

# **ELECTRONIC TRANSACTION SYSTEM AND METHOD**

## **Technical Field**

[0001] The present disclosure generally relates to an electronic transaction system and method. Particularly, the present disclosure describes various embodiments of an electronic system and method for a consumer to transact with a merchant, and more particularly with an electronic device of the consumer.

## **Background**

[0002] Transactions between consumers and merchants may occur online or by virtual interaction, such as electronic commerce (e-commerce) transactions, or may occur by physical interaction, such as at brick and mortar merchant retail stores with conventional merchant billing machines or point-of-sale (POS) terminals. There are some transactions that involve a mixture of virtual and physical interactions, such as for payment of parking fees, entertainment venue tickets, or road tolls. In such transactions, the payment happens at the point of entry or usage and the payment procedure can be time consuming. For example, at a road toll booth, a consumer (driver) uses a payment card to interact a road toll payment terminal to deduct a road toll from the payment card. This requires the vehicle to remain stationary and some time to be spent at the road toll booth. Additional time may be required if the driver is not ready upon arrival at the road toll booth, such as if the driver is fumbling to find the payment card. The time spent at the road toll booth may cause a queue of vehicles to form behind, deteriorating consumer experience for the other drivers. In some situations, the road toll booth operator or merchant may accept online payments, such as via a website of the merchant. However, this would require the consumer to know beforehand which road toll booth he/she will be passing through, in order to pay for the road toll before arriving at the road toll booth. If the consumer waits until he/she is near the road toll booth to pay, the consumer needs to spend some time on a mobile device to search through the internet to find the website of the merchant to make the online payment. This similarly may cause a queue of vehicles and deteriorates consumer experience.

[0003] Therefore, in order to address or alleviate at least one of the aforementioned problems and/or disadvantages, there is a need to provide an electronic transaction system and method in which there is at least one improved feature.

## **Summary**

[0004] According to a first aspect of the present disclosure, there is an electronic system, a computerized method, and a non-transitory computer-readable storage medium for a consumer to transact with a merchant. The system comprises a server configured for performing steps of the method, comprising: receiving, from an electronic device of the consumer, a request to access a directory of merchants identified based on location data of the electronic device; communicating identification details of the merchants from a merchant database to the electronic device; communicating merchandise details of the merchants from the merchant database to the electronic device, the merchandise details comprising details of merchandise available for purchase from each merchant; receiving, from the electronic device, a selection of merchandise to purchase from a selected merchant; communicating, to the electronic device, payment information determined based on the selected merchant and selected merchandise, the payment information comprising details of a financial account of the selected merchant and cost data of the selected merchandise; receiving, from the electronic device, details of a payment instrument of the consumer; and communicating the consumer payment instrument details and payment information to a payment network for processing payment to the selected merchant.

[0005] According to a second aspect of the present disclosure, there is an electronic system, a computerized method, and a non-transitory computer-readable storage medium for a consumer to transact with a merchant. The system comprises an electronic device of the consumer, the electronic device having an application stored thereon, the application executable for performing steps of the method, comprising: communicating, to a server, a request to access a directory of merchants identified based on location data of the electronic device; receiving identification details of the

merchants from a merchant database communicatively linked to the server; receiving merchandise details of the merchants from the merchant database, the merchandise details comprising details of merchandise available for purchase from each merchant; communicating, to the server, a selection of merchandise to purchase from a selected merchant; receiving, from the server, payment information determined based on the selected merchant and selected merchandise, the payment information comprising details of a financial account of the selected merchant and cost data of the selected merchandise; communicating, to the server, details of a payment instrument of the consumer, wherein the consumer payment instrument details and payment information are communicable from the server to a payment network for processing payment to the selected merchant.

[0006] An electronic transaction system and method according to the present disclosure is thus disclosed herein. Various features, aspects, and advantages of the present disclosure will become more apparent from the following detailed description of the embodiments of the present disclosure, by way of non-limiting examples only, along with the accompanying drawings.

### **Brief Description of the Drawings**

[0007] FIG. 1 is an illustration of an electronic system for a consumer to transact with a merchant, in accordance with embodiments of the present disclosure.

