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METHOD FOR APPROVING CARD TRANSACTIONS AND METHOD FOR MANAGING CARD TRANSACTION APPROVAL INFORMATION

Field of the Invention

The present invention relates to a method for approving card transactions and a method for managing card transaction approval information, and more particularly, to a method for approving card transactions and a method for managing card transaction approval information that store pattern information on the pattern type of attribute information of cards included in a single block on the basis of the identification numbers of the cards, and determine whether to store attribute information of cards included in an arbitrary block according to whether the attribute information of the cards included in the arbitrary block has a pattern type stored in the pattern information, thus reducing a memory capacity in a system, enhancing an update speed, and disallowing a system to be changed even when the pattern information is changed.

Background of the Invention

A card transaction approval system approves a card transaction, and collects a charge for the approved transaction. For example, in a card transaction approval system for transportation cards, fares are differentiated depending on various attribute information (e.g., availability or unavailability, and ages such as ordinary people and adolescents) to collect the fares or control the approval of the transportation cards.

In the card transaction approval system, it is required to continuously manage the change in attribute information corresponding to a serial number or an identification number of a card, for differentially collecting a charge depending on various attribute

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information or controlling approval of the card. Cards have identification numbers thereof (for example, Alias Nos.) for determining attribute information thereof.

Fig. 1 is a diagram illustrating a master file which stores flag information of all cards in a card transaction approval system in accordance with a related art.

As illustrated in Fig. 1, in a card transaction approval system, flag information, which is attribute information indicating whether or not a card is available, corresponding to an Alias No. (a series of identification numbers which are started from one) of a card is sequentially stored in master file 100, and facilitates authentication in using the card. For example, flag information "1" may indicate an available card, and flag information "0" may indicate an unavailable card.)

More specifically, Alias No. is uniquely given to each of cards in issuing the cards, and flag information on the availability or unavailability of a card with the Alias No. given thereto is set in each card. Flag information on all cards with Alias Nos. is sequentially stored in a memory address of a card transaction approval system in a bitmap scheme.

In using a card, the card transaction approval system reads an Alias No. from the card, reads flag information corresponding to the read Alias No. that is stored in a memory address of the system, and determines whether the card is available on the basis of the flag information.

However, in the above-described card transaction approval method, all flag information corresponding to the total number of cards is sequentially stored in a memory irrespective of whether the availability or unavailability of the cards is changed, and thus occupies the large storage area of the memory. Especially, in the above-described card transaction approval method, each of card issuers allocates an available storage area in the memory, and thus, the storage area for flag information allocated to each card issuer at an initial stage may be all depleted. In fact, additional flag information is not sequentially

added, and a separate storage area is reserved for cards that are not actually issued to store flag information, which results in a waste of an unnecessary memory space. For example, in transportation terminals in Seoul, Korea, a memory space of about 51MB is substantially used for storing and managing the flag information of two hundred seventy million cards, but since the memory space is predicted to be depleted in the future, the memory space is additionally expanded to store a large amount of flag information of cards.

Therefore, due to a scheme of storing Alias Nos. corresponding to all cards, card transaction approval technology of the related art has a limitation in a memory capacity. Due to such a limitation, an increase of the memory capacity entails an increase of the prices of transportation terminals. Also, the overall operations of the transportation terminals are not performed due to the shortage of the memory capacity.

As described above, in card transaction approval technology of the related art, a memory capacity largely increases due to a scheme of storing Alias Nos. corresponding to all cards, and thus, the memory capacity is restricted. Due to this reason, the prices of transportation terminals increase, and moreover, the overall operations of terminals are not performed due to the shortage of a memory capacity.

Summary of the Invention

In view of the above, the present invention provides a method, transportation terminal, and system for approving card transactions a method, terminal, and server for managing card transaction approval information, and a card transaction management server that more facilitate the approval of a card transaction using electronic money by using the pattern of attribute information such as whether to use a card corresponding to an identification number thereof and a discount.

Further, the present invention provides a method, transportation terminal, and system for approving card transactions; and a method, terminal, and server for managing card transaction approval information, and a card transaction management server that reduce the memory capacity of a system, and disallow system software to be replaced even when pattern information is changed.

Further, the present invention provides a method , terminal, and system for approving card transactions; and a method, terminal, and server for managing card transaction approval information, and a card transaction management server, in which when attribute information of a card is changed, a structured is designed in which the changed attribute information is updated on the basis of block, a block of added attribute information is disposed at the final position of master file, added position information of a block is recorded in a header of the master file, thus increasing manageability and an update speed.

In accordance with a first aspect of the embodiment of the present invention, there is provided a card transaction approval method, the method including: storing in a memory pattern information on a pattern type of attribute information of a plurality of cards included in respective block on the basis of identification numbers of the cards; generating master file that includes header information in which pattern type information and storage position information of each block is contained, and body information in which attribute information of the cards is contained on a block by block basis based on the storage position information; and determining whether to approve a card transaction on the basis of the master file.

In the embodiment, the pattern type information corresponds to a pattern type stored in an area of the pattern information, and the pattern type information on each block indicates a pattern type of attribute information of the cards contained in a corresponding block.

In the embodiment, the pattern information is operation information that is included in the master file, or is separated from and operationally linked to the master file.

In the embodiment, the identification number is an Alias No..

In the embodiment, the attribute information is represented as flag information.

In the embodiment, the number of pattern types is 256.

