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Recommended Citation

Na, Hyeonmin; Rizvi, Sajjad; and Chittari, Balakrishna, "METHOD AND SYSTEM FOR DETERMINING SUSTAINABILITY INFORMATION IN AUTHORISATION MESSAGE", Technical Disclosure Commons, (November 28, 2021)

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**METHOD AND SYSTEM FOR DETERMINING SUSTAINABILITY
INFORMATION IN AUTHORISATION MESSAGE**

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TECHNICAL FIELD

[0001] The present subject matter related to field of financial transactions, more particularly to determine carbon intensity sustainability score in authorisation message based on transaction history.

BACKGROUND

[0002] The carbon footprint is an important aspect of daily living. As individuals become more environmentally concerned, there is a greater need for financial products that provide carbon-sensitive solutions. The carbon footprint is the amount of carbon dioxide emitted due to your daily activities. There are other solutions from financial services companies that provide a generalized approach to determining carbon impact by calculating carbon sustainability score. Such score may be calculated based on total number of transactions for that registered Permanent Account Number (PAN) user using real-time transaction. Today people are more aware of their carbon impact and there is a strong business need for carbon analysis products.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] The accompanying drawings, which are incorporated in and constitute a part of this disclosure, illustrate exemplary embodiments and, together with the description, serve to explain the disclosed principles. In the figures, the left-most digit(s) of a reference number identifies the figure in which the reference number first appears. The same numbers are used throughout the figures to reference like features and components. Some embodiments of device or system and/or methods in accordance with embodiments of the present subject matter are now described, by way of example only, and with reference to the accompanying figures, in which:

[0004] Fig. 1a illustrates an exemplary environment of a system for implementing embodiments consistent with the present disclosure;

[0005] Fig. 2 shows a flowchart illustrating a process for calculating sustainability score in authorisation message based on transaction history; and

[0006] Fig. 3 illustrates a block diagram of an exemplary computer system for implementing embodiments consistent with the present disclosure.

[0007] The figures depict embodiments of the disclosure for purposes of illustration only. One skilled in the art will readily recognize from the following description that alternative embodiments of the structures and methods illustrated herein may be employed without departing from the principles of the disclosure described herein.

DESCRIPTION OF THE DISCLOSURE

[0008] In the present document, the word "exemplary" is used herein to mean "serving as an example, instance, or illustration." Any embodiment or implementation of the present subject matter described herein as "exemplary" is not necessarily to be construed as preferred or advantageous over other embodiments.

[0009] While the disclosure is susceptible to various modifications and alternative forms, specific embodiment thereof has been shown by way of example in the drawings and will be described in detail below. It should be understood, however that it is not intended to limit the disclosure to the particular forms disclosed, but on the contrary, the disclosure is to cover all modifications, equivalents, and alternative falling within the spirit and the scope of the disclosure.

[0010] The terms "comprises", "comprising", or any other variations thereof, are intended to cover a non-exclusive inclusion, such that a setup, device or method that comprises a list of components or steps does not include only those components or steps but may include other components or steps not expressly listed or inherent to such setup or device or method. In other words, one or more elements in a device or system or apparatus preceded by "comprises... a" does not, without more constraints, preclude the existence of other elements or additional elements in the device or system or apparatus.

[0011] The terms "an embodiment", "embodiment", "embodiments", "the embodiment", "the embodiments", "one or more embodiments", "some embodiments", and "one embodiment" mean "one or more (but not all) embodiments of the invention(s)" unless expressly specified otherwise.

[0012] The terms "including", "comprising", "having" and variations thereof mean "including but not limited to", unless expressly specified otherwise.

[0013] The present disclosure proposes a method and a system for determining sustainability information in authorisation message based on transaction history. The proposed system calculates a sustainability score based on the cardholder's transaction history, allowing the cardholder/user to make a payment. The sustainability score may be communicated to the cardholder via an issuer. That is, the system will not directly provide/communicate the sustainability score to the user, but it will facilitate that via the issuer. The proposed system provides information on the carbon intensity of a purchase, as well as a market-indexed benchmark score.

