

SYSTEMS AND METHODS FOR GENERATING USER CUSTOMIZED MESSAGES

Technical Field

[0001] The present disclosure relates to processing transaction data, and in particular to generating user customized messages.

Background

[0002] With technological advancements in the realms of telecommunications and computing, users are provided with a plethora of digital services ranging from entertainment services such as online gaming and video streaming, to financial services such as cryptocurrencies and mobile banking, and personal services such as online shopping, real-time digital medical services and digital travel guides.

[0003] A huge amount of data in relation to users of these digital services are collected through their use of these services. This data can be put to good use, for example, in knowing the users spending habit and lifestyles. However, this data often exists on separate platforms which do not communicate with one another. It is therefore difficult for an individual service provider to make use of all the available data so as to provide a seamless service to the cardholder. Further, with the huge amount of data, it is a challenge to organize and process data from a multitude of digital services in quick time to provide a real-time or near real-time user customized message to the service provider and/or cardholder.

Summary

[0004] In accordance with a first aspect of the present invention, there is provided a transaction data processing server for generating a user customized message. The server comprises a processor, a data storage device and a database, the database storing a plurality of cardholder profiles, each of the plurality of cardholder profiles comprising a payment card identifier, a plurality of indicators, and a score associated with each of the plurality of indicators, each indicator being dependent on at least one payment card transaction attribute, the data storage device storing computer program instructions operable to cause the processor to: (i) receive transaction data associated with a payment card transaction, the transaction data comprising a payment card identifier of a payment card associated with the payment card transaction and transaction attributes of the payment card transaction; (ii) update a score of a cardholder profile corresponding to the payment card associated with the payment card transaction according to the transaction attributes of the payment card transaction; (iii) receive a message generation trigger; (iv) extract a target cardholder profile from the database based on the message generation

trigger; (v) generate a customized message for a target cardholder corresponding to the target cardholder profile using the message generation trigger; and (vi) generate a message payload comprising the customized message and an indication of the payment card identifier associated with the target cardholder profile.

[0005] Embodiments of the present invention therefore provide a transaction data processing server for pre-processing transaction data so as to provide a customized message to a cardholder. In particular, the transaction data processing server comprises a processor, a data storage device and a database. The database stores a plurality of cardholder profiles, each of the plurality of cardholder profiles comprising a payment card identifier, a plurality of indicators, and a score associated with each of the plurality of indicators, each indicator being dependent on at least one payment card transaction attribute. The data storage device stores computer program instructions operable to cause the processor to: (i) receive transaction data associated with a payment card transaction, the transaction data comprising a payment card identifier of a payment card associated with the payment card transaction and transaction attributes of the payment card transaction; (ii) update a score of a cardholder profile corresponding to the payment card associated with the payment card transaction according to the transaction attributes of the payment card transaction; (iii) receive a message generation trigger; (iv) extract a target cardholder profile from the database based on the message generation trigger; (v) generate a customized message for a target cardholder corresponding to the target cardholder profile using the message generation trigger; and (vi) generate a message payload comprising the customized message and an indication of the payment card identifier associated with the target cardholder profile. In this way, transaction data can be pre-processed by updating the score of a cardholder profile using the transaction attributes of the payment card transaction. By pre-processing the transaction data, this lightens a burden of the server to process a large amount of data only upon receipt of the message generation trigger or a request from an intermediary server, and therefore provides a means to better managing computing resources for the server. Moreover, since the transaction data has been pre-processed, the server is able to provide the required customized message in real-time or near real-time in response to the message generation trigger. This is important in providing a seamless customer experience to cardholders as will be illustrated in examples provided below. Further, the transaction data processing server functions as a centralized platform for collating different information about a cardholder through payment transactions performed by the cardholder. This provides a consolidated source of information for other service providers to tap on to provide customized messages to their target cardholders, for example, to personalize a reward or a service provided to these target cardholders.

[0006] In addition, embodiments of the present invention may be readily implemented using existing infrastructures so that minimal costs will be incurred to execute the above. The primary set-up required is to provide the transaction data processing server as described for processing and storing information in relation to transaction data received for the cardholder profiles. This can be easily implemented using existing memory storages, servers and/or databases.

[0007] The message generation trigger may comprise an indication of a location and an indication of a payment card, the computer program instructions operable to cause the processor to extract the target cardholder profile from the database may comprise instructions to extract the target cardholder profile using the indication of the target payment card, and the data storage device may further store computer program instructions operable to cause the processor to: (i) identify a recommendation category based on the target cardholder profile; (ii) transmit, to an offer depository, a recommendation request for an offer associated with the recommendation category within a vicinity of the location; and (iii) receive, from the offer depository, a recommendation response comprising the offer, where the message payload further comprises an indication of the offer.

[0008] The message generation trigger may comprise an indication of a monitoring indicator, an indication of a monitoring time period and an indication of a monitoring range, and the data storage device may further store computer program instructions operable to cause the processor to: (i) identify a monitoring score associated with the monitoring indicator for the monitoring time period in relation to each of the plurality of cardholder profiles; and (ii) determine if the monitoring score is within the monitoring range, wherein the computer program instructions operable to cause the processor to extract the target cardholder profile from the database may comprise instructions to extract the target cardholder profile from the database if it is determined that the monitoring score is within the predetermined range.

[0009] The message generation trigger may comprises an indication of a reward criterion for rewarding a cardholder, and the data storage device may further store computer program instructions operable to cause the processor to: (i) identify a reward score associated with the reward criterion; and (ii) determine if the reward score satisfies the reward criterion, wherein the computer program instructions operable to cause the processor to extract the target cardholder profile from the database may comprise instructions to extract the target cardholder profile from the database if it is determined that its reward score satisfies the reward criterion.

[0010] The computer program instructions operable to cause the processor to update the score of the cardholder profile may comprise instructions to increase the score according to a number of payment card transactions performed in relation to an indicator associated with the score.

[0011] The data storage device may further store computer program instructions operable to cause the processor to analyses transaction data associated with a plurality of payment card transactions performed in relation to the cardholder profile to derive a derivative attribute using transaction attributes of the plurality of payment card transactions.

[0012] In accordance with a second aspect of the present invention, there is provided a transaction data processing method of generating a user customized message. The method comprising: (i) receiving transaction data associated with a payment card transaction, the transaction data comprising a payment card identifier of a payment card associated with the payment card transaction and transaction attributes of the payment card transaction; (ii) updating a score of a cardholder profile corresponding to the payment card associated with the payment card transaction according to the transaction attributes of the payment card transaction; (iii) receiving a message generation trigger; (iv) extracting a target cardholder profile from a database based on the message generation trigger, the database storing a plurality of cardholder profiles, each of the plurality of cardholder profiles comprising a payment card identifier, a plurality of indicators, and a score associated with each of the plurality of indicators, each indicator being dependent on at least one payment card transaction attribute; (v) generating a customized message for a target cardholder corresponding to the target cardholder profile using the message generation trigger; and (vi) generating a message payload comprising the customized message and an indication of the payment card identifier associated with the target cardholder profile.

[0013] The message generation trigger may comprise an indication of a location and an indication of a payment card, extracting the target cardholder profile from the database may comprise extracting the target cardholder profile using the indication of the target payment card, and the method may comprise: (i) identifying a recommendation category based on the target cardholder profile; (ii) transmitting, to an offer depository, a recommendation request for an offer associated with the recommendation category within a vicinity of the location; and (iii) receiving, from the offer depository, a recommendation response comprising the offer, where the message payload further comprises an indication of the offer.

[0014] The message generation trigger may be received in response to the payment card transaction performed by the target cardholder.

- [0015]** The message generation trigger may comprise an indication of a monitoring indicator, an indication of a monitoring time period and an indication of a monitoring range, and the method may comprise: (i) identifying a monitoring score associated with the monitoring indicator for the monitoring time period in relation to each of the plurality of cardholder profiles; and (ii) determining if the monitoring score is within the monitoring range, where extracting the target cardholder profile from the database may comprise extracting the target cardholder profile if it is determined that the monitoring score is within the predetermined range.
- [0016]** The message generation trigger may comprise an indication of a reward criterion for rewarding a cardholder, and the method may comprise: (i) identifying a reward score associated with the reward criterion; and (ii) determining if the reward score satisfies the reward criterion, where extracting the target cardholder profile from the database may comprise extracting the target cardholder profile if it is determined that its reward score satisfies the reward criterion.
- [0017]** The message payload may be in the form of a batch file comprising a plurality of customized messages and a plurality of indications of payment card identifiers associated with target cardholder profiles.
- [0018]** The message generation trigger may be received in response to a scheduler, and the method may comprise receiving the message generation trigger from the scheduler for every pre-set period of time.
- [0019]** The method may comprise resetting the monitoring score or resetting the reward score for each of the pre-set period of time according to the scheduler.
- [0020]** The message generation trigger may be received from an external request from an application interface (API).
- [0021]** Updating the score may comprise increasing the score according to a number of payment card transactions performed in relation to an indicator associated with the score.
- [0022]** The transaction attributes may include at least one of a merchant attribute, a transaction amount and a transaction nature.
- [0023]** The method may comprise receiving feedback associated with the customized message.
- [0024]** The method may comprise analyzing transaction data associated with a plurality of payment card transactions performed in relation to the cardholder profile to derive a derivative attribute using transaction attributes of the plurality of payment card transactions.

