging section; and

an object information inputting section for confirming, adding, and correcting the keyword which is proposed by the keyword proposing section.

2. An image retrieving device according to Claim 1 wherein the object acknowledging section comprises:

a human detection condition inputting section for setting up conditions for determining whether or not the image contains a human;

a face image detecting section for detecting a face image in the image; and

a face image similarity determining section for detecting a face image which is detected by the face image detecting section so as to detect a similar face image stored in the database according to the detected face imaged.

3. An image retrieving device according to Claim 2 wherein the object information inputting section serves as a personal information inputting section for confirming, adding, and correcting a personal information.

4. An image retrieving device according to Claim 2 wherein a skin color area detecting section for detecting a skin color area in the image is used when the human is detected.

5. An image retrieving device according to Claim 2 further comprising a keyword proposing section for proposing the keyword to the image which is inputted last in a case in which the similar face image is not detected by the face image similarity determining section.

6. An image retrieving device according to any one of Claims 1 to 5 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

7. A method for adding keywords in an image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword, comprising the steps for:

storing the image which is supposed to be classified and retrieved together with the keyword in a database;

acknowledging a predetermined object in the image which is inputted;

proposing the keyword which relates to the object which is acknowledged by the object acknowledging section; and

confirming, adding, and correcting the keyword which is proposed by the keyword proposing section.

8. A computer program for a computer in an image retrieving device for classifying and

retrieving an image by detecting an object in the image and adding a keyword, comprising commands for:

storing the image which is supposed to be classified and retrieved together with the keyword in a database;

acknowledging a predetermined object in the image which is inputted;

proposing the keyword which relates to the object which is acknowledged by the object acknowledging section; and

confirming, adding, and correcting the keyword which is proposed by the keyword proposing section.

ABSTRACT OF THE DISCLOSURE

An image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword comprises an image storing section for storing the image which is supposed to be classified and retrieved together with the keyword in a database, an object acknowledging section for acknowledging a predetermined object in the image which is inputted, a keyword proposing section for proposing the keyword which relates to the object which is acknowledged by the object acknowledging section, and an object information inputting section for confirming, adding, and correcting the keyword which is proposed by the keyword proposing section. By doing this, the object in the image is detected for classifying the image; thus, it is possible to provide an image retrieving device in which the keywords are added to the image efficiently.

FIG. 1

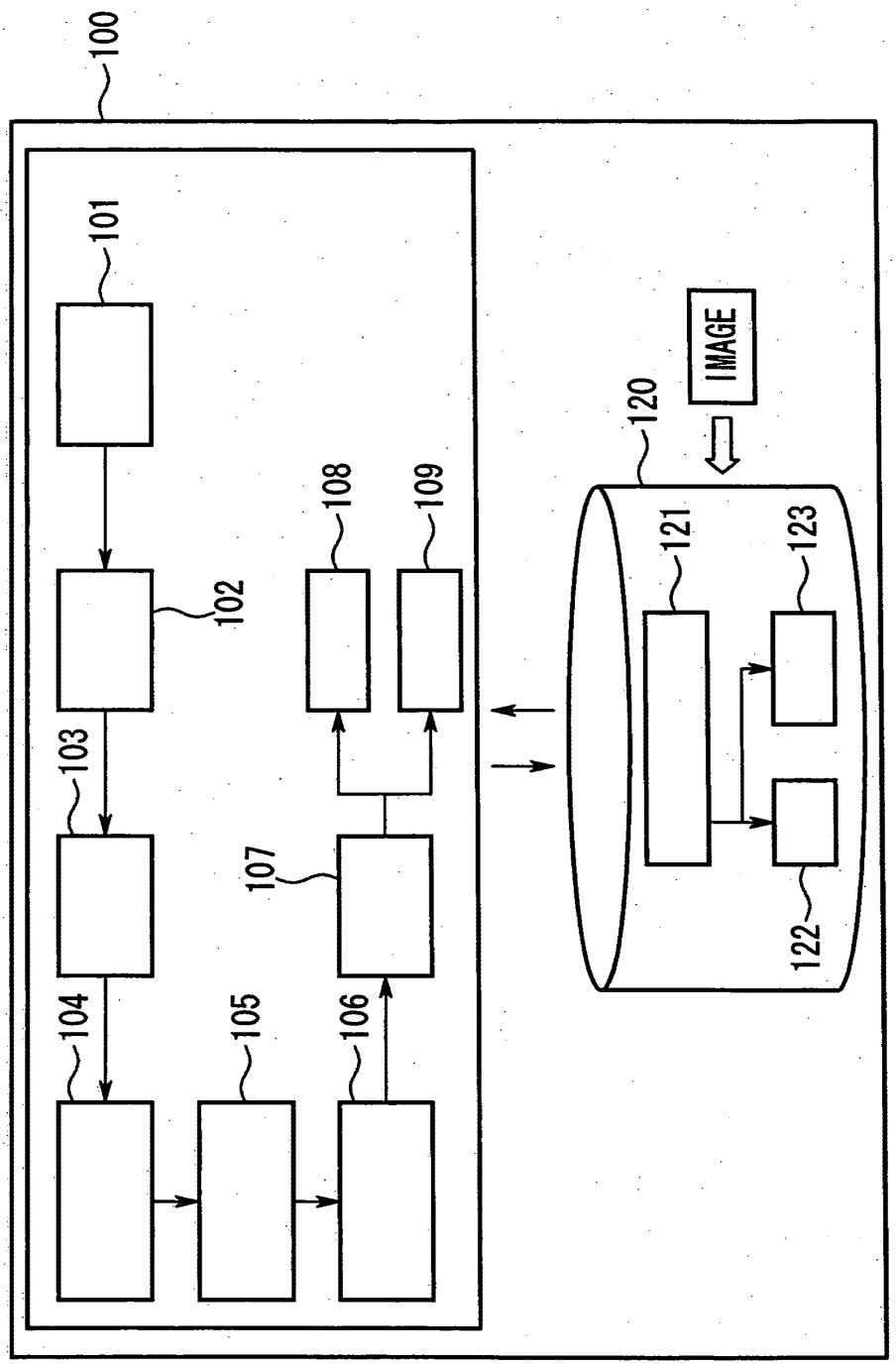


FIG.2

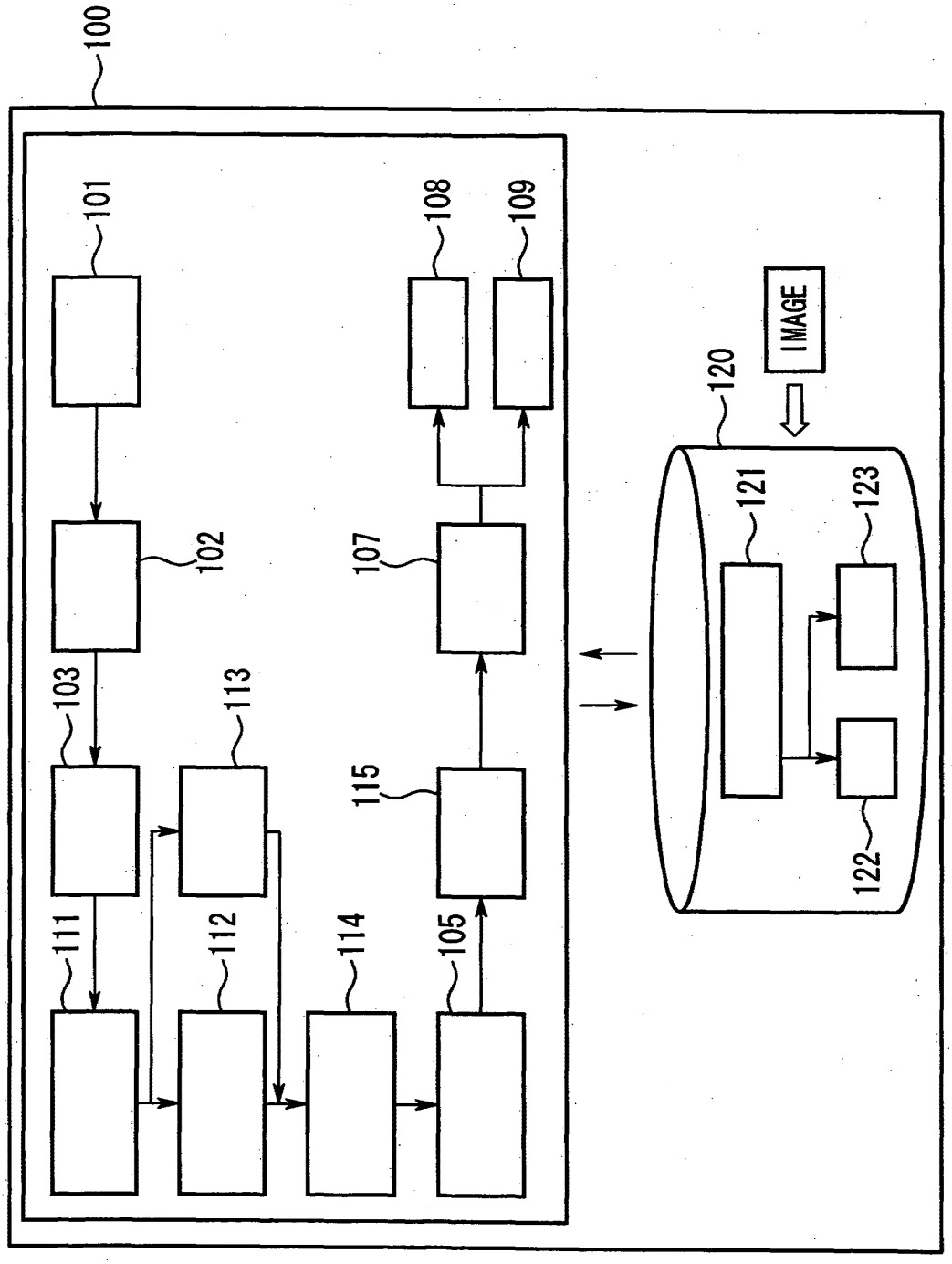

100
101
102
103
111
112
113
114
105
115
107
108
109
120
IMAGE
121
123
122

FIG. 3

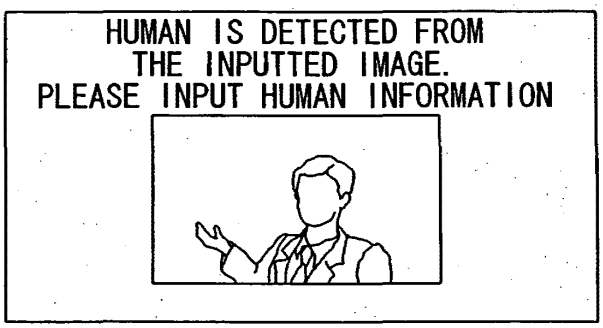


FIG. 4



FIG. 5

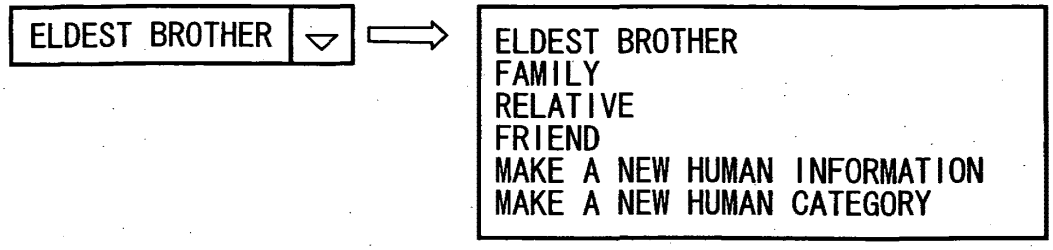


FIG.6

SUPERIOR KEYWORD 1	SUBORDINATE KEYWORD 2	NAME	BIRTHDAY	IMAGE
FAMILY	SECND ELDEST BROTHER	JIRO	JANUARY 1, 2003	IMAGE 1:TAKEN ON JANUARY 1, 2003 IMAGE 2:TAKEN ON FEBRUARY 1, 2003 IMAGE 3:TAKEN ON MARCH 1, 2003

FIG. 7

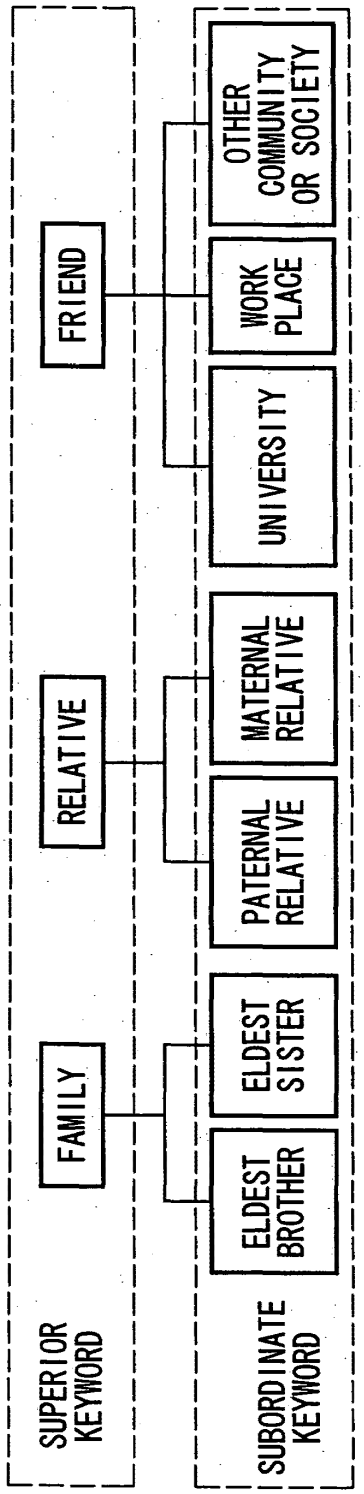

SUPERIOR KEYWORD
FAMILY
RELATIVE
FRIEND
SUBORDINATE KEYWORD
ELDEST BROTHER
ELDEST SISTER
PATERNAL RELATIVE
MATERNAL RELATIVE
UNIVERSITY
WORK PLACE
OTHER COMMUNITY OR SOCIETY

FIG. 8

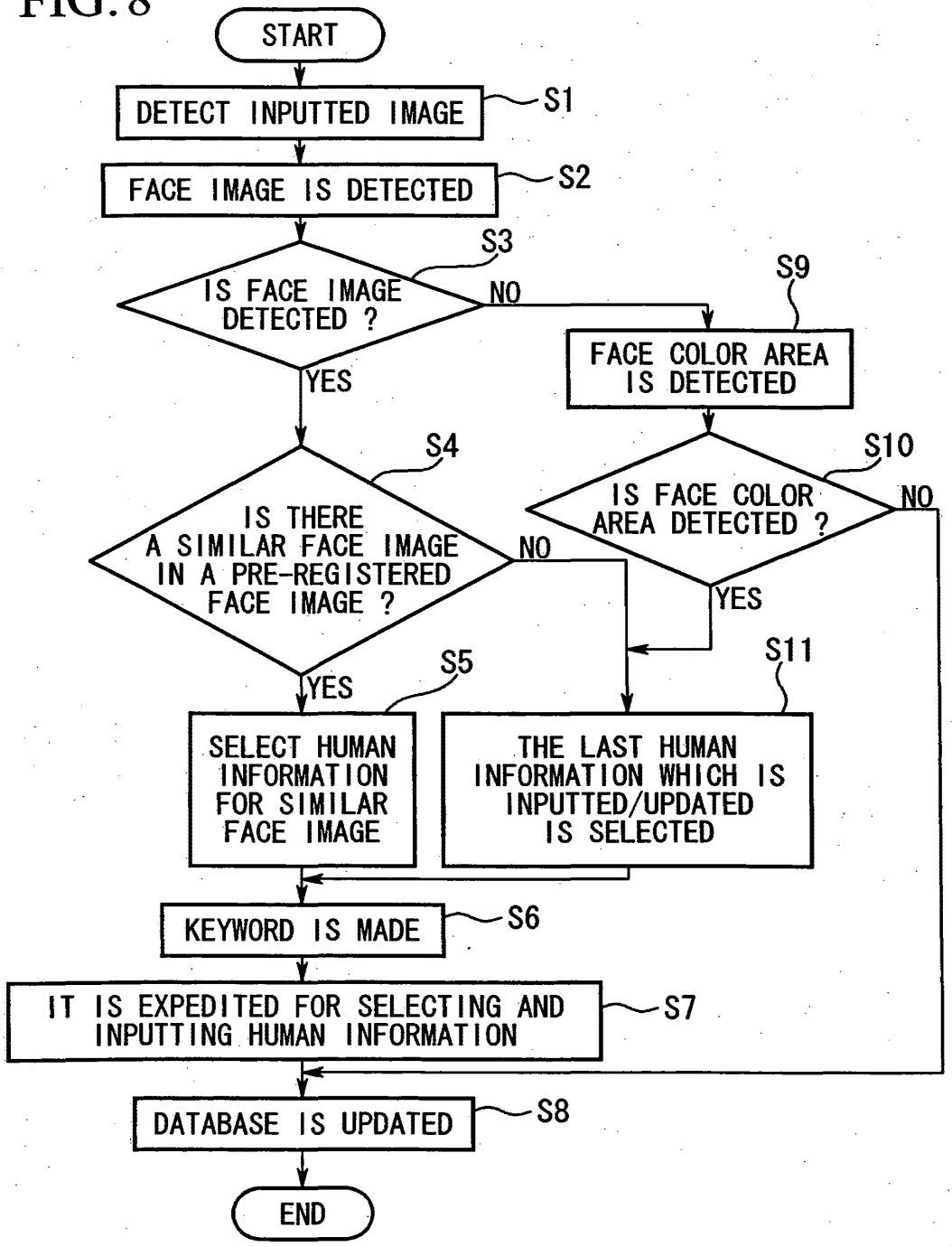

START
DETECT INPUTTED IMAGE
S1
FACE IMAGE IS DETECTED
S2
IS FACE IMAGE DETECTED ?
S3
NO
YES
S9
FACE COLOR AREA IS DETECTED
S4
IS THERE A SIMILAR FACE IMAGE IN A PRE-REGISTERED FACE IMAGE ?
NO
YES
S10
IS FACE COLOR AREA DETECTED ?
NO
YES
S5
S11
SELECT HUMAN INFORMATION FOR SIMILAR FACE IMAGE
THE LAST HUMAN INFORMATION WHICH IS INPUTTED/UPDATED IS SELECTED
KEYWORD IS MADE
S6
IT IS EXPEDITED FOR SELECTING AND INPUTTING HUMAN INFORMATION
S7
DATABASE IS UPDATED
S8
END

FIG. 9

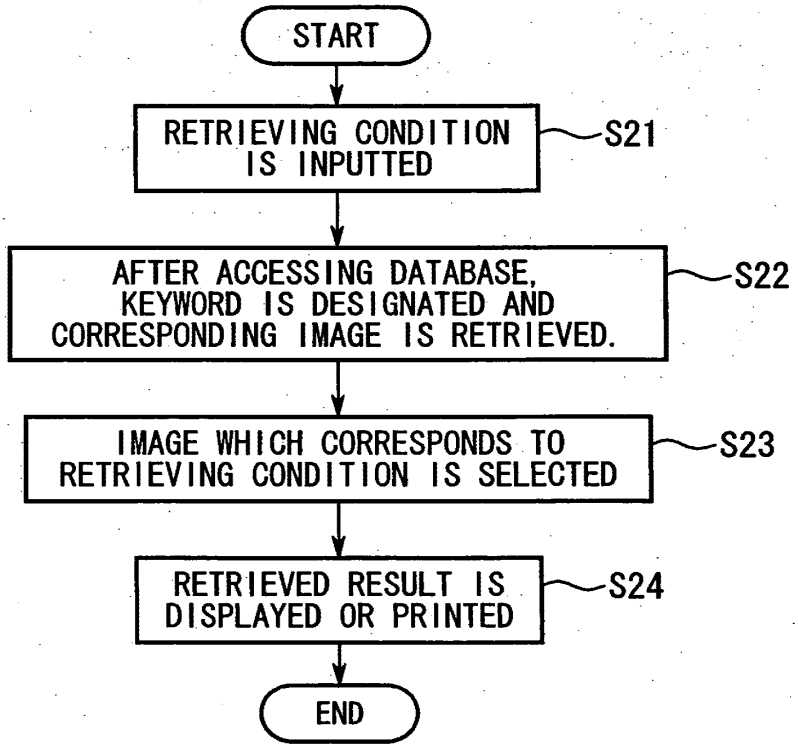
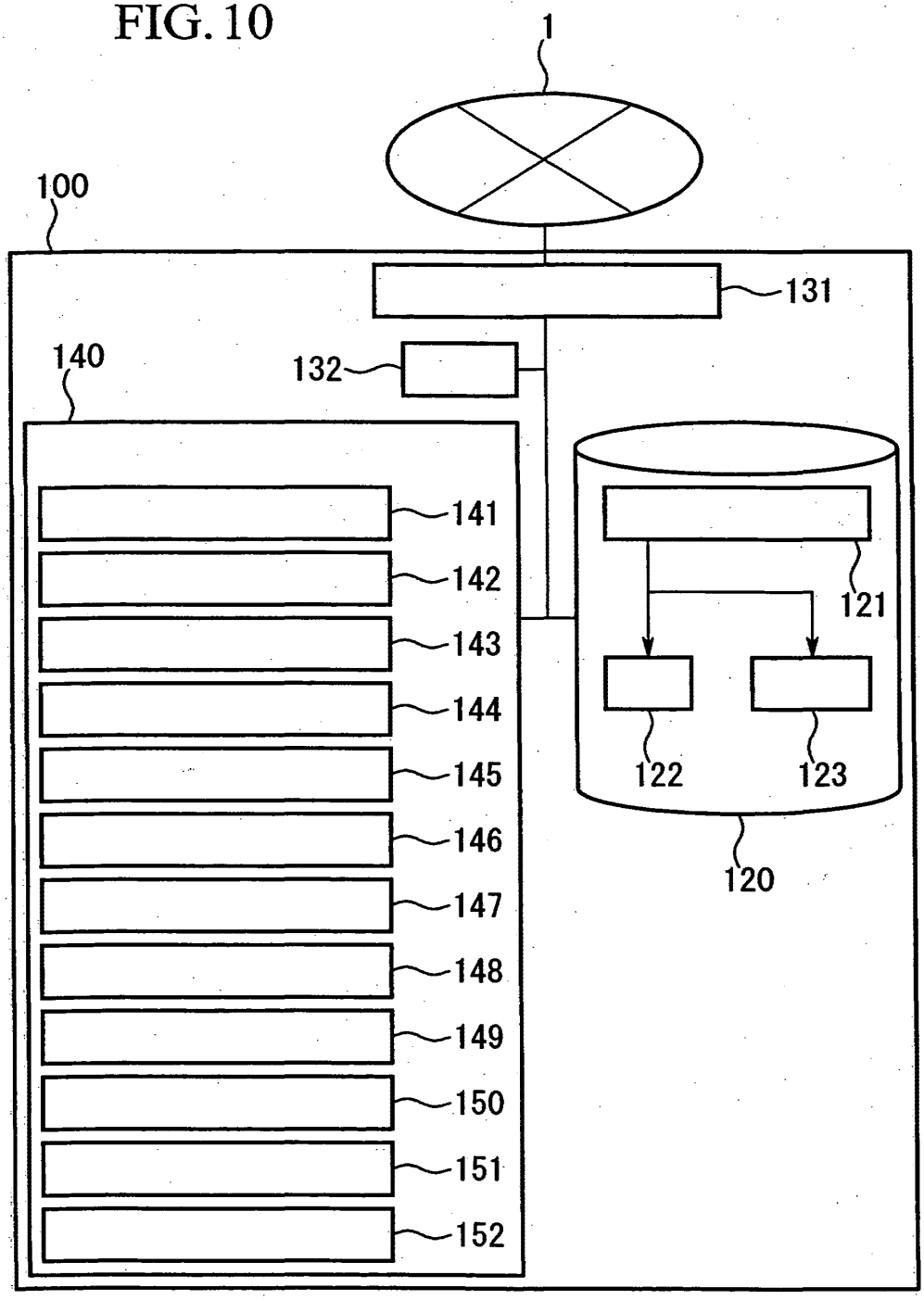

START
RETRIEVING CONDITION IS INPUTTED
S21
AFTER ACCESSING DATABASE, KEYWORD IS DESIGNATED AND CORRESPONDING IMAGE IS RETRIEVED.
S22
IMAGE WHICH CORRESPONDS TO RETRIEVING CONDITION IS SELECTED
S23
RETRIEVED RESULT IS DISPLAYED OR PRINTED
S24
END

FIG. 10


1
100
131
132
140
141
142
143
144
145
146
147
148
149
150
151
152
121
122
123
120

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toshinori NAGAHASHI

Application No.: New US Application

Filed: January 23, 2004 Docket No.: 118464

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

PRELIMINARY AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Please consider the following:

Amendments to the Claims as reflected in the listing of claims;

Remarks.

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) An image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword, comprising:

an image storing section for storing the image which is supposed to be classified and retrieved together with the keyword in a database;

an object acknowledging section for acknowledging a predetermined object in the image which is inputted;

a keyword proposing section for proposing the keyword which relates to the object which is acknowledged by the object acknowledging section; and

an object information inputting section for confirming, adding, and correcting the keyword which is proposed by the keyword proposing section.

2. (Original) An image retrieving device according to Claim 1 wherein the object acknowledging section comprises:

a human detection condition inputting section for setting up conditions for determining whether or not the image contains a human;

a face image detecting section for detecting a face image in the image; and

a face image similarity determining section for detecting a face image which is detected by the face image detecting section so as to detect a similar face image stored in the database according to the detected face imaged.

3. (Original) An image retrieving device according to Claim 2 wherein the object information inputting section serves as a personal information inputting section for confirming, adding, and correcting a personal information.

4. (Original) An image retrieving device according to Claim 2 wherein a skin color area detecting section for detecting a skin color area in the image is used when the human is detected.

5. (Original) An image retrieving device according to Claim 2 further comprising a keyword proposing section for proposing the keyword to the image which is inputted last in a case in which the similar face image is not detected by the face image similarity determining section.

6. (Currently Amended) An image retrieving device according to claim 1 ~~any one of Claims 1 to 5~~ wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

7. (Original) A method for adding keywords in an image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword, comprising the steps for:

storing the image which is supposed to be classified and retrieved together with the keyword in a database;

acknowledging a predetermined object in the image which is inputted;

proposing the keyword which relates to the object which is acknowledged by the object acknowledging section; and

confirming, adding, and correcting the keyword which is proposed by the keyword proposing section.

8. (Original) A computer program for a computer in an image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword, comprising commands for:

storing the image which is supposed to be classified and retrieved together with the keyword in a database;

acknowledging a predetermined object in the image which is inputted;

proposing the keyword which relates to the object which is acknowledged by the object acknowledging section; and

confirming, adding, and correcting the keyword which is proposed by the keyword proposing section.

9. (New) An image retrieving device according to claim 2 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

10. (New) An image retrieving device according to claim 3 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

11. (New) An image retrieving device according to claim 4 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

12. (New) An image retrieving device according to claim 5 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

REMARKS

Claims 1-12 are pending in this application. By this Amendment, claim 6 is amended and claims 9-12 are added.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Thomas J. Pardini
Registration No. 30,411

JAO:TJP/tmw

Date: January 23, 2004

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DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 15-0461

Application Data Sheet

Application Information

Application Type::	Regular
Subject Matter::	Utility
CD-ROM or CD-R:	None
Title::	IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR
Attorney Docket Number::	118464
Total Drawing Sheets::	8
Small Entity::	No

Applicant Information

Applicant Authority type::	Inventor
Primary Citizenship Country::	Japan
Status::	Full Capacity
Given Name::	Toshinori
Family Name::	NAGAHASHI
City of Residence::	Suwa-shi
Country of Residence::	Japan

Correspondence Information

Correspondence Customer Number:: 25944

Foreign Priority Information			
Country::	Application Number::	Filing Date::	Priority Claimed::
Japan	2003-020805	01/29/2003	Yes

Assignee Information	
Assignee Name::	SEIKO EPSON CORPORATION
Street of mailing address::	4-1, Nishishinjuku 2-chome, Shinjuku-ku
City of mailing address::	Tokyo
Country of mailing address::	Japan

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toshinori NAGAHASHI

Application No.: New US Application

Filed: January 23, 2004 Docket No.: 118464

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to 37 CFR §1.56, the attention of the Patent and Trademark Office is hereby directed to the reference(s) listed on the attached PTO-1449. Unless otherwise indicated herein, one copy of each reference is attached. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the reference(s) be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

☒ 1. This Information Disclosure Statement is being filed (a) within three months of the U.S. filing date of this non-CPA application, OR (b) before the mailing date of a first Office Action on the merits in the present application. No certification or fee is required.

☒ 2. Relevance of the non-English language references is discussed in the present specification.

☒ 3. English-language Abstracts of the non-English language references are attached hereto.

☒ 4. A computer-generated English translation of the following Japanese Patent Publication has been obtained from the website of the Japanese Patent Office ([http://www.jpo.go.jp]), and is attached, but has not been reviewed for accuracy. See References 1-3.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Thomas J. Pardini
Registration No. 30,411

JAO:TJP/tmw

Date: January 23, 2004

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
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Form PTO-1449 (REV. 8-83)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. New US Application
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS
	1	JP A 10-307849 (with abstract and translation)	11/17/1998	Japan		
	2	JP A 8-221547 (with abstract and translation)	08/30/1996	Japan		
	3	JP A 2001-160057 (with abstract and translation)	06/12/2001	Japan		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	DATE CONSIDERED

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: January 23, 2004

(19)日本国特許庁（ＪＰ）　(12) **公開特許公報（Ａ）**　(11)特許出願公開番号

特開平10－307849

(43)公開日　平成10年(1998)11月17日

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Ｇ０６Ｆ　17/30		Ｇ０６Ｆ	15/403	３２０Ｄ
			15/40	３７０Ａ
			15/401	３１０Ｃ
			15/403	３２０Ａ

審査請求　未請求　請求項の数９　ＯＬ　（全９頁）

(21)出願番号　特願平10－51694

(22)出願日　平成10年(1998)３月４日

(31)優先権主張番号　特願平9－52170

(32)優先日　平９(1997)３月６日

(33)優先権主張国　日本（ＪＰ）

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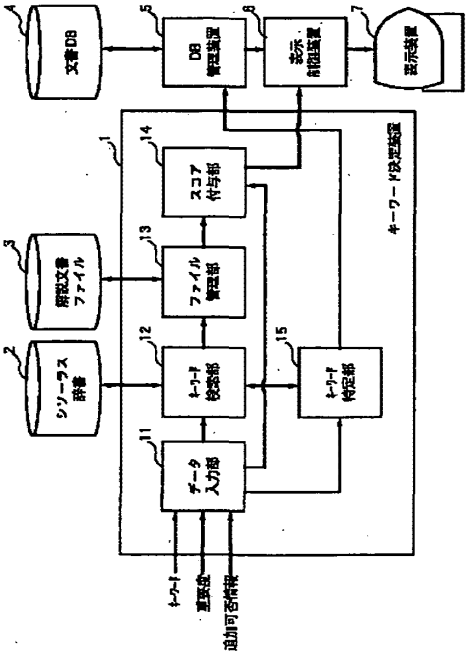
(74)代理人　弁理士　鈴木　正剛

(54)【発明の名称】　検索用のキーワードの決定方法及び装置、文書検索装置、記録媒体

(57)【要約】

【課題】　相互に関連する複数のキーワードによるシソーラス検索が可能な文書検索装置において、真に必要なキーワードのみを特定できるようにする。

【解決手段】　キーワード決定装置１において、入力キーワードに追加すべきキーワード候補をシソーラス辞書２から索出するとともに、そのキーワード候補の解説文書を解説文書ファイル３から索出する。そして、解説文書等に入力キーワードやキーワード候補との関連度合いに応じたスコアを付与し、これらを表示装置７へ表示させて、操作者に当該キーワード候補の追加可否判断を促す。操作者からの判断結果を解読し、そのキーワード候補が追加不要であれば、入力キーワードのみを検索用のキーワードとする。一方、キーワード候補の追加が必要である場合は、そのキーワード候補を検索用のキーワードに追加する。



1

【特許請求の範囲】

【請求項１】　相互に関連する複数のキーワードによるシソーラス検索が可能な文書検索装置に予めキーワード候補と当該キーワード候補の電子解説情報とをリンクさせて保持しておき、

任意の入力キーワードを受け付けたときに、前記文書検索装置上で、当該入力キーワードに追加すべき他のキーワード候補とそのキーワード候補にリンクする電子解説情報とを取得する処理と、取得したキーワード候補を電子解説情報と共に操作者が認識可能な形態で提示する処理と、該提示に応じて操作者より入力された当該キーワード候補の追加可否情報に基づいてシソーラス検索に用いる一または複数のキーワードを決定する処理とを少なくともこの順に実行することを特徴とするキーワード決定方法。

【請求項２】　前記電子解説情報に対して前記入力キーワード及びキーワード候補との関連度合いを表すスコアを付与し、前記キーワード候補及び電子解説情報を提示する際に、前記スコアに応じて異なる提示形態を形成することを特徴とする請求項１記載のキーワード決定方法。

【請求項３】　相互に関連する複数のキーワードによるシソーラス検索が可能な文書検索装置において一または複数のキーワードを決定する装置であって、

入力キーワードに対して追加すべきキーワード候補とそのキーワード候補に対応する電子解説情報とを取得するキーワード情報取得手段と、

取得した前記キーワード候補及び電子解説情報を前記文書画像検索装置が認識可能な情報形態に加工するとともに、前記文書検索装置に操作者に対して当該キーワード候補の追加可否情報の入力を促す提示形態を形成させる提示制御手段と、を有することを特徴とするキーワード決定装置。

【請求項４】　前記取得した電子解説情報に対して前記入力キーワード及びキーワード候補との関連度合いを表すスコアを付与するスコア付与手段をさらに有し、前記提示制御手段は、前記キーワード候補、及び／または、そのキーワード候補の電子解説情報を、前記スコア付与手段が付与したスコアに応じて異なる形態で文書検索装置に提示させるように構成されていることを特徴とする請求項３記載のキーワード決定装置。

【請求項５】　前記文書検索装置による提示に応じて操作者より入力されたキーワード候補の追加可否情報を解読し、解読結果に応じて当該キーワード候補をシソーラス検索用のキーワードとして追加するか否かを決定する手段をさらに有することを特徴とする請求項３または４記載のキーワード決定装置。

【請求項６】　決定されたシソーラス検索用のキーワードの各々に検索目的に応じた重み情報を付加する手段をさらに有することを特徴とする請求項５記載のキーワード決定装置。

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【請求項７】　相互に関連する複数のキーワードによるシソーラス検索が可能な文書検索装置であって、個々のキーワードに対して追加すべきキーワード候補を記録したシソーラス辞書と、キーワード候補毎にそのキーワード候補の電子解説情報を記録した情報ファイルと、前記シソーラス辞書及び情報ファイルの記録情報に基づいてシソーラス検索に用いる一または複数のキーワードを決定するキーワード決定装置とを含んで成り、

該キーワード決定装置が、

入力キーワードに追加すべきキーワード候補を前記シソーラス辞書より取得するとともに取得したキーワード候補の電子解説情報を前記情報ファイルより取得するキーワード情報取得手段と、

取得したキーワード候補及び電子解説情報を操作者が認識可能な形態で提示する情報提示手段と、

該情報提示手段による提示に応じて操作者より入力されたキーワード候補の追加可否情報を解読し、解読結果に応じて当該キーワード候補をシソーラス検索用のキーワードとして追加するか否かを決定する手段とを有することを特徴とする文書検索装置。

【請求項８】　相互に関連する複数のキーワードによるシソーラス検索が可能な文書検索装置をコンピュータ上で実現するためのプログラムがコンピュータ読み取り可能な形態で記録された記録媒体であって、

前記プログラムが、少なくとも、

予めキーワード候補と当該キーワード候補の電子解説情報とをリンクさせて保持する処理、

任意の入力キーワードを受け付けたときに、当該入力キーワードに追加すべき他のキーワード候補とそのキーワード候補にリンクする電子解説情報とを取得する処理、

取得したキーワード候補を電子解説情報と共に操作者が認識可能な形態で提示する処理、

該提示に応じて操作者より入力された当該キーワード候補の追加可否情報に基づいてシソーラス検索に用いる一または複数のキーワードを決定する処理を、前記コンピュータに実行させるものであることを特徴とする記録媒体。

【請求項９】　相互に関連する複数のキーワードによるシソーラス検索が可能な文書検索装置をコンピュータ上で実現するためのプログラムがコンピュータ読み取り可能な形態で記録された記録媒体であって、

前記プログラムが、少なくとも、

個々のキーワードに対して追加すべきキーワード候補を記録したシソーラス辞書及びキーワード候補毎にそのキーワード候補の電子解説情報を記録した情報ファイルを前記コンピュータに形成させ、さらに、

入力キーワードに追加すべきキーワード候補を前記シソーラス辞書より取得するとともに、このキーワード候補に対応する電子解説情報を前記情報ファイルより取得す

る処理、
取得したキーワード候補及び電子解説情報を操作者が認識可能な形態で提示する処理、
該提示に応じて操作者より入力されたキーワード候補の追加可否情報を解読し、解読結果に応じて当該キーワード候補をシソーラス検索用のキーワードとして追加するか否かを決定する処理、
を前記コンピュータに実行させるものであることを特徴とする記録媒体。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、相互に関連する複数のキーワードによるシソーラス検索が可能な文書検索装置に関し、特に、検索時に入力されたキーワード（入力キーワード）に追加すべき他のキーワード（キーワード候補）が、検索目的に適合したキーワードかどうかを決定して不要な検索処理を回避するための技術に関する。

【０００２】

【従来の技術】予めデータベース化された複数の電子文書から入力キーワードとの関連性がより高い電子文書を検索する装置として、入力キーワード毎に、その入力キーワードに関連する他のキーワードを追加し、相互に関連するこれらの複数のキーワードを用いてシソーラス検索を行う文書検索装置が知られている。この種の文書検索装置はコンピュータによって実現されるもので、図４の機能ブロック図に示すように、キーワード決定装置４１、シソーラス辞書４２、文書データベース（文書ＤＢ）４３、データベース（ＤＢ）管理装置４４、表示制御装置４５、及び表示装置４６を含んで構成される。

【０００３】シソーラス辞書４２は、キーワード毎に、追加すべき関連キーワード（追加キーワード）を記録したものであり、文書ＤＢ４３は、検索対象となる複数の電子文書を格納したものである。キーワード決定装置４１は、キーワードや検索目的に応じた重み情報、すなわち重要度を入力するデータ入力部４７、入力キーワードに関連する追加キーワードをシソーラス辞書４２より索出するキーワード検索部４８、及び入力キーワード及び追加キーワードにそれぞれ重要度を設定して検索に用いる複数のキーワードを特定するキーワード特定部４９の機能を備えるものである。特定されたキーワードは、ＤＢ管理装置４４に送られる。ＤＢ管理装置４４は、複数のキーワードと各キーワードに設定された重要度に基づいて文書ＤＢ４３より該当する電子文書を索出し、表示制御装置４５を通じて電子文書を表示装置４６に表示させる。

【０００４】上記構成の文書検索装置において、入力キーワード及び重要度が取得されてから、シソーラス検索に用いる複数のキーワードが特定されるまでの過程を図５に示す。図５中、符号４２，４７，４９は、図４における

キーワード決定装置４１の該当機能ブロックを表している。

【０００５】図５を参照すると、入力キーワード「ｋｗｄ１」、「ｋｗｄ２」、「ｋｗｄ３」に関連する追加キーワードとして、それぞれシソーラス辞書４２から「ｋｗｄ８」、「ｋｗｄ６」、「ｋｗｄ７」が索出されている。また、入力キーワード「ｋｗｄ１」、「ｋｗｄ２」、「ｋｗｄ３」の重要度として、それぞれ「２」、「１０」、「６」が設定されている。追加キーワード「ｋｗｄ８」、「ｋｗｄ６」、「ｋｗｄ７」の重要度については、これらが入力キーワードから二次的に導かれていることを考慮して、入力キーワード「ｋｗｄ１」、「ｋｗｄ２」、「ｋｗｄ３」に設定された重要度の値の１／２の値、つまり、「１」、「５」、「３」が設定されている。ＤＢ管理装置４４は、上記複数のキーワードと重要度とを用いたシソーラス検索（文書検索）を行い、該当する電子文書を文書ＤＢ４３より索出して、これを表示制御装置４５へ送る。表示制御装置４５は、この電子文書を表示装置４６に画面表示する。

【０００６】このように、従来の文書検索装置では、４つの入力キーワード「ｋｗｄ１」～「ｋｗｄ４」だけでなく、追加キーワード「ｋｗｄ６」～「ｋｗｄ９」をも加えた８つのキーワードによってシソーラス検索を行うことで、広範囲な検索を可能にするとともに、検索時に各キーワードの重要度をも考慮することで、検索目的に合致した電子文書の取得を可能にしている。

【０００７】

【発明が解決しようとする課題】上述のように、従来の文書検索装置では、追加キーワードを全てシソーラス検索用のキーワードとして用いている。しかし、追加キーワードの中には、操作者にとって必ずしも重要でなかったり、全く不要なものが含まれる場合があり、このような不要な追加キーワードに基づくシソーラス検索は無駄な処理となる。そのため、従来の文書検索装置では、検索時間の短縮化が図れないばかりでなく、操作者が真に望む電子文書とは全く異なる電子文書が索出されてしまう場合が多かった。例えば、パーソナルコンピュータの製品名である「マッキントッシュ」の略語である「マック」を入力キーワードとした場合に、追加キーワードとして、ファーストフードのチェーン店である「マクドナルド」が抽出されることがある。この場合、コンピュータとは全く関係のない、食品業界関係の情報を記述した電子文書が検索されてしまう。

【０００８】そこで本発明の課題は、相互に関連する複数のキーワードによるシソーラス検索が可能な文書検索装置において、入力キーワードに他の関連キーワードを追加する際に、その関連キーワードが操作者にとって真に検索に必要なキーワードかどうかを判定して無駄な検索処理を回避することにある。本発明の他の課題は、上記文書検索処理をコンピュータで実現するための記録媒

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体を提供することにある。

【０００９】

【課題を解決するための手段】上記課題を解決するため、本発明は、相互に関連する複数のキーワードによるシソーラス検索が可能な文書検索装置において適用される、改良されたキーワード決定方法を提供する。この方法は、文書検索装置に予めキーワード候補と当該キーワード候補の電子解説情報とをリンクさせて保持しておき、任意の入力キーワードを受け付けたときに、文書検索装置上で、当該入力キーワードに追加すべき他のキーワード候補とそのキーワード候補にリンクする電子解説情報とを取得する処理と、取得したキーワード候補を電子解説情報と共に操作者が認識可能な形態で提示する処理と、該提示に応じて操作者より入力された当該キーワード候補の追加可否情報に基づいてシソーラス検索に用いる一または複数のキーワードを決定する処理とを少なくともこの順に実行することを特徴とする。電子解説情報は、例えばそのキーワード候補を含む周辺知識を記録した解説文書であり、それが提示されたときに操作者がキーワード候補の意味内容を把握できる内容のものである。

【００１０】このように、文書検索装置側から操作者にキーワード候補と電子解説情報を併せて提示することで、操作者に対してキーワード候補を追加すべきかどうかの判断の便宜を図り、操作者による判断結果に応じてキーワードの追加可否を決定するようにして、不要なキーワードに基づく検索処理を回避する。

【００１１】本発明は、また、上記方法の実施に適した文書検索装置をも提供する。本発明の文書検索装置は、相互に関連する複数のキーワードによるシソーラス検索が可能な装置であって、個々のキーワードに対して追加すべきキーワード候補を記録したシソーラス辞書と、キーワード候補毎にそのキーワード候補の電子解説情報を記録した情報ファイルと、前記シソーラス辞書及び情報ファイルの記録情報に基づいてシソーラス検索に用いる一または複数のキーワードを決定するキーワード決定装置とを含んで構成される。

【００１２】キーワード決定装置は、以下のような構成要素の全てあるいは一部の組み合わせから成り、文書検索装置に、操作者に対して前記キーワード候補の追加可否情報の入力を促す提示形態を形成させるとともに、操作者からの追加可否情報に基づいて合理的な検索を行うためのキーワードを決定する。

（１）入力キーワードに対して追加すべきキーワード候補とそのキーワード候補の電子解説情報とを取得するキーワード情報取得手段。

（２）キーワード情報取得手段で取得したキーワード候補または電子解説情報に対して前記入力キーワードとの関連度合いを表すスコアを付与するスコア付与手段。

（３）前記キーワード情報取得手段で取得したキーワード候補をその電子解説情報と共に操作者が認識可能な形態で提示させる提示制御手段。なお、前述のようにスコアが電子解説情報に付与される場合、この提示制御手段は、スコアに応じて異なる形態でキーワード候補や電子解説情報を提示させるように構成する。

（４）前記提示制御手段による提示に応じて操作者より入力されたキーワード候補の追加可否情報を解読し、解読結果に応じて当該キーワード候補をシソーラス検索用のキーワードとして追加するか否かを決定する手段。

（５）決定されたシソーラス検索用のキーワードの各々に検索目的に応じた重み情報を付加する手段。

【００１３】上記他の課題を解決する本発明の記録媒体は、相互に関連する複数のキーワードによるシソーラス検索が可能な文書検索装置をコンピュータ上で実現するためのプログラムがコンピュータ読み取り可能な形態で記録された記録媒体であって、前記プログラムが、少なくとも、予めキーワード候補と当該キーワード候補の電子解説情報とをリンクさせて保持する処理、任意の入力キーワードを受け付けたときに、当該入力キーワードに追加すべき他のキーワード候補とそのキーワード候補にリンクする電子解説情報とを取得する処理、取得したキーワード候補を電子解説情報と共に操作者が認識可能な形態で提示する処理、該提示に応じて操作者より入力された当該キーワード候補の追加可否情報に基づいてシソーラス検索に用いる一または複数のキーワードを決定する処理を、前記コンピュータに実行させるものである。

【００１４】本発明の他の記録媒体は、相互に関連する複数のキーワードによるシソーラス検索が可能な文書検索装置をコンピュータ上で実現するためのプログラムがコンピュータ読み取り可能な形態で記録された記録媒体であって、前記プログラムが、少なくとも、個々のキーワードに対して追加すべきキーワード候補を記録したシソーラス辞書及びキーワード候補毎にそのキーワード候補の電子解説情報を記録した情報ファイルを前記コンピュータに形成させ、さらに、入力キーワードに追加すべきキーワード候補を前記シソーラス辞書より取得するとともに、このキーワード候補に対応する電子解説情報を前記情報ファイルより取得する処理、取得したキーワード候補及び電子解説情報を操作者が認識可能な形態で提示する処理、該提示に応じて操作者より入力されたキーワード候補の追加可否情報を解読し、解読結果に応じて当該キーワード候補をシソーラス検索用のキーワードとして追加するか否かを決定する処理、を前記コンピュータに実行させるものである。

【００１５】

【発明の実施の形態】以下、図面を参照して本発明の実施の形態を詳細に説明する。図１は、本発明の一実施形態に係る文書検索装置の機能ブロック図である。この文書検索装置は、パーソナルコンピュータやワークステーション等のコンピュータで実現される。すなわち、通信

ネットワークを通じて入力され、あるいはCD－ROM（コンパクトディスク型ROM）やFD（フレキシブルディスク）等の可搬性メディアから読み出したプログラムを図示しないコンピュータメモリにインストールし、該コンピュータが上記プログラムを随時読み出して実行することによって形成される、キーワード決定装置１、シソーラス辞書２、情報ファイルである解説文書ファイル３、文書DB４、DB管理装置５、表示制御装置６と、CRTあるいは液晶パネルからなる表示装置７とを含んで構成される。

【００１６】シソーラス辞書３、文書DB４、DB管理装置５、表示装置７は、それぞれ図４に示した従来装置のシソーラス辞書４２、文書DB４３、DB管理装置４４、表示装置４６と同一機能のものである。解説文書ファイル３には、キーワード候補毎にそのキーワード候補の意味内容、周辺知識、その他関連する情報等を記述した解説文書（電子解説情報）が記録されている。この場合、解説文書は、一つのキーワード候補について複数のものを用意しておき、各々の関連度合いに応じて特定のものを選択できるようにしておく。

【００１７】キーワード決定装置１は、シソーラス検索に用いる合理的なキーワードを決定するために、データ入力部１１、キーワード検索部１２、ファイル管理部１３、スコア付与部１４、及びキーワード特定部１５の機能を備えて構成される。データ入力部１１は、入力キーワードやその重要度、キーワード候補の追加可否情報、その他のデータの入力を受け付けるものであり、キーワード検索部１２は、入力キーワードに関連する他のキーワードをシソーラス辞書２から索出してこれを追加すべきキーワード候補として一時的に保持するものである。

【００１８】ファイル管理部１３はキーワード候補とそのキーワード候補の解説文書の記録領域とをリンクさせて管理するものである。具体的には、あるキーワード候補の解説文書が解説文書ファイル３のどの記録領域（コード番号）に存在するかを表すテーブルを有しており、キーワード候補が特定されたとき、このキーワード候補についての解説文書をコード番号を通じて解説文書ファイル３より取得できるようになっている。

【００１９】スコア付与部１４は、個々の解説文書に対して入力キーワードやキーワード候補との関連度合いを表すスコア（評価値）を付与するものである。このスコアは、同一のキーワード候補について複数の解説文書があるときの選択順序の特定と、表示制御装置６において操作者によるキーワード候補の追加可否判断を容易にするための表示形態の形成時に用いられるものである。スコアの付与については種々の手法を採用することができる。例えば、公知のTF／IDF法（「Introduction to Modern Information Retrieval」, Gerard Salton他著、McGraw-HillPublishing Company刊）や、本出願人により先に提案された特願平8-110870号明細書「類似文書検索装置」に開示されているスコア付与手法等を用いることができる。

【００２０】キーワード特定部１５は、操作者より入力された当該キーワード候補の追加可否情報を解読し、解読の結果、追加不要（操作者がそのキーワード候補を採用しない）と判定した場合は、そのキーワード候補を破棄（削除）して入力キーワードのみを検索用のキーワードとする。一方、解読の結果、追加が必要（操作者がそのキーワード候補を採用する）と判定した場合は、そのキーワード候補を入力キーワードに追加する。また、入力キーワードと追加されたキーワードの重要度をも決定し、これらを各キーワード毎に設定してDB管理装置５へ出力する。入力キーワードの重要度は、キーワードと共に入力されたものをそのまま用いる。追加されたキーワードの重要度については、入力キーワードの重要度の値をそのまま用いてもよいし、入力キーワードの重要度の値に係数（例えば、従来装置の場合と同様の０．５）を乗算した値を用いてもよい。この例では、後者の値を用いる。

【００２１】表示制御装置６は、スコアが付与された解説文書とキーワード候補とをキーワード決定装置１より受領し、キーワード候補とその解説文書とを表示装置７に同時に表示させるための制御を行うものである。表示させる形態は、例えば、キーワード候補と解説文書の一部（例えばタイトルのみ、タイトルと著者、あるいは要約のみ）を表示させる形態、キーワード候補と解説文書の全文を表示させる形態、キーワード候補のみを点滅あるいは他の部分と異なる色を用いて強調表示させる形態等、操作者が注意を喚起し得る種々の形態を任意に選択できるようにする。また、操作者がキーワード候補の追加可否の判断を容易に行えるようにするため、解説文書に付与された上記スコアを識別し、スコアの高い解説文書ほど画面上部に位置させたり、あるいは大きな文字、インパクトの強い色等で強調表示させるようにしてもよい。また、解説文書をスタック形式で表示させ、スコアの高い解説文書ほどスタックの上位に表示させるようにしてもよい。

【００２２】次に、図２及び図３を参照して、本実施形態による文書検索装置の動作を具体的に説明する。図２は、本実施形態の文書検索装置において用いる入力キーワード、キーワード候補、解説文書、スコア、重要度の具体例を示す説明図であり、図３は、主としてキーワード決定装置１におけるキーワード特定処理の手順を示すフローチャートである。図２において、符号２，３，７，１１，１３，１５は、それぞれ図１におけるキーワード決定装置１の該当機能ブロックを表している。

【００２３】いま、図２に示すように「エイズ」、「薬害」、「感染症」の３つの入力キーワードがデータ入力部１１に入力されたとする（ステップS１０１）。キーワード検索部１２は、まず、シソーラス辞書２に、「エ

イズ」について追加すべきキーワード候補が記録されているかどうかを検索する（ステップＳ１０２）。この例では、「エイズ」に対するキーワード候補として「血液製剤」がシソーラス辞書２に記録されているので、キーワード検索部１２は、この「血液製剤」を索出してファイル管理部１３へ送る。

【００２４】ファイル管理部１３は、キーワード候補である「血液製剤」からそれが記録されている領域のコード番号「4000」を特定する。そして、このコード番号「4000」に対応した解説文書ファイル３の記録領域から解説文書「１」～「３」を索出し、これをスコア付与部１４へ送る（ステップＳ１０３）。

【００２５】スコア付与部１４は、入力キーワードとその重要度、及びキーワード候補に基づいて、解説文書「１」～「３」に対してそれぞれスコアを付与する（ステップＳ１０４）。解説文書「１」には、重要度「２」の「エイズ」と、重要度「１０」の「薬害」と、重要度「６」の「感染症」とが含まれているため、スコアは他の解説文書「２」，「３」よりも高くなっている。スコアが付与された解説文書「１」～「３」は、キーワード候補である「血液製剤」と共に表示制御装置６へ送られる。表示制御装置６は、「血液製剤」と各解説文書「１」～「３」とを共に表示装置７に表示させる（ステップＳ１０５）。

【００２６】「血液製剤」等の表示に基づいて操作者からキーワード候補の追加可否情報が入力されると、キーワード特定部１５は、この追加可否情報を解読する。そして解読の結果、「血液製剤」の追加が選択されなかった場合（ステップＳ１０６：No）、キーワード特定部１５は、自己あるいはキーワード検索部１２に保持されている「血液製剤」を削除する。一方、「血液製剤」の追加が選択された場合（ステップＳ１０６：Yes）は、「血液製剤」の重要度を設定する（ステップＳ１０８）。この実施形態では、もとの入力キーワードの重要度の０．５倍の値をキーワード候補の重要度としており、入力キーワード「エイズ」の重要度が「２」であることから、「血液製剤」の重要度を「１」に設定する。

【００２７】次のキーワード候補がある場合はステップＳ１０２の処理に戻り、次のキーワード候補がない場合は検索用のキーワードを決定してＤＢ管理装置５へ出力する（ステップＳ１０９）。つまり、操作者が「血液製剤」の追加を選択しなかった場合は「エイズ」、「薬害」、「感染症」の３つの入力キーワードのみを検索用のキーワードとして決定し、一方「血液製剤」の追加を選択した場合はこれを検索用のキーワードに追加して、ＤＢ管理装置５へ出力する。ＤＢ管理装置５は、決定された検索用のキーワードをこれらの重要度をも考慮したうえで、電子文書の検索を行う。

【００２８】このように、本実施形態の文書検索装置では、キーワード追加装置１が、入力キーワードに基づいて索出されたキーワード候補の追加可否を操作者に判断させた後に検索用のキーワードを決定するので、不要なキーワードによる検索処理を回避することができる。また、キーワード候補と共にその解説文書をも表示させるようにしたので、操作者がキーワード候補の意味内容やその関連知識を別途調べなくとも、容易かつ的確にそのキーワード候補が検索に必要かどうかを判断できるようになり、検索に要する時間の短縮化を図ることもできる。さらに、各キーワードに付与された重要度をも考慮したうえでシソーラス検索を行うことができるので、検索精度を高めることもできる。

【００２９】なお、本実施形態では、キーワード候補を一つずつ処理する場合の例について説明したが、複数のキーワード候補について同時に上記処理を行うようにしてもよい。また、この実施形態では、一つの入力キーワードに対するキーワード候補の数は一つとして説明したが、入力キーワードに対するキーワード候補の数は任意に決定することができる。

【００３０】さらに、本実施形態では、操作者に対するキーワード候補や電子解説情報の提示の形態として、表示装置６を用いた画面表示の例について説明したが、画面表示に代えて、あるいは画面表示と共に、音声合成装置や既存のテキストリーダ等を用いて音声の形で提示するようにしてもよい。キーワード候補等を音声で出力する場合、上述のスコアは、例えば音量の強弱や音色を変化させるためのパラメータとして用いることができる。

【００３１】

【発明の効果】以上の説明から明らかなように、本発明によれば、キーワード候補がその電子解説情報と共に操作者に提示されるので、操作者は、そのキーワード候補の追加が必要であるか否かの判断を容易かつ正確行うことができるようになる。

【００３２】また、操作者によって必要であると判断したキーワード候補のみが追加され、余計なキーワード候補は検索に用いられなくなるので、無駄な検索処理が回避され、従来よりも一層高速かつ正確な文書検索が可能となる。

【００３３】更に、電子解説情報に、入力キーワードとの関連度合いに応じたスコアが付与されて提示されるので、操作者によるキーワード候補の追加可否判断がより一層容易かつ正確になる。

【図面の簡単な説明】

【図１】本発明の一実施形態に係る文書検索装置の機能ブロック図。

【図２】本実施形態の文書検索装置における入力キーワード、キーワード候補、解説文書、スコア、重要度の例と、これらに基づいて検索用のキーワードが特定されるまでの過程を示す説明図。

【図３】本実施形態の文書検索装置によるキーワード特定処理の手順を示すフローチャート。

【図４】従来の文書検索装置の機能ブロック図。

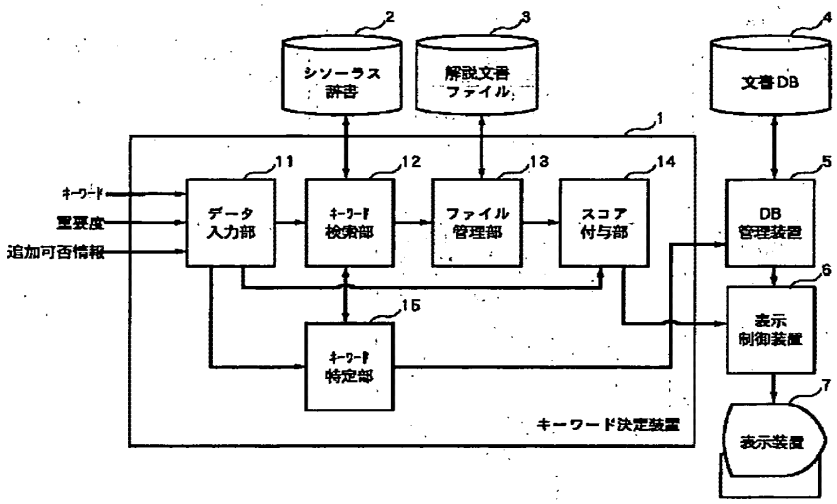
【図５】従来の文書検索装置における入力キーワード、追加キーワード、重要度の例と、検索用のキーワードが特定されるまでの過程を示す説明図。

【符号の説明】

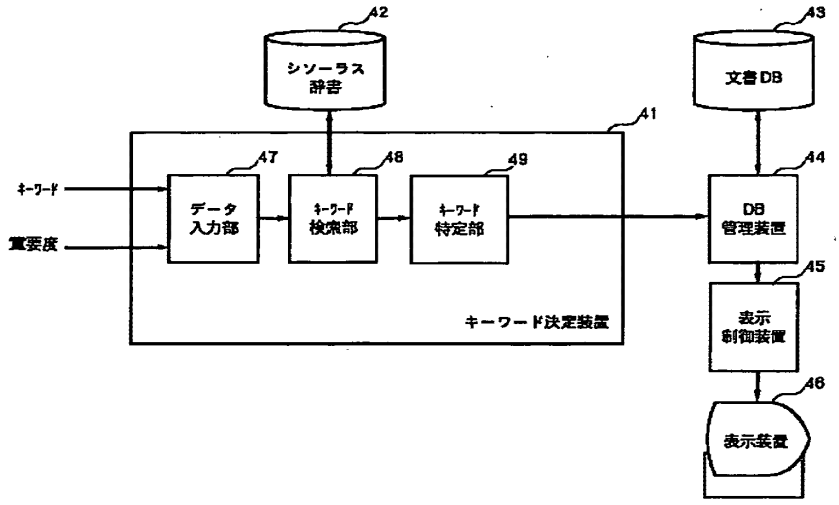
1　キーワード決定装置
2　シソーラス辞書
3　解説文書ファイル
4　文書ＤＢ（データベース）

5　ＤＢ管理装置
6　表示制御装置
7　表示装置
１１　データ入力部
１２　キーワード検索部
１３　ファイル管理部
１４　スコア付与部
１５　キーワード特定部

【図１】

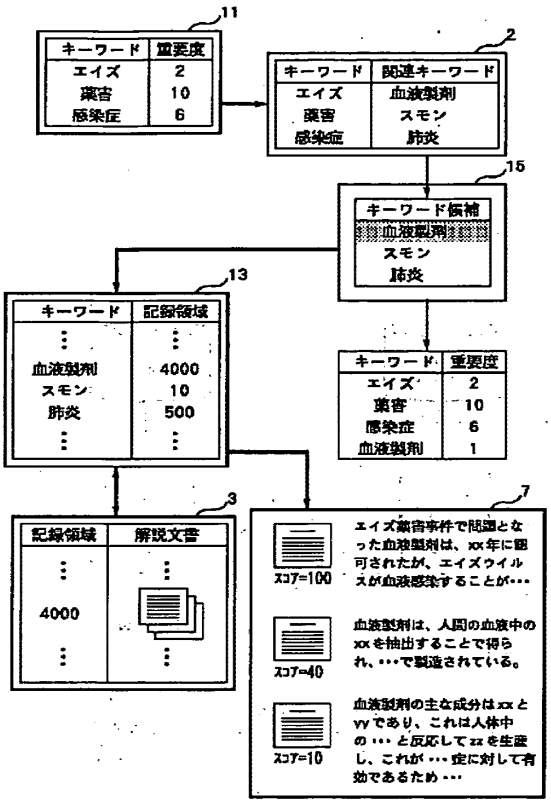


【図４】

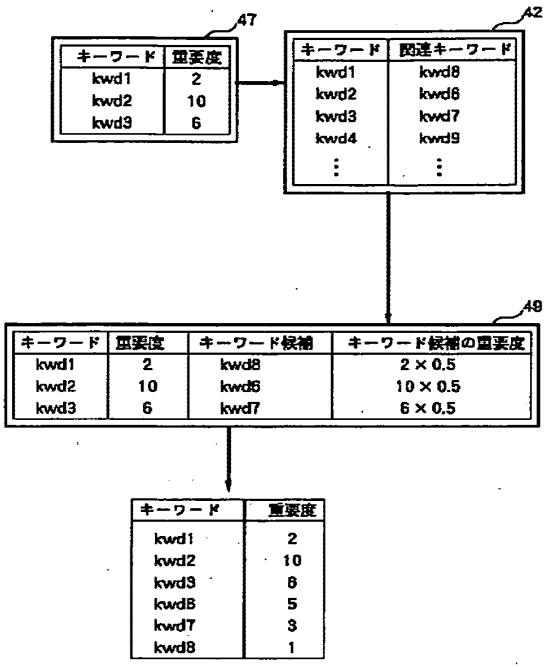


(8)

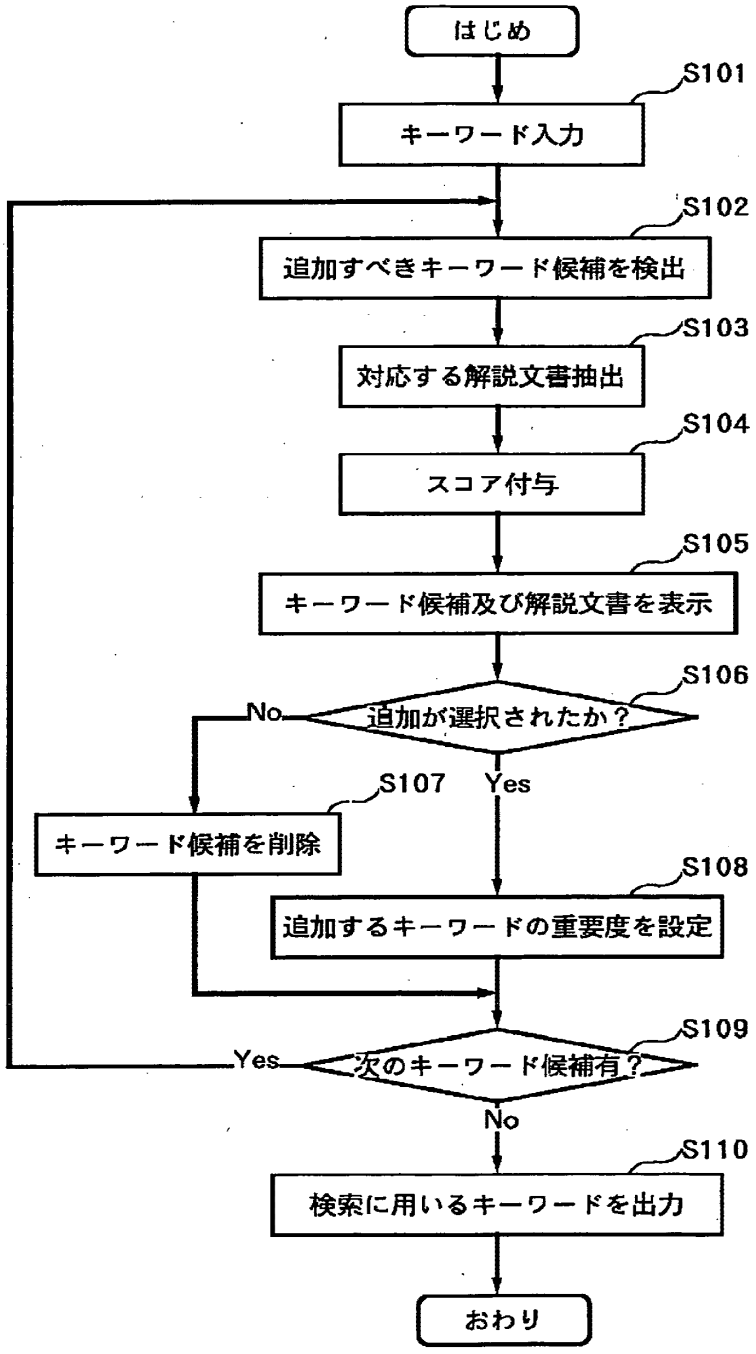
【図２】


11
キーワード
重要度
エイズ
2
薬害
10
感染症
6
2
キーワード
関連キーワード
エイズ
血液製剤
薬害
スモン
感染症
肺炎
15
キーワード候補
血液製剤
スモン
肺炎
13
キーワード
記録領域
血液製剤
4000
スモン
10
肺炎
500
キーワード
重要度
エイズ
2
薬害
10
感染症
6
血液製剤
1
3
記録領域
解説文書
4000
7
スコア=100
エイズ薬害事件で問題となった血液製剤は、xx年に認可されたが、エイズウイルスが血液感染することが・・・
スコア=40
血液製剤は、人間の血液中のxxを抽出することで得られ、・・・で製造されている。
スコア=10
血液製剤の主な成分はxxとyyであり、これは人体中の・・・と反応してzzを生成し、これが・・・症に対して有効であるため・・・

【図５】


47
キーワード
重要度
kwd1
2
kwd2
10
kwd3
6
42
キーワード
関連キーワード
kwd1
kwd8
kwd2
kwd6
kwd3
kwd7
kwd4
kwd9
49
キーワード
重要度
キーワード候補
キーワード候補の重要度
kwd1
2
kwd8
2 × 0.5
kwd2
10
kwd6
10 × 0.5
kwd3
6
kwd7
6 × 0.5
キーワード
重要度
kwd1
2
kwd2
10
kwd3
8
kwd8
5
kwd7
3
kwd8
1

【図３】


はじめ
S101
キーワード入力
S102
追加すべきキーワード候補を検出
S103
対応する解説文書抽出
S104
スコア付与
S105
キーワード候補及び解説文書を表示
S106
No
追加が選択されたか？
Yes
S107
キーワード候補を削除
S108
追加するキーワードの重要度を設定
S109
Yes
次のキーワード候補有？
No
S110
検索に用いるキーワードを出力
おわり

PATENT ABSTRACTS OF JAPAN

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(51)Int.Cl. G06F 17/30

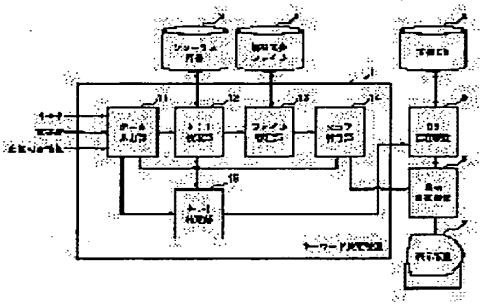
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(71)Applicant : N T T DATA:KK
(72)Inventor : NAKAJIMA HIROYUKI
KITANI TSUYOSHI

(30)Priority
Priority number : 09 52170 Priority date : 06.03.1997 Priority country : JP

(54) RETRIEVING KEYWORD DETERMINING METHOD, ITS DEVICE, DOCUMENT RETRIEVING DEVICE, AND RECORDING MEDIUM

(57)Abstract:
PROBLEM TO BE SOLVED: To specify only a really necessary keyword in a document retrieving device capable of retrieving a thesaurus by plural mutually relational keywords.
SOLUTION: A keyword determination device 1 retrieves a keyword candidate to be added to an input keyword from a thesaurus dictionary 2 and retrieves an instruction document for the keyword candidate from an instruction document file 3. A score corresponding to the degree of relation with the input keyword and the keyword candidate is applied to the document or the like and displayed on a display device 7 to suggest judgement whether a keyword candidate is to be added or not to an operator. When the addition of the keyword candidate is unnecessary after decoding the judged result from the operator, only the input keyword is selected as a keyword for retrieval. When the addition of the keyword candidate is necessary, the candidate is added to the retrieving keyword.



LEGAL STATUS
[Date of request for examination]
[Date of sending the examiner's decision of rejection]
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]
[Patent number]

[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of rejection]
[Date of extinction of right]

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CLAIMS

[Claim(s)]
[Claim 1] When the electronic description information of a keyword candidate and the keyword candidate concerned is made to link to the document-retrieval equipment in which the thesaurus reference by two or more keywords related mutually is possible beforehand, it holds and arbitrary input keywords are received The processing which acquires the electronic description information linked to other keyword candidate who should add to the input keyword concerned, and its keyword candidate on the aforementioned document-retrieval equipment, The processing which presents the keyword candidate who acquired with electronic description information with the form which an operator can recognize, The keyword determination method characterized by performing at least processing which determines 1 or two or more keywords which are used for thesaurus reference based on the additional propriety information of the keyword candidate concerned that it was inputted by the operator according to this presentation in this order.
[Claim 2] The keyword determination method according to claim 1 characterized by forming a different presentation form according to the aforementioned score in case the score which expresses a related degree with the aforementioned input keyword and a keyword candidate to the aforementioned electronic description information is given and the aforementioned keyword candidate and electronic description information are shown.
[Claim 3] Equipment which determines 1 or two or more keywords in the document-retrieval equipment in which the thesaurus reference by two or more keywords related mutually characterized by providing the following is possible A keyword information acquisition means to acquire the electronic description information corresponding to the keyword candidate who should add to an input keyword, and its keyword candidate Presentation control means in which the presentation form which urges the input of the additional propriety information of the keyword candidate concerned to the aforementioned document-retrieval equipment to an operator is made to form while processing the aforementioned keyword candidate and electronic description information which were acquired into the information form which can recognize the aforementioned document picture reference equipment
[Claim 4] It is keyword determination equipment according to claim 3 carry out that have further a score grant means give the score which expresses a related degree with the aforementioned input keyword and a keyword candidate to the electronic description information which carried out [aforementioned] acquisition, and the aforementioned presentation control means are constituted so that the aforementioned score grant means may make the aforementioned keyword candidate and/or the keyword candidate's electronic description information show document-retrieval equipment with a different form according to the given score as the feature.
[Claim 5] Keyword determination equipment according to claim 3 or 4 characterized by having further a means to determine whether to decode a keyword candidate's additional propriety information that it was inputted by the operator according to presentation by the aforementioned document-retrieval equipment, and add the keyword candidate concerned as a keyword for thesaurus reference according to a decode result.
[Claim 6] Keyword determination equipment according to claim 5 characterized by having further a means to add the weight information according to the reference purpose to each of the determined keyword for thesaurus reference.
[Claim 7] the thesaurus reference by two or more keywords related mutually characterized by providing the following is possible -- it document-retrieval-equips The thesaurus dictionary which recorded the keyword candidate who should add to each keyword The information file which recorded the keyword candidate's electronic description information for every keyword candidate A keyword information acquisition means acquire a keyword candidate's electronic description information acquired while it changed including the keyword determination equipment which determines 1 or two or more keywords

which are used for thesaurus reference based on the recording information of the aforementioned thesaurus dictionary and an information file and this keyword determination equipment acquired the keyword candidate who should add to an input keyword from the aforementioned thesaurus dictionary from the aforementioned information file A means to determine whether to decode a keyword candidate's additional propriety information that it was inputted by the operator according to presentation by information presentation means to show the keyword candidate and electronic description information which were acquired with the form which an operator can recognize, and this information presentation means, and add the keyword candidate concerned as a keyword for thesaurus reference according to a decode result

[Claim 8] It is the record medium with which the program for realizing on a computer the document-retrieval equipment in which the thesaurus reference by two or more keywords related mutually is possible was recorded with the form in which computer reading is possible. When the processing and the arbitrary input keywords which the aforementioned program makes link the electronic description information of a keyword candidate and the keyword candidate concerned beforehand, and holds at least are received The processing which acquires the electronic description information linked to other keyword candidate who should add to the input keyword concerned, and its keyword candidate, The processing which presents the keyword candidate who acquired with electronic description information with the form which an operator can recognize, The record medium characterized by being the thing which makes the aforementioned computer perform processing which determines 1 or two or more keywords which are used for thesaurus reference based on the additional propriety information of the keyword candidate concerned that it was inputted by the operator according to this presentation.

[Claim 9] It is the record medium with which the program for realizing on a computer the document-retrieval equipment in which the thesaurus reference by two or more keywords related mutually is possible was recorded with the form in which computer reading is possible. The information file which recorded the keyword candidate's electronic description information for every thesaurus dictionary in which the aforementioned program recorded at least the keyword candidate who should add to each keyword, and keyword candidate is made to form in the aforementioned computer. further While acquiring the keyword candidate who should add to an input keyword from the aforementioned thesaurus dictionary The processing which acquires the electronic description information corresponding to this keyword candidate from the aforementioned information file, The processing which presents the keyword candidate and electronic description information which were acquired with the form which an operator can recognize, The record medium characterized by being the thing which makes the aforementioned computer perform processing which determines whether to decode a keyword candidate's additional propriety information that it was inputted by the operator according to this presentation, and add the keyword candidate concerned as a keyword for thesaurus reference according to a decode result.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the technology for other keywords (keyword candidate) which should be added to the keyword (input keyword) especially inputted at the time of reference determining whether to be the keyword which suited the reference purpose, and avoiding unnecessary reference processing about the document-retrieval equipment in which the thesaurus reference by two or more keywords related mutually is possible.
[0002]
[Description of the Prior Art] As equipment with which an electronic filing document with higher relevance with an input keyword is searched from two or more electronic filing documents database-ized beforehand, other keywords relevant to the input keyword are added for every input keyword, and the document-retrieval equipment which performs thesaurus reference using two or more of these keywords relevant to mutual is known. A computer realizes, and this kind of document-retrieval equipment is constituted including keyword determination equipment 41, the thesaurus dictionary 42, the document database (document DB) 43, database (DB) management equipment 44, a display controller 45, and display 46, as shown in the functional block diagram of drawing 4 .
[0003] The thesaurus dictionary 42 records the related keyword (additional keyword) which should be added for every keyword, and a document DB43 stores two or more electronic filing documents used as the candidate for reference. Keyword determination equipment 41 is equipped with the function of the keyword specification section 49 which specifies two or more keywords which set significance as the data input section 47 which inputs the weight information according to the keyword or the reference purpose, i.e., significance, the retrieval-by-keyword section 48 which **** the additional keyword relevant to an input keyword from the thesaurus dictionary 42, an input keyword, and an additional keyword, respectively, and are used for reference. The specified keyword is sent to DB management equipment 44. DB management equipment 44 **** the electronic filing document which corresponds from a document DB43 based on the significance set as two or more keyword and each keyword, and displays an electronic filing document on display 46 through a display controller 45.
[0004] In the document-retrieval equipment of the above-mentioned composition, after an input keyword and significance are acquired, process until two or more keywords used for thesaurus reference are specified is shown in drawing 5 . Signs 42, 47, and 49 express applicable functional block of the keyword determination equipment 41 in drawing 4 among drawing 5 .
[0005] Reference of drawing 5 **** "kwd8", "kwd6", and "kwd7" from the thesaurus dictionary 42, respectively as an additional keyword relevant to an input keyword "kwd1", "kwd2", and "kwd3." Moreover, "2", "10", and "6" are set up, respectively as a significance of an input keyword "kwd1", "kwd2", and "kwd3." About the significance of an additional keyword "kwd8", "kwd6", and "kwd7", "one half of the values of the value of the significance with which these were set as an input keyword "kwd1", "kwd2", and "kwd3" in consideration of being led secondarily from the input keyword, "1", 5", and "3" are set up. [i.e.,] DB management equipment 44 performs thesaurus reference (document retrieval) using the keyword and significance of the above-mentioned plurality, **** the corresponding electronic filing document from a document DB43, and sends this to a display controller 45. A display controller 45 carries out a screen display of this electronic filing document to display 46.
[0006] Thus, with conventional document-retrieval equipment, by performing thesaurus reference by eight keywords which added not only - "kwd4" but four input keyword "kwd1" additional keywords "kwd6" - "kwd9", while enabling wide range reference, acquisition of the electronic filing document which agreed for the purpose of reference by taking the significance of each keyword into consideration at the time of reference is enabled.
[0007]
[Problem(s) to be Solved by the Invention] As mentioned above, with conventional document-retrieval

equipment, all additional keywords are used as a keyword for thesaurus reference. However, into an additional keyword, it is not necessarily important for an operator, or a completely unnecessary thing may be contained and the thesaurus reference based on such an unnecessary additional keyword serves as useless processing. Therefore, with conventional document-retrieval equipment, an electronic filing document which it not only cannot attain shortening of retrieval time, but is completely different from the electronic filing document which an operator desires truly was ****(ed) in many cases. For example, when "Mac" who is the abbreviation of the "Macintosh" which is the product name of a personal computer is made into an input keyword, "Macdonald" who is the chain store of a fast food may be extracted as an additional keyword. In this case, the electronic filing document which described the food industry-related information which is completely unrelated to a computer will be searched.

[0008] Then, in the document-retrieval equipment in which the thesaurus reference by two or more keywords related mutually is possible, in case the technical problem of this invention adds other related keywords to an input keyword, it is for the related keyword to judge whether it is a keyword very required for reference, and avoid useless reference processing for an operator. Other technical problems of this invention are to offer the record medium for a computer realizing the above-mentioned document-retrieval processing.

[0009]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, this invention offers the improved keyword determination method which is applied in the document-retrieval equipment in which the thesaurus reference by two or more keywords related mutually is possible. When this method makes the electronic description information of a keyword candidate and the keyword candidate concerned link to document-retrieval equipment beforehand, and is held and arbitrary input keywords are received, on document-retrieval equipment The processing which acquires the electronic description information linked to other keyword candidate who should add to the input keyword concerned, and its keyword candidate, The processing which presents the keyword candidate who acquired with electronic description information with the gestalt which an operator can recognize, It is characterized by performing at least processing which determines 1 or two or more keywords which are used for thesaurus reference based on the additional propriety information of the keyword candidate concerned that it was inputted by the operator according to this presentation in this order. Electronic description information is the description document which recorded the circumference knowledge which contains the keyword candidate, for example, and when it is shown, it is the thing of the content as which an operator can grasp a keyword candidate's semantic content.

[0010] Thus, as facilities are given to judgment whether a keyword candidate should be added to an operator by showing an operator a keyword candidate and electronic description information collectively from a document-retrieval equipment side and the additional propriety of a keyword is determined according to the judgment result by the operator, the reference processing based on an unnecessary keyword is avoided.

[0011] this invention also offers the document-retrieval equipment suitable for operation of the above-mentioned method again. The document-retrieval equipment of this invention is equipment in which the thesaurus reference by two or more keywords related mutually is possible, and is constituted including the keyword determination equipment which determines 1 or two or more keywords which uses for thesaurus reference based on the recording information of the thesaurus dictionary which recorded the keyword candidate who should add to each keyword, the information file which recorded the keyword candidate's electronic description information for every keyword candidate, and the aforementioned thesaurus dictionary and an information file.

[0012] Keyword determination equipment consists of all or a part of combination of the following components, and it determines the keyword for performing rational reference based on the additional propriety information from an operator while making the presentation gestalt which urges the input of the aforementioned keyword candidate's additional propriety information to document-retrieval equipment to an operator form.

(1) A keyword information acquisition means to acquire the electronic description information of the keyword candidate who should add to an input keyword, and its keyword candidate.

(2) A score grant means to give the score which expresses a related degree with the aforementioned input keyword to the keyword candidate or electronic description information acquired with the keyword information acquisition means.

(3) Presentation control means to which the keyword candidate who acquired with the aforementioned keyword information acquisition means is made to show with the electronic description information with the gestalt which an operator can recognize. In addition, when a score is given to electronic description information as mentioned above, these presentation control means are constituted so that a keyword

candidate and electronic description information may be made to show with a different gestalt according to a score.
(4) A means to determine whether to decode a keyword candidate's additional propriety information that it was inputted by the operator according to presentation by the aforementioned presentation control means, and add the keyword candidate concerned as a keyword for thesaurus reference according to a decode result.
(5) A means to add the weight information according to the reference purpose to each of the determined keyword for thesaurus reference.
[0013] The record medium of this invention which solves a technical problem besides the above It is the record medium with which the program for realizing on a computer the document-retrieval equipment in which the thesaurus reference by two or more keywords related mutually is possible was recorded with the gestalt in which computer reading is possible. When the processing and the arbitrary input keywords which the aforementioned program makes link the electronic description information of a keyword candidate and the keyword candidate concerned beforehand, and holds at least are received The processing which acquires the electronic description information linked to other keyword candidate who should add to the input keyword concerned, and its keyword candidate, The processing which presents the keyword candidate who acquired with electronic description information with the gestalt which an operator can recognize, The aforementioned computer is made to perform processing which determines 1 or two or more keywords which are used for thesaurus reference based on the additional propriety information of the keyword candidate concerned that it was inputted by the operator according to this presentation.
[0014] Other record media of this invention are record media with which the program for realizing on a computer the document-retrieval equipment in which the thesaurus reference by two or more keywords related mutually is possible was recorded with the gestalt in which computer reading is possible. The information file which recorded the keyword candidate's electronic description information for every thesaurus dictionary in which the aforementioned program recorded at least the keyword candidate who should add to each keyword, and keyword candidate is made to form in the aforementioned computer. further While acquiring the keyword candidate who should add to an input keyword from the aforementioned thesaurus dictionary The processing which acquires the electronic description information corresponding to this keyword candidate from the aforementioned information file, The processing which presents the keyword candidate and electronic description information which were acquired with the gestalt which an operator can recognize, A keyword candidate's additional propriety information that it was inputted by the operator according to this presentation is decoded, and the aforementioned computer is made to perform processing which determines whether add the keyword candidate concerned as a keyword for thesaurus reference according to a decode result.
[0015]
[Embodiments of the Invention] Hereafter, with reference to a drawing, the form of operation of this invention is explained in detail. Drawing 1 is the functional block diagram of the document-retrieval equipment concerning 1 operation form of this invention. This document-retrieval equipment is realized by computers, such as a personal computer and a workstation. Namely, it installs in the computer memory which does not illustrate the program which it was inputted through the communication network or was read from portability media, such as CD-ROM (compact disk type ROM) and FD (flexible disk). The keyword determination equipment 1 formed when this computer is beginning to read the above-mentioned program at any time and executes it, the thesaurus dictionary 2, the description document file 3 which is an information file, a document DB4, DB management equipment 5, and a display controller 6, It is constituted including the display 7 which consists of CRT or a liquid crystal panel.
[0016] The thesaurus dictionary 3, a document DB4, DB management equipment 5, and display 7 are the things of the same function as the thesaurus dictionary 42 of equipment, a document DB43, DB management equipment 44, and display 46 conventionally which was shown in drawing 4 , respectively. The description document (electronic description information) which described the keyword candidate's semantic content, circumference knowledge, other related information, etc. for every keyword candidate is recorded on the description document file 3. In this case, the description document prepares two or more things about one keyword candidate, and enables it to choose a specific thing according to each related degree.
[0017] Keyword determination equipment 1 is constituted in the function of the data input section 11, the retrieval-by-keyword section 12, the file management section 13, the score grant section 14, and the keyword specification section 15, in order to determine the rational keyword used for thesaurus reference. The data input section 11 receives the entry of data of an input keyword, its significance, a keyword

candidate's additional propriety information, and others, and holds the retrieval-by-keyword section 12 temporarily as a keyword candidate who **** other keywords relevant to an input keyword from the thesaurus dictionary 2, and should add this.
[0018] The file management section 13 makes the record section of the description document of a keyword candidate and its keyword candidate link, and is managed. It has the table which specifically means whether a certain keyword candidate's description document exists in the record section (code number) of description document file 3 throat, and when a keyword candidate is specified, the description document about this keyword candidate can be acquired from the description document file 3 through a code number.
[0019] The score grant section 14 gives the score (evaluation value) which expresses a related degree with an input keyword or a keyword candidate to each description document. This score is used at the time of specification of selection sequence in case there are two or more description documents about the same keyword candidate, and formation of the display form for making easy an additional propriety judgment of the keyword candidate by the operator in a display controller 6. About grant of a score, various technique is employable. For example, the well-known TF/IDF method ("Introduction to Modern Information Retrieval", work besides Gerard Salton, McGraw-HillPublishing Company **), the score grant technique currently indicated by the Japanese-Patent-Application-No. No. 110870 [eight to] specification "similar document-retrieval equipment" previously proposed by these people can be used.
[0020] When the additional propriety information of the keyword candidate concerned that it was inputted by the operator is decoded and it judges with additional needlessness (an operator does not employ the keyword candidate) as a result of decode, the keyword specification section 15 cancels the keyword candidate (deletion), and makes only an input keyword the keyword for reference. On the other hand, when an addition judges with the need (an operator employs the keyword candidate) as a result of decode, the keyword candidate is added to an input keyword. Moreover, the significance of an input keyword and the added keyword is also determined, these are set up for every keyword, and it outputs to DB management equipment 5. What was inputted with the keyword is used for the significance of an input keyword as it is. About the significance of the added keyword, the value of the significance of an input keyword may be used as it is, and the value which carried out the multiplication of the coefficient (for example, the 0.5 [conventionally same] as the case of equipment) to the value of the significance of an input keyword may be used. The latter value is used in this example.
[0021] A display controller 6 receives the description document and keyword candidate to whom the score was given from keyword determination equipment 1, and performs control for displaying a keyword candidate and its description document on display 7 simultaneously. The form to display enables it to choose arbitrarily various forms to which an operator can call attention, such as a form on which some of for example, keyword candidates and description documents (for example, only a title chisel, a title and an author, or a summary) are displayed, a form on which the whole sentence of a keyword candidate and a description document is displayed, and a form to which highlighting only of the keyword candidate is carried out using a different color from blink or other portions. Moreover, in order that an operator may enable it to judge a keyword candidate's additional propriety easily, the above-mentioned score given to the description document is discriminated, and you may locate the higher description document of a score in the screen upper part, or may be made to carry out highlighting in a big character, the strong color of impact, etc. Moreover, a description document is displayed in stack form and you may make it display the higher description document of a score on the high order of a stack.
[0022] Next, with reference to drawing 2 and drawing 3 , operation of the document-retrieval equipment by this operation form is explained concretely. Drawing 2 is the input keyword and keyword candidate who use in the document-retrieval equipment of this operation form, a description document, a score, and explanatory drawing showing the example of significance, and drawing 3 is a flow chart which mainly shows the procedure of the keyword specification processing in keyword determination equipment 1. In drawing 2 , signs 2, 3, 7, 11, 13, and 15 express applicable functional block of the keyword determination equipment 1 in drawing 1 , respectively.
[0023] Suppose that three input keywords, "AIDS", "phytotoxicity", and "infection", were inputted into the data input section 11 as now shown in drawing 2 (Step S101). The retrieval-by-keyword section 12 searches whether the keyword candidate who should add to the thesaurus dictionary 2 about "AIDS" is recorded first (Step S102). In this example, since the "blood product" is recorded on the thesaurus dictionary 2 as a keyword candidate to "AIDS", the retrieval-by-keyword section 12 **** this "blood product", and sends it to the file management section 13.
[0024] The file management section 13 specifies the code number "4000" of the field where it is recorded from the "blood product" which is a keyword candidate. And description document "1" - "3" is ****(ed) from the record section of the description document file 3 corresponding to this code number "4000", and

this is sent to the score grant section 14 (Step S103).
[0025] The score grant section 14 gives a score to description document "1" - "3" based on an input keyword, its significance, and a keyword candidate, respectively (Step S104). Since the "AIDS" of significance "2", the "phytotoxicity" of significance "10", and the "infection" of significance "6" are included in the description document "1", the score is higher than other description documents "2" and "3." Description document "1" - "3" to which the score was given is sent to a display controller 6 with the "blood product" which is a keyword candidate. Both the display controllers 6 display "blood product" and each description document "1" - "3" on display 7 (Step S105).
[0026] If a keyword candidate's additional propriety information is inputted from an operator based on the display of a "blood product" etc., the keyword specification section 15 will decode this additional propriety information. And when addition of a "blood product" is not chosen as a result of decode (Step S106: No), the keyword specification section 15 deletes the "blood product" currently held at self or the retrieval-by-keyword section 12. On the other hand, when addition of a "blood product" is chosen (Step S106: Yes), the significance of a "blood product" is set up (Step S108). With this operation form, significance 0.5 times the value of the input keyword of a basis is made into a keyword candidate's significance, and since the significance of an input keyword "AIDS" is "2", the significance of a "blood product" is set as "1."
[0027] When there is the next keyword candidate, it returns to processing of Step S102, and when there is no next keyword candidate, the keyword for reference is determined and it outputs to DB management equipment 5 (Step S109). That is, when an operator does not choose addition of a "blood product", only three input keywords, "AIDS", "phytotoxicity", and "infection", are determined as a keyword for reference, when addition of a "blood product" is chosen on the other hand, this is added to the keyword for reference, and it outputs to DB management equipment 5. DB management equipment 5 searches an electronic filing document, after also taking such significance into consideration for the determined keyword for reference.
[0028] Thus, with the document-retrieval equipment of this operation form, since the keyword for reference is determined after making an operator judge the additional propriety of the keyword candidate by whom keyword addition equipment 1 was ****(ed) based on the input keyword, the reference processing by the unnecessary keyword is avoidable. Moreover, since it was made to also display the description document with a keyword candidate, it can judge now whether even if an operator does not investigate separately a keyword candidate's semantic content or its related knowledge, the keyword candidate is exactly [easily and] required for reference, and shortening of the time which reference takes can also be attained. Furthermore, since thesaurus reference can be performed after also taking into consideration the significance given to each keyword, reference precision can also be raised.
[0029] In addition, although this operation form explained the example in the case of processing every one keyword candidate, you may be made to perform the above-mentioned processing simultaneously about two or more keyword candidates. Moreover, with this operation form, although the number of keyword candidates to one input keyword was explained as one, the number of keyword candidates to an input keyword can be determined arbitrarily.
[0030] Furthermore, although the example of the screen display using display 6 as a form of presentation of the keyword candidate to an operator or electronic description information was explained, it replaces with a screen display or you may make it show in an audio form with a screen display in this operation form using a voice synthesizer, the existing text reader, etc. When outputting a keyword candidate etc. with voice, an above-mentioned score can be used as a parameter for changing the strength and the tone of volume.
[0031]
[Effect of the Invention] since an operator is shown a keyword candidate with the electronic description information according to this invention so that clearly from the above explanation, an operator is easy in judgment whether an addition of the keyword candidate is required -- and it can carry out now correctly
[0032] Moreover, only the keyword candidate who judged that it was required is added by the operator, since an excessive keyword candidate will not be used for reference, useless reference processing is avoided and the much more high-speed and exact document retrieval of him becomes possible from the former.
[0033] Furthermore, since electronic description information is given and shown the score according to the related degree with an input keyword, additional propriety judgment of the keyword candidate by the operator becomes still more easily and exact.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The functional block diagram of the document-retrieval equipment concerning 1 operation gestalt of this invention.
[Drawing 2] Explanatory drawing showing the example of the input keyword in the document-retrieval equipment of this operation gestalt, a keyword candidate, a description document, a score, and significance, and process until the keyword for reference is specified based on these.
[Drawing 3] The flow chart which shows the procedure of the keyword specification processing by the document-retrieval equipment of this operation gestalt.
[Drawing 4] The functional block diagram of conventional document-retrieval equipment.
[Drawing 5] Explanatory drawing showing the example of the input keyword in conventional document-retrieval equipment, an additional keyword, and significance, and process until the keyword for reference is specified.
[Description of Notations]
1 Keyword Determination Equipment
2 Thesaurus Dictionary
3 Description Document File
4 Document DB (Database)
5 DB Management Equipment
6 Display Controller
7 Display
11 Data Input Section
12 Retrieval-by-Keyword Section
13 File Management Section
14 Score Grant Section
15 Keyword Specification Section

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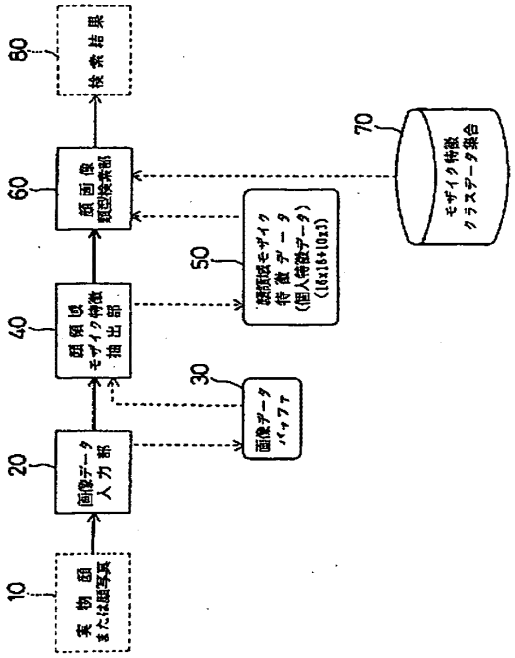
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(54)【発明の名称】　顔画像類型検索処理方法

(57)【要約】

【目的】　対象物から顔領域の特徴を効率良く記述したデータとして高精度で高速に抽出できる簡便な顔画像類型検索処理方法を提供する。

【構成】　顔領域モザイク特徴抽出部４０によるステップにおいて、顔領域を含む濃淡画像をモザイク化し、このモザイクパタンが顔領域の内部と外部とで異なることを利用して顔領域を顔領域モザイク特徴データとして抽出する。次に、顔画像類型検索部６０によるステップにおいて、その顔領域モザイク特徴データを用いて類型分類のクラス名の検索を行う。以上により、顔領域の抽出に当たって、対象物のエッジ部分に着目するのではなく、対象物領域の濃度パタンに着目することにより、高精度で高速な顔領域の抽出・検索やさらには検索のための類型分類のクラス分けを可能にする。



1

【特許請求の範囲】

【請求項１】　人物顔領域を含む濃淡画像をモザイク化し、顔部分を顔領域モザイク特徴データとして抽出する顔領域モザイク特徴抽出ステップと、

前記顔領域モザイク特徴データに関し、予め与えられたモザイク特徴クラス集合の中で最も近い特徴クラスデータを探索し、そのクラス名を検索結果として出力する顔画像類型検索ステップとを有することを特徴とする顔画像類型検索処理方法。

【請求項２】　予め指定された複数の人物顔画像に関し、それぞれの顔領域モザイク特徴データとして抽出するステップと、

前記抽出された複数の人物顔画像の顔領域モザイク特徴データの集合を類似度に基づいてクラス分けしモザイク特徴クラス集合とするステップとにより、

予めモザイク特徴クラス集合を与えることを特徴とする請求項１記載の顔画像類型検索処理方法。

【請求項３】　顔領域モザイク特徴抽出ステップは、

粗くモザイク化された人物顔画像データを予め与えられた頭部粗探索モザイク辞書を用いて頭部の大まかな位置を探索し頭部中心付近位置情報を得る頭部粗探索ステップと、

前記頭部中心付近位置情報に基づいて前記人物顔画像データ上の特定部分を細かくモザイク化し、得られた特定領域モザイク特徴データを予め与えられた特定部分詳細探索モザイク辞書を用いて前記特定部分の詳細位置を探索し顔中心詳細位置情報を得る特定部分詳細探索ステップと、

前記顔中心詳細位置情報に基づいて前記顔画像データ上の顔領域の位置を正確に求め、得られた顔領域位置情報を用いて前記顔画像データ上の顔領域をモザイク化し顔領域モザイク特徴データとして出力する顔領域モザイク化ステップとを有することを特徴とする請求項１または請求項２記載の顔画像類型検索処理方法。

【請求項４】　顔画像データ上の特定部分が目部であることを特徴とする請求項３記載の顔画像類型検索処理方法。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、実物顔のカメラ入力あるいは顔写真のスキャナ入力等により得られる多数の顔画像データを予め類型分類しておくとともに、新たに入力された顔画像データを既分類のどの顔画像クラスに近いかを知るための顔画像類型検索処理方法に関するものである。

【０００２】

【従来の技術】顔画像（濃淡画像）を類型分類し検索するには先ず画像上の顔領域を検出する必要があるが、従来の類型検索処理方法においては、画像を微分操作等によりエッジ検出し、得られたエッジ領域を細線化または

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尾根線追跡により線図形として抽出するとともに、該線図形の幾何学構造を解析することにより類型分類し検索するのが一般的であった。

【０００３】

【発明が解決しようとする課題】しかしながら、上記従来の画像の類型検索処理方法においては、画像に傾斜の緩やかな濃度変化領域や影領域が含まれることが多いため、正確にエッジ部分を検出するのはほとんど不可能に近い。しかも、微分などの処理が含まれるため、コンピュータ処理の要する時間は無視できないものである。

【０００４】したがって、実用レベルでの顔画像類型検索処理方法は、今まで発表されていないのが現状である。

【０００５】本発明で解決を図る課題は、エッジ部分の検出・解析に基づいて対象物（顔領域等）を抽出・判定しようとする従来技術の難点を解決するとともに、さらにこれに基づいて簡便な顔画像類型検索処理方法を提案することである。

【０００６】

【課題を解決するための手段】上記の課題を解決するため、人物顔領域を含む濃淡画像をモザイク化し、顔部分を顔領域モザイク特徴データとして抽出する顔領域モザイク特徴抽出ステップと、前記顔領域モザイク特徴データに関し、予め与えられたモザイク特徴クラス集合の中で最も近い特徴クラスデータを探索し、そのクラス名を検索結果として出力する顔画像類型検索ステップとを有する構成の顔画像類型検索処理方法を手段とする。

【０００７】上記の顔画像類型検索処理方法においては、予め指定された複数の人物顔画像に関し、それぞれの顔領域モザイク特徴データとして抽出するステップと、前記抽出された複数の人物顔画像の顔領域モザイク特徴データの集合全体を類似度に基づいてクラス分けしモザイク特徴クラス集合とするステップとにより、予めモザイク特徴クラス集合を与える構成とするのが、好適である。

【０００８】また、上記の顔画像類型検索処理方法において、顔領域モザイク特徴抽出ステップは、粗くモザイク化された人物顔画像データを予め与えられた頭部粗探索モザイク辞書を用いて頭部の大まかな位置を探索し頭部中心付近位置情報を得る頭部粗探索ステップと、前記頭部中心付近位置情報に基づいて前記人物顔画像データ上の特定部分を細かくモザイク化し、得られた特定領域モザイク特徴データを予め与えられた特定部分詳細探索モザイク辞書を用いて前記特定部分の詳細位置を探索し顔中心詳細位置情報を得る特定部分詳細探索ステップと、前記顔中心詳細位置情報に基づいて前記顔画像データ上の顔領域の位置を正確に求め、得られた顔領域位置情報を用いて前記顔画像データ上の顔領域をモザイク化し顔領域モザイク特徴データとして出力する顔領域モザイク化ステップとを有する構成とするのが、好適であ

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り、さらに上記の顔画像データ上の特定部分が目部である構成とするのが、好適である。

【０００９】

【作用】本発明の顔画像類型検索処理方法では、顔領域を含む濃淡画像をモザイク化し、このモザイクパタンが顔領域の内部と外部とで異なることを利用して顔領域をモザイク特徴データとして抽出し、これを用いて類型分類のクラス分けや検索を行う。このように、その顔領域の抽出に当たって、対象物のエッジ部分に着目するのではなく、対象物領域の濃度パタンに着目することにより、高精度で高速な顔領域の抽出・クラス分け・検索を可能にする。

【００１０】

【実施例】以下、本発明の実施例について図面により詳細に説明する。

【００１１】図１は本発明の顔画像類型検索処理方法に関する部分の実施例を、図２は図１におけるモザイク特徴クラスデータ集合の算出・獲得方法に関する部分の実施例を示す図である。

【００１２】図１および図２において、１０は画像入力の対象となる実物顔または顔写真である。

【００１３】２０は実物顔または顔写真をカメラやスキャナ等により入力し、得られた画像データを画像データバッファ３０に格納するステップを担う画像データ入力部である。

【００１４】４０は、画像データ入力部２０により取り込まれて画像データバッファ３０に格納されている画像データをモザイク化し、そのモザイクデータ上を走査することにより予め与えられた代表的顔領域に対するモザイクパタンとある範囲内で一致するような領域を検出し、その部分のモザイクデータを入力画像に対する顔領域モザイク特徴データ５０として出力するステップを担うものである。

【００１５】図１の顔画像類型検索部６０は、顔領域モザイク特徴抽出部４０で得られた顔領域モザイク特徴データ（モザイクパタン）５０に関し、モザイク特徴クラスデータ集合７０上のそれぞれのモザイク特徴クラスとの一致度を調べ最もよく一致するクラスを検索し、そのクラス名を検索結果８０として出力するステップを担うものである。

【００１６】図２のモザイク特徴データ収集部９０は、図２の画像データ入力部２０および顔領域モザイク特徴抽出部４０を繰り返し適用することにより、それぞれ異なる顔画像データに対する顔領域モザイク特徴データ５０を順次収集し、これらを集めてモザイク特徴データ集合１００を得るステップを担うものである。

【００１７】顔画像クラスタリング部１１０はモザイク特徴データ集合１００を例えば多次元尺度法等によりクラス分けし、それぞれのクラスに属するモザイク特徴データの代表（例えば平均）の集合をモザイク特徴クラス

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７０として出力するステップを担うものである。なお、このモザイク特徴クラス７０は、データベース化するのが好適である。

【００１８】図３は図１および図２の顔領域モザイク特徴抽出部４０の実施例を示す構成図である。同図に関し以下その内容を説明する。

【００１９】全領域モザイク化部４０１は画像データバッファ３０上の画像データを全領域にわたってある粗いブロックサイズでモザイク化し全領域をモザイク特徴データ４０２として出力するステップを担うものである。

【００２０】頭部粗探索部４０３は、代表的な一般形状の頭部（首より上の部分）についてのモザイク特徴（例えば４（横）×５（縦）ブロック）を頭部粗探索モザイク辞書４０４として用いることにより、画像データバッファ３０を粗く走査し、画像上の頭部領域を検出するとともに、おおよその両目位置の中間点を頭部中心付近位置情報４０５として出力するステップを担うものである。

【００２１】目部モザイク化部４０６は、画像データバッファ３０の画像データに関し頭部中心付近位置情報４０５で与えられる両目を含むような近傍領域をより細かいブロックサイズでモザイク化し、目部モザイク特徴データ４０７として出力するステップを担うものである。

【００２２】目部詳細探索部４０８は、代表的な一般形状の両目を含む領域についての例えば８（横）×３（縦）ブロックモザイク特徴を目部詳細探索モザイク辞書４０９（ブロックサイズは頭部粗探索モザイク辞書４０４のそれよりかなり小さく取る（例えば１／５程度））として用いることにより目領域モザイク特徴データ４０７をより詳細に走査し目部領域をより詳細に検出するとともに、得られた両目の中間点を顔中心詳細位置情報４１０として出力するステップを担うものである。

