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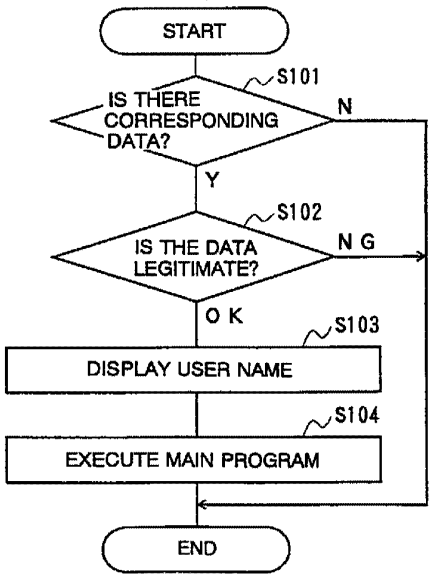
(54) Licensee notification system

(57) There is disclosed a licensee notification system for implementing a software sales system wherein license information for converting to executable form software that is presented to a user in non-executable form is communicated to the user from a management center on condition of payment of a charge, and the software is converted into executable form at the user terminal using this license information. The subject of the licensee notification system is software that decides whether or not the correspondence relationship between user identification information and signature information stored in the license file is legitimate, and, if it is legitimate, displays the user identification information to the user before starting proper operation; or, if it is not legitimate, does not start proper operation. The licensee notification system is constituted by connecting the management center and user terminals by communication circuits. If license information is requested from the user terminal, the management center transmits license information combining in integral form the user identification information identifying the user and conversion information for converting the software to executable form. The user terminal enables the software using the conversion information contained in this license information and writes user identification information and signature information whose content is determined in accordance with the content of the user identification information to a license file that is referred to when this software is operating.

FIG. 6



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Description

BACKGROUND OF THE INVENTION

1.Field of the Invention

The present invention relates to a licensee notification system employed for the sale of software using a high speed communication network such as B-ISDN and a large-capacity storage medium such as a CD-ROM.

2.Description of the Related Art

With the development of high speed communication technology such as B-ISDN (broad-band integrated services digital network) and high-capacity storage media such as CD-ROMs (compact disk read only memory) such means can now be used to distribute computer programs or video data or audio data. For example, video works which were previously supplied on video tape are now being sold stored on CD-ROM. Also, game programs etc, which contain a large amount of picture data, are being sold stored on CD-ROM. The same applies to high speed communication networks, in which the software supplier can now distribute the software by various methods.

One of these methods of software sales is the so-called "locked software" sales system. In the locked software sales system, a CD ROM on which are stored a large number of software items whose functions are restricted is sold cheaply. By using the various items of software of software on the CD-ROM that is purchased, in a condition with the functional restrictions imposed, the end user is able to make a decision as to whether or not he needs each software item. Then, if the end user does require the software, he obtains (purchases) a restriction-removal code corresponding to this software from a management center operated by the software distributor, and is able to use this restriction-removal code to remove the functional restrictions on the software.

Such a sales system may be implemented, as a specific example, using the software sales system shown in Fig. 10. As shown in this Figure, this software sales system comprises user terminals 31 and management center 32. The user terminal 31 and the management center 32 are connected by means of a communication circuit.

When actually purchasing the software (i.e. when purchasing a restriction-removal code), the end user, using a user ID etc, sets up a communication path with the management center and executes the prescribed procedure required to request that a restriction-removal code be sent to the user terminal 31. This procedure includes the input of a "contents ID", which is information for identifying the software item that is to be purchased actually. In response to the execution of such a procedure, the user terminal 31 sends to the management center 32 the contents ID and for example the characteristic information of the user, consisting of the ID of the CPU provided in user terminal 31.

Within the management center 32, there is provided a software database (software DB) in which software decoding keys employed for encoding the various software items are stored in association with the contents ID. When a contents ID is received from user terminal 31, the software decoding key corresponding to the contents ID is read from software database 33. Also, encoding unit 34 in management center 32 generates a user individual key by encoding the user characteristic information from user terminal 31 by the key "Ks". Encoding unit 35 sends the results of the encoding of the software decoding key from software database 33 to user terminal 31 as restriction-removal code, using the user individual key from encoding unit 34.

