

PROCESS AND DEVICE FOR DATA TREATMENT WITH CHIP. ✓

The present invention relates to a method of
5 processing coded information during a purchase or
payment operation by a customer, holder of a card with a
chip, at a trader's, in which the contents of the memory
of the chip card are read and a coupon is or is not
printed on the basis of the information arising from the
10 contents of said memory.

It also relates to a device implementing such
a method.

The present invention finds a particularly
important though non-exclusive application in the field
15 of the processing of loyalty cards, presented by cus-
tomers at the time of payment at a trader's, for example
in a retail outlet of the hypermarket or supermarket
type, at a service station or at a car sales dealer.

Thus, with the invention, it is possible to
20 alter a trade offer on the basis of the a posteriori
behavior of the card holder, thus making it possible to
grant him specific benefits in a customized and
immediate manner, and which may moreover be recorded on
the card.

25 A method is already known which enables
specific benefits to be granted depending on the
behavioral attitude of customers, and which consists
essentially in sending a discount coupon through the
post, shortly after the operation initiating purchase or
30 payment by the holder.

Such a method has drawbacks. In fact it
generates considerable delays and is of limited
reliability (loss of coupons, change of address).

One of the technical problems solved by the
35 invention consists in eliminating these considerable
delays, by granting a benefit to the customer at the
actual time of payment by the latter or more generally
of the operation initiating the benefit.

According to the invention, the trader will thus be able to recognize a customer on the basis of the frequency with which he calls in and of the size of his spending. It will then be possible to grant him a
5 specified definite benefit automatically and instantaneously.

For this purpose the invention proposes in particular a method of processing coded information during a purchase or payment operation by a customer,
10 holder of a card with a chip, at a trader's, in which the contents of the memory of the chip card are read and a coupon is or is not printed on the basis of the information arising from the contents of said memory, characterized in that, with the memory of the chip card
15 including a first identification file, termed the Member file, identifying the card-holding customer, a second accounting file, termed the Points file, and a third file, termed the Behavior file, relating to the behavior of the card holder towards the user trader or traders,
20 a specified algorithmic processing is performed dependent, on the one hand, on the date of the operation and, on the other hand, on the information contained in said files, including the Behavior file, then data is written to the Points file, new information
25 is written to the Behavior file, and said coupon is or is not printed on the basis of the result of said algorithmic processing.

Advantageous embodiments resort moreover to one and/or other of the following provisions:

- 30 - the algorithmic processing includes a step of incrementing or decrementing the Points file by a pre-specified number of points;
- the coupon is only printed if the number of points contained in the Points file is greater than a specified
35 value;
- the coupon is only printed and/or the Points file is only incremented or decremented if the Member file corresponds to specified criteria;

- the Points file is incremented more or less depending on the amount of the purchase or payment operation;
 - the Points file is incremented more or less depending on frequency and/or on the nature of first, second or
- 5 xth visit by the card holder over a period of time of specified duration;

- information corresponding to the operation is entered into a memory of a payment terminal located on the premises of said trader,

10 said entered information is compared with information stored in storage means and relating to prespecified series of operations, and

the results of these comparisons are processed in order to print a coupon and/or write to the Points file.

15 It is thus possible to undertake promotional operations which are limited in time and pertain to a collection of traders belonging to the same network.

- access to the files is enciphered through a so-called triple DES (Data Encryption Standard) encryption pro-
20 cedure.

The invention also proposes a device for processing coded information, during a purchase or payment operation by a user, holder of a card with a chip, comprising means for reading coded data from the
25 memory of the chip card, computation means and means of printing a coupon,

characterized in that, with the memory of the chip card including a first identification file, termed the Member file, identifying the card-holding customer, a second
30 accounting file, termed the Points file, and a third file, termed the Behavior file, relating to the behavior of the card holder towards the user trader or traders, the computation means include means of specified algorithmic processing dependent, on the one hand, on
35 the date of the operation and, on the other hand, on the information contained in said files, including the Behavior file,

and in that the device includes means for writing new information to the Points file and to the Behavior file on the basis of said specified algorithmic processing, the means of printing a coupon being configured so as to
 5 print or not print said coupon on the basis of the information arising from the contents of said files and from said algorithmic processing.