In the embodiment, when attribute information of the cards contained in a block does not have a pattern type included in the pattern information, the attribute information of the cards included in the block is stored in an area of the body information within the memory, and storage position information on the block indicates a storage position in an area of the body information of the block within the memory.

In the embodiment, the determining of whether to approve a card transaction includes: recognizing an identification number of the card; searching attribute information, corresponding to the identification number of the card, in the master file; and determining whether to approve transaction of the card according to the searched attribute information.

In the embodiment, the searching of attribute information includes: calculating storage position information of the block that includes the recognized identification number of the card; searching header information on the calculated block; and searching storage position information and pattern type information on the calculated block.

In the embodiment, the searching of storage position information and pattern type information includes: searching, when the storage position information of the block has been searched, attribute information of the card stored in an area of the body information; and obtaining, when the pattern type information of the block has been searched, attribute information of the card from the pattern type information.

In accordance with a second aspect of the embodiment of the present invention, there is provided a method of managing card transaction approval information, the method including: storing in a memory pattern information on a pattern type of attribute

information of a plurality of cards included in respective block on the basis of identification numbers of the cards; generating a master file that includes header information in which pattern type information and storage position information of each block is contained, and body information in which attribute information of a card is contained on a block by block basis based on the storage position information; determining, when attribute information of a card is changed, a pattern of attribute information of the card that is included in a block to which the card belongs; and updating the master file depending on the determined pattern.

In the embodiment, the updating of the master file includes: when the determined pattern does not have a pattern type contained in the pattern information, recording attribute information of the cards, which are included in the block to which the card belongs, at a final position of an area of the body information; and updating position information in the area of the body information on the block to which the card belongs.

In the embodiment, said updating of the master file comprises recording, when the determined pattern has a pattern type contained in the pattern information, the corresponding pattern type in pattern type information of the block to which the card belongs.

In the embodiment, said updating of the master file includes: when the determined pattern type is a pattern type contained in the pattern information, and a pattern of the corresponding block before being changed does not have the pattern type contained in the pattern information, deleting the corresponding block from the area of the body information within the memory; and deleting a block that is recorded at a final position of the area of the body information within the memory; and recording a block, which was recorded at the final position in the area of the body information, at a position from which the corresponding block has been deleted.

In accordance with a third aspect of the embodiment of the present invention,

there is provided a card transaction approval terminal, the terminal including: a memory that stores a master file that includes pattern information on a pattern type of attribute information of a plurality of cards contained in respective blocks based on identification numbers of the cards, header information in which pattern type information and storage position information of each block is contained, and body information in which attribute information of a card is contained on a block by block basis based on the storage position information; and a control unit configured to determine whether to approve transaction of a card according to attribute information of the corresponding card that is searched in the master file.

In accordance with a fourth aspect of the embodiment of the present invention, there is provided a card transaction management server, the server including: a data generation unit configured to generate a master file that includes pattern information on a pattern type of attribute information of a plurality of cards contained in respective block on the basis of identification numbers of the cards, header information in which pattern type information and storage position information of each block is contained, and body information in which attribute information of a card is contained on block by block basis on the basis of the storage position information; and a control unit configured to transmit the master file to a card transaction approval terminal.

In accordance with a sixth aspect of the embodiment of the present invention, there is provided a terminal for managing card transaction approval information, the terminal including: a memory that stores master file, the master file including pattern information on a pattern type of attribute information of a plurality of cards contained in respective blocks on the basis of identification numbers of the cards, header information in which pattern type information and storage position information of each block is contained, and body information in which attribute information of a card is contained on block by block basis on the basis of the storage position information; and a control unit

configured to determine, when attribute information of a card is changed, a pattern of attribute information of the cards that are contained in a block to which the card belongs, and update the master file according to the determined pattern.

In accordance with a seventh aspect of the embodiment of the present invention, there is provided a server for managing card transaction approval information, the server including: a data generation unit configured to generate a master file, the master file including pattern information on a pattern type of attribute information of a plurality of cards contained in respective blocks on the basis of identification numbers of the cards, header information in which pattern type information and storage position information of each block is contained, and body information in which attribute information of a card is contained on block by block basis on the basis of the storage position information; and a control unit configured to determine, when attribute information of a card is changed, a pattern of attribute information of the cards that are contained in a block to which the card belongs, and update the master file according to the determined pattern.

In accordance with an eight aspect of the embodiment of the present invention, there is provided a card transaction approval system, the system including: a card transaction approval terminal configured to store master file, the master file including pattern information on a pattern type of attribute information of a plurality of cards contained in respective blocks on the basis of identification numbers of the cards, header information in which pattern type information and storage position information of each block is contained, and body information in which attribute information of a card is contained on block by block basis based on the storage position information, wherein the card transaction approval terminal determines whether to approve transaction of a card according to attribute information of the corresponding card that is searched in the master file.

