(12) **STANDARD PATENT**   (11) Application No. **AU 2019348201 C1**
(19) **AUSTRALIAN PATENT OFFICE**

(54)   Title
       System, devices, and methods for acquiring and verifying online information

(51)   International Patent Classification(s)
       G06F 17/00 (2019.01)   ***G06Q 30/02*** (2012.01)
       G06F 17/40 (2006.01)

(21)   Application No: 2019348201   (22)   Date of Filing: **2019.09.25**

(87)   WIPO No: **WO20/061694**

(30)   Priority Data

(31)   Number   (32)   Date   (33)   Country
           16/141,213   **2018.09.25**   **US**

(43)   Publication Date: **2020.04.02**
(44)   Accepted Journal Date: **2024.08.15**
(44)   Amended Journal Date: **2024.10.31**

(71)   Applicant(s)
       Valideck International Corporation

(72)   Inventor(s)
       NARULA, Alok

(74)   Agent / Attorney
       FB Rice Pty Ltd, L 33 477 Collins Street, Melbourne, VIC, 3000, AU

(56)   Related Art
       US 2009/0132395 A1
       US 2014/0339315 A1
       US 2010/0276484 A1
       US 2013/0268457 A1
       US 2018/0047071 A1

(54) **Title:** SYSTEM, DEVICES, AND METHODS FOR ACQUIRING AND VERIFYING ONLINE INFORMATION

FIG. 3

(57) **Abstract:** A system and method of acquiring and verifying information
is provided. The system comprises a processor, and a memory comprising a
sequence of instructions which when executed by the processor configure the
processor to perform the method. The method comprises acquiring data from a
data source associated with an author of the data, normalizing the acquired data,
determining, by the processor, an identity of the author of the data, classifying
the normalized data based on the identity and acquired metadata, and storing in
a memory the normalized data. Normalizing the acquired data comprises parsing
the acquired data for meaningful information, extracting metadata from the ac-
quired data, and mapping the parsed information to internal data structures.

WO 2020/061694 A1

SYSTEM, DEVICES, AND METHODS FOR
ACQUIRING AND VERIFYING ONLINE INFORMATION

FIELD

[0001] The present disclosure generally relates to a system, device and method of acquiring and verifying online information.

INTRODUCTION

[0002] During the past two decades several software and hardware technologies have been patented and/or commercialized to assist people in searching for information and making retail purchases on the Internet. While these technologies have made it possible to do many tasks online, they have introduced some new challenges. There are a few dominant service providers for online search, social networking, and electronic commerce. Acquiring credible information on the Internet can often be a challenge due to the powerful influence of these service providers. Some people may take advantage of the tools and channels of communication provided by the service providers to influence the thoughts, motivations, and purchasing habits of people. Some of these service providers have been accused of not doing enough to curb the menace of fake news.

[0003] There exist systems for requesting and providing information from a member of a social network or an affinity group related to a requesting user. In other systems, a review engine may be connected to support modules and databases that receive, store and retrieve reviews based upon the subject and the user's relationship to the authors of the reviews. In other systems, users may selectively share information about their purchases with other users. In other systems, users may provide reviews of their online purchases so that other users may take these experiences into account when deciding what goods or services to purchase, or as part of an exchange of ideas and opinions. In other systems, a computer service allows Internet users to locate and evaluate products listed in an online portal, where a user receives personalized recommendations based upon the user's personal preference information.

[0004] In some systems, a universal card may be used to store the contents of several cards and can be used at any terminal equipped with a magnetic stripe reader or short range wireless communication capability. In other systems, a payment device may be in the same form factor as a typical credit or debit card, and can be programmed and reprogrammed with various payment profiles. In other systems, a universal financial data card may compile and store financial transaction records pertaining to a plurality of financial accounts. In other systems, a device may store information from multiple smart cards and data from multiple conventional magnetic stripe cards for use either through a magnetic stripe emulator or as a 'virtual' contactless smart card.

[0004A]   One or more embodiments of the present disclosure address or ameliorate at least one disadvantage or shortcoming of prior techniques, or at least provide a useful alternative thereto.

[0004B]   Any discussion of documents, acts, materials, devices, articles or the like which has been included in the present specification is not to be taken as an admission that any or all of these matters form part of the prior art base or were common general knowledge in the field relevant to the present disclosure as it existed before the priority date of each of the appended claims.

SUMMARY

[0005] Some embodiments of the present disclosure relate to a system for acquiring and verifying transaction information. The system comprises: a point-of-sale (POS) device comprising: a POS processor; and a POS memory comprising a sequence of instructions which when executed by the POS processor configure the POS processor to: request an authorization of a customer transaction from a payment card issuer; request an encrypted copy of a payment card token from a card issuer that generated the payment card token and mapped the payment card token to a card number associated with a card utilized by a customer for the customer transaction; receive an authorization reply from the payment card issuer comprising the authorization for the customer transaction and the encrypted copy of the payment card token; generate a customer transaction record for the customer transaction in response to receiving the authorization reply; link the encrypted copy of the payment card token with the customer transaction record; and transmit the customer transaction record and the linked encrypted copy of the payment card

token to a loyalty program server platform. The loyalty program server platform comprises: a server processor; a server memory comprising one or more data stores, including: a transaction database configured to store customer-owned customer transaction records associated with customer accounts; and a reviews database configured to store customer reviews; and a sequence of instructions which when executed by the server processor configure the server processor to: acquire payment transaction data from a data source associated with the at least one customer account, the payment transaction data comprising a payment transaction record for a transaction, the payment transaction record associated with at least one of a product, business or service, wherein the owner of the payment transaction data is a customer in the payment transaction record; normalize the acquired payment transaction data, wherein the server processor is configured to: parse the acquired payment transaction data for payment transaction record data; extract metadata from the acquired payment transaction data; and map the parsed data to internal data structures in the transaction database, wherein the server processor is configured to: identify a merchant identifier associated with the payment transaction record data; decrypt the encrypted copy of the payment card token; associate the decrypted copy of the payment card token with a customer account in the transaction database associated with the customer associated with the customer transaction; and associate the merchant identifier with the customer account in the transaction database; classify the normalized payment transaction data based on contents of the customer account and acquired metadata; store purchase details and the normalized payment transaction data in the transaction database; and credit a loyalty account associated with the customer account based on the normalized payment transaction data. The system further comprises a reviews engine configured to: obtain, from the one or more data stores, at least one attribute associated with the customer transaction record; obtain, from the one or more data stores, at least one keyword associated with the at least one attribute; obtain, from a machine learning library, at least one contextual review form parameter associated with the at least one keyword, the at least one contextual review form parameter logically associated with a type of product or service listed in the customer transaction record, wherein the machine learning library is configured to: maintain a corpus of information it discovers from at least one of contextual review form parameters used in past received reviews, or contextual review form

parameters defined or selected by users when customizing review forms; detect changes made by reviewers to past contextual review form parameters for a product or service listed in the customer transaction record; and update, responsive to the changes, a lookup table of keywords and associated contextual review form parameters; generate a contextual review form comprising the at least one parameter logically associated with the type of product or service listed in the customer transaction record; send, to a mobile device or a computer associated with the customer account, the contextual review form; receive, from the mobile device or computer associated with the customer account, contextual review form data; and store the contextual review form data, wherein the corpus of information maintained by the machine learning library is updated responsive to the storing of the contextual review form data.

[0005A]   The term 'comprising' as used in this specification means 'consisting at least in part of'. When interpreting each statement in this specification that includes the term 'comprising', features other than that or those prefaced by the term may also be present. Related terms such as 'comprise' and 'comprises' are to be interpreted in the same manner.

[0005B]   Some embodiments of the present disclosure relate to a computer-implemented method of acquiring and verifying transaction information. The method comprises: requesting, by a point-of-sale (POS) processor of a POS device, an authorization of a customer transaction from a payment card issuer; requesting, by the POS processor, an encrypted copy of a payment card token from a card issuer that generated the payment card token and mapped the payment card token to a card number associated with a card utilized by a customer for the customer transaction; receiving, by the POS processor, an authorization reply from the payment card issuer comprising the authorization for the customer transaction and the encrypted copy of the payment card token; generating, by the POS processor, a customer transaction record for the customer transaction in response to receiving the authorization reply; linking, by the POS processor, the encrypted copy of the payment card token with the customer transaction record; transmitting, by the POS processor, the customer transaction record and the linked with the encrypted copy of the payment card token to a loyalty program server platform; storing, by a transaction database, customer-owned customer transaction records associated with customer accounts; acquiring, by a server processor, payment transaction data from

a data source associated with a customer account, the payment transaction data comprising a payment transaction record for a transaction, the payment transaction record associated with at least one of a product, business or service, wherein the owner of the payment transaction data is a customer in the payment transaction record; normalizing, by the server processor, the acquired payment transaction data, said normalizing comprising: parsing, by the server processor, the acquired payment transaction data for payment transaction record data; extracting, by the server processor, metadata from the acquired payment transaction data; and mapping, by the server processor, the parsed data to internal data structures in the transaction database, said mapping comprising: identifying, by the server processor, a merchant identifier associated with the payment transaction record data; decrypting, by the server processor, the encrypted copy of the payment card token; associating, by the server processor, the decrypted copy of the payment card token with a customer account in the transaction database associated with the customer associated with the customer transaction; and associating, by the server processor, the merchant identifier with the customer account in the transaction database; classifying, by the server processor, the normalized payment transaction data based on contents of the customer account and acquired metadata; storing, by the server processor in a memory, purchase details and the normalized payment transaction data in the transaction database; and crediting, by the server processor, a loyalty account associated with the customer account based on the normalized payment transaction data; obtaining, by a reviews engine from one or more data stores, at least one attribute associated with the customer transaction record; obtaining, by the reviews engine from the one or more data stores, at least one keyword associated with the at least one attribute; obtaining, by the reviews engine from a machine learning library, at least one contextual review form parameter associated with the at least one keyword, the at least one contextual review form parameter logically associated with a type of product or service listed in the customer transaction record, wherein the machine learning library is configured to: maintain a corpus of information it discovers from at least one of contextual review form parameters used in past received reviews, or contextual review form parameters defined or selected by users when customizing review forms; detect changes made by reviewers to past contextual review form parameters for a product or service listed in the customer transaction record; and update, responsive to the changes, a lookup table of

2C

keywords and associated contextual review form parameters; generating, by the reviews engine, a contextual review form comprising the at least one parameter logically associated with the type of product or service listed in the customer transaction record; sending, by the reviews engine to a mobile device or a computer associated with the customer account, the contextual review form; receiving, by the reviews engine from the mobile device or computer associated with the customer account, the contextual review form data; and storing, by the reviews engine, the review form data, wherein the corpus of information maintained by the machine learning library is updated responsive to the storing of the review form data.

[0005C]   Disclosed herein is a system for acquiring and verifying information. The system comprises a processor, and a memory comprising a sequence of instructions which when executed by the processor configure the processor to perform a method of acquiring and verifying information. The processor is configured to acquire data from a data source associated with an author of the data, normalize the acquired data, determine an identity of the author of the data, classify the normalized data based on the identity and acquired metadata, and store the normalized data. To normalize the acquired data, the processor is further configured to parse the acquired data for meaningful information, extract metadata from the acquired data, and map the parsed information to internal data structures.

[0006] Disclosed herein is a computer-implemented method of acquiring and verifying information. The method is performed by a processor and comprises acquiring data from a data source associated with an author of the data, normalizing the acquired data, determining, by the processor, an identity of the author of the data, classifying the normalized data based on the identity and acquired metadata, and storing in a memory the normalized data. Normalizing the acquired data comprises parsing the acquired data for meaningful information, extracting metadata from the acquired data, and mapping the parsed information to internal data structures.