【００２３】顔中心・顔領域位置決定部４１１は、画像データバッファ３０上で顔中心詳細位置情報４１０で与えられる位置の近傍において濃度変化やヒストグラム等の画素値情報を用いて両目領域の位置を正確に決定するとともに、同じようにして口部を決定し、両者の位置情報により顔領域（顔幅および額・顎間で決定される領域）を決定することなどによって、顔領域位置情報４１２として出力するステップを担うものである。

【００２４】顔領域モザイク化部４１３は、画像データバッファ３０に関し顔領域位置情報４１２で与えられる領域をモザイク化し、例えば横×縦が１６×１６および１０×３（顎の部分に対応）のモザイク特徴（ブロックサイズは一般には目領域モザイク特徴データ４０７のそれよりやや小さい程度）を得、これを顔領域モザイク特徴データ５０として出力するステップを担うものである。

【００２５】なお、画像データ入力部２０から入力される顔画像の大きさが一定していない場合には、モザイク

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のサイズを変化させてモザイク辞書の探索を行うのが好適である。

【００２６】以上の実施例による各部のステップで構成される顔画像類型検索処理方法では、顔領域モザイク特徴抽出部４０によるステップにおいて、顔領域を含む濃淡画像をモザイク化し、このモザイクパタンが顔領域の内部と外部とで異なることを利用して顔領域を顔領域モザイク特徴データとして抽出し、顔画像類型検索部６０によるステップにおいて、その顔領域モザイク特徴データを用いて類型分類のクラス名の検索を行ったり、モザイク特徴データ収集部９０によるステップにおいて、多数の顔画像についての上記のモザイク特徴データを収集し、顔画像クラスタリング部１１０によるステップにおいて類型分類のクラス分けを行ったりすることにより、すなわち、顔領域の抽出に当たって、対象物のエッジ部分に着目するのではなく、対象物領域の濃度パタンに着目することにより、高精度で高速な顔領域の抽出・クラス分け・検索を可能にし、領域のエッジ検出・形状解析を主体とする従来技術の難点の解決を図る。また、顔領域のモザイク特徴データを用いることにより、入力顔画像の特徴記述を効率よく行うことが可能となる。

【００２７】上記実施例の顔画像類型検索処理方法における、図３に示した各部のステップによる顔領域モザイク特徴抽出ステップでは、顔領域モザイク特徴データを抽出するに当たり、頭部粗探索部４０３によるステップと目部詳細探索部４０８によるステップにおいて、各種サイズのモザイク特徴を段階的（全領域モザイク特徴、目領域モザイク特徴）に用いているので、画像上の顔領域の位置を容易に探索・決定できるようになり、より一層抽出精度が向上し、処理時間の短縮できる。

【００２８】なお、上記の顔中心位置詳細情報を求めるための詳細探索においては、目部以外の顔画像上の特定部分をモザイク化して探索することも可能であるが、最も濃度パタンが特徴的に現れる目部をモザイク化して探索することにより、顔領域の探索・決定をさらに容易にし、抽出精度をさらに一層向上させることができる。

【００２９】また、本発明の実施においては、コンピュータに要求される処理時間やメモリ容量が少ないため、パソコン等による簡便な顔画像類型検索方法を構成することができる。

【００３０】

【発明の効果】以上説明したように、本発明の顔画像類型検索処理方法によれば、顔画像を含む濃淡画像をモザイク化し、このモザイクパタンが顔領域の内部と外部と

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で異なることを利用することにより顔領域をモザイク特徴データとして抽出し、これを用いて類型分類のクラス分けや検索を行うようにしたので、高精度で高速な顔領域の抽出・クラス分け・検索が可能となり、領域のエッジ検出・形状解析を主体とする従来技術の難点の解決を図ることができ、また、顔領域のモザイク特徴を用いることにより、入力顔画像の特徴記述を効率よく行うことが可能となる。

【００３１】また、上記において、顔領域位置情報を得て顔領域モザイク特徴データを抽出するに当たり、各種サイズのモザイク特徴を段階的に用いて、まず顔領域を粗探索し、次に顔領域の特定部分を詳細探索するようにした場合には、抽出精度をより一層向上させることができるとともに、処理時間をより一層短縮できる。

【００３２】また、上記の詳細探索における顔領域の特定部分として目部を採用した場合には、探索がさらに容易になり、抽出精度をさらに向上させることができる。

【００３３】さらに、本発明の実施においては、コンピュータに要求される処理時間やメモリ容量が少ないため、パソコン等による簡便な顔画像類型検索方法を構成することができる。

【図面の簡単な説明】

【図１】本発明の顔画像類型検索処理方法に関する部分の実施例を示す構成図

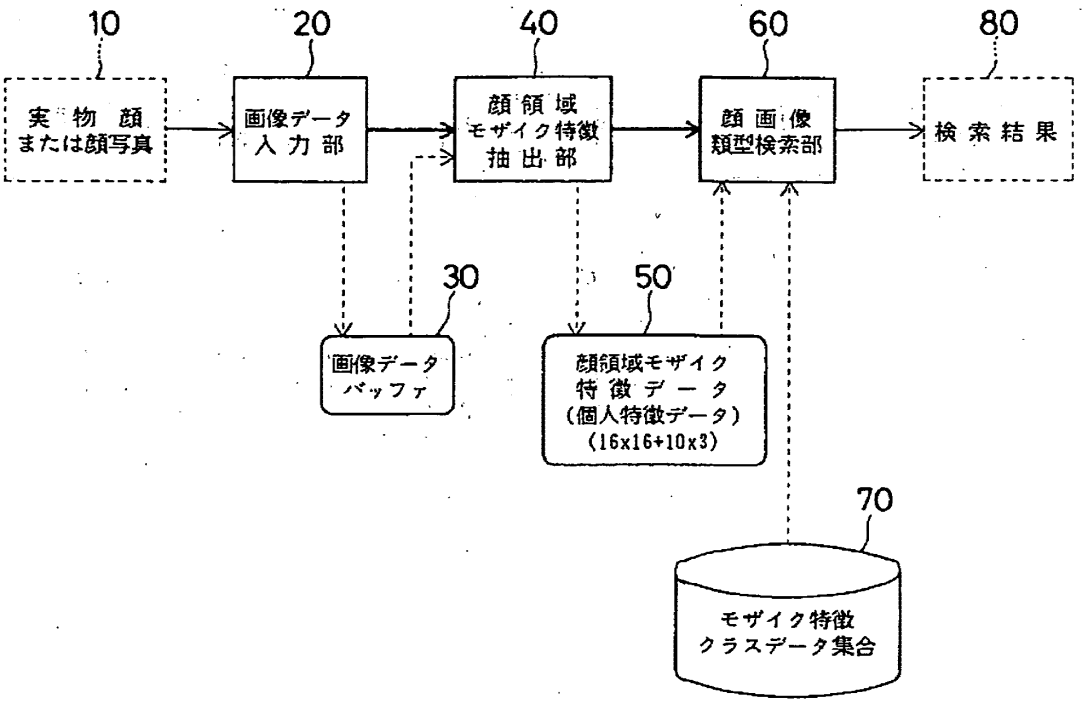
【図２】図１におけるモザイク特徴クラスデータ集合の獲得方法に関する部分の実施例を示す構成図

【図３】図１または図２における顔領域モザイク特徴抽出ステップを受け持つ部分の実施例を示す構成図

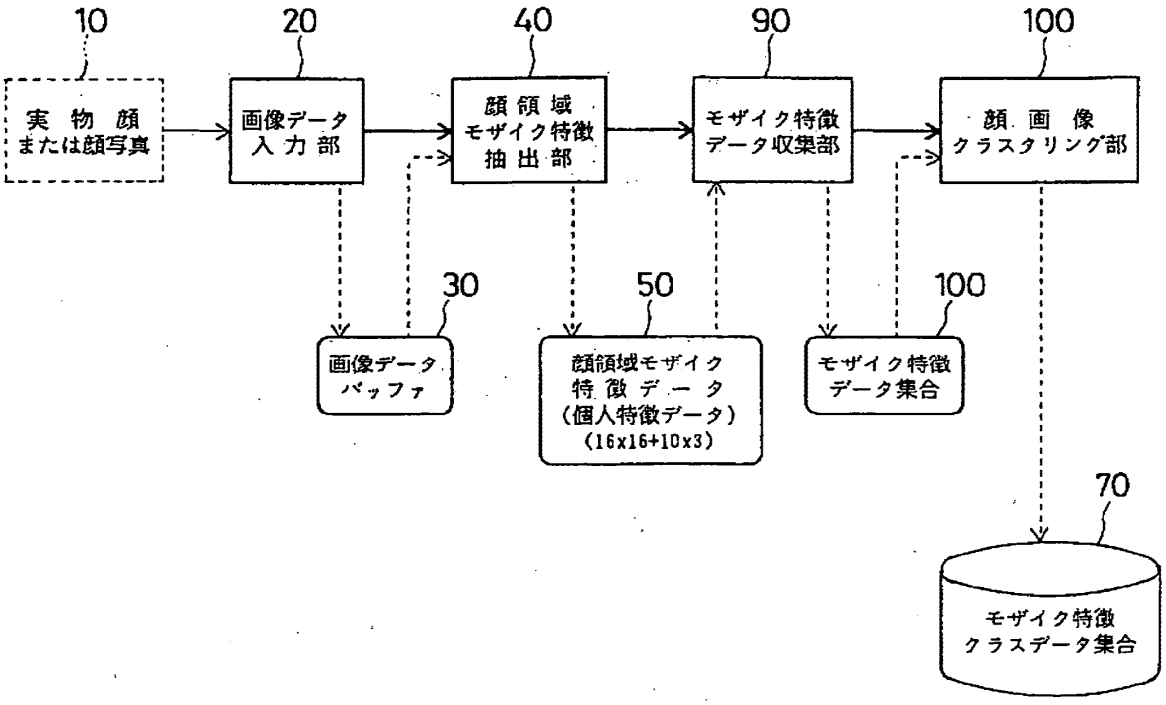
【符号の説明】

１０…実物類または顔写真
２０…画像データ入力部
３０…画像データバッファ
４０…顔領域モザイク特徴抽出部
６０…顔画像類型検索部
７０…モザイク特徴クラスデータ集合
１１０…顔画像クラスタリング部
４０１…全領域モザイク化部
４０３…頭部粗探索部
４０４…頭部粗探索モザイク辞書
４０６…目部モザイク化部
４０８…目部詳細探索部
４０９…目部詳細探索モザイク辞書
４１１…顔中心・顔領域位置決定部
４１３…顔領域モザイク化部

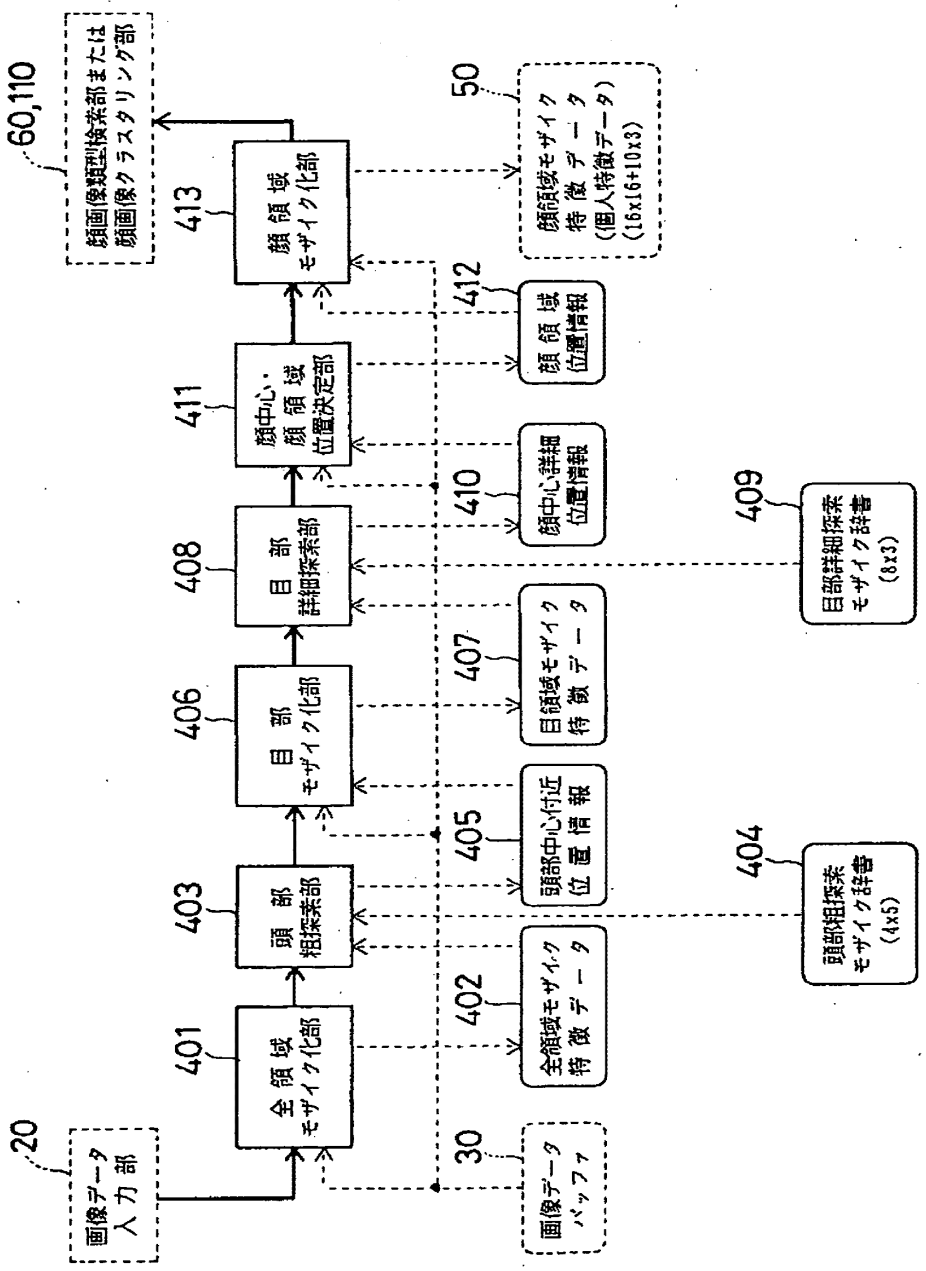
【図１】


10
20
40
60
80
実物顔
または顔写真
画像データ
入力部
顔領域
モザイク特徴
抽出部
顔画像
類型検索部
検索結果
30
50
画像データ
バッファ
顔領域モザイク
特徴データ
(個人特徴データ)
(16x16+10x3)
70
モザイク特徴
クラスデータ集合

【図2】


10
実物顔
または顔写真
20
画像データ
入力部
40
顔領域
モザイク特徴
抽出部
90
モザイク特徴
データ収集部
100
顔画像
クラスタリング部
30
画像データ
バッファ
50
顔領域モザイク
特徴データ
(個人特徴データ)
(16x16+10x3)
100
モザイク特徴
データ集合
70
モザイク特徴
クラスデータ集合

【図３】



フロントページの続き

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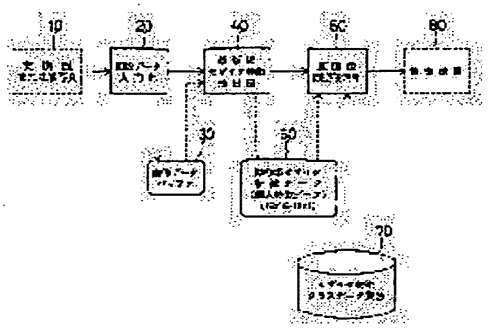
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(54) FACE IMAGE MODEL RETRIEVAL PROCESSING METHOD

(57)Abstract:
PURPOSE: To provide a simple face image model retrieval processing method with which the features of a face area can be extracted with high accuracy at a high speed from an object as efficiently described data.
CONSTITUTION: In a step by a face area mosaic feature extracting part 40, a gray level image including the face area is made into mosaic and while utilizing the fact that the pattern of this mosaic is made different inside and outside the face area, the face area is extracted as face area mosaic feature data. Next, in a step by a face image model retrieving part 60, the class name of model classification is retrieved while using those face area mosaic feature data. Thus, in the case of extracting the face area, attention is not paid on the edge part of the object but paid on the density pattern of the object area so that not only the high-accuracy and high-speed extraction/retrieval of the face area but also the classification of models for retrieval can be performed.



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CLAIMS

[Claim(s)]
[Claim 1] The face picture type reference art characterized by to have the face field mosaic feature-extraction step which mosaic-izes a shade picture including a person face field, and extracts a face portion as face field mosaic feature data, and the face picture type reference step which look for the nearest feature class data in the mosaic feature class set given beforehand about the aforementioned face field mosaic feature data, and output the class name as a reference result.
[Claim 2] The face picture type reference art according to claim 1 characterized by giving the mosaic feature class set beforehand about two or more person face pictures specified beforehand by the step extracted as each face field mosaic feature data, and the step which carries out the class division of the face field mosaic feature data aggregate of two or more person face pictures by which extraction was carried out [aforementioned] based on the degree of similar, and is considered as the mosaic feature class set.
[Claim 3] The face picture type reference art according to claim 1 or 2 characterized by providing the following. A face field mosaic feature-extraction step is a head rough search step which searches the position where a head is rough using the head rough search mosaic dictionary which was able to give beforehand the person face image data mosaic-ized coarsely, and obtains near [a head center] positional information. The particular-part detailed search step which mosaic-izes finely the particular part on the aforementioned person face image data based on the aforementioned near [a head center] positional information, searches the detailed position of the aforementioned particular part using the particular-part detailed search mosaic dictionary which was able to give the obtained specific field mosaic feature data beforehand, and obtains face center detailed positional information The face field mosaic-ized step which asks for the position of the face field on the aforementioned face image data correctly based on the aforementioned face center detailed positional information, mosaic-izes the face field on the aforementioned face image data using the obtained face field positional information, and is outputted as face field mosaic feature data
[Claim 4] The face picture type reference art according to claim 3 characterized by the particular part on face image data being the eye section.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to the face picture type reference art for knowing whether it is close to which face picture class whose face image data which carries out the type classification of the face image data of a large number obtained by the camera input of an object face or the scanner input of a photograph of his face beforehand, and which was both newly inputted has been classified.
[0002]
[Description of the Prior Art] Although the face field on a picture needed to be detected first to carry out the type classification of the face picture (shade picture), and search, while the edge detection of the picture was carried out by differential operation etc. and thinning or ridge line tracking extracted the obtained edge field as a diagram, in the conventional type reference art, it was common by analyzing the geometrical structure of this diagram to have carried out a type classification and to have searched.
[0003]
[Problem(s) to be Solved by the Invention] However, in the type reference art of the above-mentioned conventional picture, since the loose concentration change field and shadow field of an inclination are included in a picture in many cases, it is almost next to impossible to detect an edge portion correctly. And since processing of differential etc. is included, the time which computer-processing requires cannot be disregarded.
[0004] Therefore, the present condition is that the face picture type reference art in practical use level is not announced until now.
[0005] The technical problem which aims at solution by this invention is proposing a simple face picture type reference art based on this further while solving the difficulty of the conventional technology in which it tends to be based on detection and analysis of an edge portion, and extracts and judges objects (face field etc.).
[0006]
[Means for Solving the Problem] The face field mosaic feature-extraction step which mosaic-izes a shade picture including a person face field, and extracts a face portion as face field mosaic feature data in order to solve the above-mentioned technical problem, It looks for the nearest feature class data in the mosaic feature class set given beforehand about the aforementioned face field mosaic feature data, and let the face picture type reference art of composition of having the face picture type reference step which outputs the class name as a reference result be a means.
[0007] In the above-mentioned face picture type reference art, it is suitable to consider about two or more person face pictures specified beforehand as the composition which gives the mosaic feature class set beforehand by the step which extracts as each face field mosaic feature data, and the step which carries out the class division of the whole face field mosaic feature data aggregate of two or more person face pictures by which extraction was carried out [aforementioned] based on the degree of similar, and consider as the mosaic feature class set.
[0008] In the above-mentioned face picture type reference art moreover, a face field mosaic feature-extraction step The head rough search step which searches the position where a head is rough using the head rough search mosaic dictionary which was able to give beforehand the person face image data mosaic-ized coarsely, and obtains near [a head center] positional information, Based on the aforementioned near [a head center] positional information, the particular part on the aforementioned person face image data is mosaic-ized finely. The particular-part detailed search step which searches the detailed position of the aforementioned particular part using the particular-part detailed search mosaic dictionary which was able to give the obtained specific field mosaic feature data beforehand, and obtains face center detailed positional information, Based on the aforementioned face center detailed positional information, it asks for the position of the face field on the aforementioned face image data correctly. Considering as the composition which has the face field mosaic-ized step which mosaic-izes the face field

on the aforementioned face image data using the obtained face field positional information, and is outputted as face field mosaic feature data It is suitable to consider as the composition whose particular part on the suitable further above-mentioned face image data is the eye section.
[0009]
[Function] In the face picture type reference art of this invention, a shade picture including a face field is mosaic-ized, a face field is extracted as mosaic feature data using these mosaic patterns differing in the interior and the exterior of a face field, and a class division and reference of a type classification are performed using this. Thus, without paying attention to the edge portion of an object, extraction, a class division, and reference of a highly precise and high-speed face field are enabled by paying one's attention to the concentration pattern of an object field in extraction of the face field.
[0010]
[Example] Hereafter, a drawing explains the example of this invention in detail.
[0011] Drawing 1 is drawing showing the example of the portion about the calculation / acquisition method of the mosaic feature class data set [in / drawing 1 / for the example of the portion about the face picture type reference art of this invention / in drawing 2].
[0012] In drawing 1 and drawing 2 , 10 is the object face or photograph of his face set as the object of a picture input.
[0013] 20 is the image data input section which bears the step which inputs an object face or a photograph of his face with a camera, a scanner, etc., and stores the obtained image data in the picture data buffer 30.
[0014] 40 mosaic-izes the image data which is incorporated by the image data input section 20 and stored in the picture data buffer 30, detects a field which is in agreement by the mosaic pattern to the typical face field beforehand given by scanning the mosaic data top, and a certain within the limits, and bears the step which outputs the mosaic data of the portion as face field mosaic feature data 50 to an input picture.
[0015] The face picture type reference section 60 of drawing 1 searches the class which investigates the degree of coincidence with each mosaic feature class on the mosaic feature class data set 70, and is best in agreement about the face field mosaic feature data (mosaic pattern) 50 obtained in the face field mosaic feature-extraction section 40, and bears the step which outputs the class name as a reference result 80.
[0016] By repeating and applying the image data input section 20 of drawing 2 , and the face field mosaic feature-extraction section 40, the mosaic feature data collection section 90 of drawing 2 collects the face field mosaic feature data 50 to face image data different, respectively one by one, and bears the step which collects these and obtains the mosaic feature data set 100.
[0017] The face picture clustering section 110 carries out the class division of the mosaic feature data set 100 for example, by the multidimensional-scale method etc., and bears the step which outputs a set of representation [the mosaic feature data belonging to each class] (for example, average) as a mosaic feature class 70. In addition, database-izing is suitable for this mosaic feature class 70.
[0018] Drawing 3 is the block diagram showing the example of drawing 1 and the face field mosaic feature-extraction section 40 of drawing 2 . The content is explained below about this drawing.
[0019] All the field mosaic-ized sections 401 bear the step which mosaic-izes by the coarse block size which has crossed the image data on the picture data buffer 30 to all fields, and outputs all fields as mosaic feature data 402.
[0020] The head rough search section 403 bears the step which outputs the midpoint of both the near eye position as near [a head center] positional information 405 while it scans the picture data buffer 30 coarsely and detects the head field on a picture by using the mosaic feature (for example , 4 (width)x5 (length) block) about the head (portion above a neck) of a typical general configuration as a head rough search mosaic dictionary 404 .
[0021] The eye section mosaic-ized section 406 bears the step which mosaic-izes the near field which contains both the eyes given by the near [a head center] positional information 405 about the image data of the picture data buffer 30 by the finer block size, and outputs it as eye section mosaic feature data 407.
[0022] The **** detailed search section 408 About the field containing both the eyes of a typical general configuration, for example, by using the 8(width) x3 (length) block mosaic feature as a **** detailed search mosaic dictionary 409 (a block size quite smaller than that of the head rough search mosaic dictionary 404 being taken (about [for example,] 1/5)) While scanning the eye field mosaic feature data 407 in a detail more and detecting a **** field in a detail more, the step which outputs the midpoint of both the obtained eyes as face center detailed positional information 410 is borne.
[0023] While a face center and the face field spotting section 411 determine the position of both the eye field correctly using pixel value information, such as concentration change and a histogram, [near the position given by the face center detailed positional information 410] on the picture data buffer 30 The step outputted as face field positional information 412 is borne by determining the regio oralis similarly and determining a face field (field determined between a face width, and a frame and a jaw) by both

positional information etc.
[0024] The field given by the face field positional information 412 about the picture data buffer 30 is mosaic-ized, for example, horizontal x length acquires the mosaic feature (generally a block size is a grade a little smaller than that of the eye field mosaic feature data 407) of 16x16 and 10x3 (it corresponds to the portion of a jaw), and the face field mosaic-ized section 413 bears the step which outputs this as face field mosaic feature data 50.
[0025] In addition, when the size of the face picture inputted from the image data input section 20 is not fixed, it is suitable to change the size of a mosaic and to look for a mosaic dictionary.
[0026] In the face picture type reference art which consists of steps of each part by the above example A shade picture including a face field is mosaic-ized in the step by the face field mosaic feature-extraction section 40. In the step extract a face field as face field mosaic feature data using these mosaic patterns differing in the interior and the exterior of a face field, and according to the face picture type reference section 60 In the step according to the mosaic feature data collection section 90 in searching the class name of a type classification **** using the face field mosaic feature data By collecting the above-mentioned mosaic feature data about many face pictures, and performing a class division of a type classification in the step by the face picture clustering section 110 That is, solution of the difficulty of the conventional technology which enables extraction, a class division, and reference of a highly precise and high-speed face field, and makes a subject the edge detection and shape analysis of a field is aimed at in extraction of a face field by paying one's attention to the concentration pattern of an object field without paying attention to the edge portion of an object. Moreover, it becomes possible by using the mosaic feature data of a face field to perform the feature description of an input face picture efficiently.
[0027] At the face field mosaic feature-extraction step by the step of each part shown in drawing 3 in the face picture type reference art of the above-mentioned example In the step by the head rough search section 403 in extracting the face field mosaic feature data, and the step by the **** detailed search section 408 the mosaic feature of various sizes -- being gradual (all the field mosaic features, the eye field mosaic feature) -- since it uses -- the position of the face field on a picture -- easy -- search and determination -- it can do -- coming -- more -- much more -- extraction precision -- improving -- the processing time -- it can be shortened .
[0028] In addition, in the detailed search for asking for the above-mentioned face center position detailed information, although it is also possible to mosaic-ize the particular part on face pictures other than ****, and to search for it, by mosaic-izing the eye section in which a concentration pattern appears characteristic most, and searching for it, the search decision of a face field can be made still easier, and extraction precision can be raised further further.
[0029] Moreover, in operation of this invention, since there are little the processing time and memory space which are required of a computer, a simple face picture type search method with a personal computer etc. can be constituted.
[0030]
[Effect of the Invention] As explained above, according to the face picture type reference art of this invention, a shade picture including a face picture is mosaic-ized. Since a face field is extracted as mosaic feature data and it was made to perform a class division and reference of a type classification by using that these mosaic patterns differ in the interior and the exterior of a face field using this it becomes possible to perform efficiently the feature description which is an input face picture by attaining extraction, a class division, and reference of a highly precise and high-speed face field, and being able to aim at solution of the difficulty of the conventional technology which makes a subject the edge detection and shape analysis of a field, and using the mosaic feature of a face field
[0031] Moreover, in the above, when a face field is rough-searched first and the detailed search of the particular part of a face field is next made to be carried out in having obtained face field positional information and extracting the face field mosaic feature data, using the mosaic feature of various sizes gradually, while being able to raise extraction precision further, the processing time can be shortened further.
[0032] Moreover, when the eye section is adopted as a particular part of the face field in the above-mentioned detailed search, search can become still easier and extraction precision can be raised further.
[0033] Furthermore, in operation of this invention, since there are little the processing time and memory space which are required of a computer, a simple face picture type search method with a personal computer etc. can be constituted.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The block diagram showing the example of the portion about the face picture type reference art of this invention
[Drawing 2] The block diagram showing the example of the portion about the acquisition method of the mosaic feature class data set in drawing 1
[Drawing 3] The block diagram showing the example of the portion which takes charge of the face field mosaic feature-extraction step in drawing 1 or drawing 2
[Description of Notations]
10 -- Things or photograph of his face
20 -- Image data input section
30 -- Picture data buffer
40 -- Face field mosaic feature-extraction section
60 -- Face picture type reference section
70 -- The mosaic feature class data set
110 -- Face picture clustering section
401 -- All the field mosaic-ized sections
403 -- Head rough search section
404 -- Head rough search mosaic dictionary
406 -- Eye section mosaic-ized section
408 -- section detailed search section
409 -- section detailed search mosaic dictionary
411 -- A face center and the face field spotting section
413 -- Face field mosaic-ized section

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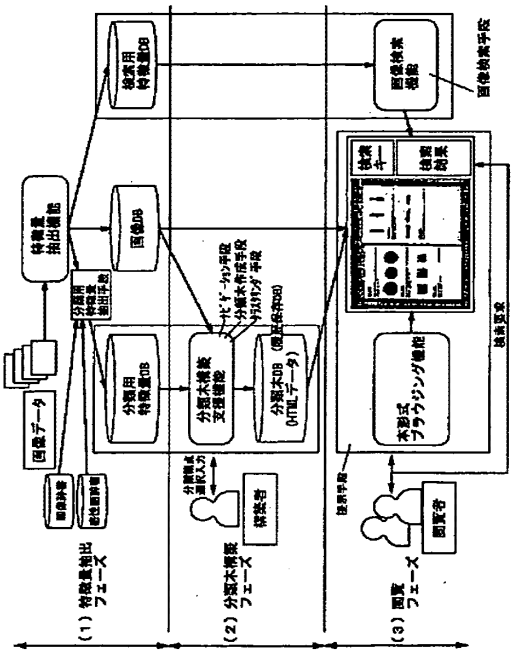
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(54)【発明の名称】　画像の階層的分類方法、および画像の分類・検索装置、およびこの方法を実行するプログラムを記録した記録媒体

(57)【要約】
【課題】　画像ＤＢ内の全体像把握のための画像分類木構築法、画像分類の提示法、及び画像検索との統合法を与え、効率的な画像ＤＢ管理・活用を実現する。
【解決手段】　ナビゲーションの途中の画像集合に対し、領域色、直線、オブジェクト、画像辞書という大分類観点がシステムから利用者に提示される。利用者が画像辞書を選択すると、システムは「人の顔」、「空」、「屋根」といった分類観点を提示する。利用者が「人の顔」を選択すると、システムは人物画の集合を提示し、同様にその画像集合に対し、領域色、直線、オブジェクト、画像辞書という小分類観点が利用者に提示され、分類観点の選択による分類が階層的に行われる。このナビゲーションの履歴は、画像ＤＢの分類に有効なので、システムに分類木情報として蓄積される。蓄積された分類木の全体像をキーワードや合成画、サンプル画像を用いて閲覧することで、画像ＤＢが概観できる。



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【特許請求の範囲】

【請求項１】　任意の画像集合を分類対象とし、
指定された分類観点により分類した分類結果を提示し、
前記分類結果に対し、続いて指定された分類観点によりさらに分類した分類結果を提示する過程を１回、または複数回繰り返し行うことを特徴とする画像の階層的分類方法。

【請求項２】　画像の概念を表す言葉と、該言葉に相当する概念を定義した画像オブジェクト、画像内領域、および、画像内直線の特徴量の条件の組とを対応づけた表を持ち、これらと言葉のシソーラスとを関係づけた画像辞書を用いて、画像を分類するための情報を抽出し、
前記抽出した情報を分類観点の一つとして画像を分類することを特徴とする請求項１記載の画像の階層的分類方法。

【請求項３】　画像および画像を分割した領域の面積により正規化した代表色Ｙ個の色ヒストグラムを求め、
明るい色の方が暗い色より小さな閾値を持ち、前記色ヒストグラムにおいて該閾値を超える色がある場合は、その色の中で最大の値を持つ色を対象領域の代表領域色として抽出し、該閾値を超える色がない場合は代表領域色を持たない領域とし、
前記決定した代表領域色を分類観点として画像を分類することを特徴とする請求項１記載の画像の階層的分類方法。

【請求項４】　画像および画像を分割した領域の面積により正規化した代表色Ｙ個の色ヒストグラムを求め、
前記ヒストグラム値が高いものから順に第１主要色、第２主要色、…、第Ｙ主要色とし、
これらの主要色を分類観点として画像を分類することを特徴とする請求項１記載の画像の階層的分類方法。

【請求項５】　代表領域色を分類観点として画像を分類する際、
ある代表領域色に属する画像枚数が一定枚数Ａより少ない場合はその画像集合を類似した色相を持つ他の集合に統合し、
逆にある代表領域色に属する画像が一定枚数Ｂ（Ｂ＞Ａ）より多い場合はより細かい色相の代表領域色に分割することを特徴とする請求項１または３または４記載の画像の階層的分類方法。

【請求項６】　感性語とその感性語からイメージされる色の特徴量を対応付けた感性語辞書を分類観点として用い、
前記感性語辞書の感性語特徴量と、対象画像から抽出される色特徴量との距離計算を行ない、
最も類似する感性語に前記対象画像を分類することを特徴とする請求項１記載の画像の階層的分類方法。

【請求項７】　画像より直線の長さ、角度、本数、および、複数直線間の関係といった特徴量を抽出し、
前記抽出した特徴量を分類観点とすることを特徴とする

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請求項１記載の画像の階層的分類方法。

【請求項８】　画像より抽出される画像内オブジェクト、その個数、複数の画像内オブジェクトの位置関係、および、画像内オブジェクトの分布といった特徴量を分類観点とすることを特徴とする請求項１記載の画像の階層的分類方法。

【請求項９】　予め基本として登録した代表形状を分類観点とし、
分類対象の画像内より抽出される画像内オブジェクトの形状特徴量を抽出し、
それらのヒストグラム間の距離計算によって最も類似する代表形状に前記画像を分類することを特徴とする請求項１記載の画像の階層的分類方法。

【請求項１０】　分類観点の指示は、複数の分類観点を組み合わせて提示した中から選択させるナビゲーションにより行われることを特徴とする請求項1から９までのいずれか1項記載の画像の階層的分類方法。

【請求項１１】　分類観点を提示する際には、該当する画像を持たない分類観点は提示対象から除き、
残る提示対象の分類観点については、各分類観点に該当する画像の枚数が多い分類観点から順に利用者に推薦提示することで分類木構築者をナビゲートすることを特徴とする請求項１０記載の画像の階層的分類方法。

【請求項１２】　ナビゲーションによる画像の階層的分類の過程での利用者からの分類観点の選択を分類履歴として保持し、
前記分類履歴から分類木を生成することを特徴とする請求項１０または１１記載の画像の階層的分類方法。

【請求項１３】　ナビゲーションにより画像を階層的に分類する場合、
予め代表的な分類項目の例をいくつか決めておき、最も近い分類項目に個々の画像を分類する請求項３から９までのいずれか１項記載の画像の階層的分類方法と、
各領域の色特徴量、形状特徴量などの画像の特徴量をクラスタリング手法を用いて類似する集合に分類するクラスタリング分類方法とを有し、
それらを自由に組み合わせて画像を分類することを特徴とする画像の階層的分類方法。

【請求項１４】　ナビゲーションの過程での利用者からの分類観点の指示をナビゲーション履歴として保持する履歴蓄積手段と、
そのナビゲーション履歴から分類木を構成する画像分類木生成手段と、
前記生成された分類木を提示する提示手段と、
利用者から検索要求がなされた場合には、前記分類木から画像の内容検索を連携して行なう検索手段とを、具備することを特徴とする画像の分類・検索装置。

【請求項１５】　前記分類木の提示手段は、
電子本を利用し、該電子本上に分類結果を表現するために分類木のノードを本の章・節の形で展開し、

前記ノードの表現には、章や節を簡潔に表現するために分類観点、合成画、代表サンプルを組み合わせて表現し、
最も末端のリーフにはそのリーフに含まれる全画像の概要を表示し、
前記検索手段は、
前記電子本から任意の画像の概要が選択された場合、その画像の概要を検索キーとして画像を検索することを特徴とする請求項１４記載の画像の分類・検索装置。
【請求項１６】　請求項１から１３までのいずれか１項記載の画像の階層的分類方法における処理手順をコンピュータで実行するプログラムを、該コンピュータが読み取り可能な記録媒体に記録したことを特徴とする画像の階層的分類方法を実行するプログラムを記録した記録媒体。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、大量の画像を有する画像ＤＢ（データベース）システム、映像ＤＢシステムなどのマルチメディアシステムを効率的に運用し、有効に活用する際に使用する画像の階層的分類方法、および装置に関するものである。
【０００２】
【従来の技術】これまで、多数の画像管理システムが実現されている。その管理方法には、主に検索と分類という二つの方法が存在する。
【０００３】＃画像検索
画像検索には画像に付加されたテキスト情報（キーワードや説明文など）によって検索を行う方法と、画像の内容情報（色やテクスチャなどの特徴量）の類似度によって検索を行う方法が存在する。
【０００４】画像の内容情報を用いた類似検索システムとしては、Ｉｎｆｏｒｍｉｘ社のＶＩＲやＮＴＴのＥｘＳｉｇｈｔがある。ＥｘＳｉｇｈｔでは、画像全体の色、模様や、画像内のオブジェクトの色、形、位置、および、画像内の直線の長さ、傾き、位置のような特徴量での検索を可能にしている。
【０００５】＃画像分類
画像の分類にも、画像に付加されたテキスト情報を利用して分類を行う方法と、画像の内容情報を用いて分類を行う方法がある。
【０００６】画像の内容情報を用いた分類システムとしては、Ｃａｌｆｏｒｎｉａ大のＮｅｔｒａや神戸大の類似シーン分類システムが存在し、それらは画像全体や画像のブロック分割領域の色やテクスチャの特徴量によってクラスタリングする。
【０００７】＃テキスト・ナビゲーション
テキスト検索の分野では、情報の絞り込みに際し、与えられた集合をさらに分類する観点（キーワード）を自動提示することで、利用者の情報の絞り込みを支援するナビゲーション手法が提案されている。

【０００８】
【発明が開発しようとする課題】画像へのテキスト情報の付与には、
・付与を手作業に頼らざるを得ないため、コストと時間がかかること、
・付与者によるバラツキが大きくＤＢ全体に一貫したテキスト情報を付与するのが難しいこと、
・テクスチャ画像のように、テキスト情報（模様名）の付与が難しいものが存在すること、
等の解決すべき課題が存在した。
【０００９】そこで、画像の内容検索の技術が開発されてきたが、
・本に索引と目次があるように、検索だけでは画像ＤＢの概観が把握できず、その結果として、検索結果の良否についても判断できなくなること、
・検索キー画像の取得方法としてスケッチ入力やデジタルカメラ入力等が存在するがそれらを利用したとしても検索キーを与えることが難しい、
等の解決すべき課題が存在した。
【００１０】また、画像の内容分類技術が近年開発されつつあるが、
・これまで開発されたものは、航空写真画像や雲画像のように特殊な領域の画像に対する専用システムであり、特殊な特徴量を利用するため一般的な画像に適用できないこと、
・一般的な画像に適用可能な場合でも、単にクラスタリングを行うだけでは階層的な分類木の構成にはなっておらず、結局、画像数が増えた場合には分類として機能しない、
等の解決すべき課題が存在した。
【００１１】本発明の課題は、画像ＤＢ内の全体像を把握するための、画像分類木構築法、画像分類の提示法、および、画像検索システムとの統合法を与え、効率的な画像ＤＢ管理・活用法を実現することである。
【００１２】
【課題を解決するための手段】本発明は、以下に列記する発明により上記の課題を解決する。
【００１３】第１の発明は、任意の画像集合を分類対象とし、指定された分類観点により分類した分類結果を提示し、前記分類結果に対し、続いて指定された分類観点によりさらに分類した分類結果を提示する過程を１回、または複数回繰り返し行うことを特徴とする画像の階層的分類方法である。
【００１４】この発明は、以下の発明の基本となるものであり、分類観点の指示と、それに基づいた分類の実行の繰り返しにより、画像の階層的な分類と、分類木の構築が実現される。
【００１５】第２の発明は、画像の概念を表す言葉と、該言葉に相当する概念を定義した画像オブジェクト、画

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像内領域、および、画像内直線の特徴量の条件の組とを対応づけた表を持ち、これらと言葉のシソーラスとを関係づけた画像辞書を用いて、画像を分類するための情報を抽出し、前記抽出した情報を分類観点の一つとして画像を分類することを特徴とする画像の階層的分類方法である。

【００１６】テキストのシソーラスは、「言葉」の持つ概念関係を表したものである。画像内に写る言葉で表現できる被写体を部分画、オブジェクト、直線など画像の特徴を組み合わせて定義することにより被写体を表現する「言葉」を画像特徴量を用いて表現することができる。ここでキーワードシソーラスの概念関係を用いれば、定義された画像間に関連性もたせることができ、これらの情報をまとめることで画像辞書が形成され、分類観点の抽出に利用できる。

【００１７】第３の発明は、画像および画像を分割した領域の面積により正規化した代表色Ｙ個の色ヒストグラムを求め、明るい色の方が暗い色より小さな閾値を持ち、前記色ヒストグラムにおいて該閾値を超える色がある場合は、その色の中で最大の値を持つ色を対象領域の代表領域色として抽出し、該閾値を超える色がない場合は代表領域色を持たない領域とし、前記決定した代表領域色を分類観点として画像を分類することを特徴とする画像の階層的分類方法である。

【００１８】例えば画像をＹ個の代表色に減色し、同じ面積にてＸ分割された個々の領域における色のヒストグラムを作成する。このとき、ヒストグラムの最大値が特定の閾値を超える場合は、最大値に相当する色をその領域における代表領域色とする。もし、その閾値を満たす色がない場合はその領域には代表領域色がないとみなす。なお、人の目には暗くて地味な色より明るく派手な色の方が目につきやすいので、明るい色の方が暗い色より閾値を低く設定する。上記した方法により抽出される代表領域色は利用者が分類を行なう際の詳細な分類観点として用いられ、この観点に基づいた階層的な分類が行なわれる。

【００１９】第４の発明は、画像および画像を分割した領域の面積により正規化した代表色Ｙ個の色ヒストグラムを求め、前記ヒストグラム値が高いものから順に第１主要色、第２主要色、…、第Ｙ主要色とし、これらの主要色を分類観点として画像を分類することを特徴とする画像の階層的分類方法である。

【００２０】画像全体について代表的な色は必ずしも１色ではなく、複数の支配的な色が存在するケースがほとんどである。そこで画像全体領域の色ヒストグラム値の高いものから順に第１主要色、第２主要色、…とする。これは画像全体領域に限らず、任意の画像領域にも拡張可能である。この結果は利用者が分類を行なう際の分類観点として用いられ、観点に基づいた階層的な分類が行なわれる。

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【００２１】第５の発明は、代表領域色を分類観点として画像を分類する際、ある代表領域色に属する画像枚数が一定枚数Ａより少ない場合はその画像集合を類似した色相を持つ他の集合に統合し、逆にある代表領域色に属する画像が一定枚数Ｂ（Ｂ＞Ａ）より多い場合はより細かい色相の代表領域色に分割することを特徴とする画像の階層的分類方法である。

【００２２】代表領域色を用いた画像分類において、分類対象となる画像の枚数が少なかったり、階層的な分類を繰り返すことで１つの分類集合に含まれる画像枚数が徐々に減少してきた場合、予め規定された代表色数を用いて分類すると数枚しか画像を含まない分類集合が形成されることがある。このような分類は分類木構造を無意味に複雑化させる。そこで、ある代表色に属する画像枚数が一定枚数Ａより少ない場合はその集合を類似した色相を持つ他の集合に統合し、分類木構造を簡単にする。逆に分類画像数が多い場合は、予め固定された代表色を用いて分類しても１つの分類集合が非常に大きくなる場合がある。そこで１度代表色で分類された後もある色相を持つ画像が一定枚数Ｂよりも多い場合は、次回の分類により細かく色相分割された代表色を用いて１つの分類集合を細分化できる詳細分類観点を追加提供する。

【００２３】第６の発明は、感性語とその感性語からイメージされる色の特徴量を対応付けた感性語辞書を分類観点として用い、前記感性語辞書の感性語特徴量と、対象画像から抽出される色特徴量との距離計算を行ない、最も類似する感性語に前記対象画像を分類することを特徴とする画像の階層的分類方法である。

【００２４】画像から受ける「かわいらしい」、「さわやかな」といった感性を用いて分類を行うために、感性語とその感性語からイメージされる色の特徴量を対応付けた感性語辞書を用いた分類を行う。画像から抽出される色情報と各感性語が持つ特徴量との距離計算を行い、最も距離が短かった感性語に対して画像を一意に振り分け分類する。

【００２５】第７の発明は、画像より直線の長さ、角度、本数、および、複数直線間の関係といった特徴量を抽出し、前記抽出した特徴量を分類観点とすることを特徴とする画像の階層的分類方法である。

【００２６】画像内からエッジの情報をもとに抽出される直線は画像の構図を反映するものが多い。しかし、始点と終点の情報からなる個々の直線情報のままでは、その画像内の構図の情報として分類に用いることはできない。そこで、直線の本数や長さ、本数、複数直線間の関係などを用いて、１枚の画像内から抽出された直線がどのような構図を反映する情報を持っているのか、また、直線同士がどのような係わり合いを持っているのかを調べる。この結果は、利用者が分類を行なう際の分類観点として用いられ、観点に基づいた階層的な分類が行なわれる。

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【００２７】第８の発明は、画像より抽出される画像内オブジェクト、その個数、複数の画像内オブジェクトの位置関係、および、画像内オブジェクトの分布といった特徴量を分類観点とすることを特徴とする画像の階層的分類方法である。

【００２８】画像内より抽出されるオブジェクトの個数やその重心位置の分布は画像によって異なり、この情報も画像の構図情報を反映する。そこで、オブジェクトの個数や重心位置をもとに１枚画内のどのあたりに多くの被写体が写っているのかといった分布状況を抽出する。この結果は利用者が分類を行なう際の分類観点として用いられ、観点に基づいた階層的な分類が行なわれる。

【００２９】第９の発明は、予め基本として登録した代表形状を分類観点とし、分類対象の画像内より抽出される画像内オブジェクトの形状特徴量を抽出し、それらのヒストグラム間の距離計算によって最も類似する代表形状に前記画像を分類することを特徴とする画像の階層的分類方法である。

【００３０】クリップアートのように１画像中に１画像内オブジェクトをもつ画像集合を分類する場合、形状は非常に重要な特徴となる。そこで、予め丸や正方形、長方形といった基本となる代表形状を数種類設定し、最も類似する代表形状に一意に分類する。具体的には、対象画像と代表形状の形状特徴量間の距離計算を行い、最も距離が短かった代表形状に分類する。

【００３１】第１０の発明は、分類観点の指示は、複数の分類観点を提示した中から選択させるナビゲーションにより行われることを特徴とする画像の階層的分類方法である。

【００３２】階層的な分類を実現するために、利用者が領域色、直線、オブジェクト、画像辞書の観点を選択しながら分類を実現する。まず領域色、直線、オブジェクト、画像辞書といった大まかな分類観点（大分類観点）を提示する。利用者がこの中から分類観点を選択すると、システムは、さらに先の選択観点に基づき該当画像を絞り込み、さらに細かい選択条件（小分類観点）に基づき集計を行なう。その結果は各小分類観点に該当する画像サンプルと共に選択条件として利用者に提示される。利用者がこの小分類観点を選択することにより実際に分類が実行され、分類集合が作成される。このような分類観点の提示により利用者をナビゲートしながら階層的な分類を繰り返し、画像の絞り込みを行なっていく。

【００３３】第１１の発明は、分類観点を提示する際には、該当する画像を持たない分類観点は提示対象から除き、残る提示対象の分類観点については、各分類観点に該当する画像の枚数が多い分類観点から順に利用者に推薦提示することで分類木構築者をナビゲートすることを特徴とする画像の階層的分類方法である。

【００３４】ナビゲーションにおいて、たくさんの分類観点がありすぎると、利用者はどれを次の分類観点として選択していいのかわからないので、不必要な分類観点は削除するとともに、推薦する観点の候補を提示する。すなわち、画像データベースに格納されるすべての画像に対して領域色、直線、オブジェクトによる分類を行なった場合、適用する画像データによっては分類観点に対して該当するものが存在しないことがある。このような結果を分類選択項目として提示しても意味がない。そこで、このような分類観点は分類選択候補から予め削除し、かつ該当する分類観点が多い順に提示順序を並び替えて推薦する分類候補として利用者に提示する。

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【００３５】第１２の発明は、ナビゲーションによる画像の階層的分類の過程での利用者からの分類観点の選択を分類履歴として保持し、前記分類履歴から分類木を生成することを特徴とする画像の階層的分類方法である。

【００３６】上記のナビゲーション時に、利用者が選択した分類観点の履歴を保存しておく。この分類履歴から、対象とする画像ＤＢを概観する静的な分類木が出来上がる。

【００３７】第１３の発明は、ナビゲーションにより画像を階層的に分類する場合、予め代表的な分類項目の例をいくつか決めておき、最も近い分類項目に個々の画像を分類する上記の画像の階層的分類方法と、各領域の色特徴量、形状特徴量などの画像の特徴量をクラスタリング手法を用いて類似する集合に分類するクラスタリング分類方法とを有し、それらを自由に組み合わせて画像を分類することを特徴とする画像の階層的分類方法である。

【００３８】種々雑多な画像を分類する場合、できるだけ多くの観点を用いて分類ができることが望ましい。そこで、本発明３～９の画像の階層的分類方法のように予め代表的な分類の例をいくつか決めておき、最も近い項目に個々の画像を割り当てる「代表分類手法」と、各領域の色特徴量、形状特徴量といった特徴量をクラスタリングすることで分類する「クラスタリング分類手法」の２種類をユーザが状況に応じて選択し分類する。このような「複合分類手法」を用いることで分類の階層化がしやすく、また、意味のある集合を形成しやすくなる。

【００３９】第１４の発明は、ナビゲーションの過程での利用者からの分類観点の指示をナビゲーション履歴として保持する履歴蓄積手段と、そのナビゲーション履歴から分類木を構成する画像分類木生成手段と、前記生成された分類木を提示する提示手段と、利用者から検索要求がなされた場合には、前記分類木から画像の内容検索を連携して行なう検索手段とを、具備することを特徴とする画像の分類・検索装置である。

【００４０】上記のナビゲーション時に、利用者が選択した分類観点の履歴を保存しておく。この分類履歴から、対象とする画像ＤＢを概観する静的な分類木が出来上がる。この静的な分類木を、閲覧する機能手段を設け、階層分類と類似検索を連携させ、利用者の要望に応

じて分類と検索を切り替えながら画像を絞り込んでいくことが可能となる。

【００４１】第１５の発明は、前記分類木の提示手段は、電子本を利用し、該電子本上に分類結果を表現するために分類木のノードを本の章・節の形で展開し、前記ノードの表現には、章や節を簡潔に表現するために分類観点、合成画、代表サンプルを組み合わせて表現し、最も末端のリーフにはそのリーフに含まれる全画像の概要を表示し、前記検索手段は、前記電子本から任意の画像の概要が選択された場合、その画像の概要を検索キーとして画像を検索することを特徴とする画像の分類・検索装置である。

【００４２】分類結果を利用者に提供する手段として、日常なじみの深い本の形式を利用し、分類した結果構築される分類木のノードを本の章・節の形で表現する。電子本の閲覧者に個々の章・節を分かりやすく表現するためには、ノード表現として代表画を表示したり、分類観点を言葉で表記したり、合成画を表示したりする。分類木の末端リーフを表現するときは、そのリーフに含まれる全画像を表示する。各章や節にはそれらの下層の節へ移動するためリンクが張られており、そのリンクをクリックすることで容易に下層の節を表示するページへジャンプすることができる。出来上がった電子本から任意の画像を選択すると、その画像を検索キーとした画像検索を行なうことが出来る。また、検索結果の中から好みの画像を選択すると電子本でその画像が掲載されたページが開かれる。上記のノード表現は、ナビゲーションによる階層的な分類実行している最中や、画像目録の分類木構造を利用者に対して視覚化する際にも、分類木のノードをうまく表現することが可能となる。

【００４３】第１６の発明は、上記の画像の階層的分類方法における処理手順をコンピュータで実行するプログラムを、該コンピュータが読み取り可能な記録媒体に記録したことを特徴とする画像の階層的分類方法を実行するプログラムを記録した記録媒体である。

【００４４】この記録媒体を用いれば、本発明の画像の階層的分類方法を記録媒体として配布したり、保存したりすることが可能となり、コンピュータを用いて本発明の方法を実現することが可能となる。

【００４５】

【発明の実施の形態】以下、本発明の実施の形態について図を用いて詳細に説明する。

【００４６】図１は、本発明による画像分類方法を実現するシステムあるいは装置の機能ブロック構成を示している。以下の各実施形態例では、これらの機能手段を適宜に用いて本発明の方法を実現する。本発明による画像分類方法は、（１）特徴量抽出フェーズ、（２）分類木構築フェーズ、（３）閲覧フェーズに分けられる。

【００４７】特徴量抽出フェーズでは、入力された画像集合の各画像から検索用特徴量が抽出されて検索用特徴量ＤＢに格納されるとともに、各画像データは画像ＤＢに格納される。一方、分類用特徴量抽出手段により画像から以下の実施形態例で述べる分類用特徴量が抽出されて分類用特徴量ＤＢに格納される。この分類用特徴量の抽出の際には、画像辞書や感性語辞書が用いられることもある。

【００４８】分類用木構築フェーズでは、分類木構築支援機能により、構築者からの分類観点の指示とそれによる画像の分類を繰り返し行われて、階層的な分類がなされ、その分類履歴から分類木が構築されて、分類木ＤＢに格納される。分類木構築支援機能は、ナビゲーション手段、分類木作成手段、およびクラスタリング手段などで実現される。

【００４９】閲覧フェーズでは、提示手段によるブラウジング機能によって、分類結果（分類木）が本形式で提示される。この提示により利用者が検索要求を発すると、画像検索手段は、分類木に基づいて検索を行い、検索結果を提示手段で提示する。

【００５０】［実施形態例１］　＃画像辞書の構成

図２（ａ），（ｂ），（ｃ）は、画像辞書を説明する図である。

【００５１】図２（ａ）は、空に関する辞書の例を示している。例えば「青空」は、画像の上部の大きな領域の代表色が青である、または、画像の上部に存在する面積の大きな画像オブジェクトの代表色が青であると定義できる。同様に「曇り空」、「夜空」が定義できる。さらに、空に関するシソーラスと組み合わせることで、「空」という概念に対応する画像辞書を構成することができる。

【００５２】図２（ｂ）は、「人の顔」に関する辞書の例を示している。「人の顔」は、丸い画像オブジェクトで、肌色のものと定義できる。

【００５３】図２（ｃ）は、「屋根」に関する辞書の例を示している。「屋根」は２本の直線が存在し、それらの位置関係が山型になっていると定義できる。これらの概念を表す言葉とその特徴量の組み合わせ、および、シソーラスの組み合わせで図３のような画像辞書を構成することができる。

【００５４】［実施形態例２］　＃領域色の抽出

図４は、画像の代表領域色抽出の例を示した図である。例えは、図のように７パターン、２４個の領域に分割する。これが領域に関する分類観点となる。さらに各領域の色に関する分布をヒストグラム化し、その上で特定の閾値を越えた最頻出色をその領域の代表領域色として決定する。閾値を越える色がないときは、その領域に関して代表領域色なしとする。この代表領域色の算出過程を図５にフローチャート化する。なお、その閾値は、個々の色毎に異なっていて構わず、明るい色の方が暗い色より小さな閾値を持つようにすると、明るい色が強調され、人間の主観により近づく。

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【００５５】領域とその代表色の情報は、分類用特徴量ＤＢに蓄積される。ＤＢ中の画像は領域とその代表領域色により分類されることになる。なお、分割領域はさらに細かな領域でも、対角線を利用し分割される領域などでも構わない。

【００５６】［実施形態例３］　＃直線分類観点の抽出
図６（ａ）～（ｆ）は、直線を使った分類観点の例である。画像または画像領域毎に各分類観点の直線の長さ、角度、本数、複数の直線間の関係に関する特徴量を抽出し、分類用特徴量ＤＢに格納する。この直線分類観点の算出のフローチャートを図７に示す。

【００５７】［実施形態例４］　＃推薦分類候補の提示
図８は、領域色における推薦分類候補提示の処理フローを示している。データベースに登録されている任意の画像集合に対し各領域毎に代表領域色が決定された後、各領域毎に代表領域色がない画像の枚数Ｘが集計される。

【００５８】この枚数Ｘが少ない領域順に並び替えられた結果が推薦分類候補として利用者に提示される。直線やオブジェクトも直線パターンやオブジェクト分布パターンを用いて同様な方法にて処理できる。

【００５９】このような推薦候補により利用者の分類をナビゲートすることにより、分類木構築作業を容易にする。

【００６０】［実施形態例５］　＃分類観点の提示によるナビゲーション、履歴の利用
図９に、分類観点の提示によるナビゲーションの例、図１０にそのフローチャートを示す。

【００６１】ナビゲーションでは検索条件を追加しながら、検索対象を絞り込んでいく（一般には絞り込みだが、場合によっては検索対象の修正等もある）。

【００６２】さらに、従来のテキスト・ナビゲーションと同様に次の絞り込みを支援するため、分類観点を提示する。ただし、その分類観点はテキスト（言葉）ではなく、画像辞書、領域色、画像内直線、画像内オブジェクトなどとなる。

【００６３】図９では、ナビゲーションの途中の画像集合に対し、領域色、直線、オブジェクト、画像辞書という検索観点がシステムから利用者に提示され、利用者は画像辞書を選択し、さらにシステム（あるいは装置）は「人の顔」、「空」、「屋根」を提示し、利用者は「人の顔」を選択し、人物画の集合を得ている。

【００６４】さらに次のステップとして、直前のステップと同様にその画像集合に対し、領域色、直線、オブジェクト、画像辞書という検索観点がシステムから利用者に提示される。このように１回の画像の絞り込みは、画像辞書、領域色、画像内直線、画像内オブジェクトといった大まかな分類観点（大分類観点）と、それらを詳細化した分類観点（小分類観点）の２種類の観点を選択することにより実行される。大分類観点の１つである領域色における推薦分類観点提示に関しては、図９に示した

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通りである。また大分類観点として領域色を選択時に提示される小分類観点と分類概要については、図１１にそのフローチャートを示す。

【００６５】図１１では、利用者から入力された領域Ａに対して各代表色（Ｎ色）に属する枚数Ｘｉ（０≦ｉ≦Ｎ）を算出し、その枚数が多い順に並び替えを行い、枚数が多い順に登録画像データの中からサンプルを取得し、枚数とともに提示する。

【００６６】図９の例では２回目の絞り込みとして、利用者は２２番の領域色を選択し、さらにシステムは２２番の領域色の分類概要（その分類に関する統計情報等）を提示し、利用者は白を選択し、白い服の人物画の集合を得ている。

【００６７】このナビゲーションの履歴として、「人の顔」や「２２番の領域が白」が現在使用中の画像ＤＢの分類に有効であることが分かるので、その履歴をシステム（あるいは装置）に静的な分類木情報として蓄積する。蓄積された静的な分類木の全体像をキーワードや合成画、サンプル画像を用いて閲覧することで画像ＤＢが概観できる。

【００６８】図１２のように画像分類と類似検索を連携する。画像を分類により絞り込んでいく過程で、その時点における分類集合の中からより具体的な被写体の写る画像を取得したい場合には、キー画像を入力し類似検索を行なう。例えば、図９の分類集合Ｄの白い服の人物画集合において「りんご」をキー画像として入力することで「白い服の人物とりんごが共に写る写真」を得ることができる。また、逆に検索から分類への切り替えも可能にする。

【００６９】［実施形態例６］　＃複合分類法（クラスタリング分類と代表分類の融合）
ナビゲーションにより画像を階層的に分類する場合、予め代表的な分類項目の例をいくつか決めておき、最も近い分類項目に個々の画像を分類する上記実施形態例の画像の階層的分類方法と、各領域の色特徴量、形状特徴量などの画像の特徴量をクラスタリング手法を用いて類似する集合に分類するクラスタリング分類方法とを有し、それらを自由に組み合わせて画像を分類する。

【００７０】種々雑多な画像を分類する場合、できるだけ多くの観点を用いて分類ができることが望ましい。そこで、上述の画像の階層的分類方法のように予め代表的な分類の例をいくつか決めておき、最も近い項目に個々の画像を割り当てる「代表分類手法」と、各領域の色特徴量、形状特徴量といった特徴量をクラスタリングすることで分類する「クラスタリング分類手法」の２種類を利用者が状況に応じて選択し分類する。このような「複合分類手法」を用いることで分類の階層化がしやすく、また、意味のある集合を形成しやすくなる。具体的には、クラスタリングを分類観点の一つとし、例えば図９において画像集合に対して提示される分類観点の中に色

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クラスタリングなどとして提示される。この色クラスタリングが選択、指示されると、色特徴量によるクラスタリングが実行され、一般には複数の画像集合に分類されるので、その一つを選択し、次の分類のステップへ移行する。

【００７１】［実施形態例７］　＃代表色の縮退・細分化

図１３は、代表色の縮退を説明する図である。

【００７２】実施形態例２の手法を用いて、ある領域の領域色が予め設定された代表色または代表色なしのいずれかに決定される。例えば１０００枚の画像を図のように１３色の代表色に分類したとき、薄緑色となる画像が２枚しかなかったとする。一般に分類木のリーフ数が多くなると、構成された分類木のどこに所望する画像が含まれているかわかりづらくなるため、できるだけシンプルな分類木を構成するほうがよい。よって、ある閾値を設け、１つのリーフに閾値以下の画像しか存在しない場合はそれに類似する色と統合する。例えば図１３のように２枚しか薄緑色が存在しない場合は、色相の近い緑色と統合する。統合できた緑の集合がまだ閾値より少ない画像枚数である場合は、さらに青の分類と結合する。このような手法を用いることでシンプルな分類木が形成される。

【００７３】一方、ある色に分類される画像の枚数がある一定枚数よりも多い場合は、次の分類観点として、よりその色を詳細に分けることが出来る分類観点を追加提供する。図１４は、代表色「青」の場合の詳細色分類の例を示している。基準となる代表色「青」を「薄い青」から「濃い青」の数段階の色で分類できるようにする。

【００７４】［実施形態例８］　＃第Ｎ主要色の抽出

図１５は、第Ｎ主要色の抽出を説明する図である。

【００７５】上述の実施形態例２の手法を用いて全体領域の代表色分類を行なうことが出来るが、画像によっては全体領域において代表的な色は必ずしも１色ではなく、複数の支配的な色が存在する。そこで図１５のように画像全体領域の色ヒストグラム値の高いものから順に第１主要色、第２主要色、…とし、これらの主要色を用いた分類を実現する。これは画像全体領域に限らず、任意の画像領域にも拡張可能である。

【００７６】［実施形態例９］　＃代表形状分類

図１６に、代表形状の例を、図１７に、代表形状分類のフローチャートを示す。

【００７７】形状に基づいた分類を実現するために、予め図１６のような丸や正方形、長方形といった基本的な画像を用意する。これらの代表形状は、分類対象となる画像の種類により利用者が任意の画像に入れ換えることが可能である。これらの代表形状と入力された分類対象画像から図１７に示すように特徴抽出と形状特徴量の距離計算を行なった上で最も距離が短かった代表形状に分類する。

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【００７８】［実施形態例１０］　＃感性語分類法

図１８に、感性語分類のフローチャートを示す。

【００７９】システム（あるいは装置）は感性語とその感性語から受ける色を対応付けた感性語辞書を持っている。登録される感性語は利用者が任意に選択することが出来る。分類対象画像が入力されると色をもとにする感性語特徴量が抽出され、感性語辞書に登録されている全感性語との距離計算が行なわれる。その中で最も距離が近かった感性語対して入力画像が一意に分類される。

【００８０】［実施形態例１１］　＃電子本システム（あるいは装置）

図１９に、電子本システム（あるいは装置）の例を示す。

【００８１】分類を繰り返すことで構築される分類木のノードを本の章・節の形で表現し、分類結果全体を把握しやすいように、電子本のはじめに目次ページを設ける。電子本の閲覧者に個々の章・節の内容を簡潔に分かりやすく表現するためには、説明した代表画を表示したり、分類観点を言葉で表記したりする。分類木の末端リーフのみは、そのリーフに含まれる全画像を表示するページを作成する。

【００８２】上記方法で出来上がる電子本は、実際の本のようにぺらぺらめくって閲覧することが出来る。また、各章や節にはそれらの下層の節へ移動するためのリンク機能を設けることで、図１９の（１）のように容易に下層の節を表示するページへ一発ジャンプできる。

【００８３】出来上がった電子本から任意の画像を選択した場合は、図１９の（２）のようにその画像を検索キーとした検索が行なわれる。また、図１９の（３）のように検索結果の中から好みの画像を選択すると、電子本でその画像が掲載されたページが開かれる。上記のような分類→検索、検索→分類の各手法へのシームレスな行き来は目的とする画像が見つかるまで何度試してもよい。

【００８４】［実施形態例１２］　＃階層的分類を実行するコンピュータプログラムの記録媒体

図１で示した機能ブロック構成の一部もしくは全部の機能を、コンピュータを用いて実現することができること、あるいは、図５、図７、図８、図１０、図１１、図１２、図１７、図１８、図１９などで示した処理手順をコンピュータで実行することができることは言うまでもなく、コンピュータでその各部の機能を実現するためのプログラム、あるいは、コンピュータでその処理手順を実行するためのプログラムを、そのコンピュータが読み取り可能な記憶媒体、例えば、ＦＤ（フロッピーディスク）や、ＭＯ、ＲＯＭ、メモリカード、ＣＤ、ＤＶＤ、リムーバブルディスクなどに記録し、提供し、配布することが可能である。

【００８５】

【発明の効果】本発明１によれば、画像を階層的に分類

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できる、分類木が容易に構築できる。

【００８６】本発明２によれば、画像の被写体または概念に基づいた階層的な分類が実現できる。また、人間の分類感覚に近い分類順序で分類木が作成できる。

【００８７】本発明３によれば、人が画像から受ける色の印象に近い代表色による階層的な分類が可能になる。

【００８８】本発明４によれば、複数の支配的な色をもつ画像の分類が可能になる。

【００８９】本発明５によれば、集合体の規模に応じた階層的な代表領域色分類結果が得られる。

【００９０】本発明６によれば、人の感性に基づいた階層的な画像分類が可能になる。

【００９１】本発明７によれば、画像の直線的な構図を反映した階層的な分類が可能になる。

【００９２】本発明８によれば、画像のオブジェクト分布による構図を反映した階層的な分類が可能になる。

【００９３】本発明９によれば、類似形状による階層的な分類が可能になる。

【００９４】本発明１０によれば、階層的に画像を分類する過程における画像の絞り込みが容易になる。

【００９５】本発明１１によれば、多数の分類観点のうち有望な分類観点を上位に提示することが可能になり、利用者の負担を軽減させることができる。

【００９６】本発明１２によれば、画像の分類木が容易に作成できる。

【００９７】本発明１３によれば、所望する画像が見つけやすい分類木の作成が可能になる。

【００９８】本発明１４によれば、画像の分類木が容易に作成でき、データベース内に登録されている画像の全体像を概観することができ、画像ＤＢの概観を把握しながらの検索が行なえる。これにより、検索結果からもれていた画像の発見も可能になる。

【００９９】本発明１５によれば、利用者が容易に画像の分類木を一覧でき、電子本でぱらぱらページをめぐりながら画像を探し出せる。また、分類・検索の両機能を用いたシームレスな画像の絞り込みが出来る。

【０１００】本発明１６によれば、画像の階層的分類方

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法をコンピュータプログラムとして保存したり、提供したり、配布したりすることができ、画像の階層的分類をコンピュータを用いて実行できる。

【図面の簡単な説明】

【図１】本発明による画像の階層的分類方法を実現するためのシステム（あるいは装置）の機能ブロック構成図である。

【図２】（ａ）は画像辞書構築の例、（ｂ）は画像辞書構築の例、（ｃ）は画像辞書構築の例を示す図である。

【図３】画像辞書の構成例を示す図である。

【図４】画像の代表領域色抽出の例を示す図である。

【図５】代表領域色の算出フローチャートである。

【図６】（ａ），（ｂ），（ｃ），（ｄ），（ｅ），（ｆ）は、直線分類候補の例を示す図である。

【図７】直線分類観点の算出フローチャートを示す図である。

【図８】領域色における推薦分類観点提示のフローチャートである。

【図９】分類観点を利用した画像ＤＢのナビゲーション分類の例を示す図である。

【図１０】分類観点の提示によるナビゲーションのフローチャートである。

【図１１】領域における分類概要提示のフローチャートである。

【図１２】画像分類と画像検索連携処理のフローチャートである。

【図１３】代表色の縮退例を示す図である。

【図１４】代表色の詳細色分類例（「青」の場合）を示す図である。

【図１５】第Ｎ主要色の抽出を説明する図である。

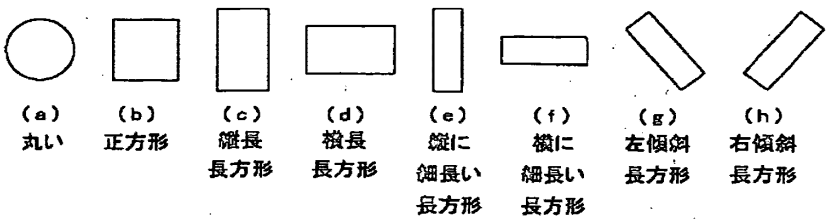
【図１６】（ａ），（ｂ），（ｃ），（ｄ），（ｅ），（ｆ），（ｇ），（ｈ）は、代表形状の例を示す図である。

【図１７】代表形状分類のフローチャートである。

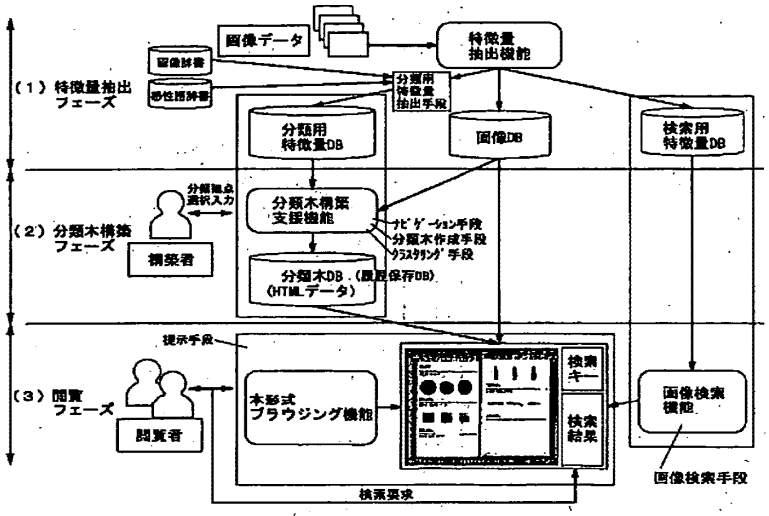
【図１８】感性語分類のフローチャートである。

【図１９】電子本システム（あるいは装置）の例を説明する図である。

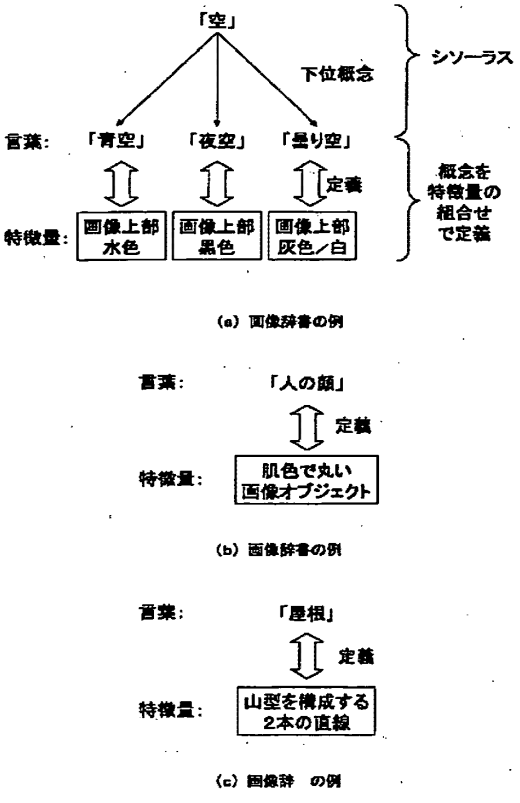
【図１６】



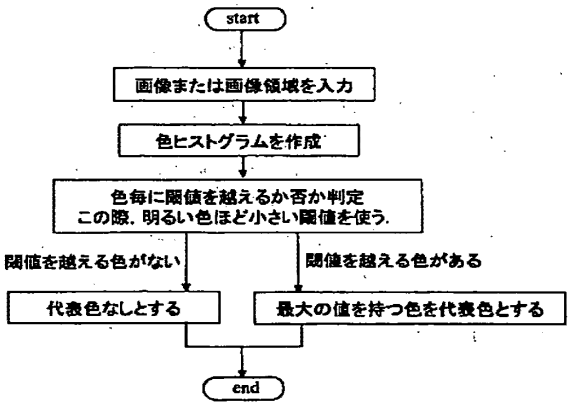
【図１】


（１）特徴量抽出フェーズ
画像データ
特徴量抽出機能
分類用特徴量抽出手段
分類用特徴量DB
画像DB
検索用特徴量DB
（２）分類木構築フェーズ
構築者
分類木構築支援機能
ナビゲーション手段
分類木作成手段
クラスタリング手段
分類木DB（HTMLデータ）
（３）閲覧フェーズ
閲覧者
提示手段
木形式ブラウジング機能
検索キー
検索結果
画像検索機能
画像検索手段
検索要求

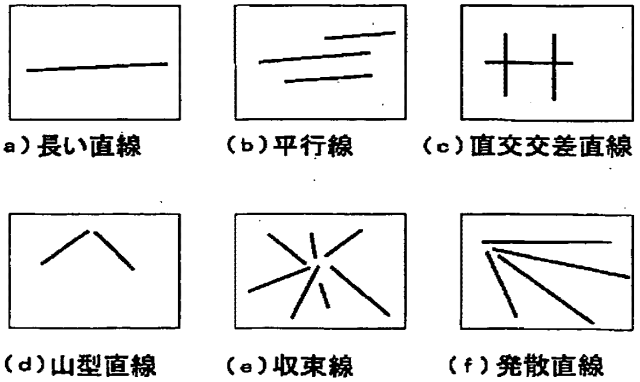
【図２】


「空」
下位概念
シソーラス
言葉：
「青空」
「夜空」
「曇り空」
定義
概念を特徴量の組合せで定義
特徴量：
画像上部水色
画像上部黒色
画像上部灰色／白
(a) 画像辞書の例
言葉：
「人の顔」
定義
特徴量：
肌色で丸い画像オブジェクト
(b) 画像辞書の例
言葉：
「屋根」
定義
特徴量：
山型を構成する2本の直線
(c) 画像辞書の例

【図５】

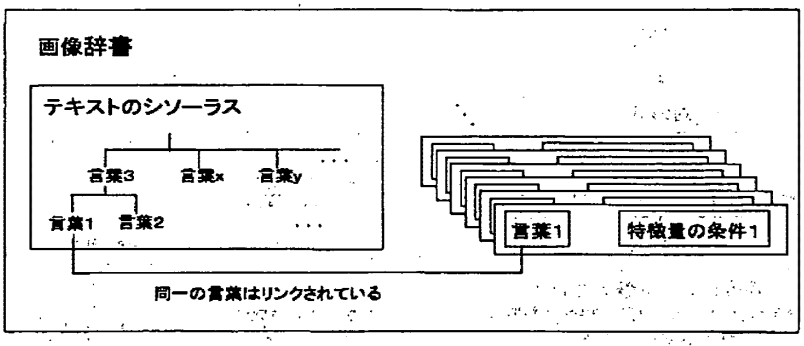

start
画像または画像領域を入力
色ヒストグラムを作成
色毎に閾値を越えるか否か判定
この際，明るい色ほど小さい閾値を使う．
閾値を越える色がない
閾値を越える色がある
代表色なしとする
最大の値を持つ色を代表色とする
end

【図６】

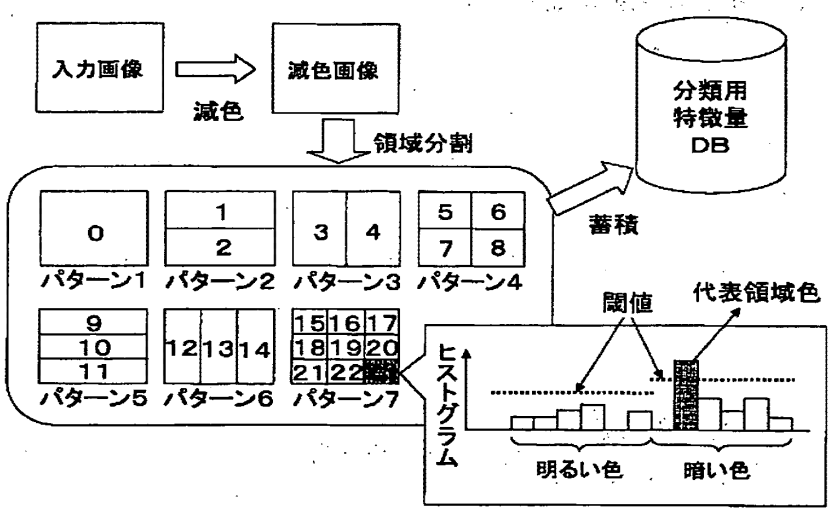

（a）長い直線
（b）平行線
（c）直交交差直線
（d）山型直線
（e）収束線
（f）発散直線

(11)

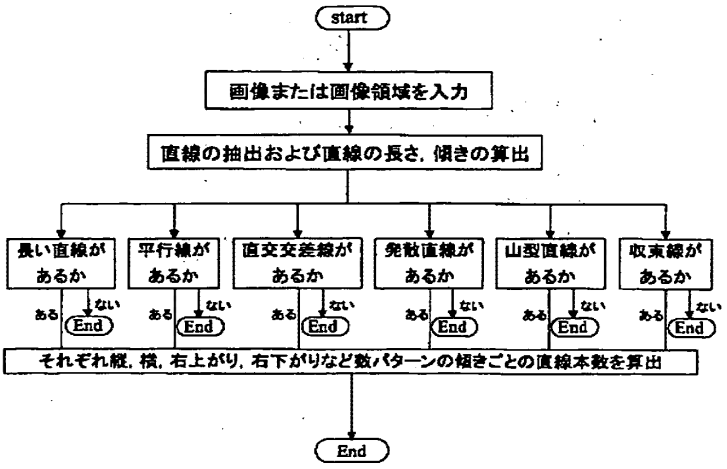
【図３】


画像辞書
テキストのシソーラス
言葉3
言葉x
言葉y
言葉1
言葉2
言葉1
特徴量の条件1
同一の言葉はリンクされている

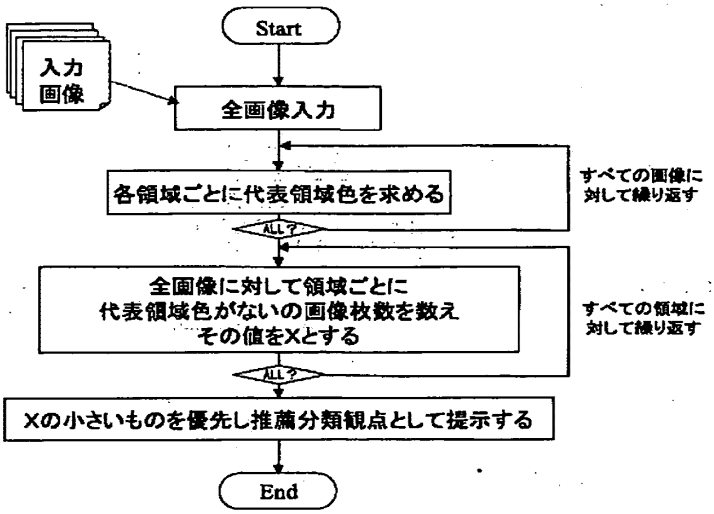
【図４】


入力画像
減色
減色画像
領域分割
分類用
特徴量
DB
蓄積
0
1
2
3
4
5
6
7
8
パターン1
パターン2
パターン3
パターン4
9
10
11
12
13
14
15
16
17
18
19
20
21
22
パターン5
パターン6
パターン7
閾値
代表領域色
ヒストグラム
明るい色
暗い色

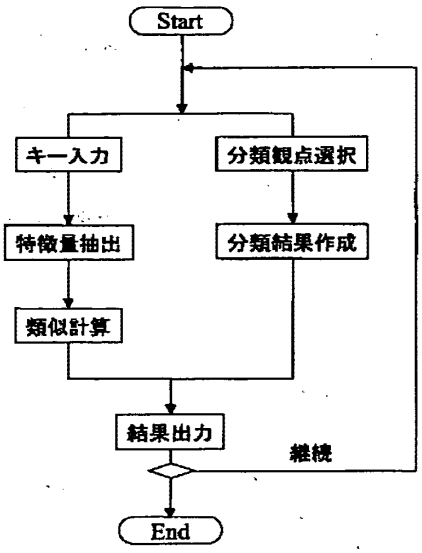
【図７】


start
画像または画像領域を入力
直線の抽出および直線の長さ，傾きの算出
長い直線があるか
平行線があるか
直交交差線があるか
発散直線があるか
山型直線があるか
収束線があるか
ある
ない
End
それぞれ縦，横，右上がり，右下がりなど数パターンの傾きごとの直線本数を算出
End

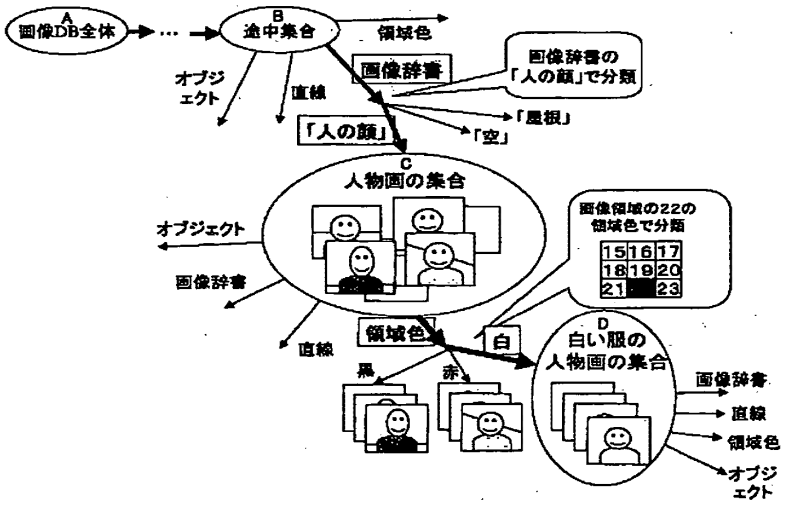
【図８】


Start
入力画像
全画像入力
各領域ごとに代表領域色を求める
すべての画像に対して繰り返す
ALL?
全画像に対して領域ごとに
代表領域色がないの画像枚数を数え
その値をXとする
すべての領域に対して繰り返す
ALL?
Xの小さいものを優先し推薦分類観点として提示する
End

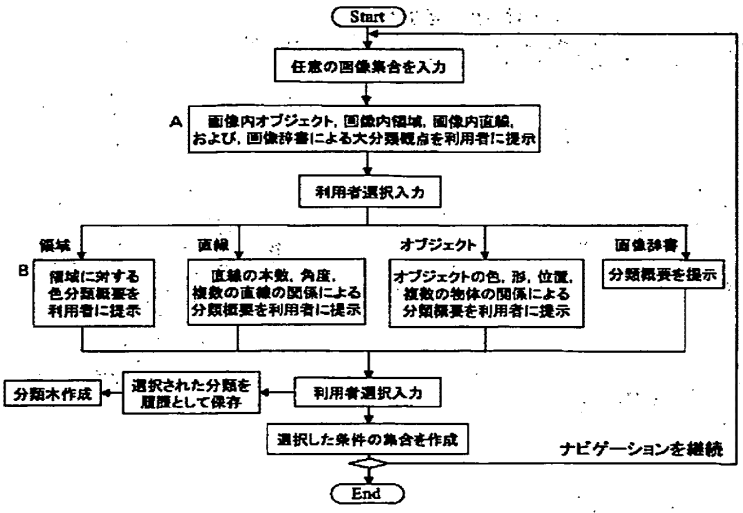
【図１２】


Start
キー入力
分類観点選択
特徴量抽出
分類結果作成
類似計算
結果出力
継続
End

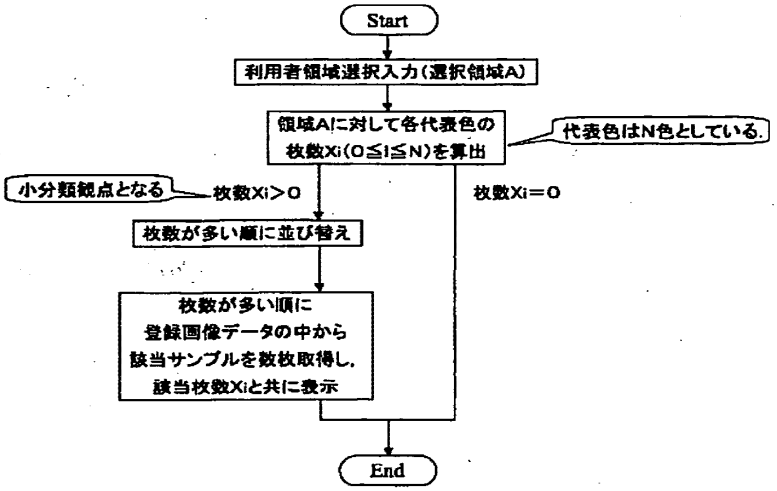
【図９】


A
画像DB全体
B
途中集合
領域色
画像辞書
画像辞書の「人の顔」で分類
オブジェクト
直線
「人の顔」
「星根」
「空」
C
人物画の集合
オブジェクト
画像辞書
画像領域の22の領域色で分類
15 16 17
18 19 20
21 23
直線
領域色
白
D
白い服の人物画の集合
黒
赤
画像辞書
直線
領域色
オブジェクト

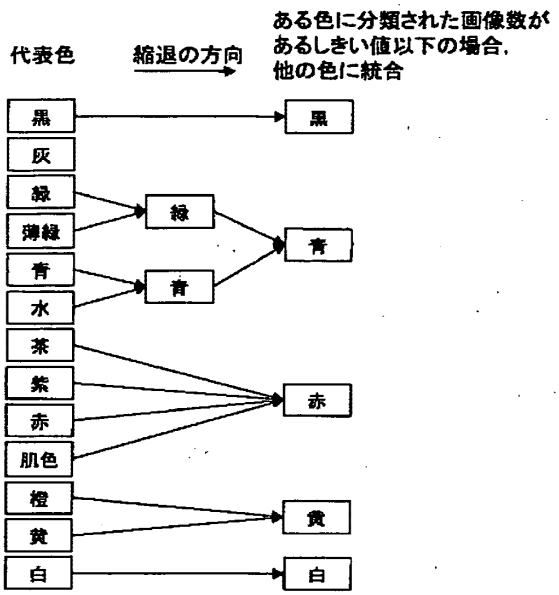
【図１０】


Start
任意の画像集合を入力
A
画像内オブジェクト，画像内領域，画像内直線，
および，画像辞書による大分類観点を利用者に提示
利用者選択入力
領域
直線
オブジェクト
画像辞書
B
領域に対する
色分類概要を
利用者に提示
直線の本数，角度，
複数の直線の関係による
分類概要を利用者に提示
オブジェクトの色，形，位置，
複数の物体の関係による
分類概要を利用者に提示
分類概要を提示
分類木作成
選択された分類を
履歴として保存
利用者選択入力
選択した条件の集合を作成
ナビゲーションを継続
End

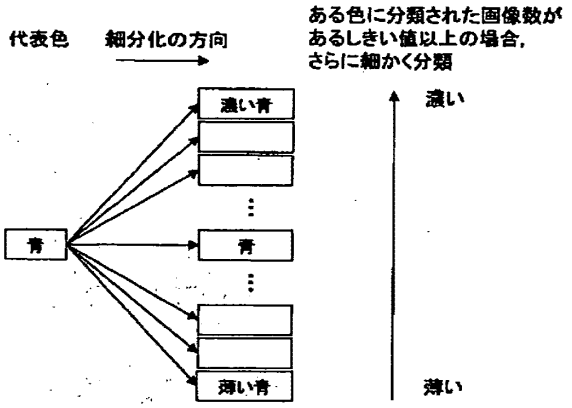
【図１１】


Start
利用者領域選択入力(選択領域A)
領域Aに対して各代表色の
枚数Xi(0≦I≦N)を算出
代表色はN色としている．
小分類観点となる
枚数Xi＞0
枚数Xi＝0
枚数が多い順に並び替え
枚数が多い順に
登録画像データの中から
該当サンプルを数枚取得し，
該当枚数Xiと共に表示
End

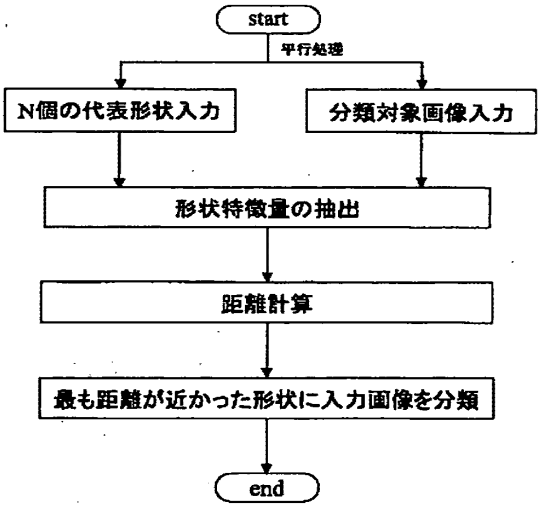
【図１３】



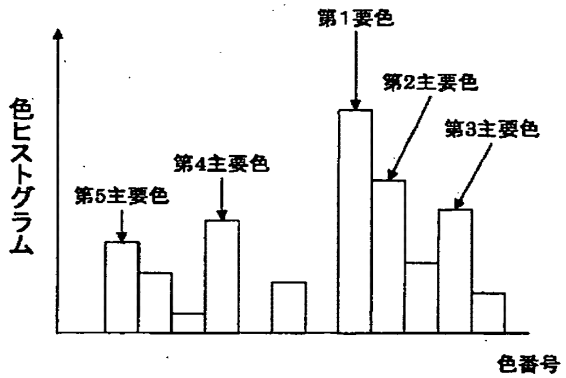
【図１４】



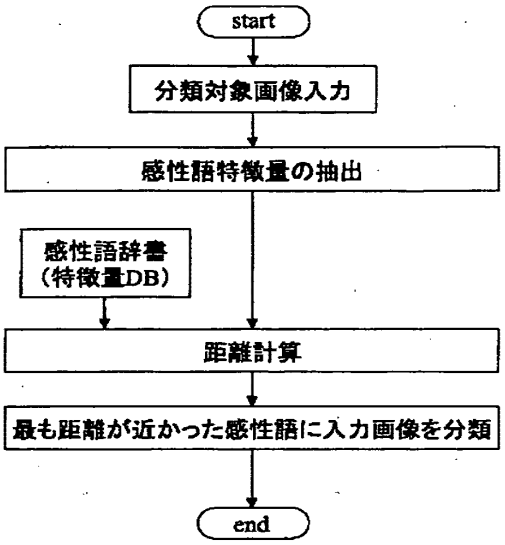
【図１７】



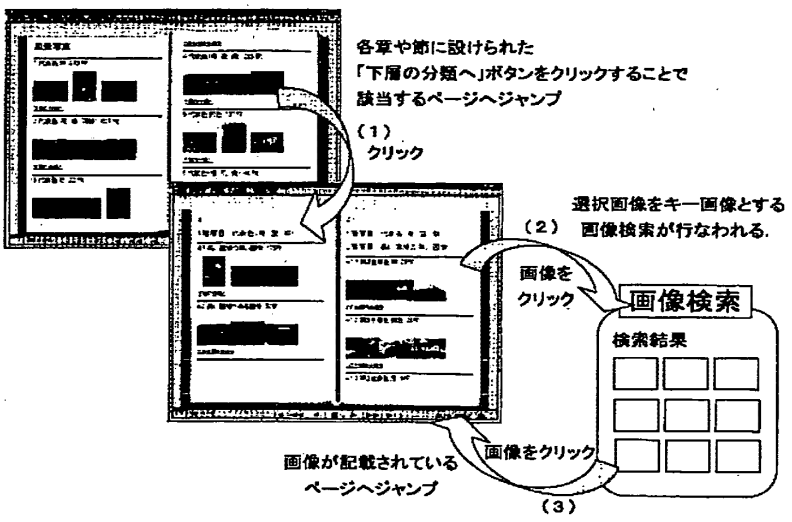
【図１５】



【図１８】



【図１９】



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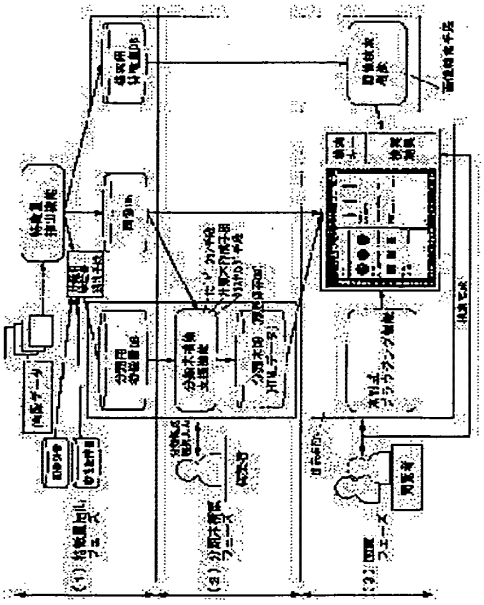
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(54) METHOD FOR HIERARCHICALLY CLASSIFYING IMAGE AND DEVICE FOR CLASSIFYING AND RETRIEVING PICTURE AND RECORDING MEDIUM WITH PROGRAM FOR EXECUTING THE METHOD RECORDED THEREON

(57)Abstract:
PROBLEM TO BE SOLVED: To realize efficient image DB(database) management and utilization by applying a picture classification tree structuring method, an image classification presenting method, and picture retrieval integrating means for capturing whole image in an image DB.
SOLUTION: Large classification points of views, such as an area color, a straight line, an object, and an image dictionary are presented from a system to a user for an image group in the middle of navigation. When a user selects the image dictionary, the system presents the classification points of view as 'a human face', 'sky', and 'roof'. When the user selects 'a human face', this system presents the set of portraits. In the same way, small classification points of view such as an area color, a straight line, an object, and an image dictionary are presented to the user for the image set, and the classification according to the selection of the classification points of view is conducted hierarchically. The history of the navigation is made valid for the classification of an image DB, and stored in this system as the classification tree information. The whole images of the stored classification tress are read by using a keyword, a composited image, or a sample image so that the image DB can be observed.



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CLAIMS

[Claim(s)]
[Claim 1] The hierarchical classification method of a picture of carrying out process in which show the classification result which made arbitrary picture sets applicable to a classification, and was classified according to the specified classification viewpoint, and the classification result further classified according to the classification viewpoint continuously specified to the aforementioned classification result is shown, as 1 time, and carrying out carrying out repeatedly two or more times as the feature.
[Claim 2] The picture object which defined the concept equivalent to the language showing the concept of a picture, and this language, It has a field within a picture, and the table which matched the group of the conditions of the characteristic quantity of the straight line within a picture. The hierarchical classification method of the picture according to claim 1 characterized by extracting the information for classifying a picture and classifying a picture for the information which carried out [aforementioned] extraction as one of the classification viewpoints using the picture dictionary which connected these and the thesaurus of language.
[Claim 3] It asks for the color histogram of Y representation colors normalized with the area of the field which divided the picture and the picture. When there is a color in which the direction of a bright color has a threshold smaller than a dark color, and exceeds this threshold in the aforementioned color histogram It is the hierarchical classification method of the picture according to claim 1 characterized by extracting a color with the greatest value in the color as a representation field color of an object domain, considering as a field without a representation field color when there is no color exceeding this threshold, and classifying a picture by making into a classification viewpoint the representation field color which made [aforementioned] a decision.
[Claim 4] the color histogram of Y representation colors normalized with the area of the field which divided the picture and the picture -- asking -- the order from what has the aforementioned high histogram value -- the -- the [1 main color and] -- the [2 main colors, --,] -- the hierarchical classification method of the picture according to claim 1 characterized by considering as Y main colors and classifying a picture by making these main colors into a classification viewpoint
[Claim 5] It unifies to other sets with the hue which was similar in the picture set when there was less picture number of sheets belonging to a certain representation field color than the fixed number of sheets A, in case a picture was classified by making a representation field color into a classification viewpoint. Conversely, it is the hierarchical classification method of a picture the claims 1 or 3 characterized by dividing into the representation field color of a hue finer when there are more pictures belonging to the existing representation field color than the fixed number of sheets B (B>A), or given in four.
[Claim 6] The hierarchical classification method of the picture according to claim 1 characterized by classifying the aforementioned object picture into the sensibility word which performs distance calculation with the sensibility word characteristic quantity of the aforementioned sensibility word dictionary, and the color characteristic quantity extracted from an object picture, using the sensibility word dictionary which matched the characteristic quantity of the color imagined from a sensibility word and its sensibility word as a classification viewpoint, and is most similar.
[Claim 7] The hierarchical classification method of the picture according to claim 1 characterized by extracting the linear length, an angle, a number, and characteristic quantity called the relation between two or more straight lines from a picture, and making into a classification viewpoint characteristic quantity which carried out [aforementioned] extraction.
[Claim 8] The physical relationship of the object within a picture extracted from a picture, its number, and two or more objects within a picture, and the hierarchical classification method of the picture according to claim 1 characterized by making characteristic quantity called the distribution of the object within a picture into a classification viewpoint.
[Claim 9] The hierarchical classification method of the picture according to claim 1 which makes a

classification viewpoint the representation configuration beforehand registered as foundations, and is characterized by classifying the aforementioned picture into the representation configuration which extracts the amount of shape facilities of the object within a picture extracted from the inside of the picture for a classification, and is most similar with the distance calculation between those histograms.
[Claim 10] It is the hierarchical classification method of a picture given [to the claims 1-9 characterized by performing directions of a classification viewpoint by the navigation made to choose from from while showing combining two or more classification viewpoints] in any 1 term.
[Claim 11] It is the hierarchical classification method of the picture according to claim 10 carried out [navigating a classification tree construction person by carrying out recommendation presentation, and] as the feature in a user to order from a classification viewpoint with much number of sheets of the picture which corresponds to each classification viewpoint about the classification viewpoint for [which removes the classification viewpoint which does not have the corresponding picture in case a classification viewpoint is shown from the candidate for presentation, and remains] presentation.
[Claim 12] The hierarchical classification method of the picture according to claim 10 or 11 characterized by holding selection of the classification viewpoint from the user in the process of the hierarchical classification of the picture by navigation as a classification history, and generating a classification tree from the aforementioned classification history.
[Claim 13] The hierarchical classification method of a picture which is equipped with the following and characterized by classifying a picture, combining them freely. The hierarchical classification method of a picture given [to the claims 3-9 which determine some examples of a typical classification item beforehand, and classify each picture into the nearest classification item when classifying a picture according to navigation hierarchical] in any 1 term The clustering classification method of classifying the characteristic quantity of pictures, such as color characteristic quantity of each field, and the amount of shape facilities, into a set similar using the clustering technique
[Claim 14] The classification / reference equipment of the picture carry out providing a history accumulation means hold directions of the classification viewpoint from the user in the process of navigation as a navigation history, a picture classification tree generation means constitute a classification tree from the navigation history, a presentation means show the classification tree by which generation was carried out [aforementioned], and a reference means carry out the content retrieval of a picture by cooperating from the aforementioned classification tree when a reference demand is made from a user as the feature.
[Claim 15] In order that the presentation means of the aforementioned classification tree may use an electronic book and may express a classification result on this electronic book, the node of a classification tree is developed in the form of the chapter and paragraph of a book. for expression of the aforementioned node In order to express a chapter and a paragraph briefly, it expresses combining a classification viewpoint, synthetic drawing, and a representation sample, and the outline of all the pictures included in the leaf is most displayed on the leaf of an end. the aforementioned reference means Classification / reference equipment of the picture according to claim 14 characterized by searching a picture by using the outline of the picture as a search key when the outline of arbitrary pictures is chosen from the aforementioned electronic book.
[Claim 16] The record medium which recorded the program which performs the hierarchical classification method of the picture characterized by recording the program which performs procedure in the hierarchical classification method of a picture given [to claims 1-13] in any 1 term by computer on the record medium which this computer can read.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention employs efficiently multimedia systems which have a lot of pictures, such as a picture DB (database) system and an image DB system, and relates to the hierarchical classification method of the picture used in case it utilizes effectively, and equipment.
[0002]
[Description of the Prior Art] Until now, many picture managerial systems are realized. Two methods of reference and a classification mainly exist in the management method.
[0003] # The method of searching using the text information (a keyword, explanatory note, etc.) added to the picture, and the method of searching with the degree of similar of the content information on a picture (characteristic quantity, such as a color and a texture) exist in picture reference picture reference.
[0004] There are VIR of Informix and ExSight of NTT as a similar retrieval system using the content information on a picture. In ExSight, reference with the color of the whole picture, a pattern, the color of the object within a picture and a form, a position and the length of the straight line within a picture, an inclination, and characteristic quantity like a position is enabled.
[0005] # There are a method of classifying using the text information added to the picture, and a method of classifying using the content information on a picture also in the classification of a picture classification picture.
[0006] As a classification system using the content information on a picture, the similar scene classification system of Netra of Calfornia size or the Kobe size exists, and they are clustered with the color of the block division field of the whole picture or a picture, or the characteristic quantity of a texture.
[0007] # The navigation technique which supports narrowing [of a user's information] down is proposed by showing automatically the viewpoint (keyword) which classifies the given set in the field of text navigation text reference further on the occasion of informational narrowing down.
[0008]
[The technical problem which invention tends to develop] The technical problem which should be solved [exist / what has difficult grant of text information (pattern name) / like that it is difficult for cost and time to give the text information to which the variation by this thing and - grant person and the whole DB cohered greatly since it cannot but depend for - grant on a handicraft, and - texture picture] in grant of the text information on a picture existed.
[0009] Then, although the technology of the content retrieval of a picture has been developed As an index and a table of contents are in a book, a general view of Picture DB cannot be grasped only by reference. - As the result The technical problem which should be solved [be / difficult / to give a search key, though they are used, although a sketch input, a digital camera input, etc. exist as the acquisition method of that it becomes impossible to judge also about the quality of a reference result and - search key picture / it] existed.
[0010] Moreover, although the content classification technology of a picture is being developed in recent years - Since it is the dedicated system to the picture of a special field which was developed until now like an aerial photograph picture or a cloud imagery and special characteristic quantity is used, are inapplicable to a general picture, - The technical problem which does not become the composition of a classification tree hierarchical only by clustering even when it can apply to a general picture, and does not function as a classification when the number of pictures increases after all and which should solve ** existed.
[0011] The technical problem of this invention is giving the picture classification tree building method for grasping the overview within Picture DB, the method of showing a picture classification, and the method of unifying a picture retrieval system, and realizing the efficient method of picture DB managing / utilizing.
[0012]

[Means for Solving the Problem] this invention solves the above-mentioned technical problem by invention listed below.

[0013] It is the hierarchical-classification method of a picture of carrying out the process which presents the classification result which the 1st invention made arbitrary picture sets applicable to a classification, and was classified according to the specified classification viewpoint, and is shown in the classification result further classified according to the classification viewpoint continuously specified to the aforementioned classification result as 1 time, and carrying out carrying out repeatedly two or more times as the feature.

[0014] This invention is to the foundations of the following invention, and hierarchical classification of a picture and construction of a classification tree are realized by directions of a classification viewpoint, and the repeat of execution of the classification based on it.