Brief Description of the Drawings

The above and other objects and features of the present invention will become apparent from the following description of embodiments given in conjunction with the accompanying drawings, in which:

Fig. 1 is a diagram illustrating master file which stores flag information of all cards in a card transaction approval system in accordance with the related art;

Fig. 2 is a schematic block diagram of a card transaction approval system in accordance with an embodiment of the present invention;

Fig. 3 is a schematic block diagram illustrating an internal configuration of a card transaction management server in accordance with an embodiment of the present invention;

Fig. 4 is a schematic block diagram illustrating an internal configuration of a card transaction approval terminal in accordance with an embodiment of the present invention;

Fig. 5 is a diagram illustrating a structure of master file in accordance with an embodiment of the present invention;

Figs. 6A and 6B show diagrams illustrating a method of updating the master file in accordance with an embodiment of the present invention;

Figs. 7A and 7B show diagrams illustrating a method of updating the master file in accordance with another embodiment of the present invention;

Figs. 8A and 8B are flowcharts illustrating a process of generating the master file in accordance with an embodiment of the present invention;

Fig. 9 is a flowchart illustrating a method of determining whether to approve a card transaction in accordance with an embodiment of the present invention; and

Figs. 10A and 10B are flowcharts illustrating a method of updating master file in accordance with an embodiment of the present invention.

Detailed Description of the Embodiments

Hereinafter, embodiments of the present invention will be described in detail with reference to the accompanying drawings.

Fig. 2 is a schematic block diagram of a card transaction approval system in accordance with an embodiment of the present invention.

Referring to Fig. 2, the card transaction approval system of the present invention includes a card transaction management server 10 and a card transaction approval terminal 20. The card transaction management server 10 may operate in connection with the card transaction approval terminal 20.

More specifically, the card transaction management server 10 receives an identification number of a card 26 issued by a card issuer and attribute information of the card 26 to produce a master file for processing whether to use a prepaid card or a postpaid card, a discount, and authentication. In an embodiment, the identification number of the card 26 may be an Alias No., and the attribute information of the card 26 may include at least one that indicates information on a prepaid card or a postpaid card, discount information, and information whether to use the card. The attribute information of the card 26, for example, may be represented as flag information.

The card transaction management server 10 transmits the master file to the card transaction approval terminal 20 for the storage thereof. Also, when the attribute information of the card 26 is changed, the card transaction management server 10 receives periodically-changed attribute information from the card issuer, updates attribute information in the master file on the basis of the received attribute information, and transmits the updated master file to the card transaction approval terminal 20 at predetermined intervals or when there is a request from the card transaction approval terminal 20.

Alternatively, the card transaction management server 10 may transmit change information, which is received from the card issuer, to the card transaction approval terminal 20, and the card transaction approval terminal 20 may autonomously update information in the pre-stored master file on the basis of the received change information.

The card transaction approval terminal 20 may be a transportation card terminal that is installed in a bus, a subway, and a taxi, or a point of sales (POS) terminal that is installed in a restaurant, a convenience store, and the like. When there is a use approval request for a card by a card user, for example, when the card 26 approaches and touches a touch region 28 of the card transaction approval terminal 20, the card transaction approval terminal 20 recognizes an identification number stored in the card 26, and searches attribute information of the card 26 to use in the predetermined master file, thereby determining whether to approve a card transaction.

Fig. 3 is a schematic block diagram illustrating an internal configuration of the card transaction management server 10 shown in Fig. 2.

As illustrated in Fig. 3, the card transaction management server 10 includes a data generation unit 12, a data storage unit 14, and a control unit 16.

The data generation unit 12 divides a plurality of attribute information for cards, which requires to be managed, into blocks having a certain size, on the basis of identification numbers of the cards, and then organizes a master file, which will be described in detail with reference to Fig. 5. The master file is then stored in the data storage unit 14. The master file includes: body information containing the attribute information of the cards, pattern information containing all predetermined pattern types, and header information containing information on pattern type of each block based on each pattern type in the pattern information and information on whether or not data is contained in the body information.

The control unit 16 stores or deletes the master file. The data control unit 16

also transmits the master file to the card transaction approval terminal 20, receives transaction data, and updates the master file on the basis of the transaction data.

Fig. 4 is a schematic block diagram illustrating an internal configuration of the card transaction approval terminal 20 shown in Fig. 2.

As illustrated in Fig. 4, the card transaction approval terminal 20 includes a memory 22 and a control unit 24.

The memory 22 stores the master file and transaction data that are received from the card transaction approval server 10. Also, the control unit 24 recognizes an identification number of a card when used in transaction, reads attribute information, corresponding to the identification number of the card, from the master file stored in the memory 22, and then approves or disapproves the transaction of the card according to the read attribute information.

Fig. 5 is a diagram illustrating the master file stored in the memory 22 shown in Fig. 4 or the data storage unit 14 shown in Fig. 3.

Referring to Fig. 5, the master file 500 includes pattern information 510, header information 520, and body information having a plurality of blocks 530 to 560. The pattern information 510 contains the pattern types of attribute information for the cards included in the same block on the basis of the identification number of the cards and is used as operation information. For example, when a card is a prepaid card, attribute information of the card may be represented as a 2-bit flag, and when a card is a postpaid card, attribute information of the card may be represented as a 1-bit flag. Other attribute information may also be represented as a 1 or 2-bit flag.

When pattern information is 1 byte in size, the pattern information may have 256 pattern types. The pattern information may be properly changed and used in operating where appropriate. For example, as illustrated in Fig. 5, when the pattern type of attribute information for cards included in the same block is 0x00, the pattern type may be

set as a pattern information '0', and when the pattern type is 0x55, the pattern type is set as a pattern information '1'. Also, when the pattern type is 0xEE, the pattern type is set as pattern information '255'.