Encoding unit 36 in user terminal 31 generates a user individual key by encoding the user characteristic information with the key "Ks". Decoding unit 37 uses the user individual key generated by encoding unit 36 to decode the restriction removal code from management center 32, thereby generating the software decoding key. Installation unit 38 then uses this software decoding key to decode the software in CD-ROM corresponding to the contents ID sent to center terminal 32: thus the software is put in a condition where it can be used with the functional restrictions removed, and, in this form, is installed on to a storage device such as a hard disk device.

With such a software sales system, it is possible to determine the software item to be purchased after actually ascertaining its contents: thus, the possibility that the purchased software might be completely different from that intended, as could happen if the purchase were made solely on the basis of the details contained in a catalogue, can be completely eliminated. Also, since the software on the CD ROM is stored in a form which is not executable without knowing special information, illicit installation can be prevented.

However, once the software has been installed, it is an extremely easy operation to copy this. Thus, the problem has arisen of unscrupulous persons copying the software without the consent of the software supplier. Various methods (so-called protection methods) of preventing such illicit copying are known but there is no way to prevent illicit copying by a person possessing knowledge at the level of the BIOS (basic input/output system). Whichever method is used, it can do no more than make it more difficult to perform illicit copying.

For this reason, software is sold in which the name of the authorized user is displayed on start-up, with the object of preventing illicit copying psychologically rather than physically. That is, the aim is to prevent illicit copying of software by displaying the name of the authorized user of the software when the illicitly copied software is executed.

However, even with such software, if the copying is inclusive of the installation software that sets the user

name, when the software is run, it can be made to display the name of the person who made the illicit copy: thus, sufficient effectiveness in preventing illicit copying was not obtained.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a licensee notification system whose psychological effectiveness in preventing illicit copying is very high.

A first licensee notification system according to the present invention consists in a system for implementing a software sales system in which software in non-executable form is presented to a user, and license information for converting the software into executable form is informed to the user on condition of payment of a charge, and the software is converted into executable form using this license information.

The first licensee notification system is constituted of a management center and user terminals; its subject is software which includes instructions that command a terminal to read user identification information in a license file and to notify the user identification information to the user on commencement of its operation.

The management center comprises a license information generating unit that generates license information combining in integrated form user identification information that specifies a user and conversion information for converting software to executable form.

The user terminal comprises a storage unit, a conversion unit, and license file creating unit. In more detail, the storage unit is employed for storing the license file and software converted to executable form. The license information, which is generated by the license information generating unit in the management center, is given to the conversion unit. The conversion unit then converts the software to executable form using the license information and installs it in the storage unit. The license file creating unit creates the license file which contains the user identification information contained in the license information, and stores the license file in the storage unit.

That is, in the first licensee notification system, software is installed in the user terminal so that the user identification information of the legitimate user is notified to the user on its start-up, using the license information which is generated in the management center and contains the user identification information.

A second licensee notification system according to the present invention is constituted of a management center and user terminal; its subject is software which includes instructions that commands the user terminal to read user identification information in the prescribed location in the software and to notify the user identification information to the user on commencement of its operation.

The management center comprises a license information generating unit that generates license information combining in integrated form user identification information identifying a user and conversion information for converting software into executable form.

The user terminal comprises a storage unit, a conversion unit and a software rewriting unit. Of these, the storage unit is employed for storing the software after this has been converted to executable form. The conversion unit converts the software to executable condition using the license information generated by the license information generating unit in the management center, and then installs it in the storage unit. The software rewriting unit rewrites the information of the prescribed location of the software that has been installed by the conversion unit with the user identification information contained in the license information.

That is, in this second licensee notification system, installation is performed with the content of the software rewritten such that the user identification information of the legitimate user is notified on start-up, using the license information which is generated in the management center and contains the user identification information.

The third licensee notification system according to the present invention has as its subject software that, on commencement of operation, includes instructions commanding the user terminal to read user identification information in a license file and to notify the user identification information to the user.