[0015] The picture object which defined the concept equivalent to the words with which the 2nd invention expresses the concept of a picture, and this language, It has a field within a picture, and the table which matched the group of the conditions of the characteristic quantity of the straight line within a picture. It is the hierarchical classification method of the picture characterized by extracting the information for classifying a picture and classifying a picture for the information which carried out [aforementioned] extraction as one of the classification viewpoints using the picture dictionary which connected these and the thesaurus of language.

[0016] The thesaurus of a text expresses the conceptual relation which "language" has. The "language" expressing a photographic subject can be expressed using picture characteristic quantity by defining the photographic subject which can express in the language reflected in a picture combining the feature of pictures, such as partial drawing, an object, and a straight line. between the pictures defined when using the conceptual relation of a keyword thesaurus here -- relevance -- ****** -- things are made, a picture dictionary is formed by summarizing these information, and it can use for extraction of a classification viewpoint

[0017] The 3rd invention asks for the color histogram of Y representation colors normalized with the area of the field which divided the picture and the picture. When there is a color in which the direction of a bright color has a threshold smaller than a dark color, and exceeds this threshold in the aforementioned color histogram It is the hierarchical classification method of the picture characterized by extracting a color with the greatest value in the color as a representation field color of an object domain, considering as a field without a representation field color when there is no color exceeding this threshold, and classifying a picture by making into a classification viewpoint the representation field color which made [aforementioned] a decision.

[0018] For example, the histogram of the color in each field by which carried out subtractive color of the picture to the representation color of Y pieces, and X division was carried out in the same area is created. When the maximum of a histogram exceeds a specific threshold at this time, let the color equivalent to maximum be a representation field color in the field. When there is no color which fills the threshold, in the field, it is considered that there is no representation field color. In addition, the color per eye and at a cone's with the showy brighter color brighter than a dark and simple color sets a threshold to people's eyes low from a dark color. The representation field color extracted by the above-mentioned method is used as a detailed classification viewpoint at the time of a user classifying, and the hierarchical classification based on this viewpoint is performed.

[0019] the color histogram of Y representation colors which normalized the 4th invention with the area of the field which divided the picture and the picture -- asking -- the order from what has the aforementioned high histogram value -- the -- the [1 main color and] -- the [2 main colors, --,] -- it is the hierarchical classification method of the picture characterized by considering as Y main colors and classifying a picture by making these main colors into a classification viewpoint

[0020] The case of a color typical about the whole picture where not one color but two or more dominant colors not necessarily exist is almost the case. then, the order from what of the whole picture field has a high color histogram value -- the -- the [1 main color and] -- it considers as 2 main colors and -- This is extensible not only to the whole picture field but arbitrary picture fields. It is used as a classification viewpoint at the time of a user classifying, and the hierarchical classification based on the viewpoint is performed by this result.

[0021] It unifies to other sets with the hue which was similar in the picture set when there was less picture number of sheets belonging to a certain representation field color than the fixed number of sheets A, in case the 5th invention made a representation field color a classification viewpoint and a picture was classified. Conversely, when there are more pictures belonging to the existing representation field color than the fixed number of sheets B (B>A), it is the hierarchical classification method of the picture characterized by dividing into the representation field color of a finer hue.

[0022] In the picture classification using the representation field color, when there is little number of sheets of the picture used as the candidate for a classification, or the picture number of sheets contained in one classification set by repeating a hierarchical classification has decreased gradually and it classifies using the representation color number specified beforehand, the classification set only whose several sheets include a picture may be formed. Such a classification makes the classification tree structure complicate unnecessarily. Then, when there is less picture number of sheets belonging to a certain representation color than the fixed number of sheets A, it unifies to other sets with the hue which was similar in the set, and the classification tree structure is simplified. Conversely, when there are many classification pictures, even if it classifies using the representation color fixed beforehand, one classification set may become very large. Then, when there are more pictures with a certain hue than the fixed number of sheets B after being once classified according to a representation color, additional offer of the specific classification viewpoint which can subdivide one classification set using the representation color in which hue division was finely carried out by the next classification is made.
[0023] It is the hierarchical classification method of the picture characterized by classifying the aforementioned object picture into the sensibility word which the 6th invention performs distance calculation with the sensibility word characteristic quantity of the aforementioned sensibility word dictionary, and the color characteristic quantity extracted from an object picture, using the sensibility word dictionary which matched the characteristic quantity of the color imagined from a sensibility word and its sensibility word as a classification viewpoint, and is most similar.
[0024] In order to classify using "it is pretty" and the sensibility of "being fresh" which are received from a picture, the classification using the sensibility word dictionary which matched the characteristic quantity of the color imagined from a sensibility word and its sensibility word is performed. Distance calculation with the sexual desire news extracted from a picture and the characteristic quantity which each sensibility word has is performed, and a picture is distributed and classified into a meaning to the sensibility word which was the shortest.
[0025] It is the hierarchical classification method of the picture characterized by for the 7th invention extracting the linear length, an angle, a number, and characteristic quantity called the relation between two or more straight lines from a picture, and making a classification viewpoint characteristic quantity which carried out [aforementioned] extraction.
[0026] The straight line extracted from the inside of a picture based on the information on an edge has many things reflecting the composition of a picture. However, with each straight-line information which consists of information on the starting point and a terminal point, it cannot use for a classification as information on the composition within the picture. Then, it investigates what relation **** straight lines have for whether it has the information in which the straight line extracted from the inside of a picture of one sheet reflects what composition using the relation between a linear number, length and a number, and two or more straight lines etc. again. It is used as a classification viewpoint at the time of a user classifying, and the hierarchical classification based on the viewpoint is performed by this result.
[0027] Invention of the octavus is the physical relationship of the object within a picture extracted from a picture, its number, and two or more objects within a picture, and the hierarchical classification method of the picture characterized by making characteristic quantity called the distribution of the object within a picture into a classification viewpoint.
[0028] The number of the object extracted from the inside of a picture and the distribution of the center-of-gravity position change with pictures, and this information also reflects the composition information on a picture. Then, the distribution situation which hit in one-sheet drawing many photographic subjects are reflected based on the number and the center-of-gravity position of an object is extracted. It is used as a classification viewpoint at the time of a user classifying, and the hierarchical classification based on the viewpoint is performed by this result.
[0029] The 9th invention is the hierarchical classification method of the picture which makes a classification viewpoint the representation configuration beforehand registered as foundations, and is characterized by classifying the aforementioned picture into the representation configuration which extracts the amount of shape facilities of the object within a picture extracted from the inside of the picture for a classification, and is most similar with the distance calculation between those histograms.
[0030] When classifying the picture set which has an object within 1 picture in 1 picture like a clip art, a configuration serves as the very important feature. Then, some kinds of representation configurations which are to foundations, such as a round head, a square, and a rectangle, beforehand are set up, and it classifies into a most similar representation configuration at a meaning. Specifically, distance calculation between the amounts of shape facilities of an object picture and a representation configuration is performed, and it classifies into the representation configuration which was the shortest.
[0031] The 10th invention is the hierarchical classification method of the picture characterized by

performing directions of a classification viewpoint by the navigation made to choose from from while showing two or more classification viewpoints.
[0032] A classification is realized, while a user chooses the viewpoint of a field color, a straight line, an object, and a picture dictionary, in order to realize a hierarchical classification. Rough classification viewpoints (very kind viewpoint), such as a field color, a straight line, an object, and a picture dictionary, are shown first. If a user chooses a classification viewpoint from this inside, a system will narrow down an applicable picture based on a previous selection viewpoint further, and will total based on a still finer selection condition (minor-key viewpoint). A user is shown the result as a selection condition with the picture sample applicable to each minor-key viewpoint. When a user chooses this minor-key viewpoint, a classification is actually performed and a classification set is created. A hierarchical classification is repeated navigating a user by presentation of such a classification viewpoint, and a picture is narrowed down.
[0033] The classification viewpoint which does not have the corresponding picture in case the 11th invention presents a classification viewpoint is removed from the candidate for presentation, and it is the hierarchical classification method of a picture of carrying out navigating a classification tree construction person by carrying out recommendation presentation as the feature in a user to order, from a classification viewpoint with much number of sheets of the picture which corresponds to each classification viewpoint about the classification viewpoint for [which remains] presentation.
[0034] In navigation, if there are many classification viewpoints too much, since a user does not understand in what may choose anything as a following classification viewpoint, an unnecessary classification viewpoint presents the candidate of a viewpoint who recommends while deleting it. Namely, when the classification by the field color, the straight line, and the object is performed to all the pictures stored in an image database, what corresponds to a classification viewpoint may not exist depending on the image data to apply. It is meaningless even if it shows such a result as classification selections. Then, such a classification viewpoint is shown to a user as a classification candidate who deletes from a classification selection candidate beforehand, and rearranges and recommends presentation sequence to order with many corresponding classification viewpoints.
[0035] The 12th invention is the hierarchical classification method of the picture characterized by holding selection of the classification viewpoint from the user in the process of the hierarchical classification of the picture by navigation as a classification history, and generating a classification tree from the aforementioned classification history.
[0036] The history of the classification viewpoint which the user chose at the time of the above-mentioned navigation is saved. The static classification tree which surveys the picture DB made into an object from this classification history is done.
[0037] The hierarchical classification method of the above-mentioned picture of the 13th invention determining some examples of a typical classification item beforehand when classifying a picture according to navigation hierarchical, and classifying each picture into the nearest classification item, It is the hierarchical classification method of the picture characterized by having the clustering classification method of classifying the characteristic quantity of pictures, such as color characteristic quantity of each field, and the amount of shape facilities, into a set similar using the clustering technique, and classifying a picture, combining them freely.
[0038] When classifying a miscellaneous picture variously, it is desirable for a classification to be possible using as many viewpoints as possible. Then, some examples of a typical classification are beforehand decided like the hierarchical classification method of the picture of this inventions 3-9, and a user chooses and classifies two kinds, the "representation classification technique" which assigns each picture to the nearest item, and the "clustering classification technique" classified according to clustering characteristic quantity, such as color characteristic quantity of each field, and the amount of shape facilities, according to a situation. It becomes easy to form the set which is easy to carry out hierarchization of a classification by using such "compound classification technique", and is meaningful.
[0039] A history accumulation means by which the 14th invention holds directions of the classification viewpoint from the user in the process of navigation as a navigation history, A picture classification tree generation means to constitute a classification tree from the navigation history, a presentation means to show the classification tree by which generation was carried out [aforementioned], and when a reference demand is made from a user It is classification / reference equipment of the picture characterized by providing a reference means to cooperate and to perform the content retrieval of a picture from the aforementioned classification tree.
[0040] The history of the classification viewpoint which the user chose at the time of the above-mentioned navigation is saved. The static classification tree which surveys the picture DB made into an object from this classification history is done. Establish a functional means to peruse this static classification tree,

and a hierarchy classification and similar reference are made to cooperate, and it becomes possible to narrow down a picture, changing reference to a classification according to a request of a user.
[0041] In order that the presentation means of the aforementioned classification tree may use an electronic book and the 15th invention may express a classification result on this electronic book, the node of a classification tree is developed in the form of the chapter and paragraph of a book. for expression of the aforementioned node In order to express a chapter and a paragraph briefly, it expresses combining a classification viewpoint, synthetic drawing, and a representation sample, and the outline of all the pictures included in the leaf is most displayed on the leaf of an end. the aforementioned reference means When the outline of arbitrary pictures is chosen from the aforementioned electronic book, it is classification / reference equipment of the picture characterized by searching a picture by using the outline of the picture as a search key.
[0042] The node of the classification tree built as a result of using and classifying the form of the deep book of concordance every day as a means to provide a user with a classification result is expressed in the form of the chapter and paragraph of a book. In order to express each chapter and paragraph intelligibly to the visitor of an electronic book, display representation drawing as node expression, a classification viewpoint is written by means of language, or synthetic drawing is displayed. When expressing the end leaf of a classification tree, all the pictures included in the leaf are displayed. In order to move to each chapter or a paragraph to those lower layer paragraphs, the link is stretched, by clicking the link, a lower layer paragraph can be displayed easily and a PEJIHE jump can be carried out. If arbitrary pictures are chosen from the done electronic book, picture reference which used the picture as the search key can be performed. Moreover, if a favorite picture is chosen out of a reference result, the page by which the picture was carried with the electronic book will be opened. In case the above-mentioned node expression visualizes the hierarchical midst by navigation which is carrying out classification execution, and the classification tree structure of picture TOC to a user, it becomes possible [expressing the node of a classification tree well].
[0043] The 16th invention is the record medium which recorded the program which performs the hierarchical classification method of the picture characterized by recording the program which performs procedure in the hierarchical classification method of the above-mentioned picture by computer on the record medium which this computer can read.
[0044] If this record medium is used, it will become possible to distribute the hierarchical classification method of the picture of this invention as a record medium, or to save it, and it will become possible to realize the method of this invention using a computer.
[0045]
[Embodiments of the Invention] Hereafter, the gestalt of operation of this invention is explained in detail using drawing.
[0046] Drawing 1 shows the functional-block composition of the system which realizes the picture classification method by this invention, or equipment. The method of this invention is realized in each following example of an operation gestalt, using these functional meanses suitably. The picture classification method by this invention is divided into (1) characteristic-quantity extraction phase, (2) classification tree construction phase, and (3) perusal phase.
[0047] In a characteristic quantity extraction phase, while the characteristic quantity for reference is extracted from each picture of the inputted picture set and being stored in the characteristic quantity DB for reference, each image data is stored in Picture DB. On the other hand, the characteristic quantity for a classification stated in the following examples of an operation gestalt from a picture by the characteristic quantity extraction means for a classification is extracted, and it is stored in the characteristic quantity DB for a classification. A picture dictionary and a sensibility word dictionary may be used in the case of extraction of this characteristic quantity for a classification.
[0048] a classification -- timber -- he be carried out in a construction phase by repeating directions of the classification viewpoint from a construction person, and the classification of the picture by it by the classification tree construction support function, and a hierarchical classification does -- a classification tree is built from the classification history, and it is stored in the classification tree DB A classification tree construction support function is realized with a navigation means, a classification tree creation means, a clustering means, etc.
[0049] In a perusal phase, a classification result (classification tree) is shown in this form by the browsing function by the presentation means. If a user emits a reference demand by this presentation, a picture reference means will search based on a classification tree, and will present a reference result with a presentation means.
[0050] [Example 1 of an operation gestalt] The block diagram 2 of # picture dictionary (a), (b), and (c) are drawings explaining a picture dictionary.

[0051] Drawing 2 (a) shows the example of the dictionary about empty. For example, a "blue sky" can be defined as the representation color of a picture object with a big area which exists in the upper part of a picture being **, or the representation color of the big field of the upper part of a picture is blue. A "cloudy sky" and a "night sky" can be defined similarly. Furthermore, the picture dictionary corresponding to the concept of "empty" can consist of combining with the thesaurus about empty.
[0052] Drawing 2 (b) shows the example of the dictionary about "people's face." "People's face" is a round picture object and can be defined as a beige thing.
[0053] Drawing 2 (c) shows the example of the dictionary about a "roof." Two straight lines exist and a "roof" can be defined as those physical relationship being mountain types. A picture dictionary like drawing 3 can consist of combination of the language showing these concepts, and its characteristic quantity, and combination of a thesaurus.
[0054] [Example 2 of an operation gestalt] Extraction drawing 4 of # field color is drawing having shown the example of representation field color extraction of a picture. A metaphor is divided into seven patterns and 24 fields as shown in drawing. This serves as a classification viewpoint about a field. Furthermore the distribution about the color of each field is histogram-ized, and the maximum frequent appearance color which exceeded the specific threshold on it is determined as a representation field color of the field. When there is no color exceeding a threshold, suppose that he has no representation field color about the field. Calculation process of this representation field color is flow-chart-ized to drawing 5 . In addition, a bright color will be emphasized and the threshold will approach by human being's subjectivity, if you may differ for each color of every and the direction of a bright color has a threshold smaller than a dark color.
[0055] The information on a field and its representation color is accumulated at the characteristic quantity DB for a classification. The picture in DB will be classified according to a field and its representation field color. In addition, a division field may also be a still finer field or a field which uses the diagonal line and is divided.
[0056] [Example 3 of an operation gestalt] Extraction drawing 6 [of # straight-line-segments viewpoint] (a) - (f) is the example of the classification viewpoint using the straight line. The characteristic quantity about the relation between the length of the straight line of each classification viewpoint, an angle, a number, and two or more straight lines is extracted for every picture or picture field, and it stores in the characteristic quantity DB for a classification. The flow chart of calculation of this straight-line-segments viewpoint is shown in drawing 7 .
[0057] [Example 4 of an operation gestalt] # recommendation classification candidate's presentation drawing 8 shows the processing flow of the recommendation classification candidate presentation in a field color. After a representation field color is determined for every field to the arbitrary picture sets registered into the database, the number of sheets X of the picture which does not have a representation field color for every field is totaled.
[0058] A user is shown the result into which this number of sheets X was rearranged in order of the few field as a recommendation classification candidate. A straight line and an object can also be processed by the same method using a straight-line pattern or an object distribution pattern.
[0059] By navigating a classification of a user by such recommendation candidate, classification tree construction work is done easy.
[0060] [Example 5 of an operation gestalt] The flow chart is shown in the example of the navigation by presentation of a classification viewpoint, and drawing 10 at the navigation by presentation of # classification viewpoint, and use drawing 9 of a history.
[0061] The candidate for reference is narrowed down in navigation, adding reference conditions (although it is generally narrowing down, there is correction for reference etc. depending on the case).
[0062] Furthermore, a classification viewpoint is shown in order to support next narrowing down like the conventional text navigation. However, the classification viewpoint serves as not a text (language) but a picture dictionary, a field color, a straight line within a picture, an object within a picture, etc.
[0063] In drawing 9 , further, to the picture set in the middle of navigation, the user was shown from the system the reference viewpoint of a field color, a straight line, an object, and a picture dictionary, the user chose the picture dictionary, and a system (or equipment) presents "people's face", "empty", and a "roof", and the user chose "people's face" and has got the set of a portrait.
[0064] A user is shown the reference viewpoint of a field color, a straight line, an object, and a picture dictionary from a system to the picture set still like the last step as a following step. Thus, one narrowing [of a picture] down is performed by choosing two kinds of viewpoints, rough classification viewpoints (very kind viewpoint), such as a picture dictionary, a field color, a straight line within a picture, and an object within a picture, and the classification viewpoint (minor-key viewpoint) which detailed them. It is as the recommendation classification viewpoint presentation in the field color which is one of the kind viewpoints very much having been shown in drawing 9 . Moreover, about the minor-key viewpoint and

the classification outline which a field color is shown very much as a kind viewpoint at the time of selection, the flow chart is shown in drawing 11 .
[0065] In drawing 11 , the number of sheets Xi (0 <=i<=N) which belongs to each representation color (N color) to the field A inputted by the user is computed, it rearranges into order with much the number of sheets, a sample is acquired out of registration image data in order with much number of sheets, and it shows with number of sheets.
[0066] In the example of drawing 9 , as 2nd narrowing down, the user chose the field color of No. 22, the system presented the classification outlines (statistical information about the classification etc.) of the field color of No. 22 further, and the user chose white and has got the set of the portrait of white dress.
[0067] Since it turns out as a history of this navigation are [of people] a "face" and that "the field of No. 22 is white" is effective in the classification of the picture DB present in use, the history is accumulated as static classification tree information to a system (or equipment). Picture DB is surveyable by perusing the overview of the accumulated static classification tree using a keyword, synthetic drawing, and a sample picture.
[0068] It cooperates a picture classification and similar reference like drawing 12 . In the process which narrows down the picture by classification, a key picture is inputted and similar reference is performed to acquire the picture to which a more concrete photographic subject is reflected out of the classification set at the time. For example, "the photograph with which both the persons and apples of white dress are reflected" can be acquired in inputting an "apple" as a key picture in a portrait set of the white dress of the classification set D of drawing 9 . Moreover, the change to the classification from reference is also enabled conversely.
[0069] [Example 6 of an operation gestalt] # compound classification (fusion of a clustering classification and a representation classification)
When classifying a picture according to navigation hierarchical, some examples of a typical classification item are decided beforehand, it has the clustering classification method of classifying into a set similar using the clustering technique the characteristic quantity of the hierarchical classification method of the picture of the above-mentioned example of an operation gestalt of classifying each picture into the nearest classification item, and pictures, such as color characteristic quantity of each field, and the amount of shape facilities, and a picture is classified, combining them freely.
[0070] When classifying a miscellaneous picture variously, it is desirable for a classification to be possible using as many viewpoints as possible. Then, some examples of a typical classification are beforehand decided like the hierarchical classification method of an above-mentioned picture, and a user chooses and classifies two kinds, the "representation classification technique" which assigns each picture to the nearest item, and the "clustering classification technique" classified according to clustering characteristic quantity, such as color characteristic quantity of each field, and the amount of shape facilities, according to a situation. It becomes easy to form the set which is easy to carry out hierarchization of a classification by using such "compound classification technique", and is meaningful. It is shown as color clustering etc. into the classification viewpoint which sets clustering to one of the classification viewpoints, for example, is specifically shown to a picture set in drawing 9 . If this color clustering is chosen and directed, since clustering by color characteristic quantity will be performed and it will generally be classified into two or more picture sets, one of them is chosen and it shifts to the step of the next classification.
[0071] [Example 7 of an operation gestalt] Degeneracy / fragmentation drawing 13 of # representation color is drawing explaining degeneracy of a representation color.
[0072] It is decided using the technique of the example 2 of an operation gestalt that it will be either without the representation color to which the field color of a certain field was set beforehand or a representation color. For example, as shown in drawing, when you classify the picture of 1000 sheets into the representation color of 13 colors, suppose that there were only two pictures used as a light green color. It is better to constitute the simpleest possible classification tree, since [which matte-loan-comes to be hard] the picture for which it asks where of the constituted classification tree is included, if the number of leaves of a classification tree generally increases. Therefore, a certain threshold is prepared, and when only the picture below a threshold exists in one leaf, it unifies with a color similar to it. For example, like drawing 13 , only two sheets are unified with the near green of a hue, when a light green color does not exist. When the unified green set is picture number of sheets still fewer than a threshold, it combines with a blue classification further. A simple classification tree is formed by using such technique.
[0073] When [than the fixed number of sheets which, on the other hand, has the number of sheets of the picture classified into a certain color] more, additional offer of the classification viewpoint which can divide the color in detail more is made as a following classification viewpoint. Drawing 14 shows the example of the detailed classification by color in the case of a representation color "blue." It enables it to classify the representation color "blue" used as criteria according to the color of several step story of "blue"

to thin "deep blue."
[0074] [example 8 of an operation gestalt] the [#] -- extraction drawing 15 of N main colors -- the -- it is drawing explaining extraction of N main colors
[0075] Although representation classification by color of a whole field can be performed using the technique of the above-mentioned example 2 of an operation gestalt, depending on a picture, as for a typical color, not one color but two or more dominant colors not necessarily exist in a whole field. then, drawing 15 -- like -- the order from what of the whole picture field has a high color histogram value -- the -- the [1 main color and] -- it considers as 2 main colors and --, and the classification using these main colors is realized This is extensible not only to the whole picture field but arbitrary picture fields.
[0076] [Example 9 of an operation gestalt] The example of a representation configuration is shown in # representation configuration classification drawing 16 , and the flow chart of a representation configuration classification is shown in drawing 17 .
[0077] In order to realize the classification based on the configuration, fundamental pictures, such as the round head and square like drawing 16 , and a rectangle, are prepared beforehand. These representation configurations can be changed to arbitrary pictures by the user according to the kind of picture used as the candidate for a classification. As shown in drawing 17 from the picture for a classification inputted as these representation configurations, after performing distance calculation of a feature extraction and the amount of shape facilities, it classifies into the representation configuration which was the shortest.
[0078] [Example 10 of an operation gestalt] The flow chart of a sensibility word classification is shown in # sensibility word classification drawing 18 .
[0079] The system (or equipment) has the sensibility word dictionary which matched the color received from a sensibility word and its sensibility word. A user can choose the sensibility word registered arbitrarily. If the picture for a classification is inputted, the sensibility word characteristic quantity based on a color will be extracted, and distance calculation with all the sensibility words registered into the sensibility word dictionary is performed. distance was the nearest in it -- sensibility **** is carried out and an input picture is classified into a meaning
[0080] [Example 11 of an operation gestalt] # electronic book system (or equipment)
The example of an electronic book system (or equipment) is shown in drawing 19 .
[0081] The node of the classification tree built by repeating a classification is expressed in the form of the chapter and paragraph of a book, and a table-of-contents page is prepared at the beginning of an electronic book so that it may be easy to grasp the whole classification result. In order to express the content of each chapter and paragraph intelligibly briefly to the visitor of an electronic book, the explained representation drawing is displayed or a classification viewpoint is written by means of language. Only the end leaf of a classification tree creates the page which displays all the pictures included in the leaf.
[0082] Like an actual book, the electronic book done by the above-mentioned method can be turned over fluently, and can be perused. Moreover, in each chapter or a paragraph, from [1] can be jumped to the page which displays a lower layer paragraph easily as shown in (1) of drawing 19 by preparing the link function for moving to those lower layer paragraphs.
[0083] When arbitrary pictures are chosen from the done electronic book, reference which used the picture as the search key as shown in (2) of drawing 19 is performed. Moreover, if a favorite picture is chosen out of a reference result as shown in (3) of drawing 19 , the page by which the picture was carried with the electronic book will be opened. The above classifications -> you may try the seamless traffic with each technique of a reference and reference -> classification how many times until the target picture is found.
[0084] [Example 12 of an operation gestalt] The part or all the functions of the functional-block composition shown by record-medium drawing 1 of the computer program which performs # hierarchical classification are realizable using a computer, Or it cannot be overemphasized that procedure shown by drawing 5 , drawing 7 , drawing 8 , drawing 10 , drawing 11 , drawing 12 , drawing 17 , drawing 18 , drawing 19 , etc. can be performed by computer. The program for a computer realizing the function of each part, Or the program for performing the procedure by computer It is possible to record the computer on the storage which can be read, for example, FD, (floppy disk), MO, ROM, memory card, CD and DVD, a removable disk, etc., to offer it, and to distribute it.
[0085]
[Effect of the Invention] According to this invention 1, a picture can be classified hierarchical and a classification tree can build easily.
[0086] According to this invention 2, the hierarchical classification based on the photographic subject or concept of a picture is realizable. Moreover, a classification tree can be created in order of the classification near human being's classification feeling.

[0087] According to this invention 3, the hierarchical classification in the representation color near the impression of the color which people receive from a picture is attained.
[0088] According to this invention 4, the classification of a picture with two or more dominant colors is attained.
[0089] According to this invention 5, the hierarchical representation field classification-by-color result according to the scale of the aggregate is obtained.
[0090] According to this invention 6, the hierarchical picture classification based on people's sensibility is attained.
[0091] According to this invention 7, the hierarchical classification reflecting the linear composition of a picture is attained.
[0092] According to this invention 8, the hierarchical classification reflecting the composition by the object distribution of a picture is attained.
[0093] According to this invention 9, the hierarchical classification by the similar configuration is attained.
[0094] According to this invention 10, narrowing [of the picture in process in which a picture is classified hierarchical] down becomes easy.
[0095] According to this invention 11, it can become possible to show a high order a promising classification viewpoint among many classification viewpoints, and a user's burden can be made to mitigate.
[0096] According to this invention 12, the classification tree of a picture can create easily.
[0097] According to this invention 13, creation of the classification tree which the picture for which it asks tends to find is attained.
[0098] According to this invention 14, the classification tree of a picture can create easily, the overview of the picture registered into the database can be surveyed, and while grasping a general view of Picture DB can be searched. Thereby, discovery of the picture which had leaked from the reference result is also attained.
[0099] According to this invention 15, a picture is discoverable, while a user can look through the classification tree of a picture easily and revolves a page with a clatter with an electronic book. Moreover, it can perform narrowing [of a seamless picture] down using both the functions of a classification and reference.
[0100] According to this invention 16, the hierarchical classification method of a picture can be saved as a computer program, can be offered, or can be distributed, and hierarchical classification of a picture can be performed using a computer.

[Translation done.]

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damages caused by the use of this translation.
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the functional block block diagram of the system (or equipment) for realizing the hierarchical classification method of the picture by this invention.
[Drawing 2] (a) is drawing in which the example of picture dictionary construction and (b) show the example of picture dictionary construction, and (c) shows the example of picture dictionary construction.
[Drawing 3] It is drawing showing the example of composition of a picture dictionary.
[Drawing 4] It is drawing showing the example of representation field color extraction of a picture.
[Drawing 5] It is the calculation flow chart of a representation field color.
[Drawing 6] (a), (b), (c), (d), (e), and (f) are drawings showing a straight-line-segments candidate's example.
[Drawing 7] It is drawing showing the calculation flow chart of a straight-line-segments viewpoint.
[Drawing 8] It is the flow chart of the recommendation classification viewpoint presentation in a field color.
[Drawing 9] It is drawing showing the example of the navigation classification using the classification viewpoint of Picture DB.
[Drawing 10] It is the flow chart of the navigation by presentation of a classification viewpoint.
[Drawing 11] It is the flow chart of the classification outline presentation in a field.
[Drawing 12] It is the flow chart of a picture classification and picture reference cooperation processing.
[Drawing 13] It is drawing showing the example of degeneracy of a representation color.
[Drawing 14] It is drawing showing the detailed classification-by-color similar case (in the case of "blue") of a representation color.
[Drawing 15] the -- it is drawing explaining extraction of N main colors
[Drawing 16] (a), (b), (c), (d), (e), (f), (g), and (h) are drawings showing the example of a representation configuration.
[Drawing 17] It is the flow chart of a representation configuration classification.
[Drawing 18] It is the flow chart of a sensibility word classification.
[Drawing 19] It is drawing explaining the example of an electronic book system (or equipment).

[Translation done.]

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出証特２００３－３０９３１８２

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出証特２００３－３０９３１８２

【書類名】　　明細書

【発明の名称】　画像検索装置、画像検索装置におけるキーワード付与方法、及びプログラム

【特許請求の範囲】

【請求項１】　画像中のオブジェクトを検出してキーワードを付与し、画像の分類と検索を行う画像検索装置であって、

分類および検索対象となる画像をキーワードとともにデータベースに保存する画像記憶手段と、

入力された画像中の所定のオブジェクトを認識するオブジェクト認識手段と、

前記オブジェクト認識手段によりオブジェクトが認識された場合に、該オブジェクトに関連するキーワードを提示するキーワード提示手段と、

前記キーワード提示手段により提示されたキーワードの確認、追加、または修正を行うためのオブジェクト情報入力手段と、

を具備することを特徴とする画像検索装置。

【請求項２】　前記オブジェクト認識手段は、

人物が画像に含まれているかどうかを判断する条件を規定するための人物検出条件入力手段と、

画像中の顔画像の検出を行う顔画像検出手段と、

前記顔画像検出手段により顔画像が検出された場合に、該顔画像を基に、前記データベースを参照して、類似する顔画像を検出する顔画像類似度判定手段と、

を具備することを特徴とする請求項１に記載の画像検索装置。

【請求項３】　前記オブジェクト情報入力手段は、

人物情報の確認、追加、または修正を行うための人物情報入力手段であることを特徴とする請求項１または請求項２に記載の画像検索装置。

【請求項４】　前記人物を検出する際には、さらに、画像中の肌色領域を検出するための肌色領域検出手段を使用すること

を特徴とする請求項２に記載の画像検索装置。

【請求項５】　前記顔画像類似度判定手段により類似する顔画像が検出されない場合には、直近に入力された画像に付与されたキーワードを提示する手段を

具備することを特徴とする請求項２に記載の画像検索装置。

【請求項６】　前記キーワードが、階層構造を持つキーワードから構成される検索テンプレートに従い付与されること

を特徴とする請求項１から５のいずれかに記載の画像検索装置。

【請求項７】　画像中のオブジェクトを検出してキーワードを付与し、画像の分類と検索を行う画像検索装置におけるキーワード付与方法であって、

分類および検索対象となる画像をキーワードとともにデータベースに保存する画像記憶手順と、

入力された画像中の所定のオブジェクトを認識するオブジェクト認識手順と、

前記オブジェクト認識手順によりオブジェクトが認識された場合に、該オブジェクトに関連するキーワードを提示するキーワード提示手順と、

前記キーワード提示手順により提示されたキーワードの確認、追加、または修正を行うためのオブジェクト情報入力手順と

を含むことを特徴とする画像検索装置におけるキーワード付与方法。

【請求項８】　画像中のオブジェクトを検出してキーワードを付与し、画像の分類と検索を行う画像検索装置内のコンピュータに、

分類および検索対象となる画像をキーワードとともにデータベースに保存する画像記憶手順と、

入力された画像中の所定のオブジェクトを認識するオブジェクト認識手順と、

前記オブジェクト認識手順によりオブジェクトが認識された場合に、該オブジェクトに関連するキーワードを提示するキーワード提示手順と、

前記キーワード提示手順により提示されたキーワードの確認、追加、または修正を行うためのオブジェクト情報入力手順と

を実行させるためのプログラム。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】

本発明は、デジタル画像の分類と検索を行う画像検索装置、画像検索装置におけるキーワード付与方法、及びプログラムに関し、特に、画像の検索・分類にお

いて、画像中のオブジェクト（例えば、人物検出）を行いキーワードを付与することにより、画像にキーワードを付与する作業を効率化する、画像検索装置、画像検索装置におけるキーワード付与方法、及びプログラムに関する。

【０００２】

【従来の技術】

近時、デジタルカメラが普及し、撮影したデジタル画像（単に「画像」ともいう）をＰＣ（パーソナルコンピュータ）等に保存しておき、後日、ＰＣ画面上に表示させるなどして、鑑賞することも多くなってきた。また、保存した画像を取り出し、ＰＣ画面上で画像を編集し、電子アルバムなどを作成することも多くなってきた。

【０００３】

このような場合に、ＰＣ等に保存されたデジタル画像を検索して多数の画像の中から所望の画像を取り出すことが必要になるが、このような検索を効率的に行うには、登録する画像に何らかの検索用のキーワードを付与しておくことが必要になる。

また、一般的に、ユーザがデジタルカメラなどで写真を撮る場合は、家族などの人物を中心にして撮影する場合が多いが、このような場合に、撮影された人物（オブジェクト）を特定できるキーワードを付与して画像を保存しておくと便利なことが多い。

しかしながら、このキーワードの付与と分類を適切に行い、後で検索を効率的に行えるようにするには、かなりの熟練と経験を必要とし、一般のユーザにとってはなかなか困難な作業となり、また煩雑であった。

【０００４】

このような問題に対処するための、画像の登録と検索に関する幾つかの先行技術が開示されており、例えば、以下に示すものがある。

（１）予め検索対象となる画像に外部情報（撮影場所や撮影日時、撮影内容）を付与し、この外部情報を検索に使用する。

（２）また、画像自身の特徴量を使う製品も市販されている。例えば、画像特徴量（色や形状）で対象画像を３次元空間上に配置し、ユーザの画像検索を効率

的に行わせる装置が市販されている。

【０００５】

（３）また、例えば、特許文献１「画像の階層的分類方法、および画像の分類・検索装置、およびこの方法を実行するプログラムを記録した記録媒体」に開示された先行技術がある。

特許文献１で開示された発明は、予め作成した画像辞書を用いながら、インタラクティブ、階層的に画像の分類、検索を行う技術である。この発明においては、ナビゲーションの途中の画像集合に対し、領域色、直線、オブジェクト、画像辞書という大分類観点がシステムから利用者に提示される。利用者が画像辞書を選択すると、システムは「人の顔」、「空」、「屋根」といった分類観点を提示する。利用者が「人の顔」を選択すると、システムは人物画の集合を提示し、同様にその画像集合に対し、領域色、直線、オブジェクト、画像辞書という小分類観点が利用者に提示され、分類観点の選択による分類が階層的に行われる。このナビゲーションの履歴は、画像ＤＢの分類に有効なので、システムに分類木情報として蓄積される。蓄積された分類木の全体像をキーワードや合成画、サンプル画像を用いて閲覧することで、画像ＤＢが概観できる。

【０００６】

（４）また、例えば、特許文献２「顔画像類型検索処理方法」に開示された先行技術がある。

特許文献２で開示された発明は、対象物から顔領域の特徴を効率良く記述したデータとして高精度で高速に抽出できる簡便な顔画像類型検索処理方法を提供することを目的とする。そして、顔領域モザイク特徴抽出部により、顔領域を含む濃淡画像をモザイク化し、このモザイクパタンが顔領域の内部と外部とで異なることを利用して顔領域を顔領域モザイク特徴データとして抽出する。次に、顔画像類型検索部により、その顔領域モザイク特徴データを用いて類型分類のクラス名の検索を行う。以上により、顔領域の抽出に当たって、対象物のエッジ部分に着目するのではなく、対象物領域の濃度パタンに着目することにより、高精度で高速な顔領域に抽出・検索さらには検索のための類型分類のクラス分けを可能にする。

【０００７】

（５）また、例えば、特許文献３「検索用のキーワードの決定方法及び装置、文書検索装置、記録媒体」に開示された先行技術がある。

特許文献３で開示された発明は、相互に関連する複数のキーワードによるシソーラス検索が可能な文書検索装置において、真に必要なキーワードのみを特定できるようにすることを目的とする。そして、キーワード決定装置において、入力キーワードに追加すべきキーワード候補をシソーラス辞書から索出するとともに、そのキーワード候補の解説文書を解説文書ファイルから索出する。そして、解説文書等に入力キーワードやキーワード候補との関連度合いに応じたスコアを付与し、これらを表示装置へ表示させて、操作者に当該キーワード候補の追加可否判断を促す。操作者からの判断結果を解読し、そのキーワード候補が追加不要であれば、入力キーワードのみを検索用のキーワードとする。一方、キーワード候補の追加が必要である場合は、そのキーワード候補を検索用のキーワードに追加する。

【０００８】

【特許文献１】

特開２００１－１６００５７号公報

【特許文献２】

特開平８－２２１５４７号公報

【特許文献３】

特開平１０－３０７８４９号公報

【０００９】

【発明が解決しようとする課題】

しかしながら、上述した従来の方法には、以下のような問題点がある。

（１）の項で説明した、画像に外部情報を付与する方法では、全ての画像に外部情報を適切に付与する必要がある。しかしながら、多様性を持った検索ができるように画像に外部情報（キーワード）を付与することは、著しく手間がかかる作業となり、現実的とは言えない。

（２）の項で説明した、画像自身の特徴量を使う方法では、同じ特徴量を持つ

複数の画像を一定の法則にしたがって画面上に表示させ、その中から所望の画像を抽出しようとするものである。従って、画像内のオブジェクト（例えば、人物）を検出してキーワードの付与を効率化しようとする本発明とは、発明の目的と用途が異なるものである。

（３）の項で説明した、特許文献１に開示された方法では、予め作成した画像辞書を用いながら、インタラクティブ、階層的に画像の分類、検索を行う技術であり、画像内のオブジェクト（例えば、人物）を検出してキーワードの付与を効率化しようとする本発明とは、発明の目的と構成が異なるものである。

（４）の項で説明した、特許文献２に開示された方法では、顔画像をモザイク化（濃淡化）して類型分類のクラス分けを行おうとするものであり、画像内のオブジェクト（例えば、人物）を検出してキーワードの付与を効率化しようとする本発明とは、発明の目的と用途が異なるものである。

（５）の項で説明した、特許文献３に開示された方法は、入力キーワードに追加すべきキーワード候補をシソーラス辞書から選定するためのものであり、画像内のオブジェクト（例えば、人物）を検出してキーワードの付与を効率化しようとする本発明とは、発明の目的と構成が異なるものである。

【００１０】

本発明はこのような問題を解決するためになされたものである。本発明は、画像を分類する際に、画像中のオブジェクト（例えば、人物）の検出を行うと共に、予め検索用のテンプレートを用意しておき、画像にキーワードを付加する作業を効率化し、また、画像の検索の際には、オブジェクトを中心とした検索を容易に行うことのできる、画像検索装置、画像検索装置におけるキーワード付与方法、及びプログラムを提供することを目的とする。

【００１１】

【課題を解決するための手段】

本発明は上記課題を解決するためになされたものであり、本発明の画像検索装置は、画像中のオブジェクトを検出してキーワードを付与し、画像の分類と検索を行う画像検索装置であって、分類および検索対象となる画像をキーワードとともにデータベースに保存する画像記憶手段と、入力された画像中の所定のオブジ

ェクトを認識するオブジェクト認識手段と、前記オブジェクト認識手段によりオブジェクトが認識された場合に、該オブジェクトに関連するキーワードを提示するキーワード提示手段と、前記キーワード提示手段により提示されたキーワードの確認、追加、または修正を行うためのオブジェクト情報入力手段と、を具備することを特徴とする。

このような構成であれば、画像記憶手段により、分類および検索対象となる画像をキーワードとともにデータベースに保存しておく。そして、オブジェクト認識手段により、新たに入力された画像中の所定のオブジェクト（例えば、人物や車）の認識（検出）を行う。そして、オブジェクト認識手段により、所定のオブジェクトが検出された場合は、キーワード提示手段により、該オブジェクトに関連するキーワードをユーザに提示する。また、提示されたキーワードの確認、追加、または修正をユーザが行うためのオブジェクト情報入力手段を設ける。

これにより、画像の検索・分類装置において、入力された画像中のオブジェクトの検出を行うことにより、画像にキーワードを付加する作業を効率化できる。また、画像内のオブジェクトに関するキーワードを付与するので、大量の画像から特定のオブジェクトが写っている画像を、的確、かつ効率的に検索することができる。

【００１２】

また、本発明の画像検索装置は、前記オブジェクト認識手段は、人物が画像に含まれているかどうかを判断する条件を規定するための人物検出条件入力手段と、画像中の顔画像の検出を行う顔画像検出手段と、前記顔画像検出手段により顔画像が検出された場合に、該顔画像を基に、前記データベースを参照して、類似する顔画像を検出する顔画像類似度判定手段と、を具備することを特徴とする。

このような構成であれば、認識（検出）対象となるオブジェクトを人物とし、人物検出条件入力手段により、人物が画像に含まれているかどうかを判断する条件（例えば、肌色領域検出を行うなど）を規定する。そして、顔画像検出手段により、新たに入力された画像中の顔画像の検出を行う。また、顔画像検出手段により顔画像が検出された場合は、該顔画像を基に、画像類似度判定手段により、データベースを参照して類似する顔画像を検出する。そして、類似する顔画像が

検出された場合は、キーワード提示手段により、該顔画像に関連するキーワードをユーザに提示し、キーワードの確認、追加、または修正をユーザに行わせる。

これにより、画像の検索・分類装置において、入力された画像中の人物の検出を行うことにより、画像にキーワードを付加する作業を効率化できる。また、画像内の人物に関するキーワードを付与するので、大量の画像から特定の人物が写っている画像を、的確、かつ効率的に検索することができる。

【００１３】

また、本発明の画像検索装置は、前記オブジェクト情報入力手段は、人物情報の確認、追加、または修正を行うための人物情報入力手段であることを特徴とする

このような構成であれば、認識（検出）対象となるオブジェクトを人物とし、画像中に人物が検出された場合には、検出された人物についてのキーワード（人物情報）の確認、または該人物についてのキーワードを入力させる。

これにより、入力された画像中の人物の検出を行い、画像内の人物に関するキーワード（人物情報）を付与するので、的確にキーワードを付与することができる。

【００１４】

また、本発明の画像検索装置は、前記人物を検出する際には、さらに、画像中の肌色領域を検出するための肌色領域検出手段を使用することを特徴とする。

このような構成であれば、顔画像検出手段により人物を検出する機能に加えて、さらに、肌色領域検出手段により人物を検出する。

これにより、画像中の人物検出をより確実かつ効果的に行うことができる。

【００１５】

また、本発明の画像検索装置は、前記顔画像類似度判定手段により類似する顔画像が検出されない場合には、直近に入力された画像に付与されたキーワードを提示する手段を具備することを特徴とする。

このような構成であれば、顔画像類似度判定手段により類似する顔画像が検出されない場合には、例えば、同じ種類（同じ主題）による同一人物の画像が入力される可能性が高いので、直近に入力された画像に付与されたキーワードを提示

する。

これにより、類似する顔画像が検出されなかった場合にも、キーワードを効果に付与することができる場合が多くなる

【００１６】

また、本発明の画像検索装置は、前記キーワードが、階層構造を持つキーワードから構成される検索テンプレートに従い付与されることを特徴とする。

このような構成であれば、予め階層構造を持つキーワードから構成される検索テンプレートを用意し、この検索テンプレートに含まれるキーワードをユーザに提示して、キーワードの付与を促す。

これにより、テンプレートを利用して、簡便な操作でキーワードを付与することができる。また、検索テンプレートは、キーワードを階層的に配置したカテゴリに基づいて構成されるので、効率的な画像の分類と検索が可能となる。また、例えば、予め用意されかつ修正可能な、人物関係を記述した検索テンプレートを使用することができるので、人物情報を基にして容易に画像検索を行うことができるようになる。

【００１７】

また、本発明の画像検索装置におけるキーワード付与方法は、画像中のオブジェクトを検出してキーワードを付与し、画像の分類と検索を行う画像検索装置におけるキーワード付与方法であって、分類および検索対象となる画像をキーワードとともにデータベースに保存する画像記憶手順と、入力された画像中の所定のオブジェクトを認識するオブジェクト認識手順と、前記オブジェクト認識手順によりオブジェクトが認識された場合に、該オブジェクトに関連するキーワードを提示するキーワード提示手順と、前記キーワード提示手順により提示されたキーワードの確認、追加、または修正を行うためのオブジェクト情報入力手順とを含むことを特徴とする。

このような手順であれば、画像記憶手順により、分類および検索対象となる画像をキーワードとともにデータベースに保存しておく。そして、オブジェクト認識手順により、新たに入力された画像中の所定のオブジェクト（例えば、人物や車）の認識（検出）を行う。そして、オブジェクト認識手順により、所定のオブ

ジェクトが検出された場合は、キーワード提示手順により、該オブジェクトに関連するキーワードをユーザに提示する。また、オブジェクト情報入力手順により、提示されたキーワードの確認、追加、または修正をユーザが行う。

これにより、画像の検索・分類装置において、入力された画像中のオブジェクトの検出を行うことにより、画像にキーワードを付加する作業を効率化できる。また、画像内のオブジェクトに関するキーワードを付与するので、大量の画像から特定のオブジェクトが写っている画像を、的確、かつ効率的に検索することができる。

【００１８】

また、本発明のコンピュータプログラムは、画像中のオブジェクトを検出してキーワードを付与し、画像の分類と検索を行う画像検索装置内のコンピュータに、分類および検索対象となる画像をキーワードとともにデータベースに保存する画像記憶手順と、入力された画像中の所定のオブジェクトを認識するオブジェクト認識手順と、前記オブジェクト認識手順によりオブジェクトが認識された場合に、該オブジェクトに関連するキーワードを提示するキーワード提示手順と、前記キーワード提示手順により提示されたキーワードの確認、追加、または修正を行うためのオブジェクト情報入力手順とを実行させるためのプログラムである。

【００１９】

【発明の実施の形態】

次に本発明の実施の形態例について図面を参照して説明する。

【００２０】

[本発明の画像検索装置における基本概念]

本発明の画像検索装置においては、画像中のオブジェクト（例えば、人物）の検出を行うとともに、予めキーワード用のテンプレートを用意しておき、オブジェクトが検出された画像にキーワードを与える作業を容易にする。これにより、キーワードによる検索を効果的に行えるようにしている。

そして、使用するキーワードには、以下の性質を持たせるようにしている。

（１）画像中のオブジェクト（例えば、人物）を検出することを契機として、画像にオブジェクトを特定するためのキーワードを付与する。この場合、予め用

意したキーワードを提示し、当該画像がどのカテゴリ（分類）に属するかを、システム側からユーザに問い合わせるようにし、ユーザは提示されたカテゴリから合致する項目があれば、そのキーワードを選択するようにしている。

（２）このキーワードは人物を含む画像を検索するために用いるが、キーワードは階層的に設定することができる。例えば、オブジェクトが人物である場合は、「家族」、「親戚」などが上位のキーワードになるが、さらに「長男」「長女」「母方」などのキーワードを下位のキーワードとすることができる。

（３）また、階層化された基本的なキーワードの構成は、検索テンプレートとして、予め用意されているものとして、かつ修正可能（キーワードの追加など）なものである。

本発明の画像検索装置は、このようにして、画像へのキーワードの付与を簡略化できるようにしたものである。

【００２１】

［本発明の画像検索装置の具体的な構成］

図１は、本発明の画像検索装置が備える手段の構成例を示すブロック図であり、本発明に直接関係するものを示したものである。図１に示す画像検索装置に設けられた各手段は、以下に示す機能を有する。

【００２２】

（１）画像入力検出手段１０１

画像検索装置１００に、新たに画像の格納が行われたことを検出するための手段である。

（２）画像読取手段１０２

画像を構成する画素ごとの値（例えばＲＧＢ値など）を読み出すための手段である。

（３）静止画生成手段１０３

画像が動画の場合に、動画像から静止画を生成するための手段である。

（４）オブジェクト認識手段１０４

画像を解析し、所定のオブジェクトが含まれているかどうかを検出するための手段である。具体的な例として、オブジェクトが「人物」である場合の例につい

て後述する。

（５）キーワード提示手段１０５

オブジェクトが検出された場合に、データベース１２０を参照し、このオブジェクトに関連するキーワードを抽出してユーザに提示するための手段である。具体的な例として、オブジェクトが「人物」である場合の例について後述する。

（６）オブジェクト情報入力手段１０６

提示されたキーワードから、ユーザがオブジェクト情報を選択する、あるいは新たにキーワードを入力・更新するための手段である。具体的な例として、オブジェクトが「人物」である場合の例について後述する。

（７）検索条件入力手段１０７

検索する画像の検索条件を入力する。例えば、検索するオブジェクトが人物の場合は、「家族」、「友人」を選ぶなどの検索条件（キーワード）を入力する。

（８）表示手段１０８

検索結果を表示するための手段である。

（９）印刷手段１０９

検索結果を印刷するための手段である。

なお、データベース（画像記憶手段）１２０には、キーワードを付与するための検索テンプレート１２１と、このキーワード（検索テンプレート）に関連づけられた動画１２２および静止画１２３のデータが記憶される。

【００２３】

次に、本発明の画像検索装置について、検出対象のオブジェクトが「人物」である場合を例にとり、より具体的に説明する。

【００２４】

図２は、図１に示す画像検索装置において、検出対象となるオブジェクトが「人物」の場合の手段の構成例を示すブロック図である。図１中のオブジェクト認識手段１０４が、図２中の、人物検出条件入力手段１１１、顔画像検出手段１１２、肌色領域検出手段１１３、及び顔画像類似度判定手段１１４となる。また、図１中のオブジェクト情報入力手段１０６が、図２中の人物情報入力手段１１５となる。その他の手段については、図１と図２において共通である。

以下、図２中の各手段について説明する。なお、図１と共通の部分については、説明を省略する。

（１）人物検出条件入力手段１１１

人物が画像に含まれているかを判断する条件を規定するための手段である。顔画像の検出だけではなく、肌色領域の検出も行って人物が含まれているかどうかの判定を行うなどの条件を入力する。

（２）顔画像検出手段１１２

画像を解析し、顔画像が含まれているかどうかを検出するための手段である。顔画像の検出方法には、予め顔画像のパターンを学習させておく方法や、画像パターンの周波数解析を行う方法など種々の方法があるが、いずれの方法を使用してもよい。また、特許文献２に開示された方法を使用することもできる。なお、この顔画像検出手段１１２は、次に説明する肌色領域検出手段１１３を併用し、人物検出を行うこともできる。

【００２５】

（３）肌色領域検出手段１１３

人物の検出には、顔画像の検出以外に、エッジ情報、テンプレートを使うなど様々な方法が考えられるが、ここでは、肌色領域を使う。この、肌色領域検出手段１１３は、読み取った画素の値が肌色の範囲にあるかどうかを判定するための手段である。この肌色領域の検出には、例えば、文献「背景と顔の方向に依存しない顔の検出と顔方向の推定、荒木、島田、白井、信学技法PRMU2001-217 pp.87-94（2002-01）」に記載された方法を使用することができる。

この文献中の２．１項に記載されているように、肌色の範囲については、以下の式に従うことで検出することができる。

$0.333 < r < 0.664, \quad r > g$

$0.246 < g < 0.398, \quad g \geqq 0.5 - 0.5r$

ここで、$r = R/(R+G+B)$，$g = G/(R+G+B)$であり、Ｒ，Ｇ，Ｂはそれぞれ当該画素のＲＧＢ値である。

【００２６】

（４）顔画像類似度判定手段１１４

検出した顔画像と類似の顔画像が格納されているかどうかを、データベース１２０を参照して、チェックするための手段である。この類似度の判定には、例えば、特許文献２で開示された、顔画像をモザイク化して類型分類のクラス分けを行う手法などが利用できる。

（５）人物情報入力手段１１５

画像検索装置１００から提示されたキーワード情報から、ユーザが人物情報を選択する、あるいは新たにキーワードを入力・更新するための手段である。

【００２７】

図３は、人物情報の入力を促す画面の例を示す図であり、画像検索装置１００に新たな画像が格納されると、画像検索装置１００では画像内の人物の検出を試み、人物が検出されると、図３に例示する表示形式で、ユーザに人物情報の入力を促す。

【００２８】

この場合、人物情報の提示には種々の方法を使用することができるが、例えば、ユーザに提示されるキーワードの情報は、ユーザの利便性を増すために次の優先度で行うことができる。

・既に格納されている顔画像と一致あるいは極めて近いと判断した場合、この人物の情報を表示し、確認を促す。

・最も近い時期に入力した画像に含まれる人物の情報、更新した人物情報、あるいはキーワードを表示する。これは、家族の写真（例えば、入学式や運動会の写真）などの場合にように、同じ人物の画像が連続して入力される可能性が高いためである。

【００２９】

図４は、キーワードとなる人物情報の提示方法の第１の例を示す図である。図４に例示するように、人物情報には予め「長男」、「家族」、「親戚」、「友人」のなどのキーワードが登録されており、これらのキーワードを優先度を考慮して全て配置し提示している例である。ユーザは、該当する項目があれば、それを選択する。また、該当する項目がない場合は、「新しく人物情報を作成する」や「新しく人物カテゴリを作成する」などの項目を選択し、新たな項目を追加する

ことができる。

【００３０】

図５は、キーワードとなる人物情報の提示方法の第２の例を示す図である。図５は、最も優先度が高いキーワード（長男）が配置されている例であり、長男の画像でない場合は、プルダウンメニューから該当するキーワードを選択する。

【００３１】

図６は、データベース１２０に記録されるレコードの例を示す図である。データベース１２０に記録されるキーワードは、上位のキーワード１と下位のキーワード２の２層構造となっている。例えば、上位のキーワード１が「家族」であり、下位のキーワード２が「次男」であり、氏名が「次郎」であり、生年月日が「２００３年１月１日」であり、保存された画像が画像１、画像２、画像３の三つであることを示している。

【００３２】

図７は、人間関係を示すために使用される検索テンプレートの例を示す図であり、この検索テンプレートは予めデータベース１２０中に用意されている。そして、図６に示すレコードを追加する場合、即ち「次男」に関する画像を格納する場合には、上位のキーワード「家族」の下に、下位のキーワード「次男」を作成する必要があり、この操作は、図３、図４、及び図５に例示した画面上での操作により行われる。

【００３３】

次に、本発明の画像検索装置における処理手順について、フローチャートを参照して説明する。

【００３４】

図８は、本発明の画像検索装置における人物検出とキーワード付与の処理手順を示す図であり、画像中の人物の検出と、キーワードの登録についての処理手順を示すフローチャートである。以下、図８を参照して、その処理手順について説明する。

（１）ステップＳ１：画像入力検出手段１０１により、新たな画像の入力を検出する。

（２）ステップＳ２：顔画像検出手段１１２により入力された画像から顔画像の検出を試みる。画像データは画像読取手段１０２により読み取る。また、動画像が入力された場合には、静止画生成手段１０３により、所定のルール、例えば一定時間ごとに静止画を生成して、以降の処理を行う。

（３）ステップＳ３：顔画像を検出したかどうかをチェックする。

（４）ステップＳ４：顔画像類似度判定手段１１４により既に登録されている類似する顔画像が、データベース１２０中にあるかどうかをチェックする。

（５）ステップＳ５：データベース１２０から、類似した顔画像に対応した人物情報を選択する。

（６）ステップＳ６：既存のキーワードがなければ、新たに人物を示すキーワードを作成する。

（７）ステップＳ７：選択した人物情報を表示手段１０８により表示し、人物情報の選択（キーワードの選択）と必要な情報の入力を促す。

（８）ステップＳ８：人物情報を格納しているデータベース１２０を更新する。

（９）ステップＳ９：ステップＳ３において、顔画像が検出されなかった場合は、ステップＳ９に移行し、肌色領域検出手段１１３により、入力された画像から肌色領域を検出する。

（１０）ステップＳ１０：肌色領域が存在したかどうかをチェックする。

（１１）ステップＳ１１：ステップＳ１０において、肌色領域が検出されなかった場合は、直近に入力・更新された人物情報を選択する。

【００３５】

また、図９は、検索を行う場合の処理手順を示すフローチャートである。

（１）ステップＳ２１：検索条件入力手段１０７により検索条件を入力する。例えば、以下に示すような検索条件を入力する。

・次郎についての、データベース１２０に格納されている全ての写真

・サークルの友人の全てについての、撮影年２００３年の写真

（２）ステップＳ２２：指定された検索条件に応じてキーワードを設定して、データベース１２０をアクセスする。

（３）ステップＳ２３：検索条件に当てはまる全ての画像を選択する。

（４）ステップＳ２４：選択した画像を表示手段１０８により表示、または印刷手段１０９により印刷する。

以上説明した処理手順により画像へのキーワードの登録と、検索を行うことができる。

【００３６】

また、図１０は、画像検索装置の構成例を示すブロック図であり、検出対象となるオブジェクトが人物の場合の例であり、本発明に直接関係する部分についてのみ示したものである。図１０において、１００は画像検索装置、１はインターネット網などの通信ネットワーク、１３１は画像検索装置と通信ネットワーク１とを接続する通信用インタフェース、１３２は画像検索装置の全体を統括制御する制御部、１４０は処理プログラム部を示している。なお、画像検索装置１００には、ＰＣ（パーソナルコンピュータ）を使用してもよい。

【００３７】

また、処理プログラム部１４０には、以下の処理部が含まれる。

・画像入力検出処理部１４１

画像検索装置１００に、新たに画像の格納が行われたことを検出するための処理部である。

・画像読取処理部１４２

画像を構成する画素ごとの値（例えばＲＧＢ値など）を読み出すための処理部である。

・静止画生成処理部１４３

画像が動画の場合に、動画像から静止画を生成するための処理部である。

・人物検出条件入力処理部１４４

人物が画像に含まれているかを判断する条件を規定するための処理部である。顔画像の検出だけではなく、肌色領域の検出も行って人物が含まれているかどうかの判定を行うなどの条件を入力する。

・顔画像検出処理部１４５

画像を解析し、顔画像が含まれているかどうかを検出するための処理部である

。顔画像の検出方法には、予め顔画像のパターンを学習させておく方法や、画像パターンの周波数解析を行う方法など種々の方法があるが、いずれの方法を使用してもよい。また、特許文献２に開示された方法を使用することもできる。なお、この顔画像検出処理部１４５は、次に説明する肌色領域検出処理部１４６と併用し、人物検出を行うこともできる。

【００３８】

・肌色領域検出処理部１４６

読み取った画素の値が肌色の範囲にあるかどうかを判定するための処理部である。この肌色領域の検出には、例えば、文献「背景と顔の方向に依存しない顔の検出と顔方向の推定、荒木、島田、白井、信学技法PRMU2001-217 pp.87-94・2002-01）」に記載された方法を使用することができる。

【００３９】

・顔画像類似度判定処理部１４７

検出した顔画像と類似の顔画像が格納されているかどうかを、データベース１２０を参照してチェックするための処理部である。この類似度の判定には、例えば、特許文献２で開示された顔画像をモザイク化して類型分類のクラス分けを行う手法などが利用できる。

・キーワード提示処理部１４８

オブジェクトが検出された場合に、データベース１２０を参照し、このオブジェクトに関連するキーワードを抽出してユーザに提示するための処理部である。

・人物情報入力処理部１４９

画像検索装置１００から提示されたキーワード情報から、ユーザが人物情報を選択する、あるいは新たにキーワードを入力・更新するための処理部である（図３及び図４参照）。

・検索条件入力処理部１５０

検索する画像の検索条件を入力するための処理部である。例えば、「家族」、「友人」を選ぶなどの検索条件（キーワード）を入力する。

・表示処理部１５１

検索結果を表示するための処理部である。

・印刷処理部１５２

検索結果を印刷するための処理部である。

【００４０】

また、データベース（画像記憶手段）１２０には、画像にキーワードを付与するための検索テンプレート１２１と、このキーワード（検索テンプレート）に関連づけられた動画１２２および静止画１２３のデータが記憶される（図６参照）。

【００４１】

なお、この処理プログラム部１４０は専用のハードウエアにより実現されるものであってもよく、またこの処理プログラム部１４０はメモリおよびＣＰＵ（中央処理装置）等の汎用の情報処理装置により構成され、この処理部の機能を実現するためのプログラム（図示せず）をメモリにロードして実行することによりその機能を実現させるものであってもよい。また、この画像検索装置１００には、周辺機器として入力装置、表示装置、印刷装置等（いずれも図示せず）が接続されているものとする。ここで、入力装置としては、キーボード、マウス等の入力デバイスのことをいう。表示装置とは、ＣＲＴ（Cathode Ray Tube）や液晶表示装置等のことをいう。印刷装置とは、レーザープリンタ、インクジェットプリンタ等のことをいう。

【００４２】

また、図１０に示す画像検索装置１００の機能を実現するためのプログラムをコンピュータ読み取り可能な記録媒体に記録して、この記録媒体に記録されたプログラムをコンピュータシステムに読み込ませ、実行することにより本発明の画像検索装置１００に必要な処理を行ってもよい。なお、ここでいう「コンピュータシステム」とは、ＯＳや周辺機器等のハードウェアを含むものとする。

また、「コンピュータシステム」は、WWWシステムを利用している場合であれば、ホームページ提供環境（あるいは表示環境）を含むものとする。

また、「コンピュータ読み取り可能な記録媒体」とは、フレキシブルディスク、光磁気ディスク、ＲＯＭ、ＣＤ－ＲＯＭ等の可搬媒体、コンピュータシステムに内蔵されるハードディスク等の記憶装置のことをいう。

さらに「コンピュータ読み取り可能な記録媒体」とは、インターネット等のネットワークや電話回線等の通信回線を介してプログラムを送信する場合の通信線のように、短時間の間、動的にプログラムを保持するもの(伝送媒体ないしは伝送波)、その場合のサーバやクライアントとなるコンピュータシステム内部の揮発性メモリのように、一定時間プログラムを保持しているものも含むものとする。

また上記プログラムは、前述した機能の一部を実現するためのものであっても良く、さらに前述した機能をコンピュータシステムにすでに記録されているプログラムとの組み合わせで実現できるもの、いわゆる差分ファイル（差分プログラム）であっても良い。

【００４３】

なお、以上説明した本発明の画像検索装置では、画像内の分類対象となるオブジェクトを顔画像（人物）としてキーワードを付与した例を示しているが、これに限らず、車、動物などを分類対象となるオブジェクトとして検出し、キーワードを付与する構成とすることもできる。

【００４４】

以上、本発明の実施の形態について説明したが、本発明の画像検索装置は、上述の図示例にのみ限定されるものではなく、本発明の要旨を逸脱しない範囲内において種々変更を加え得ることは勿論である。

【図面の簡単な説明】

【図１】　本発明の画像検索装置が備える手段の構成例を示すブロック図。

【図２】　オブジェクトが人物の場合の手段の構成例を示すブロック図。

【図３】　人物情報の入力を促す画面の例を示す図。

【図４】　キーワードとなる人物情報の提示方法の第１の例を示す図。

【図５】　キーワードとなる人物情報の提示方法の第２の例を示す図

【図６】　データベースに記録されるレコードの例を示す図。

【図７】　人間関係を示す検索テンプレートの例を示す図。

【図８】　人物検出とキーワード付与の処理手順を示すフローチャート。

【図９】　検索を行う場合の処理手順を示すフローチャート。

【図１０】　画像検索装置の構成例を示すブロック図。

【符号の説明】

１００ 画像検索装置、１０１ 画像入力検出手段、１０２ 画像読取手段

１０３ 静止画生成手段、１０４　オブジェクト認識手段

１０５ キーワード提示手段、１０６ オブジェクト情報入力手段

１０７ 検索条件入力手段、１０８ 表示手段、１０９ 印刷手段

１１１ 人物検出条件入力手段、１１２ 顔画像検出手段

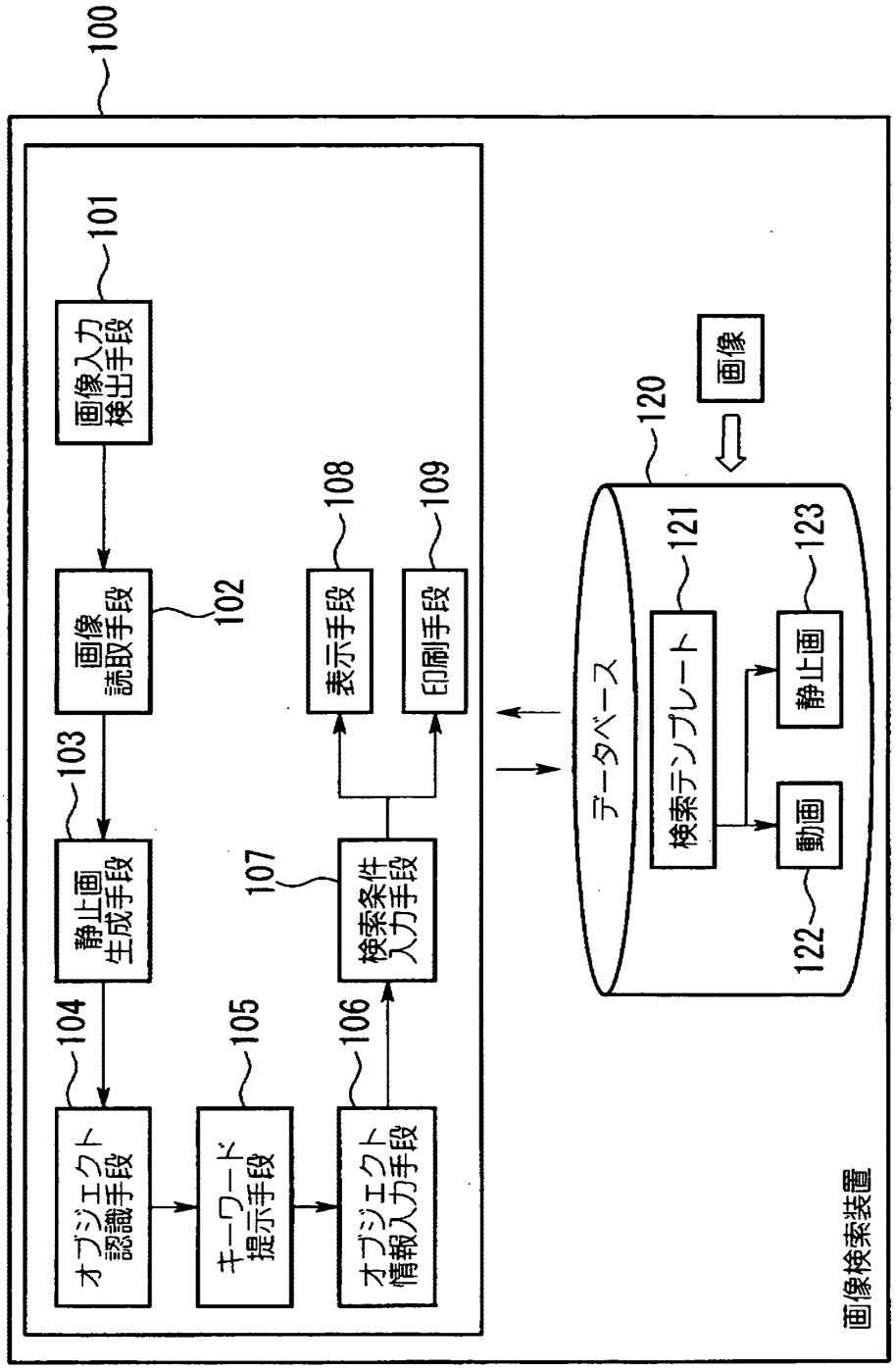
１１３ 肌色領域検出手段、１１４ 顔画像類似度判定手段

１１５ 人物情報入力手段、１２０ データベース、１２１ 検索テンプレート

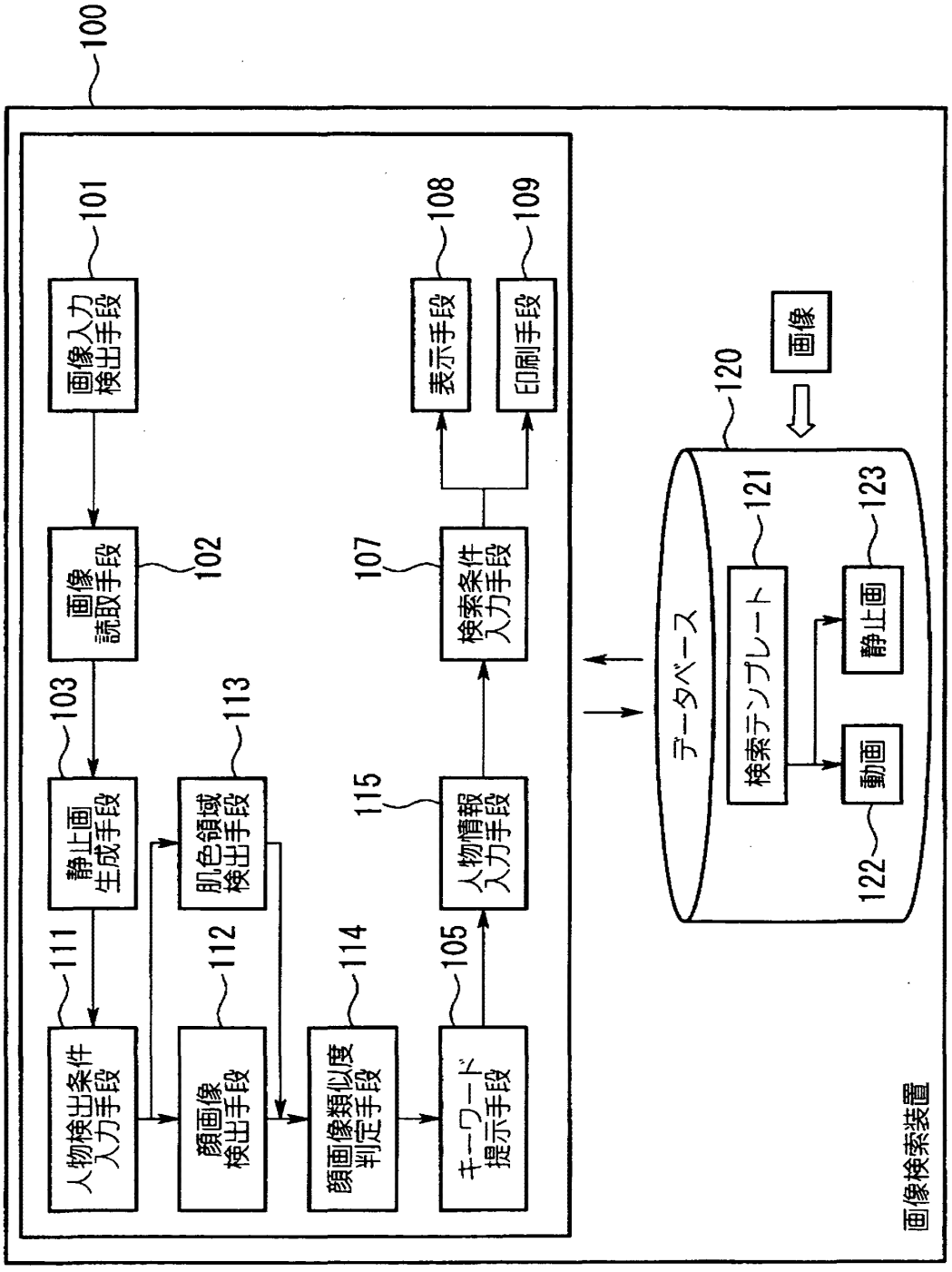
１２２ 動画、１２３ 静止画

【書類名】　図面

【図１】


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画像検索装置
101
画像入力検出手段
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画像読取手段
103
静止画生成手段
104
オブジェクト認識手段
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キーワード提示手段
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オブジェクト情報入力手段
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検索条件入力手段
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表示手段
109
印刷手段
120
データベース
121
検索テンプレート
122
動画
123
静止画
画像

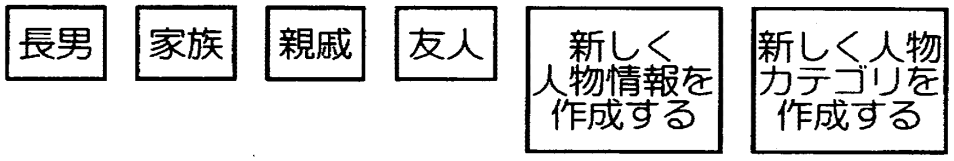
【図２】


100
画像検索装置
101
画像入力検出手段
102
画像読取手段
103
静止画生成手段
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人物検出条件入力手段
112
顔画像検出手段
113
肌色領域検出手段
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顔画像類似度判定手段
105
キーワード提示手段
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120
データベース
121
検索テンプレート
122
動画
123
静止画
画像

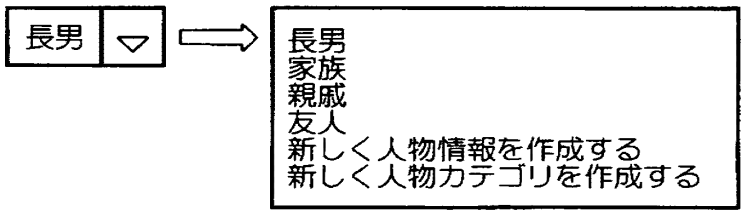
【図３】


入力された画像から人物を検出しました。
人物情報を入力して下さい。

【図４】


長男
家族
親戚
友人
新しく人物情報を作成する
新しく人物カテゴリを作成する

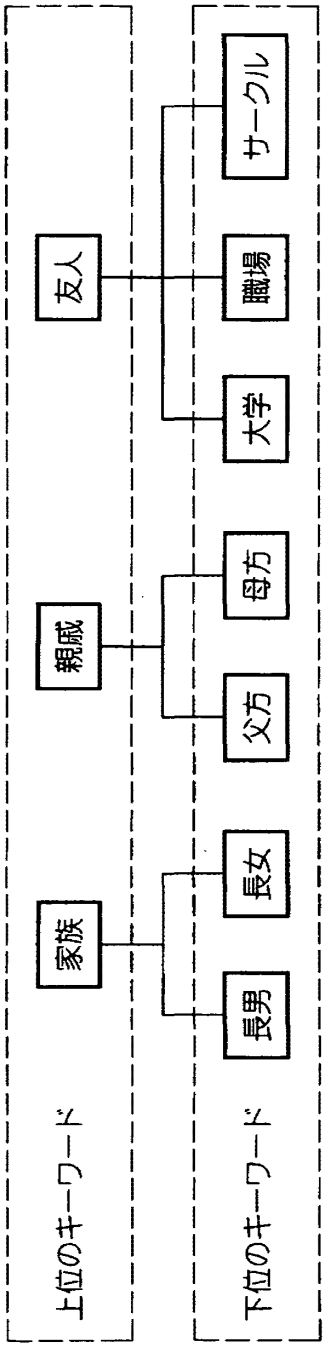
【図５】


長男
長男
家族
親戚
友人
新しく人物情報を作成する
新しく人物カテゴリを作成する

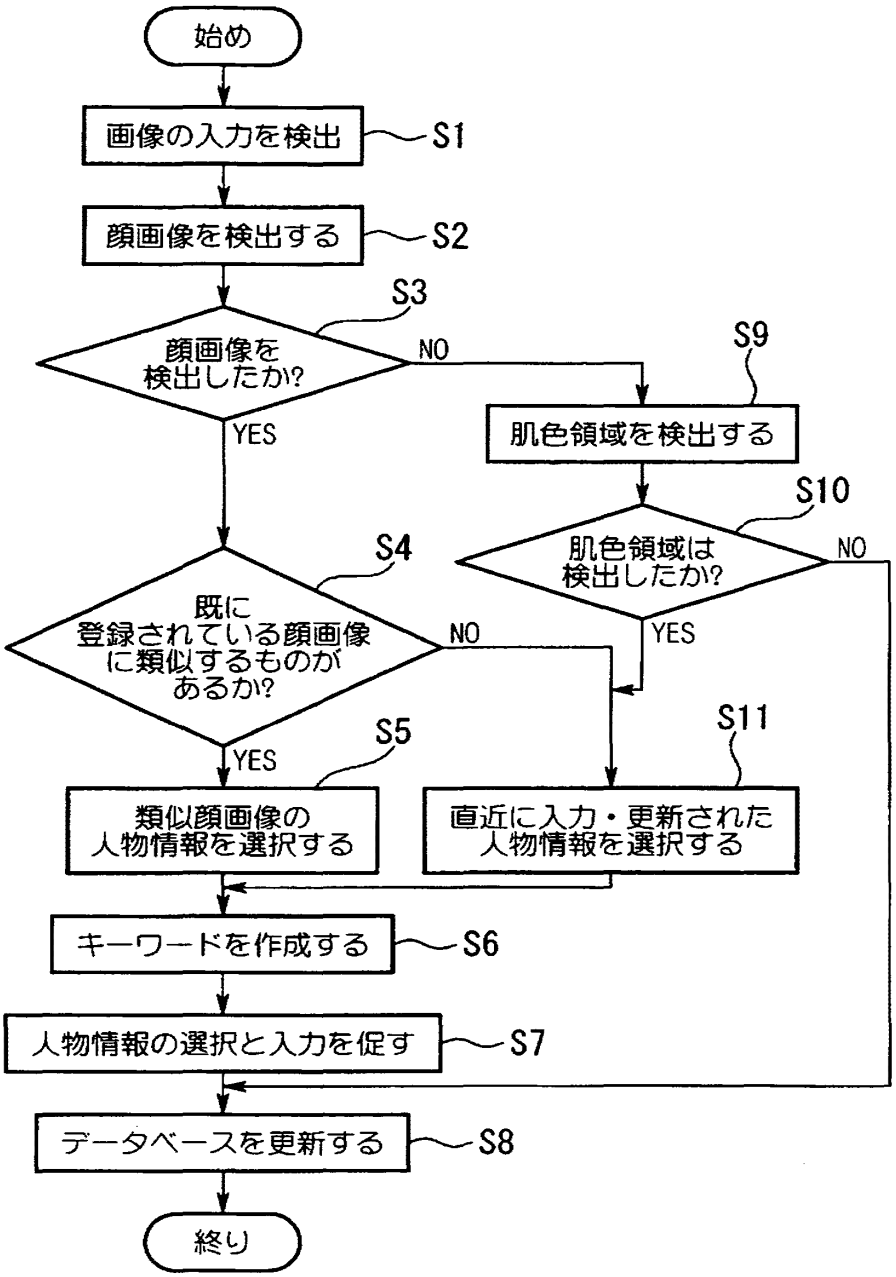
【図６】

上位のキーワード１	下位のキーワード２	氏名	生年月日	画像
家族	次男	次郎	2003年1月1日	画像１撮影 2003年1月1日 画像２撮影 2003年2月1日 画像３撮影 2003年3月1日

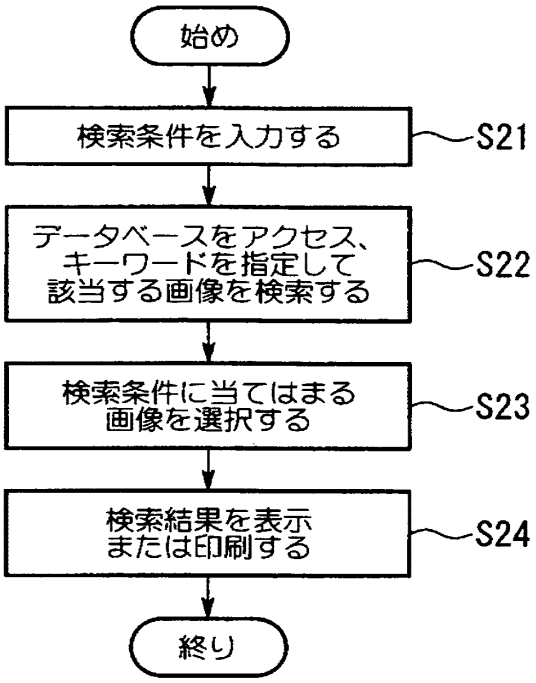
【図７】



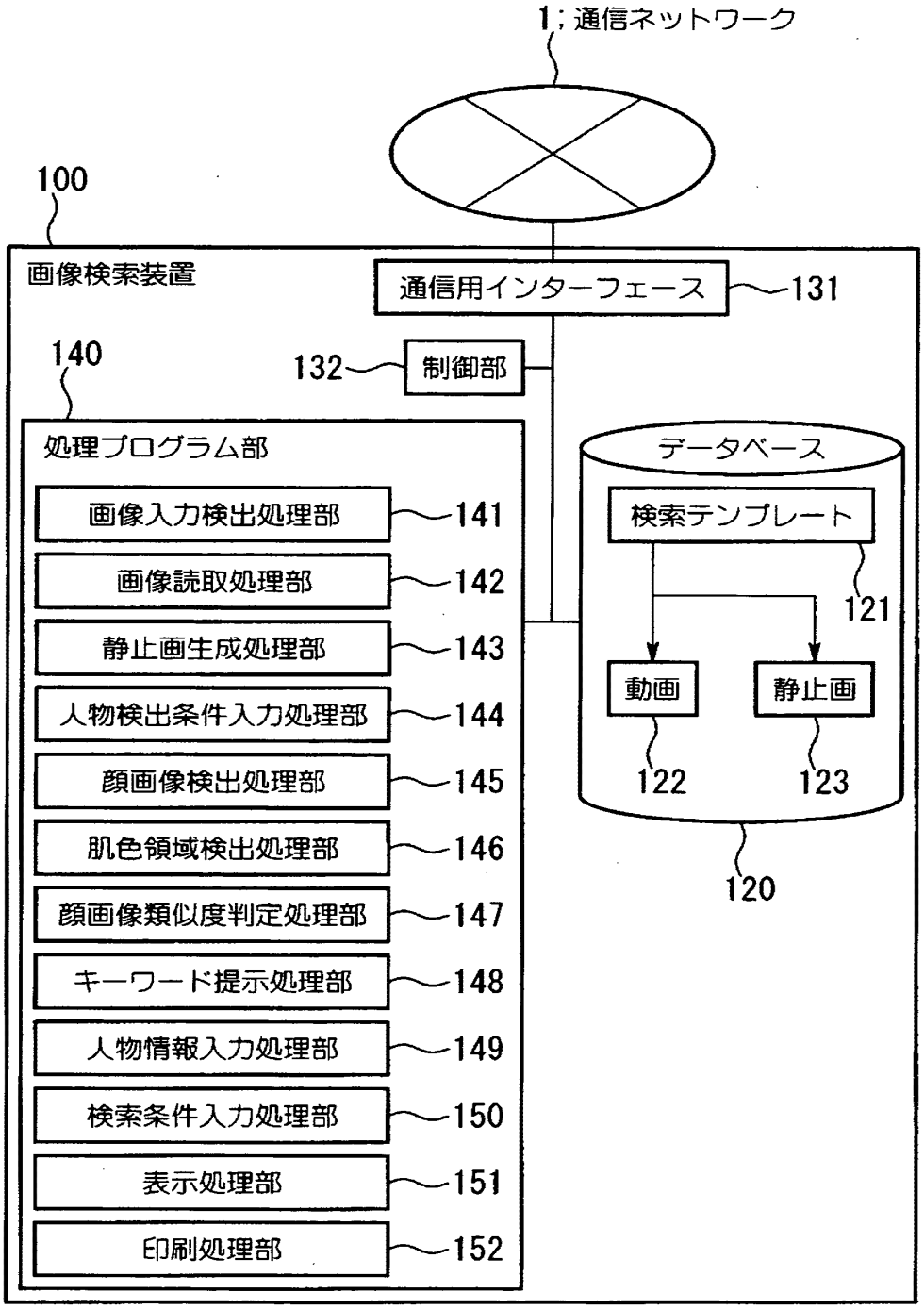
【図８】


始め
画像の入力を検出
S1
顔画像を検出する
S2
S3
顔画像を
検出したか?
NO
YES
S9
肌色領域を検出する
S10
肌色領域は
検出したか?
NO
YES
S4
既に
登録されている顔画像
に類似するものが
あるか?
NO
YES
S5
類似顔画像の
人物情報を選択する
S11
直近に入力・更新された
人物情報を選択する
キーワードを作成する
S6
人物情報の選択と入力を促す
S7
データベースを更新する
S8
終り

【図９】


始め
検索条件を入力する
S21
データベースをアクセス、
キーワードを指定して
該当する画像を検索する
S22
検索条件に当てはまる
画像を選択する
S23
検索結果を表示
または印刷する
S24
終り

【図１０】



出証特２００３－３０９３１８２

【書類名】　要約書

【要約】

【課題】　本発明の画像検索装置は、画像を分類する際に、画像中のオブジェクトの検出を行うことにより、画像にキーワードを付加する作業を効率化することを目的とする。

【解決手段】　本発明の画像検索装置は、分類および検索対象となる画像をキーワードとともにデータベースに保存する画像記憶手段と、入力された画像中の所定のオブジェクトを認識するオブジェクト認識手段と、前記オブジェクト認識手段によりオブジェクトが認識された場合に、該オブジェクトに関連するキーワードを提示するキーワード提示手段と、前記キーワード提示手段により提示されたキーワードの確認、追加、または修正を行うためのオブジェクト情報入力手段とを具備する。

【選択図】　図１

認定・付加情報

特許出願の番号	特願２００３－０２０８０５
受付番号	５０３００１４１４６６
書類名	特許願
担当官	大西　まり子　　２１３８
作成日	平成１５年　２月１７日

＜認定情報・付加情報＞

【特許出願人】
- 【識別番号】 000002369
- 【住所又は居所】 東京都新宿区西新宿２丁目４番１号
- 【氏名又は名称】 セイコーエプソン株式会社

【代理人】 申請人
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- 【氏名又は名称】 渡邊　隆

【代理人】
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- 【氏名又は名称】 志賀　正武

【選任した代理人】
- 【識別番号】 100110364
- 【住所又は居所】 東京都新宿区高田馬場３丁目２３番３号　ＯＲビル志賀国際特許事務所
- 【氏名又は名称】 実広　信哉

次頁無

出証特２００３－３０９３１８２

特願２００３－０２０８０５

出　願　人　履　歴　情　報

識別番号　　［０００００２３６９］

１．変更年月日　　１９９０年　８月２０日
［変更理由］　　新規登録
住　所　　東京都新宿区西新宿２丁目４番１号
氏　名　　セイコーエプソン株式会社

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2003

Application or Docket Number: 10762450

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	12	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	12 minus 20=	*
INDEPENDENT CLAIMS	2 minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	385.00	OR	BASIC FEE	770.00
XS 9=		OR	XS18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL		OR	TOTAL	77

CLAIMS AS AMENDED - PART II

AMENDMENT A	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
XS 9=		OR	XS18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
XS 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
***If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

01/27/2004 FFANAEIA 00000044 10762450
01 FC:1001 770.00 OP

PTO-1556
(5/87)

*U.S. Government Printing Office: 2002 — 489-267/69033

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/762,450	01/23/2004	Toshinori Nagahashi	118464

CONFIRMATION NO. 5463

25944
OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

FORMALITIES LETTER

OC000000012453042

Date Mailed: 04/26/2004

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The oath or declaration is missing.
  A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of $130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **$130** for a Large Entity

- **$130** Late oath or declaration Surcharge.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

A copy of this notice MUST be returned with the reply.

T Segerdahl

Customer Service Center
Initial Patent Examination Division (703) 308-1202
PART 3 - OFFICE COPY

OIPE JC174
JUN 2 8 2004
PATENT & TRADEMARK OFFICE

PTO/SB/106 (8-96)
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Seiko Epson Ref. No.: F009263US00 Attorney's Ref. No.: 118464

Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。	As a below named inventor, I hereby declare that:
私の住所、私書箱、国籍は、下記の私の氏名の後に記載された通りです。	My residence, post office address and citizenship are as stated next to my name.
下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。	I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled
画像検索装置、画像検索装置におけるキーワード付与方法、及びプログラム	IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR
上記発明の明細書（下記の欄で×印がついていない場合は、本書に添付）は、	the specification of which is attached hereto unless the following box is checked:
☒ 2004年1月23日に提出され、米国出願番号または特許協定条約 国際出願番号を 10/762,450 とし、（該当する場合） _____ に訂正されました。	☒ was filed on January 23, 2004 as United States Application Number or PCT International Application Number 10/762,450 and was amended on _____ (if applicable).
私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。	I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.
私は、連邦規則法典第３７編第１条５６項に定義されるとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。	I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

Burden Hour Statement: This form is estimated to take 0.4 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner of Patents and Trademarks, Washington, DC 20231.

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Japanese Language Declaration
(日本語宣言書)

私は、米国法典第３５編１１９条（ａ）－（ｄ)項又は３６５条（ｂ)項に基き下記の、米国以外の国の少なくとも１ヶ国を指定している特許協力条約３６５条(ａ)項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s) 外国での先行出願			Priority Not Claimed 優先権主張なし
2003-020805	Japan	29/January/2003	☐
(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	
			☐
(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	

私は、第３５編米国法典１１９条(ｅ)項に基いて下記の米国特許出願規定に記載された権利をここに主張いたします。

I hereby claim the benefit under Title 35, United States Code, Section 119 (e) of any United States provisional application(s) listed below.

(Application No.) (出願番号)	(Filing Date) (出願日)	(Application No.) (出願番号)	(Filing Date) (出願日)

私は下記の米国法典第３５編１２０条に基いて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約３６５条(ｃ)に基づく権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第３５編１１２条第１項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第３７編１章５６項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365 (c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application:

(Application No.) (出願番号)	(Filing Date) (出願日)	(Status: Patented, Pending, Abandoned) (現況：特許許可済、係属中、放棄済)
(Application No.) (出願番号)	(Filing Date) (出願日)	(Status: Patented, Pending, Abandoned) (現況：特許許可済、係属中、放棄済)

私は、私自身の知識に基づいて本宣言書中で私が行なう表明が真実であり、かつ私が入手した情報と私の信じるところに基づく表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第１８編第１００１条に基づき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行なえば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Japanese Language Declaration
(日本語宣言書)

委任状： 私は、下記の発明者として、本出願に関する一切の手続きを米特許商標局に対して遂行する弁理士または代理人として、下記の者を指名いたします。（弁護士、または代理人の氏名及び登録番号を明記のこと）

James A. Oliff, (Reg. 27,075)
William P. Berridge, (Reg. 30,024)
Kirk M. Hudson, (Reg. 27,562)
Thomas J. Pardini, (Reg. 30,411)
Edward P. Walker, (Reg. 31,450)
Robert A. Miller, (Reg. 32,771)
Mario A. Costantino, (Reg. 33,565)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

James A. Oliff, (Reg. 27,075)
William P. Berridge, (Reg. 30,024)
Kirk M. Hudson, (Reg. 27,562)
Thomas J. Pardini, (Reg. 30,411)
Edward P. Walker, (Reg. 31,450)
Robert A. Miller, (Reg. 32,771)
Mario A. Costantino, (Reg. 33,565)

書類送付先：	Send Correspondence to:
OLIFF & BERRIDGE, PLC P.O. Box 19928 Alexandria, Virginia 22320	OLIFF & BERRIDGE, PLC P.O. Box 19928 Alexandria, Virginia 22320
直接電話連絡先： (名前及び電話番号) OLIFF & BERRIDGE, PLC (703) 836-6400	Direct Telephone Calls to: *(name and telephone number)* OLIFF & BERRIDGE, PLC (703) 836-6400
唯一または第一発明者名 長橋 敏則	Full name of sole or first inventor Toshinori NAGAHASHI
発明者の署名 日付 長橋 敏則 2004年5月18日	Inventor's signature Date Toshinori Nagahashi May 18, 2004
住所 日本国, 長野県, 辰野町	Residence Tatsuno-machi, Nagano-ken, Japan
国籍 日本	Citizenship Japan
私書箱 392-8502 日本国長野県諏訪市大和3丁目3番5号 セイコーエプソン株式会社内	Post Office Address c/o Seiko Epson Corporation 3-5, Owa 3-chome, Suwa-shi, Nagano-ken 392-8502 Japan
第二共同発明者	Full name of second joint inventor, if any
第二共同発明者の署名 日付	Second inventor's signature Date
住所 日本国, _____, _____	Residence _____, _____, Japan
国籍	Citizenship
私書箱	Post Office Address
(第三以降の共同発明者についても同様に記載し、署名をすること)	(Supply similar information and signature for third and subsequent joint inventors.)

OIPE
JUN 28 2004
PATENT & TRADEMARK OFFICE

Supplemental Application Data Sheet

Application Information

Application Type::	Regular
Subject Matter::	Utility
CD-ROM or CD-R:	None
Title::	IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR
Attorney Docket Number::	118464
Total Drawing Sheets::	8
Small Entity::	No

Applicant Information

Applicant Authority type::	Inventor
Primary Citizenship Country::	Japan
Status::	Full Capacity
Given Name::	Toshinori
Family Name::	NAGAHASHI
City of Residence::	Tatsuno-machi
Country of Residence::	Japan

Correspondence Information

Correspondence Customer Number:: 25944

Foreign Priority Information			
Country::	Application Number::	Filing Date::	Priority Claimed::
Japan	2003-020805	01/29/2003	Yes

Assignee Information	
Assignee Name::	SEIKO EPSON CORPORATION
Street of mailing address::	4-1, Nishishinjuku 2-chome, Shinjuku-ku
City of mailing address::	Tokyo
Country of mailing address::	Japan

OIPE JC174 JUN 28 2004 PATENT & TRADEMARK OFFICE

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APPL NO.	FILING OR 371 (c) DATE	ART UNIT	FIL FEE REC'D	ATTY.DOCKET NO	DRAWINGS	TOT CLMS	IND CLMS
10/762,450	01/23/2004	2615	770	118464	8	12	3

CONFIRMATION NO. 5463

25944
OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

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APR 27 2004
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FILING RECEIPT

OC000000012453041

Date Mailed: 04/26/2004

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections, facsimile number 703-746-9195. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

Toshinori Nagahashi, ~~Suwa-shi~~, JAPAN; Tatsuno-machi

Assignment For Published Patent Application

SEIKO EPSON CORPORATION, Tokyo, JAPAN;

Domestic Priority data as claimed by applicant

Foreign Applications

JAPAN 2003-020805 01/29/2003

If Required, Foreign Filing License Granted: 04/26/2004

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

Title

Image retrieving device, method for adding keywords in image retrieving device, and computer program therefor

OIPE JC174
JUN 28 2004
PATENT & TRADEMARK OFFICE

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Attn: OIPE

Toshinori NAGAHASHI

Application No.: 10/762,450

Docket No.: 118464

Filed: January 23, 2004

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

REQUEST FOR CORRECTION OF PALM RECORDS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached is a photocopy of the original filing receipt on which errors have been corrected in red. These errors are being brought to the attention of the Patent and Trademark Office so that it may correct its records. A Supplemental Application Data Sheet is attached.

Respectfully submitted,

James A. Oliff
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Thomas J. Pardini
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JAO:TJP/bmf

Date: June 28, 2004

OLIFF & BERRIDGE, PLC
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Alexandria, Virginia 22320
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OIPE JC25
JUL 22 2005
PATENT & TRADEMARK OFFICE

IPW

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toshinori NAGAHASHI Group Art Unit: 2615

Application No.: 10/762,450

Filed: January 23, 2004 Docket No.: 118464

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

STATUS INQUIRY LETTER

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Please telephone our firm's Patent Application Filing Department at 703-836-6400 with the status of the above-identified patent application, including an indication as to when the next communication can be expected.

Respectfully submitted,

James A. Oliff
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Jesse O. Collier
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JAO:JOC/crh

Date: July 22, 2005

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OIPE JC76
AUG 09 2005
PATENT & TRADEMARK OFFICE

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toshinori NAGAHASHI

Group Art Unit: 2615

Application No.: 10/762,450

Filed: January 23, 2004

Docket No.: 118464

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
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Sir:

Pursuant to 37 CFR §1.56, the attention of the Patent and Trademark Office is hereby directed to the references listed on the attached PTO-1449. Unless otherwise indicated herein, one copy of each reference is attached. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

☒ 1. This Information Disclosure Statement is being filed (a) within three months of the U.S. filing date of this non-CPA application, OR (b) before the mailing date of a first Office Action on the merits in the present application. No certification or fee is required.

☒ 2. The references were cited in a counterpart foreign application. An English language version of the foreign search report is attached for the Examiner's information.

☒ 3. In accordance with 37 CFR §1.98(a)(2)(ii), copies of any U.S. patents and patent application publications are not attached.

Respectfully submitted,

James A. Oliff
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Philip A. Caramanica, Jr.
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JAO:PAC/crh

Date: August 9, 2005

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Form PTO-1449 (REV. 8-83)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	GROUP 2615

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS
	1	US 2001/0043727 A1	11/22/2001	COOPER		
	2	US 6,408,301 B1	06/18/2002	PATTON et al.		

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	DATE CONSIDERED

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: August 9, 2005

OIPE IAP45 NOV 17 2005 PATENT & TRADEMARK OFFICE

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toshinori NAGAHASHI

Group Art Unit: 2615

Application No.: 10/762,450

Filed: January 23, 2004

Docket No.: 118464

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
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☒ 1. This Information Disclosure Statement is being filed (a) within three months of the U.S. filing date of this non-CPA application, OR (b) before the mailing date of a first Office Action on the merits in the present application. No certification or fee is required.

☒ 2. References 2 & 3 were cited in a counterpart foreign Office Action.

☒ 3. In accordance with 37 CFR §1.98(a)(2)(ii), copies of any U.S. patents and patent application publications are not attached.

☒ 4. An English language Abstract of the non-English language reference 3 is attached hereto.

☒ 5. Reference 2 corresponds to reference 1.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Jesse O. Collier
Registration No. 53,839

JAO:JOC/crh
Date: November 17, 2005

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Form PTO-1449 (REV. 8-83) US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)	APPLICANT Toshinori NAGAHASHI	
	FILING DATE January 23, 2004	GROUP 2615

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS
	1	US 6,785,429 B1	08/31/2004	SENOH		

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS
	2	CN 1245317 A	02/23/2000	CHINA		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

	3	WANG et al.; "A Fast Human Face Detection Method From Color Images Under Complex Background"; ACTA
		ELECTRONICA SINICA; Vol. 30 No. 10 Oct. 2002; 1995-2005 Tsinghua Tongfang Optical Disc Co., Ltd.; pp. 1566-
		1569 with abstract

EXAMINER	DATE CONSIDERED

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Date: November 17, 2005

OIPE IAP13 JUN 29 2006 PATENT & TRADEMARK OFFICE

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toshinori NAGAHASHI

Application No.: 10/762,450 Group Art Unit: 2615

Filed: January 23, 2004 Docket No.: 118464

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

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☒ 1. This Information Disclosure Statement is being filed (a) within three months of the U.S. filing date of this non-CPA application, OR (b) before the mailing date of a first Office Action on the merits in the present application. No certification or fee is required.

☒ 2. An English language Abstract of one or more non-English language reference is attached hereto. See References 1-4.

☒ 3. A computer-generated English language translation of one or more Japanese Patent Publication cited herein has been obtained from the website of the Japanese Patent Office ([http://www.jpo.go.jp]), and is attached, but has not been reviewed for accuracy. See References 1-4.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Scott M. Schulte
Registration No. 44,325

JAO:SMS/cdk

Date: June 29, 2006

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Form PTO-1449 (REV. 1/06)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT(S) Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	GROUP 2615

OIPE IAP13 JUN 29 2006 PATENT & TRADEMARK OFFICE

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Date	Name

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Date	Country	With English Abstract	With English Translation
	1	JP A 10-326278	12/8/1998	JAPAN	X	X
	2	JP A 06-215089	8/5/1994	JAPAN	X	X
	3	JP A 10-049542	2/20/1998	JAPAN	X	X
	4	JP A 08-249349	9/27/1996	JAPAN	X	X

OTHER DOCUMENTS

Examiner Initials	Cite No.	(Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	DATE CONSIDERED

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Date: June 29, 2006

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-326278
(43)Date of publication of application : 08.12.1998

(51)Int.Cl. G06F 17/30
G06T 1/00

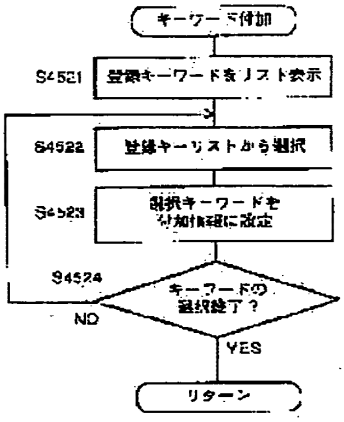
(21)Application number : 09-083091
(22)Date of filing : 01.04.1997

(71)Applicant : MINOLTA CO LTD
(72)Inventor : TOO KIMIHIKO

(30)Priority
Priority number : 09 75581 Priority date : 27.03.1997 Priority country : JP

(54) PROCESSOR AND METHOD FOR INFORMATION PROCESSING AND RECORDING MEDIUM FOR INFORMATION PROCESSING PROGRAM

(57)Abstract:
PROBLEM TO BE SOLVED: To automatically set a proper key work corresponding to the contents of image data by selecting a key word according to content classification information and feature quantities of image data and setting this key work as additional information.
SOLUTION: Registered key words are listed and displayed (registered key list) (S4521). A desired key work is selected out of the registered key list displayed on a screen (S4522). The selected key word is set as additional information of image data (S4523). On the basis of a user's input on the screen, it is determined whether or not the adding process for this key word is finished (S4524) and this operation is repeated until the user finishes this process. Therefore, a retrieval key added to an object is set, so the retrieval key corresponding to the contents of the object can be added to the object precisely and automatically.



LEGAL STATUS
[Date of request for examination]
[Date of sending the examiner's decision of rejection]
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of rejection]

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] In the information processor which saves an object with the additional information used as the retrieval information, and manages it An incorporation means to incorporate the above-mentioned object with the contents classification information that the classification of the contents is expressed, A record means to record the above-mentioned object with the above-mentioned contents classification information, The information processor characterized by having a key decision means to determine the key corresponding to the above-mentioned object, and a key addition means to make the above-mentioned key record on the above-mentioned record means with an object, based on the above-mentioned contents classification information.
[Claim 2] The information processor characterized by having a feature-extraction means to extract the characteristic quantity showing the property of the proper from the above-mentioned object further in an information processor according to claim 1.
[Claim 3] The information processor characterized by having a feature-extraction means to extract the characteristic quantity showing the property of the proper from the above-mentioned object and the above-mentioned contents classification information further in an information processor according to claim 1.
[Claim 4] In the information processor which saves an object with the additional information used as the retrieval information, and manages it An incorporation means to incorporate the above-mentioned object, and an input means to input the contents classification information that the classification of the contents of the above-mentioned object is expressed, A record means to record the above-mentioned object with the above-mentioned contents classification information, The information processor characterized by having a key decision means to determine the key corresponding to the above-mentioned object, and a key addition means to make the above-mentioned key record on the above-mentioned record means with an object, based on the above-mentioned contents classification information.
[Claim 5] The information processor characterized by having a feature-extraction means to extract the characteristic quantity showing the property of the proper from the above-mentioned object further in an information processor according to claim 4.
[Claim 6] In the information processing approach of saving an object with the additional information used as the retrieval information, and managing it The incorporation step which incorporates the above-mentioned object with the contents classification information that the classification of the contents is expressed, The record step which records the above-mentioned object with the above-mentioned contents classification information, The information processing approach characterized by having the key decision step which determines the key corresponding to the above-mentioned object, and the key addition step which makes the above-mentioned key record on the above-mentioned record means with an object based on the above-mentioned contents classification information.
[Claim 7] In the information processing approach of saving an object with the additional information used as the retrieval information, and managing it The incorporation step which incorporates the above-

mentioned object, and the input step which inputs the contents classification information that the classification of the contents of the above-mentioned object is expressed, The record step which records the above-mentioned object with the above-mentioned contents classification information, The information processing approach characterized by having the key decision step which determines the key corresponding to the above-mentioned object, and the key addition step which makes the above-mentioned key record on the above-mentioned record means with an object based on the above-mentioned contents classification information.