Moreover, the header information 520 includes total block information 522 indicating the total number of blocks, storage position information 524 that indicates a storage position, in an area within the memory 22, of each block in the body information, and pattern type information 526 that indicates the pattern type of attribute information for cards included in each block. Here, the pattern type information 526 is identical to a pattern type in the pattern information 510.

The body information 530 to 560 includes the attribute information for cards in units of a block on the basis of the header information.

In this case, when the attribute information in an arbitrary block is identical to a pattern type in pattern information 510, the pattern type information 526 in the arbitrary block may have the pattern type of attribute information in the arbitrary block that corresponds to the pattern type in the pattern information 510 (in this case, for example, the storage position information 524 of the arbitrary block in the header information 520 may have a value of 0).

On the contrary, when the attribute information in an arbitrary block does not identical to the pattern type in the pattern information 510, the attribute information of the cards in the arbitrary block may be stored in an area of the body information 530 to 560 within the memory 22, and the storage position information 524 of the arbitrary block in the header information 520 may indicate a storage position of the arbitrary block in the body information.

Alternatively, the pattern information 510 may not be included in the master file 500, but may be separately stored within the memory 22 and managed as a system file by the card transaction management server 10 or the card transaction approval terminal 20.

In this case, however, a system program is required to be replaced when pattern type information is changed. Due to this reason, the stability of a system is not secured, and the risk of the system increases inevitably.

In accordance with the embodiment, the pattern information is not stored in the card transaction approval system but is processed as operation information. Therefore, when a pattern type is changed, added, or deleted, the pattern information can be immediately available without using s separate system or without modifying system software.

More specifically, a block pattern in the body information that is set as each pattern type may be changed due to the limitation of operation and management. For example, when a 0x55 pattern that is set as pattern information '1' is changed to a 0x66 pattern, the control unit 16 of the card transaction management server 10 or the control unit 24 of the card transaction approval terminal 20 changes the 0x55 pattern for the pattern type '1' in the pattern information 510 to a 0x66 pattern, and then performs a procedure of updating the master file or changes the corresponding pattern information through rebooting.

However, the pattern information 510 is not necessarily included in the master file 500, and for example, the pattern information may be separated from and operationally linked to the master file 500, thus minimizing the change factor of the card transaction approval system as operation information.

In Fig. 5, it is noted that the master file 500 has an arrangement in which the attribute information of cards corresponding to Block3 530, Block5 540, Block6 550 and Block7 560 does not have a pattern type in pattern information 510, and the attribute information of cards corresponding to a Block1, a Block2, and a Block4 has the pattern type in the pattern information 510.

In other words, in the master file 500, the header information 520 has

information on total seven blocks, and thus, information of the total number of blocks 522 is represented as seven. In the Block1, Block2, and Block4, a regular pattern is represented, and thus, the body information arranged in the lower portion of the header information 520 does not have the attribute information of cards corresponding to the Block1, Block2, and Block4 but has only predetermined pattern type information.

In this case, '0', '1', '2', and '3' that respectively denote the specific pattern types of attribute information of cards may be pattern type information, and correspond to pattern types contained in the pattern information 510, respectively. For example, the pattern type information '0' has a pattern type 0 and denotes that the entire pattern type of a corresponding block is 0x00, and the pattern type information '1' has a pattern type '1' and denotes that the entire pattern type of a corresponding block is 0x55. Also, the pattern type information '2' denotes that the entire pattern type of a corresponding block is 0xAA and the pattern type information '3' denotes that the entire pattern type of a corresponding block is 0xFF.

In the Block3 530, Block5 540, Block6 550, and Block7 560, a pattern is not configured in a pattern type stored in an area of the pattern information 510 within the memory 22 but is configured in a random type. Therefore, the storage position information of the Block3 530, Block5 540, Block6 550, and Block7 560 in the header information 520 have positions in which corresponding blocks are stored in an area of the body information within the memory 22, and moreover, the attribute information of cards in Block3 530, Block5 540, Block6 550, and Block7 560 is sequentially stored, in units of a block, in an area of the body information within the memory 22.

Each of the blocks may have a size of 512 bytes. In case where a card is a prepaid card, 2040 numbers of card information (2-bit per one card) may be stored in the 510-byte of the entire 512-byte for each block, and when a card is a postpaid card, 4080 numbers of card information (1-bit per one card) may be stored in the 510-byte of the

entire 512-byte for each block, in which case the remaining 2-byte may be used in cyclic redundancy check (CRC).

In other words, in the Block1, an entire block indicates a 0x55 pattern, and thus, after checking the pattern type '1' corresponding to the 0x55 pattern in the pattern information 510, the pattern type '1' is not stored in an area of the body information of the master file 500 within the memory 22 but is written in an area of the header information 520 within the memory 22 (in this case, storage position information has a value of 0).

Similarly, in the Block2, an entire block indicates a 0xAA pattern, and thus, after checking the pattern type '2' corresponding to the 0xAA pattern in the pattern information area 510, the pattern type '2' is not stored in an area of the body information of the master file 500 within the memory 22 but is written in an area of the header information 520 within the memory 22.

However, in the Block3, a random pattern that is not configured in the pattern information 510 is represented, and thus, the attribute information of cards corresponding to the Block3 is stored in a position '1' of an area of the body information 530 within the memory 22, and storage position information on the Block3 in the header information 520 is written in the position '1' of an area of the body information 530 within the memory 22. In this case, the pattern type information on the Block3 may have '0' or may not have any information.