[0008] FIG. 2 is a flowchart illustration of a computerized method for a consumer to transact with a merchant, in accordance with embodiments of the present disclosure.

[0009] FIG. 3 is another flowchart illustration of a computerized method for a consumer to transact with a merchant, in accordance with embodiments of the present disclosure.

[0010] FIG. 4 is a block diagram illustration of the technical architecture of a server of the electronic system of FIG. 1, in accordance with embodiments of the present disclosure.

## Detailed Description

[0011] In the present disclosure, depiction of a given element or consideration or use of a particular element number in a particular figure or a reference thereto in corresponding descriptive material can encompass the same, an equivalent, or an analogous element or element number identified in another figure or descriptive material associated therewith. The use of “/” in a figure or associated text is understood to mean “and/or” unless otherwise indicated. For purposes of brevity and clarity, descriptions of embodiments of the present disclosure are directed to an electronic transaction system and method, in accordance with the drawings. While aspects of the present disclosure will be described in conjunction with the embodiments provided herein, it will be understood that they are not intended to limit the present disclosure to these embodiments. On the contrary, the present disclosure is intended to cover alternatives, modifications and equivalents to the embodiments described herein, which are included within the scope of the present disclosure as defined by the appended claims. Furthermore, in the following detailed description, specific details are set forth in order to provide a thorough understanding of the present disclosure. However, it will be recognized by an individual having ordinary skill in the art, i.e. a skilled person, that the present disclosure may be practiced without specific details, and/or with multiple details arising from combinations of aspects of particular embodiments. In a number of instances, known systems, methods, procedures, and components have not been described in detail so as to not unnecessarily obscure aspects of the embodiments of the present disclosure.

### Overview

[0012] In representative or exemplary embodiments of the present disclosure, there is provided an electronic system 10 as illustrated in FIG. 1. The system 10 includes a server 100 having a processor and a data storage device or memory configured to store computer-readable instructions. The server 100 operative for performing a transaction between a consumer and a merchant. The system 10 further includes an

electronic device 200 of the consumer, wherein the electronic device 200 is used by the consumer to initiate the transaction. The system 10 further includes a payment network 20 for processing payment of the transaction. The system 10 further includes a merchant database 30 for storing details of merchants, such as identification details and merchandise details of the merchants. It will be appreciated that the merchant database 30 may reside locally on the server 100, or alternatively on a remote server or computer communicatively linked to the server 100.

[0013] The consumer initiates the transaction with the electronic device 200. The consumer accesses a software application / mobile application / online website / online interface (hereafter referred to as “application”) on the electronic device 200 and communicates, to the server 100, a request to access a directory of merchants identified based on location data of the electronic device 200. The electronic device 200 receives, from the server 100, identification details and merchandise details of the merchants, which are retrieved from the merchant database 30. The identification details may include location addresses of the merchants, and the merchants may be represented on a map interface or geographical map that is displayed on the electronic device 200 according to location addresses of the merchants. The merchandise details include details of merchandise available for purchase from each merchant.

[0014] Based on the merchandise details displayed on the electronic device 200, the consumer selects merchandise to purchase from a selected merchant. This selection of merchandise is communicated to the server 100 and in response thereto, the server 100 determines payment information based on the selected merchant and selected merchandise. The payment information includes details of a financial account of the selected merchant and cost data of the selected merchandise. The payment information may include a payment address or link which the consumer can use to access a payment gateway with the electronic device 200. At the payment gateway, the consumer inputs details of a payment instrument.

[0015] The consumer payment instrument details are communicated to the server 100. The merchant financial account details and cost data of the selected

merchandise included in the payment information are determined based on the merchant identification and merchandise details. For example, the merchant identification details include a merchant identifier that is linked to a merchant bank account. The merchandise details include the total cost of the selected merchandise, e.g. cost of a per-entry road toll. The server 100 communicates the consumer payment instrument details and payment information to the payment network 20 for processing payment to the selected merchant.

[0016] An advantage of the present disclosure is that the consumer can browse the directory of merchants to look for specific merchants to purchase specific merchandise, such as to pay a road toll at an oncoming road toll booth. The merchants are identified based on location of the consumer so that the consumer can quickly identify nearby merchants. Furthermore, having the merchants overlaid on the map interface allows for more intuitive searching for merchants, as compared to searching the internet to find the correct merchant website to pay the merchant.