[Claim 8] In the medium which memorized the information processing program for saving and managing an object with the additional information used as the retrieval information The incorporation step which incorporates the above-mentioned object with the contents classification information that the classification of the contents is expressed, The record step which records the above-mentioned object with the above-mentioned contents classification information, The record medium characterized by having memorized the information processing program which has the key decision step which determines the key corresponding to the above-mentioned object, and the key addition step which makes the above-mentioned key record on the above-mentioned record means with an object based on the above-mentioned contents classification information.

[Claim 9] In the medium which memorized the information processing program for saving and managing an object with the additional information used as the retrieval information The incorporation step which incorporates the above-mentioned object, and the input step which inputs the contents classification information that the classification of the contents of the above-mentioned object is expressed, The record step which records the above-mentioned object with the above-mentioned contents classification information, The record medium characterized by having memorized the information processing program which has the key decision step which determines the key corresponding to the above-mentioned object, and the key addition step which makes the above-mentioned key record on the above-mentioned record means with an object based on the above-mentioned contents classification information.

[Translation done.]

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1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the record medium which recorded the information processing program on the information processor and the approach list.
[0002]
[Description of the Prior Art] In recent years, development of the information processing field was remarkable, and objects, such as an image and a document, were incorporated and managed [accumulated and] from the input unit, and it searched if needed, and when especially the engine performance of a personal computer etc. improved, by the time image database equipment and electronic filing system equipment which are printed in an output unit spread not only through a business field/specified use but through the general user, they became. The image and document which are processed by such equipment are often drawn up as a file, and data control is carried out. Then, in order to manage image data efficiently, adding specific information to them is known. If the additional information to image data increases, so various retrieval will be attained and retrieval effectiveness will improve. On the other hand, the input/setup of various keys to image data are needed. For example, when there are many numbers of registration of image data, a user needs to consider a key about each image data, for example, needs to register by the keyboard, and becomes a very troublesome activity for a user. For this reason, simplification of a key setup is desired from the former.
[0003] On the other hand, about attribute information, such as the creation date / modification date / file name / file format, adding to image data automatically is performed from the former. Moreover, it calculates from the color data of an image also about a tint, and adding to image data automatically is known. Moreover, addition of the keyword to image data is easy-ized by extracting the characteristic quantity which expresses the property of data propers, such as a configuration about image data, and a color, with the image file management equipment indicated by JP,6-215089,A, distinguishing the characteristic quantity, and enumerating the keywords corresponding to image data automatically.
[0004]
[Problem(s) to be Solved by the Invention] By the way, conventionally which was mentioned above, with equipment, the characteristic quantity extracted from image data is distinguished based on the characteristic quantity about the image data read before it, and the keywords about the image data which has characteristic quantity similar to the characteristic quantity from which the keyword corresponding to it was enumerated namely, extracted are enumerated. For this reason, when there is no thing similar to the characteristic quantity extracted from the image data newly read into the characteristic quantity about the image data read before, the keyword about image data must newly be inputted from input units, such as a keyboard. Moreover, since only the characteristic quantity which shows a color, a configuration, etc. is taken into consideration when enumerating the keywords of image data, the characteristic quantity about image data is similar, but when the object fields differ, the keywords unsuitable for the read image data may be enumerated. For example, like the image data showing an "apple", and the image data showing "**** and ****", although it is similar, in saying that the object

fields differ, when enumerating keywords, even if characteristic quantity (a round shape, red) takes only the above-mentioned characteristic quantity into consideration, it is not enough.
[0005] This invention was made in view of the above-mentioned technical technical problem, and aims at offering the information processor which sets up automatically the suitable keyword according to the contents of image data.
[0006]
[Means for Solving the Problem] In the information processor which this invention saves an object with the additional information used as the retrieval information, and is managed An incorporation means to incorporate an object with the contents classification information that the classification of the contents is expressed, It is characterized by having a record means to record an object with the above-mentioned contents classification information, a key decision means to determine the key corresponding to an object based on the above-mentioned contents classification information, and a key addition means to make the above-mentioned key record on the above-mentioned record means with an object. Moreover, one gestalt of this invention is characterized by having a feature-extraction means to extract the characteristic quantity showing the property of the proper from the above-mentioned object. Furthermore, other one gestalt of this invention is characterized by having a feature-extraction means to extract the characteristic quantity showing the property of the proper from the above-mentioned object and the above-mentioned contents classification information.
[0007] Moreover, this invention carries out having had an incorporation means incorporate an object, an input means input the contents classification information that the classification of the contents of the object is expressed, a record means record an object with the above-mentioned contents classification information, a key decision means determine the key corresponding to an object based on the above-mentioned contents classification information, and a key addition means make the above-mentioned key record on the above-mentioned record means with an object as the description. One gestalt of this invention is characterized by having a feature-extraction means to extract the characteristic quantity showing the property of the proper from the above-mentioned object.
[0008] Furthermore, this invention saves an object with the additional information used as the retrieval information, and it sets to the information processing approach to manage. The incorporation step which incorporates the above-mentioned object with the contents classification information that the classification of the contents is expressed, The record step which records the above-mentioned object with the above-mentioned contents classification information, It is characterized by having the key decision step which determines the key corresponding to the above-mentioned object, and the key addition step which makes the above-mentioned key record on the above-mentioned record means with an object based on the above-mentioned contents classification information.
[0009] Furthermore, this invention saves an object with the additional information used as the retrieval information, and it sets to the information processing approach to manage. The incorporation step which incorporates the above-mentioned object, and the input step which inputs the contents classification information that the classification of the contents of the above-mentioned object is expressed, The record step which records the above-mentioned object with the above-mentioned contents classification information, It is characterized by having the key decision step which determines the key corresponding to the above-mentioned object, and the key addition step which makes the above-mentioned key record on the above-mentioned record means with an object based on the above-mentioned contents classification information.
[0010] Furthermore, this invention is set to the medium which memorized the information processing program for saving and managing an object with the additional information used as the retrieval information. The incorporation step which incorporates the above-mentioned object with the contents classification information that the classification of the contents is expressed, The record step which records the above-mentioned object with the above-mentioned contents classification information, It is characterized by recording the information processing program which has the key decision step which determines the key corresponding to the above-mentioned object, and the key addition step which makes the above-mentioned key record on the above-mentioned record means with an object based on the

above-mentioned contents classification information.
[0011] Furthermore, this invention is set to the medium which memorized the information processing program for saving and managing an object with the additional information used as the retrieval information. The incorporation step which incorporates the above-mentioned object, and the input step which inputs the contents classification information that the classification of the contents of the above-mentioned object is expressed, The record step which records the above-mentioned object with the above-mentioned contents classification information, It is characterized by recording the information processing program which has the key decision step which determines the key corresponding to the above-mentioned object, and the key addition step which makes the above-mentioned key record on the above-mentioned record means with an object based on the above-mentioned contents classification information. In addition, an "object" means the electronic intelligence which serves as a subject who should be saved and managed by the above-mentioned information processor, for example, a text and image data, the folder which summarized these here.
[0012]
[Embodiment of the Invention] Hereafter, the gestalt of implementation of this invention is explained to a detail based on an accompanying drawing. The information processor of the gestalt of this operation manages the additional information which is one of the image data which is one of the objects, and the attribute information over the image data. That is, the information processor constitutes the database management system (henceforth an "image database") of image data, can add a search key to image data as additional information, and can search image data using this search key. In addition, although there are a keyword showing the description of an image, a color, a graphic form, etc. as a search key used for an image database, a keyword is used with the gestalt of this operation.
[0013] Moreover, the above-mentioned information processor deals with the image data accompanied by the contents classification information that the classification of the contents about the image data is expressed, and performs a setup of a keyword, or a keyword candidate's display automatically based on the contents classification information and the characteristic quantity showing the property of an image data proper. In addition, as the above-mentioned contents classification information, the information described by "contents description (Content description) group" of the attribute group who describes the contents of image data specified in the FlashPix (FlashPix) format which has the various information other than contents information that the contents, such as the name of the title about image data, the purpose, a location, and a material object, are expressed, in an image data file may be used, for example. The configuration and actuation of this information processor are explained below.
[0014] Drawing 1 is the block diagram of the information processor (henceforth a "system") concerning the gestalt of this operation. This system is equipped with arithmetic and program control (henceforth "CPU"), and the control unit 1 (computer) which controls the whole system is constituted as a core. The display 2 which performs the display of an image or an alphabetic character, the display for actuation, etc. in the above-mentioned control device 1, Floppy disk drive 5b which performs the writing and read-out to the keyboard 3 for performing various inputs, directions actuation, etc. and a mouse 4, and floppy disk 5a that memorizes / keeps data, and that is a medium, The hard disk drive unit 6 which memorizes and keeps a lot of image data to which attribute information is added, respectively, The printer 7 which prints an alphabetic character, image data, etc., the scanner 8 for incorporating image data, CD-ROM equipment 9b for reading the data stored in CD-ROM9a, the loudspeaker 10 for voice outputs, and the microphone phon 11 for voice input are connected.
[0015] Drawing 2 is the block diagram of this system centering on a control device 1. This control unit 1 is constituted considering CPU201 as a core. The data bus 220 connected to CPU201 is minded. The retrieval program concerning this invention ROM203 and the various data to record The display of RAM204 to memorize, an image, or an alphabetic character The display-control circuit 205 performed on a display 2, the keyboard control circuit 206 which carries out transfer control of the input from a keyboard 3, the mouse control circuit 207 which carries out transfer control of the input from a mouse 4, the floppy disk drive control circuit 208 which controls floppy disk drive 5b, A hard disk drive unit 6 The output to the hard disk control circuit 209 and printer 7 to control the printer control circuit 210 to

control, the scanner control circuit 211 which controls a scanner 8, the CD-ROM drive control circuit 212 which controls CD-ROM drive 9b, and the loudspeaker control section 213 which controls the voice output to a loudspeaker 10 -- and The microphone control circuit 214 which controls a microphone 11 is connected, respectively. Moreover, the expansion slot 215 for the clock 202 for generating a reference clock required operating this system being connected, and connecting various add-in boards through a data bus 220 further is connected to CPU201. In addition, a SCSI board may be connected to an expansion slot 215, and floppy disk drive 5b, a hard disk drive unit 6, a scanner 8, CD-ROM drive9b, etc. may be connected through this SCSI board.

[0016] In addition, although floppy disk 5a and a hard disk drive unit 6 are used in this system as a medium which keeps data, other record media, such as a magneto-optic disk, may be used. Moreover, although a scanner 8 and CD-ROM drive 9b are used as image entry-of-data equipment, other input devices, such as a still video camera and a digital camera, may be used. Moreover, although a printer 7 is used as an output unit, other output units, such as a digital copier, may be used.

[0017] In this system, the retrieval program concerning this invention is recorded on ROM203. However, a part or all of this program is kept to the data-logging medium of floppy disk 5a or hard disk drive unit 6 grade, if needed, from a data-logging medium, a program and data may be read to RAM204, and this may be performed. Moreover, although it is inputted into a hard disk drive unit 6 from external input equipment and he is trying to manage the memorized image data in this system, managing directly the image data stored in CD-ROM9b is also considered. In this case, the index data in which the image data memorized by CD-ROM9b is shown, and the search key added to this index data are memorized to a hard disk drive unit 6 (the set of this index data and search key is called a "record".). What is necessary is to extract a record as a retrieval result first and just to make it read desired image data from CD-ROM9b after an appropriate time based on the index data of the extracted record based on the set-up search key at the time of retrieval of image data.

[0018] An example of the setting screen displayed on drawing 3 on a display 2 in connection with program execution in this system is shown. Screen 21 is an initial menu screen displayed at the time of system initiation. The setting screen according to processing is displayed by choosing each selections 23-27 of an initial menu screen. A user performs the input of the set point required for a setup of a mode of operation, registration of data, or registration of a keyword etc. on these setting screens.

[0019] This system has the image database which includes the contents classification information and additional information with image data that image data should be managed. This image database includes various attribute information relevant to image data, such as a "file name" of the "data path" which shows the location on the "index" which is a registration number, the "data name" showing the contents of image data, and the information record medium with which image data is recorded, and image data, and a "keyword" used at the time of retrieval, information on other. Moreover, this system has the key list equipped with various keyword information, and the keyword corresponding to the contents classification information and characteristic quantity of an image is registered here. In addition, these image databases and a key list are recorded on the information record medium of hard disk drive unit 6 grade.

[0020] Hereafter, control processing of this system is explained. Drawing 4 is the flow chart of the main routine of the control processing performed based on the program in which CPU201 was stored in ROM203. If the power source of a system is introduced and a program is started, initialization processes, such as a display of initialization of a variable required of each processing etc. and the initialization screen (refer to drawing 3) to a display 2 top, will be performed first (a "step" is skipped step S1 and the following). Next, it judges whether selection of one of processings was performed on the initial menu screen 21 (S2). Here, when "data registration" 23 are chosen, an image is captured from the picture input device of scanner 8 grade, and data registration processing which adds predetermined information and is registered to a database is performed (S3). Moreover, when "keyword registration" 24 are chosen, keyword registration processing in which the keyword added to image data is registered to a database is performed (S4). "Data retrieval" When 25 is chosen, retrieval processing which searches desired image data from a database is performed (S5). Furthermore, when "data output" 26 are chosen,

data output processing which prints an image is performed by image output units, such as a printer, (S6). Furthermore, when "other menus" is chosen, predetermined processings other than the above-mentioned processing are performed (S7). In addition, in S2, when no menu is chosen, it progresses to other processings (S8) immediately. After other processings are completed by S8, return and the same processing as henceforth [2 / S] are performed repeatedly. In addition, about processing (S7) when the menu of keyword registration processing (S4), retrieval processing (S5), data output processing (S6), and others is chosen, and other processings (S8), it is fundamentally [as the conventional retrieval system] the same, and since it is not directly related to this application, explanation here is omitted.

[0021] Drawing 5 is the flow chart of the above-mentioned data registration processing (S3 of drawing 4). Here, processing which writes that by which additional information, such as a keyword, was added to the image data newly inputted from the picture input device of scanner 8 grade or the image data read from CD-ROM9a by CD-ROM drive 9b in a hard disk drive unit 6 as a file of an image database is performed. If this data registration processing is started, it will judge whether the above CPU 201 performs data registration by the mode of operation in automatic key attachment mode first (S31). This automatic key attachment mode is a mode of operation which chooses a keyword automatically, and adds it based on the contents classification information that the classification of the contents of the image is expressed, and the characteristic quantity expressing the property of an image pattern proper, out of the key list beforehand registered into this equipment, or chooses and displays two or more keyword candidates so that a user can choose a keyword from predetermined candidates. In setting the automatic key attachment mode flag which is a flag for a system to judge whether it is automatic key attachment mode when carrying out data registration in automatic key attachment mode, as a result of judging (S32) and not carrying out data registration in automatic key attachment mode, it clears an automatic key attachment mode flag.

[0022] Next, the image data which it is going to process from now on judges what is newly inputted, and the data which has already existed in the database (S34). A user performs this decision based on the input in which it succeeded on the data registration screen through the mouse 4 or the keyboard 3. When newly inputting image data as a result of decision, incorporation processing of the image data which incorporates new image data from the picture input device of scanner 8 grade is performed (S35). About the detail of incorporation processing (S35) of this image data, it mentions later. On the other hand, when image data is the existing data, desired data are chosen out of the existing image data (S36). Here, incorporation or selection of image data is performed by the user through a mouse 4 or keyboard 3 grade on the data registration screen 29.

[0023] Then, based on an automatic key attachment mode flag, it judges whether a mode of operation is automatic key attachment mode. When it is not in automatic key attachment mode, it progresses to S44 and automatic addition of a keyword is not performed. analysis/operation means for image recognition predetermined from image data when the mode of operation is set as automatic key attachment mode -- with, various characteristic quantity is calculated (S38). About a color or a configuration, it is a parameter expressing the property of the proper of image data (specifically a hue, lightness, saturation, a circle / ellipse / polygon-like content, a straight line / curvilinear content, etc.), and in subsequent processings, this characteristic quantity is used in order to presume a keyword.

[0024] Then, it is judged whether it is that to which the contents classification information acquired along with image data at the time of incorporation processing (S35) of image data corresponds to what kind of provisions of classification with reference to the key list which is beforehand registered into the information record medium of for example, hard disk drive unit 6 grade, and was equipped with contents classification information and the keyword information corresponding to characteristic quantity, and it is processed according to each item (S39). In the system concerning the gestalt of this operation, in passing S41 to it in corresponding to provisions of classification B to S40 when three provisions of classification A, B, and C are established and the above-mentioned contents classification information corresponds to provisions of classification A in S39, or corresponding to provisions of classification C, it progresses to S42. In addition, when the above-mentioned contents classification information corresponds to neither of provisions of classification A, B, and C, or when the image data itself does not have contents

classification information, it skips to S44.
[0025] In the above S40, the keyword according to the contents of the image data equipped with the contents classification information applicable to provisions of classification A is automatically chosen from the keyword contained in the above-mentioned key list based on the various characteristic quantity calculated by processing of S38. Similarly, in S41, the keyword according to the contents of the image data equipped with the contents classification information that the keyword according to the contents of the image data equipped with the contents classification information applicable to provisions of classification B corresponds to provisions of classification C in S42 is chosen automatically. For example, characteristic quantity is a color and a configuration and the keywords with provisions of classification A respectively following when fruit/vegetables, and provisions of classification B are [scenery and provisions of classification C] living things are chosen automatically.
[Table 1]

内容分類項目	特徴量(色, 形状)	
	(赤色, 円形状)	(緑色, 棒状)
果物／野菜	りんご	きゅうり
風景	太陽	木
生物	てんとう虫	蛇

In addition, in S40, S41, and S42, instead of one keyword being chosen automatically, respectively, two or more keyword candidates may be chosen and it may be displayed on a screen. In this case, a user can choose the optimal keyword for the contents of the image from keyword candidates. The keyword chosen in S40, S41, or S42 is set up as additional information of image data (S43). Then, it progresses to S44.
[0026] In S44, it judges whether other additional information is inputted manually. In inputting other additional information manually as a result of decision, additional information is inputted by the user through a mouse 4 or keyboard 3 grade (S45), and it progresses to S46. The detail about the additional information input process in S45 is mentioned later. Moreover, in not inputting additional information manually by S44, it skips to S46. In S46, the image data to which additional information, such as a keyword, was added, or the image data to which additional information was not added is registered into hard disk drive unit 6 grade as a file of an image database.
[0027] As mentioned above, in the information processor concerning the gestalt of this operation, based on the contents classification information and characteristic quantity of image data, a keyword is chosen and this keyword is set as additional information. In addition, although automatic addition of a keyword was not performed in S39 with the gestalt of this operation when the vocabulary of contents classification information was not registered into the above-mentioned key list, the vocabulary of contents classification information is automatically registered into the above-mentioned key list, and you may make it set it as additional information also in such a case.
[0028] Drawing 6 is the flow chart of the incorporation processing (S35 of drawing 5) of image data mentioned above. In incorporation processing of this image data, image data is first incorporated from information record media, such as a picture input device of scanner 8 grade, or CD-ROM drive9b, (S351). Next, the contents classification information corresponding to the incorporated image data is inputted through input devices, such as a keyboard, (S352). Then, the storage place of image data is set up (S353), an image data name is inputted (S354), and a return is carried out after that. In addition, a user may specify contents classification information in this equipment instead of inputting the contents classification information of an image from input units, such as a keyboard and a mouse.
[0029] Drawing 7 is the flow chart of the additional information input process (S45 of drawing 5) mentioned above. In this additional information input process, first, an additional information input menu is displayed on a screen, and CPU201 judges whether processing [which] was chosen by the user. That is, it judges any should be chosen between the processing (S452) which adds a keyword as

additional information manually, or the processing (S453) which adds information other than a keyword as additional information. When neither of the processings is chosen, it progresses to S454. When addition of a keyword is chosen, keyword attached processing is performed (S452). The detail of this keyword attached processing is mentioned later. When attached processing of the information on other is chosen, attached processing of information other than a keyword is performed (S453). About attached processing of the information on other, fundamentally, since it is equivalent to the processing from the former, or keyword attached processing of S452, the detail is omitted. After the above attached processing is completed, it judges whether the input of this additional information is ended (S454), and the same actuation is repeated until a user terminates this attached processing.

[0030] Drawing 8 is a flow chart which shows the detail of attached processing (S452 of drawing 7) of a keyword. In this keyword attached processing, the keyword registered is displayed in a list first (this list display is called registration key list hereafter (S4521)). A user chooses a desired keyword out of the registration key list displayed on the screen (S4522). As the selection approach, cursor is moved to the location of a keyword by the approach a user clicks a keyword with a mouse 4, or the keyboard 3, and how to specify inverse video and by carrying out highlighting etc. can be considered. The keyword chosen by the user is set as the additional information of image data in S4523. Then, it is judged based on the input on the screen by the user whether attached processing of this keyword is ended (S4524), and the above-mentioned actuation is repeated until a user terminates this processing.

[0031] The flow chart concerning the gestalt of other operations of the data registration processing (S3 of drawing 4) mentioned above in drawing 9 is shown. If this data registration processing is started, it will judge whether the above CPU 201 performs data registration by the mode of operation in automatic key attachment mode first (S31'). As a result of judging, in YES, an automatic key attachment mode flag is set (S32'), and, in NO, an automatic key attachment mode flag is cleared (S33'). Next, it judges whether it is the new input of image data (S34'), and in YES, it progresses to incorporation processing (S35') of image data, and progresses after that to S37'. In S34', in NO, the existing image data is chosen (S36'), and it progresses to S37' after that.

[0032] If it belongs to the classification A an automatic key attachment flag judges whether it is ON in S37' to be, the contents classification of image data is judged to be in YES (S38'), and the contents classification is beforehand remembered to be by equipment, it belongs to Classification B to S39' and it belongs to Classification C to S42', it will progress to S44'. In having neither the case where it belongs to the other classification, nor contents classification information, it skips to S46'. In S39', characteristic quantity is calculated by Processing A. Similarly, in S42', characteristic quantity is calculated by Processing B, and is calculated by Processing C in S44'. these -- characteristic quantity -- each -- it -- henceforth -- processing -- S -- 40 -- ' -- S -- 43 -- ' -- S -- 45 -- ' -- setting -- a keyword -- presuming -- a sake -- using -- having -- for example, -- a hue -- lightness -- and -- saturation -- etc. -- a color -- being related -- characteristic quantity -- a profile -- an extract -- having carried out -- a configuration -- receiving -- fourier -- the expansion into series -- etc. -- technique -- using -- having evaluated -- a configuration -- being related -- characteristic quantity -- a base -- a pattern -- periodicity -- the -- a direction -- etc. -- a texture -- be related -- characteristic quantity -- etc. etc. -- thinking -- having . In S40', a keyword is presumed from the characteristic quantity calculated by S39' using the approach A of the convention defined beforehand. Similarly, in S43', a keyword is presumed from the characteristic quantity calculated S44 from the characteristic quantity calculated by S42' using Approach B using Approach C by S45'. Then, the keyword which progressed to S41' and was presumed is set as additional information.

[0033] With the gestalt of this operation, Classification B shall be given to the data of monochrome graphic forms, such as a notation, and texture data, such as a pattern, and Classification C shall be given to color picture data, such as a photograph, for Classification A, for example. In this case, as shown below, the characteristic quantity concerning [the characteristic quantity concerning / the characteristic quantity about a configuration / the data of Classification B to periodicity] the data of Classification C to a color is extracted from the data of Classification A again. A keyword can be given to image data using the key attachment function which analyzed beforehand and was specified according to each

classification.
[Table 2]

データ	分類	抽出特徴量[xi]	キー付け関数
モノクロ図形 (ex. 記号)	A	形状に関する特徴量 (輪郭抽出した形状に対しフーリエ級数展開等の手法を用いて数値化した値)	f(xi)
テクスチャ (ex. 模様)	B	周期性に関する特徴量 (基本パターンの周期性、その方向等)	g(xi)
カラー画像 (ex. 写真)	C	色に関する特徴量 (色相、明度、彩度等)	h(xi)

Next, it judges whether other additional information is inputted manually (S46'), and in YES, additional information input process (S47') is performed, and it progresses to it after that to S48'. In step S48', the image data incorporated with additional information is kept to storage.
[0034] In addition, in the range which this invention is not limited to the gestalt of the above operation, and does not deviate from the summary, it cannot be overemphasized that various amelioration or modification on a design is possible.
[0035]
[Effect of the Invention] Since the search key added to an object is set up based on the contents classification information that the classification of not only the characteristic quantity showing the property of the proper of an object but its contents is expressed according to this invention, the search key according to the contents can be automatically added with a sufficient precision to the above-mentioned object. Consequently, the burdens of a search key addition activity are sharply reducible.

[Translation done.]

* NOTICES *

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damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the explanatory view showing the configuration of the information processor concerning the gestalt of this operation.
[Drawing 2] It is a block diagram centering on the control device in the above-mentioned information processor, and they are ** and **.
[Drawing 3] It is drawing showing the setting screen displayed on a display.
[Drawing 4] It is the flow chart of the main routine of the control processing in the above-mentioned control device.
[Drawing 5] It is the flow chart of data registration processing.
[Drawing 6] It is the flow chart of incorporation processing of image data.
[Drawing 7] It is the flow chart of additional information input process.
[Drawing 8] It is the flow chart of keyword attached processing.
[Drawing 9] It is the flow chart of the data registration processing concerning the gestalt of other operations of this invention.
[Description of Notations]
1 -- Control unit
3 -- Keyboard
5a -- Floppy disk
5b -- Floppy disk drive unit
6 -- Hard disk drive unit
8 -- Scanner
9a -- CD-ROM
9b -- CD-ROM equipment
201 -- CPU
203 -- ROM
204 -- RAM

[Translation done.]

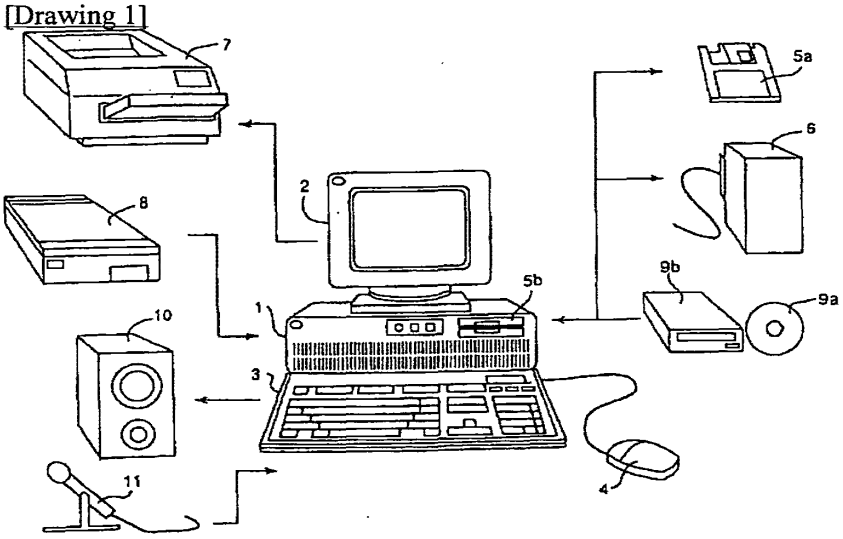
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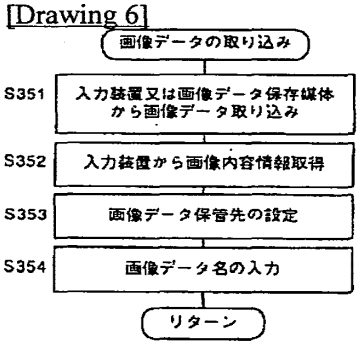
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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

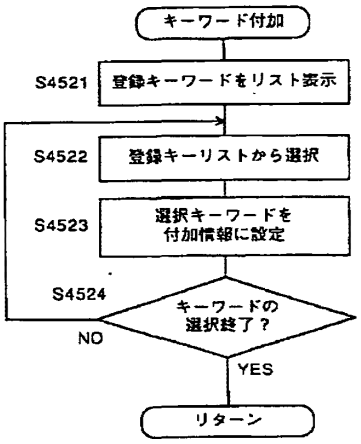
[Drawing 1]



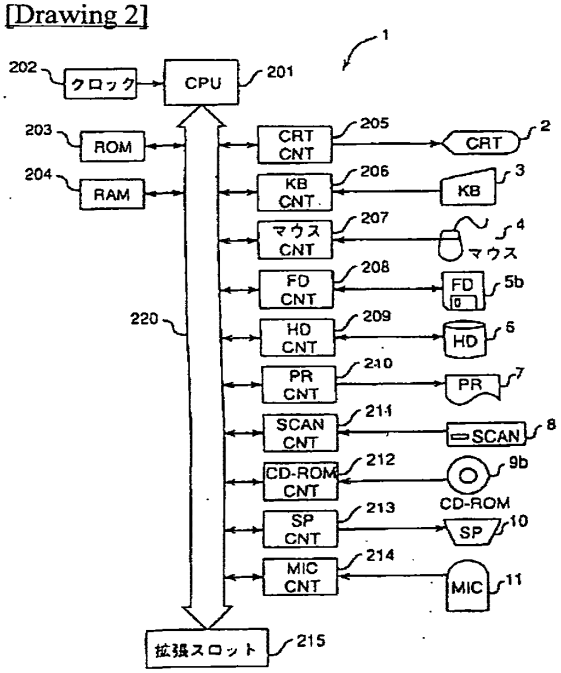
[Drawing 6]



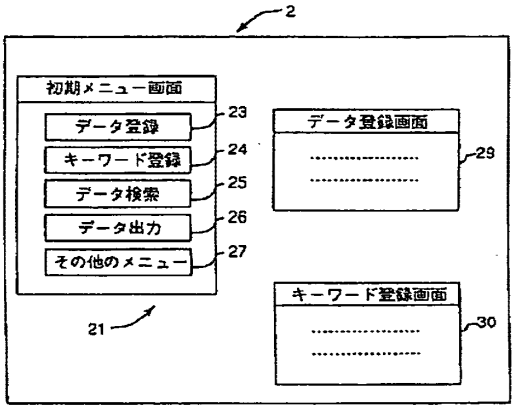
[Drawing 8]



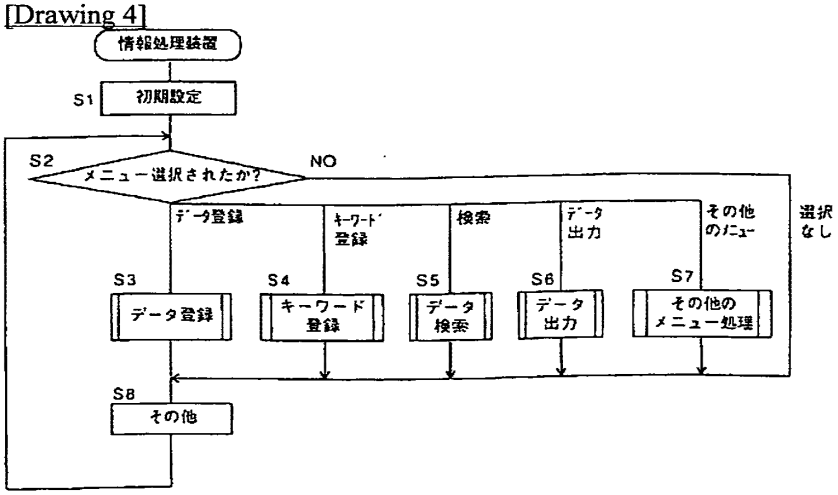
[Drawing 2]



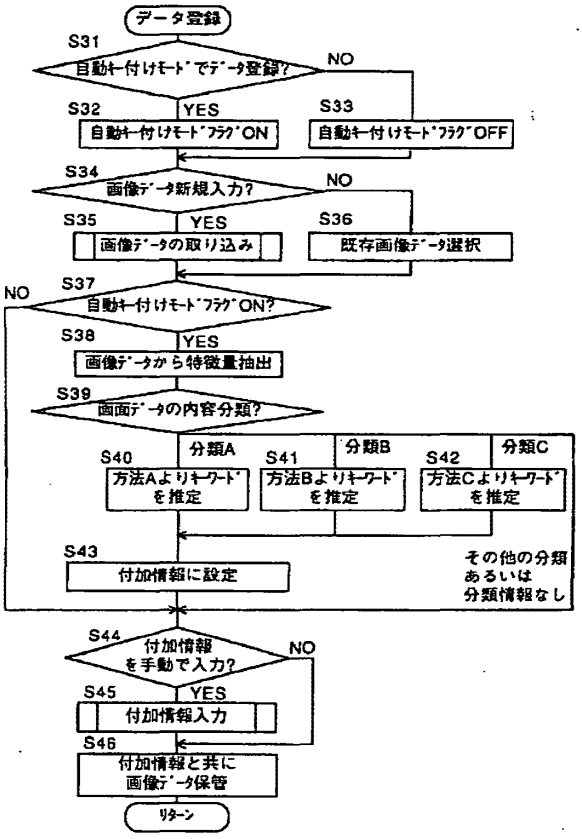
[Drawing 3]



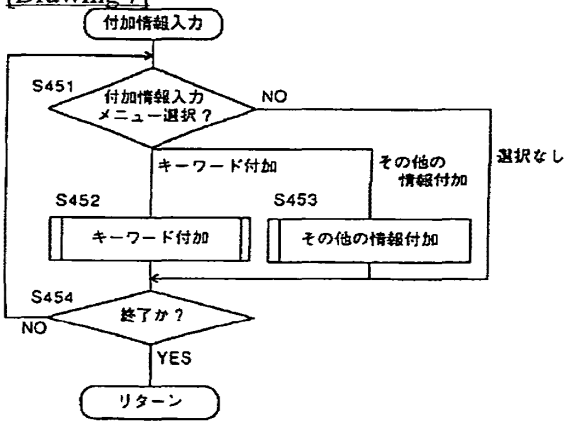
[Drawing 4]



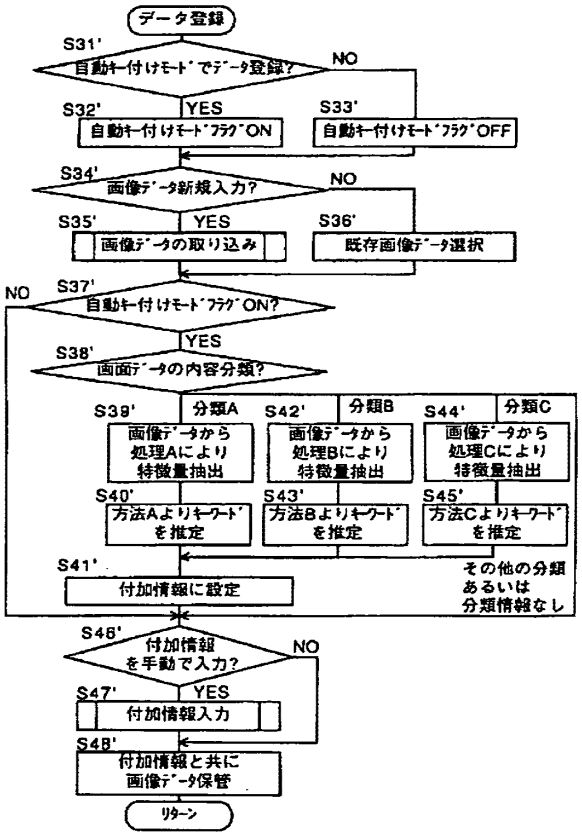
[Drawing 5]



[Drawing 7]



[Drawing 9]



[Translation done.]

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Ｇ０６Ｔ　1/00			15/40	３７０Ｂ
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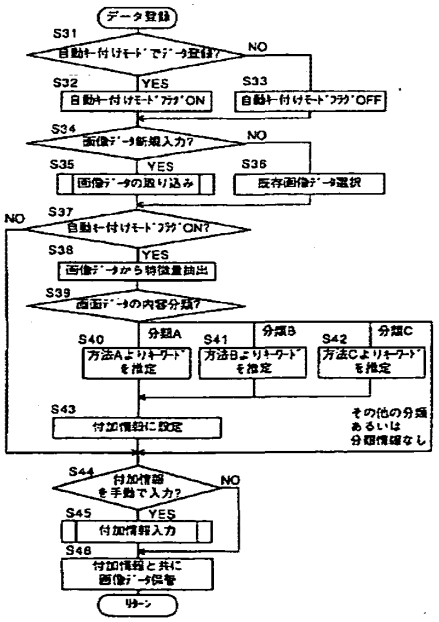
(74)代理人　弁理士　青山　葆　（外１名）

(54)【発明の名称】　情報処理装置及び方法並びに情報処理プログラムを記録した記録媒体

(57)【要約】

【課題】　オブジェクトに対してその内容に応じたキーワードを自動的に付加する情報処理装置を提供する。

【解決手段】　選択されたオブジェクトに対して、その内容の分類を表す内容分類情報と、その固有の性質を表す特徴量とに基づいて推定された用語をキーワードとして付加情報に設定し、オブジェクトとともにデータベースに登録する。



1

【特許請求の範囲】

【請求項１】　オブジェクトをその検索情報となる付加情報と共に保存し、管理する情報処理装置において、

上記オブジェクトをその内容の分類を表す内容分類情報とともに取り込む取り込み手段と、

上記オブジェクトを上記内容分類情報とともに記録する記録手段と、

上記内容分類情報に基づいて、上記オブジェクトに対応するキーを決定するキー決定手段と、

上記キーをオブジェクトとともに上記記録手段に記録させるキー付加手段とを有していることを特徴とする情報処理装置。

【請求項２】　請求項１に記載の情報処理装置において、更に、上記オブジェクトからその固有の性質を表す特徴量を抽出する特徴抽出手段を備えていることを特徴とする情報処理装置。

【請求項３】　請求項１に記載の情報処理装置において、更に、上記オブジェクトと上記内容分類情報とからその固有の性質を表す特徴量を抽出する特徴抽出手段を備えていることを特徴とする情報処理装置。

【請求項４】　オブジェクトをその検索情報となる付加情報と共に保存し、管理する情報処理装置において、

上記オブジェクトを取り込む取り込み手段と、

上記オブジェクトの内容の分類を表す内容分類情報を入力する入力手段と、

上記オブジェクトを上記内容分類情報とともに記録する記録手段と、

上記内容分類情報に基づいて、上記オブジェクトに対応するキーを決定するキー決定手段と、

上記キーをオブジェクトとともに上記記録手段に記録させるキー付加手段とを有していることを特徴とする情報処理装置。

【請求項５】　請求項４に記載の情報処理装置において、更に、上記オブジェクトからその固有の性質を表す特徴量を抽出する特徴抽出手段を備えていることを特徴とする情報処理装置。

【請求項６】　オブジェクトをその検索情報となる付加情報と共に保存し、管理する情報処理方法において、

上記オブジェクトをその内容の分類を表す内容分類情報とともに取り込む取り込みステップと、

上記オブジェクトを上記内容分類情報とともに記録する記録ステップと、

上記内容分類情報に基づいて、上記オブジェクトに対応するキーを決定するキー決定ステップと、

上記キーをオブジェクトとともに上記記録手段に記録させるキー付加ステップとを有していることを特徴とする情報処理方法。

【請求項７】　オブジェクトをその検索情報となる付加情報と共に保存し、管理する情報処理方法において、

上記オブジェクトを取り込む取り込みステップと、

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上記オブジェクトの内容の分類を表す内容分類情報を入力する入力ステップと、

上記オブジェクトを上記内容分類情報とともに記録する記録ステップと、

上記内容分類情報に基づいて、上記オブジェクトに対応するキーを決定するキー決定ステップと、

上記キーをオブジェクトとともに上記記録手段に記録させるキー付加ステップとを有していることを特徴とする情報処理方法。

【請求項８】　オブジェクトをその検索情報となる付加情報と共に保存し、管理するための情報処理プログラムを記憶した媒体において、

上記オブジェクトをその内容の分類を表す内容分類情報とともに取り込む取り込みステップと、

上記オブジェクトを上記内容分類情報とともに記録する記録ステップと、

上記内容分類情報に基づいて、上記オブジェクトに対応するキーを決定するキー決定ステップと、

上記キーをオブジェクトとともに上記記録手段に記録させるキー付加ステップとを有する情報処理プログラムを記憶していることを特徴とする記録媒体。

【請求項９】　オブジェクトをその検索情報となる付加情報と共に保存し、管理するための情報処理プログラムを記憶した媒体において、

上記オブジェクトを取り込む取り込みステップと、

上記オブジェクトの内容の分類を表す内容分類情報を入力する入力ステップと、

上記オブジェクトを上記内容分類情報とともに記録する記録ステップと、

上記内容分類情報に基づいて、上記オブジェクトに対応するキーを決定するキー決定ステップと、

上記キーをオブジェクトとともに上記記録手段に記録させるキー付加ステップとを有する情報処理プログラムを記憶していることを特徴とする記録媒体。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、情報処理装置及び方法並びに情報処理プログラムを記録した記録媒体に関する。

【０００２】

【従来の技術】近年、情報処理分野の発展はめざましく、特にパーソナルコンピュータ等の性能が向上したことにより、画像や文書等のオブジェクトを入力装置から取り込み、蓄積、管理し、必要に応じて検索し、出力装置において印刷する画像データベース装置や電子ファイリング装置が、ビジネス分野／特定用途のみならず、一般ユーザへも普及するまでになった。このような装置によって処理される画像や文書は、しばしば、ファイルとして作成されてデータ管理される。そこで、画像データを効率的に管理する為に、それらに特定の情報を付加す

ることが知られている。画像データへの付加情報が多くなれば、それだけ様々な検索が可能となり、検索効率が向上する。その反面、画像データへの様々なキーの入力／設定が必要となる。例えば、画像データの登録数が多い場合には、ユーザが各々の画像データについてキーを考え、例えばキーボードで登録する必要があり、ユーザにとって非常に面倒な作業となる。このため、キー設定の簡略化が従来から望まれている。

【０００３】一方、作成日／修正日／ファイル名／ファイルフォーマット等の属性情報については、画像データへ自動的に付加することが従来から行なわれている。また、色味についても画像の色データから演算し、画像データへ自動的に付加することが知られている。また、特開平６－２１５０８９号公報に記載された画像ファイル管理装置では、画像データについての形状および色等のデータ固有の性質を表す特徴量を抽出し、その特徴量を判別して画像データに対応するキーワードを自動的に列挙することによって、画像データへのキーワードの付加を容易化する。

【０００４】

【発明が解決しようとする課題】ところで、上述した従来装置では、画像データから抽出された特徴量が、それ以前に読込まれた画像データについての特徴量に基づいて判別され、それに対応するキーワードが列挙される、すなわち、抽出された特徴量に類似した特徴量を有する画像データについてのキーワードが列挙される。このため、以前に読み込まれた画像データについての特徴量の中に、新しく読み込まれた画像データから抽出された特徴量に類似するものがない場合には、画像データについてのキーワードを新たにキーボード等の入力装置から入力しなければならない。また、画像データのキーワードを列挙する上で、色や形状等を示す特徴量のみが考慮されるので、画像データについての特徴量は類似するが、その対象分野が異なる場合には、読み込まれた画像データに適しないキーワードが列挙される可能性がある。例えば、「りんご」を表す画像データと「てんとう虫」を表す画像データのように、特徴量（丸形，赤色）は類似するが、その対象分野は異なるという場合には、キーワードを列挙する上で、上記特徴量のみを考慮しても十分でない。

【０００５】この発明は、上記技術的課題に鑑みてなされたもので、画像データの内容に応じた適切なキーワードを自動的に設定する情報処理装置を提供することを目的とする。

【０００６】

【課題を解決するための手段】本発明は、オブジェクトをその検索情報となる付加情報とともに保存し、管理する情報処理装置において、オブジェクトをその内容の分類を表す内容分類情報とともに取り込む取り込み手段と、オブジェクトを上記内容分類情報とともに記録する記録手段と、上記内容分類情報に基づいて、オブジェクトに対応するキーを決定するキー決定手段と、上記キーをオブジェクトとともに上記記録手段に記録させるキー付加手段とを備えていることを特徴とする。また、本発明の一形態は、上記オブジェクトからその固有の性質を表す特徴量を抽出する特徴抽出手段を備えていることを特徴とする。更に、本発明の他の一形態は、上記オブジェクト及び上記内容分類情報からその固有の性質を表す特徴量を抽出する特徴抽出手段を備えていることを特徴とする。

【０００７】また、本発明は、オブジェクトを取り込む取り込み手段と、オブジェクトの内容の分類を表す内容分類情報を入力する入力手段と、オブジェクトを上記内容分類情報とともに記録する記録手段と、上記内容分類情報に基づいて、オブジェクトに対応するキーを決定するキー決定手段と、上記キーをオブジェクトとともに上記記録手段に記録させるキー付加手段とを備えたことを特徴とする。本発明の一形態は、上記オブジェクトからその固有の性質を表す特徴量を抽出する特徴抽出手段を備えていることを特徴とする。

【０００８】更に、本発明は、オブジェクトをその検索情報となる付加情報と共に保存し、管理する情報処理方法において、上記オブジェクトをその内容の分類を表す内容分類情報とともに取り込む取り込みステップと、上記オブジェクトを上記内容分類情報とともに記録する記録ステップと、上記内容分類情報に基づいて、上記オブジェクトに対応するキーを決定するキー決定ステップと、上記キーをオブジェクトとともに上記記録手段に記録させるキー付加ステップとを有していることを特徴とする。

【０００９】また更に、本発明は、オブジェクトをその検索情報となる付加情報と共に保存し、管理する情報処理方法において、上記オブジェクトを取り込む取り込みステップと、上記オブジェクトの内容の分類を表す内容分類情報を入力する入力ステップと、上記オブジェクトを上記内容分類情報とともに記録する記録ステップと、上記内容分類情報に基づいて、上記オブジェクトに対応するキーを決定するキー決定ステップと、上記キーをオブジェクトとともに上記記録手段に記録させるキー付加ステップとを有していることを特徴とする。

【００１０】また更に、本発明は、オブジェクトをその検索情報となる付加情報と共に保存し、管理するための情報処理プログラムを記憶した媒体において、上記オブジェクトをその内容の分類を表す内容分類情報とともに取り込む取り込みステップと、上記オブジェクトを上記内容分類情報とともに記録する記録ステップと、上記内容分類情報に基づいて、上記オブジェクトに対応するキーを決定するキー決定ステップと、上記キーをオブジェクトとともに上記記録手段に記録させるキー付加ステップとを有する情報処理プログラムを記録していることを

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特徴としたものである。

【００１１】また更に、本発明は、オブジェクトをその検索情報となる付加情報と共に保存し、管理するための情報処理プログラムを記憶した媒体において、上記オブジェクトを取り込む取り込みステップと、上記オブジェクトの内容の分類を表す内容分類情報を入力する入力ステップと、上記オブジェクトを上記内容分類情報とともに記録する記録ステップと、上記内容分類情報に基づいて、上記オブジェクトに対応するキーを決定するキー決定ステップと、上記キーをオブジェクトとともに上記記録手段に記録させるキー付加ステップとを有する情報処理プログラムを記録していることを特徴としたものである。なお、ここで「オブジェクト」とは、上記情報処理装置により保存、管理されるべき主体となる電子情報、例えば、テキストや画像データ、又はこれらをまとめたフォルダなどを意味する。

【００１２】

【発明の実施の形態】以下、この発明の実施の形態を、添付図面に基づいて詳細に説明する。本実施の形態の情報処理装置は、オブジェクトの１つである画像データおよびその画像データに対する属性情報の１つである付加情報を管理するものである。すなわち、情報処理装置は画像データのデータベース管理システム（以下、「画像データベース」という。）を構成しており、画像データに付加情報として検索キーを付加し、この検索キーを用いて画像データの検索を行なうことができる。なお、画像データベースに用いられる検索キーとしては、画像の特徴を表すキーワードや色、図形などがあるが、この実施の形態では、キーワードを使用する。

【００１３】また、上記情報処理装置は、その画像データに関する内容の分類を表す内容分類情報を伴う画像データを取り扱い、その内容分類情報、および、画像データ固有の性質を表す特徴量に基づいて、キーワードの設定又はキーワード候補の表示を自動的に行なう。なお、上記内容分類情報としては、例えば、画像データに関する題目、目的、場所、有形物の名称等の内容を表す内容情報の他に、種々の情報を画像データファイル中にもつフラッシュピックス（ＦｌａｓｈＰｉｘ）フォーマットで規定される、画像データの内容を記述する属性グループの「内容記述（Ｃｏｎｔｅｎｔ　ｄｅｓｃｒｉｐｔｉｏｎ）グループ」に記述される情報を用いてもよい。以下にこの情報処理装置の構成および動作を説明する。

【００１４】図１は、本実施の形態に係る情報処理装置（以下、「システム」という）の構成図である。該システムは、中央演算処理装置（以下、「ＣＰＵ」という）を備え、システム全体を制御する制御装置１（コンピュータ）を中心として構成される。上記制御装置１には、画像又は文字等の表示や操作のための表示等を行うディスプレイ２と、各種入力、指示操作等を行うためのキーボード３及びマウス４と、データを記憶／保管する媒体であるフロッピーディスク５ａへの書込み及び読出しを行なうフロッピーディスクドライブ５ｂと、それぞれ属性情報の付加されている多量の画像データを記憶及び保管するハードディスク装置６と、文字や画像データ等を印刷するプリンタ７と、画像データを取り込むためのスキャナ８と、ＣＤ－ＲＯＭ９ａに格納されたデータを読出すためのＣＤ－ＲＯＭ装置９ｂと、音声出力用のスピーカ１０と、音声入力用のマイクフォン１１とが接続されている。

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【００１５】図２は、制御装置１を中心とした本システムのブロック図である。該制御装置１は、ＣＰＵ２０１を中心として構成され、ＣＰＵ２０１に接続されるデータバス２２０を介して本発明に係る検索プログラムを記録するＲＯＭ２０３、各種データを記憶するＲＡＭ２０４、画像あるいは文字等の表示をディスプレイ２に行なう表示制御回路２０５、キーボード３からの入力を転送制御するキーボード制御回路２０６、マウス４からの入力を転送制御するマウス制御回路２０７、フロッピーディスクドライブ５ｂを制御するフロッピーディスクドライブ制御回路２０８、ハードディスク装置６を制御するハードディスク制御回路２０９、プリンタ７への出力を制御するプリンタ制御回路２１０、スキャナ８を制御するスキャナ制御回路２１１、ＣＤ－ＲＯＭドライブ９ｂを制御するＣＤ－ＲＯＭドライブ制御回路２１２、スピーカ１０への音声出力を制御するスピーカ制御部２１３、及び、マイクロフォン１１を制御するマイクロフォン制御回路２１４がそれぞれ接続される。また、ＣＰＵ２０１には、本システムを動作させるのに必要な基準クロックを発生するためのクロック２０２が接続され、さらにデータバス２２０を介して各種拡張ボードを接続するための拡張スロット２１５が接続される。なお、拡張スロット２１５にＳＣＳＩボードを接続し、このＳＣＳＩボードを介してフロッピーディスクドライブ５ｂ、ハードディスク装置６、スキャナ８、ＣＤ－ＲＯＭドライブ９ｂ等を接続しても良い。

【００１６】なお、本システムでは、データを保管する媒体としてフロッピーディスク５ａ及びハードディスク装置６を使用するが、光磁気ディスク等の他の記録媒体を用いても良い。また、画像データの入力装置としてスキャナ８及びＣＤ－ＲＯＭドライブ９ｂが使用されるが、スチルビデオカメラやデジタルカメラ等の他の入力装置を用いても良い。また、出力装置としてはプリンタ７が用いられるが、デジタル複写機等の他の出力装置を用いても良い。

【００１７】本システムでは、本発明に係る検索プログラムをＲＯＭ２０３に記録する。しかし、本プログラムの一部又は全部をフロッピーディスク５ａやハードディスク装置６等のデータ記録媒体に保管しておき、必要に応じてデータ記録媒体よりプログラム及びデータをＲＡＭ２０４に読み出し、これを実行させても良い。また、

本システムでは、外部入力装置からハードディスク装置６に入力され、記憶された画像データを管理するようにしているが、ＣＤ－ＲＯＭ９ｂに格納されている画像データを直接管理するようにすることも考えられる。この場合、ＣＤ－ＲＯＭ９ｂに記憶されている画像データを示すインデックスデータと、このインデックスデータに対して付加した検索キーとをハードディスク装置６に記憶する（このインデックスデータと検索キーとのセットを「レコード」と称す。）。画像データの検索時には、設定された検索キーに基づいて、まずレコードを検索結果として抽出し、しかる後、抽出されたレコードのインデックスデータに基づいてＣＤ－ＲＯＭ９ｂから所望の画像データを読み出すようにすれば良い。

【００１８】図３に、本システムにおいてプログラムの実行に伴いディスプレイ２上に表示される設定画面の一例を示す。画面２１は、システム開始時に表示される初期メニュー画面である。初期メニュー画面の各選択項目２３～２７を選択することにより処理に応じた設定画面が表示される。ユーザは、これらの設定画面上で、動作モードの設定、データの登録又はキーワードの登録等に必要な設定値の入力等を行なう。

【００１９】本システムは、画像データを管理すべく、画像データと共にその内容分類情報と付加情報とを含む画像データベースを有している。この画像データベースは、登録番号である「インデックス」、画像データの内容を表す「データ名」、画像データが記録されている情報記録媒体上の場所を示す「データパス」、画像データの「ファイル名」と、検索時に用いられる「キーワード」、及び、その他の情報等、画像データに関連した種々の属性情報を含んでいる。また、本システムは、種々のキーワード情報を備えたキーリストを有しており、ここには、画像の内容分類情報および特徴量に対応するキーワードが登録されている。なお、これら画像データベース及びキーリストは、ハードディスク装置６等の情報記録媒体に記録されている。

【００２０】以下、本システムの制御処理について説明する。図４は、ＣＰＵ２０１がＲＯＭ２０３に格納されたプログラムに基づいて実行する制御処理のメインルーチンのフローチャートである。システムの電源が導入され、プログラムが起動されると、まず、各処理で必要な変数等の初期化、ディスプレイ２上への初期設定画面（図３参照）の表示等の初期設定処理を行う（ステップＳ１、以下「ステップ」を省略する）。次に、初期メニュー画面２１でいずれかの処理の選択が行なわれたか否かを判定する（Ｓ２）。ここで、「データ登録」２３が選択された場合には、スキャナ８等の画像入力装置から画像を取り込み、所定の情報を付加してデータベースへ登録するデータ登録処理が実行される（Ｓ３）。また、「キーワード登録」２４が選択された場合には、画像データに付加するキーワードをデータベースへ登録するキーワード登録処理が実行される（Ｓ４）。「データ検索」２５が選択された場合、所望の画像データをデータベースから検索する検索処理が実行される（Ｓ５）。更に、「データ出力」２６が選択された場合、プリンタ等の画像出力装置により、画像を印刷するデータ出力処理が実行される（Ｓ６）。また、更に、「その他のメニュー」が選択された場合には、上記処理以外の所定の処理が実行される（Ｓ７）。なお、Ｓ２において、何のメニューも選択されない場合には、直ちにその他の処理（Ｓ８）へと進む。Ｓ８でその他の処理が終了した後、Ｓ２へと戻り、以後同様の処理が繰り返し実行される。なお、キーワード登録処理（Ｓ４）、検索処理（Ｓ５）、データ出力処理（Ｓ６）、その他のメニューが選択されたときの処理（Ｓ７）、及び、その他の処理（Ｓ８）については、従来の検索システムと基本的に同様であり、本願に直接関係しないので、ここでの説明は省略する。

【００２１】図５は、上記データ登録処理（図４のＳ３）のフローチャートである。ここでは、スキャナ８等の画像入力装置から新規に入力される画像データ、又は、ＣＤ－ＲＯＭドライブ９ｂによりＣＤ－ＲＯＭ９ａから読み込まれる画像データに、キーワード等の付加情報が付加されたものを、画像データベースのファイルとしてハードディスク装置６に書き込む処理を行なう。このデータ登録処理に入ると、上記ＣＰＵ２０１は、まず、自動キー付けモードの動作モードでデータ登録を行なうか否かを判断する（Ｓ３１）。この自動キー付けモードとは、ユーザが所定の候補の中からキーワードを選択することができるように、本装置に予め登録されているキーリストの中から、画像の内容の分類を表す内容分類情報、及び、画像パターン固有の性質を表現する特徴量に基づいて、キーワードを自動的に選択し付加する、あるいは、複数のキーワード候補を選択し表示する動作モードである。判断した結果、自動キー付けモードでデータ登録する場合には、システムが自動キー付けモードか否かを判断するためのフラグである自動キー付けモードフラグをＯＮにし（Ｓ３２）、自動キー付けモードでデータ登録しない場合には、自動キー付けモードフラグをＯＦＦにする。

【００２２】次に、これから処理しようとする画像データが新規入力するものか、既にデータベースに存在しているデータかを判断する（Ｓ３４）。この判断はユーザがマウス４又はキーボード３を介してデータ登録画面上で為した入力に基づいて行なう。判断の結果、画像データを新規入力する場合には、スキャナ８等の画像入力装置から新規の画像データを取り込む画像データの取り込み処理が実行される（Ｓ３５）。この画像データの取り込み処理（Ｓ３５）の詳細については後述する。一方、画像データが既存データである場合には、既存の画像データの中から所望のデータを選択する（Ｓ３６）。ここで、画像データの取り込み又は選択は、ユーザによりデータ登録

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画面２９上でマウス４やキーボード３等を介して行なわれる。

【００２３】その後、自動キー付けモードフラグに基づき、動作モードが自動キー付けモードであるか否かを判断する。自動キー付けモードでない場合には、Ｓ４４に進み、キーワードの自動付加は行なわれない。動作モードが自動キー付けモードに設定されている場合には、画像データから所定の画像認識のための解析／演算手段を以て各種特徴量を求める（Ｓ３８）。この特徴量は、例えば色や形状に関して、画像データの固有の性質を表現するパラメータ（具体的には色相，明度，彩度や円／楕円／多角形状含有率，直線／曲線含有率等）であり、以降の処理において、キーワードを推定するために利用される。

【００２４】続いて、画像データの取り込み処理（Ｓ３５）時に画像データに付随して得られた内容分類情報が、例えばハードディスク装置６等の情報記録媒体に予め登録されており内容分類情報および特徴量に対応するキーワード情報を備えたキーリストを参照して、いかなる分類項目に該当するものであるかが判断され、各項目別に処理される（Ｓ３９）。本実施の形態に係るシステムでは、３つの分類項目Ａ，Ｂ及びＣが設けられており、＊

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＊Ｓ３９において、上記内容分類情報が分類項目Ａに該当する場合にはＳ４０へ、分類項目Ｂに該当する場合にはＳ４１へ、若しくは、分類項目Ｃに該当する場合にはＳ４２へ進む。なお、上記内容分類情報が分類項目Ａ，Ｂ及びＣのいずれにも該当しない場合や、画像データ自体が内容分類情報をもたない場合には、Ｓ４４へスキップする。

【００２５】上記Ｓ４０では、Ｓ３８の処理で求めた各種特徴量に基づいて、分類項目Ａに該当する内容分類情報を備えた画像データの内容に応じたキーワードが、上記キーリストに含まれるキーワードから自動的に選択される。同様に、Ｓ４１では分類項目Ｂに該当する内容分類情報を備えた画像データの内容に応じたキーワードが、Ｓ４２では分類項目Ｃに該当する内容分類情報を備えた画像データの内容に応じたキーワードが自動的に選択される。例えば、特徴量が色と形状であり、分類項目Ａが果物／野菜、分類項目Ｂが風景、分類項目Ｃが生物である場合には、それぞれ以下のようなキーワードが自動的に選択される。

【表１】

内容分類項目	特徴量(色，形状)	
	(赤色，円形状)	(緑色，棒状)
果物／野菜	りんご	きゅうり
風景	太陽	木
生物	てんとう虫	蛇

なお、Ｓ４０，Ｓ４１，Ｓ４２において、それぞれ１つのキーワードが自動的に選択される代わりに、複数のキーワード候補が選択され画面上に表示されてもよい。この場合には、ユーザがキーワード候補の中から画像の内容に最適なキーワードを選択することができる。Ｓ４０，Ｓ４１若しくはＳ４２において選択されたキーワードは、画像データの付加情報として設定される（Ｓ４３）。その後、Ｓ４４へ進む。

【００２６】Ｓ４４では、他の付加情報を手動で入力するか否かを判断する。判断の結果、他の付加情報を手動で入力する場合には、ユーザにより、マウス４やキーボード３等を介して付加情報が入力され（Ｓ４５）、Ｓ４６へ進む。Ｓ４５における付加情報入力処理についての詳細は後述する。また、Ｓ４４で付加情報を手動で入力しない場合には、Ｓ４６へスキップする。Ｓ４６では、キーワード等の付加情報が付加された画像データ、あるいは、付加情報が付加されなかった画像データが、画像データベースのファイルとしてハードディスク装置６等に登録される。

【００２７】以上のように、本実施の形態に係る情報処理装置では、画像データの内容分類情報および特徴量に基づいて、キーワードを選択し、このキーワードを付加情報に設定する。なお、この実施の形態では、Ｓ３９において、内容分類情報の用語が上記キーリストに登録されていない場合には、キーワードの自動付加を行わなかったが、このような場合にも、内容分類情報の用語を自動的に上記キーリストに登録し、付加情報に設定するようにしてもよい。

【００２８】図６は、前述した画像データの取り込み処理（図５のＳ３５）のフローチャートである。この画像データの取り込み処理においては、まず、スキャナ８等の画像入力装置又はＣＤ－ＲＯＭドライブ９ｂ等の情報記録媒体から画像データを取り込む（Ｓ３５１）。次に、キーボード等の入力装置を介して、取り込んだ画像データに対応した内容分類情報を入力する（Ｓ３５２）。続いて、画像データの保管先の設定を行ない（Ｓ３５３）、画像データ名の入力を行ない（Ｓ３５４）、その後、リターンする。なお、キーボードやマウス等の入力装置から画像内容分類情報を入力する代わりに、ユーザが本装置において内容分類情報を指定してもよい。

【００２９】図７は、前述した付加情報入力処理（図５のＳ４５）のフローチャートである。この付加情報入力処理では、まず、画面上に付加情報入力メニューが表示され、ＣＰＵ２０１は、ユーザによりいずれの処理が選択されたかを判断する。すなわち、キーワードを手動で付加情報として付加する処理（Ｓ４５２）、又は、キーワ

ード以外の情報を付加情報として付加する処理（Ｓ４５３）のいずれが選択されたかを判断する。いずれの処理も選択されない場合には、Ｓ４５４に進む。キーワードの付加を選択した場合には、キーワード付加処理が行われる（Ｓ４５２）。このキーワード付加処理の詳細は後述する。その他の情報の付加処理を選択した場合には、キーワード以外の情報の付加処理が行われる（Ｓ４５３）。その他の情報の付加処理については、基本的に、従来からの処理又はＳ４５２のキーワード付加処理と同等であるのでその詳細は省略する。以上のような付加処理が終了した後、かかる付加情報の入力を終了するか否かを判断し（Ｓ４５４）、ユーザがこの付加処理を終了させるまで同様の動作が繰り返される。

【００３０】図８は、キーワードの付加処理（図７のＳ４５２）の詳細を示すフローチャートである。このキーワード付加処理では、まず、登録されているキーワードをリスト表示する（Ｓ４５２１）（以下、このリスト表示を登録キーリストという）。ユーザは、画面に表示された登録キーリストの中から所望のキーワードを選択する（Ｓ４５２２）。選択方法としては、ユーザがマウス４でキーワードをクリックする方法やキーボード３でカーソルをキーワードの位置に移動させ、反転表示や強調表示させることにより指定する方法等が考えられる。ユーザにより選択されたキーワードは、Ｓ４５２３において画像データの付加情報に設定される。その後、ユーザによる画面上での入力に基づいて、このキーワードの付加処理を終了するか否かが判断され（Ｓ４５２４）、ユーザがこの処理を終了させるまで上記動作が繰り返される。

【００３１】図９に、前述したデータ登録処理（図４のＳ３）の他の実施の形態に係るフローチャートを示す。このデータ登録処理に入ると、上記ＣＰＵ２０１は、まず、自動キー付けモードの動作モードでデータ登録を行うか否かを判断する（Ｓ３１'）。判断した結果、ＹＥＳの場合には、自動キー付けモードフラグをＯＮにし（Ｓ３２'）、ＮＯの場合には、自動キー付けモードフラグをＯＦＦにする（Ｓ３３'）。次に、画像データの新規入力か否かを判断し（Ｓ３４'）、ＹＥＳの場合には、画像データの取込み処理（Ｓ３５'）へ進み、その後、Ｓ３７'へ進む。Ｓ３４'において、ＮＯの場合には、既存の画像データを選択し（Ｓ３６'）、その後、Ｓ３７'へ進む。

【００３２】Ｓ３７'では、自動キー付けフラグがＯＮか否かを判定し、ＹＥＳの場合には、画像データの内容分類を判断し（Ｓ３８'）、その内容分類が、予め装置に記憶されている分類Ａに属するならばＳ３９'へ、分類Ｂに属するならばＳ４２'へ、分類Ｃに属するならばＳ４４'へ進む。それ以外の分類に属する場合や内容分類情報をもたない場合には、Ｓ４６'へスキップする。Ｓ３９'では処理Ａにより特徴量が求められる。同様に、Ｓ４２'では処理Ｂにより、Ｓ４４'では処理Ｃにより特徴量が求められる。これらの特徴量は、各々、それ以降の処理Ｓ４０'，Ｓ４３'，Ｓ４５'においてキーワードを推定するために利用され、例えば色相，明度および彩度等の色に関する特徴量、輪郭抽出した形状に対しフーリエ級数展開等の手法を用いて数値化した形状に関する特徴量、基本パターンの周期性、その方向等のテクスチャに関する特徴量等が考えられる。Ｓ４０'では予め定められた規定の方法Ａを用いてＳ３９'で求めた特徴量からキーワードを推定する。同様に、Ｓ４３'では方法Ｂを用いてＳ４２'で求めた特徴量から、Ｓ４５'では方法Ｃを用いてＳ４４で求めた特徴量からキーワードを推定する。その後、Ｓ４１'へ進み、推定したキーワードを付加情報に設定する。

【００３３】この実施の形態では、例えば、分類Ａが記号等のモノクロ図形のデータに、また、分類Ｂが模様等のテクスチャデータに、そして、分類Ｃが写真等のカラー画像データに付与されているものとする。この場合には、以下に示すように、分類Ａのデータから形状に関する特徴量が、分類Ｂのデータから周期性に関する特徴量が、また、分類Ｃのデータから色に関する特徴量が抽出される。それぞれの分類で予め解析し規定されたキー付け関数を用いて、画像データにキーワードを付与することができる。

【表２】

データ	分類	抽出特徴量[xi]	キー付け関数
モノクロ図形 (ex. 記号)	A	形状に関する特徴量 (輪郭抽出した形状に対しフーリエ級数展開等の手法を用いて数値化した値)	f(xi)
テクスチャ (ex. 模様)	B	周期性に関する特徴量 (基本パターンの周期性、その方向等)	g(xi)
カラー画像 (ex. 写真)	C	色に関する特徴量 (色相、明度、彩度等)	h(xi)

次に、他の付加情報を手動で入力するか否か判断し（Ｓ４６'）、ＹＥＳの場合には、付加情報入力処理（Ｓ４７'）を行い、その後、Ｓ４８'へ進む。ステップＳ４８'では、付加情報とともに取り込んだ画像データを記憶装置に保管する。

【００３４】尚、本発明は、以上の実施の形態に限定さ

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れるものではなく、その要旨を逸脱しない範囲において、種々の改良あるいは設計上の変更が可能であることは言うまでもない。

【００３５】

【発明の効果】本発明によれば、オブジェクトの固有の性質を表す特徴量のみならず、その内容の分類を表す内容分類情報に基づいて、オブジェクトに付加される検索キーが設定されるので、上記オブジェクトに対してその内容に応じた検索キーを精度良く自動的に付加することができる。その結果、検索キー付加作業の負担を大幅に削減することができる。

【図面の簡単な説明】

【図１】　本実施の形態に係る情報処理装置の構成を示す説明図である。

【図２】　上記情報処理装置における制御装置を中心としたブロック図であ，る。

【図３】　ディスプレイに表示される設定画面を示す図である。

【図４】　上記制御装置における制御処理のメインルーチンのフローチャートである。

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【図５】　データ登録処理のフローチャートである。

【図６】　画像データの取り込み処理のフローチャートである。

【図７】　付加情報入力処理のフローチャートである。

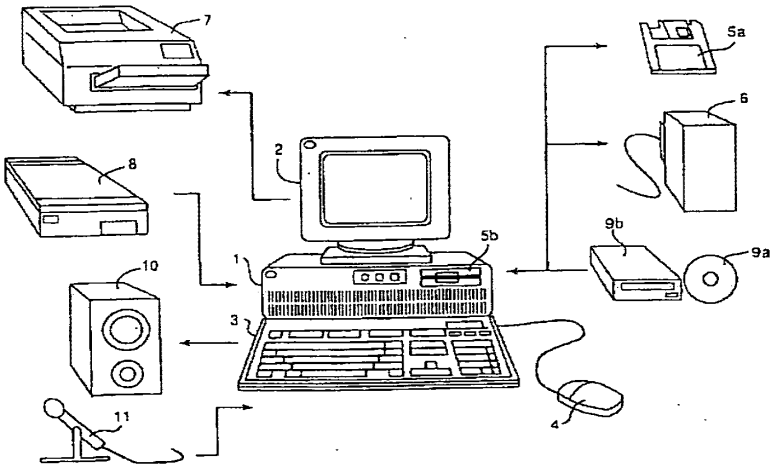
【図８】　キーワード付加処理のフローチャートである。

【図９】　本発明の他の実施の形態に係るデータ登録処理のフローチャートである。

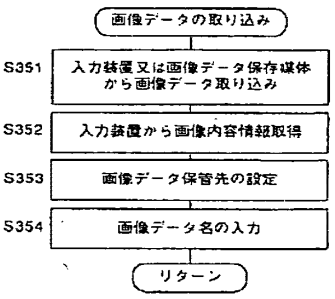
【符号の説明】

１…制御装置
３…キーボード
５a…フロッピーディスク
５b…フロッピーディスク装置
６…ハードディスク装置
８…スキャナ
９a…ＣＤ－ＲＯＭ
９b…ＣＤ－ＲＯＭ装置
２０１…ＣＰＵ
２０３…ＲＯＭ
２０４…ＲＡＭ

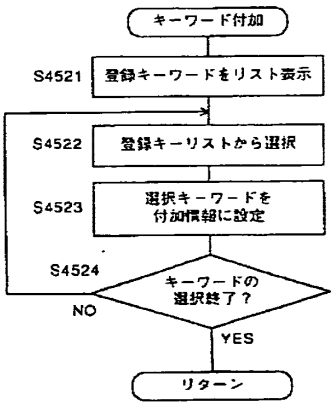
【図１】



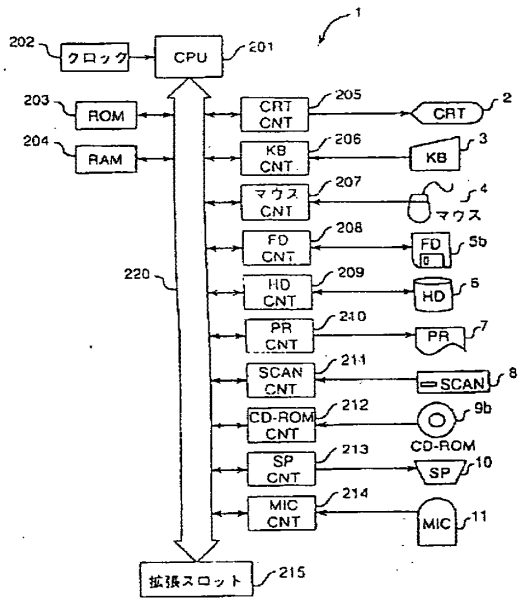
【図６】



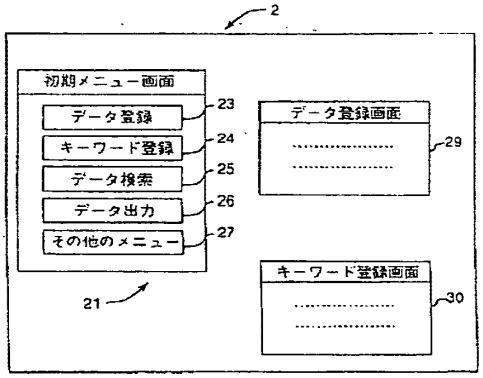
【図８】



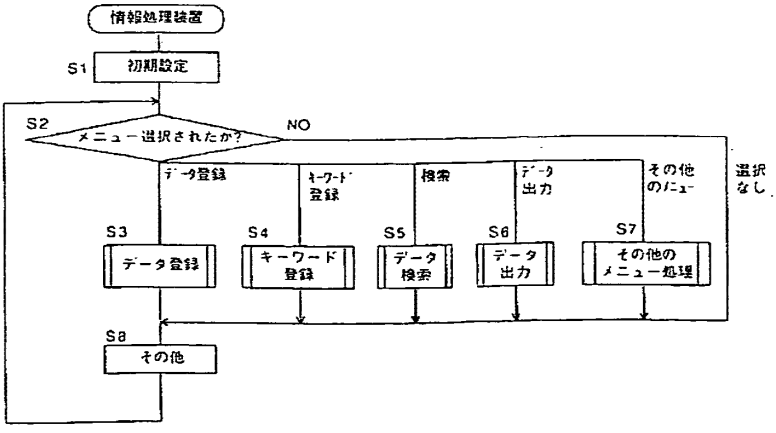
【図２】


1
202
クロック
CPU
201
203
ROM
204
RAM
CRT CNT
205
CRT
2
KB CNT
206
KB
3
マウス CNT
207
マウス
4
FD CNT
208
FD
5b
220
HD CNT
209
HD
5
PR CNT
210
PR
7
SCAN CNT
211
SCAN
8
CD-ROM CNT
212
9b
CD-ROM
SP CNT
213
SP
10
MIC CNT
214
MIC
11
拡張スロット
215

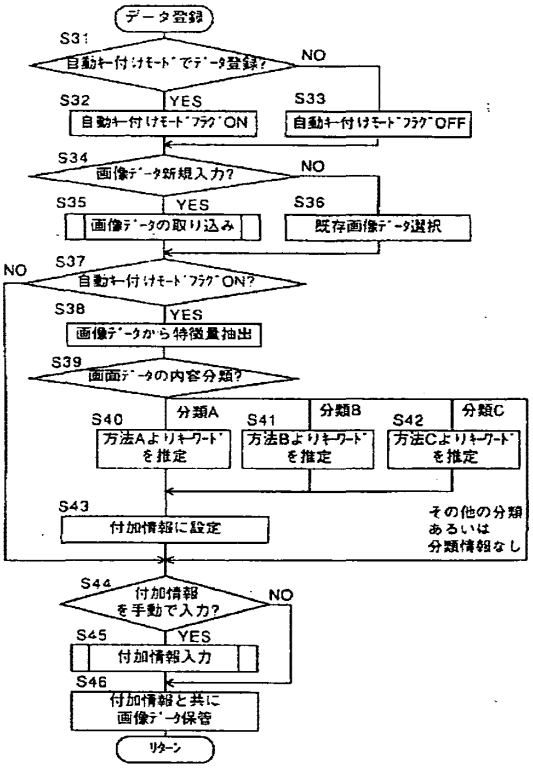
【図３】


2
初期メニュー画面
データ登録
23
キーワード登録
24
データ検索
25
データ出力
26
その他のメニュー
27
21
データ登録画面
29
キーワード登録画面
30

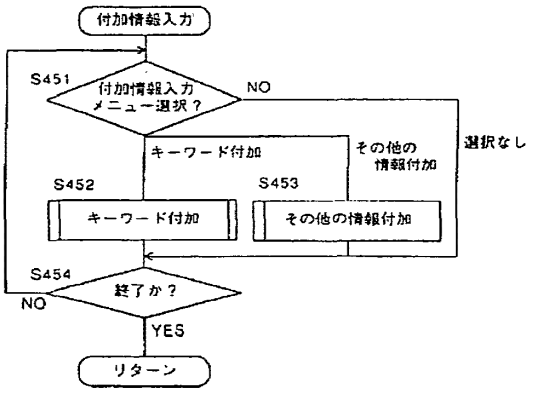
【図４】


情報処理装置
S1
初期設定
S2
メニュー選択されたか?
NO
データ登録
キーワード登録
検索
データ出力
その他のメニュー
選択なし
S3
データ登録
S4
キーワード登録
S5
データ検索
S6
データ出力
S7
その他のメニュー処理
S8
その他

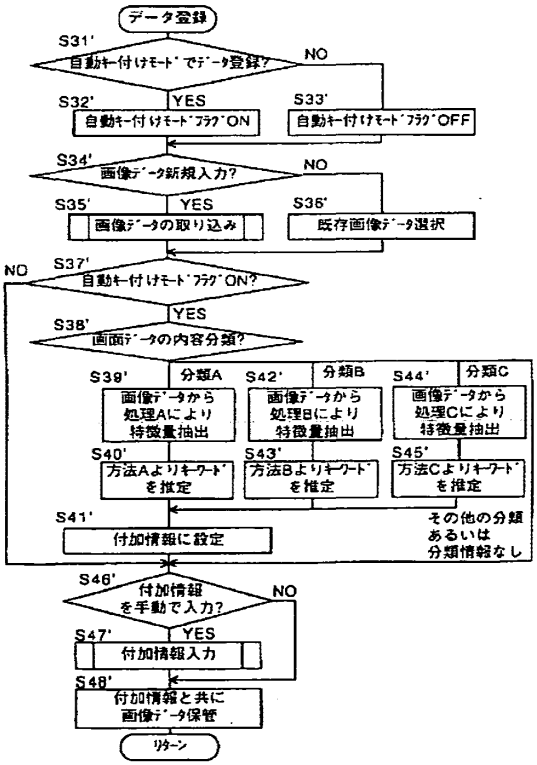
【図５】


データ登録
S31
自動ｷｰ付けﾓｰﾄﾞでﾃﾞｰﾀ登録?
NO
S32
YES
自動ｷｰ付けﾓｰﾄﾞﾌﾗｸﾞON
S33
自動ｷｰ付けﾓｰﾄﾞﾌﾗｸﾞOFF
S34
画像ﾃﾞｰﾀ新規入力?
NO
S35
YES
画像ﾃﾞｰﾀの取り込み
S36
既存画像ﾃﾞｰﾀ選択
NO
S37
自動ｷｰ付けﾓｰﾄﾞﾌﾗｸﾞON?
S38
YES
画像ﾃﾞｰﾀから特徴量抽出
S39
画面ﾃﾞｰﾀの内容分類?
分類A
分類B
分類C
S40
方法Aよりｷｰﾜｰﾄﾞを推定
S41
方法Bよりｷｰﾜｰﾄﾞを推定
S42
方法Cよりｷｰﾜｰﾄﾞを推定
S43
付加情報に設定
その他の分類あるいは分類情報なし
S44
付加情報を手動で入力?
NO
S45
YES
付加情報入力
S46
付加情報と共に画像ﾃﾞｰﾀ保管
リターン

【図７】


付加情報入力
S451
付加情報入力メニュー選択？
NO
キーワード付加
その他の情報付加
選択なし
S452
キーワード付加
S453
その他の情報付加
S454
終了か？
NO
YES
リターン

【図９】


データ登録
S31'
自動ｷｰ付けﾓｰﾄﾞでﾃﾞｰﾀ登録?
NO
S32'
YES
自動ｷｰ付けﾓｰﾄﾞﾌﾗｸﾞON
S33'
自動ｷｰ付けﾓｰﾄﾞﾌﾗｸﾞOFF
S34'
画像ﾃﾞｰﾀ新規入力?
NO
S35'
YES
画像ﾃﾞｰﾀの取り込み
S36'
既存画像ﾃﾞｰﾀ選択
NO
S37'
自動ｷｰ付けﾓｰﾄﾞﾌﾗｸﾞON?
YES
S38'
画面ﾃﾞｰﾀの内容分類?
分類A
分類B
分類C
S39'
画像ﾃﾞｰﾀから処理Aにより特徴量抽出
S42'
画像ﾃﾞｰﾀから処理Bにより特徴量抽出
S44'
画像ﾃﾞｰﾀから処理Cにより特徴量抽出
S40'
方法Aよりｷｰﾜｰﾄﾞを推定
S43'
方法Bよりｷｰﾜｰﾄﾞを推定
S45'
方法Cよりｷｰﾜｰﾄﾞを推定
S41'
付加情報に設定
その他の分類あるいは分類情報なし
S46'
付加情報を手動で入力?
NO
S47'
YES
付加情報入力
S48'
付加情報と共に画像ﾃﾞｰﾀ保管
リターン

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 06-215089
(43)Date of publication of application : 05.08.1994

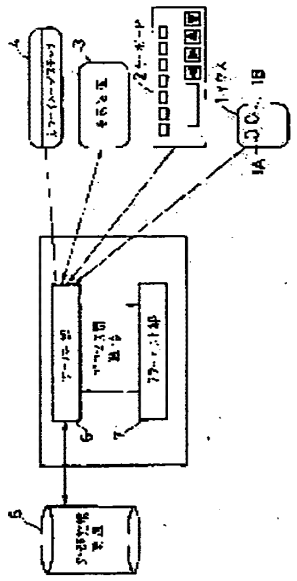
(51)Int.Cl. G06F 15/62
G06F 15/62

(21)Application number : 05-003438
(22)Date of filing : 12.01.1993

(71)Applicant : MATSUSHITA ELECTRIC IND CO LTD
(72)Inventor : ARISHIMA JIYUNICHI

(54) COLOR IMAGE FILE MANAGING DEVICE

(57)Abstract:
PURPOSE: To facilitate handling by extracting automatically a keyword, based not only on a registering method by inputting a character, but also on image information (external form and color) read in from a color image scanner, so that its keyword can be registered as a retrieval keyword.
CONSTITUTION: Not only by registration by character input from a keyboard 2, but also by image information (external form and color) inputted from a color image scanner 4, a server part 6 recognizes a keyword together with a client part 7. The recognized keyword is displayed on a display device 3, and by a button operation of a mouse 1, keyword information confirmed by a user is registered as a retrieval condition in an external storage device 5.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]
[Claim 1] The color image scanner which inputs color picture information, and the external storage which saves the image information inputted from said color image scanner, The indicating equipment which displays the inputted image information in a window, and an image recognition means to extract a keyword from the inputted image information, The coordinate input unit which displays a keyword in the window of said display as a recognition result by said image recognition means, and specifies the location of the arbitration in a window, Color picture file management equipment characterized by having a means to take a user check with said coordinate input unit, and to register the checked keyword information as retrieval conditions.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention registers a document including color picture information, is searched, and relates to the color picture file management equipment which carries out edit processing.
[0002]
[Description of the Prior Art] A color picture document is processed in recent years using a color image scanner, and the request of the equipment which creates as a file and is managed is becoming high. Conventional color picture file management equipment read a certain color picture document with the color image scanner, and when processing stored in external storage was performed, it was registering by specifying the retrieval keyword used when searching file designation or its file in the form of the alphabetic character input from a keyboard.
[0003]
[Problem(s) to be Solved by the Invention] However, with the above-mentioned conventional configuration, human being needed to consider the keyword, needed to register from the keyboard, and had not become the file management system which was suitable for human being.
[0004] This invention solves the above-mentioned conventional trouble, a keyword is automatically extracted from the image information read from the color image scanner besides the registration technique by the alphabetic character input, for example, an appearance, and a color, and it aims at offering the color picture file management equipment which can register the keyword as a retrieval keyword.
[0005]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, the color picture file-management equipment of this invention displays the keyword recognized with an image recognition means to extract a keyword based on the image information (an appearance and color) inputted from the color image scanner, and this image recognition means besides registration by the alphabetic character input, and possesses a means register the keyword information which took the user check and was checked as retrieval conditions.
[0006]
[Function] According to this invention, based on the inputted image information (an appearance and color) besides an alphabetic character input, keyword information can be registered automatically, and registration of a color picture document can be performed efficiently.
[0007]
[Example] As drawing 1 shows the block diagram of the color picture file management equipment of one example of this invention and it is shown in drawing 1 , the configuration of the color picture file management equipment of this example provides button switches 1A and 1B in the top face by moving the coordinate input device (mouse) 1 so that a coordinate data signal may be generated. A keyboard 2 inputs alphabetic data and a control code, and the display 3 consists of color CRTs (cathode-ray tube) which can display an alphabetic character, a graphic form, an image, etc. The color image scanner 4 is

for inputting the image information to register, and the inputted image information is registered into external storage 5.
[0008] In the server section 6, the data which should be displayed on an indicating equipment 3 are outputted, or data are received from a keyboard 2, or a mouse 1 and the color image scanner 4. Moreover, the server section 6 carries out package management of the indicating equipment 3 which is hardware resources required of a windowing system, a keyboard 2, a mouse 1, and the color image scanner 4, and the information from a mouse 1 is passed to the client section 7, or it requires it from the client section 7. (for example, creation of a window, a display and the image display into a window, a keyword display) It is the process (unit of work) to process.
[0009] The client section 7 means the application using a window, and shows the keyword extraction by recognition of a color picture, a keyword, and the process about registration of an image file by this example. The client section 7 receives the input from the change of state of a window and a keyboard 2, and a mouse 1 in the form of an event through the server section 6. Moreover, information is delivered by interprocess communication between the server section 6 and the client section 7.
[0010] Next, drawing 2 sends picture description instructions, such as character representation, an icon display, and a window frame display, to a display control (subsystem) 17 using the information on the server section 6 while the circuit block diagram of drawing 1 is shown, controlling the whole equipment by the host processor 8 and connecting with the controllers 11, 12, and 13 of each part, main memory 9, the font icon ROM 10, etc. through an internal bus 18.
[0011] The magnitude of a window, a location, and the contents of a display are determined by the server section 6, and those information is also sent to a subsystem 17 at coincidence. The image control processor 14 of a subsystem 17 interprets the information from a host processor 8, and bit expansion is carried out and it stores in a frame buffer 15. The bit pattern stored in this frame buffer 15 is displayed on a display 3 through CRT controller 16.
[0012] Main memory 9 has the field which a host processor 8 and a subsystem 17 use as a work area, and the field which memorizes the coordinate data on the display screen of the indicating equipment 3 of cursor to which it is made to move in connection with a motion of a mouse 1. The font icon ROM 10 is ROM in which the pattern of the character-font code used with this equipment or an icon is stored. The mouse keyboard controller 11 performs input process from a mouse 1 or a keyboard 2. The external storage controller 12 controls external storage 5, and the color image scanner 4 for the scanner controller 13 to input color picture information is controlled.
[0013] About the color picture file management equipment of this example constituted as mentioned above, the actuation is explained hereafter.
[0014] Drawing 3 is the flow chart of the main process of this example, it connects a mouse 1 etc. with the server section 6 in step S1 first, determines the attribute (definition of the class of a location, magnitude, an alphabetic character, and carbon button) of a window at step S2, and actually generates a window. When the above processing is completed, the main menu display as shown in the display screen of a display 3 at drawing 6 (a) is made. And the loop formation for taking out incorporation of an event, i.e., event information, in step S3 is performed.
[0015] That is, if it waits and pushes that the button switch formed in the mouse 1 is pushed, it will shift to step S4. If the button switch on a mouse 1 is pushed after it moved the mouse 1 and the cursor on a display screen has piled up on a menu button, in step S4, it will identify registration treatment process starting (step S5), study process starting (step S6) of a keyword, or termination (step S7).
[0016] If study of some keywords finishes and a registration treatment process is already started, processing will be advanced according to the flow chart of the registration process shown in drawing 4 below. First, the color image scanner 4 is started at step S8, and image information is read. Next, by step S9, contents of a display like drawing 6 (b) are displayed on a display 3. And the loop formation for taking out event information in step S10 is performed.
[0017] A mouse 1 is moved, if a button switch is pushed after the cursor on a display screen has piled up on a menu button, it will shift to step S11 and a recognition frame display and termination will be identified. If it is a termination carbon button, it will return to a main menu display (drawing 6 (a))

(S12). If it is a recognition frame display, it will shift to step S13 and the object to recognize will be surrounded by the recognition frame. When the above processing is completed, on the display screen, the display as shown in drawing 6 (c) is made. And it waits for the event from a user in step S14. A mouse 1 is moved, if a button switch is pushed after the cursor on a display screen has piled up on a menu button, it will shift to step S15 and recognition and termination will be identified.

[0018] If it is termination, it will return to front step S9 (condition of drawing 6 (b)). If it is recognition processing, it will progress to step S16 and image recognition will be performed. Next, it progresses to step S17 and a feature extraction and pattern matching, and keyword extraction are performed, at step S18, a keyword is extracted as compared with data [finishing / study / already], it progresses to step S19, and a keyword is displayed as a recognition result. Three keywords are displayed from the high thing of possibility, and a user is made to choose them.

[0019] When the above processing is completed, on the display screen, the display as shown in drawing 6 (d) is made. And in step S20, the loop formation for taking out event information is performed. If a mouse 1 is moved and the button switch on a display screen is pushed, it will progress to step S21 and registration of an image file and cancellation will be identified. Return (drawing 6 (c)) and the new recognition of the case of cancellation are attained to the front step S13. In registration, it progresses to step S22, and registration processing of an image file is performed with a keyword (drawing 6 (e)). In step S18, if it is judged that it is not study settled, it progresses to step S23 and step S24, and the keyword by the keyboard entry from a user can be set up (it is the same as steps S35 and S38 of a study process.). Refer to drawing 7 (d).

[0020] Next, in starting of a study process, processing is advanced according to the flow chart of the study process shown in drawing 5 . Step S25 to S33 is completely the same as registration processing (from the drawing 4 step S8 to S16), and that of the display screen of a study process is the same as that of (a) of drawing 7 , (b), (c), and (a) of drawing 6 , (b) and (c).

[0021] After image recognition, in the case of a study process, it will consider as a file, and it will register the keyword by the keyboard entry from the description data and a user (drawing 7 (f)). In steps S34 and S35, the display shown in drawing 7 (d) is performed, and the keyword from a user is set up. And if a registration carbon button is pushed with a mouse 1, it will progress to S38 from step S36, and the description data and the keyword of an image will be registered as a file (drawing 7 (f)) (drawing 7 (e)).

[0022]

[Effect of the Invention] As explained above, the color picture file management equipment of this invention can perform registration processing of a color picture etc. efficiently by establishing a means to input a color picture, a recognition means to extract a keyword based on the inputted image information (an appearance, color, etc.), and a means to display a keyword as a recognition result and to take a user check.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram of the color picture file management equipment of one example of this invention.
[Drawing 2] It is the circuit block diagram of drawing 1 .
[Drawing 3] It is the flow chart of the main process in drawing 1 .
[Drawing 4] It is the flow chart of the registration process in drawing 1 .
[Drawing 5] It is the flow chart of the study process in drawing 1 .
[Drawing 6] It is the display screen Fig. of the registration process in drawing 1 .
[Drawing 7] It is the display screen Fig. of the study process in drawing 1 .
[Description of Notations]
1 -- Coordinate input device (mouse) 2 -- Keyboard 3 -- Display (CRT), 4 -- Color image scanner 5 -- External storage 6 -- Server section, 7 -- Client section 8 -- Host processor 9 -- Main memory, 10 -- Font icon ROM 11 -- Mouse keyboard controller, 12 -- External storage controller 13 -- Scanner controller 14 [16 -- CRT controller 17 -- Display control (subsystem).] -- An image control processor, 15 -- Frame buffer

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[Translation done.]

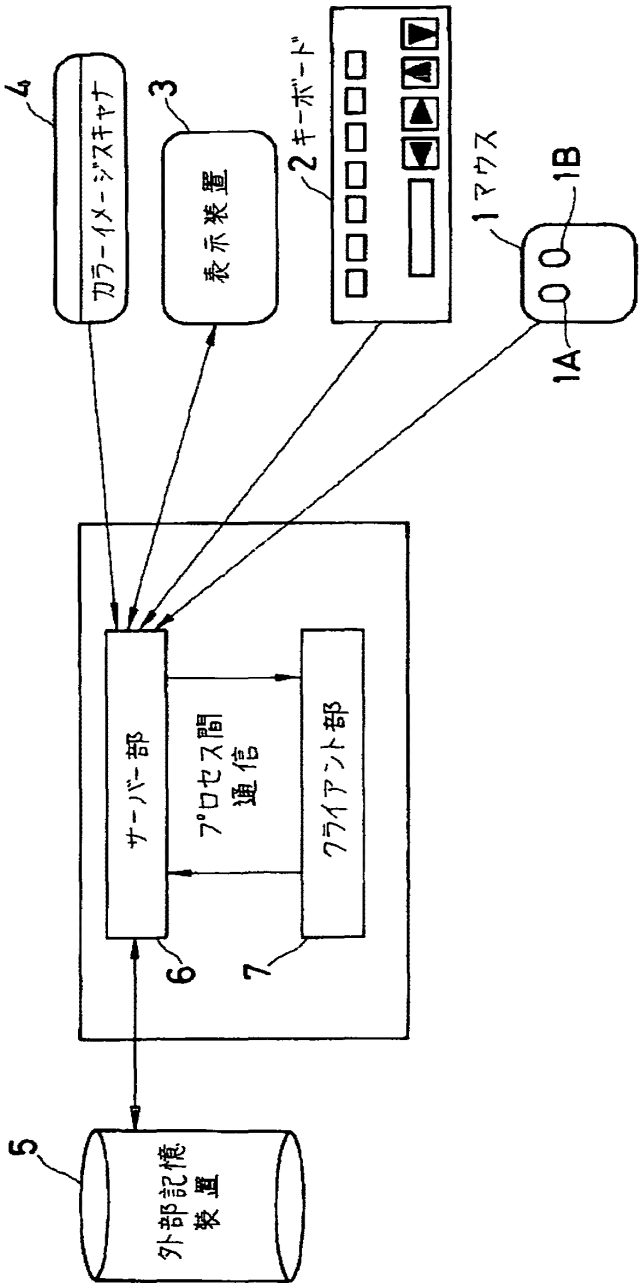
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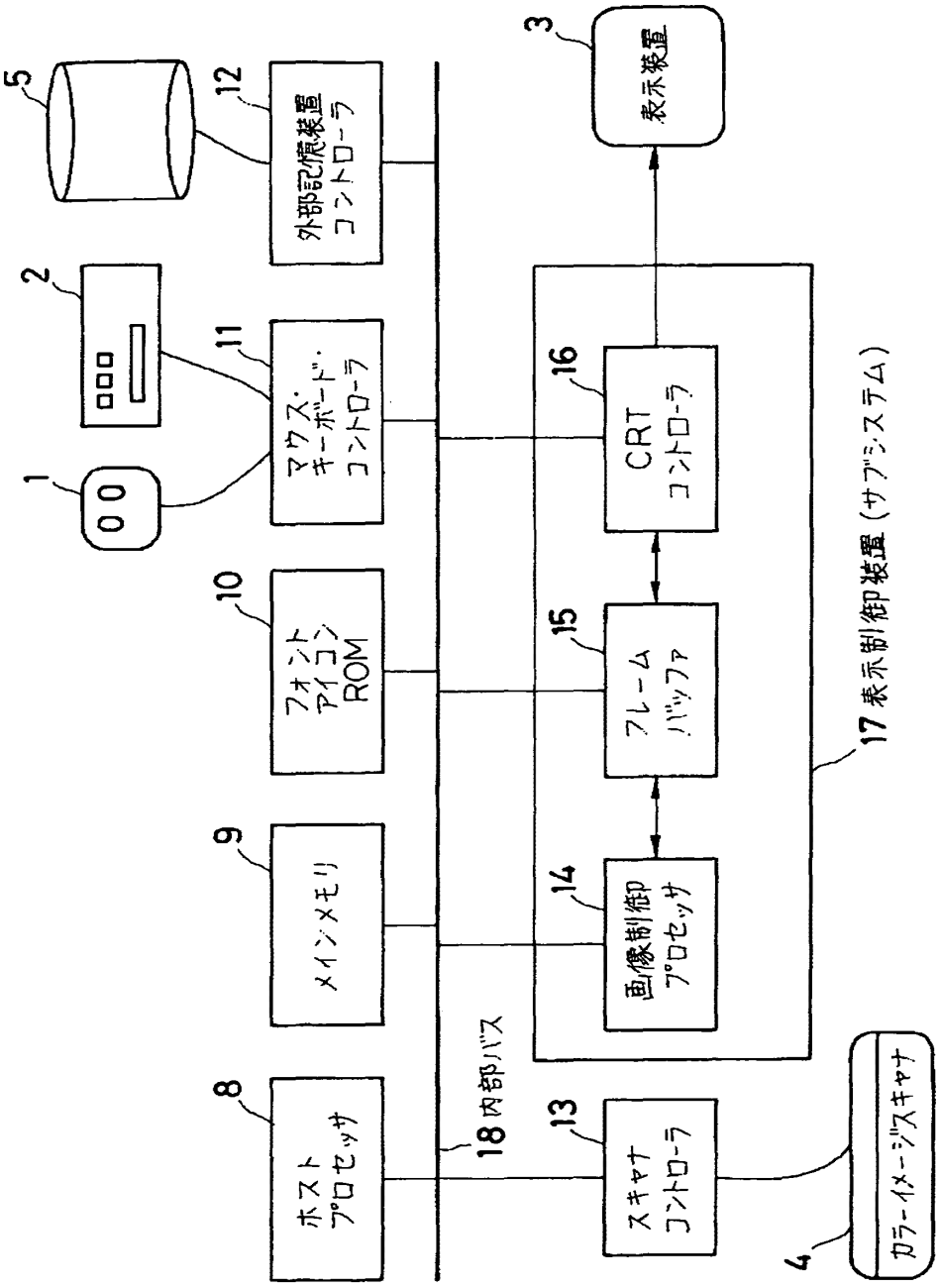
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DRAWINGS

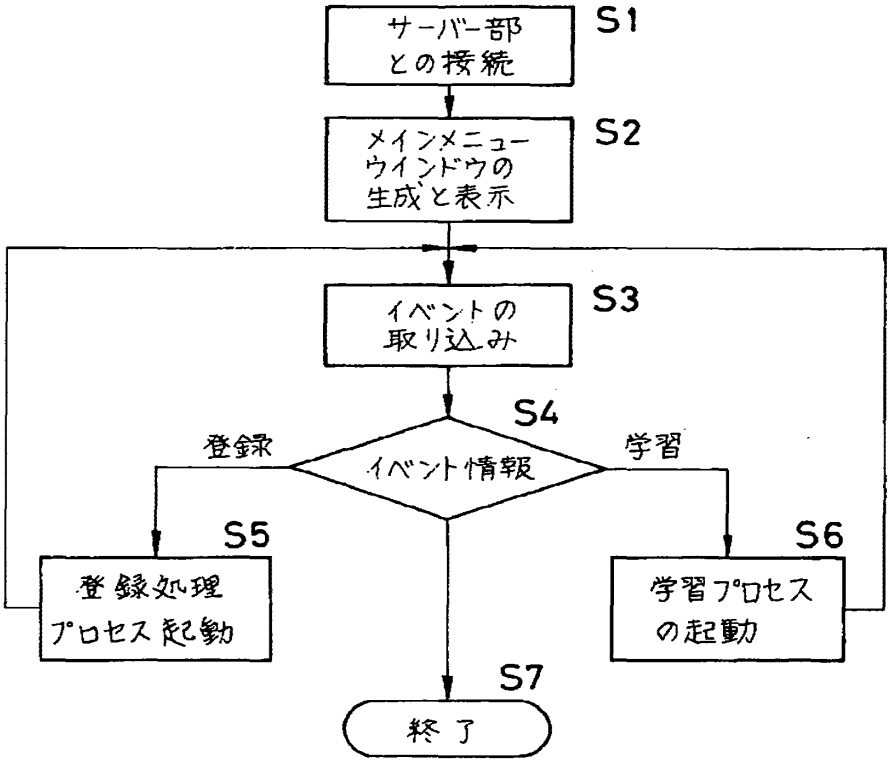
[Drawing 1]


4
カラーイメージスキャナ
3
表示装置
2 キーボード
1 マウス
1B
1A
サーバー部
プロセス間通信
クライアント部
6
7
5
外部記憶装置

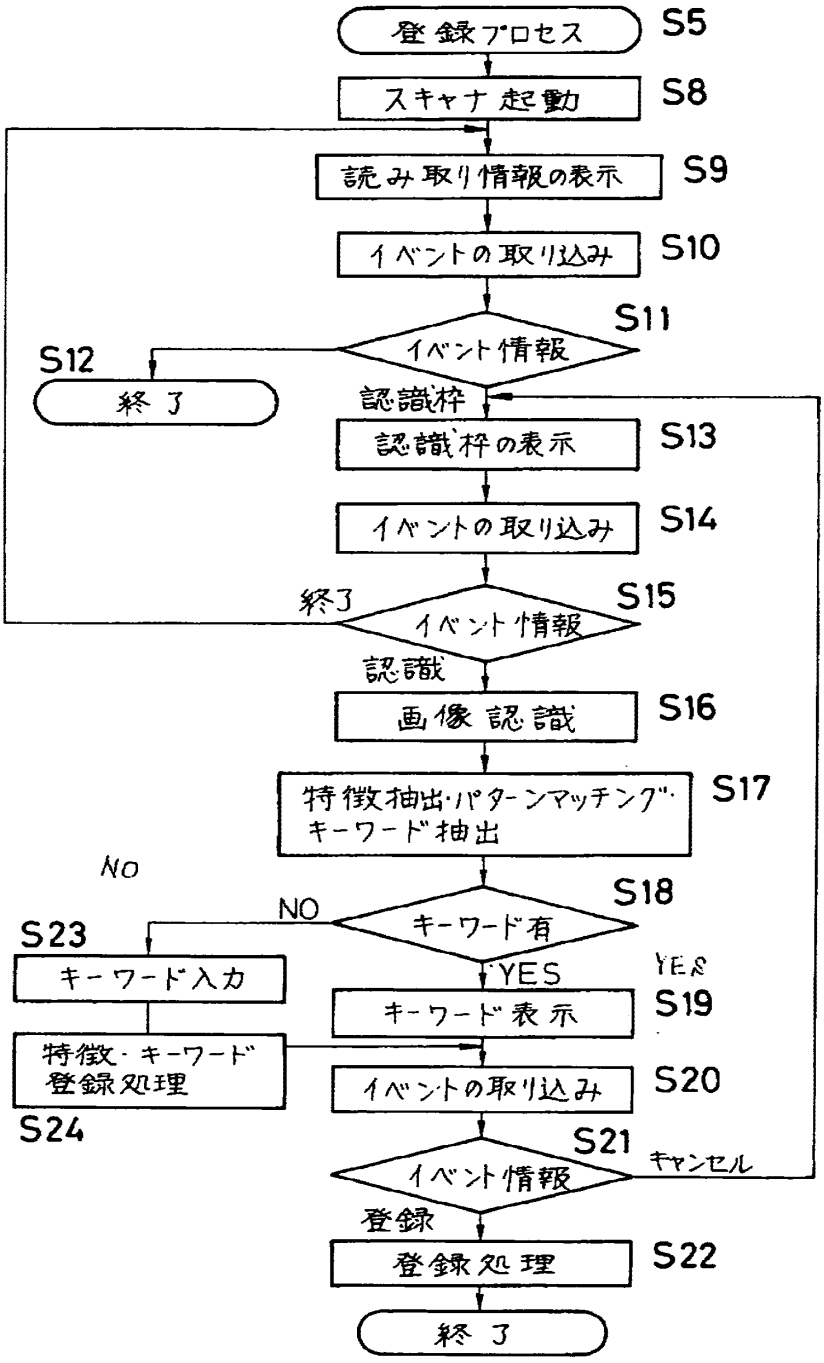
[Drawing 2]


1
2
3 表示装置
4 カラーイメージスキャナ
5
8 ホストプロセッサ
9 メインメモリ
10 フォントアイコンROM
11 マウス・キーボード・コントローラ
12 外部記憶装置コントローラ
13 スキャナコントローラ
14 画像制御プロセッサ
15 フレームバッファ
16 CRTコントローラ
17 表示制御装置（サブシステム）
18 内部バス

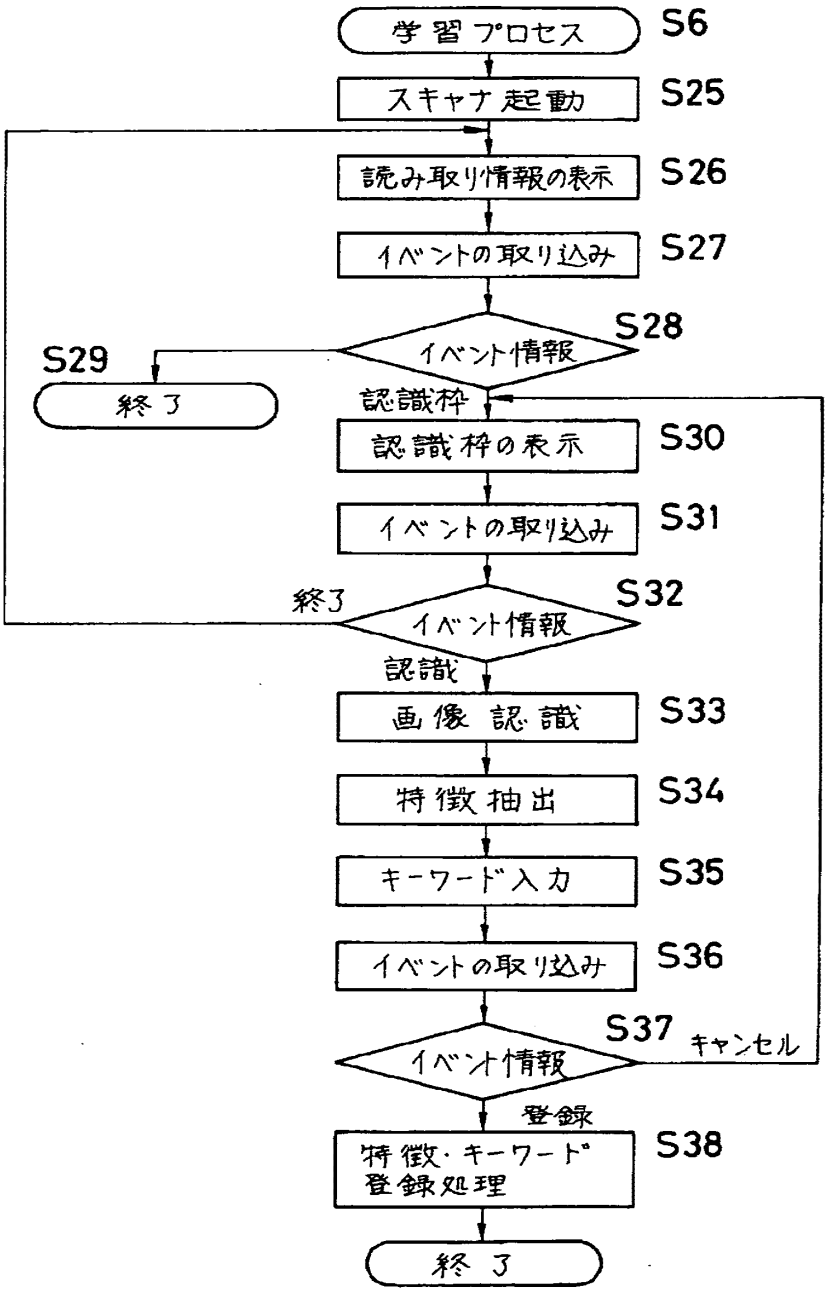
[Drawing 3]


サーバー部
との接続
S1
メインメニュー
ウインドウの
生成と表示
S2
イベントの
取り込み
S3
S4
登録
イベント情報
学習
S5
S6
登録処理
プロセス起動
学習プロセス
の起動
S7
終了

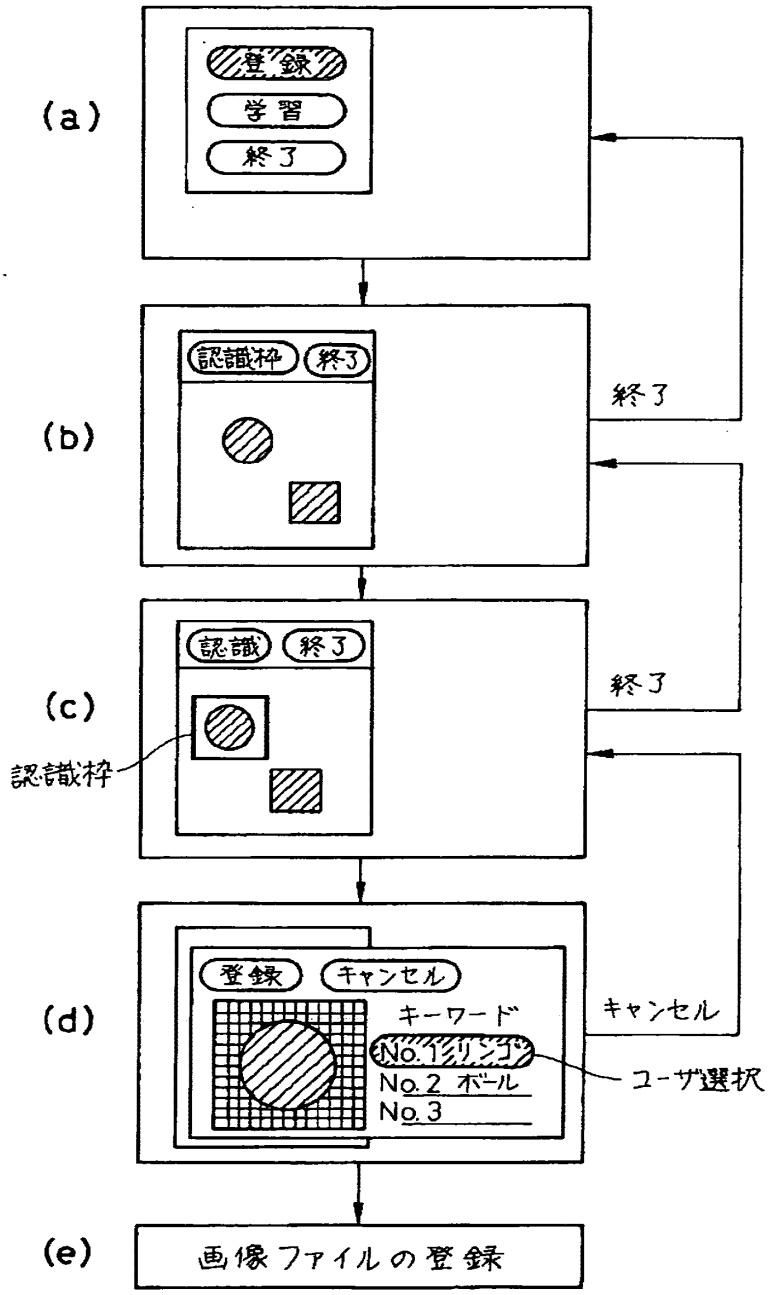
[Drawing 4]


登録プロセス
S5
スキャナ起動
S8
読み取り情報の表示
S9
イベントの取り込み
S10
S11
イベント情報
S12
終了
認識枠
認識枠の表示
S13
イベントの取り込み
S14
終了
S15
イベント情報
認識
画像認識
S16
特徴抽出・パターンマッチング・
キーワード抽出
S17
NO
S18
キーワード有
NO
S23
キーワード入力
YES
YES
キーワード表示
S19
特徴・キーワード
登録処理
S24
イベントの取り込み
S20
S21
イベント情報
キャンセル
登録
登録処理
S22
終了

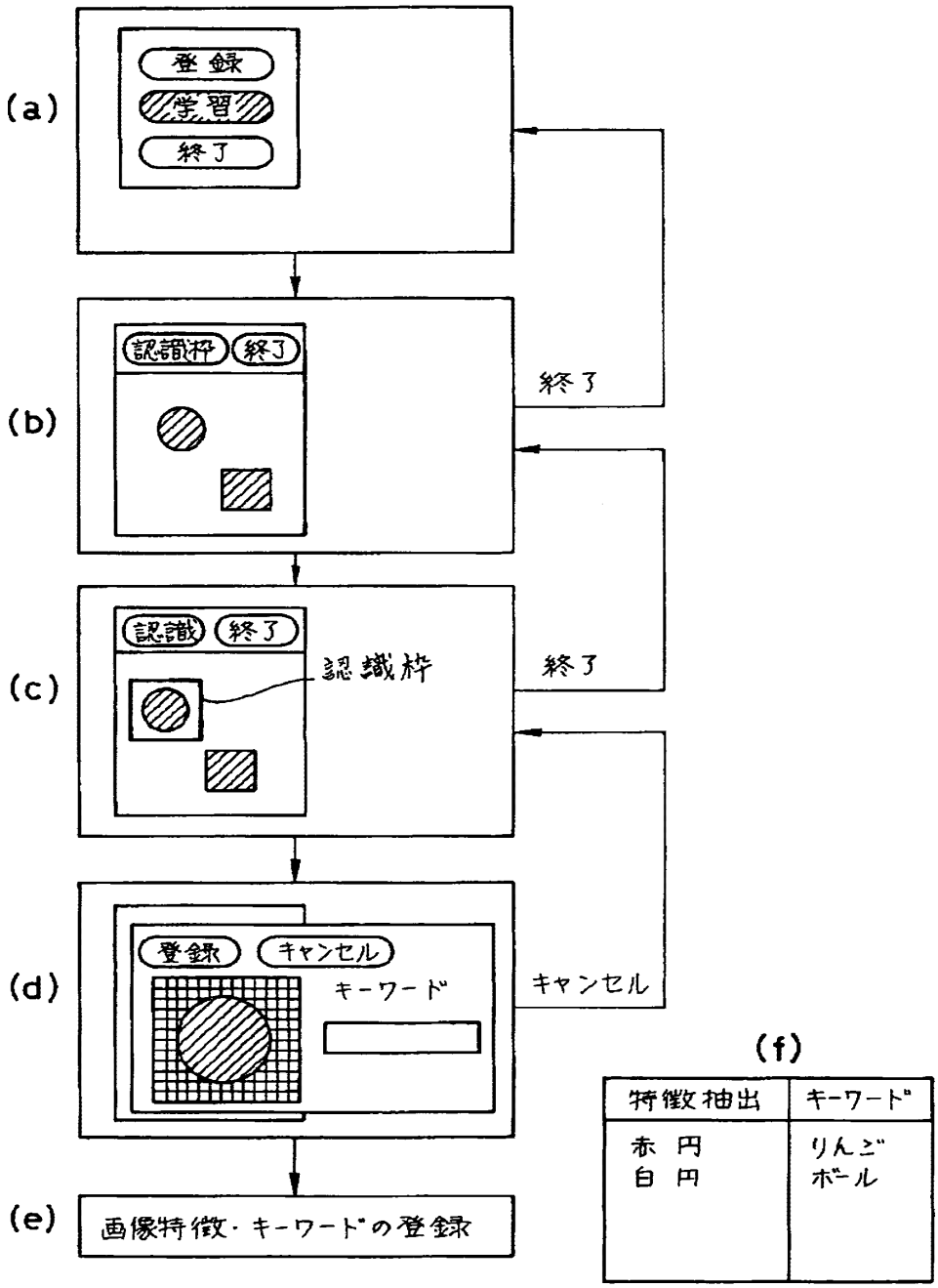
[Drawing 5]


学習プロセス
S6
スキャナ起動
S25
読み取り情報の表示
S26
イベントの取り込み
S27
イベント情報
S28
S29
終了
認識枠
認識枠の表示
S30
イベントの取り込み
S31
終了
イベント情報
S32
認識
画像認識
S33
特徴抽出
S34
キーワード入力
S35
イベントの取り込み
S36
イベント情報
S37
キャンセル
登録
特徴・キーワード
登録処理
S38
終了

[Drawing 6]


(a)
登録
学習
終了
(b)
認識枠
終了
終了
(c)
認識
終了
終了
認識枠
(d)
登録
キャンセル
キーワード
No.1 リンゴ
No.2 ボール
No.3
キャンセル
ユーザ選択
(e)
画像ファイルの登録

[Drawing 7]



[Translation done.]