[0025] In accordance with a third aspect of the present invention, a non-transitory computer-readable medium having stored thereon program instructions for causing at least one processor to perform the preceding method.

[0026] Embodiments of the invention may be implemented as a network of communicating devices (i.e. a “computerized network”). Further embodiments comprise a software application downloadable into a computer device to facilitate the method. The software application may be a computer program product, which may be stored on a non-transitory computer-readable medium on a tangible data-storage device (such as a storage device of a server, or one within a user device).

[0027] Embodiments of the present invention aim to provide a new and useful computer system and computer-implemented method for processing transaction data so as to better manage computing resources as well as to provide a seamless customer experience to cardholders.

[0028] Other desirable features and characteristics will become apparent from the subsequent detailed description and the appended claims, taken in conjunction with the accompanying drawings of the invention.

Brief description of the drawings

[0029] Non-limiting embodiments of the invention will now be described for the sake of example only, with reference to the following drawings in which:

Fig. 1 shows a computer system for processing transaction data in accordance with an embodiment of the present invention;

Fig. 2 shows a block diagram comprising functional modules of a transaction data processing server of the computer system of Fig. 1 in accordance with an embodiment of the present invention;

Fig. 3 shows steps of a transaction data processing method for providing a customized message which may be performed by the transaction data processing server of Fig. 2 in accordance with an embodiment of the present invention;

Fig. 4 shows steps of a method for providing a recommendation offer to a target cardholder which may be performed by the transaction data processing server of Fig. 2 in accordance with an embodiment of the present invention;

Fig. 5 shows steps of a method for providing a prompt to a target cardholder which may be performed by the transaction data processing server of Fig. 2 in accordance with an embodiment of the present invention;

Fig. 6 shows steps of a method for providing a reward to a target cardholder which may be performed by the transaction data processing server of Fig. 2 in accordance with an embodiment of the present invention;

Fig. 7 shows steps of a method for receiving a feedback which may be performed by the transaction data processing server of Fig. 2 in accordance with an embodiment of the present invention;

Fig. 8 shows steps of a method for deriving a derivative attribute in a cardholder profile which may be performed by the transaction data processing server of Fig. 2 in accordance with an embodiment of the present invention;

Fig. 9 shows message flows in a method for processing transaction data using the transaction data processing server comprised in the computer system of Fig. 1 in accordance with an embodiment of the present invention;

Fig. 10 shows message flows in a method for processing transaction data to provide a recommendation offer to a cardholder using the transaction data processing server comprised in the computer system of Fig. 1 in accordance with an embodiment of the present invention;

Fig. 11 shows message flows in a method for processing transaction data to provide a prompt to a cardholder using the transaction data processing server comprised in the computer system of Fig. 1 in accordance with an embodiment of the present invention;

Fig. 12 shows message flows in a method for processing transaction data to provide a reward to a cardholder using the transaction data processing server comprised in the computer system of Fig. 1 in accordance with an embodiment of the present invention;

Fig. 13 shows an example of a cardholder profile which may be used by the transaction data processing server of Fig. 2 in accordance with an embodiment of the present invention; and

Fig. 14 shows schematically a hardware structure of the transaction data processing server of Fig. 2 which may be used in the computer system of Fig. 1 to implement a method in accordance with an embodiment of the present invention.

Detailed description of the embodiment

[0030] As used herein, the term “transaction data” refers to any data associated with a transaction.

[0031] Note that the term “transaction” refers to any form of payment transaction including transactions performed using a physical payment card, or card-not-present payment transactions which may be performed electronically where the payment card is not physically present for the merchant’s examination at the time of the payment transaction. A typical card-not-present payment transaction may involve a user making a purchase of a product on a merchant website associated with a merchant server. Other forms of a card-not-present payment transaction, for example funds transfer or bill payment, may be envisaged as long as there involves a movement of funds between two parties.

[0032] Note that the term “payment card” refers to any cashless payment device associated with a payment account, such as a credit card, a debit card, a prepaid card, a charge card, a membership card, a promotional card, a frequent flyer card, an identification card, a prepaid card, a gift card, and/or any other device that may hold payment account information, such as mobile phones, Smartphones, personal digital assistants (PDAs), key fobs, transponder devices, NFC-enabled devices, and/or computers. In addition, the “payment card” may exist as application-based stored value accounts associated with an electronic wallet service provider tied in with an issuer institution.

[0033] Note that the term “institution” is used here in a sense which is not necessarily limited to organizations which are legally constituted as banks, since in some jurisdictions other organizations may be permitted to maintain financial accounts such as a payment card account. An institution may be one of the following: a bank, a financial technology company, a telecommunication company or a financial institution.

[0034] Note that the term “intermediary server” refers to any computing resources associated with a third party (e.g. a merchant or an institution or the like) for communicating with the transaction data processing server. The party associated with the intermediary server may be registered with the transaction data processing server in order to assess/communicate with the transaction data processing server.

[0035] As used in this application, the terms “component,” “module,” “system,” “apparatus,” “interface,” or the like are generally intended to refer to a computer-related entity, either hardware, a combination of hardware and software, software, or software in execution. For example, a component or a module may be, but is not limited to being, a process running on a processor, a processor, an object, an executable, a thread of execution, a program, and/or a computer. By way of illustration, both an application running on a controller and the controller can be a component or a module. One or more components/modules may

reside within a process and/or thread of execution and a component may be localized on one computer and/or distributed between two or more computers.

[0036] Furthermore, the claimed subject matter may be implemented as a method, apparatus, or article of manufacture using standard programming and/or engineering techniques to produce software, firmware, hardware, or any combination thereof to control a computer to implement the disclosed subject matter. For instance, the claimed subject matter may be implemented as a computer-readable medium embedded with a computer executable program, which encompasses a computer program accessible from any computer-readable storage device or storage media. For example, computer readable media can include but are not limited to magnetic storage devices (e.g., hard disk, floppy disk, magnetic strips . . .), optical disks (e.g., compact disk (CD), digital versatile disk (DVD) . . .), smart cards, and flash memory devices (e.g., card, stick, key drive . . .).

[0037] Fig. 1 shows a computer system 100 for processing transaction data in accordance with an embodiment of the present invention. The computer system 100 comprises a conventional payment architecture which includes a cardholder device 102, a payment card 103 associated with a cardholder, a merchant server 104, an acquirer server 106, a payment network server 108 and an issuer server 110. The cardholder device 102 includes any electronic device associated with the cardholder which enables the cardholder to perform a payment transaction. The payment transaction may be performed either at a merchant physical store or at a merchant portal associated with the merchant, and the payment transaction may be performed by the cardholder using either the cardholder device 102 or the payment card 103. The cardholder device 102 may be a mobile phone, a laptop/notebook, a desktop, a tablet, a personal digital assistant (PDA), a key fob, a transponder device, a NFC-enabled device, and/or a computer. The merchant server 104 is associated with the merchant. The payment card 103 refers to any form of cashless payment device as previously defined. The merchant server 104 may be in communication with a point-of-sale terminal in the merchant's physical store, and/or may provide the merchant portal on which card-not-present payment transactions can be initiated. The acquirer server 106 is operated by an acquirer institution at which the merchant maintains a merchant account to receive funds. The payment network server 108 is associated with a payment network, such as the Banknet payment network operated by Mastercard, for facilitating payment transactions between the cardholder and the merchant. The issuer server 110 is associated with an issuer institution which maintains at least a cardholder account which can be used for processing a payment transaction processed by the merchant server 104. Moreover, the computer system 100 comprises a transaction data processing server 112 which is in communication with the payment network server 108, the merchant server 104 and the cardholder device 102. As will be described in detail below,

embodiments of the methods for processing transaction data are performed at the transaction data processing server 112 to generate a customized message in response to a message generation trigger. Further, the computer system 100 comprises an intermediary server 113. The message generation trigger may be received from the intermediary server 113. The intermediary server 113 may be any computing resources associated with the cardholder device 102, the merchant server 104, the acquirer server 106, the issuer server 110, or any partner who uses the transaction data processing server 112 for generating a customized message. As shown in Fig. 1, the intermediary server 113 is in communication with the cardholder device 102, the merchant server 104, the acquirer server 106, the issuer server 110 and the transaction data processing server 112. Although it is shown in Fig. 1 that the intermediary server 113 is external to the merchant server 104, the acquirer server 106 and the issuer server 110, in embodiments, the intermediary server 113 forms part of the merchant server 104, the acquirer server 106 and the issuer server 110.

