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## SPECIFICATION

ACCESS RESTRICTION APPARATUS, ACCESS RESTRICTION METHOD,  
COMPUTER READABLE PROGRAM STORAGE MEDIUM RECORDED ACCESS  
5 RESTRICTION PROGRAM, AND ACCESS RESTRICTION PROGRAM

## TECHNICAL FIELD

The present invention relates to a access restriction  
apparatus, a access restriction method, a computer readable  
10 program storage medium in which a access restriction program  
is recorded, and a access restriction program.

## BACKGROUND ART

Recently, image data with regard to, for example, an  
15 image photographed with a digital camera or an image read with  
an optical character reader (OCR) have come to be exchanged  
through a network such as the Internet. A cellular phone  
equipped with a digital camera has appeared, and it has come  
to be possible to exchange image data between plural cellular  
20 phones. Conventionally, an aggregate (image data) of binary  
data such as image data is managed as a file including  
information (e.g. the information concerning the resolution  
of the image) relating to the image.

25 For example, as shown in Figure 24, conventionally,  
first image data 161 and the information 157 relating to the  
image data 161 have been managed as one file; second image  
data 162 and the information 158 relating to the image data  
162 have been managed as one file; third image data 163 and  
30 the information 159 relating to the image data 163 have been  
managed as one file; and fourth image data 164 and the

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information 160 relating to the image data 164 have been managed as one file.

If a plurality of binary data is , for example, copied  
5 or deleted, it has been necessary to process each of the binary data (a file) severally except for performing the process by the folder (or by the directory). So, if a plurality of binary data is processed by batch processing, the batch processing has not been completed sometimes owing to an omission of the  
10 processing of a part of the binary data. And, because binary data such as image data cannot include character information in the binary data, keys for the sake of retrieval or the like with respect to a certain matter for such binary data are only their file names, their creation dates and their update dates.  
15 Therefore, the binary data have the problem of the difficulty of their handling.

Further, owing to the recent advancement of the information industry, data communications of, for example,  
20 document information including such plural binary data described above, are frequently performed though networks such as the Internet. For example, in the Internet, browser software is configured to read data described by means of a mark up language called as Hyper Text Markup Language (HTML)  
25 for performing a display corresponding to the description.

The markup language can describe a site desired to be linked and the like, and the markup language is adapted to make it possible that the browser software accesses link  
30 position information such as a Uniform Resource Locator (URL) being a link destination. In the following descriptions,

"URLs" will be exemplified. In the conventional file liking or the like by means of the HTML markup language, the liking or the like has a function of changing a display correspondingly to a change of URLs by changing a certain URL to the other URL designating a position of a document (see patent document 1).

[Patent Document 1]

Japanese Patent Laid-open Publication Hei 11-96098  
(page 5, section 0012)

However, since the URL is described by means of text data which is easily understood visually, the URL may easily be altered. Consequently, the URL has a problem in which files other than the file designated by an original URL may easily be accessed.

To put it concretely, supposing that a URL "http://www.aaa.ne.jp/20010101.html" has originally been designated, the above-mentioned problem occurs at the time of amending the URL to a estimated URL "http://www.aaa.ne.jp/20010102.html" on the intention of referring to the next file.

That is, there is a problem in which a person having an evil intention can access the file ("http://www.aaa.ne.jp/20010102.html") other than the original file ("http://www.aaa.ne.jp/20010101.html").

Conventionally, it was impossible to prohibit tracing a URL other than the originally designated URL. If the

prohibition was dared to be tried, it was necessary to perform complicated processing such as alteration of the file designated by the URL in advance.

5           Moreover, if a URL to be kept in a secret is transferred by electronic mail, there is a problem in which anyone who receives the URL can easily access a file at a URL other than the transferred URL, which can be assumed from the transferred URL.

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          Accordingly, the present invention aims to provide an access restriction apparatus, an access restriction method, a computer readable program storage medium having a recorded access restriction program, and the access restriction  
15 program, capable of solving the problems described above and of allowing a terminal to refer only to management information that exists at a position designated by link position information.

## 20   DISCLOSURE OF THE INVENTION

          According to the present invention, there are provided an access restriction apparatus, an access restriction method, a computer readable program storage medium having a recorded access restriction program, and the access restriction  
25 program, capable of allowing a terminal to refer only to management information that exists at a position designated by link position information.

## BRIEF DESCRIPTION OF THE DRAWINGS

30           Figure 1 is a system block diagram showing a configuration example of a data management system to which

a data management apparatus is applied as a preferable embodiment of the present invention.

Figure 2 is a view showing a configuration example of the authority information management table of Figure 1.

5        Figure 3 is a view showing an example of the document group managed by the document management section of Figure 1.

Figure 4 is a view showing a configuration example of the document of Figure 3.

10       Figure 5 is a system conceptual view showing a data management method by a management server conceptually.

Figure 6 is a flow chart showing an example of the data management method by the management server.

15       Figure 7 is a system configuration diagram showing a configuration example of a data management system including a server computer to which a access restriction apparatus is applied as a second embodiment of the present invention.

Figure 8 is a block diagram showing a simple configuration example of the server computer of Figure 7.

20       Figure 9 is a diagram showing an example of a directory structure for the management of data by a access restriction program of Figure 8.

Figure 10 is a diagram showing an example of data stored in a first document directory of Figure 9.

25       Figure 11A is a diagrams showing a data configuration example of the actual file in Figure 10, and Figure 11B is a diagram showing a data configuration example of the index file in Figure 10.