2D

[0007] Disclosed herein is a non-transitory computer-readable storage medium having instructions thereon which, when executed by a processor, performs a method of acquiring and verifying information. The method comprises acquiring data from a data source associated with an author of the data, normalizing the acquired data, determining an identity of the author of the data, classifying the normalized data based on the identity and acquired metadata, and storing the normalized data in a memory. The normalizing of the acquired data comprises parsing the acquired data for meaningful information, extracting metadata from the acquired data, and mapping the parsed information to internal data structures.

[0008] In various further aspects, the disclosure provides corresponding systems, devices, and logic structures such as machine-executable coded instruction sets for implementing such systems, devices, and methods.

[0009] In this respect, before explaining at least one embodiment in detail, it is to be understood that the embodiments are not limited in application to the details of construction and to the arrangements of the components set forth in the following description or illustrated in the drawings. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of description and should not be regarded as limiting.

[0010] Many further features and combinations thereof concerning embodiments described herein will appear to those skilled in the art following a reading of the instant disclosure.

DESCRIPTION OF THE FIGURES

[0011] Embodiments will be described, by way of example only, with reference to the attached figures, wherein:

[0012] FIG. 1 illustrates an example of a top-level architecture of a system for acquiring and verifying online information, in accordance with some embodiments;

[0013] FIG. 2 illustrates, in a schematic diagram, an example of a platform for verifying information, in accordance with some embodiments;

3

[0014]   **FIG. 3** illustrates an example of a method of acquiring and verifying information using machine-to-machine communication, in accordance with some embodiments;

[0015]   **FIG. 4** illustrates, in a sequence diagram, an example of a method of acquiring review data (such as customer reviews) solicited by a vendor/service provider, following a transaction, in accordance with some embodiments;

[0016]   **FIG. 5** illustrates, in a sequence diagram, an example of a method of capturing unsolicited reviews, in accordance with some embodiments;

[0017]   **FIG. 6** illustrates, in a sequence diagram, an example of a method of performing a review lookup, in accordance with some embodiments;

[0018]   **FIG. 7** illustrates, in a spreadsheet table, an example of a result of a search request, in accordance with some embodiments;

[0019]   **FIGs. 8A** and **8B** illustrate an example of a contextually relevant feedback form for rating a doctor, in accordance with some embodiments;

[0020]   **FIG. 8C** illustrates, in a flowchart, an example of a method of rating a product or service, in accordance with some embodiments;

[0021]   **FIG. 8D** illustrates, in a flowchart, an example of a method of rating a previously completed review, in accordance with some embodiments;

[0022]   **FIG. 9** illustrates, in a sequence diagram, an example of a method of generating a contextual feedback form, in accordance with some embodiments;

[0023]   **FIG. 10** illustrates, in a schematic diagram, an example of a universal smart card, in accordance with some embodiments;

[0024]   **FIG. 11A** illustrates, in a schematic diagram, an example of a smart card sleeve, in accordance with some embodiments;

[0025]   **FIG. 11B** illustrates an example of a smart card sleeve/wallet display, in accordance with some embodiments;

[0026] **FIG. 11C** illustrates an example of a card status screen on the smart wallet, in accordance with some embodiments;

[0027] **FIG. 12** illustrates, in an image, an example of a sleeve receptacle, in accordance with some embodiments;

[0028] **FIG. 13** illustrates an example of a universal smart card in a sleeve, in accordance with some embodiments;

[0029] **FIG. 14** illustrates an example of the sleeve without the universal smart card, in accordance with some embodiments;

[0030] **FIG. 15** illustrates an example of a universal smart card inserted into the sleeve and unlocked, in accordance with some embodiments;

[0031] **FIGs. 16A** and **16B** illustrate an example of checking the purchase history of one of the cards stored in the universal smart card, in accordance with some embodiment;

[0032] **FIG. 17** illustrates an example of a POS setup, in accordance with some embodiments;

[0033] **FIG. 18** illustrates, in a sequence diagram, an example of a POS workflow, in accordance with some embodiments;

[0034] **FIGs. 19, 19A** and **19B** illustrate an example of a billing record, in accordance with some embodiments;

[0035] **FIG. 20** illustrates, in a flowchart, an example of a method of obtaining a review, in accordance with some embodiments;

[0036] **FIGs. 21A, 21B** and **21C** illustrate an example of sharing consumer experiences, in accordance with some embodiments;

[0037] **FIGs. 22A** and **22B** illustrate a search result of products across vendors and over time, in accordance with some embodiments;

[0038] **FIG. 23A** illustrates examples of offline and online transactions;

[0039]   **FIG. 23B** illustrates an example of transaction data collection for online and offline transactions, in accordance with some embodiments;

[0040]   **FIGs. 24A and 24B** illustrate in sequence diagrams, examples of workflows of a loyalty program based on the inverted ownership of CTRs, in accordance with some embodiments;

[0041]   **FIGs. 25A to 25D** illustrate, in tables, examples of transaction details, in accordance with some embodiments; and

[0042]   **FIG. 26** is a schematic diagram of a computing device such as a server.

[0043]   It is understood that throughout the description and figures, like features are identified by like reference numerals.

DETAILED DESCRIPTION

[0044]   Embodiments of methods, systems, and apparatus are described through reference to the drawings.

[0045]   The present disclosure provides a solution to ameliorate the problem of fake, unverifiable, and manipulated information circulating on the Internet. It also provides the means to search and locate credible information via a user's trusted network of friends, family, and acquaintances. The disclosure also provides a solution to the burden of carrying multiple plastic cards in a wallet/purse, and shows a manner in which the card transaction details can be used to capture reviews/experiences.

[0046]   It should be noted that, for privacy reasons, fictitious names and other details have been used in the examples described herein.

Problems in Online Search

[0047]   Many businesses and service providers collect reviews/feedback on their products or services at the time of purchase or when completing a transaction. The reviews may be collected on a paper form, but with increasing computerization, many reviews are collected electronically. If a review is collected in the presence of

the business/service provider, it may be verifiable. However, when the reviews are submitted in the absence of the business/service provider, the reviews may sometimes not be credible.

[0048] Some electronic commerce sites try to capture customer feedback whenever a purchase is made. However, people may submit feedback for a product that they have not purchased from its website. Moreover, the feedback may include reviews posted by people whose credentials cannot be verified. Ideally, electronic commerce reviews contain information that associates a bad/good review with a specific product feature/capability available in the product. Information other than this is typically considered superfluous and/or a distraction.

[0049] Online search engines and electronic commerce sites often use a ranking system to provide information to its users. Sometimes, such ranking systems are unable to filter the noise from a search index. A search index stores web pages based on the relevance of their content and assigns these pages a score (e.g., a page rank) based on the quality of their back references or back links. Some ranking schemes operate by counting the number and quality of links to a page to determine a rough estimate of the value of the website to the searcher. Web pages with a higher rank are given precedence over pages with a lower rank, and this precedence is reflected in the order of search results. A search engine typically lists many search results every time a user performs a search, and the burden of establishing the truth in the search results is on the user. Typically, search engines make no claim regarding the credibility of a web page, and do not have a mechanism to enforce credibility.

[0050] Consider, for example, a scenario of a user who is residing in New York, USA. When this person looks for orthopaedic doctors in the city of New York, a search engine may provide a search result that includes several healthcare portals, each having a system of grading doctors. All of these portals may show reviews against the names of doctors registered with them, but do not verify the reviewer's credentials and do not follow any standard metric to capture patient feedback. This can be a problem both for the physician as well as the patient. When evaluating a doctor for consultation, a patient is unable to arrive at a doctor's rating that is

applicable across the different portals because each portal uses different parameters for rating the doctor. For instance, portal "A" allows patients to rate a doctor on eight parameters (Ease of Appointment, Promptness, Courteous Staff, Accurate Diagnosis, Bedside Manner, Spends Time with Me, Follows Up After Visit, and Average Wait). By contrast, portal "B" allows patients to rate a doctor only on three parameters (Overall Rating, Bedside Manner, and Wait Time). This system creates a problem for the doctor too because a lower rating may be provided at a portal that uses more parameters (portal "A") versus a portal that uses fewer parameters (portal "B"). If the doctor uses both the portals for accepting appointments, the doctor may not be able to change the rating.

[0051] As such, using a search engine to find a doctor (or other services, products or information) may be fraught with problems. Since search engines typically make no claim on the credibility of its search results, if a doctor is selected based on the ratings shown on any of the healthcare portals, users run a risk of selecting a doctor with dubious skills. For instance, a look at one of the healthcare portals shows the following issues:

a) The reviews do not contain full patient names;

b) The reviews are not consistently listed in a reverse chronological manner;

c) Some doctor reviews have missing reviews for one full year, suggesting that the doctor was not practicing medicine for one whole year; and

d) The reviews do not contain a specific date (i.e., they are listed as "less than a year ago" or "more than a year ago").

[0052] Additionally, it is possible that inside staff or marketing professionals, posing as clients, wrote many of the reviews. Similar issues arise for searches of other products, services or information.

[0053] Finding credible information on the Internet can also be difficult when reviews are locked up in the silos of website owners. If a person submits reviews at five different portals, there may not be a framework to consolidate all the reviews posted by the person such that they are available to the person's social network.

Method and System to acquire and verify User Submitted Data

[0054]   Mobile devices offer users a handy alternative for capturing authenticated reviews and experiences with products, businesses, and service providers. A system architecture, platform and methods are described herein where a search result for the above scenario (for example) may be obtained that will list doctors based on the information captured about them through closed loop reviews. If these reviews are from a user's social network, the user will also be able to see the reviewer's personal data. But if the reviews are from an unrelated user, then the user will see an anonymous rank that has been credibly measured via a closed loop review, as will be further discussed below. It is understood that the proposed solution can be applied to other services, products and information canvassed on the Internet.

[0055]   **FIG. 1** illustrates an example of a top-level architecture of a system **100** for acquiring and verifying online information, in accordance with some embodiments. The system **100** architecture is organized in four sections: Acquisition **110**, Normalization **120**, Run/Operations **130**, and Storage **140**. The system **100** is representative of a typical search engine that uses a mechanism to acquire data (e.g., a search string), perform validation checks on the data, initiate a lookup matching the data, and store the data necessary to fulfill a user request.

[0056]   **FIG. 1** shows that data can be acquired via various data sources **110**, including a payment cube **111**, a wireless device **112**, direct input comprising a phone number **113**, a business card **114**, a quick response code **115**, or an electronic mail (email) / uniform resource locator (URL) link **116**. The scope of these data sources **110** is illustrative and not restricted to the devices/mechanisms described herein. Other data sources **110** may be used. For instance, a wireless data source can be any wireless device **112** such as a Bluetooth/WiFi beacon deployed in a doctor's clinic/restaurant/retail store, a smart phone that transmits payment information to a card reader via near field communication (NFC) or any other device that uses radio signals for communication. It is understood that any electronic means of receiving, obtaining or entering information may be used to acquire the information. The data acquisition means may be communicatively

coupled to a data acquisition unit or Application Programming Interface (API) of a data verification system or platform.