[0014] **Fig. 1** illustrates an exemplary environment 100 of a system for implementing embodiments consistent with the present disclosure. In an embodiment, the exemplary environment 100 may include, without limiting to, a merchant Point of Sale (POS) 101, an acquirer 103, a card network 105, and an issuer 109. When a customer submits a card to a retailer (and/or merchant) for the purpose of purchasing goods or services, the retailer charges the card by swiping it at a POS terminal. The merchant's bank gathers all transactions to calculate how much to pay the retailer and transmits each transaction to the bank that issued the card for that transaction. The card may be debit card, credit card or reloadable prepaid card which is issued for transactions to the cardholder. The card network 105 receives inputs from Carbon (CO₂) intensity Database (DB) 107 and sustainability scoring engine 111. The carbon footprint is the total greenhouse gas emission which is directly or indirectly caused by a product and expressed as "carbon dioxide equivalent" (represented as CO₂eq). In an embodiment, a method for calculating sustainability score in authorisation message based on transaction history in real time is disclosed. The method is performed by the system. Carbon sustainability score calculators are an example of eco-feedback technology that helps cardholders understand their impact on the environment. Cardholders may calculate their overall carbon footprint, which includes direct and indirect greenhouse gas emissions, by entering information about their lifestyle and living conditions into a calculator. Any consumer who has a payment card is referred to as a cardholder. The user/cardholder associated with the Primary Account Number (PAN) requests the transaction information from the card acceptor. A Primary Account Number (PAN) is a unique identifying number connected with a payment card, such as a credit card, EMI card, Gift card, prepaid card, or a debit card, that is used for a financial transaction.

PAN is a multi-digit number that is specified to be 16 or 19 digits long and consists of the Bank Identification Number (BIN) and the account number. Merchant POS 101 may assess a carbon intensity of goods in checkout basket. A POS terminal is a machine installed at merchant establishments which enables the merchants to accept payments through payment cards.

[0015] As an example, when a user/cardholder accesses the website which has an online shopping function enabled, the website allows the user to purchase goods/products/services online and takes electronic payments via debit cards, credit cards, net banking, and so on. The cardholder goes to the merchant point of sale 101 and chooses the goods or products or services which user/cardholder wishes to purchase, then adds the goods/services to the shopping basket. After the merchant receives the items, the carbon intensity (for example, decimal 123.45 or null) may be computed, with each product having its own carbon intensity. Thereafter, the merchant sends the complete data to the acquirer 103. The acquirer 103 functions as a gateway, acquiring transaction data from the card acceptor and transfers it to an interchange/exchange system. Thereafter, acquirer 103 sends the payment or transaction details to card network 105 and sends the request for authentication to an issuer 109 for verification of one or more details. The one or more details include, but are not limited to, are card number, transaction limit, carbon emission limit, and the like. The issuer 109 utilises one or more data, wherein one or more data include carbon transaction and latest green score of the PAN which provides information and insights to users related to online banking or transaction statements and so on. For instance, a green score may be tracked overtime based on trend analysis for particular user/cardholder on aggregate carbon footprint. The aggregation of carbon footprint analysed based on purchase made in a day, or a week, or a month, or a year. The issuer 109 receives a request from card network 105 to carry out an action.

[0016] In an embodiment, the card network 105 receives information from a carbon intensity database 107 and a sustainability scoring engine 111. If merchant does not provide carbon intensity value, then server estimates the carbon intensity by using merchant country, Merchant Category Codes (MCC) and amount spent on purchase. MCCs are used to identify the type of business in which a merchant is involved. MCCs are used by payment companies to categorise merchants and companies based on the sort of goods or services they supply. The sustainability scoring engine 111 calculates indexed sustainability score of the PAN holder (for example, score may vary from 0 to 999 value) using transaction history (for example, say last 12 months transaction history). The card network 105 receives confirmation of receipt of transaction

details from the issuer 109. Further, the acquirer 103 has updated its system based on the authorized message received from the card network 105. Furthermore, at the time of sale or purchase, merchants may inform users of their purchase's carbon impact as well as the most recent "sustainability" score. The present disclosure helps in providing payment network entities (for example, merchants, issuers, and consumers) with information related to carbon intensity of a purchase, as well as a market-indexed benchmark score.