[0017] Another advantage is that the transaction is performed at the leisure of the consumer, and the consumer does not have to be at the location of the merchant to complete the purchase. For example, the consumer can pay for the road toll during an approach to the road toll booth instead of doing so upon arrival. Less time is spent at the merchant location and it is thus less likely for queues to form up behind. In the example of a road toll booth, transactions can be processed faster and more vehicles can drive through the road toll booth at a quicker rate, thereby improving consumer experience for the drivers.

#### Description of Embodiments

[0018] In various embodiments further with reference to FIG. 2 and FIG. 3, there is shown a computer-implemented or computerized method 300 implemented on the server 100 of the electronic system 10, as well as a corresponding computer-implemented or computerized method 400 implemented on the electronic device 200 of the electronic system 10, for performing a transaction between a consumer and a merchant. The transaction may be performed before the consumer arrives at the

merchant location. The consumer initiates the transaction with the electronic device 200 and payment of the transaction would be completed by the time the consumer arrive at the merchant location, allowing the consumer to simply receive the purchased merchandise upon arrival.

[0019] The electronic device 200 may be a mobile device such as a mobile phone, smartphone, personal digital assistant (PDA), tablets, laptop, or computer. Furthermore, the electronic device 200 may be configured and operative as a digital wallet linked to one or more payment instruments of the consumer. The digital wallet may be operated on a software application executable on the electronic device 200. An example of a digital wallet is MasterPass® by MasterCard®. Details of the payment instruments may be tokenized and stored locally on the electronic device 200, or retrieved remotely with the electronic device 200. The term “payment instrument” may refer to any suitable cashless payment mode or mechanism, such as payment cards. Payment cards may include credit cards, debit cards, prepaid cards, and/or charge cards which the customer uses to pay for transactions. In addition to payment cards, payment instruments may include, but are not limited to, membership cards, promotional cards, frequent flyer cards, identification cards, gift cards, and/or any other payment cards that may hold payment card information and which may be stored electronically.

[0020] The consumer firstly executes the application on the electronic device 200 to initiate the transaction. The application may be standalone and separate from the digital wallet application, or integrated with the digital wallet application as a single application. In a step 402 of the method 400, the electronic device 200 communicates to the server 100 a request to access a directory of merchants identified based on location data of the electronic device 200, such as in a vicinity or within a predefined radius of the consumer or more specifically of the electronic device 200. Correspondingly, in a step 302 of the method 300, the server 100 receives the request from the electronic device 200. It will be appreciated that the electronic device 200 includes a data communications module / component 200a and the server 100 similarly includes a data communications module / component

100a, wherein communications between the electronic device 200 and server 100 occur between the data communications modules 100a and 200a.

[0021] In a step 304, the server 100 communicates identification details of the merchants to the electronic device 200. Correspondingly, in a step 404, the electronic device 200 receives the identification details of the merchants from the server 100. The identification details of the merchants are retrieved, by a data retrieval module / component 100b of the server 100, from the merchant database 30. The identification details of the merchants include, but are not limited to, merchant identifiers, names, location addresses, phone numbers, and/or merchant category codes (MCC) of the merchants. The directory of merchants is represented by the identification details of the merchants and is displayed on the electronic device 200 for browsing by the consumer. Broadly, the directory of merchants refers to a digital catalog of merchants viewable on the electronic device 200 and that allows the consumer to browse and identify one or more merchants therefrom.

[0022] In one embodiment, the directory of merchants is displayed in the form of a list structure and the consumer may browse the directory of merchants by scrolling through the list structure. Notably, the merchants displayed are those that are nearby the consumer, so that the consumers can quickly identify them to perform the transaction. The identification details of the merchants may be displayed as a menu or dropdown box beneath each merchant in the list structure. The merchants in the list structure may be filtered / sorted by various parameters, such as their names, location addresses, or MCC. For example, the consumer may adjust the predefined radius to filter the merchants that are in the vicinity of the consumer as determined by the location data of the electronic device 200. The merchants may be ranked according to distance from the consumer, such as displaying the nearest merchants at the top of the list structure. It will be appreciated that the location data may be obtained by a geolocation module / component 200b in the electronic device 200.