The management center in the third licensee notification system comprises a license information generating unit that generates license information consisting of an integral combination of conversion information for converting the software to executable form and user identification information identifying a user.

The user terminal comprises a storage unit for storing a license file, a license file creating unit, and a software execution unit. The license file creating unit creates the license file containing the license information generated by the license information generating unit, and stores the license file in the storing unit. The software execution unit, when execution of the software is designated, converts the software to executable form using the license information stored in the license file and expands it into memory, and commences operation in accordance with the expanded software.

That is, in the third licensee notification system, the software, which is presented to the user in non-executable form, is converted to executable form in accordance with the license information containing the user identification information every time execution is designated.

The fourth licensee notification system according to this invention is constituted of management center and user terminal. The subject of the system is software which judges the legitimacy of user identification information on the basis of signature information stored in a license file on commencement of operation and, if the user identification information is legitimate, commences proper operation after notifying this user identification information to the user, and, if the user identification

information is not legitimate, terminates operation.

The management center comprises a license information generating unit that generates license information combining in integral form the user identification information identifying the user and signature information whose content is determined in accordance with the user identification information.

The user terminal comprises a storage unit for storing the license file and a license file creating unit that creates the license file containing the user identification information contained in the license information generated by the license information generating unit and stores the license file in the storage unit.

That is, in the fourth licensee notification system, the license information which is necessary for running the software normally is generated on the basis of the user identification information in the management center and is informed to the user terminal.

It may be noted that although in the first to the fourth licensee notification system any means could be employed for notification of the license information, if notification of license information is performed using a communication circuit, a system that is simple to operate can be formed.

Also, it is possible to employ information including the name of the user as user identification information. It is also possible to employ a unit that generates license information including user identification information encoded with a characteristic key of the software. In this case, software is presented to user which including instructions that command the user terminal to notify to the user the result of decoding the user identification information using the characteristic key.

In the first to the third licensee notification systems, it is also possible to make the software that is presented to the user encoded, and to make the conversion information for decoding the encoded software. Also, it is possible to employ, in such a licensee notification system, license information containing the user identification information in a form that cannot be separated without special information. For example, it is possible to employ information, as license information, which is the result of encoding the conversion information and user identification information, combined in integrated manner.

Also, it is possible to make the first to third licensee notification system a system whose subject is software that, if the signature information stored in the license file does not correspond to the user identification information, terminates operation, and, as the license file creating unit, to employ a unit that generates signature information whose content is determined in accordance with the content of the user identification information, and creates the license file containing the signature information. In this case, it can be made more difficult to alter the user identification information that is notified to the user on start-up of the software. Also, in the case of such software, it is possible to employ as license information generating unit a unit that generates license information containing signature information whose contents are determined in accordance with the contents of the user identification information, and, as license file creating unit, to employ a unit that creates the license file containing signature information contained in the license information.

Also, it is possible to make the second licensee notification system a system whose subject is software that, if signature information stored in the second predetermined location does not correspond to user identification information stored in a prescribed location, terminates its operation, and, as software rewriting unit, to employ a unit that rewrites the information of the prescribed location of the software with the user identification information contained in the license information and that rewrites the information at the second prescribed location of the software with signature information whose content is determined in accordance with the user identification information. Also, in the case of such software, it is possible to employ as license information generating unit a unit that generates license information containing signature information whose content is determined in accordance with the content of the user identification information, and, as software rewriting unit, to employ a unit that rewrites information of the prescribed location with user identification information contained in the license information and that rewrites the information at the second prescribed location in the software by signature information contained in the license information.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a functional block diagram illustrating the layout of a licensee notification system according to a first embodiment of the present invention;

Fig. 2 is a diagram given in explanation of the content of the user database provided in the management center comprised in the licensee notification system according to the first embodiment;

Fig. 3 is a diagram illustrating the content of the software database provided in the management center comprised in the licensee notification system according to the first embodiment;

Fig. 4 is a diagram illustrating the content of a license file provided in a user terminal comprised in the licensee notification system according to the first embodiment;

Fig. 5 is a diagram illustrating the structure of software that is the subject of the licensee notification system according to the first embodiment;

Fig. 6 is a flow chart illustrating the operating sequence of software that is the subject of the licensee notification system according to the first embodiment;

Fig. 7 is a function block diagram illustrating the organization of a user terminal employed in the licensee notification system according to a second embodiment;

Fig. 8 is a diagram illustrating the structure of software that is the subject of the licensee notification system according to the second embodiment;

Fig. 9 is a flow chart showing the operating sequence of software that is the subject of the licensee notification system according to the second embodiment; and

Fig. 10 is a functional block diagram showing the structure of the licensee notification system used in a prior art locked software sales system.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is described in detail below with reference to the drawings.