[0038] Databases for storing relevant data used in embodiments of the present invention are also included in the computer system 100. As shown in Fig. 1, the computer system 100 comprises a database 114 which is connected to the transaction data processing server 112. In an embodiment, the computer system 100 further comprises an offer depository 115 which is in communication with the transaction data processing server 112. The database 114 may be configured to store data associated with payment transactions processed by the payment network server 108. The data may include a plurality of cardholder profiles associated with the processed payment transactions, pre-processed data associated with these cardholder profiles and/or logic scripts for generating customized messages in response to triggers received etc. Each cardholder profile comprises a payment card identifier, a plurality of indicators, and a score associated with each indicator of the plurality of indicators, where each indicator being dependent on at least one payment card transaction attribute. An example of a cardholder profile is discussed in relation to Fig. 13. The offer depository 115 may be updated with current offers or recommendations for use in providing an offer to a cardholder as exemplified by a method as discussed in relation to Fig. 4 below. Moreover, a payment network database 116 is connected to the payment network server 108 for storing data related to payment transactions performed using the payment network server 108. The data related to the payment transactions include at least the transaction attributes associated with each of these payment transactions. The payment network database 116 may also store data in relation to cardholders and partners (e.g. merchants or financial institutions etc.) who utilize the payment network server 108 for processing payment transactions. Although the database 114 and the payment network database 116 are shown as external databases in

Fig. 1, these databases 114, 116 may also form part of the transaction data processing server 112 and the payment network server 110 respectively. The offer depository 115 may also form part of the transaction data processing server 112.

[0039] While only one cardholder device 102, only one payment card 103 and only one merchant server 104 are shown in Fig. 1, it is appreciated that a plurality of cardholder devices 102, a plurality of payment cards 103 and a plurality of merchant servers 104 associated with respective POS terminals or merchant portals may also form part of the computer system 100. Similarly, a plurality of acquirer servers 106 and a plurality of issuer servers 110 may also be in communication with the payment network server 108 and form part of the computer system 100. A plurality of payment network server 108 may also form part of the computer system 100 such that the transaction data processing server 112 may be in communication with the plurality of payment network servers 108. Likewise, a plurality of payment network databases 116 associated with respective payment network servers 108 may also form part of the computer system 100. Further, although it is shown in Fig. 1 that there is only one intermediary server 113, it is appreciated that a plurality of intermediary servers 113 may also form part of the computer system 100. In an embodiment, the cardholder device 102, the merchant server 104, the acquirer server 106 and the issuer server 110 may each be associated with an intermediary server 113 which is in communication with the transaction data processing server 112.

[0040] Communication between the cardholder device 102, servers 104, 106, 108, 110, 112 and databases 114, 115, 116 may take place via any type of system, for example, a virtual private system (VPN), the Internet, a local area and/or wide area system (LAN and/or WAN), and so on.

[0041] Fig. 2 shows a block diagram comprising functional modules of the transaction data processing server 112 in accordance with an embodiment of the present invention. As shown in Figure 2, the transaction data processing server 112 comprises a communication module 202, a data processing module 204, an application module 206, a delivery module 208, and a feedback module 210. The communication module 202 allows the transaction data processing server 112 to communicate with the payment network server 108, the intermediary server 113, the database 114 and the offer depository 115 over a network (e.g. an internet or an intranet). The data processing module 204 is operable to process transaction data received from the payment network server 108 e.g. to update a score of a cardholder profile. The application module 206 is operable to interface with the intermediary server 113 to receive a message generation trigger from the intermediary server 113, to extract a target cardholder profile from the database 114, to generate a customized message in response to the message generation trigger, and to generate a

message payload comprising the customized message and an indication of the payment card identifier associated with the target cardholder profile. The delivery module 208 is operable to transmit the message payload to the intermediary server 113. The feedback module 210 is operable to receive feedback, for example from the intermediary server 113, associated with the customized message or the message payload.

[0042] Fig. 3 shows steps of a transaction data processing method 300 for providing a customized message which may be performed by the transaction data processing server of Fig. 2 in accordance with an embodiment of the present invention.

[0043] In a step 302, the data processing module 204 of the transaction data processing server 112 receives transaction data associated with a payment card transaction. The transaction data may be received from the payment network server 108 and comprises a payment card identifier of a payment card associated with the payment card transaction and transaction attributes of the payment card transaction. The transaction data may be received from an external source via a suitable API which is in communication with the transaction data processing server 112. The payment card identifier may be a payment card number or a name of the payment card holder or a unique token associated with the payment card or the like. The transaction data associated with a payment transaction may be transmitted from the payment network server 108 to the transaction data processing server 112 as soon as the payment transaction is processed by the payment network server 108. A cardholder profile comprises a payment card identifier which is uniquely associated with the cardholder. In some embodiments, a cardholder profile comprises a plurality of payment card identifiers where each of these payment cards is associated with a same cardholder. The cardholder profile comprises at least one indicator. Each indicator is associated with a score. Each score is associated with at least one transaction attribute of a payment transaction. Each of the transaction attribute may be associated with one or more scores (see e.g. Fig. 13). Examples of a transaction attribute includes a cardholder attribute (e.g. a payment card number used in the payment transaction), a merchant attribute (e.g. a merchant's name, a merchant's location, a type of merchant etc.), a payment amount, a nature of the payment transaction (e.g. contactless, credit card payment, debit card payment etc.), a time and place at which the payment transaction is performed etc. The at least one score/index/indicator may be included in the cardholder profile as required and it is typically included at request by an intermediary server for tracking an attribute or a characteristic of a cardholder profile (e.g. spending with a specific merchant etc.).

[0044] In a step 304, the data processing module 204 of the transaction data processing server 112 updates a score of a cardholder profile corresponding to the payment card

associated with the payment card transaction according to the transaction attributes of the payment card transaction. For example, if a number of contactless transactions for a cardholder is to be tracked, a “contactless score” is introduced in the cardholder profile associated with the cardholder. The data processing module 204 is configured to increase a “contactless score” in the cardholder profile once a contactless transaction is recorded in transaction data received at the transaction data processing server 112. These scores may be accessible to partners or registered users with the transaction data processing server 112, and may be introduced by the partners or registered users to track particular attributes of the cardholder profile which may be of interest. As shown in the example, in generalized terminology, the step of updating the score may comprise increasing the score according to a number of payment card transactions performed in relation to an indicator associated with the score.

[0045] The steps 302 and 304 as described above are performed continuously such that the cardholder profiles are updated regularly. Updating of the scores in the step 304 may be triggered by a receipt of the transaction data in the step 302 (e.g. whenever a payment card transaction is performed by the cardholder), or it may be triggered on a periodic basis as determined by the transaction data processing server 112 or the intermediary server 113 which are tracking the scores.

[0046] In a step 306, the application module 206 of the transaction data processing server 112 receives a message generation trigger. The message generation trigger may be received from the intermediary server 113. The message generation trigger received at the application module 206 may then prompt the application module 206 to execute specific logic scripts in relation to the message generation trigger so as to perform the necessary steps to generate a relevant customized message to the message generation trigger. The different forms of message generation triggers are discussed in relation to Figs. 4 to 6.

[0047] In a step 308, the application module 206 of the transaction data processing server 112 extracts a target cardholder profile from the database 114 based on the message generation trigger received in the step 306. Depending on a requirement associated with the message generation trigger, the application module 206 is configured to identify a target cardholder profile which satisfies a criterion posed by the message generation trigger and extract the target cardholder profile accordingly.

[0048] In a step 310, the application module 206 of the transaction data processing server 112 generates a customized message for a target cardholder corresponding to the target cardholder profile using the message generation trigger. Examples of the customized message generated are discussed below in relation to Figs. 4 to 6.