[0023] In another embodiment, the directory of merchants is represented according to the location addresses on a map interface or geographical map displayed on the electronic device 200. For example, the merchants are overlaid on the map interface

such that the consumer is able to quickly view the merchants on the map interface. The identification details of the merchants may be overlaid against the merchants represented on the map interface, such as being displayed as a menu or dropdown box next to each merchant represented on the map interface. The consumer may zoom into the map interface to more easily search for merchants that are in the vicinity of or nearby the consumer. The map interface may be provided by a digital map service provider, such as Google Maps or Apple Maps. Similarly, various options and/or filters may be implemented to assist the consumer in searching for a merchant among the directory of merchants. For example, the consumer may filter merchants based on user heuristics, such as which merchants he/she has transacted with most recently or frequently in the past. This enables the consumer to more easily identify his/her preferred merchants which are often different from another consumer, thereby improving consumer experience. The representation of the directory of merchants on the map interface allows for more intuitive exploring and searching of merchants by the consumer, as the locations of the merchants are more visually apparent to the consumer.

[0024] In a step 306, the server 100 communicates merchandise details of the merchants to the electronic device 200. Correspondingly, in a step 406, the electronic device 200 receives the merchandise details of the merchants from the server 100. The merchandise details of the merchants are retrieved, by the data retrieval module / component 100b, from the merchant database 30. The merchandise details include details of merchandise available for purchase from each merchant. The merchandise may include one or more goods, products, services, fees, and/or charges which the consumer would pay for to the merchant. In the example of a merchant being a road toll booth operator, the merchandise would be a toll chargeable to the consumer.

[0025] While the consumer is browsing through the directory of merchants on the electronic device 200, he/she may browse through the merchandise available for purchase from one or more merchants. In one example, if the consumer is driving, he/she may select the road toll booth operator (merchant) which he/she is about to approach. A list of merchandise available for purchase from the road toll booth

operator is displayed to the consumer, the merchandise including the toll charge. In another example, the consumer may select a service facility (merchant), e.g. petrol station, along a highway where he/she is driving on. A list of merchandise available for purchase from the service facility is displayed to the consumer, the merchandise including fuel, snacks, drinks, and sundries.

[0026] The merchandise available for purchase from the merchants may also be sorted or filtered based on user heuristics. For example, based on transaction history of the consumer, the more frequently purchased merchandise may be ranked higher and displayed to the consumer next to the respective merchant on the list structure / map interface. This enables the consumer to more easily identify his/her preferred merchandise which are often different from another consumer, thereby improving consumer experience.

[0027] In a step 408, from the merchandise details displayed on the electronic device 200, the consumer selects a number of merchandise to purchase from a merchant. The merchandise may be selected by the consumer via the map interface. In a step 410, the electronic device 200 communicates the selection of merchandise to the server 100. Correspondingly, in a step 308, the server 100 receives the selection of merchandise from the electronic device 200. A merchandise selection module / component 100c of the server 100 identifies the merchant which the consumer has selected to purchase the merchandise from, as well as each selected merchandise to be purchased, from the merchant database 30.

[0028] In a step 310, a payment information module / component 100d of the server 100 determines payment information based on the selected merchant and the selected merchandise. The payment information includes details of a financial account of the selected merchant determined from the identification details of the selected merchant. The merchant financial account may be a bank account or a credit instrument held by the merchant at a financial institution. The payment information further includes cost data of the selected merchandise determined from the merchandise details. The cost data of the selected merchandise refers to the

consolidated amount which the consumer is required to pay to the selected merchant for purchase of the selected merchandise.

[0029] The merchant financial account details and cost data may be encoded in the payment information such that the payment information is readable by the digital wallet of the application or by a separate digital wallet application for payment to the merchant. Alternatively, the payment information may include a payment address or link that may refer to or be represented by a web or internet address, e.g. uniform resource locator (URL) or uniform resource identifier (URI), linking or pointing to a payment gateway. The payment gateway refers to an online payment interface, e.g. website or online portal, accessible by the electronic device 200 for providing consumer payment instrument details and making payment of the selected merchandise to the selected merchant.