[0057] The data acquired through these sources may be normalized **122** before processing. Hardware and software vendors often use proprietary technologies for data storage and transmission. While the system **100** provides the means to acquire information directly into its data structures, sometimes it might need to process data that is significantly different from its own schema. In normalization **122**, the data realized through different data sources **110** may be parsed for the required/desired information, and any metadata may be extracted to check for attributes pertaining to the data. Relevant information may be subsequently mapped to internal data structures, and finally saved in the data store (e.g., data storage) **140**. An example of an internal data structure is a record having fields. It is understood that other data structures may be used to be able to retrieve and store data in a consistent manner.

[0058] Normalization may take place during machine-to-machine (M2M) communication. An example of this is when a transaction happens between a customer and a point-of-sale (POS) terminal. Once the customer makes a payment, a transaction record may be transmitted by the POS terminal to the system **100**. The transaction record of some vendors may contain metadata such as stock keeping unit (SKU) codes or industry standard product identifiers, such as a universal product code (UPC) / international standard book number (ISBN) that may assist in classifying the transaction record before saving the information in the data stores **140**. The system **100** may connect to the UPC/EAN/ASIN/ISBN database **145** to extract information on the UPC/ISBN code or interface with the vendor/service provider ERP **144** to extract attributes of a purchased item / service category. The extracted attributes may be associated with an identifier and stored with the normalized data in the data stores **140**. In other embodiments, the transaction record may not contain any code or identifier, and the contents are deciphered by the system **100** using data extraction techniques and machine learning. Once the system **100** receives the transaction record, a daemon on the system may read the contents of the transaction (i.e., acquire data), parse the data and map the relevant information to internal data structures (i.e., normalize it) before saving the data in the data stores **140**.

[0059]   In some embodiments, review forms may be cached forms in order to reduce computation overhead. For example, a feedback form may not necessarily be generated each time a request is made to capture a review. During normalization, if the system **100** discovers that the content is already classified, and the data stores **140** have a cached copy of a feedback form, the system **100** may provide the cached copy of the feedback form to the user.

[0060]   Once the data is acquired, it may be used to record a purchase transaction **131**, perform a lookup **132** to retrieve the information requested by the user or to dynamically generate a context sensitive form to capture the user's review/experience **133**. To initiate a lookup **132** or generate a context sensitive form **133**, the search engine may refer to one or many of the data stores **140** comprising the transactions database **141**, reviews database **142**, phonebook repository **143**, enterprise resource planning (ERP) system **144**, universal product code (UPC) / European article number (EAN) / Amazon standard identification number (ASIN) / international standard book number (ISBN) database **145**, keywords index **146**, attributes index **147**, and the trusted network **148**. The retrieved data may be processed **134** and returned to the user as a search result **135**. Other processes for the use of the data may be performed in other embodiments. It is understood that other databases or data repositories may be used in other embodiments.

[0061]   **FIG. 2** illustrates, in a schematic diagram, an example of a platform **200** for acquiring and verifying information, in accordance with some embodiments. The platform **200** may be an electronic device connected to an interface application **230** and data sources **110** via a network **240** (or multiple networks). The platform **200** can implement aspects of the processes described herein for acquiring and verifying information.

[0062]   The platform **200** may include a processor **204** and a memory **220** storing machine executable instructions to configure the processor **204** to receive data (e.g., from data sources **110**). The platform **200** may be implemented on an electronic device and can include an input/output (I/O) Unit **202**, a communication interface **206**, and data storage **210**. The processor **204** can execute instructions in memory **220** to implement aspects of processes described herein. The platform **200** may

receive and transmit data from one or more of these via the I/O unit **202**. When the data is received, the I/O unit **202** transmits the data to the processor **204**.

[0063]   The I/O unit **202** can enable the platform **200** to interconnect with one or more input devices, such as a keyboard, mouse, camera, touch screen and microphone, and/or with one or more output devices such as a display screen and a speaker.

[0064]   The processor **204** can be, for example, any type of general-purpose microprocessor or microcontroller, a digital signal processing (DSP) processor, an integrated circuit, a field programmable gate array (FPGA), a reconfigurable processor, or any combination thereof.

[0065]   The data storage **210** can include memory **220**, database(s) **140** and persistent storage **214**. Memory **220** may include a suitable combination of any type of computer memory that is located either internally or externally such as, for example, random-access memory (RAM), read-only memory (ROM), compact disc read-only memory (CDROM), electro-optical memory, magneto-optical memory, erasable programmable read-only memory (EPROM), and electrically-erasable programmable read-only memory (EEPROM), Ferroelectric RAM (FRAM) or the like. Data storage devices **210** can include memory **220**, databases **140**, and persistent storage **214**.

[0066]   The communication interface **206** can enable the platform **200** to communicate with other components, to exchange data with other components, to access and connect to network resources, to serve applications, and perform other computing applications by connecting to a network (or multiple networks) capable of carrying data including the Internet, Ethernet, plain old telephone service (POTS) line, public switch telephone network (PSTN), integrated services digital network (ISDN), digital subscriber line (DSL), coaxial cable, fiber optics, satellite, mobile, wireless (e.g. Wi-Fi, WiMAX, LTE), SS7 signalling network, fixed line, local area network, wide area network, and others, including any combination of these.

[0067]   The platform **200** can be operable to register and authenticate users (using a login, unique identifier, and password for example) prior to providing access to

applications, a local network, network resources, other networks and network security devices. The platform **200** can connect to different machines or entities.

[0068] The data storage **210** may be configured to store information associated with, obtained by or created by the platform **200**. Storage **210** and/or persistent storage **214** may be provided using various types of storage technologies, such as solid state drives, hard disk drives, flash memory, and may be stored in various formats, such as relational databases, non-relational databases, flat files, spreadsheets, extended markup (XML) files, etc.

[0069] The memory **220** may include a data acquisition unit **221** for acquiring data from data sources **110**, a normalization unit **120** for normalizing the acquired data, an operations unit **130** for performing operations to the normalized data, a review engine **222** to generate forms used in acquiring information or review data, and one or more machine learning libraries **224**. The units **221**, **120**, **130**, **222**, and **224** will be described in more detail below.

[0070] **FIG. 3** illustrates a method **300** of acquiring and verifying information using machine-to-machine (M2M) communication, in accordance with some embodiments. The method **300** comprises acquiring **302** data from a data source, parsing **304** the acquired data, mapping **306** the parsed data, determining **308** the identity of the data source (e.g., by checking attributes of the data), classifying **310** the normalized data based on the data source, and storing **312** the normalized data. The steps of parsing **304** and mapping **306** comprise normalizing the data. The step of determining **308** an identity of the data source may include determining the identity of a reviewer or person who provided the data. Such a determination will allow for a classification **310** of the acquired data based on the source. For example, if the data source is from a trusted source (such as a family member, acquaintance, recognized expert, recognized reputable source provider, etc.) then the acquired data can be associated with a value representing a high level of trust. If the data source is from an anonymous, non-trusted or dubious source, then the acquired data can be associated with a value representing a lower level of trust. Such classification of the data will be described in more detail below. Other steps may be added to the method **300** and the method **300** will be described in further detail below.

[0071]   In some embodiments, the acquired data may include transaction data details, and/or review opinion details associated with a transaction, a product, an item, a service and/or a topic. The acquired data may have been solicited following a transaction, unsolicited following a transaction, or unsolicited sans (i.e., without) any transaction.

Solicited Reviews

[0072]   **FIG. 4** illustrates, in a sequence diagram, an example of a method **400** of acquiring review data solicited by a vendor/service provider, following a transaction, in accordance with some embodiments. The method **400** pertains to an example of a solicited review requested by the merchant (via a co-branded form with custom parameters) following a transaction. The method **400** begins with a device **10** (such as a mobile phone) receiving an INPUT **402** from a user comprising a business/product/service review. Next, the device **10** sends an INSERT data message **404** to the review engine **222**. The message **404** may include a phone number associated with the business being reviewed, review details and a foreign key (FK) as function call variables. Next, the review engine **222** may send an Enter passcode / one time password (OTP) message **406** to the device **10**. The device may display a prompt **408** for the user to enter the passcode/OTP while the passcode is null or incorrect and allow the user to re-enter the passcode/OTP. When the device receives an input with the correct passcode, then the passcode is sent **410** to the review engine **222**. The review engine **222** confirms the passcode is correct and sends a commit data message **412** to the reviews database **142**. The commit data message **412** may include the phone number associated with the business being reviewed, the review details and the FK as function call variables. Subsequently, the review engine **222** may send an UPDATE data **414** message to the phonebook repository **143**. Next, the review engine **222** may send a review submitted message **416** to the device **10** to confirm that the review has been received and submitted.

Unsolicited Reviews

[0073]   **FIG. 5** illustrates, in a sequence diagram, an example of a method **500** of capturing unsolicited reviews, in accordance with some embodiments. The method

500 includes two use cases: (a) an example of a user submitting an unsolicited review post a business transaction **510**; and (b) an example of a user submitting an unsolicited review sans any business transaction **520**, in accordance with some embodiments. It is understood that the method **500** may implement one of **510** or **520**.

[0074]   In the first case **510**, the method begins with the device **10** receiving an OPEN record message **512** from a user. The message **512** may include a transaction record as a variable. The device **10** may then send a GET feedback form message **518** to the review engine **222**. Next, the review engine **222** may return **519** a feedback form. The feedback form may be a contextually relevant feedback form and the message **519** may include the business name and/or phone number, and FK as variables.

[0075]   In the second case **520**, the method begins with the device **10** receiving an INPUT keyword command **522** from a user. The input may include a business name and/or a business phone number as variables. The device **10** may then send a GET data message **524** to the review engine **222**. The message **524** may include a business name and/or phone number as a variable. The review engine **222** forwards this request **525** to the phonebook repository **143** that returns **526** the Name, Address, Phone Number, and Foreign Key (FK) of the business/service provider to the device **10**. Next, the device may send a GET feedback form message **528** to the review engine **222**. Next, the review engine **222** may return **529** a feedback form. The feedback form may be a contextually relevant feedback form and the message **529** may include the business name and/or phone number, and FK as variables.

[0076]   Once the device **10** has the form **519**, **529**, the device may receive an INPUT **402** from the user corresponding to a business/product/service review. The device **10** may send the review to the review engine **222** via an INSERT data message **404** that may include the business phone number, the review details and the FK as variables. Next, the review engine **222** may send an Enter passcode / one time password (OTP) message **406** to the device **10**. The device may display a prompt **408** for the user to enter the passcode/OTP while the passcode is null or incorrect and allow the user to re-enter the passcode/OTP. When the device

receives an input with the correct passcode, then the passcode is sent **410** to the review engine **222**. The review engine **222** confirms the passcode is correct and sends a commit data message **412** to the reviews database **142**. The commit data message **412** may include the phone number associated with the business being reviewed, the review details and the FK as function call variables. Subsequently, the review engine **222** may send an update data **414** message to the phonebook repository **143**. Next, the review engine **222** may send a review submitted message **416** to the device **10** to confirm that the review has been received and submitted.

Reviews Lookup

[0077] **FIG. 6** illustrates, in a sequence diagram, an example of a method of reviews lookup **600**, in accordance with some embodiments. The method **600** begins with the device **10** receiving an INPUT **602** from a user requesting a review for a business. The business name and/or phone number may be provided as a function call variable. Next, the device **10** may send a GET review message **604** to the review engine **222**. The message **604** may include the business name and/or phone number as a function call variable. Next, the review engine **222** may send a GET data message **606** to the phonebook repository **143** to obtain an identifier for the business for which the review is being requested. Next, the phonebook repository **143** may send a return data message **608** to the review engine **222**. The return data message **608** may include the business name, address, phone number and Foreign Key (FK). Next, the review engine **222** may send a GET rating message **610** to the reviews database **142**. The GET rating message **610** may include the FK as a function call variable. Next, the reviews database **142** may send a return message **612** to the review engine **222**. This message **612** includes the rating. Next, the review engine **222** sends a return review message **614** to the device **10**, which then displays it **616** for the user. The review message **614** may comprise review data pertaining to the business, including the name, address, phone number and rating.