First embodiment

Fig. 1 is a functional block diagram of a licensee notification system according to a first embodiment of the present invention. This licensee notification system is a system where CD-ROMs storing a large number of software items of restricted function are sold cheaply, and software sales are effected by selling the information needed to cancel the function restrictions of the software in this CD-ROM. Payment of the fee could be effected by for example notification of the subscriber number of a cash card or notification of a bank account withdrawal number or the like.

As shown in the drawings, the licensee notification system is constituted by user terminals 11 and management center 12 connected by means of a communication circuit. User terminals 11 and management center 12 may be described as computers and commence operation as an ensemble of the function blocks illustrated when prescribed programs are run.

First of all, the operation of management center 12 will be described.

Management center 12 is provided with two databases, called user database (user DB) 13 and software database (software DB) 14. As shown in Fig. 2, user DB 13 stores the correspondence relationship between the user ID, which is identification information given to users of this system by the manager, and the user name, which is the identification information of the user as employed in ordinary society. As shown in Fig. 3, software DB 14 stores the correspondence relationship between the contents ID, which is the identification information of each software item supplied and stored in the CD ROM, and the software decoding key, which is the decoding information needed to decode this software item.

A link-up unit 15 in management center 12 generates license information by combining the two data items: user name and software decoding key. An encoding unit 16 generates a user's individual key by encoding with key "Ks" the user characteristic information (details to be explained later) from user terminal 11. An encoding unit 17 generates coded license information by encoding the license information from link-up unit 15 using the user's individual key generated by encoding unit 16. In the present licensee notification system, a DES (data encryption standard) algorithm is employed for encoding and decoding.

The various function blocks that are not in management center 12 are arranged to operate synchronously when there is a request from user terminal 11 for information for removal of the function restrictions. Specifically, when management center 12 receives a request for information for removal of function restrictions relating to a software item from user terminal 11, it transmits to user terminal 11 coded license information containing the user's name and the software decoding key needed to remove the functional restrictions on the software item.

Next, the operation of user terminal 11 will be described. When user terminal 11 runs the programs for communication and installation, it executes the operation described below.

A request transmission unit 18 in user terminal 11 transmits to management center 12 information including the user ID, contents ID, and user's characteristic information. Request transmission unit 18 commences operation when the keyboard (not shown) of user terminal 11 is operated in accordance with a prescribed procedure that is predetermined as the procedure for request of information for removal of functional restrictions. This request procedure includes keyboard input of the user ID and contents ID; request transmission unit 18 transmits to management center 12 the keyboard input information and the user's characteristic information, which is constituted by the ID of the CPU which is employed in user terminal 11.

As already explained, when a request for information for removal of functional restrictions is received from user terminal 11, management center 12 sends to user terminal 11 encoded license information. As a result, after request transmission unit 18 has been operated, user terminal 11 receives encoded license information from management center 12.

As shown in the drawings, the encoded license information is input to decoding unit 20 in user terminal 11. Decoding unit 20 also inputs the user's individual key, which is generated by encoding unit 19 using the user's characteristic information and "Ks". Using this user's individual key, decoding unit 20 decodes the encoded license information from center terminal 12. The license information, which is the result of this decoding, is input to separating unit 21, which is a unit that performs reverse processing against link-up unit 15 in management center 12. Separating unit 21 separates and extracts the software decoding key and user name from the license information, and respectively supplies the extracted software decoding key and user name to installation unit 22 and license file compilation unit 23.

Installation unit 22, using the software decoding key from separating unit 21, removes the functional restric-

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