[0030] In one embodiment, the merchant database 30 stores predefined sets of payment information associated with the merchants in the directory of merchants, wherein each predefined set of payment information is associated with one merchant. For example, the merchant is a service facility that sells a range of merchandise. The predefined set of payment information associated with the merchant includes the financial account details of the merchant for payment to the merchant. In the step 310, the payment information module 100d determines the payment information from the predefined sets of payment information, wherein the payment information is associated with the selected merchant which the consumer is purchasing the selected merchandise from. The payment information may include a payment address to a payment gateway for payment of the selected merchandise to the selected merchant. For example, the selected merchandise includes multiple products to be purchased from the selected merchant, e.g. fuel and sundries from a service facility. The payment gateway is accessible by the electronic device 200 via the payment address for providing consumer payment instrument details and making a consolidated payment for all of the selected merchandise.

[0031] In another embodiment, the merchant database 30 stores predefined sets of payment information associated with the merchants in the directory of merchants,

wherein each merchant is associated with a number of predefined sets of payment information. More specifically, for each merchant, each predefined set of payment information is associated with individual merchandise (e.g. a product or service) available for purchase from the merchant. For example, the merchant is a road toll booth operator that charges a toll on vehicles passing through a road gantry. There is a predefined set of payment information associated with the toll charge that links to a payment gateway for payment of the toll charge. In another example, the merchant is an entertainment venue that avails two categories of tickets or entrance fees. There is a first predefined set of payment information associated with the first ticket category and a second predefined set of payment information associated with the second ticket category. The first and second sets of payment information include the merchant financial account details as well as the respective cost data of the first ticket category and second ticket category, respectively. The first and second sets of payment information may include respective payment addresses (e.g. URLs / URIs) that link to separate payment gateways for payment of the two categories of tickets. Each in the number of predefined sets of payment information is thus unique to the individual merchandise of the merchant. In the step 310, the payment information module 100d determines the payment information from the number of predefined sets of payment information associated with the selected merchant.

[0032] In a step 312, the server 100 communicates the payment information to the electronic device 200. Correspondingly, in a step 412, the electronic device 200 receives the payment information from the server 100. The payment information may include a payment address (e.g. URL / URI) displayed on the electronic device 200 which the consumer can use to access the payment gateway. The payment information may thus be represented by and displayed on the electronic device 200 as a URL / URI or a matrix barcode / quick response (QR) code that is readable by the digital wallet for payment to the merchant.

[0033] In a step 414, the consumer inputs details of a payment instrument of the consumer. The payment instrument details may be manually entered into the electronic device 200 or may be retrieved from the digital wallet operated on the electronic device 200. In a step 416, the electronic device 200 communicates the

payment instrument details to the server 100. Correspondingly, in a step 314, the server 100 receives the payment instrument details from the electronic device 200. It will be appreciated that provision of the payment instrument details by the consumer may involve other known features, such as but not limited to security and/or authorization mechanisms, as would be readily known to the skilled person.

[0034] In a step 316, the server 100 communicates the consumer payment instrument details and payment information, which includes the merchant financial account details and cost data, to the payment network 20 for processing payment to the selected merchant. It will be appreciated that the processing of payment by the payment network 20, including communications between the acquirer financial institution / bank of the merchant financial account and issuer financial institution / bank of the consumer payment instrument, is performed in a standard manner and will be readily understood by the skilled person. Payment of the transaction is completed after processing of payment to the selected merchant, specifically from the consumer payment instrument to the merchant financial account.

[0035] After processing of payment to the selected merchant, the server 100 communicates consumer payment data to the electronic device 200 and merchant payment data to an electronic device of the merchant. More specifically, an issuer financial institution of the consumer payment instrument within the payment network 20 communicates the consumer payment data, and an acquirer financial institution of the merchant financial account within the payment network 20 communicates the merchant payment data. The consumer payment data and merchant payment data serves as a form of payment receipts, informing the consumer and selected merchant that the payment has been successfully completed. The merchant electronic device may be a merchant billing machine, POS terminal, or mobile device / phone located at the merchant premises, e.g. road toll booth. The consumer payment data and merchant payment data correspond to or are associated with each other such that they are verifiable against each other. The verification may be based on a wireless or contactless communication protocol. The contactless communication protocol may be or relate to one or more of near field communication

(NFC), matrix barcode / QR code scanning, Wi-Fi, and Bluetooth. Alternatively, the verification may be based on a one time password (OTP).