[0017] **Fig. 2** shows a flowchart illustrating a process for calculating sustainability score in authorisation message based on transaction history. **At block 201**, the method comprises accessing carbon intensity of goods in the checkout basket by the merchant. For example, a purchase may be done in store by using a payment card. Once the purchase is completed, the system requests to verify the carbon intensity of the purchased goods. **At block 203**, the method comprises acquiring transaction process when the request is received from a POS terminal of a cardholder. **At block 205**, the method comprises authorisation process in card network 105 based on carbon intensity estimation provided by MCC and spent amount on the purchase. The card network 105 gets in real-time information on the estimated sustainability score of the registered PAN, where sustainability score may be derived based on transaction history, say 12 months transaction history. **At block 207**, issuer 109 responds to request for transaction and carbon intensity. Issuer 109 verifies the cardholder details as per the present authentication and authorization process, thereafter, authenticates the cardholder. After verification, the systems send the responses back to the acquirer 103. Furthermore, alerting the user based on the determined sustainability score at the POS is performed **at block 209**. Acquirer 103 sends the response to the merchant POS 101 and merchant displays authorisation message to cardholder.

[0018] Computer System

[0019] **Fig. 3** illustrates a block diagram of an exemplary computer system for implementing embodiments consistent with the present disclosure.

[0020] In an embodiment, the computer system 300 may be used to implement the system. The computer system 300 may include a central processing unit ("CPU" or "processor") 302. The processor 302 may include at least one data processor for determining sustainability score in authorisation message. The processor 302 may include specialized processing units such as, integrated system (bus) controllers, memory management control units, floating point units, graphics processing units, digital signal processing units, etc.

[0021] The processor 302 may be disposed in communication with one or more input/output (I/O) devices (312 and 313) via I/O interface 301. The I/O interface 301 employ communication protocols/methods such as, without limitation, audio, analog, digital, monoaural, radio corporation of America (RCA) connector, stereo, IEEE-1394 high speed serial bus, serial bus, universal serial bus (USB), infrared, personal system/2 (PS/2) port, bayonet neill-concelman (BNC) connector, coaxial, component, composite, digital visual interface (DVI), high-definition multimedia interface (HDMI), radio frequency (RF) antennas, S-Video, video graphics array (VGA), IEEE 802.11b/g/n/x, Bluetooth, cellular e.g., code-division multiple access (CDMA), high-speed packet access (HSPA+), global system for mobile communications (GSM), long-term evolution (LTE), worldwide interoperability for microwave access (WiMax), or the like, etc.

[0022] Using the I/O interface 301, the computer system 300 may communicate with one or more I/O devices such as input devices 312 and output devices 313. For example, the input devices 312 may be an antenna, keyboard, mouse, joystick, (infrared) remote control, camera, card reader, fax machine, dongle, biometric reader, microphone, touch screen, touchpad, trackball, stylus, scanner, storage device, transceiver, video device/source, etc. The output devices 313 may be a printer, fax machine, video display (e.g., cathode ray tube (CRT), liquid crystal display (LCD), light-emitting diode (LED), plasma, plasma display panel (PDP), organic light-emitting diode display (OLED) or the like), audio speaker, etc.

[0023] In some embodiments, the processor 302 may be disposed in communication with a communication network 309 via a network interface 303. The network interface 303 may communicate with the communication network 309. The network interface 303 may employ connection protocols including, without limitation, direct connect, ethernet (e.g., twisted pair 10/100/1000 Base T), transmission control protocol/internet protocol (TCP/IP), token ring, IEEE 802.11a/b/g/n/x, etc. The communication network 309 may include, without limitation, a direct interconnection, local area network (LAN), wide area network (WAN), wireless network (e.g., using Wireless Application Protocol), the Internet, etc. Using the network interface 303 and the communication network 309, the computer system 300 may communicate with a database 314, which may be the enrolled templates database 313. The network interface 303 may employ connection protocols include, but not limited to, direct connect, ethernet (e.g., twisted pair 10/100/1000 Base T), transmission control protocol/internet protocol (TCP/IP), token ring, IEEE 802.11a/b/g/n/x, etc.

[0024] The communication network 309 includes, but is not limited to, a direct interconnection, a peer to peer (P2P) network, local area network (LAN), wide area network (WAN), wireless network (e.g., using Wireless Application Protocol), the Internet, Wi-Fi and such. The communication network 309 may either be a dedicated network or a shared network, which represents an association of the different types of networks that use a variety of protocols, for example, hypertext transfer protocol (HTTP), transmission control protocol/internet protocol (TCP/IP), wireless application protocol (WAP), etc., to communicate with each other. Further, the communication network 309 may include a variety of network devices, including routers, bridges, servers, computing devices, storage devices, etc.