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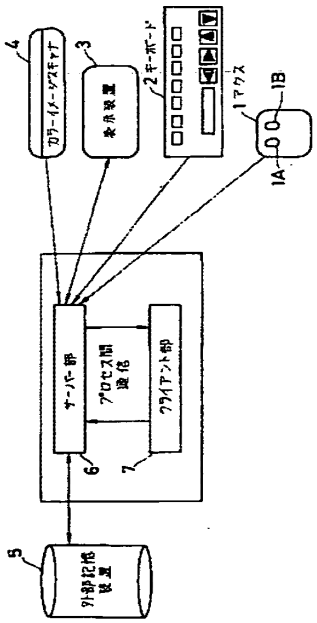
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(54)【発明の名称】　カラー画像ファイル管理装置

(57)【要約】

【目的】　文字入力による登録手法の他に、カラーイメージスキャナから読み込まれたイメージ情報（外形と色）に基づいて自動的にキーワードを抽出し、そのキーワードを検索キーワードとして登録できるようにして取り扱いを容易とする。

【構成】　キーボード2からの文字入力による登録の他に、カラーイメージスキャナ４から入力されたイメージ情報（外形と色）から、サーバー部６はクライアント部７とともにキーワードを認識する。この認識されたキーワードを表示装置３に表示し、マウス１のボタン操作によりユーザの確認がとられたキーワード情報を検索条件として外部記憶装置５に登録する。



(2)

1

【特許請求の範囲】

【請求項１】　カラー画像情報を入力するカラーイメージスキャナと、前記カラーイメージスキャナより入力されたイメージ情報を保存する外部記憶装置と、入力されたイメージ情報をウィンドウ内に表示する表示装置と、入力されたイメージ情報からキーワードを抽出する画像認識手段と、前記画像認識手段による認識結果としてキーワードを前記表示装置のウィンドウ内に表示し、ウィンドウ内の任意の位置を指定する座標入力装置と、前記座標入力装置によりユーザ確認をとり、確認されたキーワード情報を検索条件として登録する手段とを有することを特徴とするカラー画像ファイル管理装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明はカラー画像情報を含む文書を登録，検索，編集処理するカラー画像ファイル管理装置に関する。

【０００２】

【従来の技術】近年、カラーイメージスキャナを用いてカラー画像文書を処理し、ファイルとして作成し管理する装置の要望が高くなってきた。従来のカラー画像ファイル管理装置は、あるカラー画像文書をカラーイメージスキャナで読み込み、外部記憶装置に格納する処理を行う場合に、ファイルの指定、あるいはそのファイルを検索するときに使う検索キーワードをキーボードからの文字入力という形で指定し、登録を行っていた。

【０００３】

【発明が解決しようとする課題】しかしながら上記従来の構成では、人間がキーワードを考えキーボードから登録する必要があり、人間にとって適したファイル管理システムとはなっていなかった。

【０００４】本発明は上記従来の問題点を解決するもので、文字入力による登録手法の他にカラーイメージスキャナから読み込まれたイメージ情報、例えば外形と色から自動的にキーワードを抽出し、そのキーワードを検索キーワードとして登録できるカラー画像ファイル管理装置を提供することを目的とする。

【０００５】

【課題を解決するための手段】上記目的を達成するために、本発明のカラー画像ファイル管理装置は、文字入力による登録の他に、カラーイメージスキャナから入力されたイメージ情報(外形と色)に基づきキーワードを抽出する画像認識手段と、該画像認識手段で認識されたキーワードを表示し、ユーザ確認をとり確認されたキーワード情報を検索条件として登録する手段とを具備する。

【０００６】

【作用】本発明によれば、文字入力の他、入力されたイメージ情報(外形と色)に基づき自動的にキーワード情報を登録することができ、カラー画像文書の登録作業を効率的に行うことができる。

2

【０００７】

【実施例】図１は本発明の一実施例のカラー画像ファイル管理装置のブロック図を示し、図１に示すように本実施例のカラー画像ファイル管理装置の構成は、座標入力装置(マウス)１を移動させることによって座標データ信号を発生するように、その上面にボタンスイッチ１Ａ，１Ｂを設けている。キーボード２は文字データや制御コードを入力するものであり、表示装置３は文字や図形，画像などを表示することのできるカラーＣＲＴ(陰極線管)などで構成されている。カラーイメージスキャナ４は登録する画像情報を入力するためのものであり、入力された画像情報は外部記憶装置５に登録される。

【０００８】サーバー部６では、表示装置３に表示すべきデータを出力したり、キーボード２やマウス１およびカラーイメージスキャナ４からデータを受付けたりする。またサーバー部６は、ウィンドウシステムで必要なハードウェア資源である表示装置３，キーボード２，マウス１，カラーイメージスキャナ４を一括管理し、マウス１からの情報をクライアント部７へ渡したり、クライアント部７からの要求（例えばウィンドウの作成と表示，ウィンドウ内への画像表示，キーワード表示）を処理するプロセス(仕事の単位)である。

【０００９】クライアント部７はウィンドウを利用するアプリケーションを意味し、本実施例では、カラー画像の認識によるキーワード抽出，キーワードおよび画像ファイルの登録に関するプロセスを示す。クライアント部７はウィンドウの状態変化およびキーボード２，マウス１からの入力をサーバー部６を通してイベントという形で受け取る。また、サーバー部６とクライアント部７との間は、プロセス間通信で情報の受渡しを行っている。

【００１０】次に、図２は図１の回路ブロック図を示し、ホストプロセッサ８で装置全体の制御を行い、内部バス18を介して各部のコントローラ11，12，13，メインメモリ９，フォントアイコンＲＯＭ10などに接続されるとともに、サーバー部６の情報により文字表示，アイコン表示，ウィンドウ枠表示などの図形描画命令を表示制御装置(サブシステム)17へ送る。

【００１１】ウィンドウの大きさ，位置，表示内容は、サーバー部６によって決定され、それらの情報もサブシステム17へ同時に送られる。ホストプロセッサ８からの情報をサブシステム17の画像制御プロセッサ14が解釈し、フレームバッファ15にビット展開して格納する。このフレームバッファ15に格納されたビットパターンは、ＣＲＴコントローラ16を介して表示装置３に表示される。

【００１２】メインメモリ９は、ホストプロセッサ８やサブシステム17がワークエリアとして用いる領域や、マウス１の動きに伴って移動させるカーソルの表示装置３の表示画面上での座標データを記憶する領域を有している。フォントアイコンＲＯＭ10は、この装置で使用する

文字フォントコードやアイコンのパターンが格納されているＲＯＭである。マウス・キーボード・コントローラ11は、マウス１やキーボード２からの入力処理を行う。外部記憶装置コントローラ12は外部記憶装置５を制御するものであり、スキャナコントローラ13はカラー画像情報を入力するためのカラーイメージスキャナ４が制御される。

【００１３】以上のように構成された本実施例のカラー画像ファイル管理装置について、以下、その動作を説明する。

【００１４】図３は本実施例のメインプロセスのフローチャートであり、まずステップＳ1においてサーバー部６とマウス１などを接続し、ステップＳ2でウィンドウの属性(位置，大きさ，文字，ボタンの種類の定義)を決定し、ウィンドウを実際に生成する。以上の処理が終了したときには、表示装置３の表示画面には図６(a)に示すようなメインメニュー表示がなされている。そして、ステップＳ3においてイベントの取り込み、すなわちイベント情報を取り出すためのループを行う。

【００１５】つまり、マウス１に設けられたボタンスイッチが押されるのを待って、押されるとステップＳ4に移行する。マウス１を移動させて表示画面上のカーソルがメニューボタン上に重ねられた状態でマウス１上のボタンスイッチが押されると、ステップＳ4において、それが登録処理プロセス起動(ステップＳ5)か、キーワードの学習プロセス起動(ステップＳ6)か、あるいは終了(ステップＳ7)かを識別する。

【００１６】既に、いくらかのキーワードの学習が終わり、登録処理プロセスが起動されれば、次に図４に示す登録プロセスのフローチャートに従い処理を進める。まず、ステップＳ8でカラーイメージスキャナ４を起動させ、画像情報を読み込む。次にステップＳ9で、図６(b)のような表示内容を表示装置３に表示させる。そしてステップＳ10においてイベント情報を取り出すためのループを行う。

【００１７】マウス１を移動させて、表示画面上のカーソルがメニューボタン上に重ねられた状態でボタンスイッチが押されると、ステップＳ11へ移行し、認識枠表示か、終了かを識別する。終了ボタンであればメインメニュー表示(図６(a))に戻る(Ｓ12)。認識枠表示であればステップＳ13へ移行し、認識する対象を認識枠で囲む。以上の処理が終了したときには表示画面上には図６(c)に示すような表示がなされている。そしてステップＳ14において、ユーザからのイベントを待つ。マウス１を移動させて、表示画面上のカーソルがメニューボタン上に重ねられた状態でボタンスイッチが押されると、ステップＳ15へ移行し、認識か、終了かを識別する。

【００１８】終了であれば前のステップＳ9へ戻る(図６(b)の状態)。認識処理であればステップＳ16へ進み、画像認識を行う。次にステップＳ17へ進み、特徴抽出・パターンマッチング，キーワード抽出を行い、ステップＳ18では認識結果と、既に学習済とのデータと比較を行いキーワードを抽出し、ステップＳ19へ進み、キーワードを表示する。キーワードは可能性の高いものから３つ表示し、ユーザに選択させる。

【００１９】以上の処理が終了したときには、表示画面上には図６(d)に示すような表示がなされている。そしてステップＳ20において、イベント情報を取り出すためのループを行う。マウス１を移動させて表示画面上のボタンスイッチが押されると、ステップＳ21へ進み、画像ファイルの登録か、キャンセルかを識別する。キャンセルの場合は前のステップＳ13へ戻り(図６(c))、再認識が可能となる。登録の場合はステップＳ22へ進み、キーワードとともに画像ファイルの登録処理を行う(図６(e))。ステップＳ18において、学習済ではないと判断されると、ステップＳ23，ステップＳ24へ進み、ユーザからのキーボード入力によるキーワードを設定できる(学習プロセスのステップＳ35，Ｓ38と同じ。図７(d)参照)。

【００２０】次に学習プロセスの起動の場合は、図５に示す学習プロセスのフローチャートに従い、処理を進める。ステップＳ25からＳ33までは、登録処理(図４ステップＳ８からＳ16)と全く同じであり、学習プロセスの表示画面は図７の(a)，(b)，(c)と図６の(a)，(b)，(c)と同じである。

【００２１】学習プロセスの場合は画像認識後、特徴データとユーザからのキーボード入力によるキーワードをファイルとして登録(図７(f))することになる。ステップＳ34，Ｓ35において、図７(d)に示す表示を行いユーザからのキーワードを設定する。そして登録ボタンがマウス１により押されると、ステップＳ36からＳ38へ進み、画像の特徴データとキーワードをファイル(図７(f))として登録する(図７(e))。

【００２２】

【発明の効果】以上説明したように、本発明のカラー画像ファイル管理装置は、カラー画像を入力する手段と、入力されたイメージ情報(外形，色等)に基づきキーワードを抽出する認識手段と、認識結果としてキーワードを表示しユーザ確認をとる手段を設けることにより、カラー画像等の登録処理を効率的に行うことができる。

【図面の簡単な説明】

【図１】本発明の一実施例のカラー画像ファイル管理装置のブロック図である。

【図２】図１の回路ブロック図である。

【図３】図１におけるメインプロセスのフローチャートである。

【図４】図１における登録プロセスのフローチャートである。

【図５】図１における学習プロセスのフローチャートである。

【図６】図１における登録プロセスの表示画面図である。

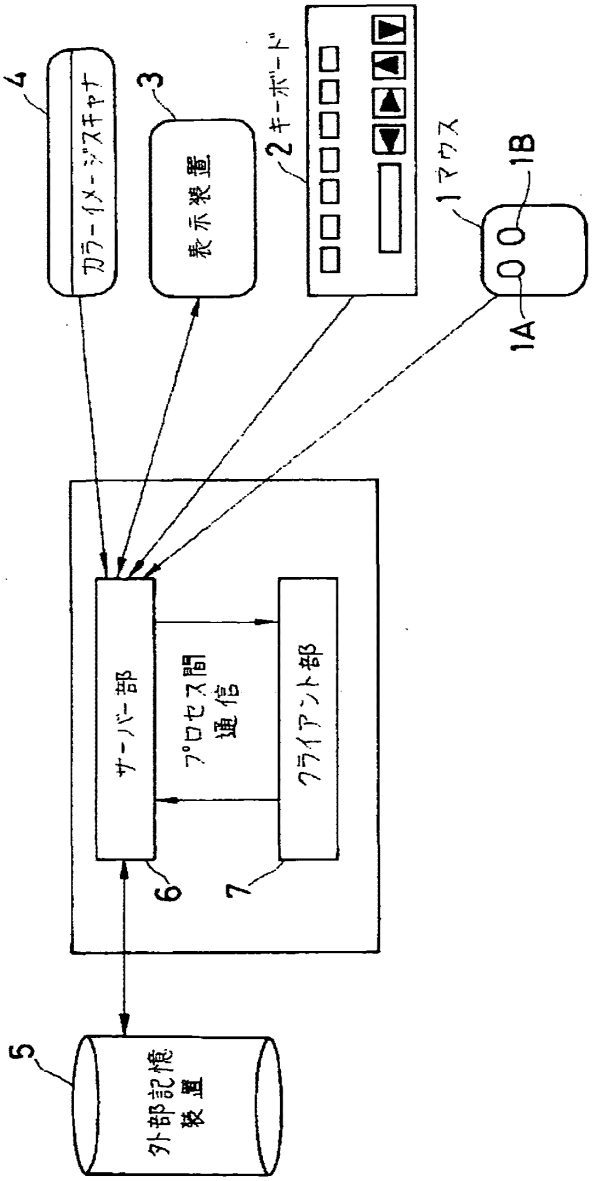
【図７】図１における学習プロセスの表示画面図である。

【符号の説明】

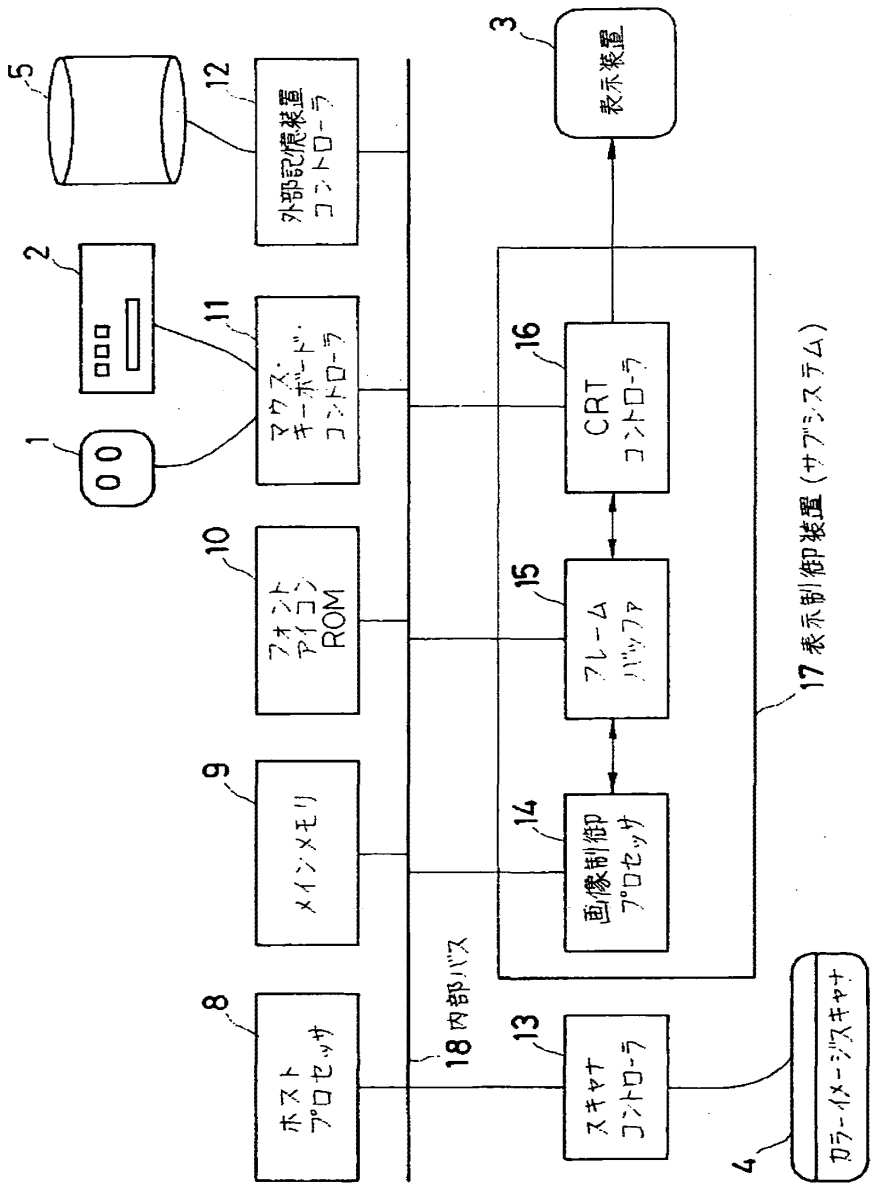
１…座標入力装置（マウス）、　２…キーボード、　３…表示装置（ＣＲＴ）、　４…カラーイメージスキャナ、

５…外部記憶装置、　６…サーバー部、　７…クライアント部、　８…ホストプロセッサ、　９…メインメモリ、　10…フォントアイコンＲＯＭ、　11…マウス・キーボード・コントローラ、　12…外部記憶装置コントローラ、　13…スキャナコントローラ、　14…画像制御プロセッサ、15…フレームバッファ、　16…ＣＲＴコントローラ、　17…表示制御装置（サブシステム）。

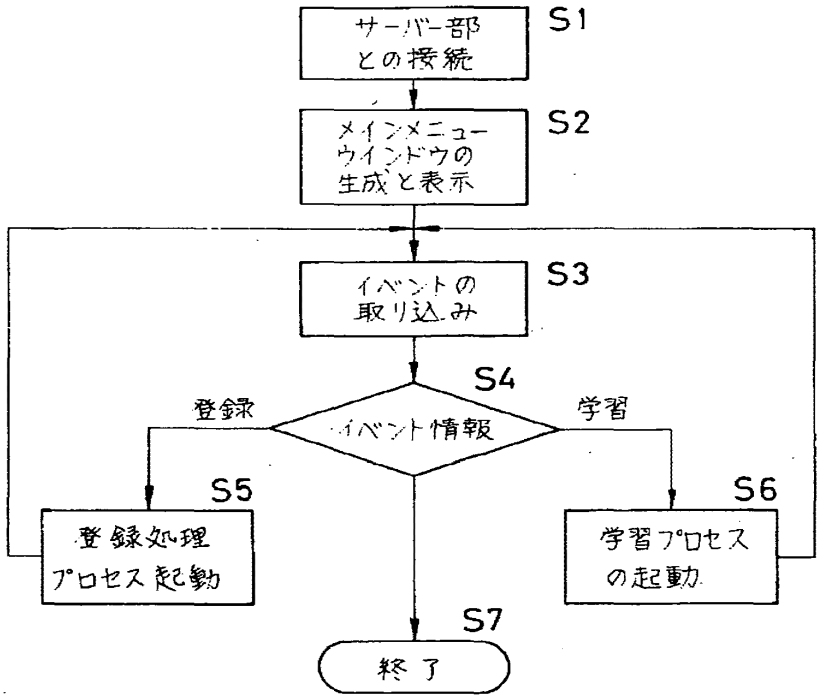
【図１】



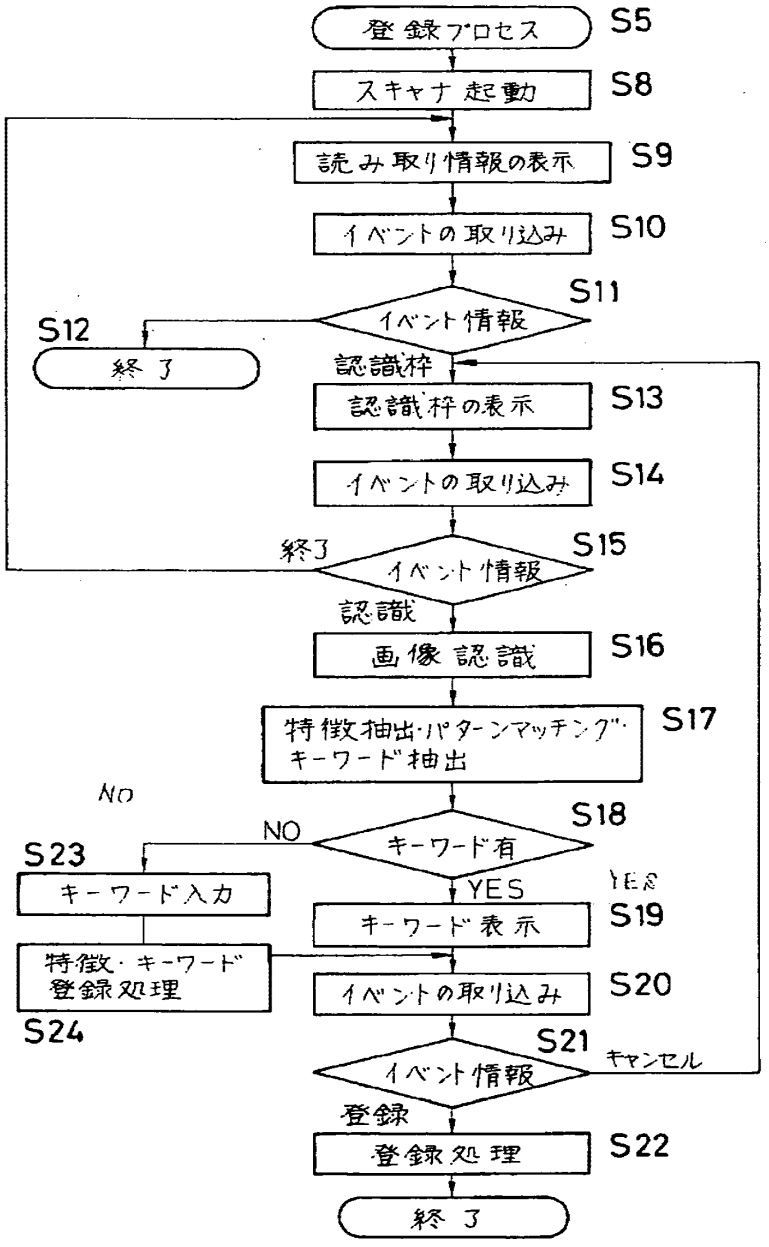
【図2】


1
2
3
4
5
8
9
10
11
12
13
14
15
16
17 表示制御装置（サブシステム）
18 内部バス
ホスト プロセッサ
メインメモリ
フォント アイコン ROM
マウス・キーボード・コントローラ
外部記憶装置 コントローラ
スキャナ コントローラ
画像制御 プロセッサ
フレーム バッファ
CRT コントローラ
表示装置
カラーイメージスキャナ

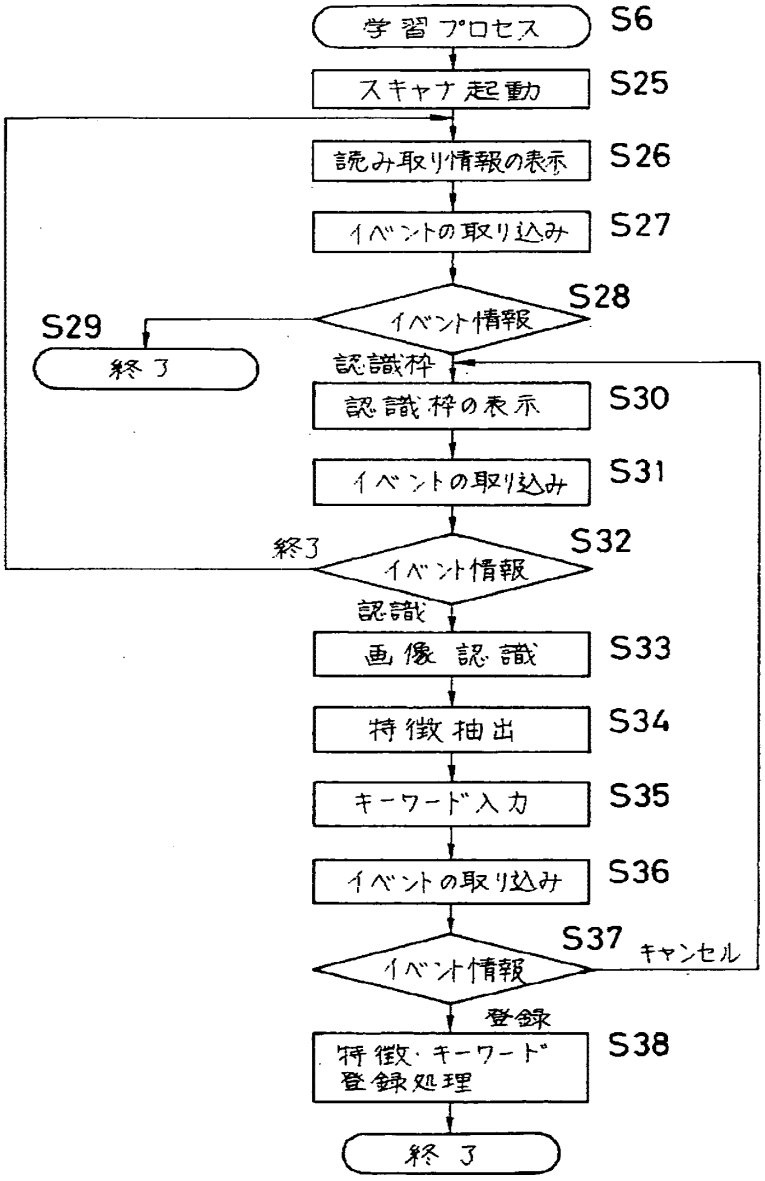
【図3】


サーバー部
との接続
S1
メインメニュー
ウインドウの
生成と表示
S2
イベントの
取り込み
S3
S4
イベント情報
登録
学習
S5
登録処理
プロセス起動
S6
学習プロセス
の起動
S7
終了

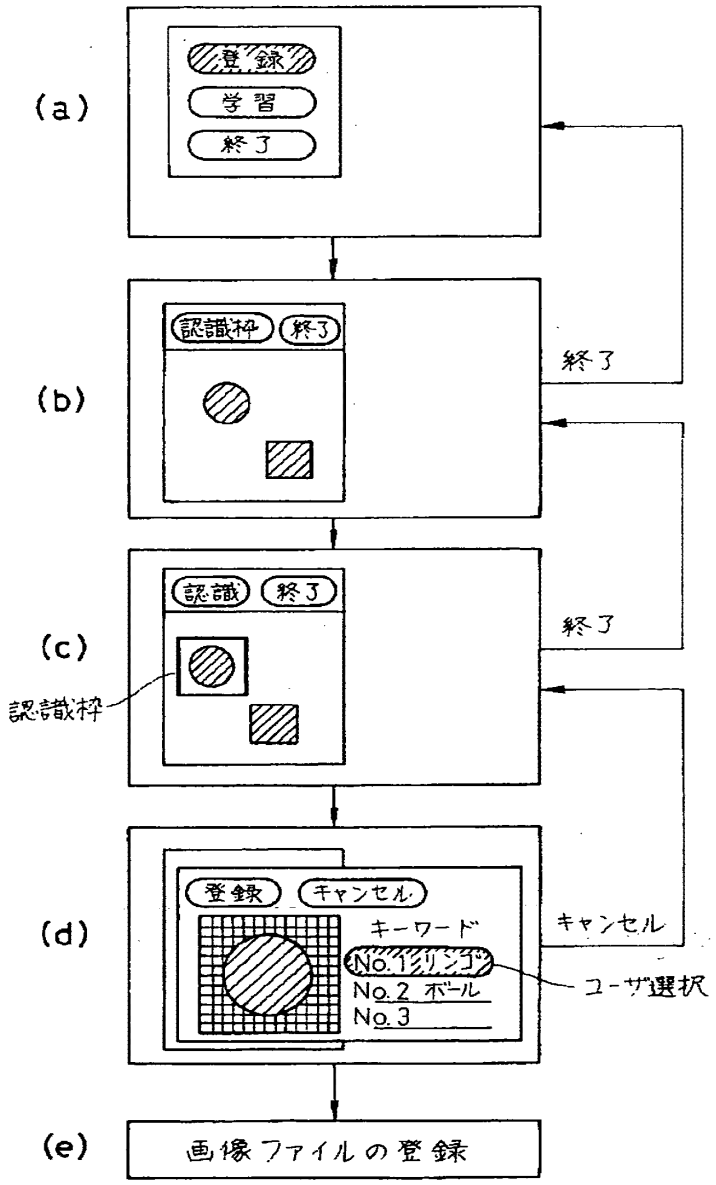
【図4】


登録プロセス
S5
スキャナ起動
S8
読み取り情報の表示
S9
イベントの取り込み
S10
イベント情報
S11
S12
終了
認識枠
認識枠の表示
S13
イベントの取り込み
S14
終了
イベント情報
S15
認識
画像認識
S16
特徴抽出・パターンマッチング・キーワード抽出
S17
NO
NO
S18
キーワード有
S23
キーワード入力
YES
YES
キーワード表示
S19
特徴・キーワード登録処理
S24
イベントの取り込み
S20
S21
イベント情報
キャンセル
登録
登録処理
S22
終了

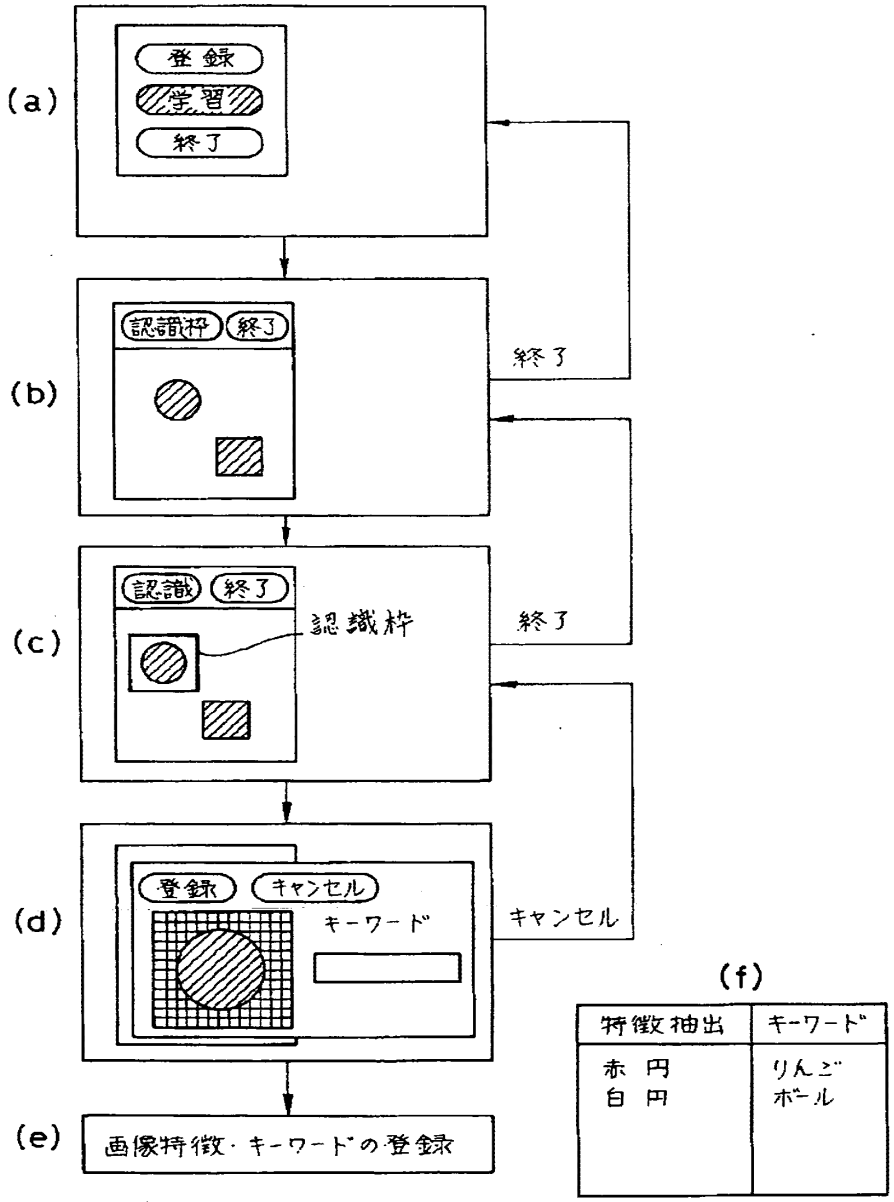
【図5】


学習プロセス
S6
スキャナ起動
S25
読み取り情報の表示
S26
イベントの取り込み
S27
イベント情報
S28
S29
終了
認識枠
認識枠の表示
S30
イベントの取り込み
S31
終了
イベント情報
S32
認識
画像認識
S33
特徴抽出
S34
キーワード入力
S35
イベントの取り込み
S36
イベント情報
S37
キャンセル
登録
特徴・キーワード
登録処理
S38
終了

【図6】


(a)
登録
学習
終了
(b)
認識枠
終了
終了
(c)
認識
終了
認識枠
終了
(d)
登録
キャンセル
キーワード
No.1 リンゴ
No.2 ボール
No.3
キャンセル
ユーザ選択
(e)
画像ファイルの登録

【図7】


(a)
登録
学習
終了
(b)
認識枠
終了
終了
(c)
認識
終了
認識枠
終了
(d)
登録
キャンセル
キーワード
キャンセル
(e)
画像特徴・キーワードの登録
(f)
特徴抽出
キーワード
赤 円
白 円
りんご
ボール

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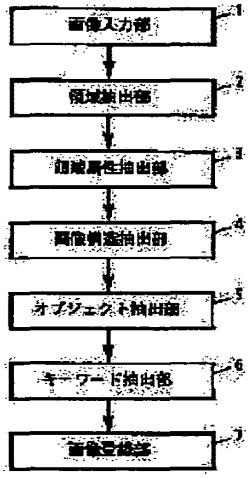
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(54) PICTURE REGISTERING DEVICE AND METHOD THEREFOR

(57)Abstract:
PROBLEM TO BE SOLVED: To automatically extract a keyword related to many constitutional elements from a picture to be registered and to register the extracted keyword as a keyword for retrieving the picture.
SOLUTION: A picture input part 1 quantizes an inputted picture and generates picture data. An area extracting part 2 extracts an area from the picture data. An area attribute extracting part 3 analyzes each area and gives features related to the color, texture, size, and shape of the area as attributes. A picture structure extracting part 4 inspects phase relation between respective areas and prepares data structure expressing respective areas and the phase relation between respective areas. An object extracting part 5 scans the data structure while referring to a dictionary and substitutes an object for a part or all of the data structure. A keyword extracting part 6 extracts the object and the positional relation of the object as the keyword of the objective picture. A picture registering part 7 registers the keyword in a picture data base relating the keyword to its corresponding picture.



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CLAIMS

[Claim(s)]
[Claim 1] An image input means to quantize the inputted image and to generate image data, A field extract means to extract the field which consists of pixels with the description which is similar from said image data generated by this image input means, A field attribute extract means to extract as an attribute the physical information which the field extracted by this field extract means has, An image structure extract means to express due to a phase field with the attribute from which the phase relation between the fields extracted by said field extract means was computed, and the image was extracted by said field attribute extract means, An object extract means to permute phase-related a part or all between fields with the attribute computed by this image structure extract means by the object, A keyword extraction means to extract the relative position of an object and an object, and the phase relation between objects from the phase relation between fields with the attribute updated with this object extract means as a keyword, Image registration equipment characterized by having an image registration means to register into a database the keyword extracted by this keyword extraction means with the image data generated by said image input means.
[Claim 2] Said field attribute extract means is image registration equipment according to claim 1 characterized by making characteristic quantity about the color of one or more fields each, magnitude, and a configuration into a field attribute at least using the color of a field, magnitude, a configuration, and the characteristic quantity about a texture as a field attribute to extract.
[Claim 3] Said image structure extract means is image registration equipment according to claim 1 characterized by extracting the relation between either coincidence, duplication, inclusion, junction or exclusion as phase relation between a field and a field.
[Claim 4] Said object extract means is image registration equipment according to claim 1 characterized by judging the object which suits from the attribute of the field which constitutes an object, the phase relation between the fields which constitute an object, and the relative relation between the attributes of the field which constitutes an object.
[Claim 5] A field extract means to extract the field which consists of pixels with the description which is similar from image data, A field attribute extract means to extract as an attribute the physical information which the field extracted by this field extract means has, An image structure extract means to express due to a phase field with the attribute from which the phase relation between the fields extracted by said field extract means was computed, and the image was extracted by said field attribute extract means, An object information storage means to memorize the phase relation between fields, and relation with a corresponding object, An object extract means to permute the phase relation between fields with said attribute by the corresponding object based on the relation memorized by said object information storage means, A phase relation extract means between objects to extract the phase relation between said extracted objects, Image registration equipment characterized by having a keyword registration means to register the phase relation between the objects extracted by this phase relation extract means between objects as a keyword for searching said image data.
[Claim 6] The step which extracts the field which consists of pixels with the step which quantizes the

inputted image and generates image data, and the description which is similar from said generated image data, The step which extracts the physical information which the extracted field has as an attribute, and the step which computes the phase relation between the extracted fields and expresses an image due to said phase field, The step which permutes phase-related a part or all between said fields by the object, The step which extracts the relative position of said object and said object, and the phase relation between said objects from the phase relation between the fields updated by said object as a keyword, The image registration approach characterized by having the step which registers said extracted keyword into a database with said generated image data.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the image registration equipment and the approach of extracting automatically the search key used in order to search the target image from an image, and registering it.
[0002]
[Description of the Prior Art] As a conventional technique about image retrieval, there is the retrieval technique based on the keyword grant in a common database. This determines the language which an image registration person gives the keyword of arbitration, or serves as a keyword beforehand, and is the technique of giving a suitable keyword with reference to these keyword groups at the time of registration. It is the retrieval technique based on the coincidence of a word which chooses the suitable vocabulary from the keyword by intention of a retrieval person, or a keyword group, and performs a search in the case of retrieval. Although there are easy and an advantage that it can search at a high speed if only the configuration of retrieval equipment is easy for this technique and it has registered the keyword which a retrieval person means, on the other hand, a registrant needs to give a keyword at the time of registration of an image, and it takes time and effort. Moreover, when a registrant differs from a retrieval person, a keyword which is different from the difference in both intention may be given, and the situation that a retrieval person cannot search the target image occurs.
[0003] In order to solve the above-mentioned problem, the technique of using an instantiation image as a search key instead of a keyword as shown in JP,4-60770,A and JP,6-243178,A is proposed. This technique is the technique for realizing retrieval based on the visual description peculiar to an image from an are recording image. It is the technique of searching the image which suits conditions to the whole are recording image using the form of a structure, magnitude, a location, and the outline image that described the color, the texture, etc. further in image information fundamentally. Moreover, in order to attain the increase in efficiency of retrieval from an are recording image, the representation color of a registered image is mapped, the representation color which the image used as a search key has is mapped on this color space, by performing adjustment and evaluation only to the image which exists in this near, Oita of extent which is an initial stage is carried out and improvement in the speed is attained. However, drawing an image [needs to create instantiation drawing at every retrieval, and] searching on instantiation drawing also generates a difficult situation.
[0004] Moreover, in an outline image creation phase as shown in JP,1-130278,A, a plot processor etc. is used, the configuration information and its attribute information on a material can be created / registered simply, and there is also a method of also carrying out retrieval using the table of configuration information and its attribute information. Components here are a desk and an apple, the attribute information is a location, magnitude, a posture, etc., and the highly accurate retrieval of it is attained. However, it is necessary to add these configuration information / attribute information to an are recording image beforehand.
[0005] Moreover, it considers as the technique of searching a natural image efficiently, for example,

there is JP,4-267480,A. This is the technique of component-izing a natural image and using the configuration / description information on a component as a search key. However, it is premised on the break in of the man by the mouse / keyboard / digitizer on the occasion of component-izing of an image.

[0006] The conventional image search method explained by the above had required remarkable time and effort at the time of registration of an image, or retrieval. As an approach for solving this problem, a keyword is extracted from an image automatically or semi-automatically, and there is the approach of registering with an image.
[0007] For example, in JP,1-73460,A, it is the approach of extracting a feeling word from an image automatically, registering with an image, and making this feeling word a keyword. Although the retrieval by this feeling word is effective to the specific image group which exists [pictures], it is not so effective to a common image. It is because feeling changes [that this is not easy to extract a feeling word from a common image, and] with people.
[0008] Moreover, there is JP,2-187864,A as the technique of extracting the keyword about a component from an image. This sets up the field of image data and physical information further included to the field, such as color information and frequency information, is extracted, and the physical quantity itself is made into a keyword, or it makes it possible to connect to language, such as empty and the sea, from the physical information on a field, for example. However, there is a limitation in the language tied up only from the physical information on a field.
[0009]
[Problem(s) to be Solved by the Invention] This invention was made in view of the situation mentioned above, extracts the keyword about many components from an image to register automatically, and aims at offering the image registration technique of registering this extracted keyword as a keyword for retrieval of an image.
[0010]
[Means for Solving the Problem] An image input means to quantize the inputted image in image registration equipment, and to generate image data in order that this invention may attain the above-mentioned purpose, A field extract means to extract the field which consists of pixels with the description which is similar from said image data generated by this image input means, A field attribute extract means to extract as an attribute the physical information which the field extracted by this field extract means has, An image structure extract means to express due to a phase field with the attribute from which the phase relation between the fields extracted by said field extract means was computed, and the image was extracted by said field attribute extract means, An object extract means to permute phase-related a part or all between fields with the attribute computed by this image structure extract means by the object, A keyword extraction means to extract the relative position of an object and an object, and the phase relation between objects from the phase relation between fields with the attribute updated with this object extract means as a keyword, It is characterized by having an image registration means to register into are recording equipment the keyword extracted by this keyword extraction means with the image data generated by said image input means.
[0011] An object points out the expression by the attribute of fields, such as a name of a proper, and "a red circle", "a white rectangular head", to things, such as "the component of the image corresponding to a keyword, for example, "people's face", and a tree", here.
[0012] According to this configuration, the relative position of an object and an object and the phase relation between objects can be automatically registered as a keyword, can input this at the time of retrieval, and can take out the purpose image.
[0013] Moreover, said field attribute extract means may be made to make a field attribute characteristic quantity about the color of one or more fields each, magnitude, and a configuration in this configuration at least using the color of a field, magnitude, a configuration, and the characteristic quantity about a texture as a field attribute to extract.
[0014] Moreover, said image structure extract means can extract the relation between either coincidence, duplication, inclusion, junction or exclusion as phase relation between a field and a field.

[0015] Furthermore, said object extract means can judge the object which suits from the attribute of the field which constitutes an object, the phase relation between the fields which constitute an object, and the relative relation between the attributes of the field which constitutes an object.
[0016] Moreover, this invention is set to image registration equipment, in order to attain the above-mentioned purpose. A field extract means to extract the field which consists of pixels with the description which is similar from image data, A field attribute extract means to extract as an attribute the physical information which the field extracted by this field extract means has, An image structure extract means to express due to a phase field with the attribute from which the phase relation between the fields extracted by said field extract means was computed, and the image was extracted by said field attribute extract means, An object information storage means to memorize the phase relation between fields, and relation with a corresponding object, An object extract means to permute the phase relation between fields with said attribute by the corresponding object based on the relation memorized by said object information storage means, A phase relation extract means between objects to extract the phase relation between said extracted objects, It is characterized by having a keyword registration means to register the phase relation between the objects extracted by this phase relation extract means between objects as a keyword for searching said image data.
[0017] According to this configuration, at least, the phase relation between objects can be automatically registered as a keyword, can input this at the time of retrieval, and can take out the purpose image.
[0018] Moreover, this invention is set to the image registration approach, in order to attain the above-mentioned purpose. The step which extracts the field which consists of pixels with the step which quantizes the inputted image and generates image data, and the description which is similar from said generated image data, The step which extracts the physical information which the extracted field has as an attribute, and the step which computes the phase relation between the extracted fields and expresses an image due to said phase field, The step which permutes phase-related a part or all between said fields by the object, The step which extracts the relative position of said object and said object, and the phase relation between said objects from the phase relation between the fields updated by said object as a keyword, It is characterized by having the step which registers said extracted keyword into a database with said generated image data.
[0019] Also in this configuration, the relative position of an object and an object and the phase relation between objects can be automatically registered as a keyword, can input this at the time of retrieval, and can take out the purpose image.
[0020]
[Embodiment of the Invention] Hereafter, the example of this invention is explained with reference to a drawing. Drawing 1 is the block diagram showing one gestalt of operation of the image registration equipment of this invention. the inside of drawing, and 1 -- for the field attribute extract section and 4, as for the object extract section and 6, the image structure extract section and 5 are [the image input section and 2 / the field extract section and 3 / the keyword extraction section and 7] the image registration sections.
[0021] The image input section 1 quantizes the inputted image, and generates image data. The field extract section 2 extracts the field constituted from image data generated in the image input section 1 by the pixel with the similar description. The field attribute extract section 3 analyzes each field extracted in the field extract section 2, and extracts the description about the color of a field, a texture, magnitude, and a configuration as an attribute. The image structure extract section 4 investigates the phase relation between each field extracted in the field extract section 2, and creates the DS expressing the phase relation between a field with the attribute extracted by the field attribute extract section 3, and each field. The object extract section 5 scans the DS created in the image structure extract section 4, referring to the dictionary which matched the phase relation and the object between attribute conditions and a field, and permutes said all all [a part or] by the object. The keyword extraction section 6 extracts the physical relationship of an object and an object from the DS updated in the object extract section 5 as a keyword of an object image. The image registration section 7 connects the keyword extracted in the keyword extraction section 6 with a corresponding image, and registers it into an image database.

[0022] Drawing 2 is the block diagram showing the example of a configuration which realizes one gestalt of operation of the image registration equipment of this invention. the inside of drawing, and 101 -- the image input-process section and 102 -- image data storage memory and 103 -- the field extract processing section and 104 -- a field / field attribute storage memory, and 105 -- for image structure storage memory and 108, as for an object dictionary and 110, the object extract processing section and 109 are [the field attribute extract processing section and 106 / the image structure extract processing section and 107 / the keyword extraction processing section and 111] the image registration processing sections.

[0023] In the image input-process section 101, using a scanner etc., the manuscript for an input is inputted, it quantizes, and multi-tone RGB color picture data (image data expressed with three elements R, G, and B of an RGB system of color representation) are generated. Since the manuscript was set as the input target, the scanner was used as an input means here, but when making outdoor scenery applicable to an input, you may input with a video camera etc. Or the image drawn using the computer is sufficient. The image inputted is once stored in storage, and it can constitute so that it may read, when processing. In this example, although RGB color picture data were generated as an input image, this invention is not necessarily limited to this, and the image data of a gray scale is sufficient as it, and it may use other color coordinate systems, such as L*a*b*.

[0024] The image data storage memory 102 memorizes the image data generated by the image input-process section 101.

[0025] The field constituted from the field extract processing section 103 by the pixel with the descriptions (a color, concentration, a texture, etc.) similar based on the image data memorized by the image data storage memory 102 is extracted. Although the technique of extracting many fields by the former is proposed, un-hierarchical clustering and the so-called k-average field division technique can be used, for example. By this example, based on the hue of each pixel, saturation, and lightness, the k-average field division approach is used and the case where all the pixels that constitute an image are clustered is shown. Since the field in this invention corresponds to an object called the component in an image, for example, a face, an eye, etc., even if an extremely small cluster is obtained, it is almost meaningless. Therefore, processing which unifies a cluster may be performed at the end if needed. And the field which consists of pixels with the similar description can be extracted by extracting the contiguity pixel belonging to the same cluster by labeling. Here, it is not necessary to memorize all the fields extracted by labeling, and a threshold may be established to area size, a total, etc. and the field to memorize may be restricted.

[0026] Although k-average field division and labeling performed field extract processing in this example, if this invention is the technique of the ability to extract the field constituted by the pixel with the description which does not limit to this and is similar, it is usable by any technique. There is a method of extracting as a field the closed region which extracts the pixel equivalent to an edge from an image as other field extract technique, and is constituted by this pixel etc.

[0027] A field / field attribute storage memory 104 memorizes the field extracted by the field extract processing section 103 as field data. Although the configuration of field data can also consider various approaches, a labeling image as shown in drawing 3 constitutes field data from this example, and it memorizes in a field / field attribute storage memory 104. Among drawing, it corresponds and the numeric value in a mass is the number (a field number is called henceforth) of a proper to the field to which the corresponding pixel whose one mass is one pixel belongs. The configuration approach of the field data in this invention is not necessarily restricted to a labeling image, gives the unique number to each pixel in an image, and may constitute field data using other approaches, such as the approach of expressing with the set of the unique number given to the pixel which belongs each field to the field, and the approach of expressing with the profile point-set of a field.

[0028] In the field attribute extract processing section 105, the attribute corresponding to each field memorized by a field / field attribute storage memory 104 is extracted. The extracted attribute is related with a corresponding field and memorized in a field / field attribute storage memory 104. The attribute in this invention can express the property about the color of a field, magnitude, a configuration, and a

texture, and characteristic quantity, such as an average hue, the histogram of saturation, area, a parameter showing maximum length and an approximation configuration, a degree of roundness (needlelike), average edge reinforcement, and spatial frequency, can be used absolutely. This inventions do not limit the attribute to extract to the above-mentioned characteristic quantity, and if they are the color of a field, magnitude, a configuration, and the characteristic quantity showing the property about a texture, they are good anything. However, it is desirable that one uses each the characteristic quantity showing the property about the color of a field, magnitude, and a configuration at least. In this example, in order to simplify, it uses as an attribute which extracts the average hue of a field except the description about a texture, average saturation, average lightness, the number of configuration pixels, a needlelike degree, and the direction of a main shaft. It is memorizable in a field / field attribute storage memory 104 as a table (an attribute table is called henceforth) made into the field number and the group as these descriptions were calculated from field data by the known approach, for example, it was shown in drawing 4 .

[0029] Moreover, the description which is equivalent to the attribute of a field in the process of this field extract depending on the field extract approach used in the field extract processing section 103 is computable. In such a case, when it computes, this description can be related with the field which corresponds as an attribute, and it can also memorize in a field / field attribute storage memory 104. Since the average hue of each field, average saturation, and average lightness can compute the number of configuration pixels of each field in the case of labeling in the case of k-average field division, he is trying to memorize these attributes in a field / field attribute storage memory 104 in field extract processing in this example. Moreover, although it is computable from field data, all the attributes (a needle-like degree, the direction of a main shaft) computed here can also be constituted so that an attribute may be computed with reference to the image data memorized by image data storage memory if needed (for example, the description about a texture) depending on the attribute to be used.

[0030] The image structure extract processing section 106 extracts the phase relation between each field using the field data memorized by a field / field attribute storage memory 104. The phase relation between the fields in this invention points out the relation between fields, such as coincidence / inclusion / duplication / junction / exclusion, and a field, and it can have the distance and the direction of [between fields] as detailed relation. In this example, since field division extracted each field, two fields of arbitration do not overlap. therefore, the phase relation of two fields -- "-- it contains -- it is /contained (inclusion) -- " -- it becomes either "adjoining (junction)" of "being separated (exclusion)." The phase relation between this field is computable by scanning the field data (labeling image) memorized by a field / field attribute storage memory 104 to a horizontal direction and a perpendicular direction, and extracting the field number which adjoins for every field. However, to use this approach, it is necessary to create the field which expresses the outside of an image with the rim part of an image as shown in drawing 5 . The pixel by which labeling was carried out for the numeric value of "0" in drawing is a field showing the outside of an image. As a result of extracting the field contiguous to each field, it comes to be shown in the term of the adjoining field list of number of drawing 6 . This result shows that the field of the field numbers 2 and 3 where only the one number of adjoining fields is is included to the field of that field number 1 that adjoins. And the list of fields which is not included and has been joined by removing the field numbers 2 and 3 can be obtained from the adjoining field list of number of the field number 1. Moreover, though natural, the field (at this example, a field number is the field of 0) which expresses the outside of an image from the list of fields in which final phase relation is shown must be removed. The extract approach of the phase relation to this invention is not limited to the above-mentioned approach. Moreover, in this example, although adjacency was computed about four, you may compute about eight. The distance and the direction of [between the fields used as detailed relation between fields] can be acquired by computing the distance and the direction on the basis of a coordinate of a center of gravity of a field.

[0031] The image structure storage memory 107 memorizes the phase relation between the fields created in the image structure extract processing section 106. In this example, the graph structure (image structure graph is called henceforth) which has a field number as shown in drawing 7 in a node, and has

the phase relation between fields in an edge is created and memorized. These values can also be given to an edge when the distance and the direction of [between each field] are being computed as detailed relation between fields. The field numbers from 1 to 11 which the image structure graph shown in drawing 7 is what was created from the labeling image (one closed region expresses one field) shown in drawing 8 , and were shown in drawing 7 shall have pointed out the field of the face, a left eye, a right eye, opening, left eyebrows, right eyebrows, the hair of hair, a left ear, a right ear, a neck, and a background in order. Although the image structure graph in this example described only the relation between the fields which include or adjoin, when a field which allows duplication is extracted in the field extract processing section 103, the phase relation between fields, such as coincidence and duplication, can be added.

[0032] In the object extract processing section 108, an object is extracted from the image structure graph memorized by the image structure storage memory 107, referring to the object dictionary 109. The object in this invention points out the expression by the attribute of fields, such as a name of a proper, and "a red circle", "a white rectangular head", to things, such as "people's face" and a "tree."

[0033] The object dictionary 109 holds two or more groups (an object item is called henceforth) of the graph structure (an object graph is called henceforth) and the object conditions which described the name of an object, the attribute of the field which constitutes an object, and the phase relation between fields. The object graph memorized in the object dictionary 109 is the same format as image structure graph. A different point is a point with the attribute conditions corresponding to the number which each node of an object graph shows instead of an attribute. Henceforth, the number which the node of an object graph has is called an attribute condition number. This attribute condition is conditions for investigating whether the corresponding node of image structure graph and an object graph suits. Moreover, with object conditions, it is a regulation about the relative relation between the attributes of the field which constitutes an object, for example, those of Field A is conditions, such as more than twice of the number of configuration pixels of the number field B of configuration pixels, and 3 or less times. The example of the attribute conditions of the part corresponding to the object item corresponding to the object "people's face", and this object item is shown in drawing 9 . Among drawing, the face, and 302 and 303 are equivalent to an eye, and 304 is equivalent to the hair of hair for the attribute condition number 301.

[0034] Below, it explains, referring to the flow chart which shows an example of the object extract approach to drawing 10 . First, the attribute table memorized by a field / field attribute storage memory 104 is sorted in descending order with the number of configuration pixels (S201). This is based on the rule of thumb that possibility that the fields where area is bigger are main components is high. Subsequent processings make a processing object the field (field number) of the sorted attribute table at order (S202). The attribute conditions registered into the object dictionary 109 are searched, and the attribute of the field of a processing object creates the list of attribute condition numbers which fulfills conditions (S203). An object graph and image structure graph with the attribute condition number of this list are compared (S204). This comparison investigates whether after making in agreement the node of image structure graph with the field number of a processing object, and the node of an object graph with the attribute condition number extracted by S203, the phase relation corresponding to all the attribute conditions and edges corresponding to the node which this object graph has suits all the image all [a part or]. When this suits, further, the object conditions corresponding to this attribute condition number are applied, and it asks for whether finally it suits or it does not carry out (S205). S208 is processed when it is judged that it finally does not suit. When suited, the subgraph with which image structure graph suited is permuted by the corresponding object (S206). This permutation can be based on a node with the number which can determine an object as a meaning, and the number (an object number is called) of the corresponding object item registered into the object dictionary 109 can be used. Correction of the phase relation corresponding to deletion of an edge or an edge, the distance between fields, and a direction is also made with this permutation. The center of gravity of the object for computing distance and a direction is computable from the field which unified the field included in the subgraph of the image structure graph permuted by the object. And the attribute corresponding to the field number and

this which are contained in the subgraph of the image structure graph permuted by the object is deleted from the attribute table sorted by S201 (S207). In S208, if it investigated how [that processed all fields] it was and the unsettled field remains, it will return to S202 and processing will be repeated.
[0035] As a result of the object extract processing section 108, some subgraphs contained in image structure graph are permuted by the object, and a graph which has an object number or a field number in each node of image structure graph is obtained. Object extract processing is performed to the image structure graph shown in drawing 7 , and the graph obtained as a result of suiting the object graph registered into the object dictionary 109 which this showed to drawing 9 is shown in drawing 11 . The field numbers 1, 2, 3, and 7 of drawing 7 shall suit the attribute condition number 301,302,303,304 of drawing 9 , respectively, and the object conditions shown in drawing 9 shall also be fulfilled. The edge between each node (phase relation) conforms, and it permutes by the node in which the subgraph which consists of field numbers 1, 2, 3, and 7 of drawing 7 has the object number 100 corresponding to the object "people's face."
[0036] Here, although the example which makes the name of the proper of a thing an object was shown, objects, such as "a red circle" and "a white rectangular head", can be extracted by creating an object item which makes the name of an object the expression about the attribute of fields, such as "a red circle" and "a white rectangular head", at the object dictionary 109.
[0037] Moreover, in this example, although the comparison of an object graph and image structure graph extracted the object by whether each node and an edge suit or it does not carry out, it takes in the concept of a goodness of fit here, and can permute it by the object which corresponds the subgraph of image structure graph with the highest goodness of fit. For example, it is realizable by constituting from a function which returns the goodness of fit, for example, a fuzzy function, by giving an attribute for the attribute conditions currently held in the object dictionary 109.
[0038] It is necessary to draw up the object dictionary 109 in this invention beforehand. Image structure graph which has been mentioned above to the image of two or more men's face as an example in this creation approach is created, and two or more image structure graph is obtained. And the object graph corresponding to the object "people's face" can be created from the phase relation of the edge which is common for the attribute of the node (field) which corresponds with two or more image structure graph. Moreover, relation it can consider that is common among the relation between the attributes which the node of two or more obtained image structure graph has can be made into object conditions.
[0039] The keyword extraction processing section 110 analyzes the image structure graph with which the subgraph was permuted by the object by the object extract processing section 108, and extracts the relation between objects as a keyword. In this example, the keyword "people's face is the center of an image" can be extracted as the relative location in the image of the object (name peculiar to a thing) which becomes settled from the object number which exists in image structure graph, and an object, for example, a location of the object "people's face", and this object **. Moreover, the relative physical relationship between the extracted objects, for example, the keyword of "being a signal at the upper left of an automobile", can be extracted as relation between objects.
[0040] The image registration processing section 111 relates with an input image the keyword extracted in the keyword extraction processing section 110, and registers it into are recording equipment (not shown).
[0041] As mentioned above, by using the explained image registration equipment, the time and effort which gives a keyword by the help at the time of registration of an image can be saved, and easy and the retrieval equipment with which the target image is searched at a high speed can consist of specifying a keyword. However, it is more desirable to constitute image retrieval equipment so that the synonym of the keyword specified as a search key at the time of retrieval may also be searched in addition to a search key, since the keyword which is extracted by the image registration equipment by this invention, and is registered with an image is mainly a name peculiar to a thing.
[0042]
[Effect of the Invention] As mentioned above, since according to this invention the keyword which has objectivity automatically is extracted from an image and it can register with a database with an image

only by inputting an image registering as explained, when a registrant registers an image, the time and effort which gives a keyword can be saved. Moreover, since it carries out based on the keyword registered with the image, directions of a search key are easy and, as for retrieval, can also simplify the configuration of retrieval equipment.

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the image registration equipment of the example of this invention as a whole.
[Drawing 2] It is the block diagram showing the example of a configuration of the image registration equipment of an example.
[Drawing 3] It is drawing showing the example of the labeling image expressing the field data in an example.
[Drawing 4] It is drawing showing the example of the attribute table of an example.
[Drawing 5] It is drawing showing the example of the labeling image used in case the phase relation between fields is extracted in an example.
[Drawing 6] It is drawing showing the example which extracted the adjoining field for every field in the example.
[Drawing 7] It is drawing showing the example of the image structure graph of an example.
[Drawing 8] It is drawing showing the example of the labeling image corresponding to the image structure graph of drawing 7 .
[Drawing 9] It is drawing showing the example of the object dictionary of an example.
[Drawing 10] It is drawing showing the example of the processing flow of the object extract art of an example.
[Drawing 11] It is drawing showing the example of the image structure graph after object extract processing of an example.
[Description of Notations]
1 Image Input Section
2 Field Extract Section
3 Field Attribute Extract Section
4 Image Structure Extract Section
5 Object Extract Section
6 Keyword Extraction Section
7 Image Registration Section
101 Image Input-Process Section
102 Image Data Storage Memory
103 Field Extract Processing Section
104 Field / Field Attribute Storage Memory
105 Field Attribute Extract Processing Section
106 Image Structure Extract Processing Section
107 Image Structure Storage Memory
108 Object Extract Processing Section
109 Object Dictionary
110 Keyword Extraction Processing Section

111 Image Registration Processing Section

[Translation done.]

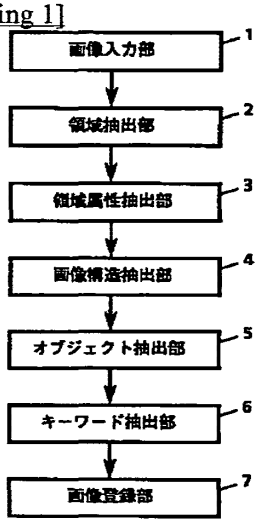
* NOTICES *

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damages caused by the use of this translation.

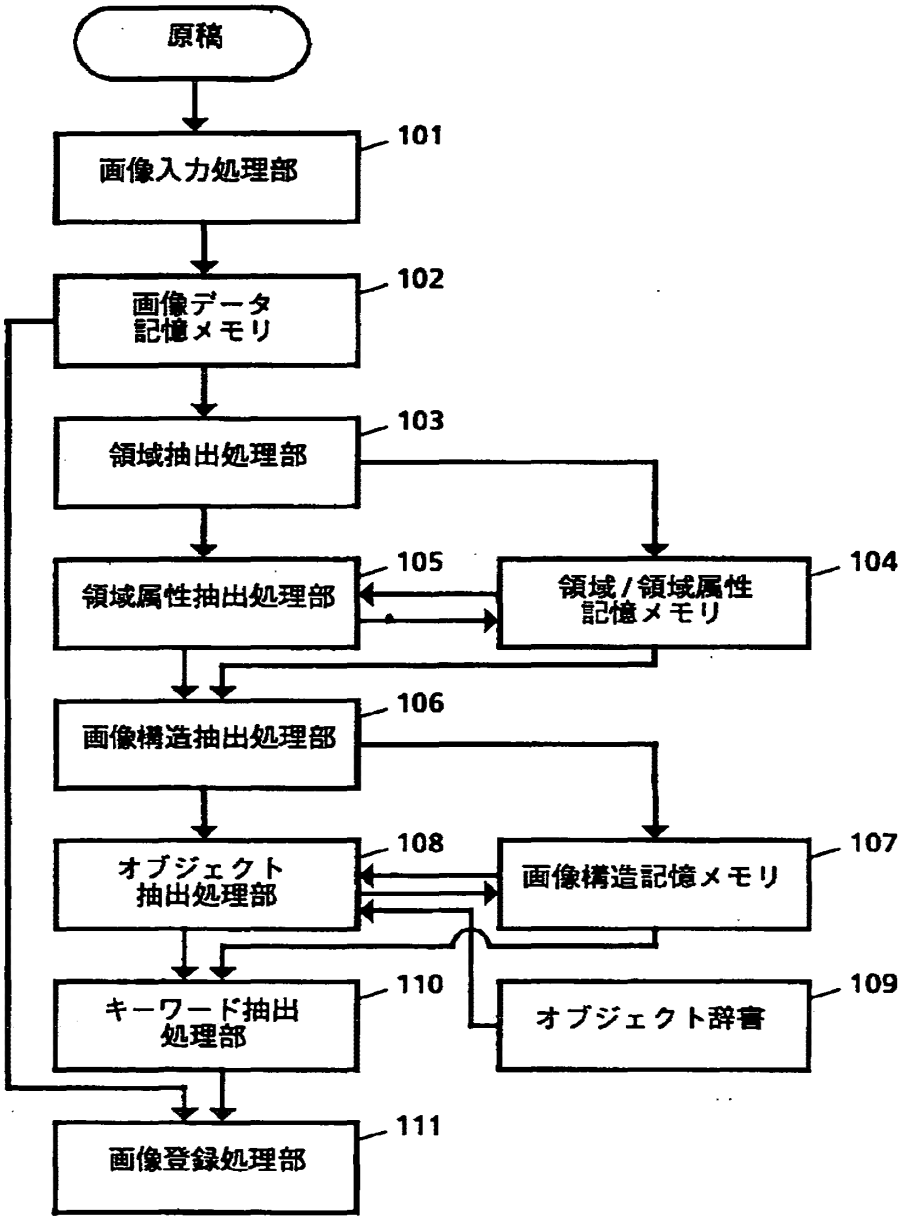
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



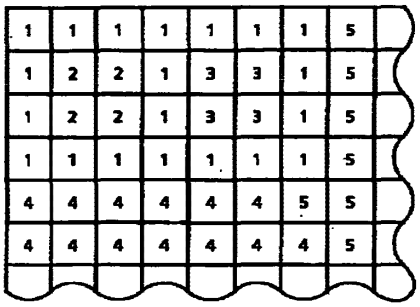
[Drawing 2]



[Drawing 6]

領域番号	隣接領域番号リスト	含んでいる領域のリスト	含まれている領域	接合している領域のリスト
1	0, 2, 3, 4, 5, …	2, 3, …	-	4, 5, …
2	1	-	1	-
3	1	-	1	-
4	0, 1, 5, …	-	-	1, 5, …
…	…	…	…	…

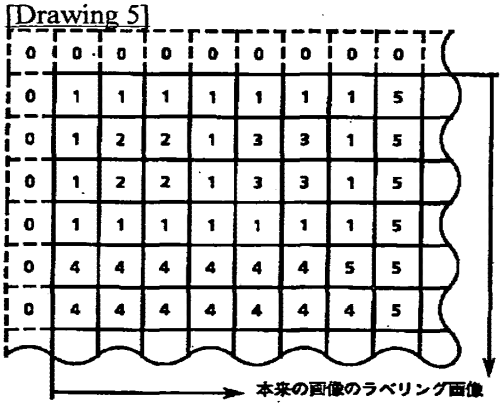
[Drawing 3]



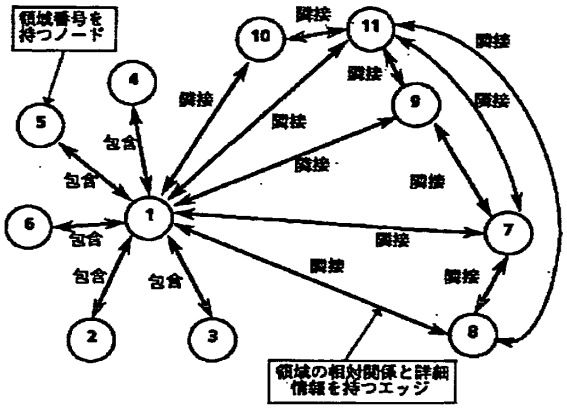
[Drawing 4]

領域番号	平均色相	平均彩度	平均明度	領域の大きさ	針状の度合い	主軸方向
1	0.1	0.4	0.5	20	0.4	0
2	0.5	0.3	0.8	4	0	0
3	0.5	0.3	0.8	4	0	0
...	...	...	...	...	...	...

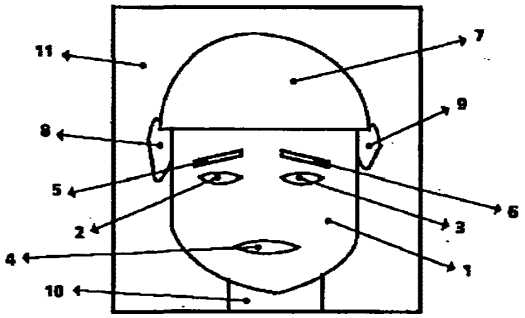
[Drawing 5]



[Drawing 7]

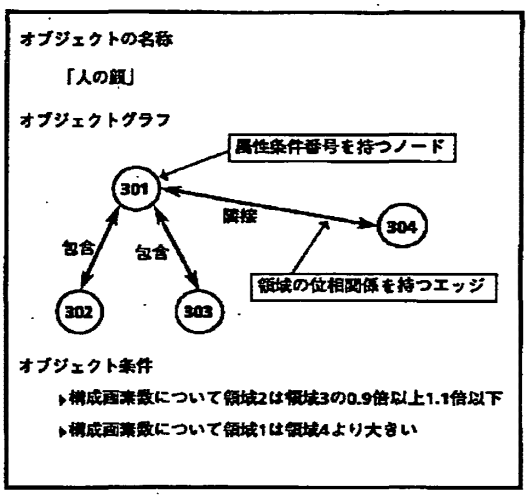


[Drawing 8]



[Drawing 9]

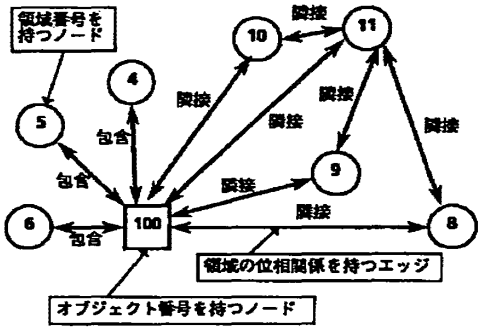
●オブジェクト項目



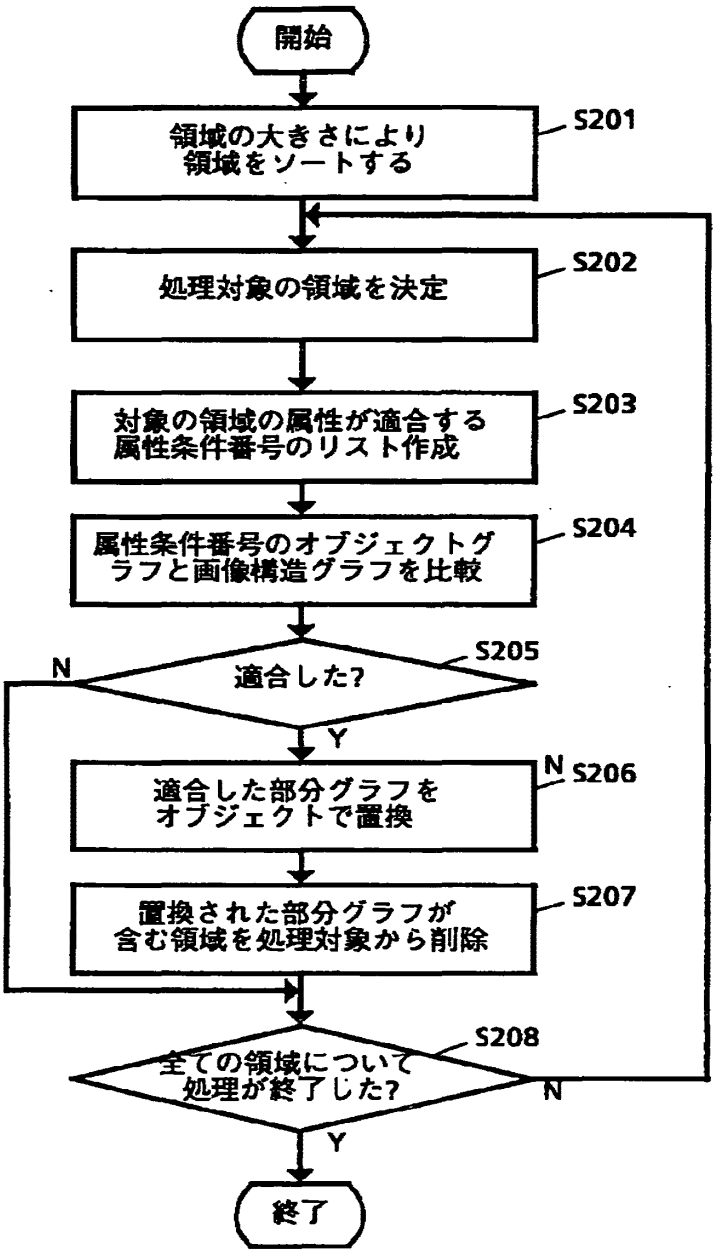
●属性条件

属性条件番号	平均色相	平均彩度	平均明度	針状の度合	主軸方向
...	...	...	...	...	...
301	0.1以上 0.3以下	0.2以上	-	0.2以下	-
302	-	0.1以下	0.1以下	0.6以上	-10度以上 10度以下
303	-	0.1以下	0.1以下	0.6以上	-10度以上 10度以下
304	-	0.01以下	0.1以下	0.3以下	-
...	...	...	...	...	...

[Drawing 11]


領域番号を持つノード
10
隣接
11
4
隣接
隣接
隣接
5
包含
包含
9
隣接
隣接
6
100
包含
8
領域の位相関係を持つエッジ
オブジェクト番号を持つノード

[Drawing 10]



[Translation done.]

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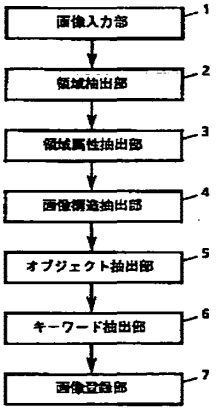
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(54)【発明の名称】　画像登録装置および方法

(57)【要約】

【課題】　登録したい画像からより多くの構成要素に関するキーワードを自動的に抽出し、画像の検索用キーワードとして登録する。

【解決手段】　画像入力部１は、入力された画像を量子化し、画像データを生成する。領域抽出部２は画像データから領域を抽出する。領域属性抽出部３は、各領域を解析し、領域の色、テクスチャ、大きさ、形状に関する特徴を属性として付与する。画像構造抽出部４は、各領域間の位相関係を調査し、領領域と各領域間の位相関係を表現したデータ構造を作成する。オブジェクト抽出部５は、辞書を参照しながらデータ構造を走査し、前記データ構造の一部またはすべてをオブジェクトで置換する。キーワード抽出部６は、オブジェクトとオブジェクトの位置関係を対象画像のキーワードとして抽出する。画像登録部７は、キーワードを対応する画像に関係づけて画像データベースに登録する。



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【特許請求の範囲】

【請求項１】　入力された画像を量子化して画像データを生成する画像入力手段と、

該画像入力手段により生成された前記画像データから類似する特徴を持つ画素から構成される領域を抽出する領域抽出手段と、

該領域抽出手段により抽出された領域の持つ物理情報を属性として抽出する領域属性抽出手段と、

前記領域抽出手段により抽出された領域間の位相関係を算出して画像を前記領域属性抽出手段により抽出された属性を持つ領域の位相関係で表現する画像構造抽出手段と、

該画像構造抽出手段により算出された属性を持つ領域間の位相関係の一部またはすべてをオブジェクトで置換するオブジェクト抽出手段と、

該オブジェクト抽出手段で更新された属性を持つ領域間の位相関係からオブジェクト、オブジェクトの相対位置、およびオブジェクト間の位相関係をキーワードとして抽出するキーワード抽出手段と、

該キーワード抽出手段により抽出されたキーワードを前記画像入力手段により生成された画像データとともにデータベースに登録する画像登録手段とを有することを特徴とする画像登録装置。

【請求項２】　前記領域属性抽出手段は、抽出する領域属性として領域の色、大きさ、形状、テクスチャに関する特徴量を用い、少なくとも各１つ以上の領域の色、大きさ、形状に関する特徴量を領域属性とすることを特徴とする請求項１に記載の画像登録装置。

【請求項３】　前記画像構造抽出手段は、領域と領域との位相関係として、一致、重複、包含、接合もしくは排他のいずれかの関係を抽出することを特徴とする請求項１に記載の画像登録装置。

【請求項４】　前記オブジェクト抽出手段は、オブジェクトを構成する領域の属性とオブジェクトを構成する領域間の位相関係とオブジェクトを構成する領域の属性間の相対的な関係から適合するオブジェクトを判断することを特徴とする請求項１に記載の画像登録装置。

【請求項５】　画像データから類似する特徴を持つ画素から構成される領域を抽出する領域抽出手段と、

該領域抽出手段により抽出された領域の持つ物理情報を属性として抽出する領域属性抽出手段と、

前記領域抽出手段により抽出された領域間の位相関係を算出して画像を前記領域属性抽出手段により抽出された属性を持つ領域の位相関係で表現する画像構造抽出手段と、

領域および領域間の位相関係と、対応するオブジェクトとの関係を記憶するオブジェクト情報記憶手段と、

前記オブジェクト情報記憶手段に記憶されている関係に基づいて、前記属性を持つ領域および領域間の位相関係を対応するオブジェクトに置換するオブジェクト抽出手段と、

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抽出された前記オブジェクト間の位相関係を抽出するオブジェクト間位相関係抽出手段と、

該オブジェクト間位相関係抽出手段により抽出されたオブジェクト間の位相関係を前記画像データを検索するためのキーワードとして登録するキーワード登録手段とを有することを特徴とする画像登録装置。

【請求項６】　入力された画像を量子化して画像データを生成するステップと、

生成された前記画像データから類似する特徴を持つ画素から構成される領域を抽出するステップと、

抽出された領域の持つ物理情報を属性として抽出するステップと、

抽出された領域間の位相関係を算出して画像を、前記領域の位相関係で表現するステップと、

前記領域間の位相関係の一部またはすべてをオブジェクトで置換するステップと、

前記オブジェクトで更新された領域間の位相関係から前記オブジェクト、前記オブジェクトの相対位置、および前記オブジェクト間の位相関係をキーワードとして抽出するステップと、

抽出された前記キーワードを、生成された前記画像データとともにデータベースに登録するステップとを有することを特徴とする画像登録方法。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、画像から目的の画像を検索するために使用する検索キーを自動的に抽出して登録する画像登録装置および方法に関する。

【０００２】

【従来の技術】画像検索に関する従来技術として、一般のデータベースにおけるキーワード付与を基本とした検索手法がある。これは、画像登録者が任意のキーワードを付与するか、もしくは、あらかじめキーワードとなる言葉を決めておき、登録時にこれらのキーワード群を参照して適切なキーワードを付与する手法である。検索の際には、検索者の意図によるキーワードもしくはキーワード群から適切な用語を選び検索を実行する、単語の一致を基本とした検索手法である。この手法は検索装置の構成が容易であり、検索者の意図するキーワードが登録してありさえすれば容易かつ高速に検索できるという利点があるが、反面、画像の登録時に登録者がキーワードを付与する必要があり、手間が掛かる。また、登録者と検索者とが異なる場合には、両者の意図の違いから異なるキーワードが付与される可能性があり、検索者が目的の画像を検索できない状況が発生する。

【０００３】前述の問題を解決するために、特開平４－６０７７０号公報および特開平６－２４３１７８号公報に示されているようなキーワードの代わりに例示画像を検索キーとして用いる手法が提案されている。この手法

は、蓄積画像から画像特有の視覚的特徴に基づく検索を実現させるための手法である。基本的には画像情報を構成物の形、大きさ、位置、さらには色、テクスチャ等を記述した概略画像を用い、蓄積画像全体に対して条件に合う画像を検索する手法である。また蓄積画像からの検索の効率化を図るため、登録画像の代表色をマッピングし、検索キーとなる画像の持つ代表色をこの色空間上にマッピングし、この近傍に存在する画像に対してのみ整合・評価を行なうことにより初期段階である程度の大分類を実施して高速化を図っている。しかし、検索の度に例示画を作成する必要があり、また、検索したい画像を例示画に描くことが困難な状況も発生する。

【０００４】また、特開平１－１３０２７８号公報に示されているような概略画像作成段階で素材の構成情報とその属性情報を作図プロセッサなどを用いて簡易に作成／登録でき、検索も構成情報とその属性情報のテーブルを用いて実施する方法もある。ここでの構成要素とは、例えば、机、りんごであり、その属性情報は位置、大きさ、姿勢等であり、確度の高い検索が可能となる。しかしながら、あらかじめ蓄積画像に対してこれら構成情報／属性情報を付加する必要がある。

【０００５】また、自然画像の検索を効率よく行なう手法として、例えば、特開平４－２６７４８０号公報がある。これは自然画像をコンポーネント化し、コンポーネントの形状／特徴情報を検索キーとする手法である。しかしながら、画像のコンポーネント化に際してはマウス／キーボード／デジタイザ等による人の介入を前提としている。

【０００６】以上までに説明した従来の画像検索方法は、画像の登録時、もしくは、検索時にかなりの手間を要していた。この問題を解決するための方法として、画像から自動的、もしくは、半自動的にキーワードを抽出して、画像とともに登録する方法がある。

【０００７】例えば、特開平１－７３４６０号公報では、画像から自動的に感覚語を抽出して画像とともに登録し、この感覚語をキーワードとする方法である。この感覚語による検索は、絵画などのある特定の画像群に対しては有効であるが、一般的な画像に対してはあまり有効ではない。これは、一般の画像から感覚語を抽出することが容易ではないことと、人により感覚が異なることが原因である。

【０００８】また、画像から構成要素に関するキーワードを抽出する手法として、例えば、特開平２－１８７８６４号公報がある。これは画像データの領域を設定し、さらにその領域に含まれる色情報、周波数情報などの物理情報を抽出し、物理量そのものをキーワードとしたり、領域の物理情報から、例えば、空、海等の言葉に結び付けることを可能にしている。しかしながら、領域の物理情報だけから結び付けられる言葉には限りがある。

【０００９】

【発明が解決しようとする課題】本発明は、上述した事情に鑑みてなされたもので、登録したい画像からより多くの構成要素に関するキーワードを自動的に抽出して、この抽出したキーワードを画像の検索用キーワードとして登録する画像登録技術を提供することを目的とする。

【００１０】

【課題を解決するための手段】本発明は、上述の目的を達成するために、画像登録装置において、入力された画像を量子化して画像データを生成する画像入力手段と、該画像入力手段により生成された前記画像データから類似する特徴を持つ画素から構成される領域を抽出する領域抽出手段と、該領域抽出手段により抽出された領域の持つ物理情報を属性として抽出する領域属性抽出手段と、前記領域抽出手段により抽出された領域間の位相関係を算出して画像を前記領域属性抽出手段により抽出された属性を持つ領域の位相関係で表現する画像構造抽出手段と、該画像構造抽出手段により算出された属性を持つ領域間の位相関係の一部またはすべてをオブジェクトで置換するオブジェクト抽出手段と、該オブジェクト抽出手段で更新された属性を持つ領域間の位相関係からオブジェクト、オブジェクトの相対位置、およびオブジェクト間の位相関係をキーワードとして抽出するキーワード抽出手段と、該キーワード抽出手段により抽出されたキーワードを前記画像入力手段により生成された画像データとともに蓄積装置に登録する画像登録手段とを有することを特徴とするものである。

【００１１】ここでオブジェクトとは、キーワードに対応する画像の構成要素、例えば、「人の顔」や「木」などのものに固有の名称、および、「赤い円」や「白い四角」などの領域の属性による表現を指す。

【００１２】この構成によれば、オブジェクト、オブジェクトの相対位置、およびオブジェクト間の位相関係が自動的にキーワードとして登録され、検索時にこれを入力して目的画像を取り出すことができる。

【００１３】また、この構成において、前記領域属性抽出手段は、抽出する領域属性として領域の色、大きさ、形状、テクスチャに関する特徴量を用い、少なくとも各１つ以上の領域の色、大きさ、形状に関する特徴量を領域属性とするようにしてもよい。

【００１４】また、前記画像構造抽出手段は、領域と領域との位相関係として、一致、重複、包含、接合もしくは排他のいずれかの関係を抽出するようにすることができる。

【００１５】さらに、前記オブジェクト抽出手段は、オブジェクトを構成する領域の属性とオブジェクトを構成する領域間の位相関係とオブジェクトを構成する領域の属性間の相対的な関係から適合するオブジェクトを判断するようにできる。

【００１６】また、本発明は、上述の目的を達成するために、画像登録装置において、画像データから類似する

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特徴を持つ画素から構成される領域を抽出する領域抽出手段と、該領域抽出手段により抽出された領域の持つ物理情報を属性として抽出する領域属性抽出手段と、前記領域抽出手段により抽出された領域間の位相関係を算出して画像を前記領域属性抽出手段により抽出された属性を持つ領域の位相関係で表現する画像構造抽出手段と、領域および領域間の位相関係と、対応するオブジェクトとの関係を記憶するオブジェクト情報記憶手段と、前記オブジェクト情報記憶手段に記憶されている関係に基づいて、前記属性を持つ領域および領域間の位相関係を対応するオブジェクトに置換するオブジェクト抽出手段と、抽出された前記オブジェクト間の位相関係を抽出するオブジェクト間位相関係抽出手段と、該オブジェクト間位相関係抽出手段により抽出されたオブジェクト間の位相関係を前記画像データを検索するためのキーワードとして登録するキーワード登録手段とを有することを特徴とする。

【００１７】この構成によれば、少なくともオブジェクト間の位相関係が自動的にキーワードとして登録され、検索時にこれを入力して目的画像を取り出すことができる。

【００１８】また、本発明は、上述の目的を達成するために、画像登録方法において、入力された画像を量子化して画像データを生成するステップと、生成された前記画像データから類似する特徴を持つ画素から構成される領域を抽出するステップと、抽出された領域の持つ物理情報を属性として抽出するステップと、抽出された領域間の位相関係を算出して画像を、前記領域の位相関係で表現するステップと、前記領域間の位相関係の一部またはすべてをオブジェクトで置換するステップと、前記オブジェクトで更新された領域間の位相関係から前記オブジェクト、前記オブジェクトの相対位置、および前記オブジェクト間の位相関係をキーワードとして抽出するステップと、抽出された前記キーワードを、生成された前記画像データとともにデータベースに登録するステップとを有することを特徴とする。

【００１９】この構成においても、オブジェクト、オブジェクトの相対位置、およびオブジェクト間の位相関係が自動的にキーワードとして登録され、検索時にこれを入力して目的画像を取り出すことができる。

【００２０】

【発明の実施の形態】以下、本発明の実施例について図面を参照して説明する。図１は本発明の画像登録装置の実施の一形態を示すブロック図である。図中、１は画像入力部、２は領域抽出部、３は領域属性抽出部、４は画像構造抽出部、５はオブジェクト抽出部、６はキーワード抽出部、７は画像登録部である。

【００２１】画像入力部１は、入力された画像を量子化し、画像データを生成する。領域抽出部２は画像入力部１で生成された画像データから、類似する特徴を持つ画

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素により構成される領域を抽出する。領域属性抽出部３は、領域抽出部２で抽出された各領域を解析し、領域の色、テクスチャ、大きさ、形状に関する特徴を属性として抽出する。画像構造抽出部４は、領域抽出部２で抽出された各領域間の位相関係を調査し、領域属性抽出部３により抽出された属性を持つ領域と各領域間の位相関係を表現したデータ構造を作成する。オブジェクト抽出部５は、属性条件および領域間の位相関係とオブジェクトとを対応づけた辞書を参照しながら画像構造抽出部４で作成されたデータ構造を走査し、前記データ構造の一部またはすべてをオブジェクトで置換する。キーワード抽出部６は、オブジェクト抽出部５で更新されたデータ構造からオブジェクトとオブジェクトの位置関係を対象画像のキーワードとして抽出する。画像登録部７は、キーワード抽出部６で抽出されたキーワードを対応する画像に関係づけて画像データベースに登録する。

【００２２】図２は、本発明の画像登録装置の実施の一形態を実現する構成例を示すブロック図である。図中、１０１は画像入力処理部、１０２は画像データ記憶メモリ、１０３は領域抽出処理部、１０４は領域／領域属性記憶メモリ、１０５は領域属性抽出処理部、１０６は画像構造抽出処理部、１０７は画像構造記憶メモリ、１０８はオブジェクト抽出処理部、１０９はオブジェクト辞書、１１０はキーワード抽出処理部、１１１は画像登録処理部である。

【００２３】画像入力処理部１０１では、スキャナなどを用いて入力対象の原稿を入力し、量子化して多階調のＲＧＢカラー画像データ（ＲＧＢ表色系の３要素Ｒ，Ｇ，Ｂで表される画像データ）を生成する。ここでは入力対象を原稿としたので入力手段としてスキャナを用いたが、屋外などの風景を入力対象とする場合にはビデオカメラなどにより入力してもよい。あるいは、計算機を用いて描画された画像などでもよい。入力される画像を一旦記憶装置に格納しておき、処理を行なう時に読み出すように構成することができる。この例では、ＲＧＢカラー画像データを入力画像として生成したが、本発明はこれに限定するわけではなく、グレイスケールの画像データでもよいし、また、Ｌ*ａ*ｂ*などの他の表色系を用いてもよい。

【００２４】画像データ記憶メモリ１０２は、画像入力処理部１０１により生成された画像データを記憶する。

【００２５】領域抽出処理部１０３では、画像データ記憶メモリ１０２に記憶されている画像データを基に類似する特徴（色や濃度、テクスチャなど）を持つ画素により構成される領域を抽出する。従来までに多くの領域を抽出する手法が提案されているが、例えば、非階層的クラスタリング、いわゆる、ｋ－平均領域分割手法を用いることができる。本実施例では、各画素の色相、彩度、明度を基に、ｋ－平均領域分割方法を用いて、画像を構成するすべての画素をクラスタリングする場合を示す。

本発明における領域は画像中の構成要素、例えば、顔や目などといったオブジェクトに対応するため、極端に小さなクラスタが得られてもあまり意味がない。従って、必要に応じて、クラスタを統合する処理を最後に行なってもよい。そして、同じクラスタに属する隣接画素をラベリングにより抽出することで、類似する特徴を持つ画素から構成される領域が抽出できる。ここで、ラベリングにより抽出された領域をすべて記憶する必要はなく、領域の大きさや総数などに対して閾値を設け、記憶する領域を制限してもよい。

【００２６】本実施例では、ｋ－平均領域分割およびラベリングにより領域抽出処理を行なったが、本発明はこれに限定するものではなく、類似する特徴を持つ画素により構成される領域を抽出できる手法であればどのような手法でも使用可能である。他の領域抽出手法としては、画像からエッジに当たる画素を抽出してこの画素によって構成される閉領域を領域として抽出する方法などがある。

【００２７】領域／領域属性記憶メモリ１０４は、領域抽出処理部１０３により抽出された領域を領域データとして記憶する。領域データの構成も種々の方法が考えられるが、この例では、図３に示すようなラベリング画像により領域データを構成し、領域／領域属性記憶メモリ１０４に記憶する。図中、一マスが１つの画素の対応し、マスの中の数値は対応する画素の属する領域に固有の番号（以降、領域番号と称する）である。本発明における領域データの構成方法はラベリング画像に限るわけではなく、画像中の各画素にユニークな番号を与えておいて各領域をその領域に属する画素に与えられたユニークな番号の集合で表す方法や、領域の輪郭点集合で表す方法などの他の方法を用いて領域データを構成してもよい。

【００２８】領域属性抽出処理部１０５では、領域／領域属性記憶メモリ１０４に記憶されている各々の領域に対応する属性を抽出する。抽出した属性は、対応する領域に関連づけて領域／領域属性記憶メモリ１０４に記憶する。本発明における属性とは、領域の色、大きさ、形状、テクスチャに関する性質を表すものであり、例えば、平均色相、彩度のヒストグラム、面積、絶対最大長、近似形状を表すパラメータ、丸さ（針状）の度合、平均エッジ強度、空間周波数などの特徴量を用いることができる。本発明は、抽出する属性を前述の特徴量に限定するものではなく、領域の色、大きさ、形状、テクスチャに関する性質を表す特徴量であれば何でもよい。しかし、領域の色、大きさ、形状に関する性質を表す特徴量を少なくとも各１つは用いることが好ましい。この例では、簡単にするために、テクスチャに関する特徴を除いた、領域の平均色相、平均彩度、平均明度、構成画素数、針状の度合、主軸方向を抽出する属性として用いる。これらの特徴を既知の方法により領域データから計

算して、例えば、図４に示すように領域番号と組にしたテーブル（以降、属性テーブルと称する）として、領域／領域属性記憶メモリ１０４に記憶できる。

【００２９】また、領域抽出処理部１０３で用いる領域抽出方法によっては、この領域抽出の過程において領域の属性に当たる特徴が算出できる。このような場合には、算出した時点でこの特徴を属性として対応する領域に関連づけて領域／領域属性記憶メモリ１０４に記憶することもできる。この例では、ｋ－平均領域分割の際に各領域の平均色相、平均彩度、平均明度が、ラベリングの際に各領域の構成画素数が算出できるので、領域抽出処理の中でこれらの属性を領域／領域属性記憶メモリ１０４に記憶するようにしている。また、ここで算出した属性（針状の度合、主軸方向）は、すべて領域データから算出できるが、用いる属性によっては（例えば、テクスチャに関する特徴）必要に応じて画像データ記憶メモリに記憶されている画像データを参照して属性を算出するように構成することもできる。