In the Block4, an entire block represents a 0x00 pattern, and thus, after checking pattern type information '0' corresponding to the 0x00 pattern in the pattern 510, the pattern type information '0' is not stored in an area of the body information of the master file 500 within the memory 22 but is stored in an area of the header information 520 within the memory 22.

In the Block5, a random pattern that is not configured in the pattern information 510 is represented, and thus, the attribute information of cards corresponding to the

Block5 is stored in an area of a position '2' of the body information 540 within the memory 22, and storage position information on the Block5 region in the header information 520 is written in an area of the position '2' of the body information 540 within the memory 22. In this case, a pattern indicates the random pattern, and thus, the pattern type information on the Block5 may have '0' or may not have any information. The above-described scheme may be repeatedly performed with respect to the Block6 and the Block7.

Figs. 6A and 6B show diagrams illustrating a method of updating the master file in accordance with an embodiment of the present invention.

When pattern information is changed, or the attribute information of a card is changed as shown in Fig. 6A, the changed information is simply added or deleted to and from the master file 600 to update the master file 650 as shown in Fig. 6B.

Specifically, the control unit 160 of the card transaction management server 10 receives changed information from a card issuer and then updates the existing master file 600 on the basis of the changed information.

First, when pattern type information is changed, added, and deleted, the control unit 16 may delete the pattern type information from pattern information 655, or replace the pattern type information with the changed pattern type information. In addition, when pattern type information is added, the added pattern type information may be disposed at a position next to that of pre-stored pattern type information.

When the update of a transaction history is required due to the changed card information, namely, when the card transaction management server 10 receives information on a Block6 630 in which the attribute information of some cards has been changed, the card transaction management server 10 reflects the received information in the existing master file 600 to generate the updated master file 650.

Information on Block6 included in the existing master file 600 has the type of a

pattern '3', and thus, the information on the Block6 is not stored in an area of body information within the memory 22, and only pattern type information is included in a header information 610.

However, information on the changed Block6 630 includes a random pattern instead of a predetermined regular pattern, and thus, as in the updated fixed file 650, information on the changed Block6 630 is stored at the lowermost portion of an area of the body information within the memory 22, namely, at a position 4 next to a Block7 675.

Furthermore, storage position information for the Block6 in the header information 660 is changed from 0 to 4. Also, the pattern information of the Block6 is changed from 3 to 0.

The updated Block6 630 may be disposed and recorded between a Block5 670 and a Block7 675. In this case, however, header information on the Block7 675 is also required to be changed, which leads to increase load applied to the control unit 16 and decrease an update speed.

Therefore, an updated block is disposed at the lowermost portion of an area of the body information within the memory 22, and thus, blocks disposed in an area of the existing body information can be updated without changing their header information. Accordingly, the load applied to the control unit 16 decreases and an update speed increases.

Figs. 7A and 7B show diagrams illustrating a method of updating the master file in accordance with another embodiment of the present invention.

When the card transaction management server 10 receives information on a Block5 685 in which the attribute information of some cards has been changed as shown in Fig. 7A, the control unit 16 reflects the received information in master file 650 to generate an updated master file 700 as shown in Fig. 7B.

Information on the Block5 670 included in the existing master file 650 includes a

random pattern, and thus has been stored at a position '2' of an area of the body information within the memory 22.

Therefore, the control unit 16 first deletes the existing Block5 670. Subsequently, the control unit 16 checks information on the changed Block5 685 to check that entire block has a 0xFF pattern.

In predetermined pattern information 655, a pattern type is set as '3' for the 0xFF pattern, and thus, information on the changed Block5 685 is not stored in an area of the body information. The information on the changed Block5 685 is stored an area of Block5 in header information 710, and pattern type information thereof is changed from 0 to 3.

Since the existing Block5 in the body information has been deleted, storage position information is changed from 2 to 0 in the area of the Block5 in the header information 710.

As described above, when a block in the body information is deleted by updating a changed block, a finally stored block is moved to and stored at a position where the deleted block was disposed.

Specifically, as in the updated master file 700, a finally stored Block6 725 is moved to a position from which information on the Block5 670 has been deleted, and stored at a body area '2' position. Accordingly, the information on the changed block is changed as information on the Block6 in the header information 710, and the storage position information is changed from 4 to 2.

Therefore, in updating the transaction information of a block, when a changed block is set from a random pattern to a pattern type that has been stored in the pattern information area, the control unit 16 may delete a block stored in an area of the body information, store only pattern type information in an area of the header information, and dispose the finally stored block at a position from which the block has been deleted.

Accordingly, a memory space does not additionally allocated, and an update speed increases.

In this connection, Figs. 7A and 7B illustrate an exemplary embodiment wherein the updated master file 700 includes total seven blocks, and information on twenty cards is stored in one block where the attribute information of one card is represented as a 2-bit value. In Figs. 7A and 7B, a Block1 stores attribute information for the identification numbers having a number 1 to a number 20, a Block2 stores attribute information for the identification numbers having a number 21 to a number 40, a Block3 stores attribute information for the identification numbers of a number 41 to a number 60, a Block4 stores attribute information for the identification numbers having a number 61 to a number 80, a Block5 stores attribute information for the identification numbers having a number 81 to a number 100, a Block6 stores attribute information for the identification numbers having a number 101 to a number 120, and a Block7 stores attribute information for the identification numbers of a number 121 to a number 140.