Advantageously, the device moreover includes:

- means of entering data corresponding to said operation
 10 into a memory for intermediate storage and display of data,
- means of storing coded information relating to one or more operations,
- means of comparing between the data entered into said
 15 intermediate memory and information stored in said information storage means,
- means of processing the results of these comparisons,
- and means configured so as automatically to print or not print the coupon on the basis of the information
 20 arising from the contents of the memory of the chip card, and controlled by said means of processing said results.

The invention will be better understood on reading the description which follows of a particular
 25 embodiment given by way of non-limiting example.

The description refers to the drawings which accompany it and in which:

- Figure 1 shows a general diagram of a device according to an embodiment of the invention.
- 30 - Figure 2 is a partial block diagram of an embodiment of the memory of the chip card in the device according to the invention.
- Figure 3 is a block diagram charting the method of processing information according to the embodiment of
 35 the invention more particularly described here.

Figure 1 shows a device 1 comprising a payment terminal 2 furnished with a reader 3 for a card 4 with a chip 5.

The payment terminal is for example of the type marketed under the reference Delta 15 by the French company Schlumberger.

The chip cards which can be used with the invention are for example cards sold under the references MP-COS by the French company Gemplus or ME 2000 by the French company Schlumberger.

They can be bank cards, personal credit cards or loyalty cards.

10 The terminal 2 comprises a keyboard 6, a display screen 7 and a processor 8 which can be programed on the basis of specified algorithms in a manner known per se.

The processor 8 is connected to the reader 3 via a read/write circuit and to a microcomputer 9 itself connected to a mass memory 10.

The device 1 also comprises means 11 for printing a coupon 12 connected to the processor 8 and to a cash till 13 and invoice printer, for example via a computer 9.

The processor 8 is connected, possibly via the computer 9, to means (not represented) which are wholly remote from the site on which the device 1 is installed and which are configured so as to ensure the consistency of the processing and/or of the information processed and collected by various devices on various sites.

Depicted in Figure 2 is the organization of an embodiment of the memory 14 of the chip 5 of the card 4.

The card comprises several applications, the memory 14 comprising a main directory or root 15.

It is organized into directories 16, 17, etc.

The information relating to the card holder or bearer is contained in a file 18 termed the Member file, under the main directory 15.

35 A System directory 16 is provided which comprises for example a file 19 relating to the card itself and other types of files 20 known per se.

According to the embodiment of the invention more particularly described here, the memory 14

comprises a directory 17 termed the "Couponing Directory" which comprises the Behavior file 21 and the Points file 22.

Embodiments of the Member file 18, the
 5 Behavior file 21 and the Points file 22 according to the invention are described below by way of example.

Member file 18

Read code : Free

10 Update code : RCode01

Field	Format	Width
Card number	9999999999	9
Type	Alpha	2
Version	99	2
Present applications	Y / N	9
Month/year of customization (manufacture)	yyymm	4
Month/year of 1st use	yyymm	4
Month/year of expiry	yyymm	4
Reserved	Alpha	46

Behavior file 21

15 Read code : Free

Update code : Rcode12

Field	Format	Width
Max number of traders	99	2
Number of traders recorded	99	2
Reserved	Alpha	16

Field	Format	Width
Traders (up to the No. of traders rec.):		
Trader code	99999	5
Business code	Alpha	1
Date of first visit	yymmdd	6
Date of last visit	yymmdd	6
Number of visits this month	99	2
Spend this month	99999	5
Number of visits this year	999	3
Spend this year	999999	6
Total number of visits	999	3
Total spend	999999	6

Points file 22 (points counter)

5 Balance read key : Free
 Debit key : RKdeb1
 Credit key : Rkcred1
 PIN (for access to the debit) : Rcode13

10 In an advantageous embodiment, provision is made for management of the security of the information in the card by encrypting the codes on the basis of the card numbers.

15 The application comprises for example two file access codes and two Points file access keys. The mother codes or the mother keys are incorporated into the terminal 2.

They are used to compute diversified codes and keys, which will subsequently be compared with the codes

and keys built into the card. Each card comprises its own unique set of codes and keys.