【００３０】画像構造抽出処理部１０６は、領域／領域属性記憶メモリ１０４に記憶されている領域データを用いて、各領域間の位相関係を抽出する。本発明における領域間の位相関係とは、一致／包含／重複／接合／排他などといった領域と領域の関係を指し、詳細な関係として領域間の距離と方向を持つようにすることもできる。この例では、領域分割により各領域を抽出したので、任意の２つの領域が重なり合うことはない。従って、２つの領域の位相関係は、「含んでいる／含まれている（包含）」か、「隣接している（接合）」か、「離れている（排他）」のいずれかになる。この領域間の位相関係は、領域／領域属性記憶メモリ１０４に記憶されている領域データ（ラベリング画像）を水平方向と垂直方向に走査して、各領域ごとに隣接している領域番号を抽出することで算出することができる。但し、この方法を用いる場合は、図５に示すように画像の外縁部分に画像外を表す領域を作成しておく必要がある。図中の「０」の数値でラベリングされた画素が画像外を表す領域である。各領域に隣接する領域を抽出した結果は、例えば、図６の隣接領域番号リストの項に示すようになる。この結果から、隣接している領域の数が１つしかない領域番号２と３の領域はその隣接している領域番号１の領域に含まれていることが分かる。そして、領域番号１の隣接領域番号リストから領域番号２と３を取り除くことで、含んでいるのでなく接合している領域のリストを得ることができる。また、当然ながら、最終的な位相関係を示す領域のリストからは画像外を表す領域（この例では領域番号が０の領域）は除かなければならない。本発明における位相関係の抽出方法は前述の方法に限定するものではない。また、この例では隣接関係を４近傍で算出したが８近傍で算出してもよい。領域間の詳細な関係として用いる領域間の距離と方向は、領域の重心の座標を基準と

した距離と方向を算出することで得ることができる。

【００３１】画像構造記憶メモリ１０７は、画像構造抽出処理部１０６で作成した領域間の位相関係を記憶する。この例では、図７に示すような、領域番号をノードに持ち、領域間の位相関係をエッジに持つグラフ構造（以降、画像構造グラフと称する）を作成して記憶する。領域間の詳細な関係として各領域間の距離と方向を算出している場合にはこれらの値もエッジに持たせることができる。図７に示した画像構造グラフは、図８に示したラベリング画像（１つの閉領域が１つの領域を表している）から作成したもので、図７に示した１から１１までの領域番号は、順に、顔面、左目、右目、口、左まゆ、右まゆ、髪の毛、左耳、右耳、首、背景の領域を指しているものとする。この例における画像構造グラフでは、包含もしくは隣接する領域間の関係のみを記述したが、重複を許すような領域を領域抽出処理部１０３で抽出した場合には、一致や重複などといった領域間の位相関係を追加することができる。

【００３２】オブジェクト抽出処理部１０８では、オブジェクト辞書１０９を参照しながら、画像構造記憶メモリ１０７に記憶された画像構造グラフからオブジェクトを抽出する。本発明におけるオブジェクトとは、「人の顔」や「木」などのものに固有の名称、および、「赤い円」や「白い四角」などの領域の属性による表現を指す。

【００３３】オブジェクト辞書１０９は、オブジェクトの名称とオブジェクトを構成する領域の属性および領域間の位相関係を記述したグラフ構造（以降、オブジェクトグラフと称する）とオブジェクト条件との組（以降、オブジェクト項目と称する）を複数保持している。オブジェクト辞書１０９に記憶しているオブジェクトグラフは、画像構造グラフと同じ形式である。異なる点は、属性の代わりにオブジェクトグラフの各ノードが示す番号に対応する属性条件を持っている点である。以降、オブジェクトグラフのノードが持つ番号を属性条件番号と称する。この属性条件とは、画像構造グラフとオブジェクトグラフとの対応するノードが適合するかどうかを調べるための条件である。また、オブジェクト条件とは、オブジェクトを構成する領域の属性間の相対的な関係に関する規則であり、例えば、領域Ａのは構成画素数領域Ｂの構成画素数の２倍以上、３倍以下といった条件である。図９に、「人の顔」というオブジェクトに対応する、オブジェクト項目とこのオブジェクト項目に対応する部分の属性条件の例を示す。図中、属性条件番号３０１が顔面、３０２と３０３が目、３０４が髪の毛に相当する。

【００３４】以下では、オブジェクト抽出方法の一例を図１０に示すフローチャートを参照しながら説明する。まず、領域／領域属性記憶メモリ１０４に記憶されている属性テーブルを構成画素数で降順にソートする（Ｓ２０１）。これは、面積の大きな領域ほど主要な構成要素である可能性が高いという経験則に基づく。以降の処理は、ソートされた属性テーブルの領域（領域番号）を順に処理対象とする（Ｓ２０２）。オブジェクト辞書１０９に登録してある属性条件を検索して、処理対象の領域の属性が条件を満たしている属性条件番号のリストを作成する（Ｓ２０３）。このリストの属性条件番号を持つオブジェクトグラフと画像構造グラフとを比較する（Ｓ２０４）。この比較は、処理対象の領域番号を持つ画像構造グラフのノードとＳ２０３で抽出された属性条件番号を持つオブジェクトグラフのノードを一致させた上で、このオブジェクトグラフの持つノードに対応するすべての属性条件とエッジに対応する位相関係が画像構造グラフの一部またはすべてに適合するかどうかを調べる。これが適合した場合には更に、この属性条件番号に対応するオブジェクト条件を適用して、最終的に適合するかしないかを求める（Ｓ２０５）。最終的に適合しないと判断された場合には、Ｓ２０８の処理を行なう。適合した場合は、画像構造グラフの適合した部分グラフを対応するオブジェクトで置換する（Ｓ２０６）。この置換はオブジェクトを一意に決定することのできる番号を持つノードによるものであり、例えば、オブジェクト辞書１０９に登録されている対応するオブジェクト項目の番号（オブジェクト番号と称する）を用いることができる。この置換に伴って、エッジの削除やエッジに対応している位相関係や領域間の距離と方向の修正も行なう。距離と方向を算出するためのオブジェクトの重心は、オブジェクトに置換された画像構造グラフの部分グラフに含まれている領域を統合した領域から算出することができる。そして、オブジェクトに置換された画像構造グラフの部分グラフに含まれている領域番号およびこれに対応する属性をＳ２０１でソートされた属性テーブルから削除する（Ｓ２０７）。Ｓ２０８ではすべての領域について処理を行なったどうかを調べて、未処理の領域が残っていればＳ２０２に戻って処理を繰り返す。

【００３５】オブジェクト抽出処理部１０８の結果、画像構造グラフに含まれているいくつかの部分グラフがオブジェクトに置換され、画像構造グラフの各ノードにオブジェクト番号もしくは領域番号を持つようなグラフが得られる。図７に示す画像構造グラフに対してオブジェクト抽出処理を行ない、これが図９に示したオブジェクト辞書１０９に登録してあるオブジェクトグラフに適合した結果得られるグラフを図１１に示す。図７の領域番号１，２，３，７がそれぞれ図９の属性条件番号３０１，３０２，３０３，３０４に適合し、図９に示したオブジェクト条件も満たしているものとする。各ノード間のエッジ（位相関係）が適合しており、図７の領域番号１，２，３，７からなる部分グラフが「人の顔」というオブジェクトに対応するオブジェクト番号１００を持つノードに置換されている。

【００３６】ここでは、ものの固有の名称をオブジェクトとする例を示したが、オブジェクト辞書１０９に「赤い円」や「白い四角」などといった領域の属性に関する表現をオブジェクトの名称とするようなオブジェクト項目を作成することで、「赤い円」や「白い四角」などといったオブジェクトを抽出することができる。

【００３７】また、この例では、オブジェクトグラフと画像構造グラフの比較は各ノードやエッジが適合するかしないかでオブジェクトの抽出を行なったが、ここに適合度という概念を取り入れて、最も適合度の高い画像構造グラフの部分グラフを対応するオブジェクトで置換するようにすることもできる。例えば、オブジェクト辞書１０９に保持している属性条件を属性を与えることによりその適合度を返すような関数、例えば、ファジィ関数で構成することにより実現できる。

【００３８】本発明におけるオブジェクト辞書１０９は予め作成しておく必要がある。この作成方法に例としては、複数の人の顔の画像に対して前述してきたような画像構造グラフを作成し、複数の画像構造グラフを得る。そして、複数の画像構造グラフで対応するノード（領域）の属性と共通するエッジの位相関係から「人の顔」というオブジェクトに対応するオブジェクトグラフを作成することができる。また、得られた複数の画像構造グラフのノードが持つ属性間の関係のうち、共通すると見なせる関係をオブジェクト条件とすることができる。

【００３９】キーワード抽出処理部１１０は、オブジェクト抽出処理部１０８により部分グラフがオブジェクトに置換された画像構造グラフを解析してオブジェクトとオブジェクト間の関係をキーワードとして抽出する。この例では、画像構造グラフ中に存在するオブジェクト番号から定まるオブジェクト（ものに固有な名称）とオブジェクトの画像中における相対的な位置、例えば、「人の顔」というオブジェクトとこのオブジェクトのの位置として「人の顔は画像の中央」というキーワードが抽出できる。また、オブジェクト間の関係として、抽出したオブジェクトの間の相対的な位置関係、例えば、「自動車の左上に信号機」というキーワードを抽出できる。

【００４０】画像登録処理部１１１は、キーワード抽出処理部１１０で抽出されたキーワードを入力画像に関連づけて蓄積装置（図示せず）に登録する。

【００４１】以上、説明した画像登録装置を用いることで、画像の登録時に人手によりキーワードを付与する手間を省き、キーワードを指定することで容易かつ高速に目的の画像を検索する検索装置を構成することができる。但し、本発明による画像登録装置によって抽出され画像とともに登録されるキーワードは主としてもの固有な名称であるため、検索時に検索キーとして指定されたキーワードの類義語も検索キーに加えて検索するように画像検索装置を構成するほうが好ましい。

【００４２】

【発明の効果】以上、説明したように、本発明によれば、登録したい画像を入力するだけで、自動的に客観性のあるキーワードを画像から抽出して、画像とともにデータベースに登録できるため、登録者が画像を登録する時にキーワードを付与する手間を省くことができる。また、検索は画像とともに登録されたキーワードを基に行なうため、検索キーの指示が容易であり、また検索装置の構成も単純にできる。

【図面の簡単な説明】

【図１】　本発明の実施例の画像登録装置を全体として示すブロック図である。

【図２】　実施例の画像登録装置の構成例を示すブロック図である。

【図３】　実施例における領域データを表現するラベリング画像の例を示す図である。

【図４】　実施例の属性テーブルの例を示す図である。

【図５】　実施例において領域間の位相関係を抽出する際に用いるラベリング画像の例を示す図である。

【図６】　実施例において領域ごとの隣接領域を抽出した例を示す図である。

【図７】　実施例の画像構造グラフの例を示す図である。

【図８】　図７の画像構造グラフに対応するラベリング画像の例を示す図である。

【図９】　実施例のオブジェクト辞書の例を示す図である。

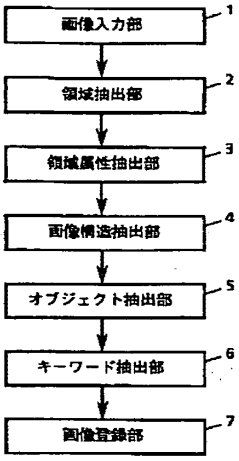
【図１０】　実施例のオブジェクト抽出処理方法の処理フローの例を示す図である。

【図１１】　実施例のオブジェクト抽出処理後の画像構造グラフの例を示す図である。

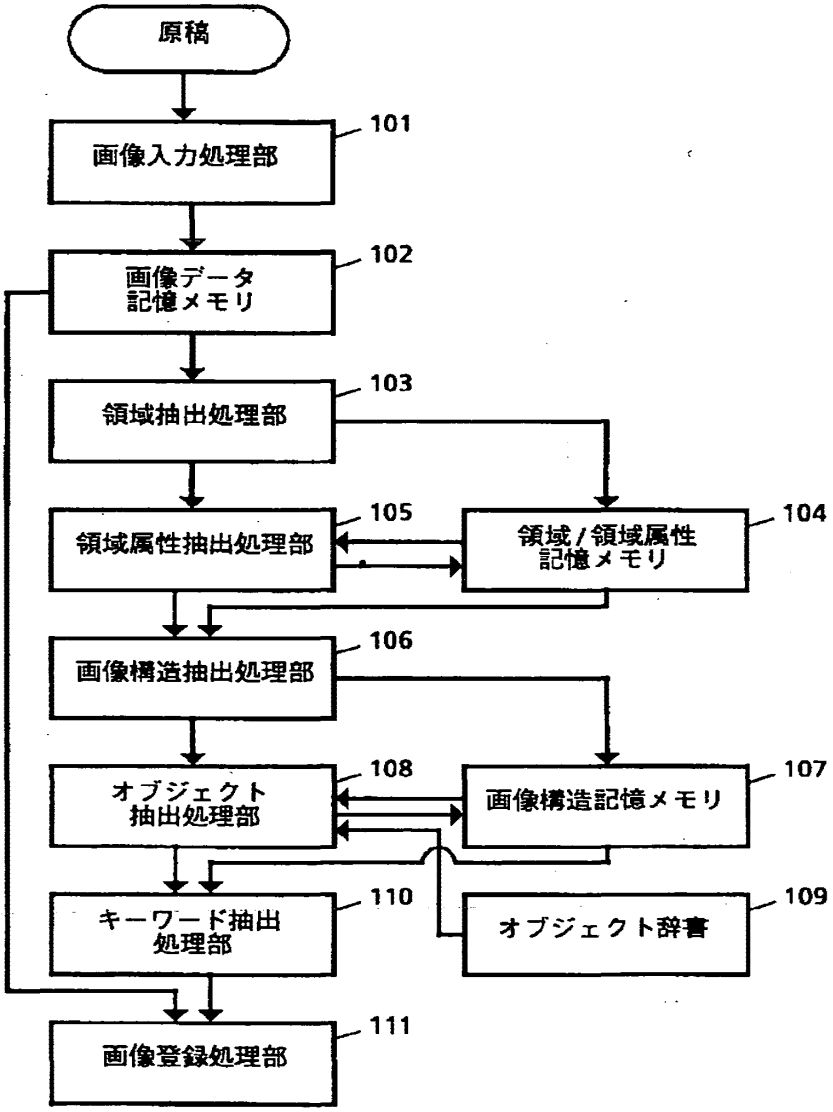
【符号の説明】

１　画像入力部
２　領域抽出部
３　領域属性抽出部
４　画像構造抽出部
５　オブジェクト抽出部
６　キーワード抽出部
７　画像登録部
１０１　画像入力処理部
１０２　画像データ記憶メモリ
１０３　領域抽出処理部
１０４　領域　／　領域属性記憶メモリ
１０５　領域属性抽出処理部
１０６　画像構造抽出処理部
１０７　画像構造記憶メモリ
１０８　オブジェクト抽出処理部
１０９　オブジェクト辞書
１１０　キーワード抽出処理部
１１１　画像登録処理部

【図１】



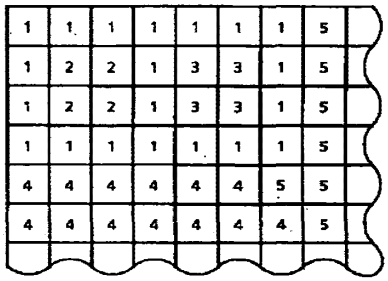
【図２】



【図６】

領域番号	隣接領域番号リスト	含んでいる領域のリスト	含まれている領域	接合している領域のリスト
1	0, 2, 3, 4, 5, …	2, 3, …	-	4, 5, …
2	1	-	1	-
3	1	-	1	-
4	0, 1, 5, …	-	-	1, 5, …
…	…	…	…	…

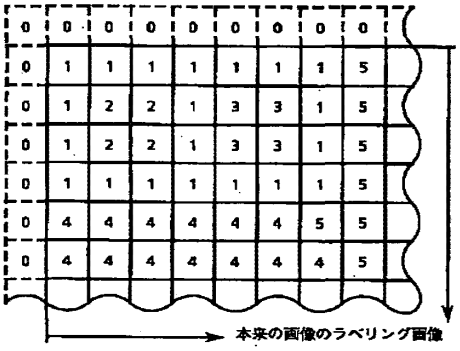
【図３】



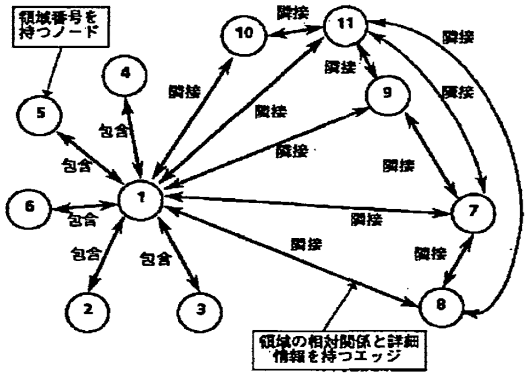
【図４】

領域番号	平均色相	平均彩度	平均明度	領域の大きさ	針状の度合い	主軸方向
1	0.1	0.4	0.5	20	0.4	0
2	0.5	0.3	0.8	4	0	0
3	0.5	0.3	0.8	4	0	0
…	…	…	…	…	…	…

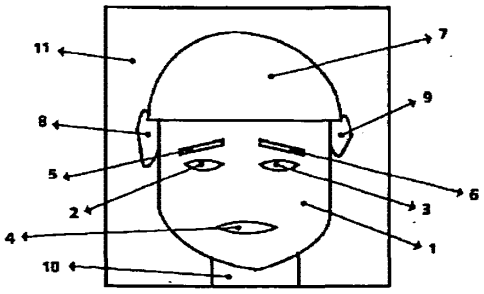
【図５】



【図７】



【図８】



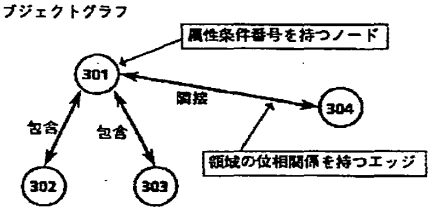
【図９】

●オブジェクト項目

オブジェクトの名称

「人の顔」

オブジェクトグラフ



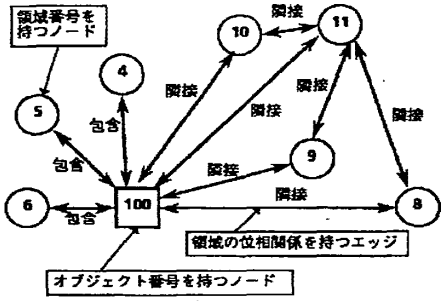
オブジェクト条件

- 構成画素数について領域2は領域3の0.9倍以上1.1倍以下
- 構成画素数について領域1は領域4より大きい

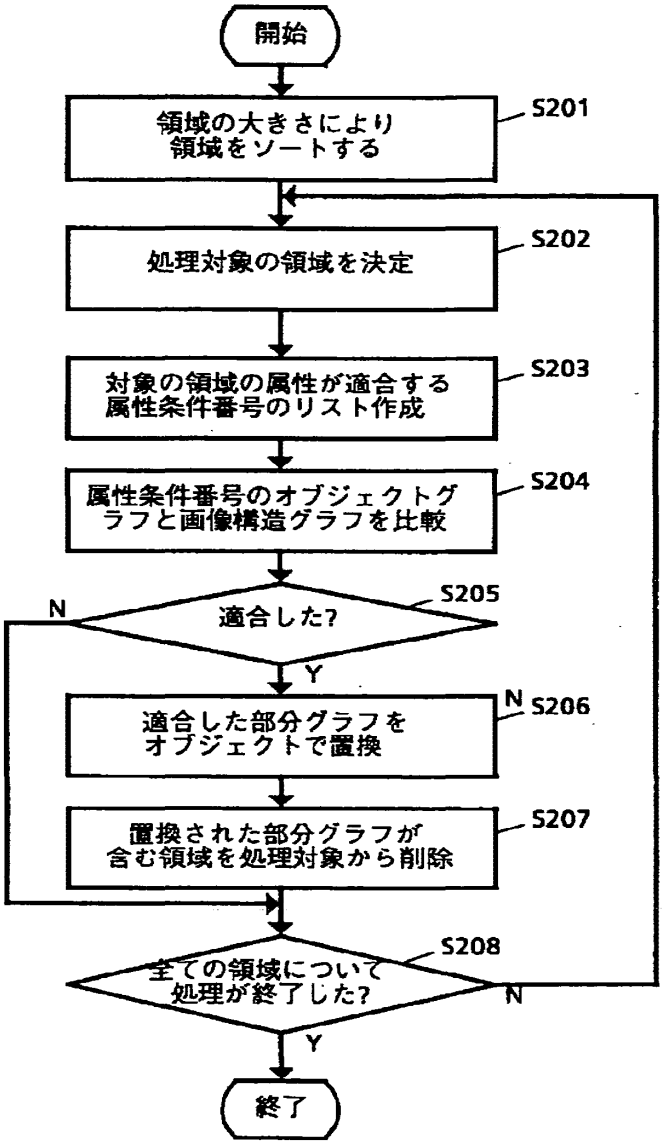
●属性条件

属性条件番号	平均色相	平均彩度	平均明度	針状の度合	主軸方向
…	…	…	…	…	…
301	0.1以上 0.3以下	0.2以上	-	0.2以下	-
302	-	0.1以下	0.1以下	0.6以上	-10度以上 10度以下
303	-	0.1以下	0.1以下	0.6以上	-10度以上 10度以下
304	-	0.01以下	0.1以下	0.3以下	-
…	…	…	…	…	…

【図１１】



【図１０】


開始
領域の大きさにより
領域をソートする
S201
処理対象の領域を決定
S202
対象の領域の属性が適合する
属性条件番号のリスト作成
S203
属性条件番号のオブジェクトグ
ラフと画像構造グラフを比較
S204
適合した?
S205
N
Y
適合した部分グラフを
オブジェクトで置換
N
S206
置換された部分グラフが
含む領域を処理対象から削除
S207
全ての領域について
処理が終了した?
S208
N
Y
終了

PATENT ABSTRACTS OF JAPAN

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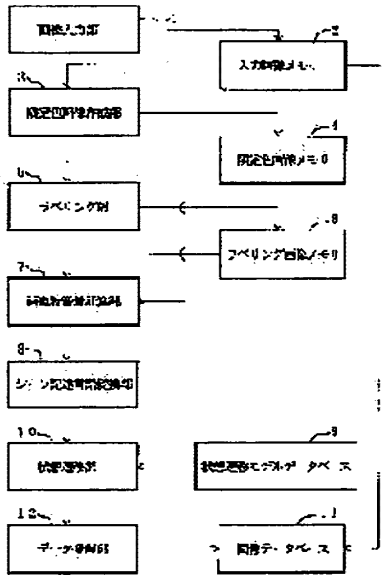
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(54) IMAGE DATA BASE DEVICE

(57)Abstract:
PURPOSE: To provide a versatile image data base device by enabling automatic extraction from an image by using a concept of higher level as a key word and lightening the operation burden at the time of registration, and enabling even an image which does not match with a state transition model to be registered and retrieved.
CONSTITUTION: The image data base device divides an input image inputted by an image input part 1 into segments, converts an image feature quantity of each segment calculated by an image feature quantity calculation part 7 into a scene description language by a scene description language conversion part 8, shifts the scene description language of each segment to a concept of stratum as high as possible by a state transition part 10 on the basis of the state transition model, and registers the final state of each segment and the scene description language of a segment having no state transition as key words in an image data base 11 by a data registration part 12 together with the input image.



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CLAIMS

[Claim(s)]
[Claim 1] An image storage means to match an image with a keyword and to memorize it, and an image input means to input an image, The image division means which carries out field division of the input image, and an image characteristic quantity calculation means to calculate the image characteristic quantity of each divided field, A scene description language conversion means to change image characteristic quantity into a scene description language, A state-transition model storage means to memorize a state-transition model, and a state-transition means to perform processing which makes the condition of each field change to a high order hierarchy as long as the scene description language of each field suits the transition Ruhr of a state-transition model, About the field where the condition changed by processing of the above-mentioned state-transition means, make the final state of this field into a keyword, and a scene description language is made into a keyword about the field where a condition did not change. Image database equipment characterized by having the registration means made to memorize to the above-mentioned image storage means with the above-mentioned input image.
[Claim 2] A retrieval demand input means by which a retrieval person inputs a retrieval demand, and a retrieval demand analysis means to create the retrieval keyword at the time of analyzing the inputted retrieval demand and performing a search, While having further an image retrieval means to search an image from an image storage means according to the above-mentioned retrieval keyword, and an image presentation means to show the image of a retrieval result to a retrieval person When the above-mentioned retrieval demand analysis means is in the condition that the inputted retrieval demand exists in a state-transition model While the transition Ruhr is gone back from this condition and this condition and the above-mentioned image retrieval means is passed by making into a retrieval keyword all the conditions that can reach When the inputted retrieval demand does not exist as a condition in a state-transition model Image database equipment according to claim 1 characterized by passing the above-mentioned image retrieval means by making into a retrieval keyword the scene description language which the retrieval person was made to input a scene description language as a retrieval demand with a retrieval demand input means, and was inputted.
[Claim 3] It is image database equipment according to claim 1 with which the above-mentioned registration means is characterized by making it memorize to the above-mentioned image storage means by making the above-mentioned positional information into a keyword about the field where the condition changed by processing of a state-transition means in addition to the above-mentioned final state while a scene description language includes the positional information which shows the location of each field in an input image.
[Claim 4] In case the above-mentioned image retrieval means searches an image according to a retrieval keyword, when a retrieval keyword is in the condition in a state-transition model While giving a score to the image which has a retrieval keyword and a keyword in agreement according to the hierarchy in the state-transition model of this condition, when a retrieval keyword is a scene description language The scene description language in which it moves and the condition of the lowest hierarchy of the state-transition model which can reach has the keyword of the image memorized by the image storage means

to the transition Ruhr, While giving a score to the image which compares the scene description language as the above-mentioned retrieval keyword, and is memorized by the above-mentioned image storage means according to whenever [coincidence] Image database equipment according to claim 2 with which the above-mentioned image presentation means is characterized by showing the image to which the score higher than a predetermined score was given as a retrieval result.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention accumulates image information in large quantities, and relates to the image database equipment which carries out automatic extracting of the keyword from an image especially in the case of registration of an image about the image database equipment with which an image can be searched by giving a keyword.
[0002]
[Description of the Prior Art] The expectation for the image database equipment for searching a required image efficiently from the image information accumulated in large quantities in recent years is growing. Although the image database equipment with which the image corresponding to this keyword is extracted is known if a registrant registers into coincidence the keyword which is the semantic information on that image by manual input and a keyword is inputted by the retrieval person at the time of retrieval in case an image is registered conventionally Since it is not efficient that a registrant inputs a keyword manually to all images, the various attempts for performing automatic extracting of a keyword from an image are made using image recognition or an image comprehension technique.
[0003] As such an attempt, for example, the image database equipment with which (1) retrieval person inputs a sensibility word and the image corresponding to the sensibility word is searched ("image retrieval which was adapted for subjective similarity": the Information Processing Society of Japan paper magazine, Vol.31, and no.2 (1990) reference), (2) The image database equipment ("the image database in consideration of keyword automatic extracting": Information Processing Society of Japan technical report '91-valve flow coefficient-73-1 reference) using a state-transition model etc. is known.
[0004]
[Problem(s) to be Solved by the Invention] However, the above-mentioned conventional configuration (1) and (2) have the following troubles, respectively.
[0005] First, it is the configuration of creating the map to the sensibility word which reflects a user's subjectivity scale from the color description which an image has based on a sample image, and referring to the equipment of the above (1) by inputting this sensibility word at the time of retrieval. For this reason, while choosing and using the suitable sample image for map creation time, since a sensibility word is subjective, it is lacking in versatility, and it has the trouble that adjustment of a map is required, by the retrieval person.
[0006] Moreover, it has the trouble that it is lacking in versatility since the extract of a keyword is completely dependent on a state-transition model, and it cannot refer to the equipment of the above (2) at all to what does not correspond to a model since a keyword is not given. Moreover, at the time of retrieval, it is required for a retrieval person to input only superordinate concepts, such as "soccer", as a keyword, scene description becomes a thing only depending on a model, and a retrieval person's volition is not reflected.
[0007] This invention aims at realizing the high image database equipment of versatility while it was made in view of each above-mentioned trouble and can extract the keyword of more advanced

conceptual level from an image automatically at the time of registration of an image.
[0008]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the image database equipment of this invention according to claim 1 An image storage means to match an image with a keyword and to memorize it, and an image input means to input an image, The image division means which carries out field division of the input image, and an image characteristic quantity calculation means to calculate the image characteristic quantity of each divided field, A scene description language conversion means to change image characteristic quantity into a scene description language, A state-transition model storage means to memorize a state-transition model, and a state-transition means to perform processing which makes the condition of each field change to a high order hierarchy as long as the scene description language of each field suits the transition Ruhr of a state-transition model, About the field where the condition changed by processing of the above-mentioned state-transition means, make the final state of this field into a keyword, and a scene description language is made into a keyword about the field where a condition did not change. It is characterized by having the registration means made to memorize to the above-mentioned image storage means with the above-mentioned input image.
[0009] Image database equipment according to claim 2 is set to equipment according to claim 1. A retrieval demand input means by which a retrieval person inputs a retrieval demand, and a retrieval demand analysis means to create the retrieval keyword at the time of analyzing the inputted retrieval demand and performing a search, While having further an image retrieval means to search an image from an image storage means according to the above-mentioned retrieval keyword, and an image presentation means to show the image of a retrieval result to a retrieval person When the above-mentioned retrieval demand analysis means is in the condition that the inputted retrieval demand exists in a state-transition model While the transition Ruhr is gone back from this condition and this condition and the above-mentioned image retrieval means is passed by making into a retrieval keyword all the conditions that can reach When the inputted retrieval demand does not exist as a condition in a state-transition model, it is characterized by passing the above-mentioned image retrieval means by making into a retrieval keyword the scene description language which the retrieval person was made to input a scene description language as a retrieval demand with a retrieval demand input means, and was inputted.

[0010] In equipment according to claim 1, image database equipment according to claim 3 is characterized by for the above-mentioned registration means to make it memorize to the above-mentioned image storage means by making the above-mentioned positional information into a keyword about the field where the condition changed by processing of a state-transition means in addition to the above-mentioned final state while a scene description language includes the positional information which shows the location of each field in an input image.
[0011] Image database equipment according to claim 4 is set to equipment according to claim 2. In case the above-mentioned image retrieval means searches an image according to a retrieval keyword, when a retrieval keyword is in the condition in a state-transition model While giving a score to the image which has a retrieval keyword and a keyword in agreement according to the hierarchy in the state-transition model of this condition, when a retrieval keyword is a scene description language The scene description language in which it moves and the condition of the lowest hierarchy of the state-transition model which can reach has the keyword of the image memorized by the image storage means to the transition Ruhr, The scene description language as the above-mentioned retrieval keyword is compared, and while giving a score to the image memorized by the above-mentioned image storage means according to whenever [coincidence], the above-mentioned image presentation means is characterized by showing the image to which the score higher than a predetermined score was given as a retrieval result.
[0012]
[Function] According to the configuration according to claim 1, the image characteristic quantity calculated from each field of the divided input image is changed into a scene description language. As long as the scene description language of each field suits the transition Ruhr of a state-transition model,

the final state of the field about the field where the condition of each field changed [in] to the superordinate concept, and the condition changed as a keyword Moreover, about the field where a condition did not change, the scene description language of the field is memorized by the image storage means with an input image as a keyword.
[0013] Since a scene description language is automatically given as a keyword and is memorized by the image storage means also to the image which has by this the concept which does not suit a state-transition model Since a registrant does not need to give a keyword in case an image is registered, while becoming possible to mitigate a registrant's activity burden, if a scene description language is given as a keyword, the above-mentioned image can be searched at the time of retrieval. That is, flexible retrieval is attained while the versatility of image database equipment improves, since the class of image in which storage and retrieval are possible is not limited with the state-transition model which image database equipment holds.
[0014] When the retrieval demand which the retrieval person inputted exists as a condition in the state-transition model which image database equipment holds according to the configuration according to claim 2 The transition Ruhr is gone back from this condition and the above-mentioned condition. All the conditions of the low order hierarchy who can reach An image retrieval means is passed as a retrieval keyword, the image with which an image retrieval means has this retrieval keyword and a keyword in agreement is searched from an image storage means, and that retrieval result is shown to a retrieval person. On the other hand, when the retrieval demand which the retrieval person inputted does not exist as a condition in the state-transition model which image database equipment holds, the scene description language which the retrieval person was made to input with a retrieval input means is passed to an image retrieval means as a retrieval keyword, and an image retrieval means searches an image according to the scene description language passed as a retrieval keyword.
[0015] Even if it is the case where retrieval of the image which does not suit by this the state-transition model which image database equipment holds is required, a scene description language is made to input as a retrieval demand, and it becomes possible to search an image according to this scene description language. Consequently, it is lost with image database equipment that the class of image in which storage and retrieval are possible is limited with a state-transition model, and it becomes possible to raise the versatility of image database equipment.
[0016] According to the configuration according to claim 3, about the field where the condition changed to the high order hierarchy by processing of a state-transition means Since the location in the input image of the field is registered [final state / of a field] with an input image as a keyword In case it searches, when a retrieval person performs the assignment a "person" as a condition of a "center section" and a field as positional information, it becomes possible to give the conditions of "the image with which a person exists in a center section", and to search an image. Consequently, retrieval effectiveness can be raised, while becoming possible to search by directing more concretely the image image for [which the retrieval person is holding] retrieval to image database equipment and attaining the flexible retrieval in which a retrieval person's volition was reflected.
[0017] According to the configuration according to claim 4, the image searched as a retrieval keyword the condition in a state-transition model The image searched considering the scene description language as a retrieval keyword by giving such a high score that a hierarchy becoming high according to the hierarchy in the state-transition model of the above-mentioned condition The scene description language which goes back the transition Ruhr from the keyword of the image memorized by the image storage means, and the condition of the lowest hierarchy of the state-transition model which can reach has, Only the image to which the scene description language as the above-mentioned retrieval keyword was compared, such a high score that whenever [coincidence] becomes high was given to, and the score higher than a predetermined score was given is shown as a retrieval result to a retrieval person.
[0018] Since the high image of possibility are the image for which a retrieval person asks will be shown by this, while becoming possible to raise the retrieval effectiveness at the time of a retrieval person choosing a desired image from the image shown as a retrieval result etc., possibility that the image which was widely different from the image for which a retrieval person asks will be shown can decrease,

and the dependability of image database equipment can raise.
[0019]
[Example] It will be as follows if one example of this invention is explained based on drawing 1 thru/or drawing 6 . As the image database equipment in this example is image database equipment with which a color picture is registered and searched and is shown in drawing 1 as a configuration about registration of an image The image input section 1 (image input means) for inputting the image database 11 which accumulates an image and its keyword, and the image registered into a database, The input image memory 2 for accumulating the image inputted from this image input section 1, The limited color image creation section 3 (image division means) which divides the whole image into two or more fields, and creates a limited color image while inputting the full color image accumulated in this input image memory 2 and carrying out subtractive color of that color number, The limited color image memory 4 which accumulates this limited color image, and the labeling section 5 which carries out labeling of the above-mentioned limited color image, and creates a labeling image, The labeling image memory 6 which accumulates a labeling image, and the image characteristic quantity count section 7 (image characteristic quantity calculation means) which calculates the image characteristic quantity of each field, The scene description language transducer 8 (scene description language conversion means) which changes image characteristic quantity into a scene description language, The state-transition model database 9 (state-transition model storage means) which accumulated the Ruhr for the condition of each above-mentioned field to change, It has the state-transition section 10 (state-transition means) which makes the condition of each field change, referring to this state-transition model database 9, and the data registration section 12 (registration means) which registers the input image of the input image memory 2 to the above-mentioned image database 11 with a keyword.
[0020] Here, a state-transition model is explained. It is a model for bringing more the condition of the segment which serves as a state transition diagram as indicated to be a state-transition model to drawing 6 from the transition Ruhr, and mentions later the actuation in which a condition will change to a high order hierarchy as an arrow head shows if the transition Ruhr in this drawing set [in / for example / conditions, such as "Human" and "Human-hair",] up beforehand is filled by repeating as long as the transition Ruhr filled exists close to a superordinate concept.
[0021] Here, registration of the color picture by the above-mentioned configuration is explained below, referring to the flow chart shown in drawing 2 . In addition, in this example, the color picture registered presupposes that each element of (Red R), green (G), and blue (B) is the full color image expressed with the 8 bits (256 gradation from 0 to 255) digital data, respectively.
[0022] First, the color picture which it is going to register into an image database is inputted by the image input section 1, and is accumulated in the input image memory 2 (it writes like S1 step 1 and the following).
[0023] Next, although a body etc. is recognized from this input image, it is necessary to cut down first the body which serves as a candidate for recognition from an image for this recognition. Here, since an input image is a full color image, it uses the technique of color segmentation of extracting the field constituted by the same color. That is, create the limited color image which limited the color to 16 color extent from the full color input image which the limited color image creation section 3 took out from the input image memory 2 (S2), and the labeling section 5 sets in the limited color image created by the above S2. The same label is given to the connection field of the same color, and an image is divided into two or more fields by making into one connection field the field which has the same label (S3). Henceforth, suppose that each of these divided fields is called a segment.
[0024] Next, the image characteristic quantity count section 7 computes image characteristic quantity, such as the pulse duty factor and circularity to area, a circumscription rectangle, a color, the direction of a main shaft, and the direction of a main shaft, and a center of gravity, about each segment, respectively, and (S4) and the scene description language transducer 8 create the scene description language of each segment from the computed image characteristic quantity (S5). in addition, this scene description language is in every direction in the magnitude of a segment, and the whole input image -- when it trichotomizes, respectively and divides into nine blocks, it consists of two or more kinds of parameters

which express the block location where an applicable segment is contained, the color of a segment, the configuration of a segment, and the direction of a main shaft of a segment, respectively.
[0025] In S6 continuing, the state-transition section 10 does as follows the activity which determines the concept of each segment based on the scene description language of each segment, and the state-transition model accumulated in the state-transition model database 9.
[0026] That is, the state-transition section 10 will make the condition of this segment change to the hierarchy on one, if it investigates whether the scene description language created by the above S5 to each segment is filling the transition Ruhr of a state-transition model sequentially from the subordinate concept of a state-transition model and the transition Ruhr is filled.
[0027] A state-transition model as shown in drawing 6 is more specifically given, and if the parameter which shows the color of the segment in the scene description language of a certain segment is "black", this segment will fill the transition Ruhr, will change to 1 hierarchy high order from "Color-segment" which is the lowest concept, and will serve as "Black-segment." Furthermore, when the scene description language of this segment fulfills the conditions which may be the image of human being's hair part, it means that the transition Ruhr was filled further and changes to 1 hierarchy high order to a pan. Thereby, this segment is recognized as a segment which has conceptual "Human-hair" that it is human being's hair.
[0028] To the above-mentioned state-transition model, moreover, for the hyperfractionation at the time of the field division in S3, shading, etc. Since what is originally one body corresponds to the body divided into the multiple segment, the body which consists of two or more colors The transition Ruhr as the field integrated Ruhr which performs only integration of segments, without making a condition change in the hierarchy of a high order is also included comparatively, the segments which fill this field integrated Ruhr are unified, and they are recognized as a segment which has one new concept.
[0029] A state-transition model as shown in drawing 6 is more specifically given, when the segment which has above-mentioned conceptual "Human-hair" as a segment contained in an input image, and the segment which has conceptual "Human-skin" that it is the image of human being's skin part exist, these segments are unified as what fills the field integrated Ruhr, and it is recognized as one segment which has conceptual "Human-face" that it is the image of human being's face part.
[0030] After it is repeated until no condition of the segments in an input image stops changing, and this actuation is completed, the data registration section 12 registers the above-mentioned actuation of S6 into an image database 11 with the image inputted by the above S1 by making into a keyword concepts, such as the final state searched for by the above S6 from each segment, i.e., above-mentioned "Human-face" etc., (S7). In addition, about the segment which changed to the concept of a high order rather than the predetermined hierarchy, the positional parameter of a scene description language is also registered with the above-mentioned keyword to an image database 11 at this time. Moreover, about the segment to which a condition did not change at all in the above S6, a scene description language is registered as a keyword.
[0031] In addition, with the above-mentioned state-transition model, on the low order hierarchy of a state-transition model, the importance of a scene description language becomes low, and the field integrated Ruhr is set up so that segments may be unified preferentially, as importance is attached to a scene description language, the transition Ruhr is set up so that a condition may be made to change, and it becomes a high order hierarchy. Thus, while raising versatility by making a condition change by the scene description language on a low order hierarchy, the dependability of recognition is raised by the high order hierarchy by seldom depending on a scene description language, but seeing the relation between segments etc. globally, and performing a state transition.
[0032] In addition, here explains creation of the limited color image in the above S2 in more detail based on the flow chart shown in drawing 3 .
[0033] First, the limited color image creation section 3 creates the histogram of a full color input image (S21). Since each of R-G-B is expressed by 256 gradation, each color in an image is expressed with this example as a point in the cube of the 1 side 256 (from 0 to 255) which is among RGB space. It divides into the cube of the this 1 called a cel in the cube of 256 one side side 8. Next, the RGB value of the

pixel in an image is calculated, it asks for to which cel the pixel belongs all over RGB space, and only 1 makes the frequency value of the cel to which the pixel belongs increase. This processing is performed to all pixels and a histogram is created.
[0034] Next, the mode cel which is a cel with the largest frequency value is detected in the created histogram (S22), the color which this mode cel expresses is made into a representation color, and the color of the cel contained in the ball of the radius to which this mode cel is beforehand given as a core is replaced in the above-mentioned representation color. Thus, it repeats until it excepts the cel as which the color was determined from an object and an object cel is lost in return and the same processing to S22. Subtractive color of the color number of a full color image can be carried out to 16 color extent by making the above-mentioned radius at the time of performing these processings adjust suitably. That is, when there is little color number, the above-mentioned radius can be made small, the number of the cels which can be expressed with one representation color by enlarging the above-mentioned radius in many can be adjusted, and the color number can be brought close to the number of hope.
[0035] Next, as explained above, in order that a retrieval person may search an image from the image database 11 with which the image is registered with the keyword, retrieval actuation of the image by the configuration with which the image database equipment of this example is equipped, and this configuration is explained, referring to drawing 4 and drawing 5 .
[0036] Further in addition to the configuration about registration of the image mentioned above, as shown in drawing 4 , the image database equipment of this example The retrieval demand input section 21 (retrieval demand input means) for the retrieval person who searches to input a retrieval demand, The retrieval demand analysis section 22 (retrieval demand analysis means) which analyzes the inputted retrieval demand, It is the configuration equipped with the retrieval section 23 (image retrieval means) which searches the image which corresponds based on the analysis result of a retrieval demand from an image database 11, and the image presentation section 24 (image presentation means) which shows a retrieval person the image searched by the retrieval section 23.
[0037] In the above-mentioned configuration, in searching the image accumulated in the image database 11, a retrieval person inputs first the name of the structure which constitutes the image to search by the retrieval demand input section 21 as a retrieval demand (S11). When it explains more concretely and a retrieval person, for example, wants to search an image including a person, it is "Human" as a name of a structure. It will input.
[0038] If a retrieval demand is inputted, the retrieval demand analysis section 22 will look for the state-transition model database 9. The concept which is in agreement with the name of the structure inputted as a retrieval demand by S11 If contained in the state-transition model accumulated in the state-transition model database 9 (S12), return and the retrieval demand input section 21 will direct to input the retrieval demand about the location of the above-mentioned structure in an image to S11 to a retrieval person.
[0039] Thereby, a retrieval person becomes possible [creating a retrieval demand, such as "an image in which a person is right in the middle",]. Consequently, while becoming possible to search by directing more concretely the image image for [which the retrieval person is holding] retrieval to image database equipment and attaining the flexible retrieval reflecting a retrieval person's volition, the effectiveness that retrieval effectiveness improves is done so. However, a retrieval person does not necessarily need to follow the above-mentioned directions, and can also progress to S13 which is the following step, without inputting the retrieval demand about a location.
[0040] If the concept which is in agreement with the name of the structure inputted as a retrieval demand on the other hand does not exist in the state-transition model accumulated in the state-transition model database 9 (S12), return and the retrieval demand input section 21 make a retrieval person input the retrieval demand by the scene description language into S11. In addition, as described above as the scene description language, it is the location to magnitude and the whole input image, the color, the configuration, and the direction of a main shaft of an object. However, it is not necessary to input these [all] as a retrieval demand.
[0041] Thus, when the location or a desired concept does not exist in a state-transition model if needed

[the concept and if needed] which exist in a state-transition model, a scene description language is passed to the retrieval section 23 as a retrieval demand. In addition, the above S11 and S12 is repeated until a retrieval person ends creation of all retrieval demands (S13).
[0042] In addition, the user interface in the retrieval demand input section 21 for a retrieval person to input a retrieval demand For example, if the concept included in the state-transition model in the menu screen by GUI (Graphical User Interface) is displayed as an icon and a retrieval person chooses a desired thing from these icons According to [the concept corresponding to the selected icon is able to be passed to the retrieval section 23 as a retrieval demand, and] this, the operability for a retrieval person can be raised. Moreover, when the concept corresponding to the structure of a request of a retrieval person is not displayed as an icon (i.e., when the desired concept is not included in a state-transition model), it can also be directed to make various kinds of parameters of a scene description language input in the pictures.
[0043] The retrieval section 23 searches the image which corresponds from an image database 11 based on the above-mentioned retrieval demand (S14), and the image presentation section 24 presents the retrieval result of the retrieval section 23 to a retrieval person (S15).
[0044] Here, the above-mentioned retrieval actuation is explained more to a detail using the example of the state-transition model shown in drawing 6 .
[0045] The retrieval demand analysis section 22 performs processing which is different whether the inputted retrieval demand is the concept which exists in a state-transition model, or it is a scene description language. Processing when the concept which exists in a state-transition model is first inputted as a retrieval demand is explained. Here, it is name "Human" of a structure by the retrieval person. As it is inputted as a retrieval demand and shown in drawing 6 , it is "Human" to a state-transition model. Suppose that it exists as a concept.
[0046] When existing in a state-transition model judges the above-mentioned retrieval demand in the analysis of the retrieval demand analysis section 22, the retrieval demand analysis section 22 is this retrieval demand "Human". It considers as a retrieval keyword and delivery and the retrieval section 23 search an image database 11 based on this retrieval keyword to the retrieval section 23. If the image whose "Human" is a keyword is registered into the image database 11 as a result of retrieval, let this image be a candidate image. furthermore, the retrieval demand analysis section 22 -- the above-mentioned state-transition model -- setting -- "Human" from -- delivery and the image with which the retrieval section 23 has this retrieval keyword and a keyword in agreement search for whether it is registered with the image database 11 to the retrieval section 23 by making into a retrieval keyword "Human-face" which is the concept from which only one hierarchy got down to low order, and when it exists, the score according to the hierarchy of this "Human-face" gives by using this image as a candidate image. In addition, the above-mentioned score is given according to the hierarchy of a state-transition model, and a high score is given, so that the hierarchy of a high order is approached.
[0047] After the lowest hierarchy of a state-transition model goes grant of the retrieval and the score by the above retrieval keywords one by one, the image which has a bigger score than the threshold beforehand set up among the candidate image and the image which became is presented by the image presentation section 24 as an image of a retrieval result to a retrieval person. Moreover, when there are two or more kinds of retrieval demands, the image with which the average of the score to all retrieval demands became larger than the above-mentioned threshold among the candidate image and the image which became is shown as a retrieval result.
[0048] Next, processing when the inputted retrieval demand is a scene description language is explained. Here, suppose that the state-transition model shown in drawing 6 is used.
[0049] In this case, the retrieval demand analysis section 22 is passed to the retrieval section 23 by making the inputted scene description language into a retrieval keyword. Next, what is registered into the image database 11 as a keyword of a registered image among the concepts in the state-transition model of the state-transition model database 9 is chosen from a state-transition model. If only "Human-face" shall be registered into the image database 11 with the image as a keyword among the concepts which exist in the state-transition model which is got blocked, for example, is shown in drawing 6 , this

"Human-face" will be chosen.
[0050] And the retrieval section 23 performs the comparison with the scene description language given as a retrieval demand in the concept of the lowest hierarchy who reaches by going back the transition Ruhr from "Human-face" to a low order hierarchy. In more detail the transition Ruhr in the low order hierarchy of a state-transition model Each parameter of the scene description language which is given as conditions which each parameter of a scene description language should fulfill, and was given as a retrieval demand, The score as a candidate image is given to the image with which each parameter of the scene description language as the above-mentioned conditions is registered into the image database 11 by making above-mentioned "Human-face" into a keyword according to whether to be how much in agreement. In addition, the score given shall also become high, so that whenever [each above-mentioned parameter's coincidence] is high.
[0051] As mentioned above, after performing grant of the comparison and score based on each parameter of a scene description language to all the keywords registered into the image database 11, the image which has a bigger score than the threshold beforehand set up among the candidate image and the image which became is presented by the image presentation section 24 as an image of a retrieval result to a retrieval person. Moreover, when there are two or more kinds of retrieval demands, the image with the larger average of the score to all retrieval demands among a candidate image and the image which became than the above-mentioned threshold is shown as a retrieval result.
[0052] As mentioned above, the image database equipment of this example divides into two or more segments the full color image which the image input section inputted based on a color, and creates a scene description language from the image characteristic quantity computed from each segment. Furthermore, in case the condition of each segment is made to change to the concept of a high level as much as possible and an image is registered into an image database by applying a state-transition model to this scene description language, the final state of each segment is registered as a keyword with an image. Moreover, it is the configuration of also registering the location of this segment in an image with the above-mentioned final state about the segment which changed to the high order hierarchy, and registering a scene description language about the segment to which transition to a high order hierarchy was not performed at this time.
[0053] Since an objective keyword is given ** [according to / a registrant's subjectivity] while the activity burdens of the registrant of the creation time of an image database are sharply reducible, since the activity which a registrant gives a keyword becomes unnecessary by this to each of the image to register, the effectiveness that the versatility and dependability of an image database can be raised is done so.
[0054] moreover, when searching the image registered by doing in this way and the concept which exists in a state-transition model is given as a retrieval demand It searches for whether while searching an image database by making this concept into a keyword, the image which made the keyword the subordinate concept in the transition Ruhr which reaches to the above-mentioned concept is registered into the image database one by one to the lowest concept. When the image is registered, the score according to the hierarchy in the state-transition model of the concept as a keyword of that image is given to the above-mentioned image, and has composition shown to a retrieval person by making only an image with this larger score than a predetermined threshold into a retrieval result.
[0055] Even when the concept as a retrieval demand which the retrieval person gave is not registered as a keyword by this, it is possible to raise possibility that the image with which a retrieval person asks for the concept of the low order hierarchy of the concept since it will be shown as a retrieval result if there is an image registered as a keyword will be shown as a retrieval result. Consequently, the effectiveness that the flexible retrieval based on a more abstract advanced concept is attained is done so. Moreover, it prevents that the image for which a retrieval person asks, and the image which was widely different are shown since only an image with a larger score than a predetermined threshold is shown, and while a retrieval person becomes possible [mitigating the burden which chooses a desired image], the dependability of an image database can be raised.
[0056] moreover, about the segment to which a condition did not change with the state-transition model

which this image database equipment holds in the case of registration of an image A scene description language is registered with an image as a keyword. In the case of retrieval When the concept which does not exist in the state-transition model which this image database equipment holds is given by the retrieval person as a retrieval demand While giving a retrieval person directions so that a retrieval demand on scene description language level may be inputted The transition Ruhr in the concept of the lowest hierarchy who can reach by going back the transition Ruhr from the concept registered into the image database as a keyword, Each parameter with the scene description language inputted by the retrieval person as a retrieval demand is compared, a score is given to the image registered corresponding to the above-mentioned keyword according to whenever [that coincidence], and this score is the configuration of showing only a larger image than a predetermined threshold as a retrieval result.

[0057] Since it becomes possible to perform registration and retrieval by using a scene description language also with the image which has the concept which does not exist in the state-transition model which this image database equipment holds by this, an image database does so the effectiveness that the versatility of an image database can be raised only depending on a state-transition model.

[0058] In addition, although this invention is not limited to the above-mentioned example and this example explained the class of parameter of a scene description language as the magnitude, the location, the color, the configuration, and the direction of a main shaft of a segment, it is also possible to make other elements into a scene description language according to the class of image registered into a database. Moreover, according to the use purpose of the class of image, or a database to register, various models are applicable also about a state-transition model.

[0059]

[Effect of the Invention] As mentioned above, the image database equipment of this invention according to claim 1 An image storage means to match an image with a keyword and to memorize it, and an image input means to input an image, The image division means which carries out field division of the input image, and an image characteristic quantity calculation means to calculate the image characteristic quantity of each divided field, A scene description language conversion means to change image characteristic quantity into a scene description language, A state-transition model storage means to memorize a state-transition model, and a state-transition means to perform processing which makes the condition of each field change to a high order hierarchy as long as the scene description language of each field suits the transition Ruhr of a state-transition model, It is a configuration equipped with the registration means which makes the final state of this field a keyword about the field where the condition changed by processing of the above-mentioned state-transition means, and is made to memorize to the above-mentioned image storage means with the above-mentioned input image by making a scene description language into a keyword about the field where a condition did not change.

[0060] Since the class of image in which storage and retrieval are possible is not limited with the state-transition model which image database equipment holds while becoming possible to mitigate a registrant's activity burden, since a scene description language is automatically given as a keyword also to the image which has by this the concept which does not suit a state-transition model, the effectiveness that the versatility of image database equipment improves is done so.

[0061] A retrieval demand input means by which, as for image database equipment according to claim 2, a retrieval person inputs a retrieval demand, A retrieval demand analysis means to create the retrieval keyword at the time of analyzing the inputted retrieval demand and performing a search, While having further an image retrieval means to search an image from an image storage means according to the above-mentioned retrieval keyword, and an image presentation means to show the image of a retrieval result to a retrieval person When the above-mentioned retrieval demand analysis means is in the condition that the inputted retrieval demand exists in a state-transition model While the transition Ruhr is gone back from this condition and this condition and the above-mentioned image retrieval means is passed by making into a retrieval keyword all the conditions that can reach When the inputted retrieval demand does not exist as a condition in a state-transition model, it is the configuration passed to the above-mentioned image retrieval means by making into a retrieval keyword the scene description

language which the retrieval person was made to input a scene description language as a retrieval demand with a retrieval demand input means, and was inputted.
[0062] Even if it is the case where retrieval of the image which does not suit by this the state-transition model which image database equipment holds is required, it becomes possible to make a scene description language input as a retrieval demand, and to search an image. Consequently, while it is lost with image database equipment that the class of image in which storage and retrieval are possible is limited with a state-transition model and more flexible retrieval is attained, the effectiveness of becoming possible to raise the versatility of image database equipment is done so.
[0063] Image database equipment according to claim 3 is a configuration which the above-mentioned registration means makes memorize to the above-mentioned image storage means by making the above-mentioned positional information into a keyword about the field where the condition changed by processing of a state-transition means in addition to the above-mentioned final state while a scene description language includes the positional information which shows the location of each field in an input image.
[0064] Since this is enabled to input the body contained in an image as a retrieval demand with the location, it becomes possible to search by directing more concretely the image image for [which the retrieval person is holding] retrieval to image database equipment. Consequently, it depends reflecting a retrieval person's volition, flexible retrieval is attained, and the effectiveness that retrieval effectiveness can be raised is done so.
[0065] In case the above-mentioned image retrieval means searches an image according to a retrieval keyword, when a retrieval keyword is in the condition in a state-transition model, image database equipment according to claim 4 While giving a score to the image which has a retrieval keyword and a keyword in agreement according to the hierarchy in the state-transition model of this condition, when a retrieval keyword is a scene description language The scene description language in which it moves and the condition of the lowest hierarchy of the state-transition model which can reach has the keyword of the image memorized by the image storage means to the transition Ruhr, While giving a score to the image which compares the scene description language as the above-mentioned retrieval keyword, and is memorized by the above-mentioned image storage means according to whenever [coincidence], the above-mentioned image presentation means is the configuration of showing the image to which the score higher than a predetermined score was given as a retrieval result.
[0066] Since the high image of possibility of being the image for which a retrieval person asks is shown by this While becoming possible to raise the retrieval effectiveness at the time of a retrieval person choosing a desired image from the image shown as a retrieval result etc. Since possibility that the image which was widely different from the image for which a retrieval person asks will be shown decreases, while a retrieval person can mitigate the burden which chooses a desired image, the effectiveness that the dependability of image database equipment can be raised is done so.

[Translation done.]

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1.This document has been translated by computer. So the translation may not reflect the original precisely.
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3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the outline of the configuration for registering an image in the image database equipment in one example of this invention.
[Drawing 2] It is the flow chart which shows the flow of registration processing of the image in the above-mentioned image database equipment.
[Drawing 3] It is a part of registration processing of the above-mentioned image, and is the flow chart which shows the flow of the processing which creates a limited color image from a full color image.
[Drawing 4] It is the block diagram showing the outline of the configuration for searching the image registered in the above-mentioned image database equipment.
[Drawing 5] It is the flow chart which shows the flow of retrieval processing of the image in the above-mentioned image database equipment.
[Drawing 6] It is the explanatory view showing an example of the state-transition model which the above-mentioned image database equipment holds.
[Description of Notations]
1 Image Input Section (Image Input Means)
3 Limited Color Image Creation Section (Image Division Means)
7 Image Characteristic Quantity Count Section (Image Characteristic Quantity Calculation Means)
8 Scene Description Language Transducer (Scene Description Language Conversion Means)
9 State-Transition Model Database (State-Transition Model Storage Means)
10 State-Transition Section (State-Transition Means)
11 Image Database (Image Storage Means)
12 Data Registration Section (Registration Means)
21 Retrieval Demand Input Section (Retrieval Demand Input Means)
22 Retrieval Demand Analysis Section (Retrieval Demand Analysis Means)
23 Retrieval Section (Image Retrieval Means)
24 Image Presentation Section (Image Presentation Means)

[Translation done.]

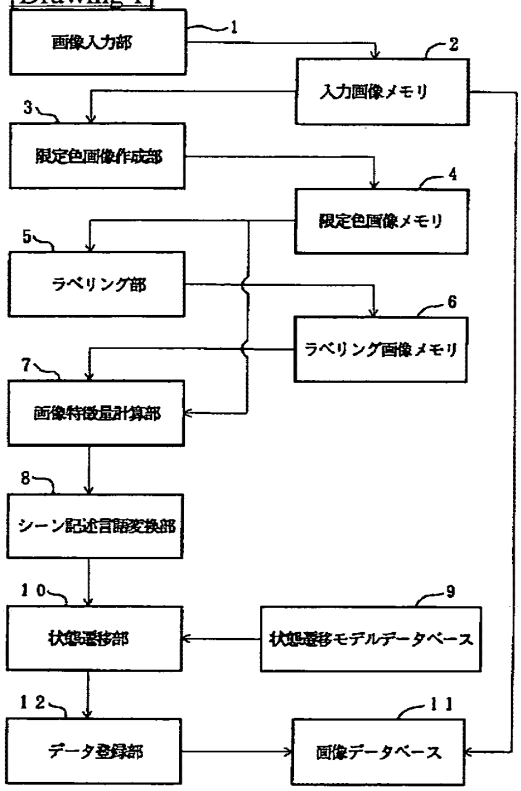
* NOTICES *

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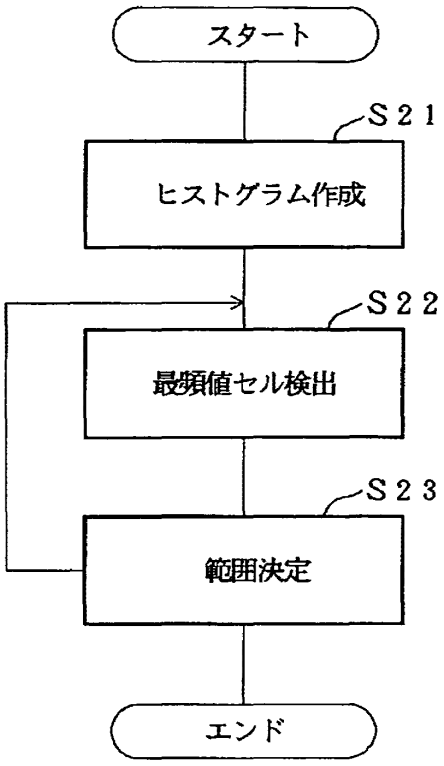
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DRAWINGS

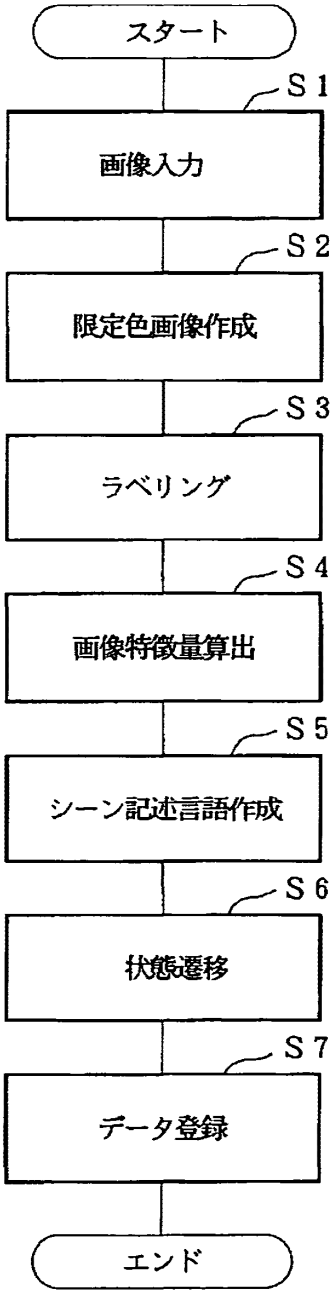
[Drawing 1]



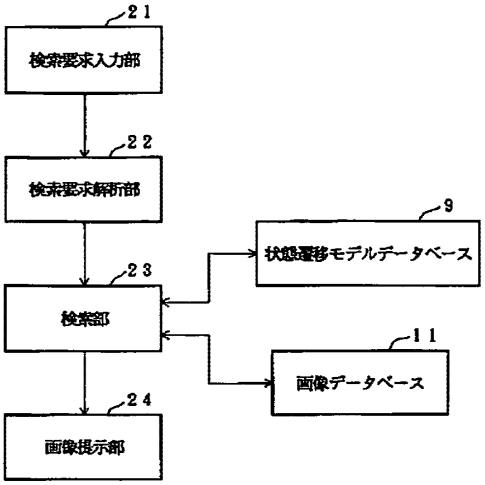
[Drawing 3]



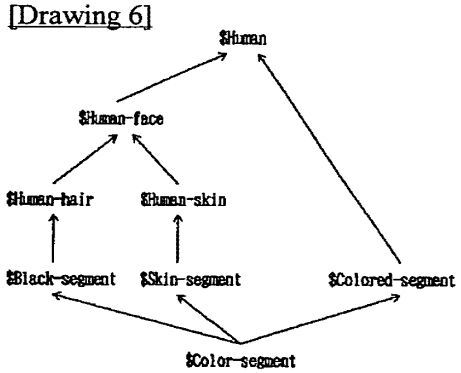
[Drawing 2]


スタート
S 1
画像入力
S 2
限定色画像作成
S 3
ラベリング
S 4
画像特徴量算出
S 5
シーン記述言語作成
S 6
状態遷移
S 7
データ登録
エンド

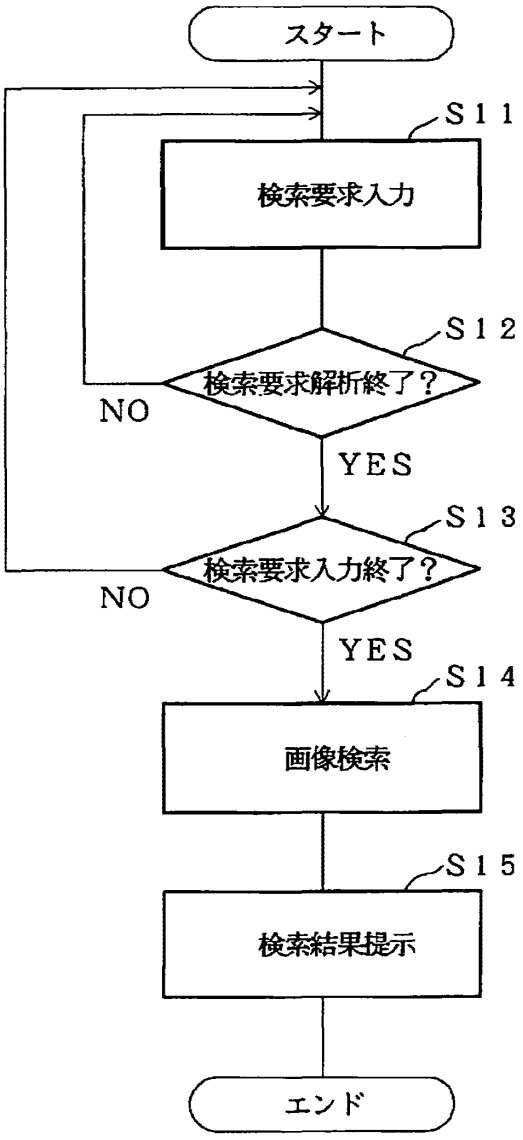
[Drawing 4]



[Drawing 6]



[Drawing 5]



[Translation done.]

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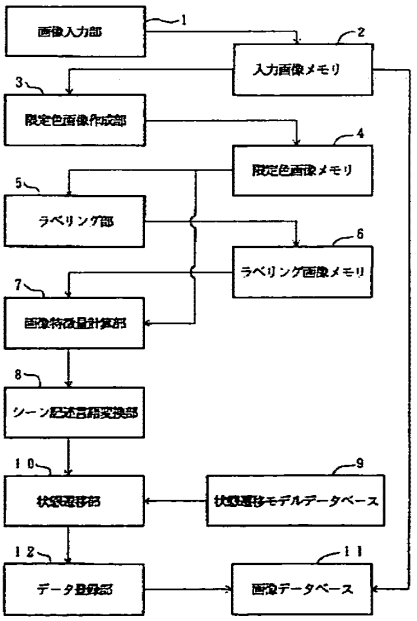
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(54)【発明の名称】　画像データベース装置

(57)【要約】

【構成】　画像データベース装置は、画像入力部１が入力した入力画像をセグメントに分割し、画像特徴量計算部７により算出された各セグメントの画像特徴量をシーン記述言語変換部８がシーン記述言語に変換し、各セグメントのシーン記述言語を状態遷移部１０が状態遷移モデルに基づいて可能な限り上位階層の概念へ遷移させ、データ登録部１２が、各セグメントの最終状態、あるいは状態が遷移しなかったセグメントについてはシーン記述言語を、キーワードとして入力画像と共に画像データベース１１へ登録する。

【効果】　より高度な概念をキーワードとして画像から自動抽出することができ、登録時の作業負担が軽減されると共に、状態遷移モデルに適合しない画像であっても登録・検索することが可能となり、汎用性の高い画像データベース装置が実現される。



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【特許請求の範囲】

【請求項１】画像をキーワードと対応づけて記憶する画像記憶手段と、画像を入力する画像入力手段と、入力画像を領域分割する画像分割手段と、分割された各領域の画像特徴量を求める画像特徴量算出手段と、画像特徴量をシーン記述言語に変換するシーン記述言語変換手段と、状態遷移モデルを記憶する状態遷移モデル記憶手段と、各領域の状態を上位階層へ遷移させる処理を、各領域のシーン記述言語が状態遷移モデルの遷移ルールに適合する限り行う状態遷移手段と、上記状態遷移手段の処理によって状態が遷移した領域については該領域の最終状態をキーワードとし、状態が遷移しなかった領域についてはシーン記述言語をキーワードとして、上記入力画像と共に上記画像記憶手段へ記憶させる登録手段とを備えていることを特徴とする画像データベース装置。

【請求項２】検索者が検索要求を入力する検索要求入力手段と、入力された検索要求を解析して検索を実行する際の検索キーワードを作成する検索要求解析手段と、上記検索キーワードに従って画像記憶手段から画像を検索する画像検索手段と、検索結果の画像を検索者へ提示する画像提示手段とをさらに備えると共に、

上記検索要求解析手段が、入力された検索要求が状態遷移モデル中に存在する状態である場合には、該状態および該状態から遷移ルールを逆行して到達可能な状態すべてを検索キーワードとして上記画像検索手段へ渡す一方、入力された検索要求が状態遷移モデル中に状態として存在しない場合には、検索者に検索要求入力手段によりシーン記述言語を検索要求として入力させ、入力されたシーン記述言語を検索キーワードとして上記画像検索手段へ渡すことを特徴とする請求項１記載の画像データベース装置。

【請求項３】シーン記述言語が、入力画像における各領域の位置を示す位置情報を含むと共に、上記登録手段が、状態遷移手段の処理によって状態が遷移した領域については、上記最終状態に加えて上記位置情報をキーワードとして上記画像記憶手段へ記憶させることを特徴とする請求項１記載の画像データベース装置。

【請求項４】上記画像検索手段が検索キーワードに従って画像を検索する際に、検索キーワードが状態遷移モデル中の状態である場合には、該状態の状態遷移モデルにおける階層に応じて、検索キーワードと一致するキーワードを有する画像に得点を付与する一方、検索キーワードがシーン記述言語である場合には、画像記憶手段に記憶されている画像のキーワードから遷移ルールを逆行して到達可能な状態遷移モデルの最下位階層の状態の持つシーン記述言語と、上記検索キーワードとしてのシーン記述言語とを比較し、その一致度に応じて上記の画像記憶手段に記憶されている画像に得点を付与すると共に、上記画像提示手段が、所定の得点よりも高い得点を付与された画像を検索結果として提示することを特徴とする

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請求項２記載の画像データベース装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、画像情報を大量に蓄積し、キーワードを与えることによって画像の検索を行うことのできる画像データベース装置に関し、特に、画像の登録の際に画像からキーワードを自動抽出する画像データベース装置に関する。

【０００２】

【従来の技術】近年、大量に蓄積された画像情報から必要な画像を効率良く検索するための画像データベース装置への期待が高まっている。従来、画像を登録する際に、登録者が、その画像の意味的な情報であるキーワードを手動入力によって同時に登録し、検索時に検索者によってキーワードが入力されるとこのキーワードに対応する画像が抽出される画像データベース装置が知られているが、すべての画像に対して登録者がキーワードを手動入力するのは効率的でないため、画像認識や画像理解技術を用いて、画像からキーワードの自動抽出を行うための種々の試みがなされている。

【０００３】このような試みとして、例えば、（１）検索者が感性語を入力し、その感性語に対応する画像を検索する画像データベース装置（「主観的類似度に適応した画像検索」：情報処理学会論文誌，Vol.31,no.2(1990) 参照）、（２）状態遷移モデルを用いた画像データベース装置（「キーワード自動抽出を考慮した画像データベース」：情報処理学会技報 '91-CV-73-1参照）等が知られている。

【０００４】

【発明が解決しようとする課題】しかしながら、上記した従来の構成（１）および（2）は、下記のような問題点をそれぞれ有している。

【０００５】まず、上記（１）の装置では、画像の持つ色特徴から利用者の主観尺度を反映する感性語への写像を、サンプル画像に基づいて作成し、検索時には、この感性語を入力することにより検索を行う構成である。このため、写像作成時に適切なサンプル画像を選択して用いる必要があると共に、感性語は主観的なものであるので汎用性に乏しく、検索者によって写像の調整が必要であるという問題点を有している。

【０００６】また、上記（２）の装置では、キーワードの抽出が状態遷移モデルに完全に依存しているために汎用性に乏しく、モデルに該当しないものに対しては、キーワードが付与されないために全く検索を行うことができないという問題点を有している。また、検索時には、検索者が例えば「サッカー」等の上位概念のみをキーワードとして入力することが必要であり、シーン記述はモデルのみに依存するものとなり、検索者の意志が反映されない。

【０００７】本発明は上記した各問題点に鑑みなされた

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 もので、画像の登録時に、より高度な概念レベルのキーワードを画像から自動的に抽出できると共に、汎用性の高い画像データベース装置を実現することを目的としている。

【０００８】

【課題を解決するための手段】上記の課題を解決するために、本発明の請求項１記載の画像データベース装置は、画像をキーワードと対応づけて記憶する画像記憶手段と、画像を入力する画像入力手段と、入力画像を領域分割する画像分割手段と、分割された各領域の画像特徴量を求める画像特徴量算出手段と、画像特徴量をシーン記述言語に変換するシーン記述言語変換手段と、状態遷移モデルを記憶する状態遷移モデル記憶手段と、各領域の状態を上位階層へ遷移させる処理を、各領域のシーン記述言語が状態遷移モデルの遷移ルールに適合する限り行う状態遷移手段と、上記状態遷移手段の処理によって状態が遷移した領域については該領域の最終状態をキーワードとし、状態が遷移しなかった領域についてはシーン記述言語をキーワードとして、上記入力画像と共に上記画像記憶手段へ記憶させる登録手段とを備えていることを特徴としている。

【０００９】請求項２記載の画像データベース装置は、請求項１記載の装置において、検索者が検索要求を入力する検索要求入力手段と、入力された検索要求を解析して検索を実行する際の検索キーワードを作成する検索要求解析手段と、上記検索キーワードに従って画像記憶手段から画像を検索する画像検索手段と、検索結果の画像を検索者へ提示する画像提示手段とをさらに備えると共に、上記検索要求解析手段が、入力された検索要求が状態遷移モデル中に存在する状態である場合には、該状態および該状態から遷移ルールを逆行して到達可能な状態すべてを検索キーワードとして上記画像検索手段へ渡す一方、入力された検索要求が状態遷移モデル中に状態として存在しない場合には、検索者に検索要求入力手段によりシーン記述言語を検索要求として入力させ、入力されたシーン記述言語を検索キーワードとして上記画像検索手段へ渡すことを特徴としている。

【００１０】請求項３記載の画像データベース装置は、請求項１記載の装置において、シーン記述言語が、入力画像における各領域の位置を示す位置情報を含むと共に、上記登録手段が、状態遷移手段の処理によって状態が遷移した領域については、上記最終状態に加えて上記位置情報をキーワードとして上記画像記憶手段へ記憶させることを特徴としている。

【００１１】請求項４記載の画像データベース装置は、請求項２記載の装置において、上記画像検索手段が検索キーワードに従って画像を検索する際に、検索キーワードが状態遷移モデル中の状態である場合には、該状態の状態遷移モデルにおける階層に応じて、検索キーワードと一致するキーワードを有する画像に得点を付与する一方、検索キーワードがシーン記述言語である場合には、画像記憶手段に記憶されている画像のキーワードから遷移ルールを逆行して到達可能な状態遷移モデルの最下位階層の状態の持つシーン記述言語と、上記検索キーワードとしてのシーン記述言語とを比較し、その一致度に応じて上記の画像記憶手段に記憶されている画像に得点を付与すると共に、上記画像提示手段が、所定の得点よりも高い得点を付与された画像を検索結果として提示することを特徴としている。

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【００１２】

【作用】請求項１記載の構成によれば、分割された入力画像の各領域から求められた画像特徴量がシーン記述言語に変換され、各領域のシーン記述言語が状態遷移モデルの遷移ルールに適合する限り、各領域の状態が上位概念へ遷移され、状態が遷移した領域についてはその領域の最終状態がキーワードとして、また状態が遷移しなかった領域についてはその領域のシーン記述言語がキーワードとして入力画像と共に画像記憶手段に記憶される。

【００１３】これにより、状態遷移モデルに適合しない概念を有する画像に対しても、シーン記述言語がキーワードとして自動的に付与されて画像記憶手段に記憶されるので、画像の登録を行う際に登録者がキーワードを付与する必要がないので登録者の作業負担を軽減することが可能となると共に、検索時には、シーン記述言語をキーワードとして与えれば上記画像の検索を行うことができる。すなわち、記憶・検索が可能な画像の種類が画像データベース装置が保持する状態遷移モデルによって限定されないので、画像データベース装置の汎用性が向上すると共に、柔軟な検索が可能となる。

【００１４】請求項２記載の構成によれば、検索者が入力した検索要求が、画像データベース装置が保持する状態遷移モデル中に状態として存在する場合には、この状態と、上記状態から遷移ルールを逆行して到達可能な下位階層の状態のすべてとが、検索キーワードとして画像検索手段に渡され、画像検索手段がこの検索キーワードと一致するキーワードを有する画像を画像記憶手段から検索し、その検索結果が検索者へ提示される。一方、検索者が入力した検索要求が、画像データベース装置が保持する状態遷移モデル中に状態として存在しない場合には、検索者に検索入力手段により入力させたシーン記述言語が検索キーワードとして画像検索手段へ渡され、画像検索手段は、検索キーワードとして渡されたシーン記述言語に従って画像の検索を行う。

【００１５】これにより、画像データベース装置が保持している状態遷移モデルに適合しない画像の検索が要求された場合であっても、シーン記述言語を検索要求として入力させ、このシーン記述言語に従って画像の検索を行うことが可能となる。この結果、画像データベース装置で記憶・検索が可能な画像の種類が状態遷移モデルにより限定されることがなくなり、画像データベース装置

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の汎用性を向上させることが可能となる。

【００１６】請求項３記載の構成によれば、状態遷移手段の処理によって状態が上位階層へ遷移した領域については、その領域の入力画像中の位置が、領域の最終状態と共にキーワードとして入力画像と共に登録されるので、検索を行う際に、検索者が位置情報として例えば「中央部」、領域の状態として例えば「人物」という指定を行うことにより、「中央部に人物が存在する画像」という条件を与えて画像を検索することが可能となる。この結果、検索者が抱いている検索対象の画像イメージをより具体的に画像データベース装置へ指示して検索を行うことが可能となり、検索者の意志が反映された柔軟な検索が可能となると共に、検索効率を向上させることができる。

【００１７】請求項４記載の構成によれば、状態遷移モデルにおける状態を検索キーワードとして検索された画像は、上記状態の状態遷移モデルにおける階層に応じて、階層が高くなるほど高い得点が付与され、シーン記述言語を検索キーワードとして検索された画像は、画像記憶手段に記憶されている画像のキーワードから遷移ルールを逆行して到達可能な状態遷移モデルの最下位階層の状態が有するシーン記述言語と、上記検索キーワードとしてのシーン記述言語とを比較し、その一致度が高くなるほど高い得点が付与され、所定の得点よりも高い得点を付与された画像のみが検索結果として検索者へ提示される。

【００１８】これにより、検索者が所望する画像である可能性の高い画像が提示されることとなるため、検索者が検索結果として提示された画像から所望の画像を選択する際等の検索効率を向上させることが可能となると共に、検索者が所望する画像からかけ離れた画像が提示される可能性を減少させることができ、画像データベース装置の信頼性を向上させることができる。

【００１９】

【実施例】本発明の一実施例について図１ないし図６に基づいて説明すれば、以下の通りである。本実施例における画像データベース装置は、カラー画像を登録・検索する画像データベース装置であり、画像の登録に関する構成として、図１に示すように、画像とそのキーワードとを蓄積する画像データベース１１と、データベースに登録する画像を入力するための画像入力部１（画像入力手段）と、この画像入力部１から入力された画像を蓄積するための入力画像メモリ２と、この入力画像メモリ２に蓄積されたフルカラー画像を入力し、その色数を減色しながら画像全体を複数の領域に分割して限定色画像を作成する限定色画像作成部３（画像分割手段）と、この限定色画像を蓄積する限定色画像メモリ４と、上記の限定色画像をラベリングしてラベリング画像を作成するラベリング部５と、ラベリング画像を蓄積するラベリング画像メモリ６と、各領域の画像特徴量を計算する画像特

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徴量計算部７（画像特徴量算出手段）と、画像特徴量をシーン記述言語に変換するシーン記述言語変換部８（シーン記述言語変換手段）と、上記の各領域の状態が遷移するためのルールを蓄積した状態遷移モデルデータベース９（状態遷移モデル記憶手段）と、この状態遷移モデルデータベース９を参照しながら各領域の状態を遷移させる状態遷移部１０（状態遷移手段）と、入力画像メモリ２の入力画像をキーワードと共に上記画像データベース１１へ登録するデータ登録部１２（登録手段）とを備えている。

【００２０】ここで、状態遷移モデルについて説明する。状態遷移モデルとは、図６に示すような状態遷移図と、遷移ルールとからなり、同図における例えば"Human"、"Human-hair"等の状態において、予め設定された遷移ルールが満たされれば、矢印で示すように状態が上位階層へ遷移する動作を、満たされる遷移ルールが存在する限り繰り返すことによって、後述するセグメントの状態をより上位概念に近づけるためのモデルである。

【００２１】ここで、上記の構成によるカラー画像の登録について、図２に示すフローチャートを参照しながら、以下に説明する。なお、本実施例では、登録されるカラー画像は、赤（Ｒ）・緑（Ｇ）・青（Ｂ）の各要素がそれぞれ８ビット（０から２５５までの２５６階調）のディジタルデータで表現されたフルカラー画像であるとする。

【００２２】まず、画像データベースに登録しようとするカラー画像が画像入力部１により入力されて入力画像メモリ２に蓄積される（ステップ１、以下、Ｓ１のように表記する）。

【００２３】次に、この入力画像から物体等を認識するわけであるが、この認識のためには、まず、画像から認識対象となる物体を切り出す必要がある。ここでは、入力画像はフルカラー画像であるため、同じような色によって構成される領域を抽出するカラーセグメンテーションの手法を用いる。つまり、限定色画像作成部３が、入力画像メモリ２から取り出したフルカラーの入力画像から、１６色程度に色を限定した限定色画像を作成し（Ｓ２）、ラベリング部５が、上記Ｓ２で作成された限定色画像において、同一色の連結領域に対して同一のラベルを付与し、同一ラベルを有する領域を一つの連結領域とすることにより画像を複数の領域に分割する（Ｓ３）。以後、これらの分割された領域のそれぞれをセグメントと呼ぶこととする。

【００２４】次に、画像特徴量計算部７が、各セグメントについて、面積、外接矩形、色、主軸方向、主軸方向に対する占有率、円形度、重心等の画像特徴量をそれぞれ算出し（Ｓ４）、シーン記述言語変換部８が、算出された画像特徴量から、各セグメントのシーン記述言語を作成する（Ｓ５）。なお、このシーン記述言語は、セグメントの大きさ、入力画像全体を縦横それぞれ３分割し

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て９個のブロックに分けた場合に該当セグメントが含まれるブロック位置、セグメントの色、セグメントの形状、およびセグメントの主軸方向をそれぞれ表現する複数種類のパラメータで構成されている。

【００２５】続くＳ６では、状態遷移部１０が、各セグメントのシーン記述言語と、状態遷移モデルデータベース９に蓄積されている状態遷移モデルとに基づいて、各セグメントの概念を決定する作業を以下のように行う。

【００２６】すなわち、状態遷移部１０は、各セグメントに対して上記Ｓ５で作成されたシーン記述言語が状態遷移モデルの遷移ルールを満たしているか否かを、状態遷移モデルの下位概念から順に調べ、遷移ルールが満たされていれば、該セグメントの状態を１つ上の階層へ遷移させる。

【００２７】より具体的には、図６に示すような状態遷移モデルが与えられ、あるセグメントのシーン記述言語におけるセグメントの色を示すパラメータが「黒」であれば、このセグメントは遷移ルールを満たしていることとなり、最下位の概念である“Color-segment”から１階層上位へ遷移して“Black-segment”となる。さらに、このセグメントのシーン記述言語が、人間の頭髪部分の画像である可能性がある条件を満たしている場合には、さらに遷移ルールが満たされたこととなり、さらに１階層上位へ遷移する。これにより、このセグメントは、人間の頭髪であるという概念"Human-hair"を有するセグメントとして認識される。

【００２８】また、上記の状態遷移モデルには、Ｓ３における領域分割時の過分割やシェーディング等のために、本来１つの物体であるものが複数セグメントに分割されてしまった物体や、複数色からなる物体等に対応するために、比較的上位の階層において、状態を遷移させずにセグメントどうしの統合のみを行う領域統合ルールとしての遷移ルールも含まれており、この領域統合ルールを満たすセグメントどうしは統合され、新たな１つの概念を有するセグメントとして認識される。

【００２９】より具体的には、図６に示すような状態遷移モデルが与えられ、入力画像に含まれるセグメントとして、上記の概念"Human-hair"を有するセグメントと、人間の肌部分の画像であるという概念"Human-skin"を有するセグメントとが存在する場合には、これらのセグメントは領域統合ルールを満たすものとして統合され、人間の顔部分の画像であるという概念"Human-face"を有する１つのセグメントとして認識される。

【００３０】上記したＳ６の動作は、入力画像中のすべてのセグメントの状態が遷移しなくなるまで繰り返され、この動作が終了した後に、データ登録部１２が、各セグメントに対して上記Ｓ６で求められた最終状態、すなわち例えば上記の"Human-face"等の概念をキーワードとして、上記Ｓ１で入力された画像と共に画像データベース１１に登録する（Ｓ７）。なお、このとき、所定の

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階層よりも上位の概念へ遷移したセグメントについては、上記キーワードと共に、シーン記述言語の位置パラメータも画像データベース１１へ登録される。また、上記Ｓ６において状態が全く遷移しなかったセグメントについては、シーン記述言語がキーワードとして登録される。

【００３１】なお、上記した状態遷移モデルでは、状態遷移モデルの下位階層ではシーン記述言語を重要視して状態を遷移させるように遷移ルールが設定されており、上位階層になるに従いシーン記述言語の重要性は低くなり、セグメントどうしの統合を優先的に行うよう領域統合ルールが設定されている。このようにして下位階層ではシーン記述言語により状態を遷移させることにより汎用性を高める一方、上位階層ではシーン記述言語にあまり頼らず、セグメント間の関係等を大局的に見て状態遷移を行うことで、認識の信頼性が高められている。

【００３２】なお、ここで、上記Ｓ２における限定色画像の作成について、図３に示すフローチャートに基づいてより詳しく説明する。

【００３３】まず、限定色画像作成部３は、フルカラーの入力画像のヒストグラムを作成する（Ｓ２１）。本実施例では、Ｒ・Ｇ・Ｂのそれぞれが２５６階調で表現されているため、画像中の各色は、ＲＧＢ空間中の一辺２５６（０から２５５）の立方体中の点として表される。この一辺２５６の立方体を、セルと呼ばれる一辺８の立方体に分割する。次に、画像中の画素のＲＧＢ値を求め、その画素がＲＧＢ空間中でどのセルに属するかを求めて、その画素の属するセルの頻度値を１だけ増加させる。この処理をすべての画素に対して行い、ヒストグラムを作成する。

【００３４】次に、作成されたヒストグラム中で、最も頻度値の大きいセルである最頻値セルを検出し（Ｓ２２）、この最頻値セルの表す色を代表色とし、この最頻値セルを中心として予め与えられている半径の球内に含まれるセルの色を上記代表色で置き換える。このように色が決定されたセルを対象から除外してＳ２２へ戻り、同様の処理を対象セルがなくなるまで繰り返す。これらの処理を行う際の上記半径を適当に調整させることでフルカラー画像の色数を１６色程度に減色することができる。つまり、色数が少ない場合には、上記半径を小さくし、多い場合には上記半径を大きくすることにより１つの代表色で表すことのできるセルの数を調整し、色数を希望の数に近づけることができる。

【００３５】次に、以上に説明したように画像がキーワードと共に登録されている画像データベース１１から、検索者が画像の検索を行うために、本実施例の画像データベース装置が備える構成と、この構成による画像の検索動作について、図４および図５を参照しながら説明する。

【００３６】本実施例の画像データベース装置は、前述

した画像の登録に関する構成にさらに加えて、図４に示すように、検索を行う検索者が検索要求を入力するための検索要求入力部２１（検索要求入力手段）と、入力された検索要求を解析する検索要求解析部２２（検索要求解析手段）と、検索要求の解析結果に基づいて該当する画像を画像データベース１１から検索する検索部２３（画像検索手段）と、検索部２３によって検索された画像を検索者に提示する画像提示部２４（画像提示手段）とを備えた構成である。

【００３７】上記の構成において、画像データベース１１に蓄積されている画像を検索する場合には、まず、検索者は、検索要求入力部２１により、検索したい画像を構成している構成物の名称を検索要求として入力する（Ｓ１１）。より具体的に説明すると、例えば、検索者が人物を含んだ画像を検索したい場合には、構成物の名称として"Human"と入力することになる。

【００３８】検索要求が入力されると、検索要求解析部２２が状態遷移モデルデータベース９を探索し、Ｓ１１で検索要求として入力された構成物の名称と一致する概念が、状態遷移モデルデータベース９に蓄積されている状態遷移モデルに含まれていれば（Ｓ１２）、Ｓ１１に戻り、検索要求入力部２１が、画像中における上記構成物の位置に関する検索要求を入力するように検索者に対して指示する。

【００３９】これにより、検索者は、例えば「真中に人物がいる画像」というような検索要求を作成することが可能となる。この結果、検索者が抱いている検索対象の画像イメージをより具体的に画像データベース装置へ指示して検索を行うことが可能となり、検索者の意志を反映した柔軟な検索が可能となると共に、検索効率が向上するという効果を奏する。ただし、検索者は上記の指示に必ずしも従う必要はなく、位置に関する検索要求を入力せずに次のステップであるＳ１３へ進むこともできる。

【００４０】一方、検索要求として入力された構成物の名称と一致する概念が状態遷移モデルデータベース９に蓄積されている状態遷移モデルに存在しなければ（Ｓ１２）、Ｓ１１へ戻り、検索要求入力部２１が、シーン記述言語による検索要求を検索者に入力させる。なお、シーン記述言語とは、前記したように、対象物の大きさ、入力画像全体に対する位置、色、形状、および主軸方向である。ただし、検索要求としてこれらすべてを入力する必要はない。

【００４１】このようにして、状態遷移モデルに存在する概念と必要に応じてその位置、あるいは、所望の概念が状態遷移モデルに存在しない場合はシーン記述言語が、検索要求として検索部２３へ渡される。なお、上記Ｓ１１およびＳ１２は、検索者がすべての検索要求の作成を終了するまで繰り返される（Ｓ１３）。

【００４２】なお、検索者が検索要求を入力するための検索要求入力部２１におけるユーザインターフェイスは、例えばＧＵＩ（Graphical User Interface）によるメニュー画面において状態遷移モデルに含まれている概念をアイコンとして表示させ、これらのアイコンから検索者が所望のものを選択すると、選択されたアイコンに対応する概念が検索要求として検索部２３へ渡されるようにすることも可能であり、これによれば、検索者にとっての操作性を向上させることができる。また、検索者が所望の構成物に対応する概念がアイコンとして表示されていない場合、すなわち所望の概念が状態遷移モデルに含まれていない場合には、シーン記述言語の各種のパラメータを入力させるよう画面で指示することもできる。

【００４３】検索部２３は、上記した検索要求に基づいて画像データベース１１から該当する画像を検索し（Ｓ１４）、画像提示部２４が検索部２３の検索結果を検索者へ提示する（Ｓ１５）。

【００４４】ここで、図６に示す状態遷移モデルの例を用いて、上記の検索動作についてより詳細に説明する。

【００４５】検索要求解析部２２は、入力された検索要求が、状態遷移モデルに存在する概念であるか、あるいはシーン記述言語であるかによって異なった処理を行う。まず最初に、検索要求として、状態遷移モデルに存在する概念が入力された場合の処理について説明する。ここでは、検索者によって、構成物の名称"Human"が検索要求として入力され、図６に示すように状態遷移モデルに"Human"が概念として存在しているとする。

【００４６】検索要求解析部２２の解析により、上記の検索要求は状態遷移モデルに存在することが判定すると、検索要求解析部２２は、この検索要求"Human"を検索キーワードとして検索部２３へ渡し、検索部２３はこの検索キーワードに基づいて画像データベース１１を探索する。探索の結果、画像データベース１１に"Human"がキーワードである画像が登録されていれば、該画像を候補画像とする。さらに、検索要求解析部２２は、上記状態遷移モデルにおいて"Human"から１階層だけ下位へ下りた概念である"Human-face"を検索キーワードとして検索部２３へ渡し、検索部２３はこの検索キーワードと一致するキーワードを有する画像が画像データベース１１に登録されているか否かを探索し、存在する場合は該画像を候補画像としてこの"Human-face"の階層に応じた得点を与える。なお、上記の得点は、状態遷移モデルの階層に応じて与えられるものであり、上位の階層に近づくほど高得点が与えられるようになっている。

【００４７】上記のような検索キーワードによる探索および得点の付与を、状態遷移モデルの最下位の階層まで順次行った後、候補画像となった画像の内、あらかじめ設定されている閾値よりも大きな得点を有する画像が、検索結果の画像として画像提示部２４によって検索者へ提示される。また、複数種類の検索要求がある場合は、

候補画像となった画像の内、すべての検索要求に対する得点の平均値が上記の閾値よりも大きくなった画像が検索結果として提示される。

【００４８】次に、入力された検索要求がシーン記述言語であった場合の処理について説明する。ここでも、図６に示す状態遷移モデルが用いられることとする。

【００４９】この場合、検索要求解析部２２は、入力されたシーン記述言語を検索キーワードとして検索部２３へ渡す。次に、状態遷移モデルデータベース９の状態遷移モデルにおける概念の内、登録画像のキーワードとして画像データベース１１に登録されているものが状態遷移モデルから選択される。つまり、例えば図６に示す状態遷移モデルに存在する概念の内、"Human-face"のみがキーワードとして画像と共に画像データベース１１に登録されているものとすると、この"Human-face"が選択される。

【００５０】そして、検索部２３が、"Human-face"から下位階層へ、遷移ルールを逆行することにより到達する最下位階層の概念において、検索要求として与えられたシーン記述言語との比較を行う。より詳しくは、状態遷移モデルの下位階層における遷移ルールは、シーン記述言語の各パラメータが満たすべき条件として与えられているものであり、検索要求として与えられたシーン記述言語の各パラメータと、上記の条件としてのシーン記述言語の各パラメータとがどの程度一致しているかに応じて、上記の"Human-face"をキーワードとして画像データベース１１に登録されている画像に対して、候補画像としての得点が与えられる。なお、上記の各パラメータの一致度が高いほど、与えられる得点も高くなるものとする。

【００５１】上記のように、シーン記述言語の各パラメータに基づく比較および得点の付与を、画像データベース１１に登録されているすべてのキーワードに対して行った後、候補画像となった画像の内、あらかじめ設定されている閾値よりも大きな得点を有する画像が、検索結果の画像として画像提示部２４によって検索者へ提示される。また、複数種類の検索要求がある場合は、候補画像となった画像の内、すべての検索要求に対する得点の平均値が上記の閾値よりも大きい画像が検索結果として提示される。

【００５２】以上のように、本実施例の画像データベース装置は、画像入力部が入力したフルカラーの画像を色に基づいて複数のセグメントに分割し、各セグメントから算出した画像特徴量からシーン記述言語を作成する。さらに、このシーン記述言語に状態遷移モデルを適用することによって各セグメントの状態を可能な限り高レベルの概念に遷移させ、画像データベースに画像を登録する際は、画像と共に、各セグメントの最終状態をキーワードとして登録する。また、この時、上位階層へ遷移したセグメントについては、上記の最終状態と共に画像中における該セグメントの位置も登録し、上位階層への遷移が行われなかったセグメントについては、シーン記述言語を登録する構成である。

【００５３】これにより、登録する画像の各々に対して登録者がキーワードを付与する作業が不要となるので、画像データベースの作成時の登録者の作業負担を大幅に削減することができると共に、登録者の主観によらずに客観的なキーワードが付与されるので、画像データベースの汎用性および信頼性を向上させることができるという効果を奏する。

【００５４】また、このようにして登録された画像を検索する際に、状態遷移モデルに存在する概念が検索要求として与えられた場合には、この概念をキーワードとして画像データベースを検索すると共に、上記概念へ到達する遷移ルールにおける下位概念をキーワードとした画像が画像データベースに登録されているか否かの探索を最下位概念まで順次行い、画像が登録されている場合には、その画像のキーワードとしての概念の状態遷移モデルにおける階層に応じた得点が上記画像に与えられ、この得点が所定の閾値よりも大きい画像のみを検索結果として検索者に提示する構成となっている。

【００５５】これにより、検索者が与えた検索要求としての概念がキーワードとして登録されていない場合でも、その概念の下位階層の概念をキーワードとして登録されている画像があれば検索結果として提示されるため、検索者の所望する画像が検索結果として提示される可能性を高めることが可能となっている。この結果、より抽象的な高度な概念に基づいた柔軟な検索が可能となるという効果を奏する。また、得点が所定の閾値よりも大きい画像のみが提示されるため、検索者が所望する画像とかけ離れた画像が提示されることを防止して、検索者が所望の画像を選択する負担を軽減することが可能となると共に、画像データベースの信頼性を向上させることができる。

【００５６】また、画像の登録の際に、本画像データベース装置が保持する状態遷移モデルにより状態が遷移しなかったセグメントについては、シーン記述言語がキーワードとして画像と共に登録され、検索の際に、本画像データベース装置が保持している状態遷移モデルに存在しない概念が検索要求として検索者から与えられた場合には、シーン記述言語レベルでの検索要求を入力するように検索者に指示を与えると共に、画像データベースにキーワードとして登録されている概念から遷移ルールを逆行することにより到達可能な最下位階層の概念における遷移ルールと、検索者により検索要求として入力されたシーン記述言語との各パラメータを比較し、その一致度に応じて上記キーワードに対応して登録されている画像に得点を与え、この得点が所定の閾値よりも大きい画像のみを検索結果として提示する構成である。

【００５７】これにより、本画像データベース装置が保

持している状態遷移モデルに存在しない概念を有する画像についても、シーン記述言語を利用することにより登録および検索を行うことが可能となるので、画像データベースが状態遷移モデルのみに依存することがなく、画像データベースの汎用性を向上させることができるという効果を奏する。

【００５８】なお、本発明は上記実施例に限定されるものではなく、例えば本実施例ではシーン記述言語のパラメータの種類を、セグメントの大きさ、位置、色、形状、および主軸方向として説明したが、データベースに登録する画像の種類に応じてこの他の要素をシーン記述言語とすることも可能である。また、状態遷移モデルについても、登録する画像の種類やデータベースの利用目的に応じて、種々のモデルを適用することができる。

【００５９】

【発明の効果】以上のように、本発明の請求項１記載の画像データベース装置は、画像をキーワードと対応づけて記憶する画像記憶手段と、画像を入力する画像入力手段と、入力画像を領域分割する画像分割手段と、分割された各領域の画像特徴量を求める画像特徴量算出手段と、画像特徴量をシーン記述言語に変換するシーン記述言語変換手段と、状態遷移モデルを記憶する状態遷移モデル記憶手段と、各領域の状態を上位階層へ遷移させる処理を、各領域のシーン記述言語が状態遷移モデルの遷移ルールに適合する限り行う状態遷移手段と、上記状態遷移手段の処理によって状態が遷移した領域については該領域の最終状態をキーワードとし、状態が遷移しなかった領域についてはシーン記述言語をキーワードとして、上記入力画像と共に上記画像記憶手段へ記憶させる登録手段とを備えている構成である。

【００６０】これにより、状態遷移モデルに適合しない概念を有する画像に対してもシーン記述言語がキーワードとして自動的に付与されるので、登録者の作業負担を軽減することが可能となると共に、記憶・検索が可能な画像の種類が画像データベース装置が保持する状態遷移モデルによって限定されないので、画像データベース装置の汎用性が向上するという効果を奏する。

【００６１】請求項２記載の画像データベース装置は、検索者が検索要求を入力する検索要求入力手段と、入力された検索要求を解析して検索を実行する際の検索キーワードを作成する検索要求解析手段と、上記検索キーワードに従って画像記憶手段から画像を検索する画像検索手段と、検索結果の画像を検索者へ提示する画像提示手段とをさらに備えると共に、上記検索要求解析手段が、入力された検索要求が状態遷移モデル中に存在する状態である場合には、該状態および該状態から遷移ルールを逆行して到達可能な状態すべてを検索キーワードとして上記画像検索手段へ渡す一方、入力された検索要求が状態遷移モデル中に状態として存在しない場合には、検索者に検索要求入力手段によりシーン記述言語を検索要求として入力させ、入力されたシーン記述言語を検索キーワードとして上記画像検索手段へ渡す構成である。

【００６２】これにより、画像データベース装置が保持している状態遷移モデルに適合しない画像の検索が要求された場合であっても、シーン記述言語を検索要求として入力させて画像の検索を行うことが可能となる。この結果、画像データベース装置で記憶・検索が可能な画像の種類が状態遷移モデルにより限定されることがなくなり、より柔軟な検索が可能となると共に、画像データベース装置の汎用性を向上させることが可能となるという効果を奏する。

【００６３】請求項３記載の画像データベース装置は、シーン記述言語が、入力画像における各領域の位置を示す位置情報を含むと共に、上記登録手段が、状態遷移手段の処理によって状態が遷移した領域については、上記最終状態に加えて上記位置情報をキーワードとして上記画像記憶手段へ記憶させる構成である。

【００６４】これにより、画像に含まれる物体をその位置と共に検索要求として入力することが可能となるため、検索者が抱いている検索対象の画像イメージをより具体的に画像データベース装置へ指示して検索を行うことが可能となる。この結果、検索者の意志を反映したより柔軟な検索が可能となり、検索効率を向上させることができるという効果を奏する。

【００６５】請求項４記載の画像データベース装置は、上記画像検索手段が検索キーワードに従って画像を検索する際に、検索キーワードが状態遷移モデル中の状態である場合には、該状態の状態遷移モデルにおける階層に応じて、検索キーワードと一致するキーワードを有する画像に得点を付与する一方、検索キーワードがシーン記述言語である場合には、画像記憶手段に記憶されている画像のキーワードから遷移ルールを逆行して到達可能な状態遷移モデルの最下位階層の状態の持つシーン記述言語と、上記検索キーワードとしてのシーン記述言語とを比較し、その一致度に応じて上記の画像記憶手段に記憶されている画像に得点を付与すると共に、上記画像提示手段が、所定の得点よりも高い得点を付与された画像を検索結果として提示する構成である。

【００６６】これにより、検索者が所望する画像である可能性の高い画像が提示されるので、検索者が検索結果として提示された画像から所望の画像を選択する際等の検索効率を向上させることが可能となると共に、検索者が所望する画像からかけ離れた画像が提示される可能性が減少するので、検索者が所望の画像を選択する負担を軽減することができると共に、画像データベース装置の信頼性を向上させることができるという効果を奏する。

【図面の簡単な説明】

【図１】本発明の一実施例における画像データベース装置において画像の登録を行うための構成の概略を示すブロック図である。

【図２】上記画像データベース装置における画像の登録処理の流れを示すフローチャートである。

【図３】上記の画像の登録処理の一部であり、フルカラー画像から限定色画像を作成する処理の流れを示すフローチャートである。

【図４】上記画像データベース装置において登録されている画像の検索を行うための構成の概略を示すブロック図である。

【図５】上記画像データベース装置における画像の検索処理の流れを示すフローチャートである。

【図６】上記画像データベース装置が保持する状態遷移モデルの一例を示す説明図である。

【符号の説明】

１　画像入力部（画像入力手段）

３　限定色画像作成部（画像分割手段）

７　画像特徴量計算部（画像特徴量算出手段）

８　シーン記述言語変換部（シーン記述言語変換手段）

９　状態遷移モデルデータベース（状態遷移モデル記憶手段）

１０　状態遷移部（状態遷移手段）

１１　画像データベース（画像記憶手段）

１２　データ登録部（登録手段）

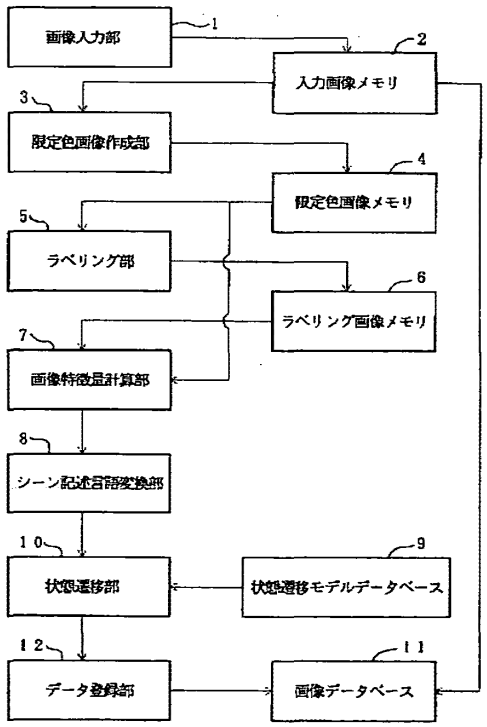
２１　検索要求入力部（検索要求入力手段）

２２　検索要求解析部（検索要求解析手段）

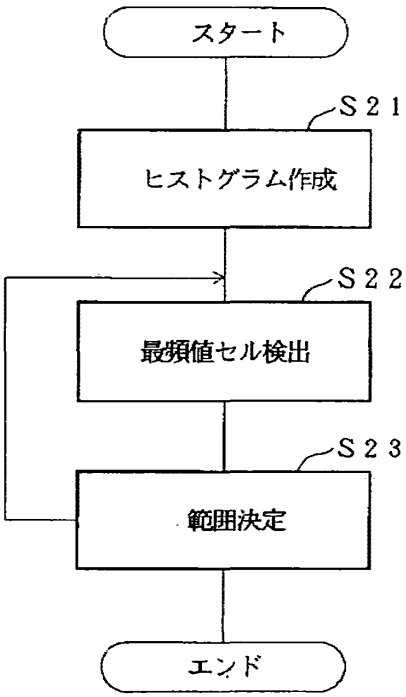
２３　検索部（画像検索手段）

２４　画像提示部（画像提示手段）

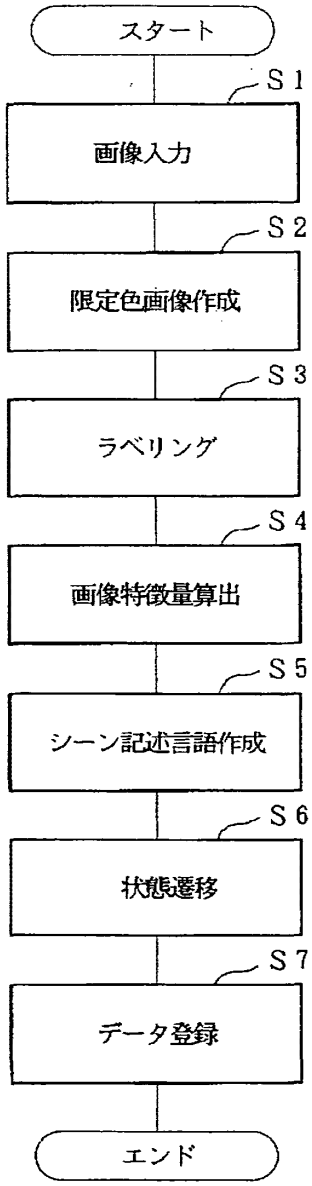
【図１】



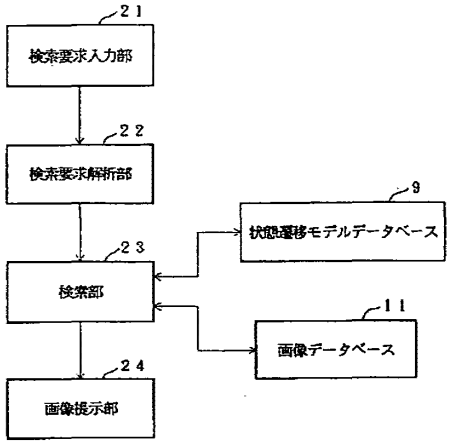
【図３】



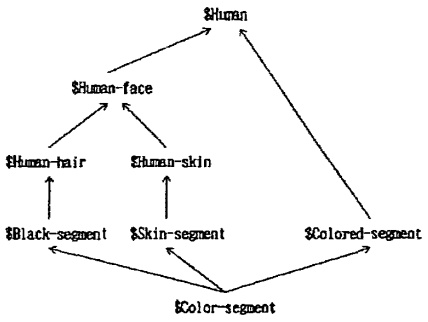
【図２】


スタート
S 1
画像入力
S 2
限定色画像作成
S 3
ラベリング
S 4
画像特徴量算出
S 5
シーン記述言語作成
S 6
状態遷移
S 7
データ登録
エンド

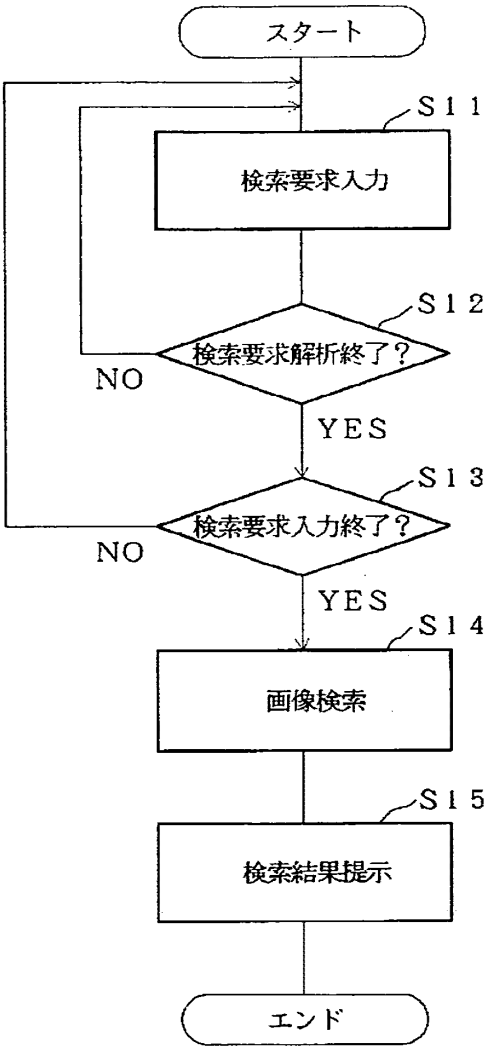
【図４】


21
検索要求入力部
22
検索要求解析部
9
状態遷移モデルデータベース
23
検索部
11
画像データベース
24
画像提示部

【図６】


$Human
$Human-face
$Human-hair
$Human-skin
$Black-segment
$Skin-segment
$Colored-segment
$Color-segment

【図5】


スタート
S11
検索要求入力
S12
検索要求解析終了？
NO
YES
S13
検索要求入力終了？
NO
YES
S14
画像検索
S15
検索結果提示
エンド

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	4	keyword near1 proposing	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:58
L2	56	keyword near1 propos$$	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:58
L3	53	keyword near1 propos$4	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:58
L4	3	3 and face	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:01
L5	97	keyword with face	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:01
L6	5670066	object	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:01
L7	2689	keyword with object	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:02
L8	0	keyword with object7 and image	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:02

EAST Search History

L9	1417	7 and image	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:02
L10	1109	9 and (extract$4 or detect$5)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:09
L11	13	"756748"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:09
L12	1	"7-56748"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:09
L13	0	("2002/0111939").URPN.	USPAT	OR	ON	2007/02/27 14:02
L14	1835	382/305	USPAT	OR	ON	2007/02/27 14:02
L15	1055	14 and detect$5	USPAT	OR	ON	2007/02/27 14:02
L16	46	15 and skin	USPAT	OR	ON	2007/02/27 14:02
L17	28	16 and face	USPAT	OR	ON	2007/02/27 14:02
L18	7	17 and keyword	USPAT	OR	ON	2007/02/27 14:54
L19	695	386/69	USPAT	OR	ON	2007/02/27 14:54
L20	333	19 and retriev$4	USPAT	OR	ON	2007/02/27 14:54
L21	253	20 and (word or key$4)	USPAT	OR	ON	2007/02/27 14:54
S1	0	(10/765450).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/02/26 17:04
S2	0	(10/762450).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/02/26 17:04

EAST Search History

S3	1	10/762450	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:05
S4	439	348/231.2	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:26
S5	22	S4 and (keyword with imag$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:18
S6	5	"6785429"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:21
S7	2	"20010043727"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:21
S8	0	("2001/0043727").URPN.	USPAT	OR	ON	2007/02/26 18:25
S9	33	S4 and keyword	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:29
S10	10	S9 and face	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:45
S11	3	image with retriev$5 with face with keyword	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:57

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,450	01/23/2004	Toshinori Nagahashi	118464	5463

25944 7590 03/07/2007

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER	
BITAR, NANCY	
ART UNIT	**PAPER NUMBER**
2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/762,450	NAGAHASHI, TOSHINORI	
	Examiner	Art Unit	
	Nancy Bitar	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :06/29/06,11/17/05,08/09/05,01/23/04.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.
>
> When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).
>
> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

2. Claim 8 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 8 defines a " computer program" embodying functional descriptive material. However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that

reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). That is, the scope of the presently claimed "a computer program" can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody the program on "computer-readable medium" or equivalent in order to make the claim statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recitation "a computer program for a computer " is generally narrative and indefinite, failing to conform with current U.S. practice. It appears to be a literal translation into English from a foreign document and is replete with grammatical and idiomatic errors.