Use Cases of Solicited Reviews, Unsolicited Reviews, and Reviews Lookup

[0078] An example of the use of the system **100** and its methods will be described with reference to **FIGs. 4**, **5**, and **6**. **FIGs. 4** and **5** comprise examples where the system **100** may acquire and verify information **300**. A use case is demonstrated

wherein a person has a smart phone that it can use to: a) Submit Solicited Review **400**, b) Submit Unsolicited Review **500**, and c) Lookup Reviews **600**. The smartphone and a caller-ID app may be used to provide a solution to mitigate the problem of fake online reviews. An average smartphone has sensors (GPS, WiFi, Bluetooth) for capturing context from many different sources (location coordinates, beacons, POS devices). A caller-ID app running on a smartphone can use the contextual data captured from the smartphone sensors and pair it with the information from the phonebook repository, to create a short and dynamic feedback form that can capture genuine user reviews easily.

[0079] With respect to **FIG. 4**, an example of submitting a solicited review **400** of a business/service provider through a mobile device is provided. Consider a scenario where a user is vacationing at a Ski resort in Whistler, Canada with a spouse and two kids. The user had a wonderful stay at the resort, save the food that they found to be a little bit off the mark for their fastidious taste. When the user checks out of the resort, the user receives a short feedback form on the user's mobile phone, asking the user to share their experience. The Ski resort uses the system **100** to manage its customer reviews, whereby customized feedback forms have been designed for the resort and the system **100** captures all reviews on the behalf of the resort. The reviews are displayed on the resort's website and at any other portal where the resort wants to display its reviews.

[0080] In some embodiments, businesses may register with the system **100**. When a new business is registered, the system **100** requests a Foreign Key (FK) for the business from the phonebook repository **143**. If the repository **143** already has a business record, it provides the FK. If not, the repository **143** creates a new business record and provides the system **100** the FK of the record. The system **100** captures the business review against the FK and then reconciles the data with the repository **143**.

[0081] The user captures their review on the feedback form and clicks the Submit button on the form that sends **302**, the user's review to the system reviews API on the review engine **222**. The reviews API caches the user's review temporarily and sends a passcode/OTP to the user to validate **308** the user's identity. When the user

enters the correct passcode/OTP, the review is recorded **312** against the Resort's phone number and also against the user's phone number in the system reviews database **142**. The App then reconciles the business address and phone number of the resort with the phonebook repository **143** API by firing a lookup in the API.

[0082]   With respect to **FIG. 5**, an example of submitting an unsolicited **500** review of a business/service provider through a mobile device is provided. Consider a scenario where a user gave his motorcar for servicing to an automobile repair shop in Vancouver, BC. The user found the business through an Internet search engine and gave the motorcar for servicing even though the user did not find any business page of the firm containing its ratings/reviews. When the user receives the motorcar back from the automobile repair shop, the bill is $50 more than the estimate. The user speaks with the owner of the shop and after a brief discussion pays for getting the car serviced. After a few days of driving the car, the user finds that the noise in the gear system has returned. The user takes the car back to the shop and after a brief checkup is told that one of the parts in the gear system has worn out. To get the car fixed, the user needs to pay $250 to replace the part. The shop waives the labor charge since it has only been a few days since the car was serviced at the shop. The user pays the $250 and drives home. The user had a bad experience with the automobile repair shop and wants to write a review of the business for the benefit of friends and family members.

[0083]   In some embodiments, the user opens the system **100** App **10** and types **522** the name or phone number of the shop. The user then clicks a Submit button that sends **524** a 'GET' query containing the Business Name and/or Phone Number to the review engine **222**. The review engine **222** forwards this request **525** to the phonebook repository **143** that returns **526** the Name, Address, Phone Number, and Foreign Key of the business/service provider to the App **10**. The App **10** uses this information to request **528** a feedback form from the system review engine **222**. The review engine **222** dynamically generates a contextually appropriate feedback form and sends **529** it to the user. The user captures their review on the feedback form and clicks the Submit button on the form that sends **404** the review to the system **100** review engine **222**. The review engine **222** caches the review temporarily and sends **406**, **408** a Passcode/OTP to the user to validate their identity. When the user

enters the correct Passcode/OTP **410**, the review is recorded **412** against the shop's phone number in the system reviews database **142** and also against the user's phone number in the same database **142**.

[0084] In some embodiments, the user's feedback is visible to their trusted network of friends and family along with the user's name but shown truncated / anonymized to the general public to prevent any backlash from the business / service provider. If anybody within the user's trusted network looks up the review of the restaurant in the mobile app, they will find the review linked with the phone number of the business and also linked to the user's phone number. This method of feedback collection is called a closed-loop review and may help select quality service providers easily instead of taking chances every time a service provider is selected. A review that is mapped to a telephone number may also be more difficult to fake since telephone operators may issue phone connections against valid identity proof (passport, social insurance number, voter ID) only.

[0085] The closed-loop review can be set up as a 2-way challenge or a 3-way challenge. In a 2-way challenge, the customer/user gives a feedback and the business/service provider verifies the review by confirming a money transaction against the client/user. In some embodiments, the customer can also provide a review of a product (e.g., book, electronic gadget) that it might have used elsewhere. In such cases, validating the client/user before recording its review may be vulnerable to misrepresentation. Some electronic commerce companies operate their online business with this model and, therefore, have to deal with the problem of misrepresentation. In a 3-way challenge, the customer gives feedback, and the feedback is routed to a 3rd party that has the capability to verify the feedback. Once the 3rd party verifies the review, the feedback is shared with the business / service provider who incorporates the review on their website. Some companies operate their business reviews with this model, through a partnership with a review company. The reviews of most businesses / service providers can be set up as a 2-way challenge. In some embodiments, such as services like medicine may be set up as a 3-way challenge to protect a doctor from biased reviews.

[0086] With respect to **FIG. 6**, an example of looking-up the reviews **600** of a business/service provider on a mobile device is provided. For example, a user opens a mobile App **10** and types **602** the name or phone number of the business/service provider. The user then clicks a Submit button that sends **604** a 'GET' query containing the Business Name and/or Phone Number to the review engine **222**. The review engine **222** forwards **606** this request to the phonebook repository **143** that returns **608** the Foreign Key (FK), Name, Phone, Address, and Operating Hours of the business/service provider to the review engine **222**. The review engine **222** then sends a 'GET' query **610** containing the FK to the system reviews database **142** and receives **612** the Business/Service Summary, Specialization, Rating, Comments, and FK. The review engine **222** may then perform a 'JOIN' on the data received from the phonebook repository **143** and the system reviews database **142** and generate the result comprising Name, Phone, Address, Operating Hrs, Business/Service Summary, Specialization, Rating, and Comments. The business/service providers review is shown on the mobile device as Name, Phone, Address, Operating Hrs, Business/Service Summary, Specialization, Rating, and Comments.

Online Search based on Verified Data

[0087] **FIG. 7** illustrates, in a spreadsheet table, an example of a search result **700** for an online review, in accordance with some embodiments. In this example, the search result **700** is for "Orthopaedic Doctors in New York". The search result **700** shows, in columns, the keyword **702** search query, doctor images **704**, corresponding doctor names **706**, overall rank (or overall score) **708** for each doctor, filter options **710** used to review the doctor, social rank **712** being the rank provided by the review, each reviewer name **714**, the reviewer relationship **716** to the user requesting the search result **700**, rating options **718** used to review the doctor, and values **720** on a 5 point scale with 1 being lowest and 5 being highest, for the ratings options **718** . A user may then select a doctor based on the overall rank **708**, social rank **712** of preferred reviewers, ratings values **720** for specific features **718**, or a combination thereof.

[0088] The overall rank **708** may be a function of the social ranks **712**. The social ranks are a function of the values **720** rated by each reviewer for the ratings options

718. In some embodiments, as shown, the review name may be partially or fully blocked unless the reviewer is within a predetermined relationship level with the person seeking the reviews. More, fewer or different items may be displayed in a search result. It is understood that the filter options **710** and rating options **718** shown are exemplary only and that other options may be used for other reviews. In some embodiments, an overall rank **708**, social rank **712** and/or ratings values **720** associated with a review for a product or service may be adjusted based on repetitive purchasing of the product or working with the same business/service provider without the receipt of a formal review. The value attributed to such default review values may be set to a value relative to a range of value options available for the review of a product or service.

[0089] As described above, in the system **100**, the review/experience by a person is not recorded in the search index and given adequate weightage until it is verified via a challenge/passcode, and also until the credibility of the submitter has been established. In some embodiments, the methodology used by the system **100** is orthogonal to a typical search engine ranking algorithm. While a search engine may rank a web page based on the quality of its back references, the proposed solution will rank a web page / URL - or any other source of online information - on the basis of the number of endorsements it has received from the common population and from subject matter experts. Endorsements from common people may be referred to herein as Voice of the People (VOP), and endorsements from subject matter experts may be referred to herein as Voice of the Expert (VOX). In some embodiments, an overall system page rank (VIC) may be derived from: a) the mathematical relationship between endorsements and rejections; and b) the mathematical relationship between the VOP and VOX rank.

[0090] In some embodiments, an overall score may comprise a combination of an average subject matter expert score and an average common person score. In some embodiments, a cumulative subject matter expert score used to determine the average subject matter expert score may be maintained in the reviews database **142**. In some embodiments, a cumulative average person score used to determine the average person score may be maintained in the reviews database **142**. In some embodiments, the review engine **222** may determine that the author is a subject

matter expert, assign a subject matter expert score to the normalized data, and store the subject matter expert score with the normalized data. In some embodiments, the review engine **222** may determine that the author is a common person, assign a common person score to the normalized data, and store the common person score with the normalized data.

[0091] In some embodiments, the system **100** may grade users as VOP and VOX, based on their skills and abilities that have been diligently scrutinized and measured, and also on the basis of various other parameters, such as, for example:

1. How many critical parameters of the product were graded by the user?

2. What is the background of the person who has given the rating? How much biographical information has the person provided to us about itself? How much of the information has been found to be credible? For instance, if the person giving the rating is a qualified electronics engineer and he has published research papers, written patents, has been working as a product development engineer in a reputed consumer electronics firm, then a rating for a consumer electronic product by the person will have considerable value.

3. How many reviews has the person submitted? Higher the number of reviews and greater the diversity of reviews (across product categories) indicates that the reviewer is genuine.

4. How many of the reviews submitted by the person are endorsed? What is the relationship between this person and the people who have endorsed its reviews? An endorsement from a related person (friend, family, acquaintance) will have less value than endorsements from unrelated people.

5. How many of the reviews submitted by the person are rejected/negatively appraised? What is the relationship between this person and the people who have rejected/negatively appraised its reviews?

The above parameters are provided as an example. It is understood that more, fewer or other parameters may be used.

[0092]   In some embodiments, a user may create an account with the platform **200**. When a user creates an account on the platform **200**, he/she may be given the status of a "VOP" user. A "VOP" user may be promoted to a "VOX" user when they provide evidence of their skills and knowledge. In some embodiments, the system **200** may provide VOP users the opportunity to collect badges via endorsements from other VOP or VOX users, take online exams that measure their skills and knowledge, and other such actions. In some embodiments, VOP users can collect badges for their skills within the platform **200** as well as from affiliates. For example, a computer programmer could collect badges via a service provider facility where software developers discuss programming issues. Once a VOP user has acquired enough badges, they may be transitioned to a VOX user. As noted above, a VOX user is a subject matter expert. In some embodiments, VOX users may be further graded on a sliding scale (e.g., level 1 through level 5).