[0049] In a step 312, the application module 206 of the transaction data processing server 112 generates a message payload comprising the customized message and an indication of the payment card identifier associated with the target cardholder profile. In an embodiment, the message payload comprises customized messages and indications of payment card identifiers associated with a plurality of target cardholder profiles. In this case, the message payload may be in the form of a batch file. The indication of the payment card identifier provides a means for identifying the target cardholder to which the customized message is to be transmitted to. The delivery module 208 of the transaction data processing server 112 may transmit the message payload to the intermediary server 113.

[0050] Figs. 4, 5 and 6 shows methods according to embodiments involving different message generation triggers which may be received by the transaction data processing server 112.

[0051] Fig. 4 shows steps of a method 400 for providing a recommendation offer to a target cardholder which may be performed by the transaction data processing server 112 of Fig. 2 in accordance with an embodiment of the present invention. In this embodiment, the message generation trigger comprises an indication of a location and an indication of a payment card. The message generation trigger may be received in response to a payment card transaction performed by the target cardholder. The location of the target cardholder may be identified using the payment card transaction made by the target cardholder. For example, when the target cardholder uses his or her payment card for payment upon exiting a train station or a public transport system (e.g. by use of EZ-Link in Singapore), a location at which the payment card transaction was performed can be used to identify a location of the target cardholder. A location of the target cardholder may also be identified using the cardholder device 102, for example, via a global positioning system (GPS) of the cardholder device 102. This may be for a scenario in which electronic payment is made an application on the cardholder device 102 and the application communicates with the GPS of the cardholder device 102 to extract a location of the target cardholder at the time of processing the payment card transaction.

[0052] In a step 402, the application module 206 of the transaction data processing server 112 extracts the target cardholder profile from the database 114 using the indication of the payment card. This step serves to further define the step 308 in which the application module 206 of the transaction data processing server 112 is configured to extract a target cardholder profile from the database 114 based on the received message generation trigger.

[0053] In a step 404, the application module 206 of the transaction data processing server 112 identifies a recommendation category based on the target cardholder profile. The recommendation may be identified using a score associated with the target cardholder profile, and may be associated with a high score stored in the target cardholder profile. For example, the target cardholder may be a café lover and have performed a high number of payment card transactions at cafés. In this case, the profile of the target cardholder records a high score associated with cafés and the application module 206 is configured to recommend a café to the target cardholder.

[0054] In a step 406, the application module 206 of the transaction data processing server 112 transmits, to the offer depository 115, a recommendation request for an offer associated with the recommendation category within a vicinity of the location. The application module 206 may be configured to access the offer depository 115 to identify a relevant service or offer which is associated with the recommendation category that is within the vicinity of the location. The relevant vicinity of the identified location may be pre-determined and it may be set to be within a walking distance (e.g. not more than 2 km or not more than 1 km) from the location. Using the above example, once it is determined that the target cardholder likes to go to cafés, the application module 206 is configured to access the offer depository 115 to determine recommended cafés and/or associated offers of the recommended cafés in the vicinity of the location of the target cardholder.

[0055] In a step 408, the application module 206 of the transaction data processing server 112 receives, from the offer depository 115, a recommendation response comprising the offer. Using the above example, the offer may comprise locations of recommended cafés in the vicinity of the identified location. The offer may include discount vouchers for use by the target cardholder in the recommended cafés.

[0056] Once the offer is received from the offer depository 115, the application module 206 of the transaction data processing server 112 generates a customized message for the target cardholder using the received offer, and generates a message payload comprising the customized message and an indication of the payment card identifier associated with the target cardholder profile as described respectively in the steps 310 and 312 above. The delivery module 208 of the transaction data processing server 112 then transmits the message payload to the intermediary server 113 for transmission of the customized message to the target cardholder. Using the above example, once the message payload comprising the offer and the indication of the payment card identifier has been generated, the delivery module 208 of the transaction data processing server 112 transmits the message payload to the intermediary server 113 (e.g. a server associated with an application of the cardholder device 112 such as Samsung Pay API). The intermediary

server 113 may then transmit the offer to the target cardholder for the target cardholder to utilize the offer.

[0057] Fig. 5 shows steps of a method 500 for providing a prompt to a target cardholder which may be performed by the transaction data processing server 112 of Fig. 2 in accordance with an embodiment of the present invention. In this embodiment, the message generation trigger comprises an indication of a monitoring indicator, an indication of a monitoring time period and an indication of a monitoring range.

[0058] An example of a prompt to a target cardholder includes providing a reminder to the target cardholder if the target cardholder has not performed any payment card transaction within a monitoring time period (e.g. a week). This example is used in the following description of the method 500 as illustration of the steps performed by the transaction data processing server 112.

[0059] In a step 502, the application module 206 of the transaction data processing server 112 identifies a monitoring score associated with the monitoring indicator for the monitoring time period in relation to each of the plurality of cardholder profiles. Using the above example, the monitoring score is associated with a number of payment transactions performed by the target cardholders within the monitoring time period. In an embodiment, instead of identifying a monitoring score for each of the plurality of cardholder profiles stored in the database 114, the application module 206 identifies a monitoring score for one of, or some of, the plurality of cardholder profiles. In this case, the identity of the target cardholder profile(s) for monitoring may be comprised in the message generation trigger received. The monitoring time period may be a period of six months, three months, two months, one month, two weeks or one week etc.

[0060] In a step 504, the application module 206 of the transaction data processing server 112 determines if the monitoring score is within the monitoring range. Using the example above, the monitoring range may be set to be not more than one. In this case, if the target cardholder has not performed a single payment card transaction within the monitoring time period (i.e. a transaction score is zero), the application module 206 determines that the monitoring score is within the monitoring range of not more than one.

[0061] In a step 506, the application module 206 of the transaction data processing server 112 extracts the target cardholder profile from the database 114 if it is determined that its monitoring score is within the monitoring range. This step serves to further define the step 308 in which the application module 206 of the transaction data processing server 112 is configured to extract a target cardholder profile from the database 114 based on the received message generation trigger.

[0062] Using the above example, once the application module 206 has determined which of the plurality of cardholder profiles has a transaction score of zero, the application module 206 extracts these target cardholder profiles. In embodiments where predetermined cardholder profile(s) are selected for monitoring, the application module 206 identifies these predetermined cardholder profile(s) using the identities (e.g. in the form of a payment card identifier) of these predetermined cardholder profile(s) provided (e.g. comprised in the message generation trigger) prior to the step 502. The steps 502 and 504 are then performed to identify the monitoring score in each of these predetermined cardholder profile(s) and determine if the monitoring score for each of the predetermined cardholder profile(s) is within the monitoring range. The step 506 is then performed to extract the target cardholder profile(s) from among these predetermined cardholder profile(s) if it is determined that its monitoring score is within the monitoring range.

[0063] In any case, once the target cardholder profile(s) is extracted, the application module 206 of the transaction data processing server 112 generates a customized message for the target cardholder associated with the extracted target cardholder profile, and generates a message payload comprising the customized message and an indication of the payment card identifier associated with the extracted target cardholder profile as described respectively in the steps 310 and 312 above. The delivery module 208 of the transaction data processing server 112 then transmits the message payload to the intermediary server 113 for transmission of the customized message to the target cardholder. Using the above example, the customized message may comprise a prompt to the target cardholder to perform a payment card transaction using the payment card associated with the profile. Once the message payload comprising the customized message and the indication of the payment card identifier has been generated, the delivery module 208 of the transaction data processing server 112 transmits the message payload to the intermediary server 113. The intermediary server 113 may then transmit the customized message to the target cardholder.

[0064] Fig. 6 shows steps of a method 600 for providing a reward to a target cardholder which may be performed by the transaction data processing server 112 of Fig. 2 in accordance with an embodiment of the present invention. The message generation trigger comprises an indication of a reward criterion for rewarding a target cardholder. The reward criterion may be associated with a reward. In an example, the reward criterion is associated with a reward of \$50 for each of a top one hundred spenders within a previous week.