On the other hand, the card transaction approval terminal 20 determines whether to approve a card transaction by using the master file 700. For example, attribute information for a card having the number 49 is stored in the Block3, and when searching the information of the Block3 in an area of the header information 710, it is checked that position information of the Block3 is '1' in an area of the body information. That is, information on the cards having the number 41 to the number 60 is stored at a position 1 in a Block 715. Since information on one card consists of 2 bits, it can be seen that a string of the seventeenth and eighteenth bits of the Block3 715 in an area of the body information, '00', is the attribute information of the number 49 card. Accordingly, it can be seen that the number 49 card is an unavailable card, and thus, a transaction approval request for the number 49 card is disapproved.

Figs. 8A and 8B are flowcharts illustrating a process of generating the master file

in accordance with an embodiment of the present invention.

Referring to Fig. 8A, in operation 800, the data generation unit 12 of the card transaction management server 10 sets and stores pattern information on the pattern type of attribute information of cards included in the same block on the basis of the identification number of each of the cards. Subsequently, the card transaction management server 10 opens a source file that is transmitted from a card issuer in operation 802, reads the source file in operation 804, and performs a text-to-binary conversion of a text into a binary number on the source file.

The card transaction management server 10 determines an area of identification numbers in the source file having the converted binary type in operation 808. Thereafter, the card transaction management server 10 opens a master file having a master file type in operation 810, and calculates the total number of blocks with the area of the identification numbers of the source file as a block type in operation 812.

The card transaction management server 10 allocates memory areas for pattern information and header information to the master file on the basis of the total number of blocks in operation 814. Subsequently, it is determined whether the check of all data in the source file is ended in operation 816. If it is determined that there is unchecked data, the process proceeds to operations 818 and 820 through a tab 'A' as shown in Fig. 8B where the card transaction management server 10 again reads the source file and performs a text-to-binary conversion.

Subsequently, the card transaction management server 10 reads option information in operation 822, and calculates the block position of an Alias No. in operation 824. The card transaction management server 10 determines whether a block under processing is the same as a block that has been previously processed in operation 826. If it is determined in operation 826 that a block under processing is the same as a block that has been previously processed, the process advances to operation 836, sets an

option in a corresponding option region, and returns to operation 816 through a tab 'B'.

Otherwise, the process proceeds to operation 828 to perform a block check, and determine whether a corresponding block pattern is a random pattern in operation 830.

When it is determined in operation 830 that the corresponding block pattern is the random pattern, the card transaction management server 10 records block information in an area of the body information, and records the position information of the body information in an area of the header information in operation 834. Next, the card transaction management server 10 sets an option in operation 836, and returns to operation 816. However, when it is determined in operation 830 that the block pattern has a predetermined pattern type, the process flows to operation 832 where the card transaction management server 10 records the corresponding pattern type in the area of the body information. Thereafter, the card transaction management server 10 set the option in operation 836, and returns to operation 816.

Meanwhile, if the read of all data in the source file is ended in operation 816, the process proceeds to operation 838 where the card transaction management server 10 performs the block check. Subsequently, the card transaction management server 10 analyzes the pattern of the corresponding block in operation 840, and if the pattern has any one of predetermined regular pattern types as the analyzed result, the process immediately goes to operation 844 where the card transaction management server 10 records pattern information in the area of the header information without recording the pattern information in the area of the body information.

However, if it is determined in operation 840 that the pattern of the corresponding block is a random pattern instead of a pattern type stored in an area of the pattern information, the process proceeds to operation 842 where the card transaction management server 10 records the corresponding block in the area of the body information. Thereafter, the card transaction management server 10 records the position

of the body information, in which the corresponding block is recorded, in the area of the header information in operation 844.

In this way, data for all blocks are stored in the areas of the body information and header information of the master file.

Fig. 9 is a flowchart illustrating a process of determining whether to approve a card transaction in accordance with an embodiment of the present invention.

Referring to Fig. 9, when it is requested to search the attribution information of a particular card for card approval, the control unit 24 of the card transaction approval terminal 20 checks an identification number (for example, Alias No.) of the requested card to determine an area of the identification number of the card in operation 900.

The control unit 24 opens a master file in operation 902, and reads the total number of blocks in operation 904. In operation 906, the control unit 24 sets bit masks by bit type in order to read a specific bit in a block. Specifically, when the bit type is 1 bit, the control unit 24 sets a bit mask as a 1-bit mask, and when the bit type is 2 bits, the control unit 24 sets a bit mask as a 2-bit mask.

Subsequently, the card transaction approval terminal 20 calculates and determines the position of a block in which the attribute information of the requested card is stored in operation 908, reads pattern information stored in an area of the pattern information in operation 910, and reads the header information of the block on the basis of the determined block position in operation 912.

In operation 914, the card transaction approval terminal 20 determines whether the corresponding block is stored in area of the body information. That is, the area of the header information includes the position information of the corresponding block stored in the area of the body information, and thus, when the corresponding block is stored in the area of the body information, the card transaction approval terminal 20 reads block information in the body information on the basis of the position information in

operation 916, and checks card information in operation 920.

However, when it is determined that the corresponding block is not stored in the area of the body information in operation 914, the card transaction approval terminal 20 checks pattern type information stored in the area of the header information in operation 918, and checks information on the requested card in operation 920.

Figs. 10A and 10B are flowcharts illustrating a process of updating the master file in accordance with an embodiment of the present invention.