[0093]   In some embodiments, as reviewers can be classified and their reviews validated, so too can the providers of ratings or appraisals of the reviews. For example, a provider of a rating of a review may be a common person or a subject matter expert. The review engine **222** may receive an appraisal of a review from a third party, send to a customer device associated with the third party a validation message to confirm the identity of the third party, receive from the customer device associated with the third party a response message that confirms the identity of the third party, and associate based on the response message the electronic feedback form with review details with the appraisal. In some embodiments, a discarded review may lower an overall score of a review. In some embodiments, a number of discarded reviews may lower a reviewer score.

[0094]   Distinguishing users into VOP and VOX (and in other embodiments into other categories of users) allows an internal overall system rank (VIC) to be derived from the mathematical relationship between endorsements/rejections received by VOP and VOX. In some embodiments, a grade by a VOX user may have a higher weight compared to a grade by a VOP user. Further, a grade by higher levels of a VOP (or VOX) user may be higher than a grade by lower levels of the VOP (or VOX) user.

Contextually Relevant Feedback Forms

[0095] In some embodiments, the system **100** uses contextually relevant feedback forms. A contextually relevant feedback form is semantically linked to the subject being reviewed. Consider a scenario where an electronic commerce site solicits a review of any product purchased via its portal. The site may provide a blank feedback form that does not include fields/parameters that a user can select. The electronic commerce site may capture user reviews in free text, and therefore, the information captured may not be amenable to searching. By contrast, the system **100** forms may be contextually relevant as will be further described below.

[0096] In some embodiments, the system **100** review forms may have a number (e.g., five) of parameters that will be automagically discovered when the user selects/clicks a Review button on a portal/user interface. In some embodiments, these parameters may comprise, or otherwise be associated with, rating options **718**. **FIGs. 8A** and **8B** illustrate an example of a contextually relevant feedback form for rating a doctor, in accordance with some embodiments. In this example, the feedback form has five parameters **810** in which a doctor's ability is measured: Diagnosis, Treatment, Bedside Manner, Follow Up, and Courteous.

[0097] A similar form to capture the feedback for a restaurant may have different parameters, such as:

   1. How was the food?

   2. Was it served on time?

   3. How was the ambiance?

   4. Did you get value for money?

   5. Did you get parking?

It is understood that fewer or other parameters may be used for different reviews of the same or different types of businesses, products, services or items.

[0098] The illustrations in **FIGs. 8A** and **8B** show an example of how a user may submit its review via a mobile phone **800** or via a smart card sleeve **1100** (the sleeve **1100** will be described in more detail below). The feedback form of the example shown in **FIGs. 8A** and **8B** may be generated by the review engine **222** when the user chose to review a healthcare provider.

[0099] **FIG. 8C** illustrates, in a flowchart, an example of a method **850** of rating a product or service, in accordance with some embodiments. The method **850** comprises obtaining **852** reviews of the product or service, and determining **854** a rating score for the product or service. The rating score may be determined based on at least one of a list of parameters that have been evaluated in the reviews, a number of positive rated parameters from common people, a number of negative rated parameters from common people, a number of positive rated parameters from subject matter experts, and/or a number of negative rated parameters from subject matter experts. The parameters may be logically associated with a type of product or service. The score may be determined based on at least one of a number of the parameters in the review that have been graded, a background of a reviewer of a review form, a number of reviews submitted by the reviewer, a number of reviews submitted by the reviewer that have been endorsed, a number of reviews submitted by the reviewer that have been rejected, a number of false reviews previously submitted by the reviewer, and/or if the product or service has received a negative rating, determining if a negative rating is reflected across different categories of the product or service provided by the supplier.

[0100] **FIG. 8D** illustrates, in a flowchart, an example of a method **860** of rating a previously completed review, in accordance with some embodiments. The method **860** comprises sending **862** to a device associated with an appraiser a completed review comprising a plurality of selected review parameters, receiving **864** from the device associated with the appraiser the appraised review form with review details, and determining **866** a score for the review based on the appraisals.

[0101] In an aspect, the background of the reviewer may comprise one of a common person, a subject matter expert, and/or a fake reviewer. In an aspect, the background of the reviewer background is determined to be a fake reviewer, and the

review is discarded. In an aspect, the background of the reviewer is determined to be a subject matter expert, and a rating of the review is raised by a first factor. In an aspect, the background of the reviewer is determined to be a common person, and a rating of the review is raised by a second factor.

[0102] Other steps may be added to the method **860**, such as obtaining the type of product or service, selecting the parameters associated with the type of product or service, and/ or auto-populating the review form with the parameters logically associated with the type of product or service. In an aspect, the method **860** further comprises providing an option for the reviewer to change a parameter in the review form.

[0103] A review can be positively appraised (e.g., via a "thumbs-up" selection) or negatively appraised (e.g., via a "thumbs-down" selection). When a review receives a "thumbs-up" or "thumbs-down" selection, the review engine **222** may determine the profile of the person who is giving the endorsement/rejection. The connection of the person with the original review may also be determined. If the endorsement is coming from an affiliate/family member, then the integrity of the affiliate/family member may also be determined.

[0104] Just as with reviews, some who appraise reviews may also try to game the system. The overall system rank (VIC) and also the VOP and VOX scores could be impacted in the scheme of things. If a person is determined to be playing mischief, their rankings in the system **100** could be adjusted so that their reviews do not have the same weight as an honest reviewer or appraiser.

[0105] **FIG. 9** illustrates, in a sequence diagram, an example of a method of generating a contextual feedback form **900**, in accordance with some embodiments. The method **900** includes two use cases: (a) an example of a user submitting a review via default parameters **925**; and (b) an example of a user submitting a review via custom parameters **950**, in accordance with some embodiments. It is understood that the method **900** may implement one of **925** or **950**.

[0106] The method **900** begins with the device **10** receiving an input **902** from a user. The input may include a transaction record or a business name and/or a

business phone number as variables. The device **10** then sends a SELECT message **904** to the review engine **222**. The SELECT message **904** may include a Foreign Key (FK) of the transaction record or business name and/or phone number. The review engine **222** then looks **906** for attributes matching the transaction invoice in its data stores **140**. Next, the data store **140** returns attributes **908** matching the invoice, and then the review engine **222** sends a GET request **910** containing the attributes **908** as parameters to receive keywords matching the attributes. Next, the data store **140** returns keywords **912** matching the invoice. The review engine **222** then initiates a request **914**, **924** with the machine learning libraries **224** to get parameters corresponding to the keywords. The machine learning libraries **224**, which may repetitively be revised by the information it is discovering, pulled out **916**, **926** the parameters corresponding to healthcare providers. The review engine **222** then generated **918**, **928** a feedback form shown in **FIGs. 8A** and **8B** and asked the user to submit its review. The user can choose to capture his review **920**, **930** in the default five parameters (use case **925**) or define its own parameters (use case **950**).

[0107]   In some embodiments, the review engine **222** is aware that some users are more knowledgeable about their domain; therefore it **222** may allow users to define their own parameters. If the user chooses to go ahead with the default parameters **920**, the review engine **222** records **922** the review in the data store **140**. If the user chooses custom parameters **930**, the review engine **222** accepts the review and submits **932** the information to the machine learning libraries **224**. The machine learning libraries **224** maintain a corpus of information that it **224** discovers via user interaction. When it **224** finds that users are choosing to define parameters that are semantically related to each other, it **224** revises its lookup table. Subsequently, the review engine **222** may send an update data message **934** to the phonebook repository **143** of the data stores **140**.

[0108]   As noted above, the machine learning libraries **224** may adjust the contextual feedback forms based on user interaction. In some embodiments, a default number of rating options **718** may be provided to the user on a contextual feedback form. Moreover, there may be only a subset of possible rating options provided in the default number. The machine learning libraries **224** may note that a number of VOP reviewers or VOX reviewers request changes to the default setting.

The machine learning libraries **224** may then update the default setting to reflect selections being made. In some embodiments a number of VOP reviewers or VOX reviewers may need to request the same change before the default setting is made. In some embodiments, the number of VOX users observed before a change to the default settings is made may be lower than the number of VOP users. In some embodiments, each VOP or VOX reviewer may be assigned a weight value. When a change is requested to a feedback form, an accumulated weight value score of reviewer changes may be tracked. Once a threshold is passed, the machine learning libraries **224** may then modify the default feedback form rating options accordingly. It is understood that there may be more categories of reviewers having different weight values. It is understood that other machine learning techniques may be used to evaluate when a change to a default feedback form rating options is to be made.

[0109]   With respect to **FIG. 9**, an example of generating a feedback form is provided. The health care use case example described above will now be extended with reference to **FIG. 9**. A user selected the Review button on a system portal/user interface when he visited his doctor for follow-up. The user had to make a part payment for their health condition because the insurance did not completely cover the treatment. After the user made the payment via a credit card, the user received a transaction invoice containing the doctor's name, business address, and phone number. The user did not record a review immediately; but after a couple of weeks when the user was sure that the doctor's treatment alleviated the medical condition.

[0110]   When the user opened the transaction **902** and selected the Review button against the doctor's invoice **904**, the review engine **222** looked **906** for attributes matching the transaction invoice in its data stores **140**. The data store **140** returned **908** attributes matching the invoice, and then the review engine **222** looked **910** for keywords matching the attributes. The data store **140** returned **912** keywords matching the invoice. The review engine **222** then initiated **914**, **924** a request with the machine learning libraries **224** to get parameters corresponding to the keywords. The machine learning libraries **224**, which may repetitively be revised by the information it is discovering, pulled **916**, **926** out the parameters corresponding to healthcare providers. The review engine **222** then generated **918**, **928** a feedback form shown in **FIG. 8A** and asked the user to submit a review of the healthcare

provider. The user can choose to capture their review in the default five parameters **925** or define their own parameters **950**. The review engine **222** may allow users to define their own parameters. If the user chooses to go ahead with the default parameters **920**, the review engine **222** records **924** the user's review in the data stores **140**. If the user defines **930** parameters, the review engine **222** accepts the review and submits **932** the information to the machine learning libraries **224** before recording (e.g., via an UPDATE **934**) the user's review in the data stores **140**. The machine learning libraries **224** maintain a corpus of information that it **224** discovers via user interaction. When it **224** finds that a number of users are choosing to define parameters that are semantically related to each other, it **224** may revise its lookup table.

[0111]   The review engine **222** and the machine learning libraries **224** work in concert to gather maximum relevant information via a review. Therefore, when a review engine **222** detects a prior review of the vendor/service provider by the submitter, it **222** may provide the submitter a choice of different parameters for capturing the review. This benefits the vendor/service provider as well because it can gather as much feedback as possible. The framework allows vendors/service providers to collaborate with the system **100** in improving the review engine **222** and the machine learning libraries **224**.

Smart Wallet

[0112]   A credit card may be used to capture details of a monetary transaction as well as initiate a purchase transaction. When a person makes a payment via a credit card, he/she may receive two print statements from the point-of-sale (POS) representative: a consolidated statement of amount debited to the person for the transaction, and a statement showing the items/service purchased. The statement of purchase need not be printed out and can be instead recorded into the credit card / smart card or into the cardholder's account on an online database, during the purchase transaction. An electronic copy of the purchase transaction can assist the card user with many things including capturing its experience vis-à-vis the different products and services he/she purchased and then share this information with a social network.