[0065] In a step 602, the application module 206 of the transaction data processing server 112 identifies a reward score associated with the reward criterion for each of the plurality of cardholder profiles. Upon receiving the reward criterion, the application module 206 uses

the reward criterion to identify a score which is relevant to the reward criterion. In an embodiment, instead of identifying a reward score for each of the plurality of cardholder profiles stored in the database 114, the application module 206 identifies a reward score for one of, or some of, the plurality of cardholder profiles. In this case, the identity of the cardholder profile(s) for providing a reward may be comprised in the message generation trigger received. Using the above example where the reward criterion is associated with a reward for a top one hundred spenders within the previous week e.g. counting from 12 am every Monday, the application module 206 is configured to identify a reward score associated with a transaction amount. The reward score of a cardholder profile may increase in relation to a payment amount for each payment card transaction performed by the cardholder associated with the cardholder profile, and may therefore accounts for a total spending by the cardholder of the cardholder profile. This reward score may also be time-tracked according to the reward criterion, and in this case, the reward score may be tracked for one week and therefore is reset every week on Monday at 12am.

[0066] In another embodiment, instead of identifying the reward score associated with the reward criterion for each of the plurality of cardholder profiles first and subsequently tracking the previous week in accordance with the reward criterion, the reward criterion (for example a top one hundred spenders within the previous week) is identified first before tracking the relevant reward score associated with the reward criterion. Using the same example, for this embodiment, scores associated with the previous week may be identified and extracted for each of the cardholder profiles in accordance with the reward criterion, before the reward score for each of the cardholder profiles for that week is tabulated and the cardholder profiles ranked to identify the cardholder profiles with the top one hundred reward scores.

[0067] In a step 604, the application module 206 of the transaction data processing server 112 determines if the reward score satisfies the reward criterion. Using the example above, the application module 206 may determine the reward score for each of the plurality of cardholder profiles for the previous week and ranks the reward score for each of the plurality of cardholder profiles to identify which of these profiles are among the top one hundred (e.g. top one hundred score associated with the transaction amount).

[0068] In a step 606, the application module 206 of the transaction data processing server 112 extracts the target cardholder profile from the database 114 if it is determined that its reward score satisfies the reward criterion. Using the example above, after having identified the reward score for each of the plurality of cardholder profiles, the application module 206 is configured to extract the one hundred cardholder profiles which satisfies the reward criterion. This step serves to further define the step 308 in which the application

module 206 of the transaction data processing server 112 is configured to extract a target cardholder profile from the database 114 based on the received message generation trigger.

[0069] Once the target cardholder profile(s) is extracted, the application module 206 of the transaction data processing server 112 generates a customized message for the target cardholder associated with the extracted target cardholder profile, and generates a message payload comprising the customized message and an indication of the payment card identifier associated with the extracted target cardholder profile as described respectively in the steps 310 and 312 above. The delivery module 208 of the transaction data processing server 112 then transmits the message payload to the intermediary server 113 for transmission of the customized message to the target cardholder. Following from the example above, the customized message may comprise a notification to the target cardholder that he/she has won a \$50 reward for being among the top one hundred spenders for the week. Once the target cardholder profiles associated with the top one hundred reward scores have been extracted, the delivery module 208 transmits the message payload to the intermediary server 113. The intermediary server 113 may then reward the \$50 to each of the target cardholders associated with these one hundred target cardholder profiles accordingly. In this case for example, the message payload may be transmitted in the form of a batch file to the intermediary server. The batch file may be dropped in a secure folder either at the intermediary server or in the database 114 which may be assessed by the intermediary server.

[0070] In a second example, the reward criterion is associated with a \$50 reward for a target cardholder who transacts three times in Hong Kong. In this case, the message generation trigger comprises an indication of a payment card for identifying the target cardholder profile. Using the method 600 as described above, in the step 602, the application module 206 identifies a reward score which is associated with the reward criterion. In this case, the reward score may be a score associated with a number of payment transaction made in Hong Kong. In this specific example, in the step 604, the application module 206 determines if the reward score associated with the target cardholder profile has satisfied the reward criterion. The application module 206 of the transaction data processing server 112 then extracts the target cardholder profile from the database 114 if it is determined that its reward score satisfies the reward criterion. Once the target cardholder profile(s) is extracted, the application module 206 of the transaction data processing server 112 generates a customized message for the target cardholder associated with the extracted target cardholder profile, and generates a message payload comprising the customized message and an indication of the payment card identifier associated with the extracted target cardholder profile as described respectively in the steps 310 and 312 above. The

customized message in this case may comprise a notification to the target cardholder that he/she has won a \$50 reward for having performed three payment card transactions in Hong Kong.

[0071] In some embodiments, the application module 206 monitors a progress of the reward score so that a customized message and a message payload may be generated and the message payload subsequently transmitted via the intermediary server 113 to the cardholder to update the target cardholder of his or her progress in obtaining the reward. For example, once it is determined by the application module 206 using the reward score that the target cardholder has made a first payment transaction in Hong Kong, the delivery module 208 is configured to transmit a message payload comprising a customized message of "Welcome to Hong Kong! This is your first transaction in Hong Kong" to the intermediary server 113 for transmission to the target cardholder. In a similar manner, once it is determined that the target cardholder has made a second transaction in Hong Kong, the delivery module 208 is configured to transmit a message payload comprising a customized message of "This is your second transaction in Hong Kong, one more transaction to receive the reward of \$50" to the intermediary server 113 for transmission to the target cardholder. Once it is determined that the third transaction has been made by the target cardholder in Hong Kong, the delivery module 208 is configured to transmit a message payload comprising a customized message of "Congratulations, you are eligible for the reward of \$50 cashback" to the intermediary server 113 for transmission to the target cardholder.

[0072] In some embodiments, the message generation trigger is received in response to a scheduler. In this case, the application module 206 of the transaction data processing server 112 receives the message generation trigger from the scheduler for every pre-set period of time. The pre-set period of time may be determined by the intermediary server 113. The scheduler may reside in the transaction data processing server 112 or with the intermediary server 113. In the case where the scheduler resides with the transaction data processing server 112, the transaction data processing server 112 is configured to set up the scheduler in response to the pre-set period of time received from the intermediary server 113 (e.g. via an initial message generation trigger received). Using the example where a reward of \$50 is to be awarded to the top one hundred spenders every week, the scheduler in this case may be configured to transmit a message generation trigger to the application module 206 at a same time every week (e.g. 12 am every Monday) so that the application module 206 can extract the relevant target cardholder profiles in relation to the message generation trigger for transmitting a customized message. In some embodiments, the data processing module 204 of the data processing server 112 is configured to reset

the monitoring score or the reward score for each of the pre-set period of time according to the scheduler.

[0073] In some embodiments, the message generation trigger is received from an external request from an application interface (API) via the intermediary server 113. For example, a message generation trigger in relation to providing a recommendation may be received from an intermediary server 113 associated with a Samsung Pay API of the cardholder device 102 whenever the target cardholder uses the Samsung Pay application in the cardholder device 102 to perform a payment card transaction.

[0074] As described above, the message generation trigger can take many forms and the application module 206 of the transaction data processing server 112 may be configured accordingly to adapt to the different forms of the message generation trigger, for example as shown in relation to Figs. 4 to 6. In an embodiment, specific logic scripts may be used to customize the steps taken by the application module 206 so as to extract relevant target cardholder profiles for a customized message to be transmitted to the target cardholders associated with these extracted target cardholder profiles. In another embodiment, specific logic scripts may be used to customize the steps taken by the application module 206 so as to determine if selected cardholder profiles qualify for a reward or require a reminder to be sent. In some embodiments, the plurality of cardholder profiles stored in the database 114 are created in response to a request received from an intermediary server 113 associated with a merchant or a financial institution etc. who wishes to use the data processing capability of the transaction data processing server 112 to run a specific campaign. In this case, the intermediary server 113 may provide a list of cardholders (e.g. a list of payment card numbers associated with the list of cardholders) to the data processing server 112 to set up the cardholder profiles for updating and monitoring. In some embodiments, the plurality of cardholder profiles may be associated with the registered users on the payment network server 108 and these cardholder profiles are set up and stored in the database 114 as long as transaction data associated with these registered users is received at the transaction data processing server 112.

[0075] It is noted that the intermediary server 113 may have access to particular information, for example in the location of the target cardholder in the scenario described with reference to Fig.4. However, the intermediary service 113 may not have access to details of all the transactions carried out by the cardholder. Embodiments of the present disclosure allow data from multiple sources to be combined to provide customized messages to the cardholder that may not be possible using data from one source alone.

[0076] Fig. 7 shows steps of a method 700 for receiving a feedback which may be performed by the transaction data processing server 112 of Fig. 2 in accordance with an embodiment of the present invention.