[0036] In one embodiment, the consumer payment data is represented by and displayed as a matrix barcode / QR code on the electronic device 200. Upon arrival at the selected merchant, e.g. road toll booth, the consumer presents the electronic device 200 to the POS terminal at the road toll booth. The POS terminal scans the matrix barcode and reads optical data therefrom. The optical data is verified by the POS terminal, or by a merchant computing device communicatively linked to the POS terminal, against the merchant payment data. The consumer payment data is verified if the optical data matches the merchant payment data. Upon verification, the road toll booth activates a road gantry to permit the consumer therethrough.

[0037] In another embodiment, the consumer payment data is represented by NFC data stored on the electronic device 200. Upon arrival at the selected merchant, e.g. service facility, the consumer presents the electronic device 200 to the POS terminal at the service facility. The POS terminal reads the NFC data from the electronic device 200. The NFC data is verified by the POS terminal, or by a merchant computing device communicatively linked to the POS terminal, against the merchant payment data. The consumer payment data is verified if the NFC data matches the merchant payment data. Upon verification, the consumer collects the selected merchandise from the selected merchant. Alternatively, the selected merchant may deliver the selected merchandise to a designated address of the consumer.

[0038] In another embodiment, the consumer payment data is represented by an OTP received, e.g. as a text message, by the electronic device 200. Upon arrival at the selected merchant, e.g. service facility, the consumer shows or reads out the OTP to a merchant staff at the service facility. The merchant staff manually verifies the OTP provided by the consumer against the merchant payment data which contains an identical OTP received by the merchant electronic device.

[0039] After completion of the transaction, the consumer may save details of the selected merchant on the electronic device 200, so that it would be more convenient

to identify this merchant in the directory of merchants for future transactions. More broadly, the details of one or more merchants may be stored on the electronic device 200, particularly when the consumer has identified certain merchants in the directory of merchants that he/she would potentially transact with in future. These details may be communicated to the server 100 to refine user heuristics data, so as to improve consumer experience when the method 300 / 400 is used again in future.

[0040] New merchants may participate in the system 10 so that consumers may transact with them using the method 300 / 400. Participation or enrolment of a new merchant may be performed through an acquirer financial institution. The acquirer financial institution sets up a number of predefined sets of payment information for the merchant. For example, there may be a single predefined set of payment information associated with the merchant, or multiple predefined sets of payment information associated with individual merchandise available for purchase from the merchant. The payment information including the identification and merchandise details of the merchant is communicated to the merchant database 30 for storage and the merchant is added to the directory of merchants.

[0041] As described above, an advantage is that the consumer can browse the directory of merchants to look for specific merchants to purchase specific merchandise. For example, the consumer may be driving towards an oncoming roll toll booth. Instead of spending some time at the road toll booth to make payment for the toll charge, the consumer can pay the road toll before arriving at the road toll booth. In another example, the consumer may be driving towards a drive-through store and intends to purchase some products. The consumer can use the method 300 / 400 to select and pay for the products before arriving at the drive-through store. Upon arrival at the drive-through store, the consumer can present the consumer payment data and collect the purchased products. Therefore, the transaction can be performed at the leisure of the consumer without the consumer being present at the merchant location or premises. Waiting times are reduced which could be important particularly if the purchased merchandise are perishable consumables, e.g. milk, fresh foods, etc., or are time-sensitive, e.g. parking charges for a predefined duration. By spending less time at the merchant location, it is less likely for queues to form up

behind the consumer, such as in the example of road toll booths. Transactions can thus be processed faster and at a quicker rate, thereby improving consumer experience.

