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Title

## METHOD OF PROCESSING A TRANSACTION REQUEST

5 Field

The invention relates to a method of processing a transaction request and a transaction processing system.

10 Background

By providing the facility for consumers to purchase goods and services on-line, merchants expose themselves to the potential for fraudulent transactions through these channels.

Accordingly, there is a need for techniques that mitigate against the risk of fraud.

20 Summary

In a first aspect, the invention provides a method of processing a transaction request, the method comprising:

- receiving a transaction request from a user device at a transaction processing system;
- obtaining a cookie stored in a browser application of the user device containing outcome data indicative of an outcome of at least one prior transaction;
- determining by the transaction processing system based on the outcome data, which of a plurality of transaction processes is to be applied by the transaction processing system to the transaction request; and
- processing the transaction in the transaction processing system in accordance with the determined transaction process.

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In an embodiment, determining which of a plurality of transaction processes is to be applied comprises selecting between a plurality of available processes, and at least a first transaction process contains at least one additional validation process than a second transaction process.

In an embodiment, determining which of a plurality of transaction processes is to be applied comprises selecting between a plurality of available processes, and at least a first transaction process contains at least one alternative validation process to a validation process of a second transaction process.

In an embodiment, there are a plurality of available validation processes that can be formed into the plurality of transaction processes and determining which of a the plurality of transaction processes comprises selecting which of the available validation processes will form the transaction process.

In an embodiment, the outcome data comprises a transaction score and determining which of the plurality of transaction processes is to be applied comprises determining to which of the plurality of transaction processes the score corresponds.

In an embodiment, the transaction processing system has a memory storing a plurality of ranges of scores in association with respective transaction processes such that any score uniquely corresponds to a transaction process.

In an embodiment, the method comprises setting a further cookie in the browser application of the user device based on the outcome of the determined transaction process.

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In a second aspect, the invention provides a transaction processing system for processing a transaction request, the transaction processing system arranged to receive a transaction request from a user device, the transaction processing system comprising:

a cookie retriever arranged to obtain a cookie stored in a browser application of the user device containing outcome data indicative of an outcome of at least one prior transaction;

a processing setter arranged to determine based on the outcome data which of a plurality of transaction processes is to be applied by the transaction processing system to the transaction request; and

a transaction processor arranged to process the transaction in accordance with the determined transaction process.

In a third aspect, the invention provides computer program code which when executed implements the above method. The invention also provides a tangible computer readable medium comprising the computer program code.

#### Brief Description of Drawings

Embodiments of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a block diagram of a transaction processing system of an embodiment; and

Figure 2 is a flow chart of a method of an embodiment.

#### Detailed Description

Referring to the drawings, there is shown an embodiment of transaction processing system 130 for implementing a method for processing a transaction request. In Figure 1,

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the processor 140 of transaction processing system 130 is shown implementing a number of modules based on program code and data stored in memory 150. Persons skilled in the art will appreciate that one or more of the modules could  
5 be implemented in some other way, for example by a dedicated circuit.

The method is implemented by the transaction processing system 130 in response to a customer seeking to purchase  
10 an item from the system 130. In this respect, the transaction processing system comprises a product selector 148 implemented by processor 140 which enables a user to browse and select products from the product database 155. In one embodiment, the product selector 148 provides a web  
15 interface via which a user can browse products for selection. The product selector 148 may also incorporate known functionality for of e-commerce systems, e.g. a shopping cart application to enable a user to select multiple products to be paid for in a single purchase  
20 transaction. In another embodiment, product selection may be implemented by a separate system such that the transaction processing system 130 is employed once a user has chosen products for purchase and is seeking to pay for them. In other embodiments, the transaction may be  
25 initiated in another manner, for example by the user selecting a product from an e-mail message sent to the user.

The items in product database 155 may be physical items of  
30 some particular value, for example, a mobile handset for \$500 or a virtual item such as a recharge voucher for applying credit to a pre-paid mobile phone account. That is, in exchange for payment, the user is provided with a code that they can enter in order to apply credit to a  
35 prepaid mobile account and as such, may not be provided with a physical receipt.

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Assuming, cookies are enabled in the web browser application 111 on the user's device 110 and the browser 111 has been used in a prior transaction, cookie 112 will include a secured algorithmic output within it that

5 contains outcome data indicative of the outcome of at least the previous transaction outcome. In one example, the transaction outcome can be one of a number of defined outcome statuses such as: completed successful, completed declined, completed fraud risk, completed velocity breach,

10 abandoned, etc. In another embodiment, the transaction outcome data can be a score (for example, a secured number with a range between 0 and 100 to determine the level of risk) or both a defined outcome status and a score.