[0077] In a step 702, the feedback module 210 of the transaction data processing server 112 receives feedback associated with the customized message. Feedback may be provided by the target cardholder who has received the customized message, and this feedback may be received by the feedback module 210 via the intermediary server 113. The feedback may be in relation to whether the target cardholder has utilized the recommendation or a reward. The feedback may be associated with a quality of the customized message provided to the target cardholder. In the above example described in relation to Fig. 4 where cafés within a vicinity of a location associated with a target cardholder are recommended to the target cardholder, feedback from the target cardholder may include a relevance of the recommendation. For example, recommendation of cafés may be relevant within a certain time period of the day (e.g. tea time from 3 pm to 5 pm) or a location (e.g. near a shopping area rather than an office location etc.).

[0078] Fig. 8 shows steps of a method 800 for deriving a derivative attribute in a cardholder profile which may be performed by the transaction data processing server 112 of Fig. 2 in accordance with an embodiment of the present invention. A further score associated with the derivative attribute may also be included in the cardholder profile.

[0079] In a step 802, the data processing module 204 of the transaction data processing server 112 analyses the transaction data associated with a plurality of payment card transactions performed in relation to the cardholder profile to derive a derivative attribute using transaction attributes of the plurality of payment card transactions. For example, by analyzing a time, a location and a type of payment transaction (these can each be considered a transaction attribute), the data processing module 204 may work out a transaction pattern or a lifestyle pattern of the cardholder. For example, the cardholder may be regularly making transactions in a certain area around lunch time (e.g. 12 noon to 2 pm) on weekdays. The data processing module 204 may be able to use the type of payment transactions (e.g. a merchant type associated with a restaurant), the time at which the payment transactions are processed, and the locations of the payment transactions to deduce an area which the cardholder may be working at. The derivative attribute in this case may be associated with a workplace of the cardholder. The derivative attribute may be retrospectively tagged to the payment transactions which are deemed to be associated with a workplace of the cardholder. In this case, a further score associated with the above derivative attribute which is associated with a workplace of the cardholder

may be formed and subsequently updated accordingly as transaction data is received at the transaction data processing server 112. To provide an example, a message generation trigger associated with recommending relevant restaurants for business lunches to a target cardholder may use the further score associated with the workplace of the target cardholder to determine which may be the relevant restaurants to recommend.

[0080] Fig. 9 shows message flows in a method 900 for processing transaction data using the transaction data processing server 112 comprised in the computer system 100 of Fig. 1 in accordance with an embodiment of the present invention. As described above, the intermediary server 113 may be any third party computing resources which is in communication with the transaction data processing server 112 for transmitting a message generation trigger to the transaction data processing server 112 and for receiving a customized message from the transaction data processing server 112.

[0081] In a step 902, the data processing module 204 of the transaction data processing server 112 receives transaction data from the payment network server 108. The transaction data comprises a payment card identifier of a payment card associated with the payment card transaction and transaction attributes of the payment card transaction. Upon receiving the transaction data in the step 902, the data processing module 204 of the transaction data processing server 112 updates a score of a cardholder profile corresponding to the payment card associated with the payment card transaction according to the transaction attributes of the payment card transaction in a step 904. The score is accessible to the intermediary server 113 (e.g. partners or registered users with the transaction data processing server 112).

[0082] In a step 906, the application module 206 of the transaction data processing server 112 receives a message generation trigger from the intermediary server 113. The message generation trigger received at the application module 206 may then prompt the application module 206 to execute specific logic scripts in relation to the message generation trigger so as to perform the necessary steps to generate a relevant customized message to the message generation trigger. The different forms of triggers are discussed in relation to Figs. 4 to 6. In a step 908, the application module 206 of the transaction data processing server 112 extracts a target cardholder profile from the database 114 based on the message generation trigger received in the step 906. Depending on a requirement associated with the message generation trigger, the application module 206 determines the target cardholder profile which satisfies a criteria posed by the message generation trigger and extract the target cardholder profile accordingly. In a step 910, the application module 206 of the transaction data processing server 112 generates a customized message for a target cardholder corresponding to the target cardholder profile using the

message generation trigger. In a step 912, the application module 206 of the transaction data processing server 112 generates a message payload comprising the customized message and an indication of the payment card identifier associated with the target cardholder profile. In a step 914, the delivery module 208 of the transaction data processing server 112 transmits the message payload to the intermediary server 113.

[0083] Fig. 10 shows message flows in a method 1000 for processing transaction data to provide a recommendation offer to a target cardholder using the transaction data processing server 112 comprised in the computer system 100 of Fig. 1 in accordance with an embodiment of the present invention.

[0084] In a step 1002, the application module 206 of the transaction data processing server 112 receives a message generation trigger from the intermediary server 113. The message generation trigger comprises an indication of a location and an indication of a payment card. In a step 1004, the application module 206 of the transaction data processing server 112 extracts the target cardholder profile from the database 114 using the indication of the payment card received in the step 1002. In a step 1006, the application module 206 of the transaction data processing server 112 identifies a recommendation category based on the target cardholder profile. The recommendation category may be identified using a score associated with the target cardholder profile. In a step 1008, the application module 206 of the transaction data processing server 112 transmits, to the offer depository 115, a recommendation request for an offer associated with the recommendation category within a vicinity of the location. In a step 1010, the application module 206 of the transaction data processing server 112 receives, from the offer depository 115, a recommendation response comprising the offer. In a step 1012, the application module 206 of the transaction data processing server 112 generates a customized message for the target cardholder corresponding to the target cardholder profile using the message generation trigger. The customized message comprises the offer received from the offer depository 115 in the step 1010. In a step 1014, the application module 206 of the transaction data processing server 112 generates a message payload comprising the customized message and an indication of the payment card identifier associated with the target cardholder profile. In a step 1016, the delivery module 208 of the transaction data processing server 112 transmits the message payload to the intermediary server 113 for transmission of the customized message to the target cardholder associated with the target cardholder profile.

[0085] Fig. 11 shows message flows in a method 1100 for processing transaction data to provide a prompt to a target cardholder using the transaction data processing server 112

comprised in the computer system 100 of Fig. 1 in accordance with an embodiment of the present invention.

[0086] In a step 1102, the application module 206 of the transaction data processing server 112 receives a message generation trigger from the intermediary server 113. The message generation trigger comprises an indication of a monitoring indicator, an indication of a monitoring time period and an indication of a monitoring range. In a step 1104, the application module 206 of the transaction data processing server 112 identifies a monitoring score associated with the monitoring indicator for the monitoring time period in relation to each of the plurality of cardholder profiles. In a step 1106, the application module 206 of the transaction data processing server 112 determines if the monitoring score is within the monitoring range. In a step 1108, the application module 206 of the transaction data processing server 112 extracts the target cardholder profile from the database 114 if it is determined that its monitoring score is within the monitoring range. In a step 1110, the application module 206 of the transaction data processing server 112 generates a customized message for the target cardholder corresponding to the target cardholder profile using the message generation trigger. The customized message comprises a prompt to the target cardholder to perform a payment card transaction using the payment card associated with the profile. In a step 1112, the application module 206 of the transaction data processing server 112 generates a message payload comprising the customized message and an indication of the payment card identifier associated with the target cardholder profile. In a step 1114, the delivery module 208 of the transaction data processing server 112 transmits the message payload to the intermediary server 113 for transmission of the customized message to the target cardholder associated with the target cardholder profile.

[0087] Fig. 12 shows message flows in a method 1200 for processing transaction data to provide a reward to a target cardholder using the transaction data processing server 112 comprised in the computer system 100 of Fig. 1 in accordance with an embodiment of the present invention.

[0088] In a step 1202, the application module 206 of the transaction data processing server 112 receives a message generation trigger from the intermediary server 113. The message generation trigger comprises an indication of a reward criterion for rewarding a target cardholder. The reward criterion may be associated with a reward. In a step 1204, the application module 206 of the transaction data processing server 112 identifies a reward score associated with the reward criterion for each of the plurality of cardholder profiles. In a step 1206, the application module 206 of the transaction data processing server 112 determines if the reward score satisfies the reward criterion. In a step 1208, the

application module 206 of the transaction data processing server 112 extracts the target cardholder profile from the database 114 if it is determined that its reward score satisfies the reward criterion. In a step 1210, the application module 206 of the transaction data processing server 112 generates a customized message for the target cardholder corresponding to the target cardholder profile using the message generation trigger. The customized message comprises a notification to the target cardholder that he/she has won a reward. In a step 1212, the application module 206 of the transaction data processing server 112 generates a message payload comprising the customized message and an indication of the payment card identifier associated with the target cardholder profile. In a step 1214, the delivery module 208 of the transaction data processing server 112 transmits the message payload to the intermediary server 113 for transmission of the customized message to the target cardholder associated with the target cardholder profile.