[0042] While some examples of merchants and merchandise are described in various embodiments, such as road toll booths and service facilities or stations, it will be appreciated that various aspects of these embodiments may be applicable to other merchants and merchandise. Some examples include, but are not limited to, service providers such as car wash and car parks, as well as entertainment venues that charge for tickets or entrance fees, such as amusement parks and zoos.

### Technical Architecture

[0043] The following is a description of the technical architecture of the server 100 with reference to FIG. 4. It will be appreciated that the electronic device 200 may have a similar technical architecture as well.

[0044] The technical architecture of the server 100 includes a processor 102 (also referred to as a central processor unit or CPU) that is in communication with memory devices including secondary storage 104 (such as disk drives or memory cards), read only memory (ROM) 106, and random access memory (RAM) 108. The processor 102 may be implemented as one or more CPU chips. Various modules or components for performing various operations or steps of the method 300 / 400 are configured as part of the processor 102 and such operations or steps are performed in response to non-transitory instructions operative or executed by the processor 102.

[0045] The technical architecture further includes input/output (I/O) devices 110, and network connectivity devices 112. The secondary storage 104 typically includes a memory card or other storage device and is used for non-volatile storage of data and as an over-flow data storage device if RAM 108 is not large enough to hold all working data. Secondary storage 104 may be used to store programs which are loaded into RAM 108 when such programs are selected for execution.

[0046] The secondary storage 104 has a processing component 114, including non-transitory instructions operative by the processor 102 to perform various operations or steps of the method 300 / 400 according to various embodiments of the present disclosure. The ROM 106 is used to store instructions and perhaps data which are read during program execution. The secondary storage 104, the ROM 106, and/or the RAM 108 may be referred to in some contexts as computer-readable storage media and/or non-transitory computer-readable media. Non-transitory computer-readable media include all computer-readable media, with the sole exception being a transitory propagating signal per se.

[0047] The I/O devices 110 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, and/or other known input devices.

[0048] The network connectivity devices 112 may take the form of modems, modem banks, Ethernet cards, universal serial bus (USB) interface cards, serial interfaces, token ring cards, fibre distributed data interface (FDDI) cards, wireless local area network (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 communication (NFC), radio frequency identity (RFID), and/or other air interface protocol radio transceiver cards, and other known network devices. These network connectivity devices 112 may enable the processor 102 to communicate with the Internet or one or more intranets. With such a network connection, it is contemplated that the processor 102 might receive information from the network, or might output information to the network in the course of performing the operations or steps of the method 300 / 400. Such information, which is often represented as a sequence of instructions to be executed using processor 102, may be received from and outputted to the network, for example, in the form of a computer data signal embodied in a carrier wave.

[0049] The processor 102 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 104), flash drive, ROM 106, RAM 108, or the network connectivity devices 112. While only one processor 102 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.

[0050] It will be appreciated that the technical architecture of the server 100 may be formed by one computer, or multiple 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 multiple 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 the application and/or applications in a cloud computing environment. Cloud computing may include providing computing services via a network 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.

[0051] It is understood that by programming and/or loading executable instructions onto the technical architecture of the server 100, at least one of the CPU 102, the ROM 106, and the RAM 108 are changed, transforming the technical architecture in part into a specific purpose machine or apparatus having the functionality as taught by various embodiments of the present disclosure. 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 known design rules.

[0052] In the foregoing detailed description, embodiments of the present disclosure in relation to an electronic transaction system and method are described with reference to the provided figures. The description of the various embodiments herein is not intended to call out or be limited only to specific or particular representations of the present disclosure, but merely to illustrate non-limiting examples of the present disclosure. The present disclosure serves to address at least one of the mentioned problems and issues associated with the prior art. Although only some embodiments of the present disclosure are disclosed herein, it will be apparent to a person having ordinary skill in the art in view of this disclosure that a variety of changes and/or modifications can be made to the disclosed embodiments without departing from the scope of the present disclosure. Therefore, the scope of the disclosure as well as the scope of the following claims is not limited to embodiments described herein.