15 During a transaction, the cookie retriever 141 of system 130 looks to the user's browser 111 to see if any previous cookies exist. If a cookie exists, then the outcome data is obtained and deciphered by the cookie retriever 141 to obtain the transaction outcome status. In one embodiment,

20 the outcome status is then employed by the processing setter 142 to determine what rules sets and processing may be applied to the in-situ transaction. For example, the processing setter may be arranged to choose between a first set 153 and a second set 154 of transaction

25 processing rules 152.

Thus, for example, in a high volume processing environment the processing setter 142 and processing rules 152 can be arranged so that a transaction outcome with the status

30 "completed fraud risk" undergoes a higher detail of scrutiny than a transaction with a transaction outcome of "completed successful".

During processing of the transaction, the transaction

35 scorer scores the current transaction based on transaction scoring rules 151 and the cookie setter 141 sets an updated cookie 112 in the browser.

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In another embodiment, each successful transaction outcome contains a transaction state and a transaction score which is stored as outcome data in the cookie 112. The  
5 transaction state is a statement as to the end outcome of the transaction, such as completed successful, declined, abandoned, insufficient funds, attempted fraud, velocity breach etc. A three digit number is used to define the transaction state. For example, an approved transaction  
10 may hold a transaction state number of 167.

In one embodiment, the transaction score is a number in a defined range which may be, for example between theoretical minus infinity and infinity. In one embodiment  
15 of system 130, when the transaction processor 143 processes a transaction, any score over 99 will see that transaction fail. In one embodiment, the transaction score stored in the cookie, scores are restricted to the range to between 0000 and 9999. Scores below zero generate an  
20 automatic 0000 score and above 9999 generate a 9999 rating.

A cookie is then issued with the transaction state and transaction score tied together as a masked 7 digit number  
25 as part of the cookie's credentials. For example, an approved transaction that had an initial transaction score of 65 may have a smart cookie containing the following string:

30 878df76536531670065328768768543askh32234srlkh312h8, with the underlined portion encoding the transaction data where the "167" identifies the transaction state (Approved) and the "0065" identifies the transaction score.

35 The above example indicates to the system 130 that the device having this cookie is a device on which a potentially acceptable user was going to perform a

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transaction and select transaction processing rules 152 accordingly.

However, if the embedded code were "2290970", this would  
5 indicate that the last transaction was an attempted fraud  
(where the device was used in previous fraud activities  
and the transaction score was 970). In this case, certain  
other defence mechanisms for the system may slow the  
transaction processing down. For example, the system may  
10 implement additional Device ID checking rules, rainbow  
forms and the like during the transaction processing.

If the device used for the transaction has cookies turned  
off, or there is no cookie, or the format of the cookie  
15 has been tampered with then the processing setter 142 is  
arranged such that additional measures for transaction  
processing are automatically enabled.

In this respect, Figure 1 shows transaction processing  
20 rules 152 containing a first set 153 and a second set 154  
of rules. The first set 153 and the second set 154 may  
differ from each other in that the second set 154 contains  
additional transaction validation processing steps that  
are undertaken based on the processing score. In another  
25 example, alternative transaction validation processing  
steps may be undertaken, for example the second set 154  
may replace a processing step from the first set 153 with  
an alternative set.

30 Persons skilled in the art will also appreciate that the  
presence of two sets of rules in Figure 1 is indicative  
only and that a number of different sets of rules may be  
employed depending on the degree of granularity required  
in processing the transactions.

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Further, in one embodiment, the rules may not be  
established as separate sets but rather a series of

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different processing modules that are assembled based on the transaction outcome data that is set.

Referring to Figure 2, there is shown a method in accordance with one embodiment of the invention. In the method 200 a transaction request is received from the device 210. It is then determined whether the browser contains a cookie. If the browser does not contain a cookie then the transaction is processed based on default transaction rules 225 and a cookie is set 230 in the browser for use in future transactions before the processing ends 280. In one example, the default transaction rules may include additional validation processing steps to a base set of rules used when the cookie indicates that a prior transaction has been approved.