[0089] Fig. 13 shows an example of a cardholder profile 1300 which may be used by the transaction data processing server 112 of Fig. 2 in accordance with an embodiment of the present invention.

[0090] The cardholder profile 1300 is associated with a profile identifier 1302. This may be a payment card identifier (e.g. a payment card number) associated with the cardholder of the cardholder profile. The cardholder profile comprises a number of scores where each of the scores is associated with each of a plurality of indicators, each indicator being dependent on at least one transaction attribute of the transaction data received from the payment network server 108. The transaction data may be associated with all of the payment card transactions performed using the payment card associated with the payment card number 1302 which is as shown in a transaction parameter 1303. In some embodiments, a range of payment card transactions or a subset of all the payment card transactions may be defined for use in updating the cardholder profile 1300. The cardholder profile 1300 as shown comprises a number of indicators 1304, 1306, 1308, 1310, 1312, 1314, 1316. These indicators may be used to categories the scores. In the present embodiment as shown in Fig. 13, the indicators include industry scores 1304, custom scores 1306 and merchant scores 1308. Associated with each indicator may be other indicators. In this embodiment, the other indicators include "eating places" 1310, "grocery stores" 1312, "automotive fuel" 1314 and "other transportation fuel" 1316. At least one score may be entered for each of these indicators. For example, for the indicator "eating places" 1310, the scores may be associated with a number of payment card transactions performed by the cardholder which is associated with a merchant type of an eatery.

[0091] As shown in Fig. 13, in the present embodiment, there is a row of twenty-four parameters associated with the indicator “eating places” 1310. The number of parameters associated with each indicator may however be adjusted accordingly. Each parameter may be associated with a weekly score under the indicator “eating places” 1310. For instance, w1 may represent the score for the indicator “eating places” 1310 in week 1, w2 may represent the score for the indicator “eating places” 1310 in week 2 and so forth. The twenty-four parameters from “w1, w2, w3 ... w24” therefore each represent a score for a week up to a total of twenty-four weeks. In other words, for the cardholder profile 1300 as shown in Fig.13, a total of twenty-four scores for the indicator “eating places” 1310 can be recorded. These twenty-four scores are therefore a record of the score related to “eating places” 1310 in a span of twenty-four weeks. In an embodiment, once all the twenty-four parameters have been filled, the score for the 25th week may be used to replace the score of w1, the score for the 26th week may be used to replace the score of w2 and so forth, so that the score for the indicator “eating places” 1310 is continuously updated. In another embodiment, once all the twenty-four parameters have been filled, all of the twenty-four parameters may be cleared to generate fresh set of bins of “w1, w2, w3.... w24” so that no record of the previous twenty-four weeks-block is kept in the cardholder profile 1300. This is similar for the indicators “Grocery stores” 1312, “automotive fuel” 1314 and “other transportation fuel” 1316 as shown in Fig. 13.

[0092] It is to be understood that the logics used in the above embodiments for calculating, maintaining and refreshing the scores are customizable and not hard coded within the system of the transaction data processing server 112. In yet another embodiment, the score associated with the indicator “eating places” 1310 can be increased by one for every incoming transaction which is associated with an eatery / a restaurant / a café. The score may be an aggregate score at a weekly level (e.g. Week 1, Week 2... ... Week X) where the number of weeks (e.g. up to X) may be coded within the system and customized. The score can be aggregated for the trailing X weeks. For example, after each week for X weeks, the score is refreshed and replaced so that the score is only an aggregate score for that week for a total of X times.

[0093] Similarly, the indicator of Custom Scores 1306 as shown may be associated with indicators such as “Contactless”, “CoffeeTransactions”, “MovieTransactions” and “GroceryTransactions”. Each of these indicators is also associated with a row of twenty-four parameters as described above and they are editable in a similar manner.

[0094] Another example of keeping track of a score in the cardholder profile 1300 is shown in relation to the indicator of Merchant Scores 1308. The indicator Merchant Scores 1308 may associated with other indicators in relation to merchant names such as “McD” 1317,

“XX” 1318 and “YY” 1319 as shown. For each of these merchants, there is a counter (i.e. a score) which keeps track of the number of payment transactions performed at each of these merchants. For example, as shown in Fig. 10, there is a count 1320 of 50 for “McD” 1317.

[0095] Fig. 13 shows an example of a cardholder profile 1300. A plurality of these cardholder profiles may be stored in the database 114. In an embodiment, once the transaction data is received from the payment network server 108, the data processing module 204 of the transaction data processing server 112 updates the relevant scores in a cardholder profile 1300 using the transaction attributes associated with the transaction data. The parameters and/or the counts as described above may then be updated accordingly. It is possible that two indicators may be related to one transaction attribute. For example, if a payment transaction is processed for the merchant “McD” 1317, the count 1320 associated with the indicator “merchantName: “McD”” and a relevant score associated with the indicator “eating places” 1310 may be updated accordingly.

[0096] Fig. 14 is a block diagram showing a technical architecture of the transaction data processing server 112 according to an embodiment of the present invention. The technical architecture of the transaction data processing server 112 is for performing steps of exemplary methods as described above. Typically, the methods are implemented by a number of computers each having a data-processing unit. The block diagram as shown in Figure 14 illustrates a technical architecture of a computer which is suitable for implementing one or more embodiments herein.

[0097] The technical architecture includes a processor 1402 (which may be referred to as a central processor unit or CPU) that is in communication with memory devices including secondary storage 1404 (such as disk drives), read only memory (ROM) 1406, and random access memory (RAM) 1408. The processor 1402 may be implemented as one or more CPU chips. The technical architecture may further comprise input/output (I/O) devices 1410, and system connectivity or network devices 1412.

[0098] The secondary storage 1404 is typically comprised of one or more disk drives or tape drives and is used for non-volatile storage of data and as an over-flow data storage device if RAM 1408 is not large enough to hold all working data. Secondary storage 1404 may be used to store programs which are loaded into RAM 1408 when such programs are selected for execution. In this embodiment, the secondary storage 1404 has a communication module 202, a data processing module 204, an application module 206, a delivery module 208 and a feedback module 210 comprising non-transitory instructions operative by the processor 1402 to perform various operations of the method of the present invention. As depicted in Figure 14, the modules 202, 204, 206, 208, 210 are

distinct modules which perform respective functions implemented by the transaction data processing server 112. It will be appreciated that the boundaries between these modules are exemplary only, and that alternative embodiments may merge modules or impose an alternative decomposition of functionality of modules. For example, the modules discussed herein may be decomposed into sub-modules to be executed as multiple computer processes, and, optionally, on multiple computers. Moreover, alternative embodiments may combine multiple instances of a particular module or sub-module. It will also be appreciated that, while a software implementation of the modules 202, 204, 206, 208, 210 is described herein, these may alternatively be implemented as one or more hardware modules (such as field-programmable gate array(s) or application-specific integrated circuit(s)) comprising circuitry which implements equivalent functionality to that implemented in software. The ROM 1406 is used to store instructions and perhaps data which are read during program execution. The secondary storage 1404, the ROM 1406, and/or the RAM 1408 may be referred to in some contexts as computer readable storage media and/or non-transitory computer readable media.

[0099] I/O devices 1410 may include printers, video monitors, liquid crystal displays (LCDs), plasma displays, touch screen displays, keyboards, keypads, switches, dials, mice, track balls, voice recognizers, card readers, paper tape readers, or other input devices.

[00100] The system connectivity or network devices 1412 may take the form of modems, modem banks, Ethernet cards, universal serial bus (USB) interface cards, serial interfaces, token ring cards, fiber distributed data interface (FDDI) cards, wireless local area system (WLAN) cards, radio transceiver cards that promote radio communications using protocols such as code division multiple access (CDMA), global system for mobile communications (GSM), long-term evolution (LTE), worldwide interoperability for microwave access (WiMAX), near field communications (NFC), radio frequency identity (RFID), and/or other air interface protocol radio transceiver cards, and other system devices. These system connectivity or network devices 1412 may enable the processor 1402 to communicate with the Internet or one or more intranets. With such a system connection, it is contemplated that the processor 1402 might receive information from the system, or might output information to the system in the course of performing the above-described method operations. Such information, which is often represented as a sequence of instructions to be executed using processor 1402, may be received from and outputted to the system, for example, in the form of a computer data signal embodied in a carrier wave.