## Claims

1. An electronic system for a consumer to transact with a merchant, the system comprising a server configured for performing steps comprising:
  - receiving, from an electronic device of the consumer, a request to access a directory of merchants identified based on location data of the electronic device;
  - communicating identification details of the merchants from a merchant database to the electronic device;
  - communicating merchandise details of the merchants from the merchant database to the electronic device, the merchandise details comprising details of merchandise available for purchase from each merchant;
  - receiving, from the electronic device, a selection of merchandise to purchase from a selected merchant;
  - communicating, to the electronic device, payment information determined based on the selected merchant and selected merchandise, the payment information comprising details of a financial account of the selected merchant and cost data of the selected merchandise;
  - receiving, from the electronic device, details of a payment instrument of the consumer; and
  - communicating the consumer payment instrument details and payment information to a payment network for processing payment to the selected merchant.
2. The system according to claim 1, wherein the identification details comprise location addresses of the merchants.
3. The system according to claim 2, wherein the directory of merchants is represented according to the location addresses on a map interface displayed on the electronic device.
4. The system according to any one of claims 1 to 3, wherein the merchant database stores predefined sets of payment information associated with the

merchants, and wherein the payment information is determined from a number of pre-defined sets of payment information associated with the selected merchant.

5. The system according to any one of claims 1 to 3, wherein the payment information comprises a payment address linking to a payment gateway accessible by the electronic device for providing the consumer payment instrument details.

6. The system according to claim 5, wherein the payment address is represented by a uniform resource locator / identifier or matrix barcode.

7. The system according to any one of claims 1 to 6, the steps further comprising communicating consumer payment data to the electronic device after processing of payment to the selected merchant.

8. The system according to claim 7, the steps further comprising communicating merchant payment data to an electronic device of the selected merchant after processing of payment to the selected merchant.

9. The system according to claim 8, wherein the consumer payment data and merchant payment data are verifiable against each other based on a contactless communication protocol.

10. The system according to claim 9, wherein the contactless communication protocol relates to near field communication (NFC) or matrix barcode scanning.

11. A computerized method for a consumer to transact with a merchant, the method performed by a server of an electronic system according to any one of claims 1 to 10.

12. A non-transitory computer-readable storage medium storing computer-readable instructions that, when executed, cause a server to perform a method according to claim 11.

13. An electronic system for a consumer to transact with a merchant, the system comprising an electronic device of the consumer, the electronic device having an application stored thereon, the application executable for performing steps comprising:

- communicating, to a server, a request to access a directory of merchants identified based on location data of the electronic device, the directory of merchants represented on a map interface displayed on the electronic device;

- receiving identification details of the merchants from a merchant database communicatively linked to the server, the identification details overlaid against the merchants represented on the map interface;

- receiving merchandise details of the merchants from the merchant database, the merchandise details comprising details of merchandise available for purchase from each merchant;

- communicating, to the server, a selection of merchandise to purchase from a selected merchant, the merchandise selected by the consumer via the map interface;

- receiving, from the server, payment information determined based on the selected merchant and selected merchandise, the payment information comprising details of a financial account of the selected merchant and cost data of the selected merchandise;

- communicating, to the server, details of a payment instrument of the consumer,

- wherein the consumer payment instrument details and payment information are communicable from the server to a payment network for processing payment to the selected merchant.

14. The system according to claim 13, the steps further comprising:

- receiving consumer payment data from the server after processing of payment to the selected merchant; and

- verifying the consumer payment data against merchant payment data of the merchant,

wherein verification of the consumer payment data allows the consumer to collect the selected merchandise from the selected merchant.

15. The system according to claims 13 or 14, wherein the payment information comprises a payment address linking to a payment gateway accessible by the electronic device for providing the consumer payment instrument details.

16. The system according to claim 15, wherein the payment address is represented by a uniform resource locator / identifier or matrix barcode.

17. The system according to any one of claims 14 to 16, wherein the merchant payment data is communicated to an electronic device of the selected merchant.

18. The system according to any one of claims 14 to 17, wherein the consumer payment data is represented by near field communication (NFC) data or a matrix barcode.

19. A computerized method for a consumer to transact with a merchant, the method performed by an application stored on a consumer electronic device of an electronic system according to any one of claims 13 to 18.

20. A non-transitory computer-readable storage medium storing computer-readable instructions that, when executed, cause an application stored on a consumer electronic device to perform a method according to claim 19.