30       Figure 12 is a figure showing an example of the data format of the index file of Figure 11.

Figure 13 is a diagram showing an example of the

processing of adding image data.

Figure 14 is a diagram showing the example of the processing of adding the image data.

Figure 15 is a diagram showing the example of the  
5 processing of adding the image data.

Figure 16A is a diagram showing a configuration example of the index file before the addition processing, and Figure 16B is a diagram showing a configuration example of the index file after the addition processing.

10 Figure 17 is a diagram showing an example of the processing of deleting image data.

Figure 18 is a diagram showing an example of the processing of deleting image data.

Figure 19A is a diagram showing a configuration example  
15 of the index file before the deletion processing, and Figure 19B is a diagram showing a configuration example of the index file after the deletion processing.

Figure 20 is a diagram showing an example of the processing of dividing image data.

20 Figure 21 is a diagram showing an example of the processing of dividing image data.

Figure 22 is a diagram showing an example of the processing of dividing image data.

Figure 23A is a diagram showing a configuration example  
25 of the index file before the division processing, and Figure 23B is a diagram showing a configuration example of the index file after the division processing.

Figure 24 is a diagram showing an example of a conventional access restriction method.

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BEST MODES FOR CARRYING OUT THE INVENTION

Hereinafter, preferred embodiments of the present invention will be described in detail on the basis of the attached drawings.

5           Incidentally, since the embodiments to be described in the following is a suitable concrete example, various technically preferable limitations are added to it. However, the scope of the present invention is not limited to the forms of the limitations as long as a description indicating that  
10 the present invention is especially limited to the forms is not made.

#### <First Embodiment>

Figure 1 is a system block diagram showing a  
15 configuration example of a data management system 1 to which a data management apparatus as a preferable embodiment of the present invention is applied.

The data management system 1 is provided with a document  
20 management server computer 25 (management server), client computers 23A, 23B, 23C and 23D (clients) as terminals, a network 8 and a mail server computer 27 (mail server). In the following descriptions, persons operating the client computers 23A, 23B, 23C and 23D severally will be called as,  
25 for example, "Mr. A", "Mr. B", "Mr. C" and "Mr. D", respectively. All of them will be called as "accessing persons".

The management server 25 is provided with an authority  
30 information management table 16, an access management section 14 and a document management section 18. It is supposed that

the management server 25 has a name of, for example, "a".

The authority information management table 16 is a table for managing the access authority of the client computers 23A and so on, which the access persons operate. The authority information management table 16 manages the access authority to the access persons, for example, as shown in Figure 2. In the example shown in the figure, Mr. A has the access authority of "3", Mr. B has the access authority of "2", and Mr. C has the access authority of "1".

The document management section 18 manages documents to be stored as shown in Figure 3 as a document group 19. The document group 19 is managed under a classification in which the document group 19 is classified into documents 19A, 19B and 19C as management information. It is supposed that the document group 19 has a document group name "AAA", for example. It is also supposed that the document 19B has a document name "bbb".

20

Moreover, the document 19B has documents composed of pages, for example, from a first page P1 to a sixth page P6 (a plurality of pieces of unit information) as shown in Figure 4, and authority information 37 is attached to them. The authority information 37 is the access authority set in the authority information management table 16 shown in Figure 2, and the authority information 37 is, for example, "2".

The access management section 14 acquires the access authority from the authority information management table 16 to every accessed client such as the client 23A and so on.

The access management section 14 is configured to supply the client 23A and so on with a document composed of set pages such as the document 19A and so on when the access management section 14 judges that the client 23A and so on have the access  
5 authority.

On the other hand, the client 23D in Figure 1 includes a notification content setting section 35 and mail software  
33.

10

The notification content setting section 35 has the function of setting link position information 39 including the information indicating a linking destination such as the document 19A and so on as the contents intended to be notified  
15 to the client 23A and so on. To put it concretely, in the link position information 39, for example, "a" as a server name, "AAA" as a document group, "bbb" as a document name, "pages 2-5" as page specification, and "ON" as an attribute are set, as shown in Figure 5. The link position information  
20 39 may be adapted to encrypt not only the information indicating the linking destination, but also any one of or a combination of some of the page specification, access authority and the attribute.

25 The mail software 33 shown in Figure 1 is the software having the function of exchanging electronic mail with the other clients 23A and so on by utilizing mail boxes 21A and so on of the mail server 27. The mail software 33 can receive the documents 19A and so on composed of the pages  
30 corresponding to access authority from the management server 25 as will be described later. Incidentally, it is needless

to say that the means of the data communication is not limited to the mail software, but other means may be used.

The client 23A includes a document acquisition section 31 and mail software 33. Since the mail software 33 has functions similar to those of the above-mentioned mail software 33 of the client 23D, the description thereof is omitted. The document acquisition section 31 can acquire the documents 19A and so on composed of a predetermined pages received by the mail software 33 to display the documents 19A and so on, for example. Incidentally, since the clients 23B and 23C have configurations and functions similar to those of the client 23A, the descriptions about them are omitted.

The management server 25 has the configuration mentioned above. Next, Figures 1-4 are referred while an example of the data management method of the management server 25 is described.

Figure 5 is a system conceptual view showing the data management method of the management server 25 conceptually. Figure 6 is a flow chart showing an example of the data management method of the management server 25. In the following descriptions, the client 23A is called as "Mr. A"; the client 23B is called as "Mr. B"; the client 23C is called as "Mr. C"; and the client 23D is called as "Mr. D".