[0025] In some embodiments, the processor 302 may be disposed in communication with a memory 305 (e.g., RAM, ROM, etc. not shown in Fig. 3) via a storage interface 304. The storage interface 304 may connect to memory 305 including, without limitation, memory drives, removable disc drives, etc., employing connection protocols such as, serial advanced technology attachment (SATA), integrated drive electronics (IDE), IEEE-1394, universal serial bus (USB), fiber channel, small computer systems interface (SCSI), etc. The memory drives may further include a drum, magnetic disc drive, magneto-optical drive, optical drive, redundant array of independent discs (RAID), solid-state memory devices, solid-state drives, etc.

[0026] The memory 305 may store a collection of program or database components, including, without limitation, user interface 306, an operating system 307, etc. In some embodiments, computer system 300 may store user/application data, such as, the data, variables, records, etc., as described in this disclosure. Such databases may be implemented as fault-tolerant, relational, scalable, secure databases such as Oracle or Sybase.

[0027] The operating system 307 may facilitate resource management and operation of the computer system 300. Examples of operating systems include, without limitation, AppleTM MacintoshTM OS XTM, UNIXTM, Unix-like system distributions (e.g., Berkeley Software Distribution (BSD), FreeBSDTM, Net BSDTM, Open BSDTM, etc.), Linux distributions (e.g., Red HatTM, UbuntuTM, K-UbuntuTM, etc.), International Business Machines (IBMTM) OS/2TM, Microsoft WindowsTM (XPTM, Vista/7/8, etc.), Apple iOSTM, Google AndroidTM, BlackberryTM operating system (OS), or the like.

[0028] In some embodiments, the computer system 300 may implement web browser 308 stored program components. Web browser 308 may be a hypertext viewing application, such as Microsoft™ Internet Explorer™, Google Chrome™, Mozilla Firefox™, Apple™ Safari™, etc. Secure web browsing may be provided using secure hypertext transport protocol (HTTPS), secure sockets layer (SSL), transport layer security (TLS), etc. Web browsers 308 may utilize facilities such as AJAX, DHTML, Adobe™ Flash, Javascript, Application Programming Interfaces (APIs), etc. In some embodiments, the computer system 300 may implement a mail server stored program component. The mail server may be an Internet mail server such as Microsoft Exchange, or the like. The mail server may utilize facilities such as ASP, ActiveX, ANSI C++/C#, Microsoft .NET, Common Gateway Interface (CGI) scripts, Java, JavaScript, PERL, PHP, Python, WebObjects, etc. The mail server may utilize communication protocols such as Internet Message Access Protocol (IMAP), Messaging Application Programming Interface (MAPI), Microsoft Exchange, Post Office Protocol (POP), Simple Mail Transfer Protocol (SMTP), or the like. In some embodiments, the computer system 300 may implement a mail client stored program component. The mail client may be a mail viewing application, such as Apple Mail, Microsoft Entourage, Microsoft Outlook, Mozilla Thunderbird, etc.

[0029] Furthermore, one or more computer-readable storage media may be utilized in implementing embodiments consistent with the present disclosure. A computer-readable storage medium refers to any type of physical memory on which information or data readable by a processor may be stored. Thus, a computer-readable storage medium may store instructions for execution by one or more processors, including instructions for causing the processor(s) to perform steps or stages consistent with the embodiments described herein. The term “computer-readable medium” should be understood to include tangible items and exclude carrier waves and transient signals, i.e., be non-transitory. Examples include Random Access Memory (RAM), Read-Only Memory (ROM), volatile memory, non-volatile memory, hard drives, Compact Disc (CD) ROMs, DVDs, flash drives, disks, and any other known physical storage media.

[0030] The described operations may be implemented as a method, system or article of manufacture using standard programming and/or engineering techniques to produce software, firmware, hardware, or any combination thereof. The described operations may be implemented as code maintained in a “non-transitory computer readable medium”, where a processor may read and execute the code from the computer readable medium. The processor

is at least one of a microprocessor and a processor capable of processing and executing the queries. A non-transitory computer readable medium may include media such as magnetic storage medium (e.g., hard disk drives, floppy disks, tape, etc.), optical storage (CD-ROMs, DVDs, optical disks, etc.), volatile and non-volatile memory devices (e.g., EEPROMs, ROMs, PROMs, RAMs, DRAMs, SRAMs, Flash Memory, firmware, programmable logic, etc.), etc. Further, non-transitory computer-readable media may include all computer-readable media except for a transitory. The code implementing the described operations may further be implemented in hardware logic (e.g., an integrated circuit chip, Programmable Gate Array (PGA), Application Specific Integrated Circuit (ASIC), etc.).