Claim Rejections - 35 U.S.C. § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3,6-10,12 are rejected under 35 U.S.C. § 102(b) as being anticipated by Kondo et al (2002/0111939).

As to claim 1, Kondo et al. teaches an image retrieving device (image data retrieval apparatus, 100,200, figure 1) for classifying and retrieving an image by detecting an object in the image and adding a keyword, comprising:
an image storing section for storing the image which is supposed to be classified and retrieved together with the keyword in a database(image database, 105,figure 1);
an object acknowledging section for acknowledging a predetermined object in the image which is inputted (a user designates an image or holder to be registered. In accordance with the designation a first image is input at step S803, step S805 a decision is made as to whether the input image includes any figure of a person. If so then at step S807 all figures in the image have their respective face images cut out , paragraph [0081-0082]);
a keyword proposing section for proposing the keyword which relates to the object which is acknowledged by the object acknowledging section (step S813 a name is entered to correspond to the face image. Then at step S815 the face image cut out and the entered name are correlated with each other and thus registered in the face dictionary, paragraph [0084]); and an object information inputting section for confirming, adding, and correcting the keyword which is proposed by the keyword proposing section (from step s811 to s819, paragraph [0086-0088].

As to claim 2, Kondo et al. teaches an image retrieving device according to claim 1 wherein the object acknowledging section comprises: a human detection condition

inputting section for setting up conditions for determining whether or not the image contains a human(step s805, a decision is made as to whether the input image includes any figure of a person) ; a face image detecting section for detecting a face image in the image; and a face image similarity determining section for detecting a face image which is detected by the face image detecting section so as to detect a similar face image stored in the database according to the detected face imaged (step s809 an image of the face of a first person is read and at step s811 a decision is made as to whether the face image has already been registered in a face dictionary, paragraph [0084-0087]).

As to claim 3, Kondo et al. teaches an image-retrieving device according to claim 2 wherein the object information inputting section serves as a personal information inputting section for confirming, adding, and correcting personal information(the information obtains more than one item of information, paragraph [0020]).

As to claim 5, Kondo et al teaches an image retrieving device according to claim 2 further comprising a keyword proposing section for proposing the keyword to the image which is inputted last in a case in which the similar face image is not detected by the face image similarity determining section (paragraph [0084] if not a keyword name is entered to correspond to the face image).

As to claim 6, and 9-10 and 12, Kondo et al teaches an image-retrieving device according to claim 1 wherein the keyword is added according to a retrieving template, which is formed by the keywords, which have hierarchical structure (paragraph [0094-0097]).

As to claim 7 differ from claim 1 only in that claim 7 is a method claim whereas; claim 1 is an apparatus claim. Thus, claim 7 is analyzed as previously discussed with respect to claim 1 above.

As to claim 8 differ from claim 1 only in that claim 8 is a computer claim whereas; claim 1 is an apparatus claim. Thus, claim 8 is analyzed as previously discussed with respect to claim 1 above.

Claim Rejections - 35 U.S.C. § 103

7. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 4 and 11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Luo et al. (US 6,826,316).

While Kondo meets a number of the limitations of the claimed invention, as pointed out more fully above, Kondo fails to specifically teach the a skin color area detecting section for detecting a skin color area in the image is used when the human is detected.

Specifically, Luo et al. discloses a study of a photographic image database of over 2000 images, over 70% of the photographic images have people and about the same number of images have sizable faces in them. Indeed, people are the single most important subject in photographs. Moreover, Luo et al teaches the use of an image retrieval system by providing perceptually significant features of the image where the use of skin detection as one of a semantic feature utilizes color image segmentation and a predetermined skin where the skin region classification is based on maximum probability according to the average color of a segmented region. The probabilities are mapped to a belief output via a sigmoid belief function. Because the use of skin detection helps retrieve feature based similarities of faces in an image by computing a belief value for all pixels using the Bayes net (column 6, lines 61-67). It would have been obvious to one of ordinary skill in the art to use the skin algorithm in Kondo in order to get better and accurate recognition result thus getting certain identification. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claim 11, Kondo et al teaches an image-retrieving device according to claim 1 wherein the keyword is added according to a retrieving template, which is formed by the keywords, which have hierarchical structure (paragraph [0094-0097])

Conclusions

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ray et al (US 2005/0105803) is cited to teach a method for selecting an emphasis image from a collection of images based on facial identification,

Cooper et al (US 2001/0043727) is cited to teach a method for cataloging facial images stores an image associated with at least one facial image in a face database.

Koshimizu et al (Keyword and Face Image Retrieval based on Latent Semantic Indexing, IEEE 2004) is cited to teach to annotate images and to retrieve images based on their contents by assigning keyword to images at conceptual levels.

Inquiries

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nancy Bitar whose telephone number is 571-270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on 571-272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nancy Bitar 02/25/2007

JOSEPH MANCUSO
SUPERVISORY PATENT EXAMINER

Form PTO-1449 (REV. 1/06)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT(S) Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	GROUP 2615

OPE IAP13 JUN 29 2006 PATENT & TRADEMARK OFFICE

PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Date	Name

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Date	Country	With English Abstract	With English Translation
NB	1	JP A 10-326278	12/8/1998	JAPAN	X	X
NB	2	JP A 06-215089	8/5/1994	JAPAN	X	X
NB	3	JP A 10-049542	2/20/1998	JAPAN	X	X
NB	4	JP A 08-249349	9/27/1996	JAPAN	X	X

OTHER DOCUMENTS

Examiner Initials	Cite No.	(Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	/Nancy Bitar/	DATE CONSIDERED	02/26/2007

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: June 29, 2006

OIPE IAP45
NOV 17 2005
PATENT & TRADEMARK OFFICE

Form PTO-1449 (REV. 8-83) US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)	APPLICANT Toshinori NAGAHASHI	
	FILING DATE January 23, 2004	GROUP 2615

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS
NB	1	US 6,785,429 B1	08/31/2004	SENOH		

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS
NB	2	CN 1245317 A	02/23/2000	CHINA		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

NB	3	WANG et al.; "A Fast Human Face Detection Method From Color Images Under Complex Background"; ACTA ELECTRONICA SINICA; Vol. 30 No. 10 Oct. 2002; 1995-2005 Tsinghua Tongfang Optical Disc Co., Ltd.; pp. 1566-1569 with abstract

EXAMINER	DATE CONSIDERED
/Nancy Bitar/	02/26/2007

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: November 17, 2005

AUG 0 9 2005
PATENT & TRADEMARK OFFICE

Form PTO-1449 (REV. 8-83)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	GROUP 2615

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS
NB	1	US 2001/0043727 A1	11/22/2001	COOPER		
NB	2	US 6,408,301 B1	06/18/2002	PATTON et al.		

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	/Nancy Bitar/	DATE CONSIDERED 02/26/2007

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: August 9, 2005

1/23/04

Sheet 1 of 1

Form PTO-1449 (REV. 8-83)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. New US Application
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS
NB	1	JP A 10-307849 (with abstract and translation)	11/17/1998	Japan		
NB	2	JP A 8-221547 (with abstract and translation)	08/30/1996	Japan		
NB	3	JP A 2001-160057 (with abstract and translation)	06/12/2001	Japan		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	/Nancy Bitar/	DATE CONSIDERED 02/26/2007

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: January 23, 2004

Notice of References Cited	Application/Control No. 10/762,450	Applicant(s)/Patent Under Reexamination NAGAHASHI, TOSHINORI	
	Examiner Nancy Bitar	Art Unit 2624	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2002/0111939	08-2002	Kondo et al.	707/1
*	B	US-6,826,316	11-2004	Luo et al.	382/305
*	C	US-2005/0105803	05-2005	Ray, Lawrence A.	382/209
*	D	US-2001/0043727	11-2001	COOPER, FREDERICK J.	382/118
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	"Keyword and Face Image Retrieval Based on Latent Semantic Indexing", Koshimizu et al., IEEE 2004
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
10/762,450	NAGAHASHI, TOSHINORI
Examiner	**Art Unit**
Nancy Bitar	2624

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	+	Restricted	I	Interference	O	Objected

Claim		Date
Final	Original	2/27/07
	1	√
	2	√
	3	√
	4	√
	5	√
	6	√
	7	√
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	9	√
	10	√
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Claim		Date
Final	Original	
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Claim		Date
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Search Notes

Application/Control No.	Applicant(s)/Patent under Reexamination	
10/762,450	NAGAHASHI, TOSHINORI	
Examiner	**Art Unit**	
Nancy Bitar	2624	

SEARCHED			
Class	Subclass	Date	Examiner
382	305	2/27/2007	NB
348	231.2	2/27/2007	NB
386	69	2/27/2007	NB

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
East Search	2/27/2007	NB

UNITED STATES PATENT AND TRADEMARK OFFICE

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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Bib Data Sheet

CONFIRMATION NO. 5463

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/762,450	01/23/2004 RULE	382	2624	118464

APPLICANTS

Toshinori Nagahashi, Tatsuno-machi, JAPAN;

**** CONTINUING DATA ***************************

**** FOREIGN APPLICATIONS *********************

JAPAN 2003-020805 01/29/2003

IF REQUIRED, FOREIGN FILING LICENSE GRANTED

** 04/26/2004

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☑ yes ☐ no 35 USC 119 (a-d) conditions met ☑ yes ☐ no ☐ Met after Allowance Verified and Acknowledged Examiner's Signature Initials	JAPAN	8	12	3

ADDRESS

25944

TITLE

Image retrieving device, method for adding keywords in image retrieving device, and computer program therefor

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
900	No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toshinori NAGAHASHI

Group Art Unit: 2624

Application No.: 10/762,450

Examiner: N. BITAR

Filed: January 23, 2004

Docket No.: 118464

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

AMENDMENT UNDER 37 C.F.R. §1.111

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In reply to the March 7, 2007 Office Action, please consider the following:

Amendments to the Claims as reflected in the listing of claims; and

Remarks.

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword, the image retrieving device comprising:

an image storing section for storing the image which is supposed to be classified and retrieved together with the keyword in a database;

an object acknowledging section for acknowledging a predetermined object in the image which is inputted;

a keyword proposing section for proposing the keyword so as to display on a display, the keyword which relates to the object which is acknowledged by the object acknowledging section; and

an object information inputting section for confirming, adding, and correcting the keyword which is proposed by the keyword proposing section.

2. (Currently Amended) An image retrieving device according to ~~Claim 1~~Claim 1, wherein the object acknowledging section ~~comprises~~includes:

a human detection condition inputting section for setting up conditions for determining whether or not the image contains a human;

a face image detecting section for detecting a face image in the image; and

a face image similarity determining section for detecting a face image which is detected by the face image detecting section so as to detect a similar face image stored in the database according to the detected face imaged.

3. (Original) An image retrieving device according to Claim 2 wherein the object information inputting section serves as a personal information inputting section for confirming, adding, and correcting a personal information.

4. (Currently Amended) An image retrieving device according to Claim 2 ~~wherein~~ further comprising a skin color area detecting section for detecting a skin color area in the ~~image~~ image, wherein

the skin color area detecting section is used when the human is detected.

5. (Original) An image retrieving device according to Claim 2 further comprising a keyword proposing section for proposing the keyword to the image which is inputted last in a case in which the similar face image is not detected by the face image similarity determining section.

6. (Original) An image retrieving device according to claim 1 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

7. (Currently Amended) A method for adding keywords in an image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword, the method ~~comprising the steps for:~~comprising:

storing the image which is supposed to be classified and retrieved together with the keyword in a database;

acknowledging a predetermined object in the image which is inputted;

proposing the keyword so as to display on a display, the keyword which relates to the object which is acknowledged by the object acknowledging section; and

confirming, adding, and correcting the keyword which is proposed by the keyword proposing section.

8. (Currently Amended) ~~A computer program for a computer in an image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword, comprising commands for:~~A storage medium having a program stored therein for operating an image retrieving device which classifies and retrieves an image by detecting an object in the image and adding a keyword, the storage medium comprising:

storing the image which is supposed to be classified and retrieved together with the keyword in a database;

acknowledging a predetermined object in the image which is inputted;

proposing the keyword so as to display on a display, the keyword which relates to the object which is acknowledged by the object acknowledging section; and

confirming, adding, and correcting the keyword which is proposed by the keyword proposing section.

9. (Original) An image retrieving device according to claim 2 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

10. (Original) An image retrieving device according to claim 3 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

11. (Original) An image retrieving device according to claim 4 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

12. (Original) An image retrieving device according to claim 5 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

13. (New) A method according to claim 7, wherein the keyword is added according to a retrieving template which is formed by the keywords which have a hierarchical structure.

14. (New) A storage medium according to claim 8, wherein the keyword is added according to a retrieving template which is formed by the keywords which have a hierarchical structure.

REMARKS

Claims 1-14 are pending in this application. By this Amendment, claims 1, 2, 4, 7 and 8 are amended, and claims 13 and 14 are new. No new matter is added by these amendments. Reconsideration of the application based on the above amendments and the following remarks is respectfully requested.

The Office Action, on page 2, rejects claim 8 under 35 U.S.C. §101 for failing to claim statutory subject matter. Claim 8 is amended to obviate this rejection.

The Office Action, on page 3, rejects claim 8 under 35 U.S.C. §112, second paragraph, as being indefinite. Claim 8 is amended to obviate this rejection.

The Office Action, on page 4, rejects claims 1-3, 6-10 and 12 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Application Publication No. 2002/0111939 to Kondo et al. (hereinafter "Kondo"). Additionally, the Office Action, on page 6, rejects claims 4 and 11 under 35 U.S.C. §103(a) as being unpatentable over Kondo in view of U.S. Patent No. 6,826,316 to Luo et al. (hereinafter "Luo"). Applicant respectfully traverses these rejections.

The Office Action asserts that Kondo teaches many of the features as positively recited in at least claims 1, 7 and 8. However, Kondo does not teach an image retrieving device including at least a keyword proposing section for proposing the keyword so as to display on a display the keyword which relates to the object which is acknowledged by the object acknowledging section, as recited in at least amended claims 1, 7 and 8.

The Office Action asserts that Kondo, in Fig. 8 step S813, discloses the keyword proposing section for proposing a keyword. Kondo, in paragraph [0084], discloses in step S813 and S815 a name being entered corresponding to the face image, where the face image and the entered name are correlated with each other by registering in a face directory. In addition, Kondo, in Fig. 9, discloses a keyword being entered into the system. However, the keyword entered in Fig. 9 is not the same as the name entered in step S813. Therefore,

Kondo does not teach an image retrieving device including at least a keyword proposing section for proposing the keyword so as to display on a display the keyword which relates to the object which is acknowledged by the object acknowledging section, as recited in at least amended claim 1.

Luo fails to disclose or suggest the above feature, and therefore, fails to make up for the above noted deficiencies of Kondo.

For at least the above reasons, Kondo can not reasonably be considered to teach, or to have suggested, the combinations of all the features recited in claims 1, 7 and 8. Further, claims 2-6 and 9-12 would also not have been suggested by the applied prior art references for at least the respective dependence of these claims on allowable independent claims 1, 7 and 8, respectively, as well as for the patentable subject matter that each of these claims recite.

Accordingly, reconsideration and withdrawal of the rejections of claims 1-12 under 35 U.S.C. §102(b) and §103(a) are respectfully requested.

New claims 13 and 14 are patentable based on their dependency from independent claims 7 and 8 respectively, as well as for additional features recited therein.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-14 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Tiffany J. Brooks
Registration No. 57,912

JAO:TJB/lah

Date: June 7, 2007

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 15-0461

PATENT APPLICATION FEE DETERMINATION RECORD
Effective December 8, 2004

10762450

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS		
OR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	12 minus 20=	*
INDEPENDENT CLAIMS	2 minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		☐

If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	150.00	OR	BASIC FEE	300.00
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	
TOTAL		OR	TOTAL	

CLAIMS AS AMENDED - PART II

6/7/07	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 19	Minus	** 20	=
Independent	* 2	Minus	*** 3	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	4	"6826316"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/08/29 12:36
L2	76625	"4" and hierarchical	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/08/29 12:36
L3	0	1 and hierarchical	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/08/29 12:36
L4	3	1 and (hierarchical or tree or simpl$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/08/29 12:37
L5	0	2002/0111939	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/08/29 12:37
L6	2	"20020111939"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/08/29 12:37
L7	0	6 and hier$6	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/08/29 12:37
L8	1	6 and (hier$6 or tree or simpl$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/08/29 12:37

EAST Search History

S1	0	(10/765450).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/02/26 17:04
S2	0	(10/762450).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/02/26 17:04
S3	1	10/762450	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:05
S4	439	348/231.2	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:26
S5	22	S4 and (keyword with imag$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:18
S6	5	"6785429"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:21
S7	2	"20010043727"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:21
S8	0	("2001/0043727").URPN.	USPAT	OR	ON	2007/02/26 18:25
S9	33	S4 and keyword	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:29

EAST Search History

S10	10	S9 and face	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:45
S11	3	image with retriev$5 with face with keyword	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:57
S12	4	keyword near1 proposing	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:58
S13	56	keyword near1 propos$$	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:58
S14	53	keyword near1 propos$4	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:58
S15	3	S14 and face	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:01
S16	97	keyword with face	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:01
S17	5670066	object	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:01

EAST Search History

S18	2689	keyword with object	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:02
S19	0	keyword with object7 and image	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:02
S20	1417	S18 and image	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:02
S21	1109	S20 and (extract$4 or detect$5)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:09
S22	13	"756748"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:09
S23	1	"7-56748"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:09
S24	0	("2002/0111939").URPN.	USPAT	OR	ON	2007/02/27 14:02
S25	1835	382/305	USPAT	OR	ON	2007/02/27 14:02
S26	1055	S25 and detect$5	USPAT	OR	ON	2007/02/27 14:02
S27	46	S26 and skin	USPAT	OR	ON	2007/02/27 14:02
S28	28	S27 and face	USPAT	OR	ON	2007/02/27 14:02
S29	7	S28 and keyword	USPAT	OR	ON	2007/02/27 14:54
S30	695	386/69	USPAT	OR	ON	2007/02/27 14:54
S31	333	S30 and retriev$4	USPAT	OR	ON	2007/02/27 14:54
S32	253	S31 and (word or key$4)	USPAT	OR	ON	2007/02/27 14:54

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,450	01/23/2004	Toshinori Nagahashi	118464	5463

25944 7590 08/31/2007

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER	
BITAR, NANCY	
ART UNIT	**PAPER NUMBER**
2624	

MAIL DATE	DELIVERY MODE
08/31/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/762,450	NAGAHASHI, TOSHINORI	
	Examiner	Art Unit	
	Nancy Bitar	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :06/29/06,11/17/05,08/09/05,01/23/04.

DETAILED ACTION

Response to Amendment

1. Applicant's response to the last Office Action, filed 03/07/2007, has been entered and made of record.

2. Applicant has amended claims 1-4,7-8. Claims 13-14 have been added. Claims 1-14 are currently pending.

3. Applicants arguments filed 06/07/2007 have been fully considered but they are not persuasive.

4. Applicant argues that Kondo fails to teach an image retrieving device including at least a keyword proposing section for proposing the keyword so as to display on a display the keyword which relates to the object which is acknowledge by the object acknowledging section. Additionally the applicant argues that Kondo keyword entered in Figure 9 is not the same as the name entered in step S813 figure 8.

In response, figure 9 shows an example of a window DISPLAYED on a screen in the figure 3 condition window display process (S301) where a user can enter a search periods a keyword an a name of person to be RETRIEVED thus a key face can be retrieved (first embodiment) or the name can be retrieved (2nd embodiment). Kondo gave an example in paragraph [0078] explains the proposing of the keyword where a user DESIGNATE an image of the face of Mr. A as a key image to appropriately extract an image with MR.A from a large amount of stored image data.

Further the applicant's assertion that keyword entered in Figure 9 is not the same as the name entered in step S813 figure 8 is true since figure 8 teaches the registration of the keyword in the image database 105 see paragraph [0078-0087] whereas figure 9 teaches the " proposing of the keyword" and the image retriever since a user can enter a search period a keyword and a name of a person to be retrieved and to conduct a search the user is only required to enter a desired name or a proposed name see paragraph [0089-0093] . Additionally the applicant's argument that the combination of all the features recited in claims 1-14 makes the applicant's invention patentable different is not found persuasive and thus Kondo still reads on the applicant's claimed invention.

5. All remaining arguments are reliant on the aforementioned and addressed arguments and thus are considered to be wholly addressed herein.

Examiner Notes

6. Examiner cites particular columns and line numbers in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recitation "proposing the keyword so as to display the keyword " is generally narrative and indefinite, it is unclear what feature or element is being further defined by this claim language, is it displaying the keyword of the database or the proposed keyword? The claim fails to clearly point out and distinctly claim applicant's invention. Claims 2-7 and 9-14 are variously dependent from claim 1 and 8 and are thus similarly indefinite.

Claim Rejections - 35 U.S.C. § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-3,6-10,12 are rejected under 35 U.S.C. § 102(b) as being anticipated by Kondo et al (2002/0111939).

As to claim 1, Kondo et al. teaches an image retrieving device (image data retrieval apparatus, 100,200, figure 1) for classifying and retrieving an image by detecting an object in the image and adding a keyword, the image retrieving device comprising:
an image storing section for storing the image, which is supposed to be classified and retrieved together with the keyword in a database (image database, 105,figure 1);
an object acknowledging section for acknowledging a predetermined object in the image which is inputted (a user designates an image or holder to be registered. In accordance with the designation a first image is input at step S803, step S805 a decision is made as to whether the input image includes any figure of a person. If so then at step S807 all figures in the image have their respective face images cut out , paragraph [0081-0082]);
a keyword proposing section for proposing the keyword so as to display on a display the keyword which relates to the object which is acknowledged by the object acknowledging section (step S813 a name is entered to correspond to the face image. Then at step S815 the face image cut out and the entered name are correlated with each other and thus registered in the face dictionary, paragraph [0084]); and an object information inputting section for confirming, adding, and correcting the keyword which is proposed by the keyword proposing section (from step s811 to s819, paragraph [0086-0088].

As to claim 2, Kondo et al. teaches an image retrieving device according to claim 1 wherein the object acknowledging section includes: a human detection condition inputting section for setting up conditions for determining whether or not the image contains a human (step s805, a decision is made as to whether the input image includes any figure of a person); a face image detecting section for detecting a face image in the image; and a face image

similarity determining section for detecting a face image which is detected by the face image detecting section so as to detect a similar face image stored in the database according to the detected face imaged (step s809 an image of the face of a first person is read and at step s811 a decision is made as to whether the face image has already been registered in a face dictionary, paragraph [0084-0087]).

As to claim 3, Kondo et al. teaches an image-retrieving device according to claim 2 wherein the object information inputting section serves as a personal information inputting section for confirming, adding, and correcting personal information (the information obtains more than one item of information, paragraph [0020]).

As to claim 5, Kondo et al teaches an image retrieving device according to claim 2 further comprising a keyword proposing section for proposing the keyword to the image which is inputted last in a case in which the similar face image is not detected by the face image similarity determining section (paragraph [0084] if not a keyword name is entered to correspond to the face image).

As to claim 6, and 9-10 and 12, Kondo et al teaches an image-retrieving device according to claim 1 wherein the keyword is added according to a retrieving template, which is formed by the keywords, which have hierarchical structure (paragraph [0094-0097]).

As to claim 7 differ from claim 1 only in that claim 7 is a method claim whereas; claim 1 is an apparatus claim. Thus, claim 7 is analyzed as previously discussed with respect to claim 1 above.

As to claim 8 differ from claim 1 only in that claim 8 is a computer claim whereas; claim 1 is an apparatus claim. Thus, claim 8 is analyzed as previously discussed with respect to claim 1 above.

As to claim 13 and 14, Kondo teaches a the keyword have a hierarchical structure (the retrieval key image in order to expedite and simply the retrieval of the image, paragraph [0015])

Claim Rejections - 35 U.S.C. § 103

10. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4 and 11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Luo et al. (US 6,826,316).

While Kondo meets a number of the limitations of the claimed invention, as pointed out more fully above, Kondo fails to specifically teach the a skin color area detecting section is used when the human is detected. Specifically, Luo et al. discloses a study of a photographic image database of over 2000 images, over 70% of the photographic images have people and about the same

number of images have sizable faces in them. Indeed, people are the single most important subject in photographs. Moreover, Luo et al teaches the use of an image retrieval system by providing perceptually significant features of the image where the use of skin detection as one of a semantic feature utilizes color image segmentation and a predetermined skin where the skin region classification is based on maximum probability according to the average color of a segmented region. The probabilities are mapped to a belief output via a sigmoid belief function. Because the use of skin detection helps retrieve feature based similarities of faces in an image by computing a belief value for all pixels using the Bayes net (column 6, lines 61-67). It would have been obvious to one of ordinary skill in the art to use the skin algorithm in Kondo in order to get better and accurate recognition result thus getting certain identification. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claim 11, Kondo et al teaches an image-retrieving device according to claim 1 wherein the keyword is added according to a retrieving template, which is formed by the keywords, which have hierarchical structure (paragraph [0094-0097]).

Conclusion

11. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the

THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nancy Bitar whose telephone number is 571-270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on 571-272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nancy Bitar

SAMIR AHMED
PRIMARY EXAMINER

8/29/2007

Notice of References Cited	Application/Control No. 10/762,450	Applicant(s)/Patent Under Reexamination NAGAHASHI, TOSHINORI	
	Examiner Nancy Bitar	Art Unit 2624	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2002/0111939	08-2002	Kondo et al.	707/1
*	B	US-6,826,316	11-2004	Luo et al.	382/305
*	C	US-2005/0105803	05-2005	Ray, Lawrence A.	382/209
*	D	US-2001/0043727	11-2001	COOPER, FREDERICK J.	382/118
*	E	US-6,785,429	08-2004	Senoh, Takanori	382/305
*	F	US-2005/0243188	11-2005	Anderson, Eric C.	348/231.2
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
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	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Form PTO-1449 (REV. 1/06)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT(S) Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	GROUP 2615

OIPE IAP13 JUN 29 2006 PATENT & TRADEMARK OFFICE

PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Date	Name

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Date	Country	With English Abstract	With English Translation
/NB/	1	JP A 10-326278	12/8/1998	JAPAN	X	X
/NB/	2	JP A 06-215089	8/5/1994	JAPAN	X	X
/NB/	3	JP A 10-049542	2/20/1998	JAPAN	X	X
/NB/	4	JP A 08-249349	9/27/1996	JAPAN	X	X

OTHER DOCUMENTS

Examiner Initials	Cite No.	(Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	DATE CONSIDERED
/Nancy Bitar/	08/29/2007

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: June 29, 2006

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PATENT & TRADEMARK OFFICE

Form PTO-1449 (REV. 8-83) US Dept of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)	APPLICANT Toshinori NAGAHASHI	
	FILING DATE January 23, 2004	GROUP 2615

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS
/NB/	1	US 6,785,429 B1	08/31/2004	SENOH		

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS
/NB/	2	CN 1245317 A	02/23/2000	CHINA		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

/NB/	3	WANG et al.; "A Fast Human Face Detection Method From Color Images Under Complex Background"; ACTA ELECTRONICA SINICA; Vol. 30 No. 10 Oct. 2002; 1995-2005 Tsinghua Tongfang Optical Disc Co., Ltd.; pp. 1566-1569 with abstract

EXAMINER	DATE CONSIDERED
/Nancy Bitar/	08/29/2007

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: November 17, 2005

AUG 0 9 2005
PATENT & TRADEMARK OFFICE

Form PTO-1449 (REV. 8-83)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	GROUP 2615

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS
/NB/	1	US 2001/0043727 A1	11/22/2001	COOPER		
/NB/	2	US 6,408,301 B1	06/18/2002	PATTON et al.		

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	/Nancy Bitar/	DATE CONSIDERED 08/29/2007

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: August 9, 2005

Form PTO-1449 (REV. 8-83)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. New US Application
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS
/NB/	1	JP A 10-307849 (with abstract and translation)	11/17/1998	Japan		
/NB/	2	JP A 8-221547 (with abstract and translation)	08/30/1996	Japan		
/NB/	3	JP A 2001-160057 (with abstract and translation)	06/12/2001	Japan		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	DATE CONSIDERED
/Nancy Bitar/	08/29/2007

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: January 23, 2004

Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
10/762,450	NAGAHASHI, TOSHINORI
Examiner	**Art Unit**
Nancy Bitar	2624

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

Claim		Date
Final	Original	8/29/07
	1	√
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Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/762,450	NAGAHASHI, TOSHINORI	
	Examiner	Art Unit	
	Nancy Bitar	2624	

SEARCHED			
Class	Subclass	Date	Examiner
382	305	8/29/2007	NB
348	231.2	8/29/2007	NB
386	69	8/29/2007	NB

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Update east search	8/29/2007	NB
Consulted with Samir Ahmed	8/29/2007	NB

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Bib Data Sheet

CONFIRMATION NO. 5463

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/762,450	01/23/2004 RULE	382	2624	118464

APPLICANTS
Toshinori Nagahashi, Tatsuno-machi, JAPAN; N.B

**** CONTINUING DATA ***************************

**** FOREIGN APPLICATIONS ********************** N.B
JAPAN 2003-020805 01/29/2003

IF REQUIRED, FOREIGN FILING LICENSE GRANTED
** 04/26/2004

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☑ yes ☐ no	JAPAN	8	12	3
35 USC 119 (a-d) conditions met ☑ yes ☐ no ☐ Met after Allowance				
Verified and Acknowledged Examiner's Signature Initials N.B				

ADDRESS
25944

TITLE
Image retrieving device, method for adding keywords in image retrieving device, and computer program therefor

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
900	No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

Interview Summary	Application No.	Applicant(s)	
	10/762,450	NAGAHASHI, TOSHINORI	
	Examiner	Art Unit	
	Nancy Bitar	2624	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Nancy Bitar*. (3)_____.

(2) *Tiffany Brooks*. (4)_____.

Date of Interview: *13 December 2007*.

Type: a)☐ Telephonic b)☐ Video Conference
c)☒ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☐ No.
If Yes, brief description: _____.

Claim(s) discussed: *1*.

Identification of prior art discussed: _____.

Agreement with respect to the claims f)☐ was reached. g)☒ was not reached. h)☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *See Continuation Sheet*.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

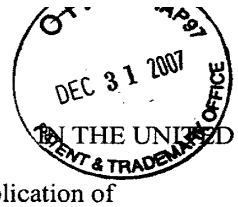
THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

ANDREW W. JOHNS
PRIMARY EXAMINER

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

Examiner's signature, if required

Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Applicant proposed an amendemnt to overcome the 112 second rejection.Examiner agreed that the proposed amendemtn will overcome the 112 rejection.Applicant argued that the limitation of confirming and correcting the keyword which is proposed by the keyword proposing section is not found in Kondo reference.Examiner showed that step s811 to s819 shows how Kondo corrects the keyword and suggested that applicant be more specific in the limitation of confirming the keyword .



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toshinori NAGAHASHI

Group Art Unit: 2624

Application No.: 10/762,450

Examiner: N. BITAR

Filed: January 23, 2004

Docket No.: 118464

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

MAIL STOP RCE

LARGE ENTITY REQUEST FOR CONTINUED EXAMINATION UNDER 37 C.F.R. §1.114

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. §1.114, Applicant(s) hereby request(s) continued examination.

☒ Applicant further requests entry and consideration of the attached submission.

The above-identified application was filed on or after June 8, 1995. Thus, entry is proper under 37 C.F.R. §1.114(d).

Attached hereto is our check no. 200885 in the amount of ☒ $810.00 as payment of the fees set forth in 37 C.F.R. §1.17(e). The Commissioner is hereby authorized to charge any additional fees or credit any overpayment associated with this communication to Deposit Account No. 15-0461.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Kirk D. Berkhimer
Registration No. 59,874

JAO:KDB/hms

Date: December 31, 2007

OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 15-0461

01/02/2008 CNGUYEN2 00000015 10762450
01 FC:1801 810.00 OP



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toshinori NAGAHASHI

Group Art Unit: 2624

Application No.: 10/762,450

Examiner: N. BITAR

Filed: January 23, 2004

Docket No.: 118464

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

AMENDMENT UNDER 37 C.F.R. §1.114

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In reply to the August 30, 2007 Office Action, upon entry of the attached Request for Continued Examination (RCE), the shortened statutory period of time being extended by the attached Petition for Extension of Time, please consider the following:

Amendments to the Claims as reflected in the listing of claims; and

Remarks.

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword, the image retrieving device comprising:

an image storing section for storing the image which is supposed to be classified and retrieved together with the keyword in a database;

an object acknowledging section for acknowledging a predetermined object in the image which is inputted;

a keyword proposing section for proposing the keyword ~~so as to display~~ on a display, the keyword which relates to the predetermined object which is acknowledged by the object acknowledging section; and

an object information inputting section for ~~confirming,~~ confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing ~~section.~~section when the predetermined object acknowledged by the object acknowledging section is similar to the object in the image previously stored in the database.

2. (Previously Presented) An image retrieving device according to Claim 1, wherein the object acknowledging section includes:

a human detection condition inputting section for setting up conditions for determining whether or not the image contains a human;

a face image detecting section for detecting a face image in the image; and

a face image similarity determining section for detecting a face image which is detected by the face image detecting section so as to detect a similar face image stored in the database according to the detected face imaged.

3. (Original) An image retrieving device according to Claim 2 wherein the object information inputting section serves as a personal information inputting section for confirming, adding, and correcting a personal information.

4. (Previously Presented) An image retrieving device according to Claim 2 further comprising a skin color area detecting section for detecting a skin color area in the image, wherein

the skin color area detecting section is used when the human is detected.

5. (Original) An image retrieving device according to Claim 2 further comprising a keyword proposing section for proposing the keyword to the image which is inputted last in a case in which the similar face image is not detected by the face image similarity determining section.

6. (Original) An image retrieving device according to claim 1 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

7. (Currently Amended) A method for adding keywords in an image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword, the method comprising:

storing the image which is supposed to be classified and retrieved together with the keyword in a database;

acknowledging a predetermined object in the image which is inputted;

proposing the keyword ~~so as to display~~ on a display, the keyword which relates to the predetermined object which is acknowledged by ~~the~~ an object acknowledging section; and

~~confirming,~~ confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing ~~section.~~section when the predetermined object

acknowledged by the object acknowledging section is similar to the object in the image previously stored in the database.

8. (Currently Amended) A storage medium having a program stored therein for operating an image retrieving device which classifies and retrieves an image by detecting an object in the image and adding a keyword, the storage medium comprising:

storing the image which is supposed to be classified and retrieved together with the keyword in a database;

acknowledging a predetermined object in the image which is inputted;

proposing the keyword ~~so as to display~~ on a display, the keyword which relates to the predetermined object which is acknowledged by ~~the~~ an object acknowledging section; and

~~confirming,~~ confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing ~~section.~~section when the predetermined object acknowledged by the object acknowledging section is similar to the object in the image previously stored in the database.

9. (Original) An image retrieving device according to claim 2 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

10. (Original) An image retrieving device according to claim 3 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

11. (Original) An image retrieving device according to claim 4 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

12. (Original) An image retrieving device according to claim 5 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

13. (Previously Presented) A method according to claim 7, wherein the keyword is added according to a retrieving template which is formed by the keywords which have a hierarchical structure.

14. (Previously Presented) A storage medium according to claim 8, wherein the keyword is added according to a retrieving template which is formed by the keywords which have a hierarchical structure.

REMARKS

Claims 1-14 are pending in this application. By this Amendment, claims 1, 7 and 8 are amended. No new matter is added. Support for the amendments to claims 1, 7 and 8 is found in the specification at, for example, page 16, line 11 to page 17, line 5. Reconsideration of the application is respectfully requested.

The courtesies extended to Applicant's representative by Examiner Bitar at the interview held December 13, 2007, are appreciated. The reasons presented at the interview as warranting favorable action are incorporated into the remarks below and constitute Applicant's record of the interview.

The Office Action rejects claims 1 and 8 under 35 U.S.C. §112, second paragraph. The Office Action also asserts that claims 2-7 and 9-14 are indefinite because they depend from claims 1 and 8.

Claims 1 and 8 are amended to obviate the rejection. As discussed and agreed to during the interview, amended claims 1 and 8 are therefore definite. Claim 7 is amended similarly. Claims 3-6 and 9-17 only depend from rejected claims 1 and 8. As such, withdrawal of the rejection is respectfully quested.

The Office Action rejects claims 1-3, 6-10 and 12 under 35 U.S.C. §102(b) over U.S. Patent Publication No. 2002/0111939 to Kondo et al. Applicant also understands that claim 5 is rejected under this rejection because the Office Action provides grounds for rejecting claim 5. This rejection is respectfully traversed.

Claim 1 recites, *inter alia*, a keyword proposing section for proposing the keyword on a display, the keyword which relates to the predetermined object which is acknowledged by the object acknowledging section, and an object information inputting section for confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing section when the predetermined object acknowledged by the object acknowledging section is

similar to the object in the image previously stored in the database. Claims 7 and 8 each recite, *inter alia*, proposing the keyword on a display, the keyword which relates to the predetermined object which is acknowledged by the object acknowledging section, and confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing when the predetermined object acknowledged by the object acknowledging section is similar to the object in the image previously stored in the database.

According to the features recited in claims 1, 7 and 8, it is possible to add the keywords to the image efficiently by detecting the inputted objects in the image in the detecting/classifying device for the image. Also, because the keywords that relate to the object in the image are added, it is possible to accurately and efficiently retrieve the image that contains a specific object using the keyword from numerous other images accurately.

The Office Action asserts that Kondo discloses, at paragraph [0084], step S813 in which a name is entered to correspond to the face image, and step S815 in which the face image cut out and the entered name are correlated with each other and thus registered in the face dictionary. Also, the Office Action asserts that Kondo disclosed, at paragraphs [0086] to [0088], steps S811 to S819 which are allegedly equivalent to confirming by the user, adding, and correcting the keyword when the predetermined object acknowledged by the object acknowledging section is similar to the object in the image previously stored in the database. See also FIG. 8 of Kondo. Applicant respectfully disagrees with these assertions.

At step S811 of Kondo, a decision is made as to whether the face image has already been registered in a face dictionary. If the face image has not already been registered at step S811, then a name is entered to correspond to the face image at step S813. After carrying out at the step S813, the face image cut out and the entered name are correlated with each other and thus registered in the face dictionary at step S815, and the program moves on to step

S817. If the face image has already been registered at step S811, then the program skips these steps S813 and S815 and moves on to step S817.

As described above, in Kondo, if the face image has not already been registered, a name is entered to correspond to the face image. On the other hand, if the face image has already been registered, the program skips these steps. Thus, in Kondo, the face image which has already been registered is not proposed to a user at all. Therefore, the user cannot confirm the face image which is skipped in steps S813 and S815.

More specifically, in the case of registering face images of two persons whose names are different from each other but whose faces strongly resemble each other. For example, for images of twins, brothers, or the like, the image data retrieval apparatus of Kondo automatically determines the above-described "the face image has not already been registered" or "the face image has already been registered" without giving the opportunity for the user to confirm the name or the face. Therefore, the image data retrieval apparatus of Kondo automatically determines the above-described decision as to whether the face image has already been registered in a face dictionary (step S811) without arbitrary determination by the user.

In contrast, the subject matter of the pending claims recites that when a predetermined object in the inputted image is acknowledged by the object acknowledging section, the keyword proposing section proposes, on a display, the keyword relating to the predetermined object which is acknowledged by the object acknowledging section. Furthermore. In the object information inputting section, the proposed keyword of the keyword proposing section is confirmed by the user, and the keyword is then added and corrected as needed, *i.e.*, when the predetermined object acknowledged by the object acknowledging section is similar to the object in the image previously stored in the database. As such, even if the face images have been registered in the face dictionary, the user is prompted to confirm the keyword.

Accordingly, Applicant respectfully submits that Kondo fails to teach or suggest confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing section when the predetermined object acknowledged by the object acknowledging section is similar to the object in the image previously stored in the database, as recited in claims 1, 7 and 8. Therefore, claims 1, 7 and 8 are patentably distinct from Kondo.

Dependent claims 2, 3, 5, 6, 9, 10 and 12 are allowable at least for their dependence on allowable bases, as well as for the additional features they recite. As such, withdrawal of the rejection is respectfully requested.

The Office Action rejects claims 4 and 11 under 35 U.S.C. §103(a) over Kondo in view of U.S. Patent No. 6,826,316 to Luo et al. (Luo). This rejection is respectfully traversed.

Luo does not overcome the deficiency of Kondo with respect to claims 1 and 8. Therefore, claims 4 and 11 are allowable at least for their dependence on allowable base claims, as well as for the additional features they recite. Withdrawal of the rejection is respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Kirk D. Berkhimer
Registration No. 59,874

JAO:KXH/hms

Attachments:
Request for Continued Examination
Petition for Extension of Time

Date: December 31, 2007

OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

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DEC 31 2007
PATENT & TRADEMARK OFFICE

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Date December 31, 2007

In re the Application of

Toshinori NAGAHASHI

Group Art Unit: 2624

Application No.: 10/762,450

Examiner: N. BITAR

Filed: January 23, 2004

Docket No.: 118464

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

LARGE ENTITY PETITION FOR 1st - 3rd EXTENSION OF TIME UNDER 37 C.F.R. §1.136(a) AND TRANSMITTAL OF FEE UNDER 37 C.F.R. §1.17

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith is a response to the outstanding Official Action in the above-identified patent application. The shortened statutory period having expired November 30, 2007, an extension of time for a period of one month is hereby requested. Attached hereto is our Check No. 200884 in the amount of $120 in payment for:

X Extension fee for response within first month pursuant to §1.136(a) ($120.00)

_____ Extension fee for response within second month pursuant to §1.136(a) ($460.00)

_____ Extension fee for response within third or subsequent month pursuant to §1.136(a) ($1050.00)

The Commissioner is hereby authorized to charge any additional fee or credit any overpayment associated with this communication to Deposit Account No. 15-0461.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Kirk D. Berkhimer
Registration No. 59,874

01/02/2008 CNGUYEN2 00000015 10762450
02 FC:1251 120.00 OP

JAO:KDB/hms

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
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OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 10/762,450	Filing Date 01/23/2004	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT	12/31/2007	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 14	Minus	** 20	= 0	X $ =		OR	X $50=	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $210=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
Karen Vestal

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,450	01/23/2004	Toshinori Nagahashi	118464	5463

25944 7590 03/20/2008

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER	
BITAR, NANCY	
ART UNIT	PAPER NUMBER
2624	
MAIL DATE	DELIVERY MODE
03/20/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/762,450	NAGAHASHI, TOSHINORI	
	Examiner	Art Unit	
	NANCY BITAR	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/31/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 January 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/29/05,11/17/05,08/09/05,01/23/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant argues that Kondo fails to teach or suggest confirming by the user, adding and correcting the keyword which is proposed by the keyword proposing section. Moreover, applicant asserts that if the face image has not already been registered a name is entered to correspond to the face image. On the other hand, if the face image has already been registered the face image is not proposed to a user at all thus the user cannot confirm the face image .It is true that if the initial figure is already registered Kondo will move to step s817 in order to find any subsequent figure therefore, when a user is not sure about a name he will click on yes and the steps will go back to s811 and register the new name as desired (see figure 8). Therefore, Kondo face image is being confirmed by the user. Applicant argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies "confirming the face image is already have been registered " are not recited in the rejected claims. The claim language is generalized to any face image whether it is registered in the database or not. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993)

2. All remaining arguments are reliant on the aforementioned and addressed arguments and thus are considered to be wholly addressed herein.

Drawings

3. The drawings are objected to because figure 1,2,10 does not comply with 37 CFR 1.84(o) where suitable descriptive legends may be used subject to approval by Office, or may be

required by the examiner where necessary for understanding of the drawing. They should contain as few words as possible

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.
>
> When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).
>
> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

4. Claim(s) 8 and 14 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 8 defines "a storage medium having a program stored "embodying functional descriptive material. However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). That is, the scope of the presently claimed "a storage medium having a program stored" can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody "a computer readable medium storing a computer program" or equivalent in order to make the claim statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

Examiner Notes

5. Examiner cites particular columns and line numbers in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3, 5-10, 12-14 rejected less than 35 U.S.C. 102 (b) as being anticipated by Kondo ET al (2002/0111939).

As to claim 1, Kondo et al. teaches an image retrieving device (image data retrieval apparatus, 100,200, figure 1) for classifying and retrieving an image by detecting an object in the image and adding a keyword, the image retrieving device comprising:

an image storing section for storing the image, which is supposed to be classified and retrieved together with the keyword in a database (image database, 105,figure 1);

an object acknowledging section for acknowledging a predetermined object in the image which is inputted (a user designates an image or holder to be registered. In accordance with the designation a first image is input at step S803, step S805 a decision is made as to whether the input image includes any figure of a person. If so then at step S807 all figures in the image have their respective face images cut out , paragraph [0081-0082]);

a keyword proposing section for proposing the keyword so as to display on a display the keyword which relates to the predetermined object which is acknowledged by the object

acknowledging section (step S813 a name is entered to correspond to the face image. Then at step S815 the face image cut out and the entered name are correlated with each other and thus registered in the face dictionary, paragraph [0084]); and an object information inputting section for confirming by the user , adding, and correcting the keyword which is proposed by the keyword proposing section when the predetermined object acknowledged by the object acknowledging section is similar to the object in the image previously stored in the database (Kondo confirm the keyword before being registered by the user, also registering an image in image database 105 a figure included in the image can be cut out and without making a decision as to whether it has already been registered the face image and an image file name corresponding thereto can be recorded in a face dictionary. note that a user as desired input a keyword necessary for retrieval previously when image data is registered and a user can enter a search period, a keyword and a name of a person to be retrieved, paragraph before or after registration [0086-0089] . Kondo teaches in paragraph [0015] a retrieval key image designator for designating a desired retrieval key image among the stored retrieval key images; and a retriever for using the designated retrieval key image to retrieve from the image database more than one item of image data containing an image identical or analogous to the retrieval key image, see also step 1303 and 1305 and figure 8).

As to claim 2, Kondo et al. teaches an image retrieving device according to claim 1 wherein the object acknowledging section includes: a human detection condition inputting section for setting up conditions for determining whether or not the image contains a human (step s805, a decision is made as to whether the input image includes any figure of a person); a face image detecting section for detecting a face image in the image; and a face image similarity

determining section for detecting a face image which is detected by the face image detecting section so as to detect a similar face image stored in the database according to the detected face imaged (step s809 an image of the face of a first person is read and at step s811 a decision is made as to whether the face image has already been registered in a face dictionary, paragraph [0084-0087]).

As to claim 3, Kondo et al. teaches an image-retrieving device according to claim 2 wherein the object information inputting section serves as a personal information inputting section for confirming, adding, and correcting personal information (the information obtains more than one item of information, paragraph [0020]).

As to claim 5, Kondo et al teaches an image retrieving device according to claim 2 further comprising a keyword proposing section for proposing the keyword to the image which is inputted last in a case in which the similar face image is not detected by the face image similarity determining section (paragraph [0084] if not a keyword name is entered to correspond to the face image).

As to claim 6, and 9-10 and 12, Kondo et al teaches an image-retrieving device according to claim 1 wherein the keyword is added according to a retrieving template, which is formed by the keywords, which have hierarchical structure (paragraph [0094-0097]).

As to claim 7 differ from claim 1 only in that claim 7 is a method claim whereas; claim 1 is an apparatus claim. Thus, claim 7 is analyzed as previously discussed with respect to claim 1 above.

As to claim 8 differ from claim 1 only in that claim 8 is a computer claim whereas; claim 1 is an apparatus claim. Thus, claim 8 is analyzed as previously discussed with respect to claim 1 above.

As to claim 13 and 14, Kondo teaches a the keyword have a hierarchical structure (the retrieval key image in order to expedite and simply the retrieval of the image, paragraph [0015])

Claim Rejections - 35 U.S.C. § 103

7. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 4 and 11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Luo et al. (US 6,826,316).

While Kondo meets a number of the limitations of the claimed invention, as pointed out more fully above, Kondo fails to specifically teach the a skin color area detecting section is used when the human is detected. Specifically, Luo et al. discloses a study of a photographic image database of over 2000 images, over 70% of the photographic images have people and about the

same number of images have sizable faces in them. Indeed, people are the single most important subject in photographs. Moreover, Luo et al teaches the use of an image retrieval system by providing perceptually significant features of the image where the use of skin detection as one of a semantic feature utilizes color image segmentation and a predetermined skin where the skin region classification is based on maximum probability according to the average color of a segmented region. The probabilities are mapped to a belief output via a sigmoid belief function. Because the use of skin detection helps retrieve feature based similarities of faces in an image by computing a belief value for all pixels using the Bayes net (column 6, lines 61-67). It would have been obvious to one of ordinary skill in the art to use the skin algorithm in Kondo in order to get better and accurate recognition result thus getting certain identification. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claim 11, Kondo et al teaches an image-retrieving device according to claim 1 wherein the keyword is added according to a retrieving template, which is formed by the keywords, which have hierarchical structure (paragraph [0094-0097]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NANCY BITAR whose telephone number is (571)270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew W. Johns/
Primary Examiner, Art Unit 2624

Nancy Bitar 3/15/2008

Notice of References Cited	Application/Control No. 10/762,450	Applicant(s)/Patent Under Reexamination NAGAHASHI, TOSHINORI	
	Examiner NANCY BITAR	Art Unit 2624	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2002/0111939	08-2002	Kondo et al.	707/1
*	B	US-6,826,316	11-2004	Luo et al.	382/305
*	C	US-6,785,429	08-2004	Senoh, Takanori	382/305
*	D	US-2005/0243188	11-2005	Anderson, Eric C.	348/231.2
	E	US-			
	F	US-			
	G	US-			
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	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
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	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Sheet 1 of 1

Form PTO-1449 (REV. 8-83)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. New US Application
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS
/NB/	1	JP A 10-307849 (with abstract and translation)	11/17/1998	Japan		
/NB/	2	JP A 8-221547 (with abstract and translation)	08/30/1996	Japan		
/NB/	3	JP A 2001-160057 (with abstract and translation)	06/12/2001	Japan		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	/Nancy Bitar/	DATE CONSIDERED	08/29/2007

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: January 23, 2004

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PATENT & TRADEMARK OFFICE

Form PTO-1449 (REV. 8-83)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	GROUP 2615

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS
/NB/	1	US 2001/0043727 A1	11/22/2001	COOPER		
/NB/	2	US 6,408,301 B1	06/18/2002	PATTON et al.		

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	/Nancy Bitar/	DATE CONSIDERED 08/29/2007

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: August 9, 2005

Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
10/762,450	NAGAHASHI, TOSHINORI
Examiner	**Art Unit**
NANCY BITAR	2624

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

Claim		Date
Final	Original	3/14/08
	1	√
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Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/762,450	NAGAHASHI, TOSHINORI	
	Examiner	Art Unit	
	NANCY BITAR	2624	

SEARCHED			
Class	Subclass	Date	Examiner
382	305	3/15/2008	NB
386	69	3/15/2008	NB
707	1	3/15/2008	NB
382	118	3/15/2008	NB

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Update East search	3/15/2008	NB
NPL search	3/15/2008	NB
Inventor name search	3/15/2008	NB
Consulted with samir Ahmed	3/15/2008	NB

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/762,450	NAGAHASHI, TOSHINORI	
	Examiner	Art Unit	
	NANCY BITAR	2624	

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	0	(2002/0111939)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/15 16:20
L3	0	2002/0111939	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/15 16:21
L4	2	"20020111939"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/15 16:21
S1	0	(10/765450).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/02/26 17:04
S2	0	(10/762450).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/02/26 17:04
S3	1	10/762450	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:05
S4	439	348/231.2	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:26
S5	22	S4 and (keyword with imag $4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:18
S6	5	"6785429"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:21

S7	2	"20010043727"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:21
S8	0	("2001/0043727").URPN.	USPAT	OR	ON	2007/02/26 18:25
S9	33	S4 and keyword	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:29
S10	10	S9 and face	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:45
S11	3	image with retriev$5 with face with keyword	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:57
S12	4	keyword near1 proposing	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:58
S13	56	keyword near1 propos$$	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:58
S14	53	keyword near1 propos$4	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:58
S15	3	S14 and face	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:01
S16	97	keyword with face	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:01
S17	5670066	object	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:01

S18	2689	keyword with object	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:02
S19	0	keyword with object7 and image	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:02
S20	1417	S18 and image	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:02
S21	1109	S20 and (extract$4 or detect$5)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:09
S22	13	"756748"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:09
S23	1	"7-56748"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:09
S24	0	("2002/0111939").URPN.	USPAT	OR	ON	2007/02/27 14:02
S25	1835	382/305	USPAT	OR	ON	2007/02/27 14:02
S26	1055	S25 and detect$5	USPAT	OR	ON	2007/02/27 14:02
S27	46	S26 and skin	USPAT	OR	ON	2007/02/27 14:02
S28	28	S27 and face	USPAT	OR	ON	2007/02/27 14:02
S29	7	S28 and keyword	USPAT	OR	ON	2007/02/27 14:54
S30	695	386/69	USPAT	OR	ON	2007/02/27 14:54
S31	333	S30 and retriev$4	USPAT	OR	ON	2007/02/27 14:54
S32	253	S31 and (word or key$4)	USPAT	OR	ON	2007/02/27 14:54

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Form PTO-1449 (REV. 1/06)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT(S) Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	GROUP 2615

OIPE IAP13 JUN 29 2006 PATENT & TRADEMARK OFFICE

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Date	Name

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Date	Country	With English Abstract	With English Translation
/NB/	1	JP A 10-326278	12/8/1998	JAPAN	X	X
/NB/	2	JP A 06-215089	8/5/1994	JAPAN	X	X
/NB/	3	JP A 10-049542	2/20/1998	JAPAN	X	X
/NB/	4	JP A 08-249349	9/27/1996	JAPAN	X	X

OTHER DOCUMENTS

Examiner Initials	Cite No.	(Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	DATE CONSIDERED
/Nancy Bitar/	08/29/2007

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: June 29, 2006

OIPE IAP45
NOV 17 2005
PATENT & TRADEMARK OFFICE

Form PTO-1449 (REV. 8-83) US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)	APPLICANT Toshinori NAGAHASHI	
	FILING DATE January 23, 2004	GROUP 2615

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS
/NB/	1	US 6,785,429 B1	08/31/2004	SENOH		

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS
/NB/	2	CN 1245317 A	02/23/2000	CHINA		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

/NB/	3	WANG et al.; "A Fast Human Face Detection Method From Color Images Under Complex Background"; ACTA ELECTRONICA SINICA; Vol. 30 No. 10 Oct. 2002; 1995-2005 Tsinghua Tongfang Optical Disc Co., Ltd.; pp. 1566-1569 with abstract

EXAMINER	DATE CONSIDERED
/Nancy Bitar/	08/29/2007

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: November 17, 2005



IFW

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toshinori NAGAHASHI

Group Art Unit: 2624

Application No.: 10/762,450

Examiner: BITAR

Filed: January 23, 2004

Docket No.: 118464

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In reply to the March 20, 2008 Office Action, please consider the following:

Amendments to the Claims as reflected in the listing of claims;

Amendments to the Drawings include an attached replacement sheet; and

Remarks.

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword, the image retrieving device comprising:

an image storing section for storing the image which is supposed to be classified and retrieved together with ~~the~~ a keyword in a ~~database;~~database and an object of the image being previously contained in the database;

an image inputting detecting section that detects an inputted image that is newly inputted to the image retrieving device;

an object acknowledging section for acknowledging ~~a predetermined~~an inputted object in the inputted image ~~which is inputted;~~that has been detected by the image inputting detecting section;

a keyword proposing section for proposing the keyword on a display, the keyword which relates to the ~~predetermined~~ inputted object which is acknowledged by the object acknowledging section; and

an object information inputting section for confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing section when the ~~predetermined~~ inputted object acknowledged by the object acknowledging section is similar to the object ~~in~~ of the image previously ~~stored~~ contained in the database.

2. (Previously Presented) An image retrieving device according to Claim 1, wherein the object acknowledging section includes:

a human detection condition inputting section for setting up conditions for determining whether or not the image contains a human;

a face image detecting section for detecting a face image in the image; and

a face image similarity determining section for detecting a face image which is detected by the face image detecting section so as to detect a similar face image stored in the database according to the detected face imaged.

3. (Original) An image retrieving device according to Claim 2 wherein the object information inputting section serves as a personal information inputting section for confirming, adding, and correcting a personal information.

4. (Previously Presented) An image retrieving device according to Claim 2 further comprising a skin color area detecting section for detecting a skin color area in the image, wherein

the skin color area detecting section is used when the human is detected.

5. (Original) An image retrieving device according to Claim 2 further comprising a keyword proposing section for proposing the keyword to the image which is inputted last in a case in which the similar face image is not detected by the face image similarity determining section.

6. (Original) An image retrieving device according to claim 1 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

7. (Currently Amended) A method for adding keywords in an image retrieving device for classifying and retrieving an image by detecting an object in the image and adding a keyword, the method comprising:

storing the image which is supposed to be classified and retrieved together with the keyword in a ~~database;~~database and an object of the image being previously contained sin the database;

detecting an inputted image that is newly inputted to the image retrieving device by an image inputting detection section;

acknowledging ~~a predetermined~~an inputted object in the inputted image ~~which is inputted;~~that has been detected by the image inputting detecting section;

proposing ~~the~~ a keyword on a display, the keyword which relates to the ~~predetermined~~ inputted object which is acknowledged by an object acknowledging section; and

confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing section when the ~~predetermined~~ inputted object acknowledged by the object acknowledging section is similar to the object ~~in~~ of the image previously ~~stored~~ contained in the database.

8. (Currently Amended) A computer readable medium storing a computer program~~storage medium having a program stored therein~~ for operating an image retrieving device which classifies and retrieves an image by detecting an object in the image and adding a keyword, the storage medium comprising:

storing the image which is supposed to be classified and retrieved together with ~~the~~ a keyword in a ~~database;~~database and an object of the image being previously contained in the database;

detecting an inputted image that is newly inputted to the image retrieving device by an image inputting detecting section;

acknowledging ~~a predetermined~~an inputted object in the image ~~which is inputted;~~that has been detected by the image inputting detecting section;

proposing the keyword on a display, the keyword which relates to the ~~predetermined~~ inputted object which is acknowledged by an object acknowledging section; and

confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing section when the ~~predetermined~~ inputted object acknowledged by the object acknowledging section is similar to the object in the image previously ~~stored~~ contained in the database.

9. (Original) An image retrieving device according to claim 2 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

10. (Original) An image retrieving device according to claim 3 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

11. (Original) An image retrieving device according to claim 4 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

12. (Original) An image retrieving device according to claim 5 wherein the keyword is added according to a retrieving template which is formed by the keywords which have hierarchical structure.

13. (Previously Presented) A method according to claim 7, wherein the keyword is added according to a retrieving template which is formed by the keywords which have a hierarchical structure.

14. (Currently Amended) A ~~storage medium~~ computer readable medium storing a computer program according to claim 8, wherein the keyword is added according to a retrieving template which is formed by the keywords which have a hierarchical structure.

Amendments to the Drawings:

The attached replacement drawing sheets makes changes to Figs. 1, 2 and 10 and replace the original sheets with Figs. 1, 2 and 10.

Attachment: Replacement Sheets

REMARKS

Claims 1-14 are pending in this application. By this Amendment, claims 1, 7, 8 and 14, and Figures 1, 2 and 10 are amended. No new matter is added by these amendments as support can be found in at least paragraphs [0028], [0069], [0100]-[0105] and [0112], regarding claims 1, 7 and 8, and paragraphs [0159]-[0161] regarding claims 8 and 14. Reconsideration of the application based on the above amendments and the following remarks is respectfully requested.

The Office Action, in paragraph 3, objects to the Figures 1, 2 and 10 as failing to comply with 37 C.F.R. §1.84. Figures 1, 2 and 10 are amended to obviate the objection. Accordingly, withdrawal of the objection to the drawings is respectfully requested.

The Office Action, in paragraph 4, rejects claims 8 and 14 under 35 U.S.C. §101 as being directed to non-statutory subject matter. Claims 8 and 14 are amended to obviate the rejection. Accordingly, reconsideration and withdrawal of the rejection of claims 8 and 14 under 35 U.S.C. §101 are respectfully requested.

The Office Action, in paragraph 6, rejects claims 1-3, 5-10 and 12-14 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Application Publication No. 2002/0111939 to Kondo et al. (hereinafter "Kondo"). Additionally, in paragraph 8, the Office Action rejects claims 4 and 11 under 35 U.S.C. §103(a) as being unpatentable over Kondo in view of U.S. Patent No. 6,826,316 to Luo et al. (hereinafter "Luo"). The Applicant respectfully traverses these rejections.

In rejecting at least independent claims 1, 7 and 8 the Office Action asserts that Kondo teaches all of the features of these claims. However, Kondo does not teach the features of amended claims 1, 7 and 8, as described in detail below.

The image retrieving device of the pending claims recites the following features.

(a) an image storing section for storing the image which is supposed to be classified and retrieved together with the keyword in a database and the object of the image being previously contained in the database,

(b) an image inputting detecting section that detects an inputted image that is newly inputted to the image retrieving device,

(c) an object acknowledging section for acknowledging an inputted object in the inputted image that has been detected by the image inputting detecting section,

(d) a keyword proposing section for proposing a keyword on a display, the keyword which relates to the inputted object which is acknowledged by the object acknowledging section, and

(e) an object information inputting section for confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing section when the inputted object acknowledged by the object acknowledging section is similar to the object of the image previously contained in the database.

Kondo teaches, as illustrated in Fig. 8, at steps S811 to S817, the below-described processes (i) to (iv) are sequentially carried out.

(i) At step S811, a decision is made as to whether the face image has already been registered in a face dictionary.

(ii) If the face image has not already been registered at step S811, then a name is entered to correspond to the face image at step S813.

(iii) After carrying out step S813, the face image is cut-out and the entered name are correlated with each other and, therefore, registered in the face dictionary at step S815. The program proceeds to step S817.

(iv) If the face image has already been registered at step S811, then the program skips steps S813 and S815, and proceeds to step S817.

As described above, with respect to Kondo, if the face image has not already been registered, a name is entered to correspond to the face image. On the other hand, if the face image has already been registered, the program skips these steps.

Kondo does not teach that a keyword relating to the inputted object, as acknowledged by the object acknowledging section, is proposed on a display, the keyword which relates to the inputted object which is acknowledged by the object acknowledging section; and an object information inputting section for confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing section when the inputted object acknowledged by the object acknowledging section is similar to the object of the image previously contained in the database, as positively recited in the amended claims.

Therefore, since Kondo does not provide the user the opportunity to confirm, add and correct the keyword when the inputted object is similar to the object of the image previously contained in the database, the user cannot confirm the face image.

When face images of two persons whose names are different from each other, but whose faces strongly resemble each other are registered in a database, for example, images of twins, brothers, or the like, when one of the face images is inputted to the image data retrieval apparatus of Kondo, the image data retrieval apparatus uses the above-described process, (i) to (iv). As described above, Kondo does not propose the keyword relating to the inputted face image, nor cause the user to confirm, add, and correct the proposed keyword, even when the inputted face image is similar to the face images previously contained in the database.

In contrast, in claim 1, when an inputted object in the inputted image that has been detected by the image inputting detecting section is acknowledged by the object acknowledging section, the keyword proposing section proposes, on a display, a keyword relating to the inputted object which is acknowledged by the object acknowledging section. Furthermore, in the object information inputting section, the proposed keyword, as provided

by the keyword proposing section, is confirmed by the user, and the keyword is added and corrected as needed, when the inputted object is similar to the object of the image previously contained in the database.

Additionally, the Office Action asserts that Kondo, in paragraph [0084], teaches the keyword proposing section, as positively recited in claim 1. This assertion is incorrect. Instead, Kondo teaches that a name is entered to correspond to the face image in step S813. However, Kondo does not teach that the name is a name that is selectively input from names that are proposed on a display by the keyword proposing section. Therefore, Kondo cannot reasonably be considered to teach a keyword proposing section for proposing the keyword on a display, the keyword which relates to the inputted object which is acknowledged by the object acknowledging section, as positively recited.

Furthermore, Kondo teaches, in Fig. 8, that if the initial figure was previously registered, step S811, the process moves to step S817, in order to find any subsequent figure without proposing on a display the keyword which relates to the inputted object acknowledged by the object acknowledging section. That is, Kondo does not show the keyword relating to the inputted object acknowledged by the object acknowledging section to the user.

The Office Action asserts that Kondo teaches that when a user is unsure about a name, step S817, the user will click on yes and return to S811 and register the new name as desired. This assertion is incorrect. Kondo only teaches that when the registration in the face dictionary ends, a decision is made at step S817 as to whether there exists any subsequent person to be registered. Therefore, Kondo cannot reasonably be considered to teach confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing section when the inputted object acknowledged by the object acknowledging

section is similar to the object of the image previously contained in the database, as positively recited in the amended claims.

The Office Action asserts that the face image is confirmed by the user. This assertion is incorrect. As Kondo does not disclose that the keyword, which relates to the inputted object acknowledged by the object acknowledging section, is proposed on a display, and since Kondo does not teach the feature when a user is not sure about a name, Kondo cannot reasonably be considered to teach that a face image is confirmed by the user.

Therefore, based on the above discussion, Kondo cannot reasonably be considered to teach a keyword proposing section for proposing the keyword on a display, the keyword which relates to the inputted object which is acknowledged by the object acknowledging section, as positively recited in the amended claims.

In paragraph 1 of the Office Action, it is asserted that the claim language of this application is generalized to any face image whether it is registered in the database or not. Claims 1, 7 and 8 are amended to recite the object of the image being previously contained in the database, and an image inputting detecting section that detects an inputted image that is newly inputted to the image retrieving device. Furthermore, when the inputted object, acknowledged by the object acknowledging section, is similar to the object of the image previously contained in the database, the keyword, which is proposed by the keyword proposing section, is confirmed by the user, added and corrected in the object information inputting section.

Luo does not overcome the deficiencies, as identified above, of Kondo, as applied to the subject matter of claim 1, 7 and 8.

For at least the above reasons, Kondo and Luo cannot reasonably be considered to teach, or to have suggested, the combinations of all of the features recited in at least independent claims 1, 7 and 8. Further, claims 2-6 and 9-14 would also not have been

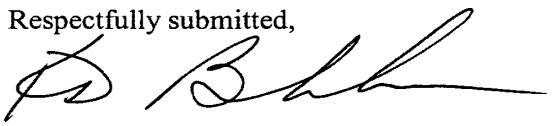
suggested by the applied prior art references for at least the respective dependence of these claims on allowable independent claims 1, 7 and 8 as well as for the separately patentable subject matter that each of these claims recites.

Accordingly, reconsideration and withdrawal of the rejections of claims 1-14 under 35 U.S.C. §102((b) and §103(a) as being unpatentable over the combination of applied prior art references are respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-14 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Registration No. 27,075

Kirk D. Berkhimer
Registration No. 59,874

JAO:KDB/mab

Date: June 20, 2008

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Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 15-0461

FIG. 1

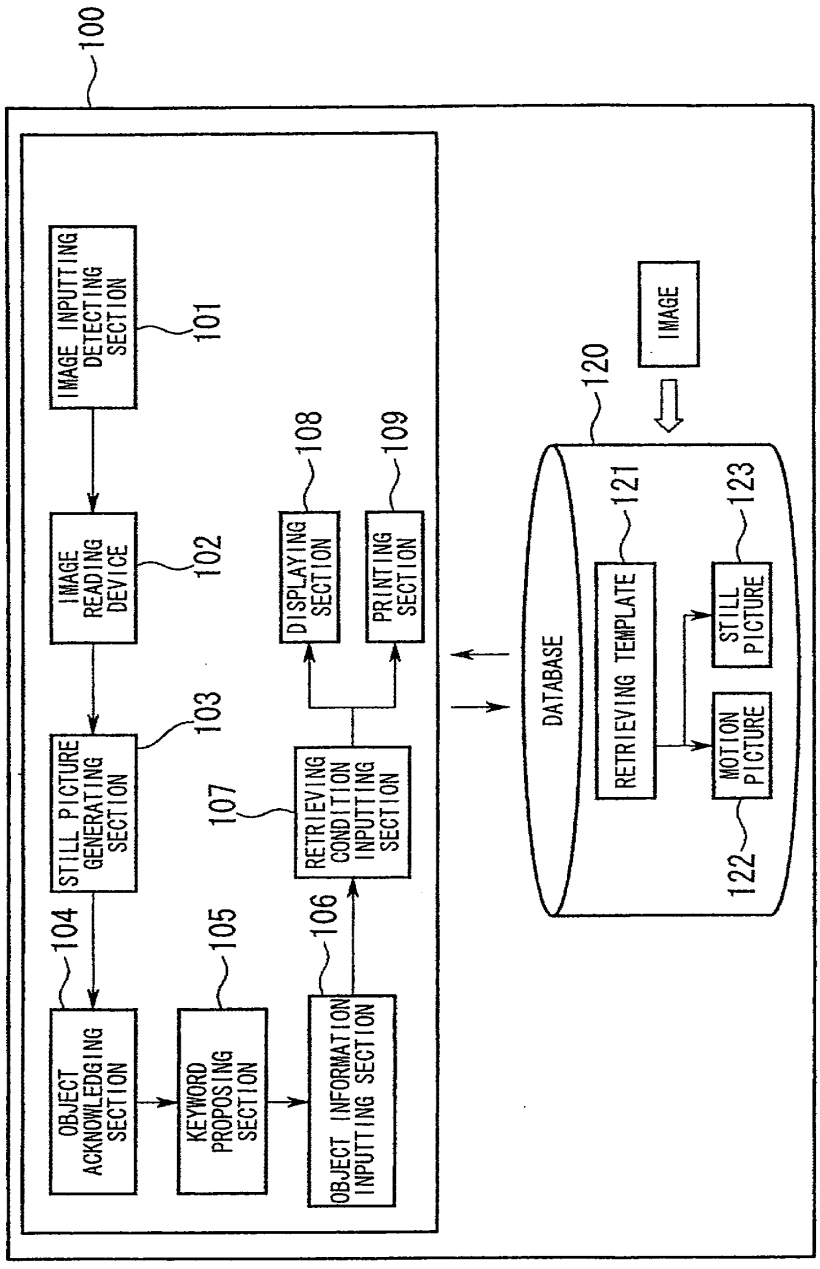

100
IMAGE INPUTTING DETECTING SECTION
101
IMAGE READING DEVICE
102
STILL PICTURE GENERATING SECTION
103
OBJECT ACKNOWLEDGING SECTION
104
KEYWORD PROPOSING SECTION
105
OBJECT INFORMATION INPUTTING SECTION
106
RETRIEVING CONDITION INPUTTING SECTION
107
DISPLAYING SECTION
108
PRINTING SECTION
109
DATABASE
120
RETRIEVING TEMPLATE
121
MOTION PICTURE
122
STILL PICTURE
123
IMAGE

FIG. 2

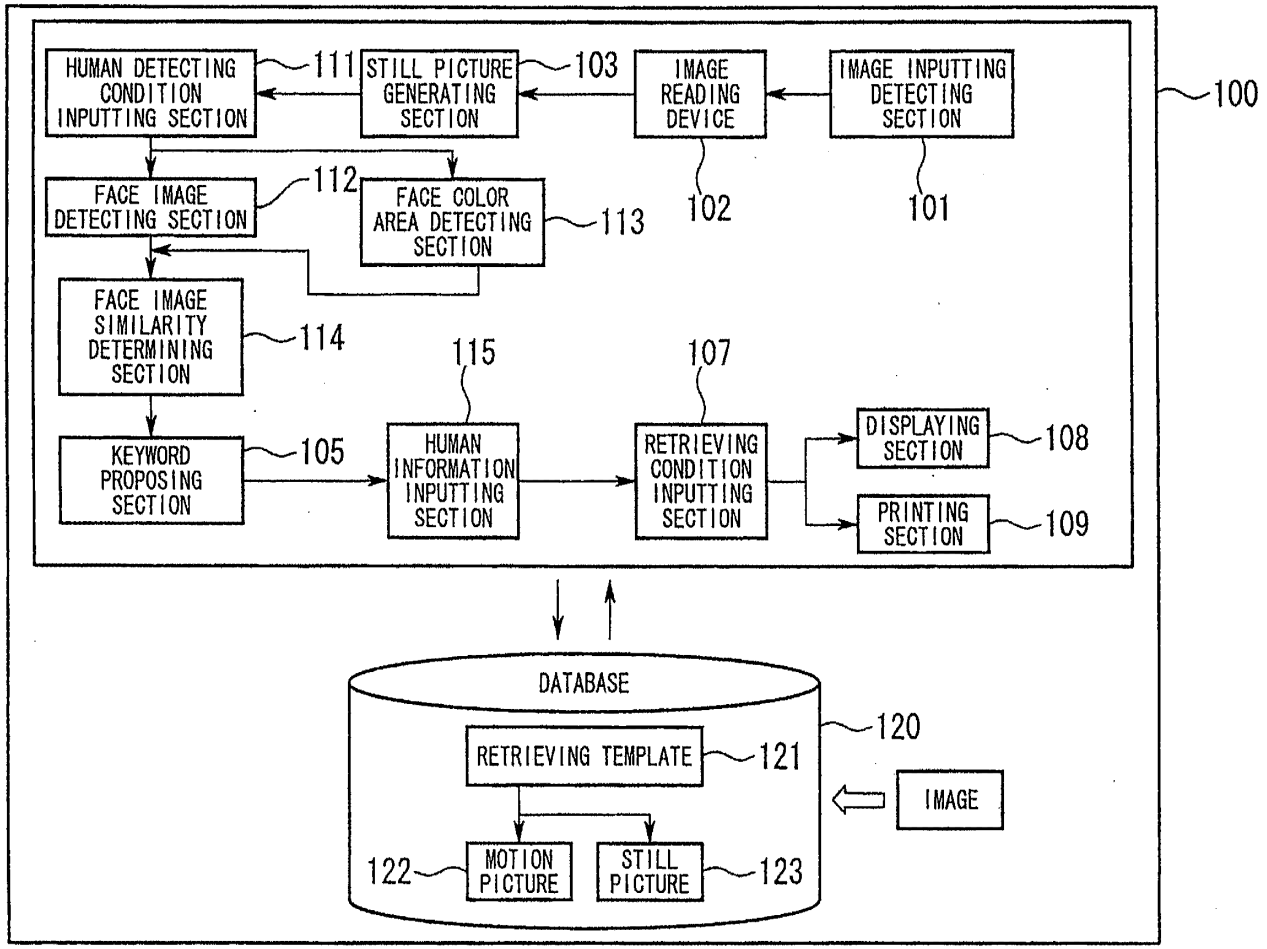
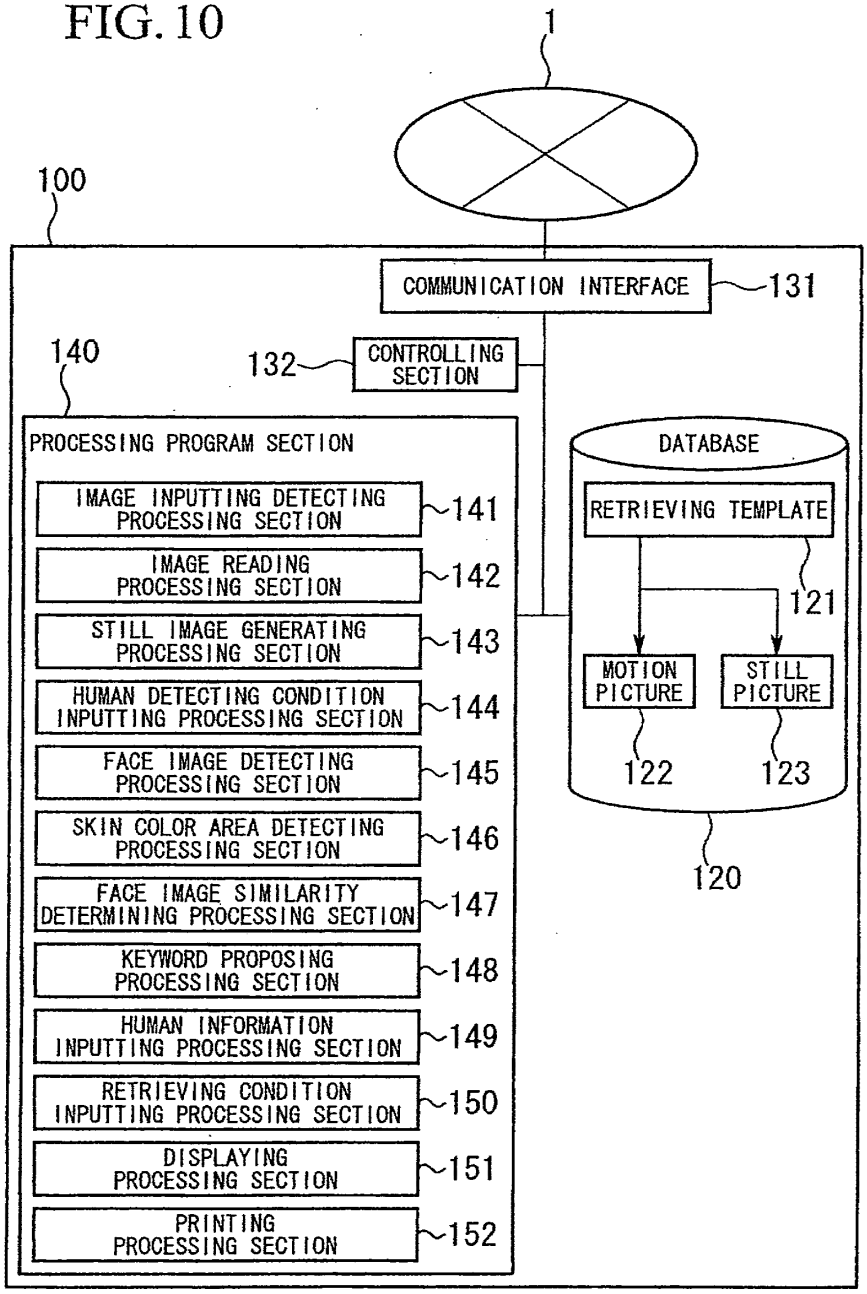

HUMAN DETECTING CONDITION INPUTTING SECTION
111
STILL PICTURE GENERATING SECTION
103
IMAGE READING DEVICE
IMAGE INPUTTING DETECTING SECTION
100
FACE IMAGE DETECTING SECTION
112
FACE COLOR AREA DETECTING SECTION
113
102
101
FACE IMAGE SIMILARITY DETERMINING SECTION
114
115
107
KEYWORD PROPOSING SECTION
105
HUMAN INFORMATION INPUTTING SECTION
RETRIEVING CONDITION INPUTTING SECTION
DISPLAYING SECTION
108
PRINTING SECTION
109
DATABASE
120
RETRIEVING TEMPLATE
121
IMAGE
122
MOTION PICTURE
STILL PICTURE
123

FIG. 10


1
100
COMMUNICATION INTERFACE
131
140
132
CONTROLLING SECTION
PROCESSING PROGRAM SECTION
IMAGE INPUTTING DETECTING PROCESSING SECTION
141
IMAGE READING PROCESSING SECTION
142
STILL IMAGE GENERATING PROCESSING SECTION
143
HUMAN DETECTING CONDITION INPUTTING PROCESSING SECTION
144
FACE IMAGE DETECTING PROCESSING SECTION
145
SKIN COLOR AREA DETECTING PROCESSING SECTION
146
FACE IMAGE SIMILARITY DETERMINING PROCESSING SECTION
147
KEYWORD PROPOSING PROCESSING SECTION
148
HUMAN INFORMATION INPUTTING PROCESSING SECTION
149
RETRIEVING CONDITION INPUTTING PROCESSING SECTION
150
DISPLAYING PROCESSING SECTION
151
PRINTING PROCESSING SECTION
152
DATABASE
RETRIEVING TEMPLATE
121
MOTION PICTURE
STILL PICTURE
122
123
120

PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
10/762,450	01/23/2004	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	06/20/2008	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 14	Minus	** 20	= 0	X $ =		OR	X $50=	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $210=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/CRYSTAL QUEEN/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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NOTICE OF ALLOWANCE AND FEE(S) DUE

25944 7590 09/22/2008

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER	
BITAR, NANCY	
ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 09/22/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,450	01/23/2004	Toshinori Nagahashi	118464	5463

TITLE OF INVENTION: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1440	$300	$0	$1740	12/22/2008

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

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If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

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B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

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A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

PART B - FEE(S) TRANSMITTAL

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

25944 7590 09/22/2008

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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,450	01/23/2004	Toshinori Nagahashi	118464	5463

TITLE OF INVENTION: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1440	$300	$0	$1740	12/22/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
BITAR, NANCY	2624	382-118000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,450	01/23/2004	Toshinori Nagahashi	118464	5463

25944 7590 09/22/2008

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER	
BITAR, NANCY	
ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 09/22/2008

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 683 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 683 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	10/762,450	NAGAHASHI, TOSHINORI	
	Examiner	Art Unit	
	NANCY BITAR	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *6/20/2008*.

2. ☒ The allowed claim(s) is/are *1-14*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Nancy Bitar/
Examiner, Art Unit 2624

DETAILED ACTION

Allowable Subject Matter

1. Claims 1-14 are allowed.

The following is an examiner's statement of reasons for allowance: After reviewing the remarks made by the Applicant in response to the non-final office action the Examiner finds the remarks to be persuasive. The most pertinent prior art is Kondo et al (US 2002/0111939) and Koshimizu et al (Keyword and Face image retrieval based on latent semantic indexing, IEEE 2004). Kondo discloses an image retrieving device (image data retrieval apparatus, 100,200, figure 1) for classifying and retrieving an image by detecting an object in the image and adding a keyword, the image retrieving device comprising: an image storing section for storing the image, which is supposed to be classified and retrieved together with the keyword in a database (image database, 105,figure 1); an object acknowledging section for acknowledging a predetermined object in the image which is inputted (a user designates an image or holder to be registered. In accordance with the designation a first image is input at step 803, step 805 a decision is made as to whether the input image includes any figure of a person. If so then at step 807 all figures in the image have their respective face images cut out, paragraph [0081-0082]) and in step 813 the name is entered to correspond to the face image then at step 815 the face image cut out and the entered name are correlated with each other and thus registered in the face dictionary, paragraph [0084]); Koshimizu et al teaches retrieving suitable keywords on face images and for retrieving face images based on latent semantic indexing in a face image annotation and a retrieval system . The visual features are represented in sizes lengths of face parts, and symbolic features in keywords, respectively. A space is constructed by applying latent semantic index- big, which is called the

latent semantic space. This space consists of face images and keywords. Also, this space reflects the sizes/lengths of the face parts. Retrieving face images and keywords in terms of sizes/lengths of face parts, and retrieving keywords which are suitable to be assigned to the face images are achieved. Retrieving keywords using the sizes/lengths is corresponding to assignment of keywords to one face image. Neither Kondo nor Koshimizu discloses a keyword relating to the inputted object, as acknowledged by the object acknowledging section, is proposed on a display, the keyword which relates to the inputted object which is acknowledged by the object acknowledging section; and an object information inputting section for confirming by the user, adding, and correcting the keyword which is proposed by the keyword proposing section when the inputted object acknowledged by the object acknowledging section is similar to the object of the image previously contained in the database. The Examiner finds no reason or motivation to combine the above references in an obviousness rejection thus placing the application in condition for allowance.

Any comments considered necessary by applicant must be submitted on later than the payment of the issue fee and to avoid processing delays should preferably accompany the issue fee. Such submissions should be clearly labeled, comments on statement of reasons for allowance.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NANCY BITAR whose telephone number is (571)270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jinge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nancy Bitar 9/10/2008

/Samir A. Ahmed/

Supervisory Patent Examiner, Art Unit 2624

Notice of References Cited	Application/Control No. 10/762,450	Applicant(s)/Patent Under Reexamination NAGAHASHI, TOSHINORI	
	Examiner NANCY BITAR	Art Unit 2624	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,608,387	03-1997	Davies, John H. E.	340/5.27
*	B	US-6,785,429	08-2004	Senoh, Takanori	382/305
*	C	US-6,408,301	06-2002	Patton et al.	707/102
*	D	US-2001/0043727	11-2001	COOPER, FREDERICK J.	382/118
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10762450	NAGAHASHI, TOSHINORI
	Examiner	**Art Unit**
	NANCY BITAR	2624

ORIGINAL		INTERNATIONAL CLASSIFICATION									
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED				
382	118	G	0	6	K	9 / 00 (2006.01.01)					

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
382	305	232	243	276	232
382	224	120	128	115	307
707	104.1	1	3	100	
704	2	3	4	277	251
704	255	257	277		
235	487				
358	448	450	403	453	527

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1														
2	2														
3	3														
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12	12														
13	13														
14	14														

/NANCY BITAR/ Examiner.Art Unit 2624	09/16/2008	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	1	
/Samir A Ahmed/	9/16/08	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office

Part of Paper No. 20080916

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	10/762450	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 16:56
L2	4759	382/305,232,243,305.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:01
L3	1145	2 and ((keyword or word) with imag$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:01
L4	168	2 and ((keyword) with imag$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:02
L5	5103	382/276,232,224.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:02

L6	44	5 and ((keyword) with imag$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:02
L7	28161	707/104.1,1,3,100.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:03
L8	724	7 and ((keyword) with imag$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:03
L9	1172	358/403,404.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:03
L10	55	9 and ((keyword) with imag$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:03
L11	1516	345/423	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:03

L12	0	11 and ((keyword) with imag$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:03
L13	1029	386/69	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:05
L14	778	386/70	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:05
L15	2064	382/118	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:05
L16	4058	(imag$4 and keyword and classi$4 and object and acknowl$5 and propos$4 and input$4 and confirm$5 and add$5 abd correct$4 and similar).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:06
L17	1	(imag$4 and keyword and classi$4 and object and acknowl$5 and propos$4 and input$4 and confirm$5 and add$5 and correct$4 and similar).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:06

L18	0	13 and 17	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:06
L19	0	14 and 17	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:06
L20	0	15 and 17	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:06
L21	4	13 and 16	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:07
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L25	0	(imag$4 and keyword and classi$4 and object and acknowl$5 and propos$4 and input$4 and confirm$5 and add$5 and correct$4 and similar and display).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:08
L26	1	(imag$4 and keyword and classi$4 and object and acknowl$5 and propos$4 and input$4 and confirm$5 and add$5 and correct$4 and similar).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:09
L27	102712	(imag$4 and keyword and classi$4 and object and acknowl$5 and propos$4 and input$4 and confirm$5 and add$5 and correct$4 and similarand database).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:09
L28	1	(imag$4 and keyword and classi$4 and object and acknowl$5 and propos$4 and input$4 and confirm$5 and add$5 and correct$4 and similar and database).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:09
L29	0	28 and 15	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:09

L30	1312	704/3,257,277.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:11
L31	356	345/171	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:11
L32	6252	704/2,3,4,5,6,7,8,9,10,277,251,252,255,257.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:12
L33	30	32 and ((keyword) with imag$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:13
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L35	2	30 and ((keyword) with imag$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:17

L36	36	"6408301"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:23
S1	0	(10/765450).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/02/26 17:04
S2	0	(10/762450).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/02/26 17:04
S3	1	10/762450	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:05
S4	439	348/231.2	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:26
S5	22	S4 and (keyword with imag$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:18

S6	5	"6785429"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:21
S7	2	"20010043727"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:21
S8	0	("2001/0043727").URPN.	USPAT	OR	ON	2007/02/26 18:25
S9	33	S4 and keyword	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:29
S10	10	S9 and face	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/26 18:45
S11	3	image with retriev$5 with face with keyword	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:57
S12	4	keyword near1 proposing	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:58

S13	56	keyword near1 propos$$	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:58
S14	53	keyword near1 propos$4	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 10:58
S15	3	S14 and face	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:01
S16	97	keyword with face	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:01
S17	5670066	object	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:01
S18	2689	keyword with object	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:02

S19	0	keyword with object7 and image	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:02
S20	1417	S18 and image	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:02
S21	1109	S20 and (extract$4 or detect$5)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:09
S22	13	"756748"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:09
S23	1	"7-56748"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/02/27 11:09
S24	0	("2002/0111939").URPN.	USPAT	OR	ON	2007/02/27 14:02
S25	1835	382/305	USPAT	OR	ON	2007/02/27 14:02
S26	1055	S25 and detect$5	USPAT	OR	ON	2007/02/27 14:02

S27	46	S26 and skin	USPAT	OR	ON	2007/02/27 14:02
S28	28	S27 and face	USPAT	OR	ON	2007/02/27 14:02
S29	7	S28 and keyword	USPAT	OR	ON	2007/02/27 14:54
S30	695	386/69	USPAT	OR	ON	2007/02/27 14:54
S31	333	S30 and retriev$4	USPAT	OR	ON	2007/02/27 14:54
S32	253	S31 and (word or key$4)	USPAT	OR	ON	2007/02/27 14:54
S33	0	(2002/0111939)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/15 16:20
S34	0	2002/0111939	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/15 16:21
S35	2	"20020111939"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/15 16:21
S36	10934	707/1	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/15 17:39

S37	571	348/231.2	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/15 17:39
S38	29	S37 and (keyword with imag$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/15 17:39
S39	0	S36 and S38	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/15 17:39

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BIB DATA SHEET

CONFIRMATION NO. 5463

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/762,450	01/23/2004 RULE	386	2624	118464

APPLICANTS
Toshinori Nagahashi, Tatsuno-machi, JAPAN;

**** CONTINUING DATA ***************************

**** FOREIGN APPLICATIONS ***************************
JAPAN 2003-020805 01/29/2003

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
04/26/2004

Foreign Priority claimed ☑ Yes ☐ No 35 USC 119(a-d) conditions met ☑ Yes ☐ No Verified and Acknowledged /NANCY BITAR/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		JAPAN	8	12	3

ADDRESS

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850
UNITED STATES

TITLE

Image retrieving device, method for adding keywords in image retrieving device, and computer program therefor

FILING FEE RECEIVED		
900	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L13	1029	386/69	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:05
L14	778	386/70	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:05
L15	2064	382/118	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:05
L17	1	(imag$4 and keyword and classi$4 and object and acknowl$5 and propos$4 and input$4 and confirm$5 and add$5 and correct$4 and similar).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:06
L28	1	(imag$4 and keyword and classi$4 and object and acknowl$5 and propos$4 and input$4 and confirm$5 and add$5 and correct$4 and similar and database).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:09

L29	0	28 and 15	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/09/16 17:09

9/16/2008 5:10:22 PM
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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10762450	NAGAHASHI, TOSHINORI
	Examiner	Art Unit
	NANCY BITAR	2624

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/10/2008								
1	1	=								
2	2	=								
3	3	=								
4	4	=								
5	5	=								
6	6	=								
7	7	=								
8	8	=								
9	9	=								
10	10	=								
11	11	=								
12	12	=								
13	13	=								
14	14	=								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10762450	NAGAHASHI, TOSHINORI
	Examiner	Art Unit
	NANCY BITAR	2624

SEARCHED			
Class	Subclass	Date	Examiner
382	118,209,	9/10/2008	NB
707	102,3,104,5,512,104	9/10/2008	NB
355	27	9/10/2008	NB
434	217	9/10/2008	NB
704	2,3,4,5,6,7,8,9,10,277,251,252,255,257	9/10/2008	NB
358	403, 404	9/10/2008	NB

SEARCH NOTES		
Search Notes	Date	Examiner
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Inventor name search	9/10/2008	NB
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INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
382	118	9/10/2008	NB
386	69,70	9/10/2008	NB
	PGPub text search see intereference search printout	9/10/2008	NB

/NANCY BITAR/ Examiner.Art Unit 2624	

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toshinori NAGAHASHI — Group Art Unit: 2624

Application No.: 10/762,450 — Examiner: N. BITAR

Filed: January 23, 2004 — Docket No.: 118464

For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to 37 CFR §1.56, the attention of the Patent and Trademark Office is hereby directed to the reference listed on the attached PTO-1449. Unless otherwise indicated herein, one copy of each reference is attached. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the reference be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

☒ 1. This Information Disclosure Statement is being filed more than three months after the U.S. filing date and after the mailing date of a Final Rejection, Notice of Allowance, or other action that closes prosecution (e.g., Quayle Action), but before payment of the Issue Fee. The fees associated with this filing under 37 C.F.R. §1.17(p) are being paid electronically with this filing. The Commissioner is hereby authorized to charge any additional fee (or credit any overpayment) associated with this communication to Deposit Account No. 15-0461.

☒ a. I hereby certify that each item of information contained in this Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Information Disclosure Statement. 37 CFR §1.97(e)(1).

☒ 2. Each item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart application, and this communication was not received by any individual designated in §1.56(c) more than thirty days prior to the filing of this Information Disclosure Statement.

☒ 3. An English language Abstract of one or more non-English language reference is attached. See Reference 1.

☒ 4. A computer-generated English language translation of one or more Japanese Patent Publication cited herein has been obtained from the website of the Japanese Patent Office ([http://www.jpo.go.jp]), and is attached, but has not been reviewed for accuracy. See Reference 1.

Respectfully submitted,

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JAO:KTW/acd

Date: December 12, 2008

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Form PTO-1449 (REV. 1/06)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
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U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Date	Name

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Date	Country	With English Abstract	With English Translation
	1	JP-A-10-312387	11/24/1998	JAPAN	X	X

OTHER DOCUMENTS

Examiner Initials	Cite No.	Including name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.