As shown in Figure 5, it is supposed that the document 19B composed of six pages from the first page P1 to the sixth page P6 shown in Figure 4 is prepared in the document group 19 (hereinafter, referred to as "document group AAA") shown

in Figure 3 together with the access authority "2" on the management server 25 having the name "a" (Step ST1).

Moreover, it is supposed that the pieces of access  
5 authority "3", "2" and "1" are given to Messrs. A, B and C, respectively, as the access authority, as shown in Figure 2 (Step ST2).

Now, Mr. D is going to notify Messrs. A, B and C of the  
10 locations of the data of the pages of the document 19B having the document name "bbb" from the second page P2 to the fifth page P5 (public pages) shown in Figure 4 for showing the pages to Messrs. A, B and C.

15 Mr. D inputs pieces of position information (e.g. from the server name to the document name) concerning the location of the document 19B by means of the notification content setting section 35 as shown in Figure 5. Thereby, Mr. D performs page setting as described above, and sets the  
20 attribute "ON". Hereupon, the attribute indicates that only receivers (Mr. A and the like) having the access authority, for example, smaller than a certain piece of access authority (authority number) can browse the document 19B after the confirmation of the existence of the authority of the  
25 receivers at the time of "ON", and that the receivers can browse the document 19B regardless of their access authority without the confirmation of the existence of the authority at the time of "OFF".

30 Incidentally, at the time of the performance of these settings, it is preferable that Mr. D has the authority for

referring to at least the document 19B having the document name "bbb". As the setting methods of the authority, for example, direct hand inputting may be adopted, or designation in conformity with the gist of clipping and pasting at the  
5 time of editing or the like may be adopted.

After the completion of the setting of the link position information 39 as such notification information, Mr. D encrypts, for example, the page specification and the  
10 attribute in the link position information 39 as shown in Figure 5 by means of the notification content setting section 35. Then, the encrypted link position information 39a is distributed by being transmitted by the electronic mail to the mail boxes 28A and so on of the mail server 27 by means  
15 of the mail software 33 to be notified to Mr. A and so on (Step ST3).

Mr. A and so on operate the client 23A and so on, respectively, to refer to the electronic mail pertaining to  
20 the link position information 39a, and initiate to access the management server 25 (Step ST4). Accessing the management server 25 first initiates the checking of the attribute (Step ST5). As described above, the authority is set so that, for example, Mr. A has the access authority "3", Mr. B has the  
25 access authority "2", and Mr. C has the access authority "1".

Although the link position information 39a is automatically encrypted in the memories of the client A and so on severally, the access authority of Mr. A and so on is  
30 "3", which is larger than the above-mentioned "2". Consequently, Mr. A and so on do not have the access authority,

and cannot browse the encrypted link position information 39.

Hereupon, since the attribute is "ON" in the link position information, the client 23A and so on severally  
5 confirm the access authority necessary for referring to the document 19B having the document name "bbb" in the management server 25, and know that, for example, the access authority "2" is necessary.

10 Since Messrs. A and B have the authority number larger than the authority "2" severally, Messrs. A and B do not have the access authority to the pages from the second page P2 to the fifth page P5 of the document 19B. On the contrary, since Mr. C has the authority number "1", it is known that Mr. C  
15 has the access authority for referring to the pages (Step ST6). Incidentally, as described above, when the attribute of the link position information 39 is "OFF", the confirmation of the access authority to the management server 25 is not performed, and Messrs A and B having no proper access  
20 authority also can refer to the pages of the document 19B having the document name "bbb" from the second page P2 to the fifth page P5.

The transmission of the link position information 30a  
25 concerning the document 19B having the document name "bbb" from Mr. D to Mr. C is notified to Mr. C (Step ST7). When Mr. C accesses the management server 25 by means of the contents of the link position information 39a as a key, Mr. C can browse only the pages of the document 19B from the second  
30 page P2 to the fifth page P5. That is, the management server 25 is configured so that Mr. C cannot browse the pages other

than the browsable pages such as the first page P1 and the sixth page P6. Consequently, the management server 25 is configured to be able to make the document 19B intended to be browsed secret or browsable at every page.

5

In this case, it is preferable that the page numbers indicating the first page P1 and the sixth page P6 severally cannot be browsed. This is for making it impossible that Mr. A and so on, who browsed the browsable pages, recognize the  
10 existence of the not browsable pages such as the first page P1.

In this situation, Messrs. A and B cannot refer to the document name "bbb" as long as their access authority is made  
15 to be "2" or more severally, or as long as the link position information 39a (file link) in which the attribute "OFF" is encrypted is transmitted to them. Consequently, it is possible to make the respective clients 23A and 23B of Messrs. A and B, which have no access authority, impossible to browse  
20 the document 19B of the management server 25 severally. Hence, secrets can be kept.

According to the first embodiment of the present invention, it is possible that the client 23C can access only  
25 the partial pages of the document 19B which the client 23C is allowed to access. Moreover, even if the access authority to the document 19B is not changed, it is possible to make a specific person refer to the information of the document 19B by setting the attribute of the link position information  
30 39 to "OFF". Moreover, in the embodiment described above, the input and the output of the file of the pages of the

document 19B, for example, from the send page P2 to the firth page P5 are limited to be fixed.