[0031] The illustrated steps are set out to explain the exemplary embodiments shown, and it should be anticipated that ongoing technological development will change the manner in which particular functions are performed. These examples are presented herein for purposes of illustration, and not limitation. Further, the boundaries of the functional building blocks have been arbitrarily defined herein for the convenience of the description. Alternative boundaries can be defined so long as the specified functions and relationships thereof are appropriately performed. Alternatives (including equivalents, extensions, variations, deviations, etc., of those described herein) will be apparent to persons skilled in the relevant art(s) based on the teachings contained herein. Such alternatives fall within the scope and spirit of the disclosed embodiments. Also, the words "comprising," "having," "containing," and "including," and other similar forms are intended to be equivalent in meaning and be open ended in that an item or items following any one of these words is not meant to be an exhaustive listing of such item or items, or meant to be limited to only the listed item or items. It must also be noted that as used herein, the singular forms "a," "an," and "the" include plural references unless the context clearly dictates otherwise.

[0032] Furthermore, one or more computer-readable storage media may be utilized in implementing embodiments consistent with the present disclosure. A computer readable storage medium refers to any type of physical memory on which information or data readable by a processor may be stored. Thus, a computer readable storage medium may store instructions for execution by one or more processors, including instructions for causing the processor(s) to perform steps or stages consistent with the embodiments described herein. The term "computer readable medium" should be understood to include tangible items and exclude carrier waves and transient signals, i.e., are non-transitory. Examples include random access

memory (RAM), read-only memory (ROM), volatile memory, non-volatile memory, hard drives, CD ROMs, DVDs, flash drives, disks, and any other known physical storage media.

[0033] Finally, the language used in the specification has been principally selected for readability and instructional purposes, and it may not have been selected to delineate or circumscribe the inventive subject matter. Accordingly, the disclosure of the embodiments of the disclosure is intended to be illustrative, but not limiting, of the scope of the disclosure.

[0034] With respect to the use of substantially any plural and/or singular terms herein, those having skill in the art can translate from the plural to the singular and/or from the singular to the plural as is appropriate to the context and/or application. The various singular/plural permutations may be expressly set forth herein for sake of clarity.

**METHOD AND SYSTEM FOR DETERMINING SUSTAINABILITY
INFORMATION IN AUTHORISATION MESSAGE**

ABSTRACT

The present disclosure relates to method and system for calculating sustainability information in authorisation message based on transaction data. The present invention uses payment rails, sourcing for delivering sustainability information. The method also comprises sourcing and providing payment network entities and consumers the information on carbon intensity of a purchase. The present disclosure provides a solution for calculating the sustainability score of the registered Permanent Account Number (PAN) using transaction history, where transaction history is used to establish direct connectivity between merchants and issuers for the purpose of processing card transactions.