[0113]   Smart cards may be programmed via a wireless interface, which is typically the person's mobile phone. However, an active wireless interface on a payment device may be vulnerable to reverse engineering and theft. Payment cards should be amenable to programming via a hand held device that reads and writes to the payment card via a physical connection.

[0114]   The present disclosure also provides a solution to mitigate the burden of carrying multiple plastic cards in a wallet/purse, and describes a way in which the card transaction details can be used to capture reviews/experiences.

[0115]   **FIG. 10** illustrates, in a schematic diagram, an example of a universal smart card (USC) **1000**, in accordance with some embodiments. The universal smart card **1000** comprises a plastic card having the following components: a Microprocessor/CPU **1002**, a Near Field Communication **1004** chip, an EEPROM **1006**, an E-Ink **1008** chip, an RFID **1010** chip, a battery **1012**, an authentication **1014** chip, a display interface **1016**, and electrical contacts **1018** to charge the universal smart card **1000**. In some embodiments, the universal smart card **1000** may be charged via the smart card sleeve **1100**.

[0116]   **FIG. 11A** illustrates, in a schematic diagram, an example of a smart card sleeve **1100**, in accordance with some embodiments. The smart card sleeve **1100** is an example of a smart wallet. The term "sleeve" will be used herein to reference a smart wallet. The "sleeve" is an example of a form factor for a smart wallet. The smart card sleeve **1100** may comprise any container form factor that may hold and read a smart card. The smart card sleeve **1100** shown is a jacket sized to hold the entire smart card, for simplicity of presentation. The smart card sleeve **1100** comprises a jacket/pocket **1102** to insert a smart card **1000** and includes the following components: a Microprocessor/CPU **1104**, a micro USB port **1106** to charge the sleeve without a receptacle (see **FIG. 12**), a battery **1108**, a wireless interface **1110**, an authentication **1112** chip, RAM **1114** chip, an EEPROM **1116** chip, a capacitive display interface **1118**, universal smart card charging pins **1120**, and a charging connection **1122** for the sleeve when it is put on the receptacle (see **FIG. 12**). The capacitive display **1118** allows **a** user to input data into the sleeve **1100** and view the results of processing. The sleeve **1100** may also store a universal

smart card (USC) and: (a) display a credit window of each of the cards stored in the USC, (b) display redemption points or cash back on any of the plurality of cards stored in the USC, (c) program the USC to use the card with the maximum credit window by default, (d) program the USC to split the payment among the different cards stored in its EEPROM, (e) display the purchase transactions of any of the cards stored in the USC, and (f) allow the card user to capture and read reviews of purchase transactions directly. The sleeve **1100** provides an alternate tool for making electronic payments and checking transaction history. In some embodiments, the features in the sleeve **1100** could also be made available in a smart phone with wireless payment capabilities through Near Field Communication (NFC) or similar technologies. The disclosure describes scenarios where a user can choose to view the transaction history via a sleeve **1100** or a mobile phone **800**. The sleeve **1100** may be preferred by users who do not want all their information or cards on a phone.

[0117] In some embodiments, a smart card sleeve may be limited to the jacket/pocket **1102** to hold the universal smart card **1000**, the Microprocessor/CPU **1104** to execute instructions stored in the memory **1116**, a communication interface (such as the wireless interface **1110**) for communicating with the platform **200**, and the EEPROM **1116** chip for storing transaction details, and instructions for the operation of the universal smart card **1000**. Other element from the smart card sleeve **1100** may be added to this alternative embodiment.

[0118] In some embodiments, there is provided a smart card sleeve (e.g., smart wallet). The smart card sleeve comprises a jacket of sufficient size to fit at least one smart card, a communication interface, a processor, and a memory comprising a sequence of instructions which when executed configure the processor to receive from a smart card inserted in the jacket the purchase details of recent purchases made using the smart card, receive from a server the purchase reviews of the purchases made, and store the purchase details and purchase reviews in the memory.

[0119] In an aspect, the smart card sleeve processor is further configured to transmit to the server the purchase details, and transmit to the server, the purchase reviews.

[0120] In an aspect, the smart card sleeve further comprises a display. The processor is further configured to display the purchase details and purchase reviews.

[0121] **FIG. 11B** illustrates an example of a smart card sleeve/wallet display **1150**, in accordance with some embodiments. The smart card wallet display **1150** includes user selection options for a browser **1152** for searching the smart wallet contents, a money transfer option **1154** for transferring funds into, out of, or between accounts, a journal option **1156** for storing user notes, a review option **1158** for reading, storing and/or generating reviews, an analysis option **1160** for analyzing spending, a settings configuration tab **1162** for user setting configuration, a synchronization option **1164** for synchronizing smart wallet information such as transactions with another computer or server, and an authenticate option **1166** for providing user security. Other features can be added to the smart wallet. Some of the features shown in the smart wallet display **1150** are described herein.

[0122] In some embodiments, the smart card wallet/sleeve **1100** may consolidate payment cards into one card, divide payment among different cards, optimize available credit, secure card information from third parties, analyze spending per category (e.g., travel, food, housing, etc.), provide a single window activation/cancellation of cards, transfer money to another person/business, submit and read reviews/experiences, check multiple card transactions on a single device, and/or search and locate products, businesses and service providers.

[0123] **FIG. 11C** illustrates an example of a card status screen **1170** on the smart wallet **1100**, in accordance with some embodiments. The card status screen **1170** includes slider buttons **1172** which allow users to allow access (button **1172** on the right) or restrict access **1172** (button **1172** on the left) to an account. In some embodiments, such allowance/restriction may be used for security purposes to prevent unauthorized transactions.

[0124] **FIG. 12** illustrates, in an image, an example of a sleeve receptacle **1200**, in accordance with some embodiments. The sleeve receptacle **1200** comprises a WiFi interface embedded in its charging pad **1202**, a power connection **1204**, a WiFi LED **1206** and a charging LED **1208**. When the sleeve **1100** is put on the receptacle **1200**, it may charge the battery of the sleeve **1100**, and may also synchronize the universal smart card **1000** with the latest information from the issuer. In some embodiments, the sleeve **1100** is programmed to run a synchronization (sync) operation with trusted devices (mobile devices/computer) within a geographical boundary only (house/office) in order to prevent hackers from eavesdropping into any communication between the sleeve **1100** and an Internet device (e.g., mobile phone **800**).

[0125] Thus, a mechanism to store multiple cards into the universal smart card **1000** via the sleeve **1100** is provided. To store multiple cards, the user may first insert each card that needs to be stored onto the universal smart card **1000** into the sleeve **1100** and then remove it. This process (i.e., Registration) may import the information of all the cards into the sleeve **1100** and allow it **1100** to program the universal smart card **1000** with multiple card information (i.e., Initialization). Another way to achieve the same result would be to store the information of all the cards into the user's online account, and then import the details into the universal smart card **1000** via the sleeve **1100**. It is understood that the sleeve **1100** may be configured to add new cards or update current cards in a similar manner as the Registration and Initialization. For example, a user may insert and remove a new card and the sleeve **1100** may initialize the new card within the universal smart card **1000**.

[0126] **FIGs. 13, 14, 15,** and **16** demonstrate a use case wherein an intelligent sleeve **1100** can be used to unobtrusively capture the purchase details of card transactions.

[0127] **FIG. 13** illustrates an example of a universal smart card **1000** in a sleeve **1100**, in accordance with some embodiments. The universal smart card **1000** is capable of storing the details of multiple cards (debit, credit, loyalty etc.) inserted into the sleeve **1100** wherein the card details are protected via a passcode. The display unit **1118** shows the date and time and the card status (locked). The sleeve **1100**

can be used with a standard smart card **1000** encoded with a single card number also, although the smart card **1000** should also have the capability of capturing purchase details into its EEPROM **1006.**

[0128] **FIG. 14** illustrates an example of the sleeve **1100** without the universal smart card **1000,** in accordance with some embodiments. In some embodiments, when the universal smart card **1000** is removed from the sleeve **1100,** the card number, expiry, and CW number are masked. This is intended to prevent a person other than the card owner from copying the card details. In some embodiments, the sleeve **1100** programs the universal smart card **1000** to use the credit card with the maximum credit window/repayment period by default.

[0129] Retail stores may give loyalty cards to their customers to allow them to earn points every time they make a purchase. A loyalty card can be a plastic card without any credit on it or a plastic card that contains some credit provided by the merchant. A side effect of carrying multiple loyalty cards is that although consumers are able to redeem points at the POS every time they make a purchase, each loyalty card adds to the bulk of the wallet/purse, making them unwieldy and prone to theft. The universal smart card **1000** may eliminate the need to carry multiple cards.

[0130] The universal smart card **1000** has an EEPROM **1006** that can store the vendor identifier (id) into its memory. A user can add a vendor into the universal smart card **1000** by inserting (and removing) the existing loyalty card into the sleeve **1100** (which reads the loyalty card information) and subsequently inserting the universal smart card **1000** into the sleeve **1100** (which will import the loyalty card information into the EEPROM **1006** of the universal smart card). An alternative way of registering loyalty card information into the universal smart card **1000** is when a customer enters the POS of the merchant and attempts to make a purchase by inserting the universal smart card **1000** into a card reader. The card reader interrogates the EEPROM **1006** of the universal smart card **1000** to read the vendor id. If it finds none, the POS representative may ask the customer if it wants to register for a loyalty card. The customer can decline the offer or accept the offer. In some embodiments, if the customer declines the offer, the merchant records the denial into the EEPROM **1006** and the customer is not asked the same question

34

again. If the customer accepts the offer, the merchant records an acceptance in the EEPROM **1006** and requests the customer to fill a paper or electronic form for further processing. When the customer's request is processed, the loyalty card information is saved in the EEPROM **1006**. The merchant is then able to add and delete points from the users loyalty card account as necessary.

[0131] **FIG. 15** illustrates an example of a universal smart card **1000** inserted into the sleeve **1100** and unlocked, in accordance with some embodiments. In some embodiments, the sleeve **1100** shows the full card details and shows a menu **1510** to synchronize **1512** the card with the issuer/bank so that current balance can be viewed. The menu **1510** may also allow the user to browse **1514** all the cards stored in the universal smart card **1000**, capture **1516** a review/experience with any purchase, and also analyze/configure **1518** its spending on any or all of the cards. In some embodiments, the sleeve **1100** could be programmed to assist smart card users to set purchase limits and alerts on cards per spend category (e.g., travel, food, vehicle, entertainment).

[0132] **FIGs. 16A** and **16B** illustrate an example of a user checking the purchase history of one of the cards stored in the universal smart card **1000**, in accordance with some embodiment. **FIG. 16A** shows the information displayed on a smart phone **800**. **FIG. 16B** shows the information displayed on a sleeve **1100**. In this example, the user has selected card number 5228-1400-0789-6223 that has a credit balance of $1,200 and a payment due date of June 15. The user looks at the transactions of this card and selects a transaction initiated with Amazon on March 12. Per the transaction history, the user spent $107.92 to purchase five products. The user can submit a review of any or all of the products via the intelligent sleeve **1100** (see **FIG. 16B**) itself or through a computer or a mobile device **800** (see **FIG. 16A**) that can access the transaction details of the card **1000**.