Moreover, since the link position information 39a is  
5 encrypted, it is difficult to alter the link position  
information 39a including the linking destination. If the  
alteration of the link position information 39a is performed,  
the decoding of the information 39a becomes impossible, which  
makes it impossible to use the data. Moreover, if the  
10 document 19B at the linking destination is transferred  
without previous notice, the terminal having no access  
authority to which the document 19B has been transferred  
cannot browse the document 19B, since the access authority  
is set to every client.

15

#### <Second Embodiment>

Figure 7 is a system configuration diagram showing a  
configuration example of a data management system 1a  
including a server computer SV to which a access restriction  
20 apparatus as a second embodiment of the present invention is  
applied.

The data management system 1a includes the server  
computer SV, a network 11 and client computers CL, and is,  
25 for example, a computer system employing the so-called client  
server system.

The server computer SV is capable of processing  
predetermined processes at a high speed in response to a  
30 demand of a client computer CL. For example, predetermined  
basic software is operated on the server computer SV. The

client computers CL, for example, demands to predetermined processes to the sever computer SV. Predetermined basic software is operated on the client computers CL. The basic software is also called as an operating system (OS) which has the function of data communication by the use of a protocol such as Transmission Control Protocol/Internet Protocol (TCP/IP) or the like on the network 11, and can carry out that a access restriction program which will be described later. The access restriction program may have the function substantially same as the basic software so that the program performs without the basic software.

The data management system 1a is characterized in that management information corresponding to the document 19A of the first embodiment and the like is managed in the following way with or instead of performing functions of the data management system 1 of the first embodiment. That is, the data management system 1a performs management processing on data aggregate that is integrated by combining a plurality of data while having delimiter information between those plurality of data, which constitute the management information, and related information aggregate that is integrated by combining a plurality of related information, each of which respectively relate to those plurality of data.

25

The network 11 includes a router 5 and cables 3. The network 11 has the function of data communication between the server computer SV and the client computers CL through network cards or the like provided to the server computer SV and the client computers CL, severally. The cables 3 are, for example, for 10-BASE-T or for 100-BASE-T. The router 5 has the

function of data exchanges while controlling the data passing through the connected cables 3.

Figure 8 is a block diagram showing a simple  
5 configuration example of the server computer SV of Figure 7.

The server computer SV includes an operation section 15, a central processing unit (CPU) 13, a memory 9 and a hard disk 7.

10

The operation section 15 is operation means such as a keyboard or a mouse. The hard disk 7 is a large capacity information recording medium capable of recording various data and programs.

15

The memory 9 is a volatile information recording medium capable of storing various data, the basic software and a program temporarily. The CPU 13 can recognize operations of the operation section 15 and can execute a predetermined  
20 process, also can read a access restriction program 17 stored in the hard disk 7, and write into a work area of the memory 9 for executing the access restriction program 17. By the way, descriptions of the operation of the client computers CL are omitted because the server computer SV has the  
25 substantially same configuration as the client computers CL except that the processing of the CPU 13 operates at a higher speed than the client computers CL.

Figure 9 is a diagram showing an example of a directory  
30 structure for the management of data by the access restriction program 17 of Figure 8. Figure 10 is a diagram showing an

example of data stored in a first document directory 25 of Figure 9.

The access restriction program 17 of Figure 8 manages  
5 a plurality of data stored in the hard disk 7, for example,  
in a way shown in Figure 9 by using the memory 9 as the work  
area. Specifically, the access restriction program 17 has  
a document group directory 20 as a root directory, and has  
the function of managing a plurality of image data read with,  
10 for example, a scanning apparatus such as an optical character  
reader (OCR) as the plurality of data.

A group version directory 21, a DOC directory 23, an  
STG directory 29, a BIN directory 36 and a TMP directory 40  
15 are formed at a lower layer of the document group directory  
20. The group version directory 21 is a directory for storing  
the version information of created document group directory  
20. In the DOC directory 23, the information concerning a  
plurality of image data is stored for each document. Further,  
20 in the DOC directory 23, document text data, tag data, index  
data and thumbnail image data are stored in addition to such  
image data.

A first document STG directory 32 and a second document  
25 STG directory 34 are formed at a lower layer of the STG  
directory 29. The first document STG directory 32 stores  
attached files which are managed in a one-to-one  
correspondence base to the information such as image data to  
be stored in the first document STG directory 31. Further,  
30 in practice, the attachment file is stored not for each page  
in the one-to-one base but for each document if the attachment

file for a certain document is to be managed in the one-to-one base. The above-described attachment file includes, for example, tables, graphs and the like relating to results of analysis of information, such as image data of the first document directory 26. Here, the attachment file is an attribute data existed not for each pages but for, for example, each documents. The first document directory 26 stores, for example, electronic documents that are originals of image data or attribute data for voice or moving picture.

10

The BIN directory 36 is for retaining indices to perform search over entire image data. The TMP directory 40 is for storing data temporarily. The TMP directory 40 is a temporary directory to be used inside programs for, for example, editing. In other words, the TMP directory 40 has a functionality for storing data being edited.

15

The first document directory 26 and a second document directory 28 are formed at a lower layer of the DOC directory 23. In the first document directory 26, for example, as shown in Figure 10, an index file 41 (a related information aggregate) and an actual file 43 (a data aggregate) are stored. Preferably, a thumbnail file 45, a tag file 47, a page summary file 51 and an attached file list file 53 are stored therein.

20

25

The access restriction program 17 manages, for example, a plurality of image data as the index file 41 and the actual file 43. Preferably, the thumbnail file 45, the tag file 47, the page summary file 51 and the attached file list file 53 are also managed.