This diversification is achieved through the triple DES (Data Encryption Standard) procedure, applied both to the mother codes (or the mother keys) and the card number.

The mother codes and mother keys incorporated into the terminal are for example:

Code01 Mother code for updating the Member file
 10 Code12 Mother code for updating the Behavior file
 Kauth1 Mother key for authenticating the Points file
 Kcred1 Mother key for crediting the Points file

The mother codes or the mother keys are moreover and for example diversified as follows:

- 15 1. The mother codes or the mother keys (16 bytes) are split into two equal parts of 8 bytes KL (left part) and KR (right part)
2. N (the first 8 bytes of the card No.) is enciphered by KL: $R1 = DES(KL, N)$
- 20 3. R1 on 8 bytes is deciphered by KR: $R2 = DES^{-1}(KR, R1)$
4. R2 on 8 bytes is enciphered by KL: $R = DES(KL, R2)$

R is the result on 8 bytes of the triple DES diversification of a code or a mother key and therefore represents the value built into the card.

An example of the operation of the device of Figure 1 will now be described with reference to Figure 3.

30 The customer user, holder of the card, enters the card 4 into the reader 3 (step 30), and the Member, Behavior and Points files are then read (step 32).

A test step 34 on the validity of the card (date of expiry) is then performed by comparison with today's date.

Next the amount of the purchase is entered (step 36) either via the till 13 and the microcomputer 9, or via the keyboard 6.

If the total is greater than a specified value (test 38), an algorithmic processing 40 is then performed on the basis of the information contained in the Member file, the Behavior file and the Points file.

5 The operation leads to a step 42 of incrementing the Points file by a specified number of points based, for example, on the number of operations performed by the card holder within the month.

Otherwise (step 44), the screen 7 displays for
10 example a "no discount" message.

A test step 46 is provided next which compares the number of points in the Points file with a specified threshold size.

If the number of points is less than this value,
15 a message is output at 48. If it is greater, a discount coupon for a specified amount is printed (step 50).

The invention thus enables the card holder to obtain two types of benefit separately or simultaneously:

20 - a points credit on an electronic points counter in the chip of the card,
- a discount voucher printed at the time of the purchase, to be set against the current purchase or a later purchase.

25 Several examples of operation are given below.

The trader can choose, for example, to allot 2 points to his customers on their first visit of the month, 4 points with the second visit and 6 points with the third visit each month.

30 Another trader may choose to link the points credit to a transaction amount. Thus, with his first visit, the customer will receive, for example, a number of points equal to 10 % of his purchase. For every subsequent visit, the points credit will be 5 %.

35 Another trader will choose to offer a discount voucher to be set against a purchase from him. For example, the trader may grant a 25 % discount to customers of his who come in for the first time, and 10 % to the others.

The discount voucher can have a value in terms of points. In this case, the voucher is given to the customer against a points debit. For example, the trader introduces a 25 % discount voucher against an amount of 10 points - the voucher will be printed only if the card has a minimum of 10 points.

The invention also makes it possible to target specific cards. The trader identifies beforehand the numbers of the cards in the Member file, which will receive a benefit during their later visits.

This list of cards can also be downloaded by a central system via the external link described with reference to Figure 1.

An advantage of the invention is to be able to formulate offers on the basis of customer behavior at other trader's, each trader belonging to a "business group", identified by a field present in the Behavior file described above.

This aspect of the invention can thus be used to identify the customers who spend little at the trader's, but a lot in a business sector close to that of the trader. Customers thus identified can therefore be introduced to greater benefits.

Below is given an example of the parametrization of the algorithm for issuing benefits according to the invention.