[0133] The transaction details captured on the universal smart card **1000** will assist users in capturing their reviews/experiences with a product/business/service. The proposed solution provides a way to lookup the information mapped to UPC, EAN, ASIN, or ISBN numbers and dynamically generate a contextually relevant form to capture the review/experience associated with the transaction. The captured

review/experience can be shared with the user's social network and anonymously submitted to the search index providing authenticated information about a product/business/service provider. Other alternate ways to capture the UPC, EAN, ASIN, or ISBN numbers including the transaction details is by scanning a Quick Response (QR) code containing the details on the printout of the purchase statement, receiving an email/URL containing the transaction details or electronically recording the transaction into the cardholder's account in an online database, at the time of making the payment. Since all payment cards have a unique id, the transaction invoice containing the card id (Foreign Key) can be linked to the cardholder's id (Primary Key) in the transactions database **141**.

[0134] In an aspect, the smart card sleeve further comprises a first and a second communication interface. The processor **1104** is configured to communicate with the smart card **1000** via the first communication interface, and communicate with the server via the second communication interface. In an aspect, the second communication interface is a wireless communication interface, and the processor is further configured to only communicate with the server within a predefined distance from a trusted device **10**, **800** in communication with the platform **200** server. In an aspect, the second communication interface is a wireless communication interface, and the processor is further configured to only communicate with the trusted device and at a trusted location.

[0135] In an aspect, the sleeve **1100** houses a smart card **1000** comprising a plurality of cards, and the processor is further configured to track spending usage of each of the plurality of cards stored in the smart card **1000**.

[0136] In an aspect the smart card sleeve processor **1104** is further configured to maintain a balance for each of the plurality of cards, display a credit window for each of the plurality of cards, split the payment among the different cards stored in its EEPROM **1116**, and display redemption points or cash back on any of the plurality of cards. In an aspect, the smart card sleeve processor **1104** is further configured to maintain a balance for each of the plurality of cards **1100**, and display a recommendation to use one of the cards having a maximum credit window.

[0137]   **FIG. 17** illustrates an example of a POS setup **1700**, in accordance with some embodiments. The POS setup **1700** comprises a POS device **1702**, a payment cube/card reader **1704**, a printer **1706**, and a router **1708**. The system **1700** allows a customer transaction record (CTR) to be captured via a modified payment cube **1704**, an Internet-enabled dongle (H/W Loopback **1710**) installed at the printer **1706** or a software driver (S/W Loopback **1720**) installed on the POS device **1702**.

[0138]   **FIG. 18** illustrates, in a sequence diagram, an example of a POS workflow **1800**, in accordance with some embodiments. The workflow **1800** includes three use cases: (a) an example of a user making a payment by inserting a card into the payment cube **1810**; (b) an example of a user making a payment by tapping/swiping the card or tapping the phone **1830**; and (c) an example of a user making a payment in cash **1850**, in accordance with some embodiments. The method **1800** begins with the user initiating a payment at the point of sale (POS).

[0139]   In the first use case **1810**, the user inserts **1812** the universal smart card **1000** into the payment cube **1704** (connected to POS device **1702**). The payment cube **1704** detects that it is a universal smart card **1000** and sends a message **1814** to notify the POS device **1702**. The POS device **1702** sends a message **1816** to trigger the payment cube **1704** to record the transaction details (e.g., the CTR) directly into the EEPROM **1006** of the universal smart card **1000**. Next the user removes **1818** the universal smart card **1000** from the payment cube **1704**. In some embodiments, if the payment cube **1704** detects that the inserted card is not a universal smart card **1000**, the POS device **1702** may send a message **1836** to the printer **1706** to print the transaction details, and send a message **1838** to the transaction database **141** to update the transaction record in the card user's online account as in the second use case **1830**. Once the transaction details are recorded into the universal smart card **1000**, the user inserts **1820** the universal smart card **1000** into the sleeve **1100**. If the sleeve **1100** is connected to the Internet, it sends a message **1822** to the transaction database **141** to synchronize the universal smart card **1000** with the user's online account, and the sleeve **1100** displays **1824** the updated transaction details to the user. Transaction details are uploaded and downloaded as required.

[0140]   In the second use case **1830**, the user taps or swipes **1832** the payment card into the payment cube **1704**. The payment card can be a universal smart card **1000** or any ordinary payment card containing an NFC chip and Magnetic stripe. The payment cube **1704** detects that it is a NFC/Magstripe operation and sends a message **1834** to notify the POS device **1702**. Next, the POS device **1702** sends a message **1836** to the printer **1706** to print the transaction details, and sends a message **1838** to the transaction database **141** to update the transaction record in the card user's online account. Next, the user opens the mobile device/computer **800** and sends a message **1840** to the transaction database **141** to display the updated transaction details to the user.

[0141]   In the third use case **1850**, the user makes a cash payment **1852** to the POS representative. The representative accepts the payment and triggers the POS device **1702** to send a command to the printer to print **1854** a transaction invoice containing a Quick Response (QR) code associated with the transaction details. The user may then scan **1856** the QR code via its mobile device **800** and update **1858** the CTR in the card user's online account (i.e., in the transactions database **141**). Next, the user opens the mobile device/computer **800** and sends a message **1860** to the transaction database **141** to display the updated transaction details to the user.

[0142]   The POS **1700** provides multiple options for capturing the full details of a card transaction. Some customers elect to tap (using NFC) or swipe (using Magnetic Stripe) their card at the POS, which may not give enough time to record the transaction details on their card. In such cases, the merchant can send an electronic copy of the transaction to the customer's email id or record the data into a central location from where the customer can access full information on the card transaction.

[0143]   **FIGs. 19, 19A** and **19B** illustrate an example of a billing record **1900**, in accordance with some embodiments. **FIG. 19** shows the billing record **1900** of a person (e.g., Bill Richardson) who used different payment channels (online payment, smartphone, and credit card) to pay for his transactions. **FIG. 19A** shows an enlarged view of the display. The billing record **1900** shown in this example can be on the smart phone **800** or sleeve **1100**. In this example, Bill can check the transaction details of any of the bills paid by him by selecting the corresponding

record. **FIG. 19B** shows an enlarged view of three examples of transaction details. In the first example **1902**, an example of transactions for an online payment system account is shown. In the second example **1904**, an example of transactions for an ASIN account is shown. In the third example **1906**, an example of transactions for a UPC account is shown.

[0144]   **FIG. 20** illustrates, in a flowchart, an example of a method **2000** of obtaining a review, in accordance with some embodiments. The method **2000** comprises receiving **2002** an input comprising a product or service, locating **2004** a review associated with the input, and displaying **2006** the review. Other steps may be added to the method **2000**. In an aspect, the smart card sleeve processor **1104** is configured to receive an input comprising a product or service, locate a review associated with the input, and display the review.

Social Search

[0145]   Some social networking websites allow people to publish their profiles, receive and provide endorsements for professional skills, and also receive and give professional recommendations. While this methodology is good in intent, some people may try to game the system and promote themselves/others fraudulently. Many social networking websites do not have a mechanism of checking the credibility of the person giving the endorsement and also verifying the credentials of the person who has created a profile in their platform. The burden of establishing the proof may be placed on the reader. The system **100** may mitigate or attempt to remove the ambiguity in online content.

[0146]   Prior to the current teachings, a customer can submit reviews of a product/business/service provider and share the review with its social network and the rest of the world if the product/business/service provider solicits a review from the customer. Additionally, the submitted reviews are locked into the product/business/service provider's database and not visible to the rest of the world. In contrast, the current teachings break away from this limitation by allowing customers to capture reviews of product/business/service provider by performing a phonebook lookup or by associating the review with a business transaction. When

the customer captures information in this manner, the reviews are associated with the product/business/service provider and the customer.

[0147]   The reviews database **142** that is built and maintained may be considered to be a single point of truth (SPOT) that comprises credible information about products, businesses, service providers or any other data critical in decision making. This objective is realized by allowing ordinary people and subject matter experts to rank and rate their experience with any of the aforementioned entities without any fear of retribution, as ordained in consumer protection legislation, such as the United States **Consumer Review Fairness Act of 2016 (HR-5111)** for example. The system **100** provides one technique of accomplishing this mission - capturing all electronic (online) transactions and card payments into a database that is accessible to users via their individual accounts and allowing users to rank and rate their experience with any product/business/service (see **FIG. 5** – use case **510**). In addition, the system **100** also provides a technique of capturing solicited and unsolicited reviews via a phonebook repository (see **FIG. 4** and **FIG. 5** – use case **520**). The system **100** is not limited in scope to the aforementioned data sources only as it is clear that it can be extended to other data sources **110** as well. For example, the techniques described in the embodiment could also be used to validate and endorse/reject news in the online world. The menace of fake news has taken root in the online world, in part, because there is no universally recognized organization that has the responsibility or trust of certifying a news story. Once a mechanism is put up to connect a story with the provider and validate the credentials of the provider, the problem of fake news may be mitigated.

Centralized Repository of Customer Reviews

[0148]   The transaction details and reviews captured in a centralized repository can assist consumers in many ways. Consumers may be able to visibly share their experiences with products, businesses, and service providers with their social network and anonymously with the rest of the world. **FIGs. 21A** to **21C** illustrate an example of sharing consumer experiences, in accordance with some embodiments. **FIGs. 21A** to **21C** show three use cases: a) Business as Usual **2110**, b) SPOT – Consolidated Reviews per Person **2120**, and c) Shared - Reviews Shared among a

Group **2130**. The first use case **2110** is the present scenario wherein reviews are locked into each vendor's database and not accessible to the outside world. The second use case **2120** illustrates a scenario wherein user reviews are captured at a central location in their respective accounts. These reviews can be accessed via a mobile device (phone, sleeve) or a computer. The third use case **2130** illustrates a scenario wherein a group of friends have consented to share their reviews with each other. Thus, when any one of them accesses the system **100** reviews database **142**, they are able to see all the reviews captured by the group.

[0149] A consolidated database of reviews may assist consumers as well as vendors in decision making. For instance, a current customer may be able to infer, for example, that a previous customer regularly purchases computer hardware; the current customer should speak with the previous customer before buying computer hardware and/or check their reviews; the system **100** consolidates the previous customer's reviews across retailers; the current customer can learn from the previous customer's experience. The current customer may also be able to infer that, for example, that the previous customer gave a negative review of a business' extender device; the current customer should consider purchasing a better router to improve the network connectivity at their house; the current customer was just about to purchase the business' extender after looking at its raving reviews on an electronic commerce website; thanks to the system **100**, the current customer can see that the product has engineering defects. A vendor may be able to infer, for example, that a customer has done a very thorough review of a branded USB cable and a branded MP3 player. The customer's profile suggests that the customer is an experienced electronics engineer. Looking at the average rating that these products received from other customers also, the product should be delisted from the vendor's catalog, and return the unsold stock to the manufacturer.

[0150] The system **100** search engine **132** may also assist consumers in determining the real value of products and services. For example, some retailers may entice customers to purchase products by raising the prices of products and then offering a discount on the inflated price. This practice nullifies any discount as the customer ends up paying the actual retail price of the product. In some embodiments, the system **100** may maintain an archive of prices across stores and

geographic locations, thereby allowing customers to compare prices across retailers before making a purchase (see **FIG. 22A**). The system **100** may also allow them to verify the historical price of a product before making a purchase (see **FIG. 22B**). **FIGs. 22A** and **22B** illustrate examples of search results of products across vendors and over time, in accordance with some embodiments.

Framework for Inverted Ownership of Customer Transaction Records (CTR)

[0151]   In some embodiments, the POS setup **1700** shown in **FIG. 17** may be used to create a unique value proposition for merchants/vendors and customers – a Loyalty Program based on Inverted Ownership of Customer Transaction Records (CTR). The operating principles of such a program will now be described.