30

The actual file 43 includes a plurality of image data. The details of the actual file 43 will be described later. The index file 41 indicates the information related to the actual file 43. For example, if the actual file 43 includes  
5 a plurality of image data, the index file 41 includes the information pertaining to the resolution or the like of the image data. The details of the index file 41 will be described later.

10 The thumbnail file 45 stores reduced image data of the actual file 43. The tag file 47 is for handling the index of each of the image data. The tag file 47 is, for example, index information. Here, the index information means a list of data consisting of, for example, heading positions (1-4),  
15 index titles and pages. The page summary file 51 is text data indicating the summary information of the actual file 43. The page summary files 51 are text data, for example, extracted from image data by the OCR or the like, or, included in image data and registered by another tool. The attached file list  
20 file 53 is a figure indicating lists of the attached files stored in the first document STG directory 32.

Figure 11A is a diagram showing a data configuration example of the actual file 43 of Figure 10, and Figure 11B  
25 is a diagram showing a data configuration example of the index file 41 of Figure 10.

The access restriction program 17 manages a plurality of data as single integrated structure as shown in Figure 11A,  
30 for example, four image data from first image data 61 to fourth image data 64 are combined with tags 66, 67, 68 (69) inserted

between these image data as delimiter information.

Concretely, the tag 66 is provided between the first image data 61 and the second image data 62; the tag 67 is provided between the second image data 62 and the third image data 63; the tag 68 is provided between the third image data 63 and the fourth image data 64. Consequently, the first image data 61 and so forth can easily be separated by the use of the tag 66 and so forth as references because the first image data 61 and so forth are delimited by the tag 66 and so forth, respectively.

As shown in Figure 11B, the index file 41 includes a header 55, a first body 57, a second body 58, a third body 59 and a fourth body 60. The header 55 is the information for identifying each index file 41 from the other index files not shown in the figure. The first body 57 and so forth are data indicating information regarding the first image data 61 and so forth of the actual file 43, respectively. For example, the first body 57 includes the related information such as a resolution and the like concerning the first image data 61.

Figure 12 is a figure showing an example of the data format of the index file 41 of Figure 11B. The second body 58 and so forth except the first body 57 in the index file 41 shown in Figure 11B are omitted in Figure 12 for the simplification of description.

The index file 41 chiefly includes an "INDEX" tag, an "IDX\_HEAD" tag and an "IDX\_BODY" tag. "IDX\_HEAD {IDX\_BODY}"

following the "INDEX" tag indicates that there are one or more of the "IDX\_HEAD" tag and the "IDX\_BODY" tag.

Shown "DTAG\_OFF" indicates the offset from the tag 66 and so forth. "DTAG\_COUNT" indicates the number of the tag 66 and so forth shown in Figure 11A. By referring "DTAG\_COUNT", it is possible to grasp the number of the first image data 61 and so forth. These various tag information make it possible to access desired image data with a higher speed.

"DABS\_OFF" indicates the offset from the head of the page summary file 51 of Figure 10. "DABS\_LEN" indicates the number of bytes of the page summary file 51 of Figure 10. The number of the bytes in this place is supposed not to include the header in the page summary file 51.

The "IDX\_BODY" tag includes a "DEG" tag, an "ACT\_WIDTH" tag, an "ACT\_HEIGHT" tag, an "ACT\_DPI" tag, an "ACT\_CMP" tag, an "ACT\_OFF" tag, an "ACT\_LEN" tag, a "THUMB\_WIDTH" tag, a "THUMB\_HEIGHT" tag, a "THUMB\_CMP" tag, a "THUMB\_OFF" tag, a "THUMB\_LEN" tag, a "TAG\_OFF" tag, a "TAG\_NUM" tag, an "ANN\_OFF" tag, an "ANN\_NUM" tag, an "ABS\_OFF" tag, an "ABS\_LEN" tag, an "ABS\_REGD" tag, a "RESV1" tag, a "RESV2" tag, and a "RESV3" tag.

The "DEG" tag indicates rotation angles of image data and the like. The "ACT\_WIDTH" tag and the "ACT\_HEIGHT" tag indicate the offsets from the head of the page summary file 51 of Figure 10. The "ACT\_DPI" tag indicates the resolutions of image data (actual images). The "ACT\_CMP" tag indicates

an example of the compression method of image data. The "ACT\_OFF" tag indicates the offset from the head of the actual file 43. The "ACT\_LEN" tag indicates the numbers of bytes of image data.

5

The "THUMB\_WIDTH" tag and the "THUMB\_HEIGHT" tag indicate the dot size of the thumbnail file 45. The "THUMB\_CMP" tag indicates the compression rate of the thumbnail file 45. The "THUMB\_OFF" tag indicates the offset  
10 from the head of the thumbnail file 45. The "THUMB\_LEN" tag indicates the number of the bytes of the thumbnail file 45.

The "TAG\_OFF" tag indicates the offsets from the head of the tag 66 and so forth shown in Figure 11A. The "TAG\_NUM"  
15 tag indicates the numbers of the tag 66 and so forth.

The "ANN\_NUM" tag indicates the number of annotations. The "ABS\_OFF" tag indicates the offset from the head of the page summary file 51. The "ABS\_LEN" tag indicates the number  
20 of bytes of the page summary file 51. The "ABS\_REGD" tag indicates whether the summary file 51 has been registered or not. These tags may be used by an OCR or the like.