If it is determined 220 that the transaction request contains a cookie (in the sense that a cookie can be retrieved from the browser) it is determined whether the cookie is indicative of the prior approved transaction 235. If it is not indicative of a prior approved transaction, the request is processed with additional transaction rules 260 and the cookie is updated 270 and the process ends 280. If the cookie is indicative of a prior transaction that has been approved, it is processed in accordance with base transaction rules 240 and the cookie is updated 250.

### 30 Scoring

In one example, scoring is based on data obtained by the processing system 130 from the user's device. For example, the transaction may involve a customer placing a request to purchase a physical product on a web site managed by the transaction processing system 130. The device "appearing" to be presented by the customer is an Apple

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iPhone 4S with iOS 6.1 software installed. Also derived from the device are other ID markings such as:

- name of the device (e.g. the user's iTunes user name)
- telecommunication network provider (the entity that provides the phone service to the user)
- network carrier (the entity that provides the physical infrastructure used by the telecommunication network provider (which may be the same or different)
- serial number of the device
- capacity of the device
- network carrier's operating system version
- WiFi address used for the transaction (if used)
- Bluetooth address of the device (if turned on)
- IMEI (International Mobile Station Equipment Identity) number
- ICCID number (a SIM (subscriber identification module) card serial number
- modem firmware version

The above list is specifically for an Apple iPhone. However, as discussed above, the list would vary based on the device.

The above information is recorded to the extent that it is complete. Some fields for each device ID list are mandatory and some are not and this may differ for different devices. For example, the WiFi address and Bluetooth address of an iPhone device are not mandatory as, in order to collect them, both services need to be turned on. Where these fields are completed, this adds positively (in the sense of improving) an initial score for the first identification data.

For example, the transaction scorer 144 of processing system 130 may initially score an iPhone 5 with all of the above fields with a score of 0 points if the total device information possible is retrieved. (A lower score being

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treated as more indicative that the device is trustworthy). If the WiFi field was not populated but an IP address was received along with the incoming details then the device may be treated as suspicious and granted a score of 25 points.

In one example, the device details are matched internally against existing device details. In one example, the score may be decreased based on the number of transactions previously presented where that particular device was used and the transactions either failed or were considered of a fraudulent nature. Alternatively, a device ID may have been presented previously and have been used in multiple successful transactions. Over time, those individual transactions begin to garner their own score weighting to the initial score. A successful transaction using a particular device ID that was performed 9 months ago and has not had a chargeback or refund against it has a negative score against it (say -5), whereas a successful transaction performed on the current date may only receive -1 points. The reason for the different scores is that, although a transaction today is successful, a bank may apply a chargeback against the transaction anywhere (generally) up to 180 days past the date of the transaction. In this way a score can reflect more than one transaction outcome.

Points are also allocated based on the outcome of the transaction itself. In this respect transactions can be allocated into different categories with associated point scores such as completed successful, completed declined, completed fraud risk, completed with velocity breach, abandoned, etc.

In an alternative embodiment, these categories can be the outcome data. That is, instead of the transaction being

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scored, a category can be allocated to it and stored in the cookie as the outcome data.

Persons skilled in the art will appreciate that in accordance with known techniques, functionality at the server side of the network may be distributed over a plurality of different computers, for example for load balancing or security.

Further aspects of the method will be apparent from the above description of the system. It will be appreciated that at least part of the method will be implemented electronically, for example, digitally by a processor executing program code. In this respect, in the above description certain steps are described as being carried out by the system, it will be appreciated that such steps will often require a number of sub-steps to be carried out for the steps to be implemented electronically, for example due to hardware or programming limitations. For example, to carry out a step such as evaluating, determining or selecting, a processor may need to compute several values and compare those values.

As indicated above, the method may be embodied in program code. The program code could be supplied in a number of ways, for example on a tangible computer readable storage medium, such as a disc or a memory device, e.g. an EEPROM, (for example, that could replace part of memory 103) or as a data signal (for example, by transmitting it from a server). Further different parts of the program code can be executed by different devices, for example in a client server relationship. Persons skilled in the art will appreciate that program code provides a series of instructions executable by a processor.

Herein the term "processor" is used to refer generically to any device that can process game play instructions in

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accordance with game play rules and may include: a microprocessor, microcontroller, programmable logic device or other computational device, a general purpose computer (e.g. a PC) or a server. That is a processor may be  
5 provided by any suitable logic circuitry for receiving inputs, processing them in accordance with instructions stored in memory and generating outputs (for example on the display). Such processors are sometimes also referred to as central processing units (CPUs). Most processors are  
10 general purpose units, however, it is also known to provide a specific purpose processor, for example, an application specific integrated circuit (ASIC) or a field programmable gate array (FPGA).