Referring to Fig. 10A, the card transaction approval terminal 20 reads an update file that is transferred thereto in operation 1000, and reads an identification number of the card in operation 1002. The card transaction approval terminal 20 determines the area of the identification number in operation 1004, and sets the name of a master file in operation 1006.

The card transaction approval terminal 20 opens the master file that has been set in operation 1008, and opens a new master file for merging the update file in operation 1010. The card transaction approval terminal 20 first reads the number of blocks in operation 1012, sets the total number of blocks in operation 1014, and performs a memory allocation. The card transaction approval terminal 20 then reads header information and copies the header information to the new master file in operation 1016.

Subsequently, the card transaction approval terminal 20 determines whether the check of the update file is ended in operation 1018, and when the check of the update file is not ended, the process proceeds to operation 1020 where the card transaction approval terminal 20 converts an update record into an identification number. Next, the card transaction approval terminal 20 determines whether the check of all transaction records is ended in operation 1022. If the check of all the update records is not ended, the card transaction approval terminal 20 sets a bit mask in operation 1024.

The card transaction approval terminal 20 calculates a block position in operation

1026, and determines whether a currently processed block is the same as a previously processed block in operation 1028. If the currently processed block is the same as the previously processed block, the card transaction approval terminal 20 sets an option value in the currently processed block in operation 1030. Subsequently, the process returns to operation 1022 through a tab 'B' where the card transaction approval terminal 20 determines whether the check of the update records is ended. If the check of the update records is ended, the process returns to operation 1018.

Meanwhile, if it is determined in operation 1018 that the check of the update file is ended, the process returns to operation 1100 as shown in Fig. 10B through a tab 'A' where the card transaction approval terminal 20 checks a pattern of a block. Subsequently, the card transaction approval terminal 20 checks pattern information to determine whether a block pattern is a random pattern in operation 1102.

When the block pattern is the random pattern, the card transaction approval terminal 20 records changed block information in an area where the existing block is disposed in an area of body information in operation 1104, records position information (in which a changed block is recorded in the area of the body information) in an area of header information in operation 1106. The process then returns to operation 1022 through a tab 'B'.

However, when it is determined in operation 1102 that the block pattern is not the random pattern but is one of predetermined patterns, the process proceeds to operation 1108 where the card transaction approval terminal 20 determines whether the corresponding block is disposed in the finally stored block in the area of the body information or the final position of the area of the body information.

When it is determined in operation 1108 that the corresponding block is disposed in the final position of the area of the body information, since the position of the block is not changed even though the existing block is deleted, the process proceeds to operation

1112 where the card transaction approval terminal 20 searches the value of the pattern type of the block in an area of pre-stored pattern information, whereupon the card transaction approval terminal 20 records a corresponding pattern type in the area of the header information. The card transaction approval terminal 20 then proceeds to operation 1114.

Meanwhile, when it is determined in operation 1108 that the corresponding block is not disposed in the finally stored block in the area of the body information or the final position of the area of the body information, the position of a block might have been changed in deleting the existing block. That is, the process proceeds to operation 1110 to move an end record of the file to a position from which the existing block has been deleted, and performs record.

In operation 1112, subsequently, the card transaction approval terminal 20 records position information on the moved block in the area of the header information, searches the pattern information of the changed block in the area of the pre-stored pattern information, and records the corresponding pattern type in the area of the header information. The process then proceeds to operation 1114.

The card transaction approval terminal 20 determines whether an operation of changing all update files is completed in operation 1114. When any file to be checked is left, the process returns to operation 1022 through a tab 'B'. However, when it is determined in operation 1114 that the operation of changing all the update files has been completed, the process ends the operation.

According to the card transaction approval method, terminal, and system, the method, terminal, and server for managing card transaction approval information, and the card transaction management server, in accordance with the embodiments of the present invention, data to be stored or not to be stored is classified on the basis of pattern information of attribute information corresponding to an identification number of a card,

and data in a master file is compressed and generated on the basis of the classified data, thus reducing a memory capacity for the data in the master file. Accordingly, the rapid increase in a capacity is prevented when the number of cards and the amount of changed information increase by allocating a conventional fixed memory area, and the update of changed information can be performed, thus facilitating management and shortening a search time. Moreover, even when data is compressed and stored in a storage space, approval can be quickly performed, and the change in information can be easily managed, thus enabling the stable operation of a system.

Moreover, in the present invention, the system does not manage pattern information on the pattern type of attribute information of cards included in a single block on the basis of the identification number of each of the cards, and the pattern information is added into the master file and stored, or the pattern information is stored separately from the master file. In this case, the pattern information is not stored in the system but is processed as operation information, and thus, even when pattern information is changed or added, the system can be operated without a change.

Moreover, when the master file is updated, the present invention disposes newly-added block information at the final position of the master file, and records the position information in an area of the header of the master file, thus performing an update without adding memories and enhancing an update speed.

While the invention has been shown and described with respect to the embodiments, the present invention is not limited thereto. It will be understood by those skilled in the art that various changes and modifications may be made without departing from the scope of the invention as defined in the following claims.

What is claimed is:

1. A card transaction approval method, comprising:

storing in a memory pattern information on a pattern type of attribute information of a plurality of cards included in respective block on the basis of identification numbers of the cards;

generating a master file that includes header information in which pattern type information and storage position information of each block is contained and body information in which attribute information of the cards is contained on a block by block basis based on the storage position information; and

determining whether to approve a card transaction on the basis of the master file.