The data management system 1a has the configuration  
25 described above. With reference to Figures 7-12, an operation example of the data management system 1a is described. In the following description, as an example of the operation of the data management system 1a, an operation of data communication from the server computer SV as a  
30 transmission terminal shown in Figure 7 to a client computer CL as a receiving terminal is exemplified.

#### <CREATION PROCESSING OF IMAGE DATA>

The data to be objects are read with an OCR or the like provided in the client computer CL, and the information such as an rotation angle, a resolution, a compression method and the like of an image is newly generated to be recorded in the index file 41 shown in Figure 11B. In addition to it, for example, the thumbnail file 45 is generated. Such data may be created by, in other words, reading images with a scanner or the like, or, for example, by reading images with a printing processing of a virtual printer driver, or by reading images via data exchange of image data with another programs.

#### <GENERATION PROCESSING OF ACTUAL FILE BY COMBINING IMAGE DATA MUTUALLY>

Then, the read image is made to be the actual file 43, as it will be described later. The sizes of the actual file 43 and the thumbnail file 45, both being shown in Figure 10, are registered in "ACT\_LEN" and "THUMB\_LEN" of the index file 41 shown in Figure 12, respectively. And, in a full-text keyword retrieval index retention directory 38 shown in Figure 9, keywords for the full-text keyword retrieval with respect to the actual file 43 are stored. These keywords are, for example, data in text format. Further, the index in this section indicates, for example, a index file that is separately managed for the full-text retrieval.

For the mutual combination of the image data, the information of the tag 66 and so forth in the actual file 43 shown in Figure 11A is changed. As a concrete method for such performance, the data of "DTAG\_COUNT" in the index file 41

shown in Figure 12 is increased by the data of "DTAG\_COUNT" of the image data to be inserted. On the other hand, in the actual file 43, as shown in Figure 11A, for example, both of the tag 68 to be inserted and the fourth image data 64 are  
5 made to be a set, and are combined after the third image data 63.

The server computer SV has the function of managing a plurality of data as described above. The server computer  
10 SV manages, for example, the data of four sheets of images as the actual file 43 in which the image data are combined with the tag 66 and so forth as the delimiter information for each of the image data from the first image data 61 to the fourth image data 64 shown in Figure 11A as described above.  
15 Because the first image data 61 to the fourth image data 64 can be managed integrally by managing the first image data 61 and so forth in such a combined state, the trouble of the management for the prevention of the separation of these image data can be saved.

20

As the combination method, in place of the above-mentioned combination method, for example, in the case where the first image data 61 includes a not shown first unit of image data and a second unit of image data, the second image  
25 data 62 may be combined with the first unit of image data, and the second unit of image data may be combined after that to form the combination of the first unit of image data + the second image data 62 + the second unit of image data.

30 The server computer SV manages the index file 41 as the information regarding the actual file 43 in addition to the

actual file 43 itself. The index file 41 includes the first body 57 to the fourth body 60 corresponding to the first image data 61 to the fourth image data 64, respectively, and the header 55. That is, the first body 57 to the fourth body 60 indicate the information concerning the resolution and the like corresponding to the first image data 61 to the fourth image data 64, respectively. By such a configuration, the first body 57 to the fourth body 60 can also be managed integrally.

#### <ADDITION PROCESSING>

Figure 13 to Figure 15 are diagrams showing an example of the processing of adding image data severally. In each diagram, dotted lines indicate mutual link.

Figure 16A is a diagram showing a configuration example of the index file 41 before addition processing, and Figure 16B is a diagram showing the index file 41 after the addition processing.

The actual file 43 before adding image data includes image data A1, the tag 69, image data A2, the tag 69, image data A3 and an end-of-file EOF, for example, as shown in Figure 13A. The index file 41 before adding image data stores the information concerning an order (e.g. "1", "2" and "3") as the first body 57 to the third body 59, for example, as shown in Figure 13B.

In the following description, the addition of image data B1 shown in Figure 14 between the image data A2 and the image data A3 of the actual file 43 shown in Figure 13A is

exemplified.

First, the image data B1 is added to the actual file 43 with the tag 69 put between them as shown in Figure 15A, and the end-of-file EOF is attached at the end. That is, in the actual file 43, the image data B1 is not added by separating the image data A3 from the image data A2. Consequently, because only the image data B1 added in the actual file 43, the addition of the image data B1 can be processed at a high speed.

In the index file 41, the length thereof is elongated by the length of the added image data B1. The position of a page or the like to which the image data B1 is inserted is set to a fourth body 60 as "3" as shown in Figure 15B. In addition to the setting, the third body 59 is set as "4" indicating the position of the image data A3.

If the modification of the index file 41 is shown concretely, the setting shown in Figure 16A is modified to the setting shown in Figure 16B. In the way described above, the addition processing (or insertion processing) is completed.

#### <DELETION PROCESSING>

Figure 17-Figure 18 are diagrams showing an example of the deletion processing of image data severally. In each figure, dotted lines indicate mutual link.

Figure 19A is a diagrams showing a configuration example of the index file 41 before the deletion processing,

and Figure 19B is a diagrams showing a configuration example of the index file 41 after the deletion processing.

The actual file 43 before deleting image data includes  
5 the image data A1, the tag 69, the image data A2, the tag 69,  
the image data A3, the tag 69, the image data B1 and the  
end-of-file EOF, for example, as shown in Figure 17A. The  
index file 41 before deleting image data stores the  
information concerning an order (e.g. "1", "2", "3" and "4")  
10 as the first body 57 to the fourth body 60, respectively, for  
example, as shown in Figure 17B.