EXAMINER	DATE CONSIDERED

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: December 12, 2008

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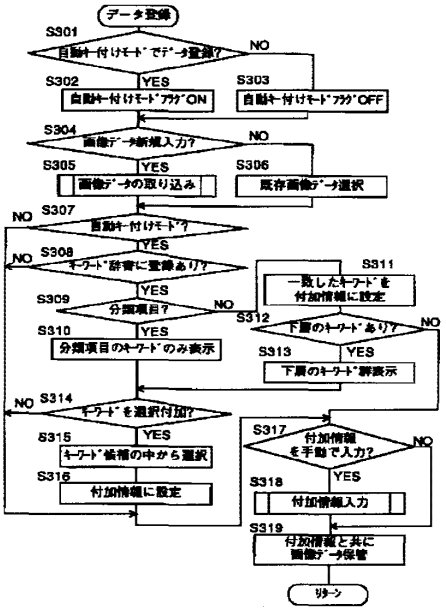
(74)代理人　弁理士　青山　葆　（外１名）

(54)【発明の名称】　情報処理装置及び方法並びに情報処理プログラムを記録した記録媒体

(57)【要約】

【課題】　キーワードを自動的に付加することを可能とした情報処理装置を提供する。

【解決手段】　選択された画像データに対して、画像データの内容を示す内容情報に含まれる用語を、キーワード辞書に登録されたキーワードと比較し、両者が一致するときに、一致する用語をキーワードとして付加情報に設定し、画像データとともに画像データベースに登録する。



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【特許請求の範囲】
【請求項１】　オブジェクトを、該オブジェクトの内容を示す情報である内容情報とともに、前記オブジェクトの検索情報である付加情報と関連づけて保存、管理する情報処理装置において、
記憶手段と、
前記オブジェクトを選択するオブジェクト選択手段と、
前記オブジェクト選択手段により選択されたオブジェクトの内容情報に基づきキーワードを決定するキーワード決定手段と、
前記オブジェクト選択手段により選択された前記オブジェクトに対して、前記キーワード決定手段により決定されたキーワードを付加情報として付加し、前記記憶手段に記憶させるキーワード付加手段とを備えたことを特徴とする情報処理装置。
【請求項２】　請求項１に記載の情報処理装置において、さらに、キーワードを記憶するキーワード記憶手段を備え、前記キーワード決定手段は前記内容情報に含まれる用語が前記キーワード記憶手段に登録されているときに、前記用語をキーワードとして選択することを特徴とする情報処理装置。
【請求項３】　請求項２に記載の情報処理装置において、前記キーワード決定手段は、前記内容情報に含まれる用語が前記キーワード記憶手段に登録されていないときは、前記用語をキーワードとして選択し、さらに、前記用語を前記キーワード記憶手段に登録することを特徴とする情報処理装置。
【請求項４】　請求項２に記載の情報処理装置において、さらに、キーワード候補を表示する表示手段と、前記キーワード候補の中から特定のキーワードを指定する指定手段とを備え、前記キーワード記憶手段はキーワードを分類して記憶し、前記表示手段は前記オブジェクトの内容情報に含まれる前記用語が前記分類と一致するときに該分類に属するキーワードをキーワード候補として表示し、前記キーワード決定手段は前記表示手段に表示されたキーワード候補の中から前記指定手段により指定されたキーワードを選択することを特徴とする情報処理装置。
【請求項５】　請求項４に記載の情報処理装置において、前記キーワード記憶手段は前記キーワードを階層的に記憶し、前記表示手段は前記オブジェクトの内容情報に含まれる用語と一致したキーワードの下層にさらにキーワードを有するときに該下層のキーワードをキーワード候補として表示し、前記キーワード決定手段は前記表示手段に表示された該キーワード候補の中から前記指定手段により指定されたキーワードを選択することを特徴とする情報処理装置。
【請求項６】　オブジェクトを、該オブジェクトの内容を示す情報である内容情報とともに、前記オブジェクトの検索情報である付加情報と関連づけて保存、管理する

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情報処理方法において、
オブジェクトを選択するステップと、
選択されたオブジェクトの内容情報に含まれる用語がキーワードとして記憶媒体に記憶されているとき、該キーワードを選択するステップと、
選択されたオブジェクトに、選択されたキーワードを付加情報として付加し、記憶媒体に記憶させるステップとを有することを特徴とする情報処理方法。
【請求項７】　請求項６に記載の情報処理方法において、さらに、
選択されたオブジェクトの内容情報に含まれる用語がキーワードとして記憶媒体に記憶されていないときに、選択されたオブジェクトの内容情報に基づき前記用語を決定するステップと、
選択されたオブジェクトに、前記決定された用語を付加情報として付加し、記憶媒体に記憶させるステップと、
決定された用語をキーワードとして記憶媒体に記憶させるステップとを有することを特徴とする情報処理方法。
【請求項８】　請求項６に記載の情報処理方法において、
前記キーワードを選択するステップは、
オブジェクトの内容情報に含まれる用語が分類と一致したときに、該分類に属するキーワードをキーワード候補として表示するステップと、
該表示されたキーワード候補の中から前記オブジェクトに基づきキーワードを選択するステップとを有することを特徴とする情報処理方法。
【請求項９】　オブジェクトを、該オブジェクトの内容を示す情報である内容情報とともに、前記オブジェクトの検索情報である付加情報と関連づけて保存、管理するためのプログラムを記録した記録媒体において、
前記プログラムは、
オブジェクトを選択するステップと、
選択されたオブジェクトの内容情報に含まれる用語がキーワードとして記憶媒体に記憶されているとき、該キーワードを選択するステップと、
選択されたオブジェクトに、選択されたキーワードを付加情報として付加し、記憶媒体に記憶させるステップとを有することを特徴とする、プログラムを記録した記録媒体。
【請求項１０】　請求項９に記載の記録媒体において、
前記プログラムは、さらに、
選択されたオブジェクトの内容情報に含まれる用語がキーワードとして記憶媒体に記憶されていないときに、選択されたオブジェクトの内容情報に基づき前記用語を決定するステップと、
選択されたオブジェクトに、前記決定された用語を付加情報として付加し、記憶媒体に記憶させるステップと、
決定された用語をキーワードとして記憶媒体に記憶させるステップとを有することを特徴とする、プログラムを

記録した記録媒体。

【請求項１１】　請求項９に記載の記録媒体において、前記キーワードを選択するステップは、

オブジェクトの内容情報に含まれる用語が分類と一致したときに、該分類に属するキーワードをキーワード候補として表示するステップと、

該表示されたキーワード候補の中から前記オブジェクトに基づきキーワードを選択するステップとを有することを特徴とする、プログラムを記録した記録媒体。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は所定の情報にキーワードを付加する情報処理装置に関するものである。

【０００２】

【従来の技術】近年、情報処理分野の発展はめざましく、特にパーソナルコンピュータ等の性能は飛躍的に向上している。これにより、ビジネス分野／特定用途のみならず、一般ユーザに対しても、画像や文書を入力装置で取り込み、蓄積、管理し、必要に応じて検索し、出力装置にて印刷する画像データベース装置や電子ファイリング装置等の情報処理装置が普及してきている。

【０００３】通常、これらの情報処理装置でのデータ検索容易化のために、データが入力される際にデータとともに検索に用いられるための付加情報が入力される。この付加情報の種類を増加させることにより、様々な検索が可能となり検索効率が向上する。しかし、付加情報の種類が多くなると、データ入力時において入力手順の増加や操作の煩雑化を招き、データ登録件数が多い場合、ユーザにとって面倒な作業となる。

【０００４】データに付随するデータ管理のために必須となる情報である、データの作成日／修正日、ファイル名、ファイルフォーマット等の属性情報においては、データに対して属性情報を自動的に付加することは一般的である。また、画像データに対して、画像データの色データから色味を演算し、自動的に付加する方法または装置等も従来より考案されている。

【０００５】

【発明が解決しようとする課題】しかし、付加情報の１つであるキーワードの自動付加については有効な手段がなかった。従来では、例えば、ユーザがデータに付加するキーワードを考えて手動入力するか、または、キーワード辞書等に登録された大量のキーワードの中からユーザが選択して付加する方法しかなく、このような方法では、ユーザが大量のキーワード候補の中からどれを付加するか考慮しなければならず、ユーザに負担がかかっていた。また、テキストデータにおいてはその文書内に含まれる単語をキーワードとして抽出して付加する方法があるが、この方法では、あまり関連性のない単語がキーワードとして抽出され、キーワードの精度の問題や、テキストを含まない画像データや音声データには対応できないという問題がある。

【０００６】一方、最近、画像データ編集の大衆化を狙った新技術であるフラッシュピックス（ＦｌａｓｈＰｉｘ）が発表された。これは、イーストマンコダック社、マイクロソフト社、ヒューレットパッカード社等が共同で開発し、提案した画像データファイルフォーマットである。このフラッシュピックス・フォーマットでは、画像データの管理を有効に行うために、画像データとともに、その内容を示す種々の情報（以下「内容情報」と称す。）を画像データファイル中に持たせるよう規定されている。例えば、フラッシュピックス・フォーマットは、画像データに対して、どのようにして画像データが作成されたかを詳細に記述する「ファイルソース（Ｆｉｌｅ ｓｏｕｒｃｅ）」、所有権や著作権の情報を含む「知的財産（Ｉｎｔｅｌｌｅｃｔｕａｌ Ｐｒｏｐｅｒｔｙ）」、画像データの内容を記述する「内容記述（Ｃｏｎｔｅｎｔ ｄｅｓｃｒｉｐｔｉｏｎ）」等の属性グループと呼ばれる情報を有するよう規定されている。今後、このフラッシュピックス・フォーマットに従った画像データ管理が普及するものと思われる。しかし現状では、このようなフラッシュピックス・フォーマットに従った画像データであっても、検索に用いるキーワードを付加するためには従来の方法で行うしかなく、前述と同様の問題がある。

【０００７】本発明は上記問題を解決すべくなされたものであり、その目的とするところは、テキスト、音声、画像等のデータの種類にかかわらず、データに付随する内容情報をもとにキーワードを自動的に付加することを可能とした情報処理装置を提供することにある。

【０００８】

【課題を解決するための手段】本発明に係る情報処理装置は、オブジェクトを、該オブジェクトの内容を示す情報である内容情報とともに、前記オブジェクトの検索情報である付加情報と関連づけて保存、管理する情報処理装置において、記憶手段と、前記オブジェクトを選択するオブジェクト選択手段と、前記オブジェクト選択手段により選択されたオブジェクトの内容情報に基づきキーワードを決定するキーワード決定手段と、前記オブジェクト選択手段により選択された前記オブジェクトに対して、前記キーワード決定手段により決定されたキーワードを付加情報として付加し、前記記憶手段に記憶させるキーワード付加手段とを備える。

【０００９】前記情報処理装置において、さらに、キーワードを格納するキーワード記憶手段を備え、前記キーワード決定手段は前記内容情報に含まれる用語が前記キーワード記憶手段に登録されているときに、前記用語をキーワードとして選択してもよい。

【００１０】また、前記情報処理装置において、前記キーワード決定手段は、前記内容情報に含まれる用語が前記キーワード記憶手段に登録されていないときは、前記用語をキーワードとして選択し、さらに、前記用語を前

記キーワード記憶手段に登録してもよい。

【００１１】また、前記情報処理装置において、さらに、キーワード候補を表示する表示手段と、前記キーワード候補の中から特定のキーワードを指定する指定手段とを備え、前記キーワード記憶手段はキーワードを分類して記憶し、前記表示手段は前記オブジェクトの内容情報に含まれる前記用語が前記分類と一致するときに該分類に属するキーワードをキーワード候補として表示し、前記キーワード決定手段は前記表示手段に表示されたキーワード候補の中から前記指定手段により指定されたキーワードを選択してもよい。

【００１２】さらに、前記情報処理装置において、前記キーワード記憶手段は前記キーワードを階層的に記憶し、前記表示手段は前記オブジェクトの内容情報に含まれる用語と一致したキーワードの下層にさらにキーワードを有するときに、該下層のキーワードをキーワード候補として表示し、前記キーワード決定手段は前記表示手段に表示された該キーワード候補の中から前記指定手段により指定されたキーワードを選択してもよい。

【００１３】オブジェクトを、該オブジェクトの内容を示す情報である内容情報とともに、前記オブジェクトの検索情報である付加情報と関連づけて保存、管理する情報処理方法において、オブジェクトを選択するステップと、選択されたオブジェクトの内容情報に含まれる用語がキーワードとして記憶媒体に記憶されているとき、該キーワードを選択するステップと、選択されたオブジェクトに、選択されたキーワードを付加情報として付加し、記憶媒体に記憶させるステップとを設ける。

【００１４】さらに、上記情報処理方法において、選択されたオブジェクトの内容情報に含まれる用語がキーワードとして記憶媒体に記憶されていないときに、選択されたオブジェクトの内容情報に基づき前記用語を決定するステップと、選択されたオブジェクトに、前記決定された用語を付加情報として付加し、記憶媒体に記憶するステップと、決定された用語をキーワードとして記憶媒体に記憶するステップとを設けてもよい。

【００１５】また、前記キーワードを選択するステップは、オブジェクトの内容情報に含まれる用語が分類と一致したときに、該分類に属するキーワードをキーワード候補として表示するステップと、該表示されたキーワード候補の中から前記オブジェクトに基づきキーワードを選択するステップとを有してもよい。

【００１６】オブジェクトを、該オブジェクトの内容を示す情報である内容情報とともに、前記オブジェクトの検索情報である付加情報と関連づけて保存、管理するためのプログラムを記録した記録媒体において、前記プログラムは、オブジェクトを選択するステップと、選択されたオブジェクトの内容情報に含まれる用語がキーワードとして記憶媒体に記憶されているとき、該キーワードを選択するステップと、選択されたオブジェクトに、選択されたキーワードを付加情報として付加し、記憶媒体に記憶させるステップとを有する。情報処理装置がこの記録媒体に記録されたプログラムを読み取り、実行することにより、オブジェクトに付随する内容情報をもとに付加情報を自動的に付加する機能を実現する。

【００１７】また、前記記録媒体において、前記プログラムは、さらに、選択されたオブジェクトの内容情報に含まれる用語がキーワードとして記憶媒体に記憶されていないときに、選択されたオブジェクトの内容情報に基づき前記用語を決定するステップと、選択されたオブジェクトに、前記決定された用語を付加情報として付加し、記憶媒体に記憶させるステップと、決定された用語をキーワードとして記憶媒体に記憶させるステップとを有してもよい。

【００１８】さらに、前記記録媒体において、前記キーワードを選択するステップは、オブジェクトの内容情報に含まれる用語が分類と一致したときに、該分類に属するキーワードをキーワード候補として表示するステップと、該表示されたキーワード候補の中から前記オブジェクトに基づきキーワードを選択するステップとを有してもよい。

【００１９】尚、ここで、オブジェクトとは、上記情報処理装置により保存、管理されるべき主体となる電子情報、例えば、テキストデータ、音声データもしくは画像データ等、または、これらをまとめたフォルダ等を意味する。また、属性情報とは、これら主体としてのオブジェクトに付加される副次的情報、例えば、検索キー（キーワード、色、形状等）、データ作成者、作成日時、サイズ、コメント、アイコン等である。

【００２０】

【発明の実施の形態】以下、添付の図面を用いて本発明に係る情報処理装置の実施の形態を説明する。

【００２１】本実施形態の情報処理装置は、オブジェクトの１つである画像データおよびその画像データに対する属性情報の１つである付加情報を管理するものである。すなわち、情報処理装置は画像データのデータベース管理システム（以下、「画像データベース」と称す。）を構成し、画像データに付加情報として検索キーを付加し、この検索キーを用いて画像データの検索を行えるようになっている。なお、画像データベースに用いられる検索キーとしては、画像の特徴を表すキーワードや色、図形などがあるが、本実施形態ではキーワードを使用する。また、本情報処理装置は、その画像データに関する題目、目的、場所、有形物の名称等の内容を示す情報である内容情報を伴う画像データを取り扱い、その内容情報に基づいて、キーワードの設定またはキーワード候補の表示を自動的に行う。ここで、内容情報としては、例えば、前述のフラッシュピックス・フォーマットで規定される、画像データの内容を記述する属性グループである「内容記述（Content description）」におい

て記述される、画像データの主題／目的を記述した「説明テキスト（caption text）」、画像データ中に描写された有形物の名前を記述した「画像データ中の物（things in the image）」、または、画像データ中に描写された場所を記述した「画像データ中の場所（places in the image）」等の情報を用いてもよい。以下にこの情報処理装置の構成および動作を説明する。

【００２２】図１に本実施形態の情報処理装置（以下、「システム」と称す。）の概略構成図を示す。図１に示すように、システムは中央演算処理装置（以下、「ＣＰＵ」と称す。）を備え、システム全体を制御する制御装置１を中心として構成される。ＣＰＵには例えばインテル社製のペンティアム等が用いられる。この制御装置１には、画像あるいは文字等の表示や、操作のための表示等を行うディスプレイ２と、各種入力、指示操作等を行うためのキーボード３およびマウス４と、データ保管媒体であるフロッピーディスク装置５ａおよびハードディスク装置６と、文字や画像データ等を印刷するプリンタ７と、画像データを取り込むためのスキャナ８と、ＣＤ－ＲＯＭ９ａに格納されたデータを読み出すためのＣＤ－ＲＯＭ装置９ｂと、音声出力のためのスピーカ１０と、音声入力のためのマイクロホン１１とが接続される。

【００２３】図２に本システムのブロック図を示す。ＣＰＵ２０１には、データバス２２０を介して、本システムを制御するプログラムが格納されているＲＯＭ２０３と、ＣＰＵ２０１が制御のために実行するプログラムやデータを一時的に格納するＲＡＭ２０４とが接続される。また、ＣＰＵ２０１にデータバス２２０を介して接続される回路には、画像あるいは文字等の表示のためディスプレイ２を制御する表示制御回路２０５と、キーボード３からの入力を転送制御するキーボード制御回路２０６と、マウス４からの入力を転送制御するマウス制御回路２０７と、フロッピーディスク装置５ｂを制御するフロッピーディスク装置制御回路２０８と、ハードディスク装置６を制御するハードディスク装置制御回路２０９と、プリンタ７への出力を制御するプリンタ制御回路２１０と、スキャナ８を制御するスキャナ制御回路２１１と、ＣＤ－ＲＯＭ装置９ｂを制御するＣＤ－ＲＯＭ装置制御回路２１２と、スピーカ１０を制御するスピーカ制御回路２１３と、マイクロホン１１を制御するマイクロホン制御回路２１４とがある。さらに、ＣＰＵ２０１には、システムを動作させるために必要な基準クロックを発生させるためのクロック２０２が接続され、また、各種拡張ボードを接続するための拡張スロット２１５がデータバス２２０を介して接続される。なお、拡張スロット２１５にＳＣＳＩＩボードを接続し、このＳＣＳＩＩボードを介してフロッピーディスク装置５ｂ、ハードディスク装置６、スキャナ８またはＣＤ－ＲＯＭ装置９ｂ等を接続してもよい。

【００２４】なお、上記システムにおいて、画像データ保管媒体としてはフロッピーディスク５ａ、ハードディスク装置６を用いているが、光磁気ディスク（ＭＯ）等の他の情報記憶媒体でもよい。また、画像データ入力装置としてスキャナ８を用いているが、スチルビデオカメラやデジタルカメラ等の他のデータ入力装置であってもよい。さらに、出力装置としてプリンタ７を用いているが、デジタル複写機等の他の出力装置であってもよい。

【００２５】本システムでは、画像データの管理システムを実現するプログラムをＲＯＭ２０３に格納する。しかし、本プログラムの一部または全部をフロッピーディスク５ａやハードディスク装置６等の情報記憶媒体に格納しておき、必要に応じて情報記憶媒体よりプログラムおよびデータをＲＡＭ２０４に読み出し、これを実行させてもよい。また、本システムは、外部入力装置からハードディスク装置６に入力され、格納された画像データを管理するようにしているが、ＣＤ－ＲＯＭ９ｂに格納されている画像データを直接管理するようにすることも考えられる。この場合、ＣＤ－ＲＯＭ９ｂに格納されている画像データを特定するデータであるインデックスデータと、このインデックスデータに対して付加した検索キーとをハードディスク装置６に格納する（このインデックスデータと検索キーとのセットを「レコード」と称す。）。画像データの検索時には、設定された検索キーに基づいて、まずレコードを検索結果として抽出し、しかる後、抽出されたレコードのインデックスデータに基づいてＣＤ－ＲＯＭ９ｂから所望の画像データを読みだすようにすればよい。

【００２６】図３に、本システムにおいてプログラムの実行に伴いディスプレイ２に表示される設定画面の一例を示す。この図において、画面２１はシステム開始時に表示される初期メニュー画面である。初期メニュー画面の各選択項目２３～２７を選択することにより処理に応じた設定画面が表示される。ユーザは、これらの設定画面上で、動作モードの設定、データの登録またはキーワードの登録等に必要な設定値の入力等を行う。

【００２７】また、本システムは前述のように画像データを管理するため、画像データおよびその内容情報と付加情報を含む画像データベースおよび検索時に用いられるキーワード辞書を有する。これらの画像データベースおよびキーワード辞書はハードディスク装置６等の情報記憶媒体に記憶される。図４と図５に、本システムのハードディスク装置６内に記憶される画像データベースおよびキーワード辞書の構成の一例を示す。図４に示す画像データベース３１は、種々のインデックスデータ、すなわち、登録番号である「インデックス」と、画像データの内容を表す「データ名」と、画像データが記憶されている情報記憶媒体上の場所を示す「データパス」と、画像データの「ファイル名」と、検索時に用いられる「キーワード」等のインデックスデータと、他の情報等

を含んでいる。

【００２８】また、図５に示すキーワード辞書３３は分類項目を格納する分類テーブル３５とキーワードを格納するキーワードテーブル３７とからなる。分類テーブル３５は、分類項目の登録番号である「インデックス」と、分類項目の名称である「分類名」とからなる。ここで、分類項目とは、キーワードを分類するための項目である。例えば、図５に示すように、分類項目には「地域」、「季節」等があり、分類項目の「地域」の下には、国名や県名等の地域に関連したキーワードが登録される。キーワードテーブル３７は、キーワードの登録番号である「インデックス」と、キーワードがどの分類項目に属するかを示す「分類番号」と、キーワードが階層をなす場合にその上位のキーワードのインデックスを示す「親インデックス」と、具体的なキーワードである「キーワード名」とからなる。親インデックスにおける「０００」はそのキーワードが最上位の階層のものであることを示す。図５で示すキーワードテーブル３７の分類番号が「０１」（地域）となるキーワード（インデックスが００１～００７）についてみると、親インデックスの関係から、これらのキーワードは図６に示すような階層を示す。

【００２９】上記のように構成された本システムにおいて、画像データが画像データベース３１に登録される際には、マウス４やキーボード３等によりオブジェクトである画像データが選択され、その選択された画像データに付随する内容情報に基づき、キーワードの決定またはキーワード候補の表示が行われる。すなわち、選択された画像データの内容情報に含まれる用語がキーワードを記憶しているキーワード辞書３３内に登録されている場合は、その用語がキーワードとして決定され、画像データに付加され、画像データとともに画像データベース３１に登録される。

【００３０】また、キーワード辞書３３はキーワードを分類して階層的に記憶しているため、さらに、そのキーワードの下層にキーワードがあるときは、その下層のキーワードがキーワード候補として表示手段であるディスプレイ２上に表示される。また、内容情報に含まれる用語がキーワードの分類である場合は、その分類の下層に登録されたキーワードが画像データのキーワード候補としてディスプレイ２上に表示される。このように、ディスプレイ２上に表示されたキーワード候補の中から、キーボードやマウス等のディスプレイ２上の任意の座標位置を指定する手段を介してユーザにより指定されたキーワードが、登録されるべきキーワードとして選択され、画像データに付加され、画像データとともに画像データベース３１に登録される。以上のように本システムは画像データに付随する内容情報に基づき、キーワードの付加またはキーワード候補の抽出を自動的に行うため、キーワードの付加作業においてユーザの負担を軽減することができ、また、画像データの内容に関連したキーワードを精度よく付加できる。

【００３１】以下に、本システムの制御処理について説明する。図７は、ＣＰＵ２０１がＲＯＭ２０３に格納するプログラムに基づいて実行する制御処理のメインルーチンのフローチャートである。システムの電源が投入された後、プログラムが起動されると、まず、ＣＰＵ２０１は各処理で必要な変数等の初期化およびディスプレイ２上への初期メニュー画面２１（図３）の表示等の初期設定処理を行う（Ｓ１）。次に、初期メニュー画面２１上で処理の選択が行われたか否かを判定する（Ｓ２）。ここで、「データ登録」２３が選択された場合、スキャナ８等の画像入力装置から画像をデータとして取り込み、所定の情報を付加してデータベースへ登録するデータ登録処理を実行する（Ｓ３）。「キーワード登録」２４が選択された場合、画像データへ付加するキーワードをデータベースへ登録する処理を行うキーワード登録処理を実行する（Ｓ４）。「データ検索」２５が選択された場合、所望の画像データをデータベースから検索する検索処理を実行する（Ｓ５）。「データ出力」２６が選択された場合、画像データをディスプレイ２上に表示またはプリンタ７により印刷するデータ出力処理を実行する（Ｓ６）。「その他のメニュー」２７が選択された場合、上記処理以外の所定の処理を実行する（Ｓ７）。初期メニュー画面２１上で何も選択されない場合は、ステップＳ８へ進む。ステップＳ８では、その他の処理を行う。

【００３２】なお、検索処理（Ｓ５）、データ出力処理（Ｓ６）、その他のメニュー処理（Ｓ７）およびその他の処理（Ｓ８）については、従来の情報処理装置での処理と基本的に同様であり、また本発明には関係しないため、ここでの説明は省略する。以下に、前述のデータ登録処理（Ｓ３）とキーワード登録処理（Ｓ４）について詳細に説明する。

【００３３】図８はメインルーチンにおけるデータ登録処理（図６のステップＳ３）のフローチャートを示す。データ登録処理において、ＣＰＵ２０１はまず、自動キー付けモードの動作モードでデータ登録を行うか否かを判断する（Ｓ３０１）。この判断はユーザがデータ登録画面２９で入力した値に基づいて行う。ここで、自動キー付けモードとは、ユーザが所定の候補の中からキーワードを選択することができるように、事前にキーワード辞書に登録されているキーワードの中から、画像データに付随する内容情報に基づいてキーワードを自動的に付加または、キーワード候補を選択し、表示する動作モードである。判断した（Ｓ３０１）結果、自動キー付けモードでデータ登録を行う場合は、システムが自動キー付けモードか否か判断するためのフラグである自動キー付けモードフラグをＯＮにし（Ｓ３０２）、自動キー付けモードでデータ登録を行わない場合は自動キー付けモー

ドフラグをＯＦＦにする（Ｓ３０３）。

【００３４】次に、これから処理しようとする画像データが新規入力か、既にデータベースに存在しているデータかを判断する（Ｓ３０４）。この判断はユーザがデータ登録画面２９上でマウス４またはキーボード３を介して行った入力に基づいて行う。判断した（Ｓ３０４）結果、画像データが新規入力の場合、新規の画像データを取り込む画像データの取り込み処理を行なう（Ｓ３０５）。この画像データの取り込み処理（Ｓ３０５）の詳細については後述する。画像データが既存データである場合は、既存の画像データの中から所望のデータを選択する（Ｓ３０６）。ここで、画像データの取り込みまたは選択は、ユーザによりデータ登録画面２９上でマウス４またはキーボード３等を介して行われる。

【００３５】その後、自動キー付けモードフラグに基づき、動作モードが自動キー付けモードか否かを判断する（Ｓ３０７）。自動キー付けモードでない場合は、ステップＳ３１７に進み、キーワードの自動付加は行わない。自動キー付けモードの場合、画像データに付随する内容情報に含まれる用語がキーワード辞書に登録されているか否かを判断する（Ｓ３０８）。ここでは、内容情報がキーワード辞書の用語に完全に一致するか否かを判断してもよいし、内容情報が文章／複合語である場合にはそれから単語のみを抽出し、その単語がキーワード辞書の用語に一致するか否かの判断を行ってもよい。この判断（Ｓ３０８）の結果、内容情報に含まれる用語がキーワード辞書に登録されてない場合はステップＳ３１７に進む。一方、内容情報に含まれる用語がキーワード辞書に登録されている場合は、そのキーワードが分類項目であるか否かを判断する（Ｓ３０９）。

【００３６】ステップＳ３０９での判断の結果、内容情報に含まれる用語が分類項目である場合、キーワード辞書に登録されているその分類項目に該当するキーワードのうち最上位の階層に位置するキーワードをキーワード候補として画面に表示し（Ｓ３１０）、ステップＳ３１４に進む。例えば、内容情報の中に分類項目の１つである「地域」という用語が含まれている場合は、分類項目が「地域」となるキーワードのうち最上位の階層のキーワードである「アジア」、「北アメリカ」をキーワード候補として画面上に表示する。

【００３７】また、内容情報に含まれる用語が分類項目でない場合、この内容情報に含まれる用語をキーワードとして付加情報に設定する（Ｓ３１１）。次に内容情報に含まれる用語に一致するキーワードの下層にさらにキーワードがあるか否かを判断する（Ｓ３１２）。下層にキーワードがある場合、下層のキーワード群のみをキーワード候補として表示し（Ｓ３１３）、ステップＳ３１４に進む。下層にキーワードがない場合、ステップＳ３１７に進む。

【００３８】ステップ３１４では、画面上に表示されているキーワード候補の中からキーワードを選択し、付加するか否かを判断する。この選択付加を行わない場合はステップＳ３１７に進む。選択付加を行う場合は、ステップＳ３１０またはステップＳ３１３で表示されたキーワード候補の中からユーザによりキーボード３やマウス４等で指定されたキーワードを選択し（Ｓ３１５）、選択されたキーワードを付加情報に設定し（Ｓ３１６）、ステップＳ３１７に進む。

【００３９】ステップ３１７では、付加情報を手動で入力するか否かを判断する。付加情報を手動で入力しない場合、ステップＳ３１９に進む。付加情報を手動で入力する場合、付加情報入力処理を行い（Ｓ３１８）、ステップＳ３１９に進む。付加情報入力処理（Ｓ３１８）の詳細については後述する。ステップＳ３１９では、付加情報とともに画像データをデータベースに登録する。

【００４０】以上のようにして、本実施形態の情報処理装置は画像データの内容情報に基づいて、キーワードを選択し、このキーワードを付加情報に設定する。なお、上記説明では、ステップＳ３０８において、内容情報の用語がキーワード辞書に登録されてないときには、キーワードの自動付加を行わなかったが、キーワード辞書に登録されていなくても、内容情報の用語を自動的にキーワード辞書に登録し、付加情報に設定するようにしてもよい。

【００４１】図９は前述の画像データの取り込み処理（図８のステップＳ３０５）のフローチャートである。画像データの取り込み処理においては、まず、スキャナ８等の画像入力装置またはハードディスク装置６等の画像データを格納する情報記憶媒体から画像データを取り込む（Ｓ３０５１）。次に入力装置から画像データに関連した画像内容情報を入力する（Ｓ３０５２）。なお、入力装置から画像内容情報を入力するかわりにユーザが本装置にて内容情報を指定してもよい。また、入力装置から画像内容情報を取得したが、画像内容情報の代わりに分類項目を取得してもよい。その後、画像データの保管先を設定し（Ｓ３０５３）、画像データのデータ名を入力し（Ｓ３０５４）、処理を終了する。このようにして画像データの取り込みが行われる。

【００４２】図１０は前述の付加情報入力処理（図８のステップＳ３１８）のフローチャートである。付加情報入力処理において、画面上には、付加情報入力のためのメニューが表示されており、ＣＰＵ２０１は、どの処理が選択されたか判断する（Ｓ３１８１）。すなわち、ユーザによりキーワードを手動で付加情報に付加する処理、もしくは、キーワード以外の情報を付加情報に付加する処理のいずれが選択されたか、または、いずれも選択されてないかを判断する。いずれも選択されてない場合はステップＳ３１８４に進む。キーワードを付加する処理が選択された場合は、キーワード付加処理を行う（Ｓ３１８２）。キーワード付加処理の詳細については

後述する。その他の情報を付加する処理が選択された場合、その他の情報付加処理を行う（Ｓ３１８３）。その他の情報付加処理については従来からの処理またはステップＳ３１８２のキーワード付加処理と同等であるため、ここでの説明は省略する。その後、ユーザによる画面上での入力に基づき付加情報処理を終了するか否か判断し（Ｓ３１８４）、ユーザがこの処理を終了させるまで上記動作を繰り返す。

【００４３】図１１は前述のキーワード付加処理（図１０のステップＳ３１８２）のフローチャートである。キーワード付加処理においては、まず、図１２に示すようにキーワード辞書のツリー構造全体を表示する（Ｓ３１８２１）。ユーザは画面に表示されたツリーの中から取り込みたいキーワードを選択する。選択の方法としては、例えば、図１３に示すようにユーザがマウス４でそのキーワードをクリックする方法や、キーボード３によりカーソルをそのキーワードの位置に移動し、反転表示や強調表示させることにより指定する方法等がある。次に、ユーザにより選択されたキーワードを取り込み（Ｓ３１８２２）、このキーワードを付加情報に設定する（Ｓ３１８２３）。その後、ユーザによる画面上での入力に基づきキーワード付加処理を終了するか否か判断し（Ｓ３１８２４）、ユーザがこの処理を終了させるまで上記動作を繰り返す。

【００４４】図１４はメインルーチンにおけるキーワード登録処理（図７のステップＳ４）のフローチャートである。キーワード登録処理においてシステムは、まず、キーワード辞書３３のツリー全体を表示する（Ｓ４１）。次に、キーワード辞書３３のツリー中において、ユーザにより指定されたキーワードを登録したい位置（階層）を入力する（Ｓ４２）。登録位置の指定方法としては、例えば、ユーザが登録位置の上層のキーワードをマウス４でクリックするか、あるいはカーソルを登録位置に移動し反転表示や強調表示させることにより指定する方法等がある。次に、キーボード３等を介してユーザにより入力された文字列をキーワードとして入力する（Ｓ４３）。その後、入力されたキーワードをキーワード辞書３３の指定位置に登録する（Ｓ４４）。登録後、ディスプレイ２上の表示されているキーワードツリーの表示を更新する（Ｓ４５）。その後、ユーザによる画面からの入力に基づきキーワード登録処理を終了するか否か判断し（Ｓ４６）、ユーザがこの処理を終了させるまで上記動作（Ｓ４２～Ｓ４６）を繰り返す。

【００４５】

【発明の効果】本発明の情報処理装置によれば、オブジェクトに付随する内容情報に基づいて、キーワードが選

択され、自動的にオブジェクトに付加されるか、または、キーワード候補が表示される。このため、キーワード付加作業の負担が大幅に軽減され、また、オブジェクトの内容に関連したキーワードが精度よく付加される。

【図面の簡単な説明】

【図１】　本実施形態の情報処理装置の構成の概略を示す図。

【図２】　制御装置を中心としたブロック図。

【図３】　ディスプレイに表示される設定画面を示す図。

【図４】　ハードディスク装置に格納される画像データベースを示す図。

【図５】　ハードディスク装置に格納されるキーワード辞書を示す図。

【図６】　キーワード辞書におけるキーワードの階層構造を示す図。

【図７】　ＣＰＵにおける制御処理のメインルーチンのフローチャート。

【図８】　データ登録処理のフローチャート。

【図９】　画像データの取り込み処理のフローチャート。

【図１０】　付加情報入力処理のフローチャート。

【図１１】　キーワード付加処理のフローチャート。

【図１２】　キーワードの階層構造を説明する図。

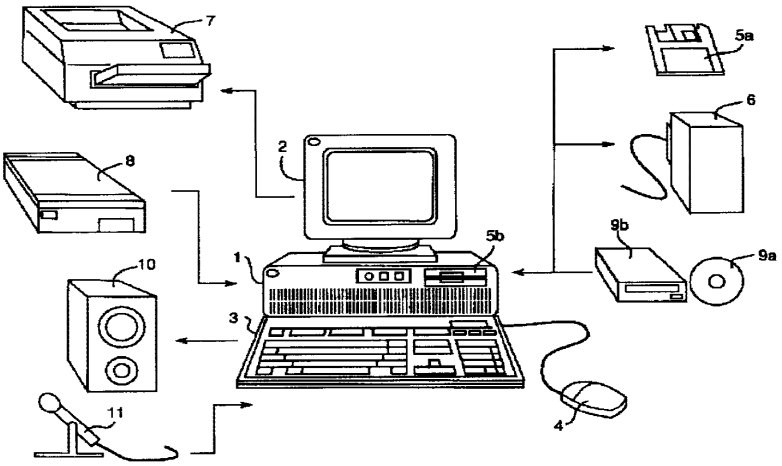
【図１３】　キーワードの階層においてマウスによる位置指定を説明する図。

【図１４】　キーワード登録処理のフローチャート。

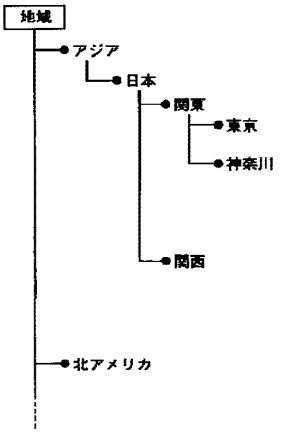
【符号の説明】

１…制御装置、　２…ディスプレイ、　３…キーボード、　４…マウス、　５ａ…フロッピーディスク、　５ｂ…フロッピーディスク装置、　６…ハードディスク、　７…プリンタ、　８…スキャナ、　９ａ…ＣＤ－ＲＯＭ、　９ｂ…ＣＤ－ＲＯＭ装置、　１０…スピーカ、　１１…マイク、　２１…初期メニュー画面、　２３～２７…処理選択アイコン、　２９…データ登録画面、　３０…キーワード登録画面、　３１…画像データベース、　３３…キーワード辞書、　３５…分類テーブル、３７…キーワードテーブル、　２０１…ＣＰＵ、　２０２…クロック、　２０３…ＲＯＭ、　２０４…ＲＡＭ、　２０５…表示制御回路、　２０６…キーボード制御回路、　２０７…マウス制御回路、　２０８…フロッピーディスク制御回路、　２０９…ハードディスク制御回路、　２１０…プリンタ制御回路、　２１１…スキャナ制御回路、　２１２…ＣＤ－ＲＯＭ制御回路、　２１３…スピーカ制御回路、　２１４…マイク制御回路、　２１５…拡張スロット、２２０…データバス。

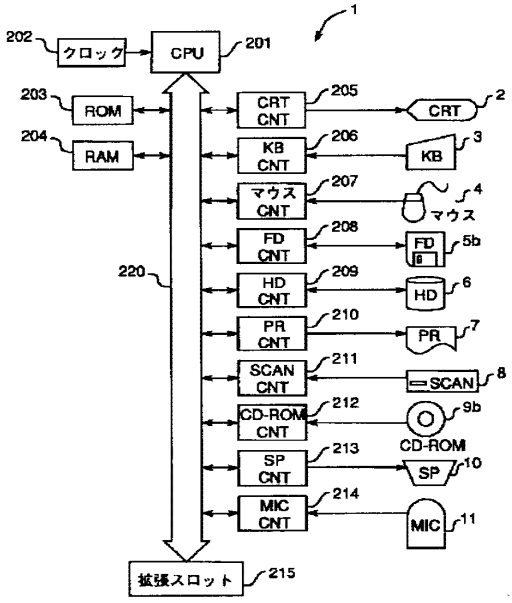
【図１】



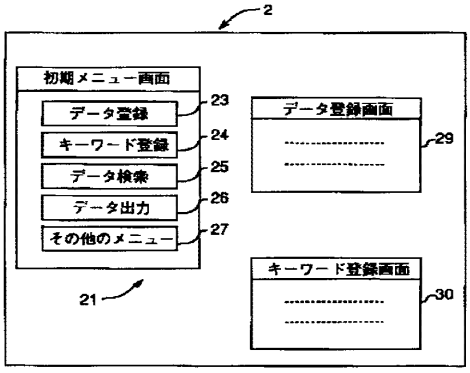
【図６】



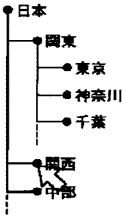
【図２】



【図３】



【図１３】

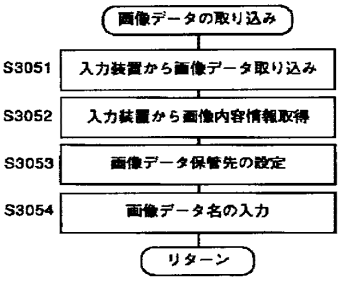


【図４】

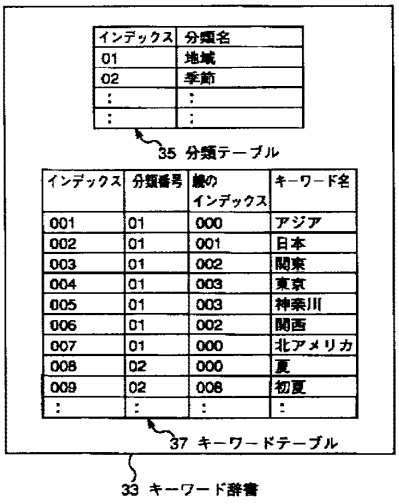
31 画像データベース

インデックス	データ名	データパス	ファイル名	キーワード	他の情報	…
00001	富士山	c:¥folder	img1.fpx	002	:	:
00002	東京タワー	c:¥folder	img2.jpg	004	:	:
00003	レインボーブリッジ	d:	img3.bmp	004	:	:
00004	:	:	:	:	:	:
:	:	:	:	:	:	:
:	:	:	:	:	:	:

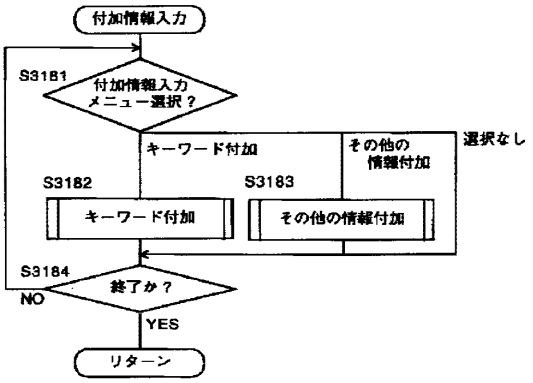
【図９】



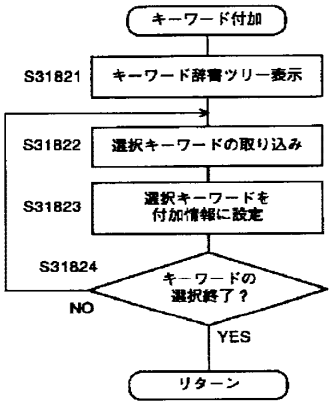
【図５】


インデックス
分類名
01
地域
02
季節
35 分類テーブル
インデックス
分類番号
親のインデックス
キーワード名
001 01 000 アジア
002 01 001 日本
003 01 002 関東
004 01 003 東京
005 01 003 神奈川
006 01 002 関西
007 01 000 北アメリカ
008 02 000 夏
009 02 008 初夏
37 キーワードテーブル
33 キーワード辞書

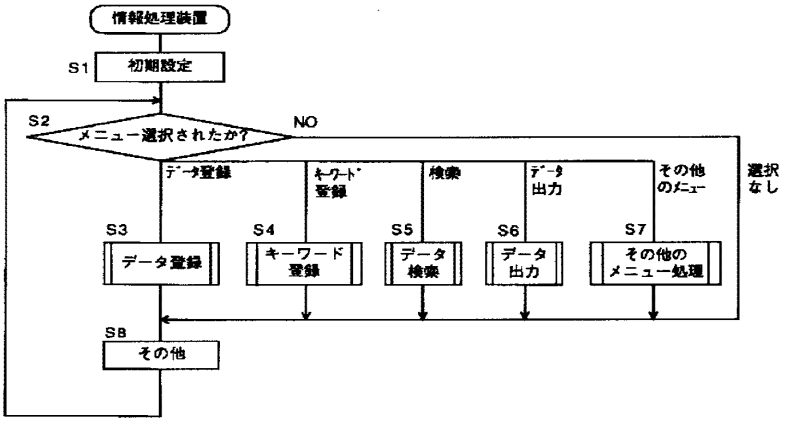
【図１０】


付加情報入力
S3181
付加情報入力メニュー選択？
キーワード付加
その他の情報付加
選択なし
S3182
S3183
キーワード付加
その他の情報付加
S3184
終了か？
NO
YES
リターン

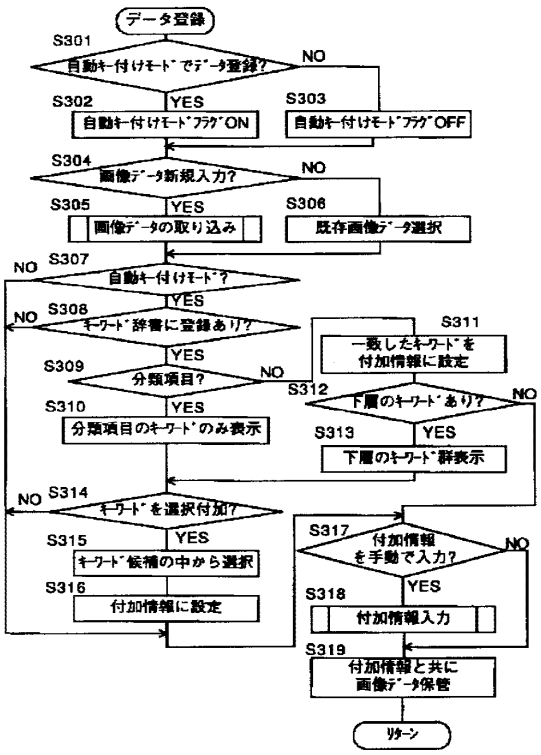
【図１１】


キーワード付加
S31821
キーワード辞書ツリー表示
S31822
選択キーワードの取り込み
S31823
選択キーワードを付加情報に設定
S31824
キーワードの選択終了？
NO
YES
リターン

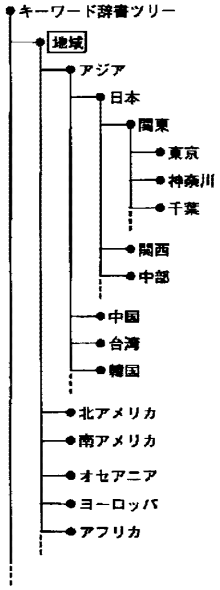
【図７】


情報処理装置
S1
初期設定
S2
メニュー選択されたか?
NO
データ登録
キーワード登録
検索
データ出力
その他のメニュー
選択なし
S3
データ登録
S4
キーワード登録
S5
データ検索
S6
データ出力
S7
その他のメニュー処理
S8
その他

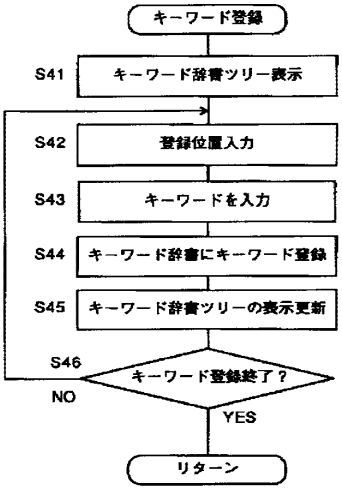
【図８】


データ登録
S301
自動ｷｰ付けﾓｰﾄﾞでﾃﾞｰﾀ登録?
NO
YES
S302
自動ｷｰ付けﾓｰﾄﾞﾌﾗｸﾞON
S303
自動ｷｰ付けﾓｰﾄﾞﾌﾗｸﾞOFF
S304
画像ﾃﾞｰﾀ新規入力?
NO
YES
S305
画像ﾃﾞｰﾀの取り込み
S306
既存画像ﾃﾞｰﾀ選択
NO
S307
自動ｷｰ付けﾓｰﾄﾞ?
YES
NO
S308
ｷｰﾜｰﾄﾞ辞書に登録あり?
YES
S309
分類項目?
NO
YES
S310
分類項目のｷｰﾜｰﾄﾞのみ表示
S311
一致したｷｰﾜｰﾄﾞを
付加情報に設定
S312
下層のｷｰﾜｰﾄﾞあり?
NO
YES
S313
下層のｷｰﾜｰﾄﾞ群表示
NO
S314
ｷｰﾜｰﾄﾞを選択付加?
YES
S315
ｷｰﾜｰﾄﾞ候補の中から選択
S316
付加情報に設定
S317
付加情報
を手動で入力?
NO
YES
S318
付加情報入力
S319
付加情報と共に
画像ﾃﾞｰﾀ保管
ﾘﾀｰﾝ

【図１２】


キーワード辞書ツリー
地域
アジア
日本
関東
東京
神奈川
千葉
関西
中部
中国
台湾
韓国
北アメリカ
南アメリカ
オセアニア
ヨーロッパ
アフリカ

【図１４】


キーワード登録
S41
キーワード辞書ツリー表示
S42
登録位置入力
S43
キーワードを入力
S44
キーワード辞書にキーワード登録
S45
キーワード辞書ツリーの表示更新
S46
キーワード登録終了?
NO
YES
リターン

PATENT ABSTRACTS OF JAPAN

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G06T 1/00

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(72)Inventor : TOO KIMIHIKO

(30)Priority

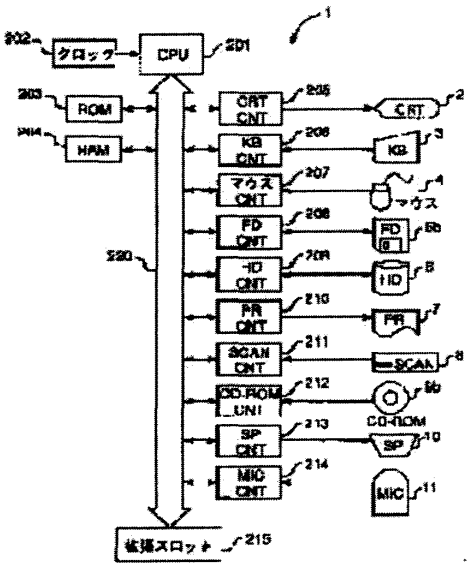
Priority number : 09 56087 Priority date : 11.03.1997 Priority country : JP

(54) PROCESSOR AND METHOD FOR INFORMATION PROCESSING AND RECORDING MEDIUM WHERE INFORMATION PROCESSING PROGRAM IS RECORDED

(57)Abstract:

PROBLEM TO BE SOLVED: To lighten the burden of key word adding operation by selecting a key word according to content information attached to an object and automatically adding it to the object or displaying a key word candidate.

SOLUTION: When image data are registered in an image data base, the image data as an object are selected with a mouse 4 or on a keyboard 3, etc., and the key word is determined or a key word candidate is displayed according to the content information attached to the selected image data. When a term included in the content information is a classification of the key word, key words registered below the layer of the classification are displayed on a display 2 as key word candidates for the image data. Thus, the key word is added or the key word candidate is extracted automatically according to the content information attached to the image data, so the burden of key word adding operation on the user is lightened and the key word can precisely be added in relation to the contents of the image data.



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3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1]An information processor which relates an object with additional information which is search information on said object with contents information which is information which shows the contents of this object, and is saved and managed, comprising:
A memory measure.
An object selection means to choose said object.
A keyword determination means to determine a keyword based on contents information of an object selected by said object selection means.
A keyword addition means which adds a keyword determined by said keyword determination means as additional information to said object selected by said object selection means, and said memory measure is made to memorize.

[Claim 2]In the information processor according to claim 1, have further a key word storage means which memorizes a keyword, and when a term included in said contents information is registered into said key word storage means, said keyword determination means, An information processor choosing said term as a keyword.
[Claim 3]In the information processor according to claim 2, said keyword determination means, An information processor which chooses said term as a keyword and is further characterized by registering said term into said key word storage means when a term included in said contents information is not registered into said key word storage means.
[Claim 4]Have the following, and said key word storage means classifies and memorizes a keyword, Said displaying means displays a keyword which belongs to this classification when said term included in contents information of said object is in agreement with said classification as a keyword candidate, The information processor according to claim 2, wherein said keyword determination means chooses a keyword specified by said setting means from keyword candidates displayed on said displaying means.
A displaying means which displays a keyword candidate.
A setting means which specifies a specific keyword out of said keyword candidate.

[Claim 5]In the information processor according to claim 4, said key word storage means memorizes said keyword hierarchical, Said displaying means displays a keyword of this lower layer as a keyword candidate, when it has a keyword further in a lower layer of a keyword which was in agreement with a term included in contents information of said object, An information processor, wherein said keyword determination means chooses a keyword specified by said setting means from these keyword candidates displayed on said displaying means.
[Claim 6]An information processing method which relates an object with additional information which is search information on said object with contents information which is information which shows the contents of this object, and is saved and managed, comprising:
A step which chooses an object.
A step which chooses this keyword when a term included in contents information of a selected object is memorized by storage as a keyword.

A step which adds a selected keyword to a selected object as additional information, and it stores in a storage.

[Claim 7]The information processing method comprising according to claim 6:
A step which determines said term based on contents information of a selected object when a term included in contents information of a selected object is not memorized by storage as a keyword.
A step which adds said determined term to a selected object as additional information, and it stores in a storage.
A step stored in a storage by making a determined term into a keyword.

[Claim 8]The information processing method comprising according to claim 6:
A step which displays a keyword belonging to this classification as a keyword candidate when term of a step which chooses said keyword included in contents information of an object corresponds with a classification.
A step which chooses a keyword based on said object from displayed this keyword candidates.

[Claim 9]A recording medium which recorded a program for relating an object with additional information which is search information on said object, and saving and managing it with contents information which is information which shows the contents of this object, comprising:
A step as which said program chooses an object.
A step which chooses this keyword when a term included in contents information of a selected object is memorized by storage as a keyword.
A step which adds a selected keyword to a selected object as additional information, and it stores in a storage.

[Claim 10]The recording medium comprising according to claim 9:
A step as which said program determines said term based on contents information of a selected object when a term further included in contents information of a selected object is not memorized by storage as a keyword.
A step which adds said determined term to a selected object as additional information, and it stores in a storage.
A step stored in a storage by making a determined term into a keyword.

[Claim 11]The recording medium comprising according to claim 9:
A step which displays a keyword belonging to this classification as a keyword candidate when term of a step which chooses said keyword included in contents information of an object corresponds with a classification.
A step which chooses a keyword based on said object from displayed this keyword candidates.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the information processor which adds a keyword to predetermined information.
[0002]
[Description of the Prior Art]In recent years, development of the information processing field is remarkable and especially the performance of a personal computer etc. is improving by leaps and bounds. By this, a picture and a document are incorporated and managed [accumulate and] with an input device also not only to a business field/particular application but to a general user, it searches if needed, and information processors printed with an output unit, such as an image database unit and an electronic filing device, are spreading.
[0003]Usually, when data is inputted for data retrieval facilitating in these information processors, the additional information for being used for search with data is inputted. By making the kind of this additional information increase, various search is attained and retrieval effectiveness improves. However, if the kind of additional information increases, at the time of data input, the increase in an input procedure and complicated-ization of operation are caused, and when there are many data registration numbers, it will become work troublesome for a user.
[0004]In attribution information, such as a creation date/modification date of data which is the information which becomes indispensable because of the data management which accompanies data, a file name, and a file format, it is common to add attribution information automatically to data. To image data, a tint is calculated from the color data of image data, and a method or a device added automatically is devised conventionally.
[0005]
[Problem(s) to be Solved by the Invention]However, there was no effective means about automatic addition of the keyword which is one of the additional information. . [whether in the former a user considers and does manual input of the keyword added to data, for example, and] Or only as for the method which a user chooses and adds out of a lot of keywords registered into the key word dictionary etc., there was nothing, and in such a method, the user had to take into consideration which is added out of a lot of keyword candidates, and the burden was placed on the user. Although there is the method of extracting as a keyword the word contained in the document in text data, and adding it, In this method, a word irrelevant [almost] is extracted as a keyword and there is a problem that it cannot respond in the problem of the accuracy of a keyword, the image data which does not contain a text, or voice data.
[0006]On the other hand, FlashPix (FlashPix) which is the new technology which aimed at popularization of image data edit was announced recently. Eastman Kodak Co., Microsoft Corp., Hewlett Packard, etc. develop this together, and it is the proposed image data file format. In this FlashPix format, in order to manage image data effectively, it is specified that it gives various information (the following "contents information" is called.) which shows those contents with image data into an image data file. For example, a FlashPix format, "File sauce (File source)" which describes in detail how image data was created to image data, It is specified that it has the information called attribute groups, such as "an intellectual property (Intellectual Property)"

including the information on ownership or copyright, and "content description (Content description)" which describes the contents of image data. It seems that the image data management according to this FlashPix format will spread from now on. However, under the present circumstances, even if it is the image data according to such a FlashPix format, in order to add the keyword used for search, it cannot but carry out by the conventional method, and there is the same problem as the above-mentioned.
[0007]There is a place which this invention is made that the above-mentioned problem should be solved, and is made into the purpose in providing the information processor which made it possible to add a keyword automatically based on the contents information which accompanies data irrespective of the kind of data of a text, a sound, a picture, etc.
[0008]
[Means for Solving the Problem]An information processor concerning this invention is provided with the following.
In an information processor which relates an object with additional information which is search information on said object with contents information which is information which shows the contents of this object, and is saved and managed, it is a memory measure.
An object selection means to choose said object.
A keyword determination means to determine a keyword based on contents information of an object selected by said object selection means.
A keyword addition means which adds a keyword determined by said keyword determination means as additional information to said object selected by said object selection means, and said memory measure is made to memorize.

[0009]In said information processor, it has further a key word storage means which stores a keyword, and said keyword determination means may choose said term as a keyword, when a term included in said contents information is registered into said key word storage means.
[0010]In said information processor, when a term included in said contents information is not registered into said key word storage means, said keyword determination means may choose said term as a keyword, and may register said term into said key word storage means further.
[0011]A displaying means which displays a keyword candidate further in said information processor, It has a setting means which specifies a specific keyword out of said keyword candidate, Said key word storage means classifies and memorizes a keyword, and said displaying means displays a keyword which belongs to this classification when said term included in contents information of said object is in agreement with said classification as a keyword candidate, Said keyword determination means may choose a keyword specified by said setting means from keyword candidates displayed on said displaying means.
[0012]In said information processor, said key word storage means memorizes said keyword hierarchical, When it has a keyword further in a lower layer of a keyword which was in agreement with a term included in contents information of said object, said displaying means, A keyword of this lower layer may be displayed as a keyword candidate, and said keyword determination means may choose a keyword specified by said setting means from these keyword candidates displayed on said displaying means.
[0013]An object is related with additional information which is search information on said object with contents information which is information which shows the contents of this object, and an information processing method saved and managed is provided with the following.
A step which chooses an object.
A step which chooses this keyword when a term included in contents information of a selected object is memorized by storage as a keyword.
A step which adds a selected keyword to a selected object as additional information, and it stores in a storage.

[0014]When a term included in contents information of a selected object in the above-mentioned information processing method is not memorized by storage as a keyword, A step which determines said term based on contents information of a selected object, a step which adds said

determined term to a selected object as additional information, and is memorized to a storage, and a step memorized to a storage by making a determined term into a keyword may be provided.
[0015]A step which chooses said keyword, When a term included in contents information of an object is in agreement with a classification, it may have a step which displays a keyword belonging to this classification as a keyword candidate, and a step which chooses a keyword based on said object from this displayed keyword candidates.
[0016]Said program is provided with the following in a recording medium which recorded a program for relating an object with additional information which is search information on said object, and saving and managing it with contents information which is information which shows the contents of this object.
A step which chooses an object.
A step which chooses this keyword when a term included in contents information of a selected object is memorized by storage as a keyword.
A step which adds a selected keyword to a selected object as additional information, and it stores in a storage.
When an information processor reads and executes a program recorded on this recording medium, a function for which additional information is automatically added based on contents information which accompanies an object is realized.
[0017]In said recording medium, said program, When a term included in contents information of a selected object is not memorized by storage as a keyword, It may have a step which determines said term based on contents information of a selected object, a step which adds said determined term to a selected object as additional information, and is stored in a storage, and a step stored in a storage by making a determined term into a keyword.
[0018]A step which chooses said keyword in said recording medium, When a term included in contents information of an object is in agreement with a classification, it may have a step which displays a keyword belonging to this classification as a keyword candidate, and a step which chooses a keyword based on said object from this displayed keyword candidates.
[0019]Here, an object means a folder etc. which summarized these for electronic intelligence which serves as a subject who should be saved and managed by the above-mentioned information processor, for example, text data, voice data, or image data. Attribution information is secondary information added to an object as these subjects, for example, search keys, including a keyword, a color, shape, etc., a data creation person, the date and time of creation, size, a comment, an icon, etc.
[0020]
[Embodiment of the Invention]Hereafter, the embodiment of the information processor applied to this invention using an attached drawing is described.
[0021]The information processor of this embodiment manages the additional information which is the image data which is one of the objects, and one of the attribution information to the image data. Namely, an information processor constitutes the database management system (an "image database" is called hereafter.) of image data, adds a search key to image data as additional information, and can search image data now using this search key. Although there are a keyword, a color, a figure, etc. showing the feature of a picture as a search key used for an image database, a keyword is used in this embodiment. This information processor deals with the image data accompanied by the contents information which is information which shows the contents, such as the name of the title about the image data, the purpose, a place, and material being, and performs automatically setting out of a keyword, or a keyword candidate's display based on the contents information. . As contents information, are prescribed by the above-mentioned FlashPix format here, for example. . "The content description (Content description)" which is an attribute group who describes the contents of image data is described. "The explanatory text (caption text)" which described the theme/the purpose of image data, The information on "the thing (things in the image) in image data" which described the name of the material being described in image data, or "the place (places in the image) in image data" which described the place described in image data may be used. The composition and operation of this information

processor are explained below.
[0022]The outline lineblock diagram of the information processor (a "system" is called hereafter.) of this embodiment is shown in drawing 1. As shown in drawing 1, a system is provided with a central processing unit ("CPU" is called hereafter.), and the control device 1 which controls the whole system is constituted as a center. Pentium made from Intel, etc. are used for CPU. The display 2 which performs the display of a picture or a character, the display for operation, etc. in this control device 1, The keyboard 3 and the mouse 4 for performing various inputs, instructing operation, etc., The floppy disk drive unit 5a and the hard disk drive 6 which are data storage media, The printer 7 which prints a character, image data, etc., the scanner 8 for incorporating image data, the CD-ROM device 9b for reading the data stored in CD-ROM 9a, the loudspeaker 10 for voice response, and the microphone 11 for voice input are connected.
[0023]The block diagram of this system is shown in drawing 2. RAM204 which stores temporarily the program executed for control of ROM203 and CPU201 in which the program which controls this system is stored, and data is connected to CPU201 via the data bus 220. In the circuit connected to CPU201 via the data bus 220. The display control circuit 205 which controls the display 2 for the display of a picture or a character, The keyboard control circuit 206 which carries out transfer control of the input from the keyboard 3, The mouse control circuit 207 which carries out transfer control of the input from the mouse 4, and the floppy disk drive unit control circuit 208 which controls the floppy disk drive unit 5b, The hard disk drive control circuit 209 which controls the hard disk drive 6, The printer control circuit 210 which controls the output to the printer 7, and the scanner control circuit 211 which controls the scanner 8, There are the CD-ROM device control circuit 212 which controls the CD-ROM device 9b, the loudspeaker control circuit 213 which controls the loudspeaker 10, and the microphone control circuit 214 which controls the microphone 11. The expansion slot 215 for the clock 202 for generating a reference clock required in order to operate a system being connected, and connecting various add-in boards is connected to CPU201 via the data bus 220. A SCSII board may be connected to the expansion slot 215, and the floppy disk drive unit 5b, the hard disk drive 6, the scanner 8, or the CD-ROM device 9b may be connected via this SCSII board.
[0024]In the above-mentioned system, although the floppy disk 5a and the hard disk drive 6 are used as an image data storage medium, other information storage media, such as a magneto-optical disc (MO), may be used. Although the scanner 8 is used as an image data input device, they may be other data input units, such as a still video camera and a digital camera. Although the printer 7 is used as an output unit, they may be other output units, such as a digital copier.
[0025]In this system, the program which realizes the managerial system of image data is stored in ROM203. However, a part or all of this program is stored in the floppy disk 5a or the information storage medium of hard disk drive 6 grade, if needed, from an information storage medium, a program and data may be read to RAM204 and this may be performed. Although this system is inputted into the hard disk drive 6 from an external input device and he is trying to manage the stored image data, managing directly the image data stored in CD-ROM 9b is also considered. In this case, the index data which is data which specifies the image data stored in CD-ROM 9b, and the search key added to this index data are stored in the hard disk drive 6 (the set of this index data and search key is called a "record".). What is necessary is to extract a record as search results first based on the set-up search key, and just to read desired image data from CD-ROM 9b after an appropriate time based on the index data of the extracted record at the time of search of image data.
[0026]An example of the setting screen displayed on the display 2 with execution of a program in this system is shown in drawing 3. In this figure, Screen 21 is an initial menu screen displayed at the time of a system start. The setting screen according to processing is displayed by choosing each selections 23-27 of an initial menu screen. A user performs the input of a preset value required for setting out of operational mode, registration of data, or registration of a keyword, etc. on these setting screens.
[0027]This system has a key word dictionary used at the time of an image database including image data, and its contents information and additional information and search in order to

manage image data as mentioned above. These image databases and key word dictionaries are memorized by the information storage medium of hard disk drive 6 grade. An example of the composition of the image database and key word dictionary which are memorized in the hard disk drive 6 of this system is shown in drawing 4 and drawing 5. The "index" whose image databases 31 shown in drawing 4 are various index data, i.e., a registration number, The "data path" which shows the place on the "data name" showing the contents of image data and the information storage medium with which image data is memorized, the "file name" of image data and the index data of a "keyword" etc. used at the time of search, other information, etc. are included.
[0028]The key word dictionary 33 shown in drawing 5 consists of the classification table 35 which stores a classification item, and the key word table 37 which stores a keyword. The classification table 35 consists of an "index" which is a registration number of a classification item, and a "classification name" which is the names of a classification item. Here, a classification item is an item for classifying a keyword. For example, as shown in drawing 5, there are "area", "season", etc. in a classification item, and the keyword relevant to areas, such as the name of a country and a name of a prefecture, is registered under the "area" of a classification item. The "index" whose key word table 37 is a registration number of a keyword, It consists of the "classification number" which shows to which classification item a keyword belongs, a "parent index" which shows the index of the keyword of the higher rank when a keyword makes a hierarchy, and a "keyword name" which is concrete keywords. "000" in a parent index shows that the keyword belongs to the top hierarchy. When it sees about the keyword (indexes are 001-007) from which the classification number of the key word table 37 shown by drawing 5 is set to "01" (area), these keywords show a hierarchy as shows drawing 6 from the relation of a parent index.
[0029]In this system constituted as mentioned above, when image data is registered into the image database 31, The image data which is an object is chosen by the mouse 4 and keyboard 3 grade, and the determination of a keyword or a keyword candidate's display is performed based on the contents information which accompanies the selected image data. That is, when the term included in the contents information of the selected image data is registered into the key word dictionary 33 which has memorized the keyword, the term is determined as a keyword, is added to image data, and is registered into the image database 31 with image data.
[0030]Since the key word dictionary 33 classified the keyword and has memorized it hierarchical, when the lower layer of the keyword has a keyword, the lower layer keyword is further displayed on the display 2 which is a displaying means as a keyword candidate. When the term included in contents information is the classification which is a keyword, the keyword registered into the lower layer of the classification is displayed on the display 2 as a keyword candidate of image data. Thus, out of the keyword candidate displayed on the display 2. The keyword specified by the user via a means to specify the arbitrary coordinates positions on the display 2 of a keyboard, a mouse, etc. is chosen as a keyword which should be registered, is added to image data, and is registered into the image database 31 with image data. In order that this system may perform addition of a keyword, or a keyword candidate's extraction automatically based on the contents information which accompanies image data as mentioned above, A user's burden can be eased in the addition work of a keyword, and the keyword relevant to the contents of image data can be added with sufficient accuracy.
[0031]Below, the control management of this system is explained. Drawing 7 is a flow chart of the main routine of the control management which CPU201 performs based on the program stored in ROM203. If a program is started after the power supply of a system is switched on, CPU201 will first perform initialization processings, such as a display of initialization of a variable required of each processing etc., and the initial menu screen 21 (drawing 3) to the display 2 top (S1). Next, it is judged whether selection of processing was performed on the initial menu screen 21 (S2). Here, when "data registration" 23 are chosen, an image is captured from the picture input device of scanner 8 grade as data, and data registration processing which adds predetermined information and is registered to a database is performed (S3). "Keyword registration" When 24 is chosen, keyword registration processing which performs processing which registers to a database the keyword added to image data is performed (S4). "Data

retrieval" When 25 is chosen, retrieval processing which searches desired image data from a database is performed (S5). "Data output" When 26 is chosen, data output processing which prints image data with a display or the printer 7 on the display 2 is performed (S6). When "other menu" 27 are chosen, predetermined processings other than the above-mentioned processing are performed (S7). When nothing is chosen on the initial menu screen 21, it progresses to Step S8. Others are processed in Step S8.

[0032]About retrieval processing (S5), data output processing (S6), other menu processings (S7), and other processings (S8), it is fundamentally [as processing with the conventional information processor] the same, and since it is not related to this invention, explanation here is omitted. Below, the above-mentioned data registration processing (S3) and keyword registration processing (S4) are explained in detail.

[0033]Drawing 8 shows the flow chart of the data registration processing (Step S3 of drawing 6) in a main routine. In data registration processing, it is judged whether CPU201 performs data registration by the operational mode in automatic key attachment mode first (S301). A user makes this judgment based on the value inputted on the data registration screen 29. With automatic key attachment mode, here so that a user can choose a keyword from predetermined candidates, It is the operational mode which chooses addition or a keyword candidate automatically and displays a keyword based on the contents information which accompanies image data out of the keyword registered into the key word dictionary a priori. As a result of judging (S301), when performing data registration in automatic key attachment mode, The automatic key attachment mode flag which is a flag for judging whether a system is in automatic key attachment mode is turned ON (S302), and when not performing data registration in automatic key attachment mode, an automatic key attachment mode flag is turned OFF (S303).

[0034]Next, the image data which it is going to process from now on judges a new input and the data which has already existed in the database (S304). A user makes this judgment based on the input performed via the mouse 4 or the keyboard 3 on the data registration screen 29. As a result of judging (S304), when image data is a new input, incorporation processing of the image data which incorporates new image data is performed (S305). The details of incorporation processing (S305) of this image data are mentioned later. When image data is the existing data, desired data is chosen out of the existing image data (S306). Here, incorporation or selection of image data is performed by the user via the mouse 4 or keyboard 3 grade on the data registration screen 29.

[0035]Then, based on an automatic key attachment mode flag, it is judged whether operational mode is automatic key attachment mode (S307). When it is not in automatic key attachment mode, it progresses to Step S317 and automatic addition of a keyword is not performed. In the case of automatic key attachment mode, it is judged whether the term included in the contents information which accompanies image data is registered into the key word dictionary (S308). Here, it may judge whether contents information is thoroughly in agreement with the term of a key word dictionary, when contents information is a text/compound, only a word may be extracted, and it may be judged whether the word is in agreement with the term of a key word dictionary. As a result of this judgment (S308), when the term included in contents information is not registered into a key word dictionary, it progresses to Step S317. On the other hand, when the term included in contents information is registered into the key word dictionary, it is judged whether the keyword is a classification item (S309).

[0036]When the term in Step S309 included in contents information as a result of judgment is a classification item, it displays on a screen by making into a keyword candidate the keyword located in the top hierarchy among the keywords applicable to the classification item registered into the key word dictionary (S310), and progresses to Step S314. For example, when the term of the "area" which is one of the classification items is included in contents information, a classification item displays on a screen by making into a keyword candidate "Asia" and "North America" which are the top hierarchy's keywords among the keywords used as the "area."

[0037]When the term included in contents information is not a classification item, it is set as additional information by making into a keyword the term included in this contents information (S311). Next, it is judged whether the lower layer of the keyword which is in agreement with the

term included in contents information has a keyword further (S312). When a lower layer has a keyword, only a lower layer keyword group is displayed as a keyword candidate (S313), and it progresses to Step S314. When there is no keyword in a lower layer, it progresses to Step S317.
[0038]In Step 314, it is judged whether a keyword is chosen and added out of the keyword candidate currently displayed on the screen. When not performing this selection addition, it progresses to Step S317. When performing selection addition, the keyword specified by the user in the keyboard 3 or the mouse 4 grade is chosen from the keyword candidates displayed at Step S310 or Step S313 (S315), The selected keyword is set as additional information (S316), and it progresses to Step S317.
[0039]In Step 317, it is judged whether additional information is inputted manually. When not inputting additional information manually, it progresses to Step S319. When inputting additional information manually, an additional information input process is performed (S318), and it progresses to Step S319. The details of an additional information input process (S318) are mentioned later. In Step S319, image data is registered into a database with additional information.
[0040]The information processor of this embodiment chooses a keyword based on the contents information of image data as mentioned above, and this keyword is set as additional information. In the above-mentioned explanation, in Step S308, when the term of contents information was not registered into a key word dictionary, did not perform automatic addition of the keyword, but. Even if it does not register with a key word dictionary, the term of contents information is automatically registered into a key word dictionary, and it may be made to set it as additional information.
[0041]Drawing 9 is a flow chart of incorporation processing (Step S305 of drawing 8) of the above-mentioned image data. In incorporation processing of image data, image data is first incorporated from the information storage medium which stores the image data of the picture input device of scanner 8 grade, or hard disk drive 6 grade (S3051). Next, the image content information relevant to image data is inputted from an input device (S3052). A user may specify contents information with this device instead of inputting image content information from an input device. Although image content information was acquired from the input device, a classification item may be acquired instead of image content information. Then, the keeping destination of image data is set up (S3053), the data name of image data is inputted (S3054), and processing is ended. Thus, incorporation of image data is performed.
[0042]Drawing 10 is a flow chart of the above-mentioned additional information input process (Step S318 of drawing 8). In an additional information input process, the menu for an additional information input is displayed on the screen, and CPU201 judges which processing was chosen (S3181). That is, it is judged any should be chosen between the processing which adds a keyword to additional information manually by a user, or the processing which adds information other than a keyword to additional information, or whether neither is chosen. When neither is chosen, it progresses to Step S3184. When the processing which adds a keyword is chosen, keyword attached processing is performed (S3182). The details of keyword attached processing are mentioned later. When the processing which adds other information is chosen, other information attached processing is performed (S3183). Since it is equivalent to the processing from the former, or keyword attached processing of Step S3182 about other information attached processing, explanation here is omitted. Then, it judges whether additional information processing is ended based on the input on the screen by a user (S3184), and the above-mentioned operation is repeated until a user terminates this processing.
[0043]Drawing 11 is a flow chart of the above-mentioned keyword attached processing (Step S3182 of drawing 10). In keyword attached processing, first, as shown in drawing 12, the whole tree structure of a key word dictionary is displayed (S31821). A user chooses a keyword to incorporate out of the tree displayed on the screen. There are a way a user clicks the keyword with the mouse 4 as the method of selection, for example as shown in drawing 13, the method of moving cursor to the position of the keyword with the keyboard 3, and specifying a reversing display and by carrying out highlighting, etc. Next, a keyword with the selected user is incorporated (S31822), and this keyword is set as additional information (S31823). Then, it judges

whether keyword attached processing is ended based on the input on the screen by a user (S31824), and the above-mentioned operation is repeated until a user terminates this processing.

[0044]Drawing 14 is a flow chart of the keyword registration processing (step S4 of drawing 7) in a main routine. In keyword registration processing, a system displays the whole tree of the key word dictionary 33 first (S41). Next, a position (hierarchy) to register into the keyword specified by the user in the tree of the key word dictionary 33 is inputted (S42). There are the method of a user clicking the keyword of the upper layer of a registration position with the mouse 4, or moving cursor to a registration position as a specification method of a registration position, for example, and specifying a reversing display and by carrying out highlighting, etc. Next, the character string inputted by the user via the keyboard 3 grade is inputted as a keyword (S43). Then, the inputted keyword is registered into the specified position of the key word dictionary 33 (S44). The display of the keyword tree on the display 2 currently displayed is updated after registration (S45). Then, it judges whether keyword registration processing is ended based on the input from the screen by a user (S46), and the above-mentioned operation (S42-S46) is repeated until a user terminates this processing.
[0045]
[Effect of the Invention]According to the information processor of this invention, based on the contents information which accompanies an object, a keyword is chosen, and it is automatically added to an object, or a keyword candidate is displayed. For this reason, the burden of keyword addition work is eased substantially, and the keyword relevant to the contents of the object is added with sufficient accuracy.

[Translation done.]

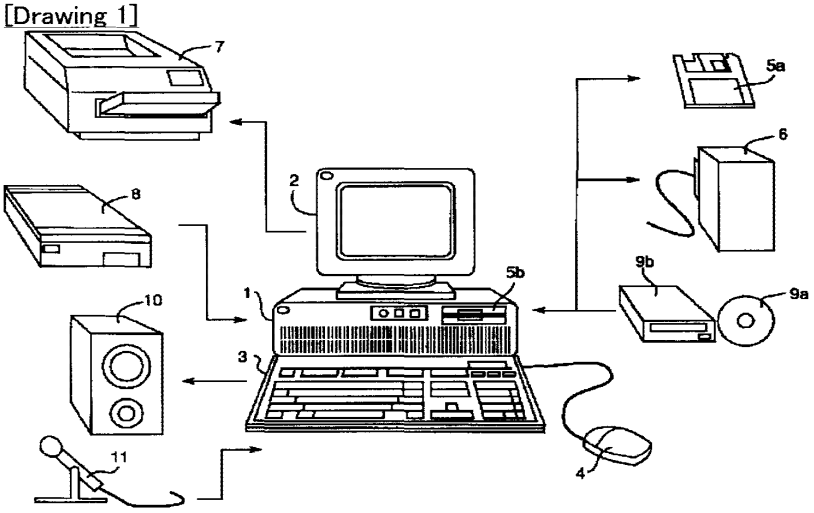
* NOTICES *

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damages caused by the use of this translation.

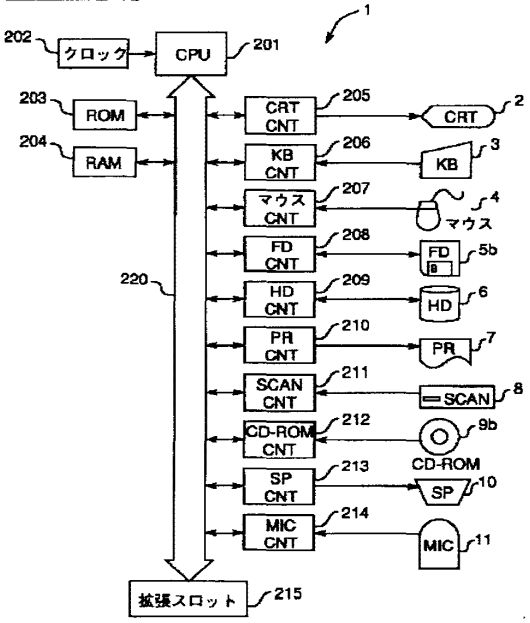
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

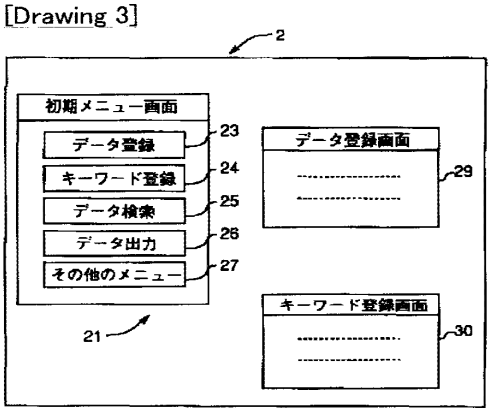
[Drawing 1]



[Drawing 2]



[Drawing 3]

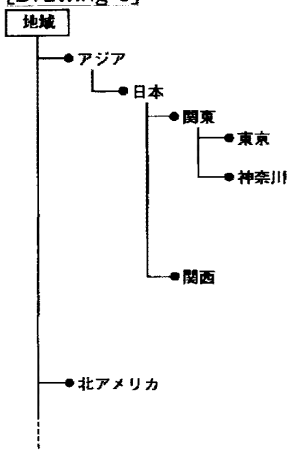


[Drawing 4]

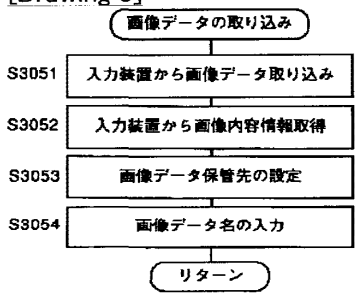
31 画像データベース

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00002	東京タワー	c:¥folder	img2.jpg	004	:	:
00003	レインボーブリッジ	d:	img3.bmp	004	:	:
00004	:	:	:	:	:	:
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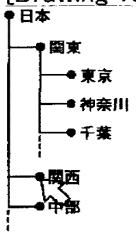
[Drawing 6]



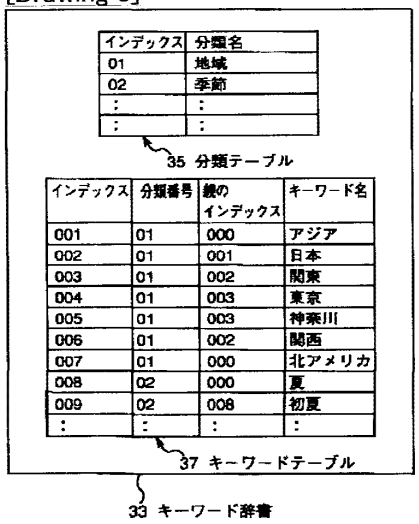
[Drawing 9]



[Drawing 13]



[Drawing 5]



インデックス	分類名
01	地域
02	季節
:	:
:	:

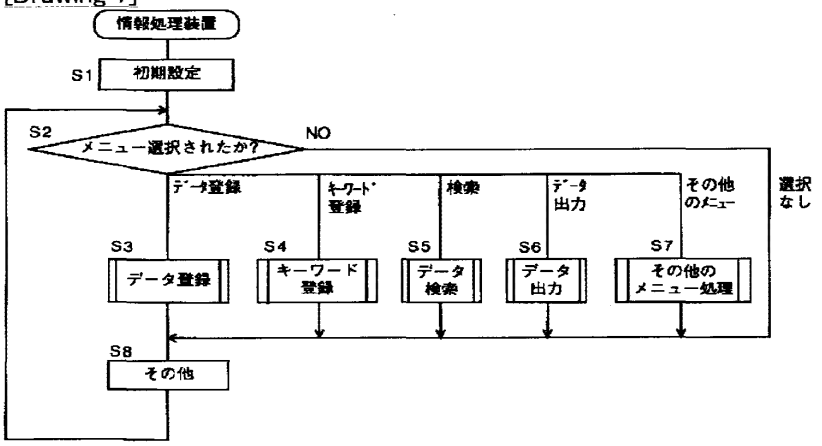
35 分類テーブル

インデックス	分類番号	親のインデックス	キーワード名
001	01	000	アジア
002	01	001	日本
003	01	002	関東
004	01	003	東京
005	01	003	神奈川
006	01	002	関西
007	01	000	北アメリカ
008	02	000	夏
009	02	008	初夏
:	:	:	:

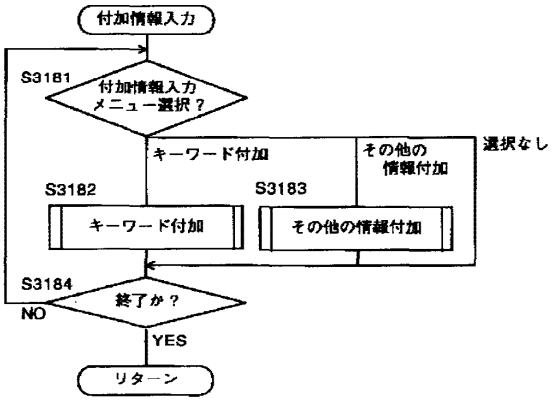
37 キーワードテーブル

33 キーワード辞書

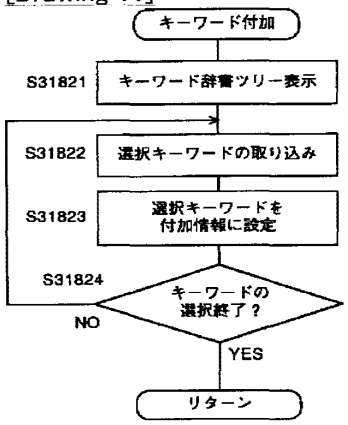
[Drawing 7]



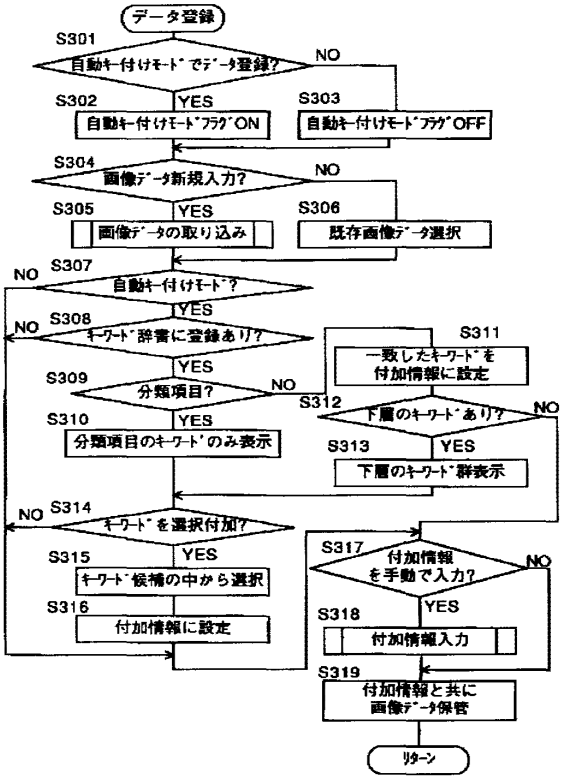
[Drawing 10]



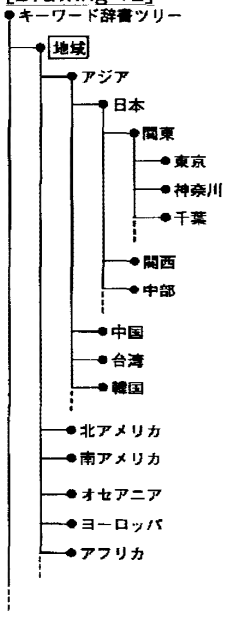
[Drawing 11]



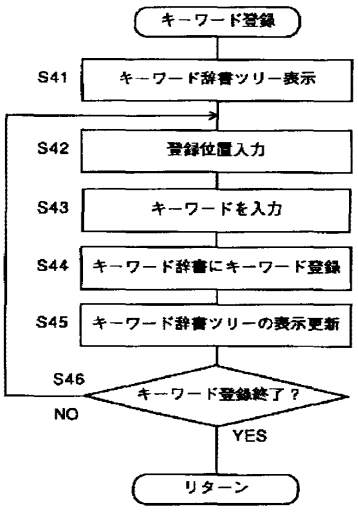
[Drawing 8]



[Drawing 12]



[Drawing 14]



[Translation done.]

Electronic Patent Application Fee Transmittal	
Application Number:	10762450
Filing Date:	23-Jan-2004
Title of Invention:	IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR
First Named Inventor/Applicant Name:	Toshinori Nagahashi
Filer:	James Albert Oliff/Ashley DeHart
Attorney Docket Number:	118464
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

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Application Number:	10762450
International Application Number:	
Confirmation Number:	5463
Title of Invention:	IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR
First Named Inventor/Applicant Name:	Toshinori Nagahashi
Customer Number:	25944
Filer:	James Albert Oliff/Ashley DeHart
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Attorney Docket Number:	118464
Receipt Date:	12-DEC-2008
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Time Stamp:	16:57:30
Application Type:	Utility under 35 USC 111(a)

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Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	2267
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Authorized User	
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	Document Description		**Start**	**End**	
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Information:					
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Information:					
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,450	01/23/2004	Toshinori Nagahashi	118464	5463

25944 7590 12/18/2008

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER	
BITAR, NANCY	
ART UNIT	PAPER NUMBER
2624	

MAIL DATE	DELIVERY MODE
12/18/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of Allowability	Application No.	Applicant(s)	
	10/762,450	NAGAHASHI, TOSHINORI	
	Examiner	Art Unit	
	NANCY BITAR	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *IDS filed 12/12/2008*.

2. ☒ The allowed claim(s) is/are *1-14*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 12/12/2008
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Nancy Bitar/ Examiner, Art Unit 2624	/Jingge Wu/ Supervisory Patent Examiner, Art Unit 2624

Sheet 1 of 1

Form PTO-1449 (REV. 1/06)	US Dept. of Commerce PATENT & TRADEMARK OFFICE	ATTY DOCKET NO. 118464	APPLICATION NO. 10/762,450
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT(S) Toshinori NAGAHASHI	
		FILING DATE January 23, 2004	GROUP 2624

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Date	Name

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Date	Country	With English Abstract	With English Translation
	1	JP-A-10-312387	11/24/1998	JAPAN	X	X

OTHER DOCUMENTS

Examiner Initials	Cite No.	Including name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.

EXAMINER /Nancy Bitar/	DATE CONSIDERED 12/16/2008

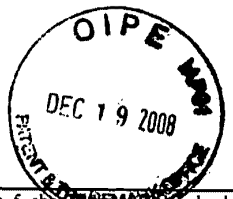
Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: December 12, 2008

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /NB/

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885



INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

25944 7590 09/22/2008

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,450	01/23/2004	Toshinori Nagahashi	118464	5463

TITLE OF INVENTION: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	~~$1440~~ 1670.00	$300	$0	~~$1740~~ 1810.00	12/22/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
BITAR, NANCY	2624	382-118000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Oliff & Berridge, PLC
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Seiko Epson Corporation

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Tokyo, Japan

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☒ A check is enclosed. Ck#213330
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 15-0461 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Typed or printed name Kipman T. Werking

Registration No. ~~40,544~~ 60,187

12/22/2008 JADDO2 00000021 10762450
Date December 19, 2008
01 FC:1501 1510.00 OP
02 FC:1504 300.00 OP

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,450	02/03/2009	7486807	118464	5463

25944 7590 01/14/2009

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 676 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Toshinori Nagahashi, Tatsuno-machi, JAPAN;

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
10/762,450	7486807	2624	9200

OC000000038387892

Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 27049 on 10/20/2009

- **Correspondence Address**
- **Power of Attorney Address**

The address of record for Customer Number 27049 is:

27049
OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

PART 1 - ATTORNEY/APPLICANT COPY
page 1 of 1

Docket No. 005750-000049

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT of:	)	
Toshinori NAGAHASHI	)	Application No. 10/762,450
Patent No. 7,486,807	)	Examiner: Nancy Bitar
Issued: February 3, 2009	)	Group Art Unit: 2664
For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR	))))	Date: January 13, 2022

REQUEST FOR CERTIFICATE OF CORRECTION
UNDER 37 CFR §§ 1.322 and 1.323

Attention Certificates of Correction Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Patentee's assignee respectfully requests issuance of a Certificate of Correction in order to correct the following errors in the claims in issued U.S. Patent No. 7,486,807.

It is certified that errors appear in the above-identified patent and that said Letters Patent should be hereby corrected in Claims 1 and 5-14 as shown below:

In Claim 1, at lines 36 and 37, in Column 13,

"with a keyword in" should be changed to --**with the keyword in**--;

In Claim 5, at lines 8 and 9, in Column 14,

"claim 2 further comprising a keyword proposing section for proposing" should be changed to --**claim 2, wherein the keyword proposing section proposes**--;

In Claim 6, at line 15, in Column 14,

"is formed by the keywords" should be changed to --**is formed by keywords**--;

In Claim 7, at line 23, in Column 14,

"previously contained sin the" should be changed to --**previously contained in the**--;

In Claim 7, at line 31, in Column 14,

"proposing a keyword on a display" should be changed to --**proposing the keyword on a display**--;

In Claim 7, at line 35, in Column 14,

"proposed by the keyword proposing section" should be changed to --**proposed by a keyword proposing section**--;

In Claim 8, at line 44, in Column 14,

"together with a keyword" should be changed to --**together with the keyword**--;

In Claim 8, at line 56, in Column 14,

"proposed by the keyword proposing section" should be changed to --**proposed by a keyword proposing section**--;

In Claim 9, at line 62, in Column 14,

"formed by the keywords" should be changed to --**formed by keywords**--;

In Claim 10, at line 66, in Column 14,

"formed by the keywords" should be changed to --**formed by keywords**--;

In Claim 11, at line 3, in Column 15,

"formed by the keywords" should be changed to --**formed by keywords**--;

In Claim 12, at line 7, in Column 15,

"formed by the keywords" should be changed to --**formed by keywords**--;

In Claim 13, at lines 2 and 3, in Column 16,

"formed by the keywords" should be changed to --**formed by keywords**--; and

In Claim 14, at lines 6 and 7, in Column 16,

"formed by the keywords" should be changed to --**formed by keywords**--.

REMARKS

The requested correction is set forth in attached Form PTO-1050 (PTO/SB/44).

The fee under 37 C.F.R. 1.20(a) in the amount of $160 is being submitted herewith.

Patentee's assignee respectfully asserts that the above changes are directed towards providing proper antecedent basis for the recited features, and thus do not constitute new matter and do not require reexamination. Accordingly, patentee's assignee requests issuance of the Certificate of Correction.

The Commissioner is hereby authorized to charge any fees, which may be required, or credit any overpayment to Deposit Account No. 50-4525.

Respectfully submitted,

/Tyler Drye/
Tyler Drye
Reg. No. 75,034

STUDEBAKER & BRACKETT PC
8255 Greensboro Drive, Suite 300
Tysons, Virginia 22102
Phone: (703) 390-9051
E-mail: info@sbpatentlaw.com
Customer No: 78198

PTO/SB/44 (09-07)
Approved for use through 01/31/2020. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,486,807

APPLICATION NO.: 10/762,450

ISSUE DATE : February 3, 2009

INVENTOR(S) : Toshinori NAGAHASHI

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Claim 1, at lines 36 and 37, in Column 13,
"with a keyword in" should be changed to --with the keyword in--;
In Claim 5, at lines 8 and 9, in Column 14,
"claim 2 further comprising a keyword proposing section for proposing" should be changed to --claim 2, wherein the keyword proposing section proposes--;
In Claim 6, at line 15, in Column 14,
"is formed by the keywords" should be changed to --is formed by keywords--;
In Claim 7, at line 23, in Column 14,
"previously contained sin the" should be changed to --previously contained in the--;
In Claim 7, at line 31, in Column 14,
"proposing a keyword on a display" should be changed to --proposing the keyword on a display--;
In Claim 7, at line 35, in Column 14,
"proposed by the keyword proposing section" should be changed to --proposed by a keyword proposing section--;
In Claim 8, at line 44, in Column 14,
"together with a keyword" should be changed to --together with the keyword--;
On Claim 8, at line 56, in Column 14,
"proposed by the keyword proposing section" should be changed to --proposed by a keyword proposing section--;
In Claim 9, at line 62, in Column 14,
"formed by the keywords" should be changed to --formed by keywords--;
In Claim 10, at line 66, in Column 14,
"formed by the keywords" should be changed to --formed by keywords--;

MAILING ADDRESS OF SENDER (Please do not use Customer Number below):

STUDEBAKER & BRACKETT PC
8255 Greensboro Drive, Suite 300
Tysons, Virginia 22102

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 11/30/2014. OMB 0651-0051
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TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	10/762,450
Filing Date	January 23, 2004
First Named Inventor	Toshinori NAGAHASHI
Title	IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR
Art Unit	2664
Examiner Name	Nancy Bitar
Attorney Docket Number	005750-000049

SIGNATURE of Applicant or Patent Practitioner

Signature	/Donald R. Studebaker/	Date (Optional)	January 13, 2022
Name	Donald R. Studebaker	Registration Number	32,815
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 78198

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

138 East LCD Advancements Limited

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Garrett Dempsey	Date (Optional)	21 Dec 2021
Name	Garrett Dempsey		
Title	Director		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Patent Application Fee Transmittal				
Application Number:	10762450			
Filing Date:	23-Jan-2004			
Title of Invention:	IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR			
First Named Inventor/Applicant Name:	Toshinori Nagahashi			
Filer:	Donald R. Studebaker/Jamie Bak			
Attorney Docket Number:	118464			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	**Fee Code**	**Quantity**	**Amount**	**Sub-Total in USD($)**
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
CERTIFICATE OF CORRECTION	1811	1	160	160

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**160**

Electronic Acknowledgement Receipt	
EFS ID:	44741029
Application Number:	10762450
International Application Number:	
Confirmation Number:	5463
Title of Invention:	IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR
First Named Inventor/Applicant Name:	Toshinori Nagahashi
Customer Number:	27049
Filer:	Donald R. Studebaker/Jamie Bak
Filer Authorized By:	Donald R. Studebaker
Attorney Docket Number:	118464
Receipt Date:	13-JAN-2022
Filing Date:	23-JAN-2004
Time Stamp:	16:01:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$160
RAM confirmation Number	E20221CG01460971
Deposit Account	504525
Authorized User	Jamie Bak
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Certificate of Correction	2022-01-13_CoC_Request.pdf	35341 c52fd8ad17dcd36f3867ebec04decb7d283b7001	no	3
Warnings:					
Information:					
2	Request for Certificate of Correction	2022-01-13_SB44.pdf	197043 586e6ddec6654044f6446b47cc35e68d0c33156d	no	2
Warnings:					
Information:					
3	Power of Attorney	2022-01-13_Signed_POA.pdf	1233987 ed16f693f58a1ae4e0b856a425776da7d40f9275	no	2
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	38345 e9c687d530cea4bdfaee986cc25241f398697595	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1504716		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/762,450	01/23/2004	Toshinori Nagahashi	005750-000049

CONFIRMATION NO. 5463

78198
Studebaker & Brackett PC
8255 Greensboro Drive
Suite 300
Tysons, VA 22102

POA ACCEPTANCE LETTER

OC000000131191935

Date Mailed: 01/19/2022

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/13/2022.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/tmwilliams/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/762,450	01/23/2004	Toshinori Nagahashi	118464

CONFIRMATION NO. 5463

27049
OLIFF PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

POWER OF ATTORNEY NOTICE

OC000000131191898

Date Mailed: 01/19/2022

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/13/2022.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/tmwilliams/

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

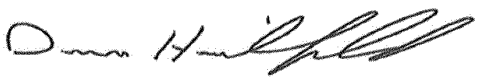
PATENT NO. : 7,486,807 B2
APPLICATION NO. : 10/762450
DATED : February 3, 2009
INVENTOR(S) : Toshinori Nagahashi

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

In Claim 1, at Lines 36 and 37, in Column 13:
"with a keyword in" should be changed to --with the keyword in--;
In Claim 5, at Lines 8 and 9, in Column 14:
"claim 2 further comprising a keyword proposing section for proposing" should be changed to --claim 2, wherein the keyword proposing section proposes--;
In Claim 6, at Line 15, in Column 14:
"is formed by the keywords" should be changed to --is formed by keywords--;
In Claim 7, at Line 23, in Column 14:
"previously contained sin the" should be changed to --previously contained in the--;
In Claim 7, at Line 31, in Column 14:
"proposing a keyword on a display" should be changed to --proposing the keyword on a display--;
In Claim 7, at Line 35, in Column 14:
"proposed by the keyword proposing section" should be changed to --proposed by a keyword proposing section--;
In Claim 8, at Line 44, in Column 14:
"together with a keyword" should be changed to --together with the keyword--;
On Claim 8, at Line 56, in Column 14:
"proposed by the keyword proposing section" should be changed to --proposed by a keyword proposing section--;
In Claim 9, at Line 62, in Column 14:
"formed by the keywords" should be changed to --formed by keywords--;
In Claim 10, at Line 66, in Column 14:
"formed by the keywords" should be changed to --formed by keywords--.

Signed and Sealed this
Eighth Day of February, 2022



Drew Hirshfeld
Performing the Functions and Duties of the Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office

Docket No. 005750-000049

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT of:	)	
Toshinori NAGAHASHI	)	Application No. 10/762,450
Patent No. 7,486,807	)	Examiner: Nancy Bitar
Issued: February 3, 2009	)	Group Art Unit: 2664
For: IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR	)	Date: February 18, 2022

REQUEST FOR CERTIFICATE OF CORRECTION
UNDER 37 CFR §§ 1.322 and 1.323

Attention Certificates of Correction Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In view of the Certificate of Correction issued on February 8, 2022, in the above-identified patent, patentee's assignee respectfully requests issuance of a second Certificate of Correction in order to correct the following errors in the claims in issued U.S. Patent No. 7,486,807. It is noted that the following errors were previously identified in the Request for Certificate of Correction under 37 CFR §§ 1.322 and 1.323 filed on January 13, 2022, but they were inadvertently omitted from the Form PTO-1050 (PTO/SB/44) accompanying the Request. Therefore, the following errors were not corrected in the Certificate of Correction issued on February 8, 2022. Accordingly, patentee's assignee requests correction of these errors.

It is certified that errors appear in the above-identified patent and that said Letters Patent should be hereby corrected in Claims 11-14 as shown below:

In Claim 11, at line 3, in Column 15,

"formed by the keywords" should be changed to --**formed by keywords**--;

In Claim 12, at line 7, in Column 15,

"formed by the keywords" should be changed to --**formed by keywords**--;

In Claim 13, at lines 2 and 3, in Column 16,

"formed by the keywords" should be changed to --**formed by keywords**--; and

In Claim 14, at lines 6 and 7, in Column 16,

"formed by the keywords" should be changed to --**formed by keywords**--.

REMARKS

The requested correction is set forth in attached Form PTO-1050 (PTO/SB/44).

The fee under 37 CFR § 1.20(a) in the amount of $160 is being submitted herewith.

Patentee's assignee respectfully asserts that the above changes are directed towards providing proper antecedent basis for the recited features and are consistent with the changes made to claims 1 and 5-10 in the Certificate of Correction issued on February 8, 2022 in said Letters Patent (see, in particular, claims 9 and 10 of said Certificate of Correction), and thus do not constitute new matter and do not require reexamination. Accordingly, patentee's assignee requests issuance of the Certificate of Correction.

The Commissioner is hereby authorized to charge any fees, which may be required, or credit any overpayment to Deposit Account No. 50-4525.

Respectfully submitted,

/Tyler Drye/
Tyler Drye
Reg. No. 75,034

STUDEBAKER & BRACKETT PC
8255 Greensboro Drive, Suite 300
Tysons, Virginia 22102
Phone: (703) 390-9051
E-mail: info@sbpatentlaw.com
Customer No: 78198

PTO/SB/44 (09-07)
Approved for use through 01/31/2020. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.
(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,486,807

APPLICATION NO.: 10/762,450

ISSUE DATE : February 3, 2009

INVENTOR(S) : Toshinori NAGAHASHI

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Claim 11, at line 3, in Column 15,
"formed by the keywords" should be changed to --formed by keywords--;
In Claim 12, at line 7, in Column 15,
"formed by the keywords" should be changed to --formed by keywords--;
In Claim 13, at lines 2 and 3, in Column 16,
"formed by the keywords" should be changed to --formed by keywords--; and
In Claim 14, at lines 6 and 7, in Column 16,
"formed by the keywords" should be changed to --formed by keywords--.

MAILING ADDRESS OF SENDER (Please do not use Customer Number below):

STUDEBAKER & BRACKETT PC
8255 Greensboro Drive, Suite 300
Tysons, Virginia 22102

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	10762450
Filing Date:	23-Jan-2004
Title of Invention:	IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR
First Named Inventor/Applicant Name:	Toshinori Nagahashi
Filer:	Donald R. Studebaker/Jamie Bak
Attorney Docket Number:	005750-000049

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
CERTIFICATE OF CORRECTION	1811	1	160	160

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**160**

Electronic Acknowledgement Receipt	
EFS ID:	45031996
Application Number:	10762450
International Application Number:	
Confirmation Number:	5463
Title of Invention:	IMAGE RETRIEVING DEVICE, METHOD FOR ADDING KEYWORDS IN IMAGE RETRIEVING DEVICE, AND COMPUTER PROGRAM THEREFOR
First Named Inventor/Applicant Name:	Toshinori Nagahashi
Customer Number:	78198
Filer:	Donald R. Studebaker/Jamie Bak
Filer Authorized By:	Donald R. Studebaker
Attorney Docket Number:	005750-000049
Receipt Date:	18-FEB-2022
Filing Date:	23-JAN-2004
Time Stamp:	11:27:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$160
RAM confirmation Number	E20222HB27554553
Deposit Account	504525
Authorized User	Jamie Bak
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Certificate of Correction	2022-02-18_COC_Supp_Request.pdf	33942 fc4f73f8bf0bbd10f861a84d5073aaf510f79c87	no	2
Warnings:					
Information:					
2	Request for Certificate of Correction	2022-02-18_Supp_SB44.pdf	201990 a74bd228b24891223e6aeac8712284a3c08efe29	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	38466 0ab4a3410dbf086ea2a6401d5823906644382470	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	274398		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Patent No.: 7486807
Issue Date: 02/03/2009
Appl. No.: 10/762,450
Filed: 01/23/2004

PART (A) RESPONSE FOR CERTIFICATES OF CORRECTION

This is a decision on the Certificate of Correction request filed 18 February 2022.

The request for issuance of Certificate of Correction for the above-identified correction(s) under the provisions of 37 CFR 1.322 and/or 1.323 is hereby:

(Check one)
☑ Approved ☐ Approved in Part ☐ Denied

Comments: ____

PART (B) PETITION UNDER 37 CFR 1.324 OR 37 CFR 1.48

☐ This is a decision on the petition filed ____ to correct inventorship under 37 CFR 1.324.

☐ This is a decision on the request under 37 CFR 1.48, petition filed ____. In view of the fact that the patent has already issued, the request under 37 CFR 1.48 has been treated as a petition to correct inventorship under 37 CFR 1.324.

The petition is hereby: ☐ Granted ☐ Dismissed

Comment: ____

The patented filed is being forwarded to Certificate of Corrections Branch for issuance of a certificate naming only the actual inventor or inventors.

/NAY A MAUNG/
Supervisory Patent Examiner, Art Unit 2664
Technology Center 2600
Phone: (571)272-7882

Certificates of Correction Branch email: CustomerServiceCoC@uspto.gov CoC Central Phone Number: (703) 756-1814

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,486,807 B2
APPLICATION NO. : 10/762450
DATED : February 3, 2009
INVENTOR(S) : Toshinori Nagahashi

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

In Claim 11, at Line 3, in Column 15:
"formed by the keywords" should be changed to --formed by keywords--;
In Claim 12, at Line 7, in Column 15:
"formed by the keywords" should be changed to --formed by keywords--;
In Claim 13, at Lines 2 and 3, in Column 16:
"formed by the keywords" should be changed to --formed by keywords--; and
In Claim 14, at Lines 6 and 7, in Column 16:
"formed by the keywords" should be changed to --formed by keywords--.

This certificate supersedes the Certificate of Correction issued February 8, 2022.

Signed and Sealed this
Fifth Day of July, 2022

Katherine Kelly Vidal

Katherine Kelly Vidal
Director of the United States Patent and Trademark Office