2. The card transaction approval method of claim 1, wherein the pattern type information corresponds to a pattern type stored in an area of the pattern information within the memory, and

the pattern type information on each block indicates a pattern type of attribute information of the cards contained in the block.

3. The card transaction approval method of claim 1, wherein the pattern information is operation information that is included in the master file, or is separated from and operationally linked to the master file.

4. The card transaction approval method of claim 1, wherein the identification number is an Alias No..

5. The card transaction approval method of claim 1, wherein the attribute

information is represented as flag information.

6. The card transaction approval method of claim 1, wherein the number of pattern types is 256.

7. The card transaction approval method of claim 1, wherein when attribute information of the cards included in a block does not have a pattern type included in the pattern information,

the attribute information of the cards included in the block is stored in an area of the body information within the memory, and

storage position information on the block indicates a storage position in the area of the body information of the block within the memory.

8. The card transaction approval method of claim 1, wherein said determining of whether to approve a card transaction comprises:

recognizing an identification number of the card;

searching attribute information, corresponding to the identification number of the card, in the master file; and

determining whether to approve transaction of the card according to the searched attribute information.

9. The card transaction approval method of claim 8, wherein said searching of attribute information comprises:

calculating storage position information of the block that includes the recognized identification number of the card;

searching header information on the calculated block; and

searching storage position information and pattern type information on the calculated block.

10. The card transaction approval method of claim 9, wherein said searching of storage position information and pattern type information comprises:

searching, when the storage position information of the block has been searched, attribute information of the card stored in the area of the body information; and

obtaining, when the pattern type information of the block has been searched, attribute information of the card from the pattern type information.

11. A method of managing card transaction approval information, the method comprising:

storing in a memory pattern information on a pattern type of attribute information of a plurality of cards included in respective block on the basis of identification numbers of the cards;

generating a master file that includes header information in which pattern type information and storage position information of each block is contained, and body information in which attribute information of a card is contained on a block by block basis based on the storage position information;

determining, when attribute information of a card is changed, a pattern of attribute information of the card that is included in a block to which the card belongs; and

updating the master file depending on the determined pattern.

12. The method of claim 11, wherein said updating of the master file comprises:

when the determined pattern does not have a pattern type contained in the pattern information,

recording attribute information of the cards, which are included in the block to which the card belongs, at a final position of an area of the body information; and

updating position information in the area of the body information on the block to which the card belongs.

13. The method of claim 11, wherein said updating of the master file comprises recording, when the determined pattern has a pattern type contained in the pattern information, the corresponding pattern type in pattern type information of the block to which the card belongs.

14. The method of claim 11, wherein said updating of the master file comprises:

when the determined pattern type is a pattern type contained in the pattern information, and a pattern of the corresponding block before being changed does not have the pattern type contained in the pattern information,

deleting the corresponding block from the area of the body information within the memory; and

deleting a block that is recorded at a final position of the area of the body information within the memory; and

recording a block, which was recorded at the final position in the area of the body information, at a position from which the corresponding block has been deleted.

15. A card transaction approval terminal, comprising:

a memory that stores a master file that includes pattern information on a pattern type of attribute information of a plurality of cards contained in respective blocks based on identification numbers of the cards, header information in which pattern type information and storage position information of each block is contained, and body

information in which attribute information of a card is contained on a block by block basis based on the storage position information; and

a control unit configured to determine whether to approve transaction of a card according to attribute information of the corresponding card that is searched in the master file.

16. A card transaction management server, comprising:

a data generation unit configured to generate a master file that includes pattern information on a pattern type of attribute information of a plurality of cards contained in respective block on the basis of identification numbers of the cards, header information in which pattern type information and storage position information of each block is contained, and body information in which attribute information of a card is contained on block by block basis on the basis of the storage position information; and

a control unit configured to transmit the master file to a card transaction approval terminal.

17. A terminal for managing card transaction approval information, the terminal including:

a memory that stores master file, the master file including pattern information on a pattern type of attribute information of a plurality of cards contained in respective blocks on the basis of identification numbers of the cards, header information in which pattern type information and storage position information of each block is contained, and body information in which attribute information of a card is contained on block by block basis on the basis of the storage position information; and

a control unit configured to determine, when attribute information of a card is changed, a pattern of attribute information of the cards that are contained in a block to

which the card belongs, and update the master file according to the determined pattern.

18. A server for managing card transaction approval information, the server including:

a data generation unit configured to generate a master file, the master file including pattern information on a pattern type of attribute information of a plurality of cards contained in respective blocks on the basis of identification numbers of the cards, header information in which pattern type information and storage position information of each block is contained, and body information in which attribute information of a card is contained on block by block basis on the basis of the storage position information; and

a control unit configured to determine, when attribute information of a card is changed, a pattern of attribute information of the cards that are contained in a block to which the card belongs, and update the master file according to the determined pattern.

19. A card transaction approval system, comprising:

a card transaction approval terminal configured to store a master file, the master file including pattern information on a pattern type of attribute information of a plurality of cards included in respective blocks on the basis of identification numbers of the cards, header information in which pattern type information and storage position information of each block is contained, and body information in which attribute information of a card is contained on block by block basis based on the storage position information,

wherein the card transaction approval terminal determines whether to approve transaction of a card according to attribute information of the corresponding card that is searched in the master file.