In the following description, the deletion of the image  
data B1 from the actual file 43 shown in Figure 17A is  
15 exemplified.

The deletion of the image data B1 is not actually  
performed in the actual file 43. However, in the index file  
41, for example, a mark "x" indicated to be voidedis set to  
20 the fourth body 60 corresponding to the image data B1 to be  
deleted (deletion processing).

If the modification of the index file 41 is specified  
more concrete way, the setting shown in Figure 19A becomes  
25 the setting shown in Figure 19B. In the way described above,  
the deletion processing is completed.

#### <DIVISION PROCESSING>

Figure 20-Figure 22B are diagrams showing an example  
30 of the division processing of image data severally. In each  
figure, dotted lines indicate mutual link.

Figures 23 are diagrams showing configuration examples of the index file 41.

5       The actual file 43 before dividing image data includes the image data A1, the tag 69, the image data A2, the tag 69, the image data A3, the tag 69, the image data B1 and the end-of-file EOF, for example, as shown in Figure 20A. The index file 41 before dividing image data stores the  
10 information concerning an order (e.g. "1", "2", "3" and "4") as the first body 57 to the fourth body 60, for example, as shown in Figure 20B.

In the following description, the division of the image  
15 data B1 from the actual file 43 shown in Figure 20A is exemplified.

The division of the image data B1 is not actually performed in the actual file 43. However, in the index file  
20 41, for example, a mark "x" indicated to be voided is set to the fourth body 60 corresponding to the image data B1 to be divided.

The image data B1 of the actual file 43 is copied as  
25 shown in Figure 22A, and made to be an actual file 43 having the end-of-file EOF at the end thereof. An index file 41 related to the actual file 43 shown in Figure 22A is generated as shown in Figure 22B.

30       If the modification of the index file 41 is indicated more concrete way, the setting as shown in Figure 23A becomes

the setting shown in Figure 23B. In the way described above, the division processing is completed.

#### <DATA COMMUNICATION PROCESSING>

5           The actual file 43 and the index file 41, both being managed by the server computer SV in such a way, are transmitted to the client computers CL by data communication in accordance with, for example, File Transfer Protocol (FTP) through the network 11 of Figure 7. The data management  
10 system 1a performs the data communication of the image data from the first image data 61 to the fourth image data 64, for example, as unified data. By the employment of such a way, the data management system 1a can perform the data communication as unified data accurately without partially  
15 communicating or any data missing.

          In the data management system 1a, the image data from the first image data 61 to the fourth image data 64 may be transmitted by, for example, data communication respectively.  
20 By the employment of such a way, the data management system 1a can communicate each of the data at a higher speed than communicating integrally. When each of the image data from the first image data 61 to the fourth image data 64 is cut out, they are separated by the use of the tag 66 and so forth  
25 as references.

          According to the second embodiment of the present invention, the image data from the first image data 61 to the fourth image data 64 as the plurality of data can be handled  
30 easily as a unified data. That is, in the data management system 1a, for example, the actual file 43 is made by combining

a plurality of image data having different image formats each other, and it is managed as one file. Consequently, for example, in the case where a plurality of image data is processed as a batch, it prevents leaving processing some  
5 part of the image data. Moreover, according to the second embodiment of the present invention, because the number of times of accessing each file storing image data or the like decreases, file inputs and outputs (I/O's) in reading and writing can be decreased. Moreover, according to the second  
10 embodiment of the present invention, the number of files of image data to be managed can be decreased. Thus, if the number of files to be managed is, for example, only one, the program processing can be performed as a batch.

15 When use each of a plurality of images to resemble a page and turning them over at a high speed, for example, as shown in Figure 11A, each image can be accessed at a high speed and further corresponding data can be transmitted, for example, for each page because each of the image data from  
20 the first image data 61 to the fourth image data 64 is only divided with the tab 66 and so forth to be within the same data. If the pages of the images are turned over at a high speed, the images having a plurality of image formats can be displayed without any delay to cause the sense of discomfort.

25

In the data management system 1a, the first image data 61 to the fourth image data 64 can be managed by being combined with the tag 66 and so forth to be as unified data. Consequently, if each of the image data from the first image  
30 data 61 to the fourth image data 64 is a literary work, the alteration thereof can be prevented to keep the sameness

thereof. Further, it is possible to realize a system that may easily be used for a user by creating various forms of files from single document as described above and utilizing them in accordance with their specific objectives. For  
5 example, an over view of image data may be viewed by using the thumbnail files, or a high speed search is performed by utilizing the text data.

The present invention is not limited to the  
10 above-mentioned embodiment.

In the first embodiment, encrypted link information 39a regarding only on the specified pages and the attribution of the link information 39 shown in Figure 5 is distributed.  
15 However, it is not limited thereto, and any other document group names or document names may be encrypted and distributed.

Further, the link information 39a may be used in a  
20 similar way as a short cut file that allows automatic access to the management server 25 when the link information 39a is clicked and viewing of pages, for example, specified in the document 19B if it is authorized. If the file is created as a short cut file and such a short cut is directly triggered,  
25 actual processing such as decryption, checking of the authorization status and the like may be performed by an associated applications.

Further, the above described link information 39a may  
30 be encrypted by employing various encryption codes.

A program storage medium to be used for installing a access restriction program executing the above-mentioned series of processing into a computer to make it possible to execute the program by the computer, may be not only a package  
5 medium such as a flexible disk, for example, a floppy (a registered trade mark), a compact disc read only memory (CD-ROM), a digital versatile disc (DVD) and the like, but also a semiconductor memory, a magnetic disk and the like, in which a program is stored temporarily or permanently.