15 It will be understood to persons skilled in the art of the invention that many modifications may be made without departing from the spirit and scope of the invention, in particular it will be apparent that certain features of embodiments of the invention can be employed to form  
20 further embodiments.

It is to be understood that, if any prior art is referred to herein, such reference does not constitute an admission that the prior art forms a part of the common general  
25 knowledge in the art in any country.

In the claims which follow and in the preceding description of the invention, except where the context requires otherwise due to express language or necessary  
30 implication, the word "comprise" or variations such as "comprises" or "comprising" is used in an inclusive sense, i.e. to specify the presence of the stated features but not to preclude the presence or addition of further features in various embodiments of the invention.  
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## CLAIMS:

1. A method of processing a transaction request, the method comprising:

5 receiving a transaction request from a user device at a transaction processing system in respect of a product;

obtaining a cookie stored in a browser application of the user device containing outcome data previously generated by the transaction processing system and  
10 indicative of an outcome of at least one prior transaction with the transaction processing system, wherein the outcome data comprises a score produced processing the at least one prior transaction with the transaction processing system;

15 determining by the transaction processing system based on the outcome data, which of a plurality of transaction processes is to be applied by the transaction processing system to the transaction request by determining to which of the plurality of transaction  
20 processes the score corresponds; and

processing the transaction in the transaction processing system in accordance with the determined transaction process.

25 2. A method as claimed in claim 1, wherein determining which of a plurality of transaction processes is to be applied comprises selecting between a plurality of available processes, and at least a first transaction process contains at least one additional validation  
30 process than a second transaction process.

3. A method as claimed in claim 1, wherein determining which of a plurality of transaction processes is to be applied comprises selecting between a plurality of  
35 available processes, and at least a first transaction process contains at least one alternative validation

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process to a validation process of a second transaction process.

4. A method as claimed in claim 1, wherein there are a plurality of available validation processes that can be formed into the plurality of transaction processes and determining which of a the plurality of transaction processes comprises selecting which of the available validation processes will form the transaction process.

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5. A method as claimed in claim 4, wherein the transaction processing system has a memory storing a plurality of ranges of scores in association with respective transaction processes such that any score uniquely corresponds to a transaction process.

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6. A method as claimed in any one of claims 1 to 5, further comprising setting a further cookie in the browser application of the user device based on the outcome of the determined transaction process.

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7. A transaction processing system for processing a transaction request, the transaction processing system arranged to receive a transaction request from a user device in respect of a product, the transaction processing system comprising:

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a transaction scorer for scoring transactions;  
a cookie retriever arranged to obtain a cookie stored in a browser application of the user device containing outcome data previously generated by the transaction system and indicative of an outcome of at least one prior transaction with the transaction processing system, the outcome data comprising a score produced by the transaction scorer processing the at least one prior transaction;

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a processing setter arranged to determine based on the outcome data which of a plurality of transaction

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processes is to be applied by the transaction processing system to the transaction request by determining to which of the plurality of transaction processes the score corresponds; and

5        a transaction processor arranged to process the transaction in accordance with the determined transaction process.

8.    A transaction processing system as claimed in claim  
10    7, wherein the processing setter is arranged to select between a plurality of available processes, and at least a first transaction process contains at least one additional validation process than a second transaction process.

15    9.   A transaction processing system as claimed in claim 7, wherein the processing setter is arranged to select between a plurality of available processes, and at least a first transaction process contains at least one  
20    alternative validation process to a validation process of a second transaction process.

10.   A transaction processing system as claimed in claim 7, wherein there are a plurality of available validation  
25    processes that can be formed into the plurality of transaction processes and the processing setter is arranged to select which of the available validation processes will form the transaction process.

11.   A transaction processing system as claimed in any one  
30    of claims 7 to 10, comprising a memory storing a plurality of ranges of scores in association with respective transaction processes such that any score uniquely corresponds to a transaction process.

35    12.   A transaction processing system as claimed in any one of claims 7 to 11, further arranged to set a further

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cookie in the browser application of the user device based on the outcome of the determined transaction process.

13. A transaction processing system as claimed in any one  
5 of claims 7 to 12, comprising a cookie setter for setting cookies in the browser application of the user device.

14. Computer program code which when executed implements  
10 the method of any one of claims 1 to 6.

15. A tangible computer readable medium comprising the computer program code of claim 14.