[00101] The processor 1402 executes instructions, codes, computer programs, scripts which it accesses from hard disk, floppy disk, optical disk (these various disk based

systems may all be considered secondary storage 1404), flash drive, ROM 1406, RAM 1408, or the system connectivity or network devices 1412. While only one processor 1402 is shown, multiple processors may be present. Thus, while instructions may be discussed as executed by a processor, the instructions may be executed simultaneously, serially, or otherwise executed by one or multiple processors.

[00102] Although the technical architecture is described with reference to a computer, it should be appreciated that the technical architecture may be formed by two or more computers in communication with each other that collaborate to perform a task. For example, but not by way of limitation, an application may be partitioned in such a way as to permit concurrent and/or parallel processing of the instructions of the application. Alternatively, the data processed by the application may be partitioned in such a way as to permit concurrent and/or parallel processing of different portions of a data set by the two or more computers. In an embodiment, virtualization software may be employed by the technical architecture to provide the functionality of a number of servers that is not directly bound to the number of computers in the technical architecture. In an embodiment, the functionality disclosed above may be provided by executing an application and/or applications in a cloud computing environment. Cloud computing may comprise providing computing services via a system connection using dynamically scalable computing resources. A cloud computing environment may be established by an enterprise and/or may be hired on an as-needed basis from a third party provider.

[00103] It is understood that by programming and/or loading executable instructions onto the technical architecture, at least one of the CPU 1402, the ROM 1406, and the RAM 1408 are changed, transforming the technical architecture in part into a specific purpose machine or apparatus having the novel functionality taught by the present invention. It is fundamental to the electrical engineering and software engineering arts that functionality that can be implemented by loading executable software into a computer can be converted to a hardware implementation by well-known design rules.

[00104] Whilst the foregoing description has described exemplary embodiments, it will be understood by those skilled in the art that many variations of the embodiments can be made within the scope of the invention as defined by the claims. Moreover, features of one or more embodiments may be mixed and matched with features of one or more other embodiments.

Claims

1. A transaction data processing server for generating a user customized message, the server comprising a processor, a data storage device and a database, the database storing a plurality of cardholder profiles, each of the plurality of cardholder profiles comprising a payment card identifier, a plurality of indicators, and a score associated with each of the plurality of indicators, each indicator being dependent on at least one payment card transaction attribute, the data storage device storing computer program instructions operable to cause the processor to:

receive transaction data associated with a payment card transaction, the transaction data comprising a payment card identifier of a payment card associated with the payment card transaction and transaction attributes of the payment card transaction;

update a score of a cardholder profile corresponding to the payment card associated with the payment card transaction according to the transaction attributes of the payment card transaction;

receive a message generation trigger;

extract a target cardholder profile from the database based on the message generation trigger;

generate a customized message for a target cardholder corresponding to the target cardholder profile using the message generation trigger; and

generate a message payload comprising the customized message and an indication of the payment card identifier associated with the target cardholder profile.

2. The server of claim 1, wherein the message generation trigger comprises an indication of a location and an indication of the target payment card, the computer program instructions operable to cause the processor to extract the target cardholder profile from the database comprise instructions to extract the target cardholder profile using the indication of the target payment card, and the data storage device further stores computer program instructions operable to cause the processor to:

identify a recommendation category based on the target cardholder profile;

transmit, to an offer depository, a recommendation request for an offer associated with the recommendation category within a vicinity of the location; and

receive, from the offer depository, a recommendation response comprising the offer, wherein the message payload further comprises an indication of the offer.

3. The server of claim 1, wherein the message generation trigger comprises an indication of a monitoring indicator, an indication of a monitoring time period and an indication of a

monitoring range, the data storage device further stores computer program instructions operable to cause the processor to:

- identify a monitoring score associated with the monitoring indicator for the monitoring time period in relation to each of the plurality of cardholder profiles; and

- determine if the monitoring score is within the monitoring range,

- wherein the computer program instructions operable to cause the processor to extract the target cardholder profile from the database comprise instructions to extract the target cardholder profile from the database if it is determined that its monitoring score is within the predetermined range.

4. The server of claim 1, wherein the message generation trigger comprises an indication of a reward criterion for rewarding a cardholder, the data storage device further stores computer program instructions operable to cause the processor to:

- identify a reward score associated with the reward criterion for each of the plurality of cardholder profiles; and

- determine if the reward score satisfies the reward criterion,

- wherein the computer program instructions operable to cause the processor to extract the target cardholder profile from the database comprise instructions to extract the target cardholder profile from the database if it is determined that its reward score satisfies the reward criterion.

5. The server of any one of the preceding claims, wherein the computer program instructions operable to cause the processor to update the score of the cardholder profile comprise instructions to increase the score by one for each payment card transaction performed in relation to an indicator associated with the score.

6. The server of any one of the preceding claims, wherein the data storage device further stores computer program instructions operable to cause the processor to analyze transaction data associated with a plurality of payment card transactions performed in relation to the cardholder profile to derive a derivative attribute using transaction attributes of the plurality of payment card transactions.

7. A transaction data processing method of generating a user customized message, the method comprising:

- receiving transaction data associated with a payment card transaction, the transaction data comprising a payment card identifier of a payment card associated with the payment card transaction and transaction attributes of the payment card transaction;

updating a score of a cardholder profile corresponding to the payment card associated with the payment card transaction according to the transaction attributes of the payment card transaction;

receiving a message generation trigger;

extracting a target cardholder profile from a database based on the message generation trigger, the database storing a plurality of cardholder profiles, each of the plurality of cardholder profiles comprising a payment card identifier, a plurality of indicators, and a score associated with each of the plurality of indicators, each indicator being dependent on at least one payment card transaction attribute;

generating a customized message for a target cardholder corresponding to the target cardholder profile using the message generation trigger; and

generating a message payload comprising the customized message and an indication of the payment card identifier associated with the target cardholder profile.

8. The method of claim 7, wherein the message generation trigger comprises an indication of a location and an indication of a payment card, extracting the target cardholder profile from the database comprises extracting the target cardholder profile using the indication of the target payment card, and the method further comprises:

identifying a recommendation category based on the target cardholder profile;

transmitting, to an offer depository, a recommendation request for an offer associated with the recommendation category within a vicinity of the location; and

receiving, from the offer depository, a recommendation response comprising the offer, wherein the message payload further comprises an indication of the offer.

9. The method of claim 8, wherein the message generation trigger is received in response to the payment card transaction performed by the target cardholder.

10. The method of claim 7, wherein the message generation trigger comprises an indication of a monitoring indicator, an indication of a monitoring time period and an indication of a monitoring range, the method further comprises:

identifying a monitoring score associated with the monitoring indicator for the monitoring time period in relation to each of the plurality of cardholder profiles; and

determining if the monitoring score is within the monitoring range,

wherein extracting the target cardholder profile from the database comprises extracting the target cardholder profile if it is determined that the monitoring score is within the predetermined range.

11. The method of claim 7, the message generation trigger comprises an indication of a reward criterion for rewarding a cardholder, the method further comprising:
- identifying a reward score associated with the reward criterion; and
 - determining if the reward score satisfies the reward criterion,
- wherein extracting the target cardholder profile from the database comprises extracting the target cardholder profile if it is determined that its reward score satisfies the reward criterion.
12. The method of any one of claims 7 to 11, wherein the message payload is in the form of a batch file comprising a plurality of customized messages and a plurality of indications of payment card identifiers associated with target cardholder profiles.
13. The method of any one of claims 10 to 12, wherein the message generation trigger is received in response to a scheduler, the method further comprises receiving the message generation trigger from the scheduler for every pre-set period of time.
14. The method of claim 13 further comprising resetting the monitoring score when it is dependent on claim 10 or resetting the reward score when it is dependent on claim 11 for each of the pre-set period of time according to the scheduler.
15. The method of claims 7 to 14, wherein the message generation trigger is received from an external request from an application interface (API).
16. The method of claims 7 to 15, wherein the step of updating the score comprises increasing the score according to a number of payment card transactions performed in relation to an indicator associated with the score.
17. The method of claims 7 to 16, wherein the transaction attributes include at least one of: a merchant attribute, a transaction amount and a transaction nature.
18. The method of claims 7 to 17, further comprising receiving feedback associated with the customized message.
19. The method of claims 7 to 18, further comprising analyzing transaction data associated with a plurality of payment card transactions performed in relation to the cardholder profile to derive a derivative attribute using transaction attributes of the plurality of payment card transactions.

20. A non-transitory computer-readable medium having stored thereon program instructions for causing at least one processor to perform the method according to any one of claims 7 to 19.