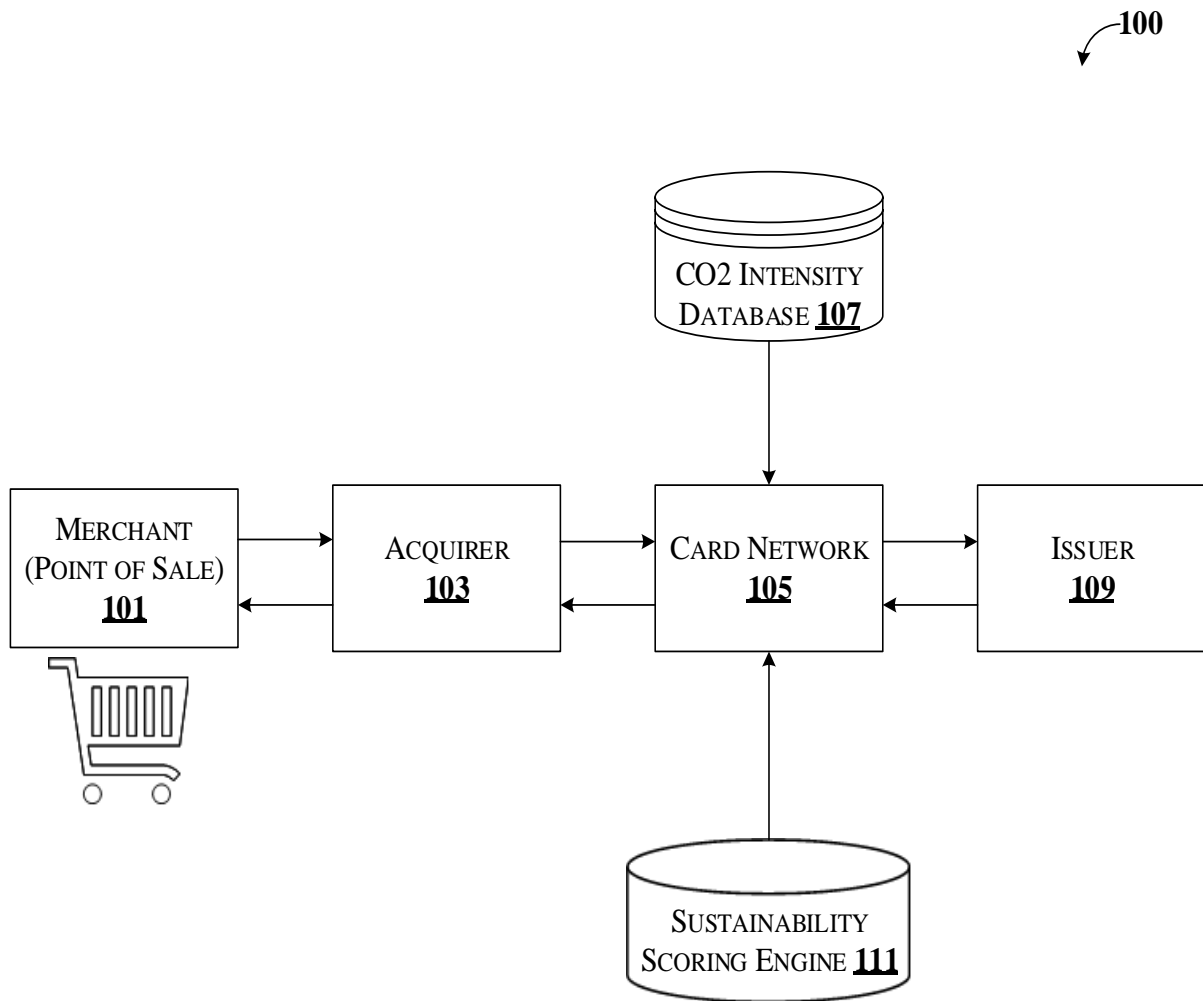


Fig. 1

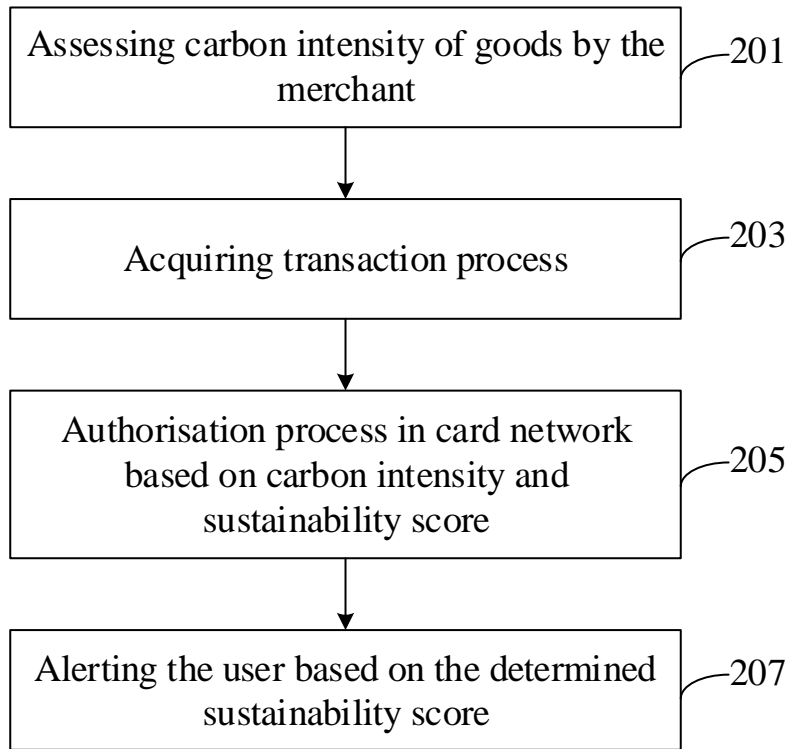