10

As means for storing a program in these program storage media, a wired or a radio communication medium such as a local area network, the Internet, digital satellite broadcasting and the like may be used, and the program may be stored in  
15 such media by interposing various communication interfaces such as a router, a modem and the like.

The above described management server 25, clients 23A and the like may be respectively provided with a drive  
20 apparatus at least capable of reading out data such as programs and the like of the program storage media described above.

Further, the access restriction program having an  
25 access restriction functionality for performing the above described functions may not be limited to a form which is stored in the above described program storage media, and may, obviously, be in a form which is data-communicated via various communication means such as the internet.

30

The server computer SV and the client computer CL may

be equipped with a drive apparatus capable of reading the data such as a program in the program storage media at least.

Although, the second embodiment of the present  
5 invention is described about the case where the invention is applied only to the server computer SV managing a plurality of data mainly in the embodiment thereof, it is not limited to the sever computer SV. The invention may be applied to the whole of the data management system 1a to have a  
10 configuration to manage a plurality of data as a whole.

A part of each configuration of the embodiment may be omitted, or each of the configurations may be combined with each other in a different way from that described above  
15 arbitrarily.

#### INDUSTRIAL APPLICABILITY

As described above, with the access restriction apparatus, the access restriction method, the computer  
20 readable program storage medium having a recorded access restriction program, and the access restriction program, it is possible to restrict an access and prevent information alteration.

## CLAIMS

1. An access restriction apparatus for restricting a terminal accessing managed management information, said  
5 access restriction apparatus characterized by comprising:  
supply means for supplying said terminal with link position information indicating a linking destination of said management information, said link position information being partially or totally encrypted; and  
10 access management means for managing access of said terminal to said management information on a basis of said link position information decoded by said terminal.

2. The access restriction apparatus according to claim 1,  
15 characterized wherein:  
said apparatus is configured to make said link position information include any one of or a combination of some of page indication in said management information including a plurality of pages, access authority set in said terminal,  
20 and an attribute indicating whether to consider said access authority or not.

3. The access restriction apparatus according to claim 1, characterized wherein:  
25 said access management means is configured to judge whether said terminal has authority to access said management information on a basis of access authority set in said terminal or not on the basis of access authority set in said terminal.

30

4. The access restriction apparatus according to claim 3,

characterized wherein:

said apparatus is configured to make said management information include a plurality of pieces of unit information, and to make said link position information include  
5 specification information specifying whether said terminal can access each piece of said unit information or not.

5. The access restriction apparatus according to claim 1, characterized wherein:

10 said management information is configured to utilize:

a data aggregate that is formed by combining said plurality of data with delimiter information arranged in between said plurality of data constituting said management information; and

15 a related information aggregate that is formed by combining a plurality of related information, said plurality of related information being related to said plurality of data, respectively.

20 6. The access restriction apparatus according to claim 5, characterized wherein:

if said other data is to be added to said data aggregate, other data is added to an end of said plurality of data, and an order of said plurality of data and said other data are  
25 managed with said related information aggregate.

7. The access restriction apparatus according to claim 5, characterized wherein:

if said part in said plurality of data is to be deleted,  
30 deletion processing is performed to related information in said related information aggregate instead of actual deletion

of said part in said data aggregate, said related information being corresponding to a part of said plurality of data to be deleted from said data aggregate.

- 5    8.    An access restriction method for restricting a terminal accessing managed management information, said method characterized by including:

         a supply step of supplying said terminal with link position information indicating a linking destination of said management information, said link position information being  
10    partially or totally encrypted; and

         an access management step of managing access of said terminal to said management information on a basis of said link position information decoded by said terminal.

15

9.    The access restriction method according to claim 8, characterized by comprising:

         a first generating step for generating a data aggregate by combining and integrating a plurality of data constituting  
20    said management information with delimiter information arranged in between them; and

         a second generating step for generating a related information aggregate by combining and integrating a plurality of related information related to said plurality  
25    of data included in said data aggregate, respectively.

10.   A computer readable program storage medium having a recorded access restriction program for performing a function of restricting a terminal for accessing managed management  
30    information, said computer readable program storage medium characterized by having said recorded access restriction

program that executes:

a supply step of supplying said terminal with link position information indicating a linking destination of said management information, said link position information being  
5 partially or totally encrypted; and

an access management step of managing access of said terminal to said management information on a basis of said link position information decoded by said terminal.

10 11. The computer readable program storage medium according to claim 10, characterized by recording said access restriction program that executes:

a first generating step for generating a data aggregate by combining and integrating a plurality of data constituting  
15 said management information with delimiter information arranged in between them; and

a second generating step for generating a related information aggregate by combining and integrating a plurality of related information related to said plurality  
20 of data included in said data aggregate, respectively.

12. An access restriction program for performing a function of restricting a terminal for accessing managed management information, characterized by executing:

25 a supply step of supplying said terminal with link position information indicating a linking destination of said management information, said link position information being partially or totally encrypted; and

an access management step of managing access of said  
30 terminal to said management information on a basis of said link position information decoded by said terminal.

13. The access restriction program according to claim 12, characterized by executing:

5 a first generating step for generating a data aggregate by combining and integrating a plurality of data constituting said management information with delimiter information arranged in between them; and

10 a second generating step for generating a related information aggregate by combining and integrating a plurality of related information related to said plurality of data included in said data aggregate, respectively.