Parametrization of the algorithm

Category	Parameter	Nature	Description
General parameters	Minimum purchase	Amount in centimes	Threshold below which the operation is too small to be regarded as a visit
	One visit per day?	Yes	Only the first operation within one day will be regarded as a visit
		No	N operations within one day = N visits

Parameterization of the algorithm

Category	Parameter	Nature	Description
	Multi-visit function	Not activated	Apply the parameters of "Visit 1" for every visit. Do not update the Behavior file in the card
		same Month	Distinguish between 1st, 2nd and 3rd visit in one month
		same Year	... in one year
		since creation of card	... since the creation of the card
	Threshold bonus	Amount	Threshold for the issuing of bonus points
	Points bonus	999	Amount of bonus points
Parameters visit 1	Points computation	Not activated	No points credit or debit at the first visit
		Credit	
		Debit	
	Points computation	Fixed	The "Points Value" field is a fixed total of points
		Percentage	The "Points Value" field is a percentage of the amount of the operation
	Points value	999	Value in points (up to 999), or as a percentage (up to 99.9%)
	Text of coupon	Not activated	No additional message to be printed on the receipt
		ASCII 2 x 20	Print 2 rows of 20 characters, plus the info relating to the old balance, points acquired, and new balance
Parameters visit 2	Points function	cf Visit 1	
	Points computation		
	Points value		
	Text of coupon		

Category	Parameter	Nature	Description
Parameters visit 3	Points function	cf Visit 1	
	Points comput- ation		
	Points value		
	Text of coupon		
Parameters visits 4 and +	Points function	cf Visit 1	
	Points comput- ation		
	Points value		
	Text of coupon		

As is self-evident, and as results from the foregoing, the present invention is not limited to the embodiment of the invention more particularly described
5 here. On the contrary it embraces all variants thereof and especially those in which the algorithmic processing is remotely programable.



CLAIMS

1. Method of processing coded information during a purchase or payment operation by a customer, holder of a card with a chip, at a trader's, in which the contents of the memory of the chip card are read and a coupon is or is not printed on the basis of the information arising from the contents of said memory,
characterized in that, with the memory of the chip card including a first identification file, termed the Member file, identifying the card-holding customer, a second accounting file, termed the Points file, and a third file, termed the Behavior file, relating to the behavior of the card holder towards the user trader or traders, a specified algorithmic processing is performed dependent, on the one hand, on the date of the operation and, on the other hand, on the information contained in said files, including the Behavior file,
the algorithmic processing including a step of incrementing or decrementing the Point [sic] file by a predetermined number of points depending on the frequency and/or the nature of first, second or xth visit by the card holder over a time period of specified duration,
the coupon is printed only if the number of points contained in the Points file is greater than a specified value
then data is written to the Points file,
new information is written to the Behavior file,
and said coupon is or is not printed on the basis of the result of said algorithmic processing.
2. Method according to claim 1, characterized in that the coupon is only printed and/or the Points file is only incremented or decremented if the Member file corresponds to specified criteria.

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3. Method according to either one of claims 1 and 2, characterized in that the Points file is incremented more or less depending on the amount of the purchase or payment operation.
4. Method according to any one of the preceding claims, characterized in that information corresponding to the operation is entered into a memory of a payment terminal located on the premises of said trader, said entered information is compared with information stored in storage means and relating to prespecified series of operations, and the results of these comparisons are processed in order to print a coupon and/or write to the Points file.
5. Method according to any one of the preceding claims, characterized in that access to the files is enciphered through a so-called triple DES encryption procedure.
6. Device for processing coded information, during a purchase or payment operation by user, holder of a card with a chip, comprising means for reading coded data from the memory of the chip card, computation means and means of printing a coupon, characterized in that, with the memory of the chip card including a first identification file, termed the Member file, identifying the card-holding customer, a second accounting file, termed the Points file, and a third file, termed the Behavior file, relating to the behavior of the card holder towards the user trader or traders, the computation means include means of specified algorithmic processing dependent, on the one hand, on the date of the operation and, on the other hand, on the information contained in said files, including the Behavior file, and in that the device includes means for writing information to the Points file and to the Behavior file on the basis of said specified algorithmic processing, the means of printing a coupon being configured so as to print or not print said coupon on the basis of the information arising from the contents of said files and from said algorithmic processing.

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7. Device according to Claim 6, characterized in that it includes
- means of entering data corresponding to said operation into a memory for intermediate storage and display of data,
 - means of storing coded information relating to one or more operations,
 - means of comparing between the data entered into said intermediate memory and information stored in said information storage means,
 - means of processing the results of these comparisons,
 - and means configured to print a coupon automatically, and controlled by said means of processing said results and on the basis of the information arising from the contents of the memory of said chip card.

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