Fig. 2

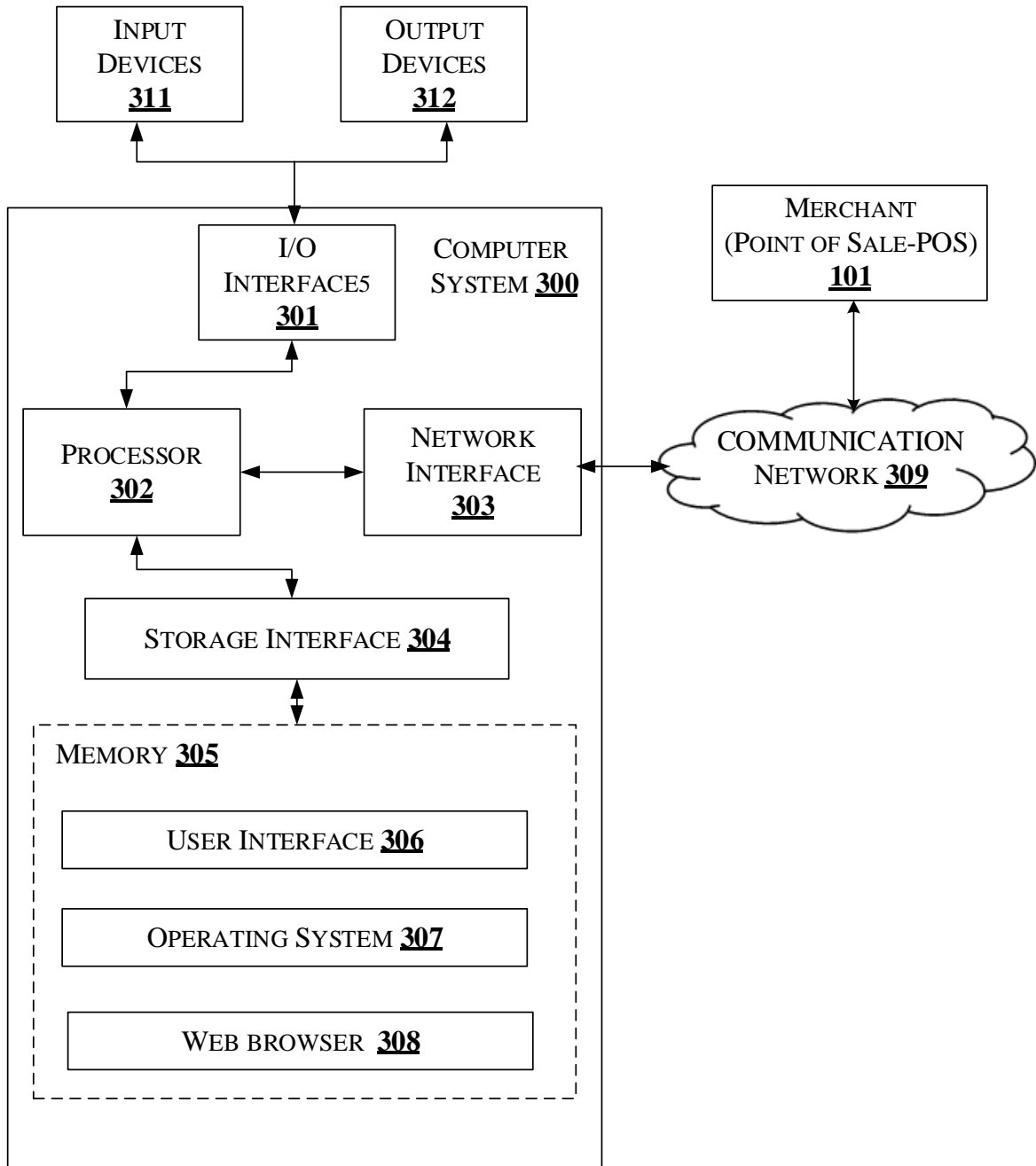


Fig. 3