[0152]   Many merchants/vendors and some banks issue co-branded payment cards to customers where the customers earn reward points or cashback every time they make a purchase at a designated store or business establishment using that card. Merchants, vendors and banks offer this benefit as a loyalty bonus because they want to retain their customers, and also because they want to learn from the purchasing behavior of their customers. The reward points or cashback can be redeemed for some product, or adjusted against the outstanding/purchase amount at the merchant's store or within a partner network.

[0153]   When customers take a co-branded payment card from a merchant/vendor or bank, they sign up to an agreement with the card issuer whereby their transaction records are retained by the merchant/vendor or bank and used for promotions, business insights etc. Merchants, vendors, and banks do not share the customer transaction records with their competitors and are required to abide by any applicable privacy laws specified by a regulatory body (typically a government body). Additionally, while a merchant/vendor retains a copy of the transaction invoice of the customer containing an itemized breakdown of everything they purchased, the bank only receives a statement containing the total amount spent at the merchant/vendor.

[0154]   If a customer has multiple payment cards issued by different merchants/vendors or banks (typical case), the business insight available to a merchant/vendors or bank is very limited in scope. For example, a merchant/vendor

cannot determine that a customer is a repeat purchaser of a certain brand of soap or edible oil if the customer purchases the same soap or edible oil via a payment card other than the one issued by the merchant/vendor, or if the customer purchases the aforesaid products from other merchants. Information such as this can be very valuable to the manufacturer of soap or edible oil in planning their production volumes and advertising budget.

[0155]   The POS setup **1700** allows customers to save all of their transaction records – online as well as offline – in their account in a centralized repository. This architecture is an improvement over the existing/current setup. **FIG 23A** illustrates an example of a customer activity where the transactions records are either printed out or recorded in an online database. There is no centralized database recording all of the customer transactions. **FIG. 23B** illustrates an example of customer activity where all transaction records (online and offline) are recorded in a centralized database, in accordance with some embodiments. A centralized repository of transaction records reverses the ownership of customer transaction records (CTR) and places the transaction data directly in the hands of the customer. In the new framework, the customer does not need to obtain and use a merchant/vendor co-branded card or identifier, such as a QR code in order to earn loyalty credits. The customer can use any card it already owns and link the card to its purchase transactions with the merchant. The customer can subsequently leverage the electronic record of its purchase transactions to get promotions, discounts, offers, and cashback from the merchants/vendors.

[0156]   To allow a merchant/vendor to run a loyalty program without a merchant specific payment card or identifier, such as a QR code, the system **100** allows the merchant/vendor and the customer to create their own accounts under the system **100**. The system **100** subsequently allows the customer to add Token Numbers corresponding to their payment cards inside their account. Customers can add Token Numbers to their account via their online accounts with the card issuer or dynamically during a transaction. Payment card issuers tokenize payment cards (via a one-way hash) at the request of the cardholder and provide an encrypted copy of the stored Token Number to the payment processor every time they receive a request for the Token Number. The system **100** uses Token Numbers to associate a

payment card used during a transaction with the customer account containing the Token Number. The Token Number uniquely identifies a payment card but cannot be mathematically reversed to reveal the payment card number. It is encrypted with the system **100** public key and can be decrypted only via the matching system **100** private key deployed at the system **100**. It is understood that others schemes may be employed that uniquely identifies a payment card without revealing its owner.

[0157]   When a transaction is initiated, the transaction record may be saved in the customer's account as well as the associated merchant's account. The system **100** may link the customer's transaction record with the merchant's account if the customer is enrolled in the merchant's loyalty program. If the customer is not enrolled in the merchant's loyalty program and the merchant has created a loyalty program, the customer may be prompted to register itself with the merchant's loyalty program. If the customer consents to enrol itself with the merchant's loyalty program, the transaction record may be linked with the merchant's account. If the customer declines to enrol with the merchant's loyalty program, the customer action is recorded with the system **100** and the customer is not prompted to register with the merchant's loyalty program again. If the merchant has not created a loyalty program, the customer transaction record is only saved in the customer's account with the system and the merchant does not receive any information about the customer record.

[0158]   **FIGs. 24A and 24B** illustrate in sequence diagrams, examples of workflows **2400A and 2400B** of a loyalty program based on the inverted ownership of CTRs, in accordance with some embodiments. The workflows includes four use cases: (a) an example of a method **2410** of capturing user card payment transaction records and loyalty credits electronically via the payment processor; (b) an example of a method **2430** of capturing user card payment transaction records and loyalty credits electronically via the payment processor where the user card has not been registered; (c) an example of a method **2450** of capturing cash payment transaction records and loyalty credits electronically by displaying a Quick Response (QR) code on a mobile app, which the POS representative reads with a scanning machine; and (d) an example of a method **2460** of cash payment transactions where a printout containing a Quick Response (QR) code of the transaction record is received, which

the user scans with a mobile app and captures the transaction records and loyalty credits electronically. The methods **2410**, **2430, 2450**, and **2460** begin with the user initiating a payment at the point of sale (POS).

[0159]   In the first use case **2410**, the user initiates a purchase **2412** (e.g., tap, swipe, insert card) via a payment cube connected to POS Device **1702**. The payment cube reads the encrypted card details and the bill amount, and forwards **2414** the information to the POS Device **1702**. The POS Device **1702** accepts the information and routes **2416** it to the payment processor **2490** for authorization (e.g., in an authorization request message), and also to receive an encrypted copy of the Token Number corresponding to the card.

[0160]   When the payment processor **2490** receives **2416** the authorization request, it decrypts the card details and forwards the card number to the card issuer for authorization. The payment processor **2490** requests the card issuer to also provide an encrypted copy of the Token Number (if any) of the card. The card issuer checks the cardholder's account to confirm if there are enough funds available to process the transaction. If the account has sufficient funds, the card issuer sends an authorization to the payment processor and also provides an encrypted copy of the Token Number (if any) corresponding to the card. The payment processor **2490** forwards **2418** the authorization and the encrypted Token Number to the POS Device **1702** (e.g., in an authorization reply message). Once the POS Device **1702** receives the authorization and the Token Number, it generates an electronic copy of the customer transaction record (CTR) and links the CTR with the encrypted Token Number. The merchant then transmits **2420** both of the information to the system **100** containing the online Transaction Database **141**. At the system **100**, the Token Number is decrypted. Then, the system **100** looks up **2422** the Customer Account Number containing the Token Number. If the Token Number is registered in a Customer Account Number, the CTR is appended (e.g., via an INSERT CTR message **2424**) to the transaction records of Customer Account Number. If the Token Number is not registered in a Customer Account Number, the customer is prompted to allow the system **100** to register the Token Number into its account number and then the transaction records in the customer's account are updated with the new transaction record. Once the transaction record is appended **2424** to the

customer's transaction record, the information is also linked (e.g., via a LINK transaction message **2426)** to the merchant's loyalty program (if any). If the merchant is running a loyalty program but the customer has not enrolled in it, the merchant provides the customer information about its loyalty program and describes the steps to enrol in the program. Once the transaction record is inserted into the customer account, the transaction details may be displayed **2440** on the user device (or smart wallet display).

[0161]   The second use case **2430,** begins with steps **2412 to 2420.** However, in this use case, when system looks up the **2422** the Customer Account Number containing the Token Number, it is unable to find the Token Number associated with any customer account **2432.** The POS Device **1702** then displays an Unknown Card message **2434.** An authorization to include the Token Number corresponding to the payment card may be received **2436** at the POS Device **1702** which then sends an ADD Card message **2438** to the system **100.** The system **100** may then create/add the token number corresponding to the payment card in the Customer Account Number, which is included as a variable in the message **2438.** Once the Token Number is added **2438,** then steps **2424 to 2426** may occur. Once the transaction record is inserted into the customer account, the transaction details may be displayed **2440** on the user device (or smart wallet display).

[0162]   In the third use case **2450,** the user makes a cash payment **2452** via the POS Device **1702** and indicates to the POS representative that it has a mobile app installed on its smartphone to collect reward points. The POS representative asks the user to display the Quick Response (QR) code containing the Customer Account Number registered with the system **100.** When the user displays **2454** the QR code on its smartphone, the POS representative initiates the scanning process **2472** and receives **2474** the customer account number. The POS Device **1702** then sends a Transaction Record message **2476** to register the CTR with the system **100.** The system **100** may append/insert **2424** the CTR into the database **141** and LINK **2426** the transaction with the merchant's loyalty program (if any). If the merchant is running a loyalty program but the customer has not enrolled in it, the merchant provides the customer information about its loyalty program and describes the steps to enrol in the program. Once the transaction record is inserted into the customer

account, the transaction details may be displayed **2440** on the user device (or smart wallet display).

[0163]   In the fourth use case **2460**, the user makes cash payment **2452** via the POS Device **1702** and indicates to the POS representative that it wants to receive a printout of the Customer Transaction Record. The POS Device **1702** sends a print invoice message **2462** to a printer that prints **2464** an invoice wherein the entire transaction record is captured in a Quick Response (QR) code. Steps **2472** to **2426** described above may then occur. Once the transaction record is inserted into the customer account, the transaction details may be displayed **2440** on the user device (or smart wallet display).

[0164]   The procedure in use case #3 **2450** and #4 **2460** allows a customer to collect reward points and cashback even with cash transactions. Transaction records captured in this manner allow a customer to get instant visibility on their spending habits across payment methods and payment cards. The system **100** also allows a customer to join a merchant's loyalty program without providing any confidential information about itself. Most mainstream loyalty programs require a customer to sign up an agreement and provide confidential information about itself (Name, Age, Phone Number, Email Address, Postal Address, Social Security Number etc.) before enrolling the customer in the loyalty program. Furthermore, since each merchant issues its own loyalty card, the customer can accumulate a lot of loyalty cards in its wallet, which increases the chances of theft and misuse of cards. The proposed system awards customers loyalty credits based on the payment method used at the time of the transaction. The customer can earn loyalty credits through cash (via QR code) as well as card (via Token Number) purchases.

[0165]   **FIGs. 25A to 25D** illustrate, in tables, examples of transaction details **2510**, **2520**, **2530**, and **2540**, in accordance with some embodiments. **FIGs. 25B** to **25D** show that each party in the system (Merchant **2530**, Bank **2540**, and Online Transaction Database **2520**) have visibility only on the information that they own. The merchant has information on the transactions **2530** done by the customer within its store/partner network, and uses this information to compute the loyalty credits for the customer. However, it requires consent from the customer before receiving

information on the customer's transactions **2510** outside its own store/partner network. It is understood that merchants would provide loyalty credits to a customer to receive such information. The bank has information on the customer spending **2540** across market segments but does not know how the money was spent because the transaction records **2510** are not shared with the bank. The online transaction **2520** database does not know the customer behind the Token Number because the bank is not required to share this information with the online transaction database **2520**. The only party having full access to the transaction records **2510** is the customer making the purchases. The customer can share its transaction records **2510** with the other parties in the system without revealing its identity.

[0166]   **FIG. 26** is a schematic diagram of a computing device **2600** such as a server. As depicted, the computing device includes at least one processor **2602**, memory **2604**, at least one I/O interface **2606**, and at least one network interface **2608**.

[0167]   Processor **2602** may be an Intel or AMD x86 or x64, PowerPC, ARM processor, or the like. Memory **2604** may include a suitable combination of computer memory that is located either internally or externally such as, for example, random-access memory (RAM), read-only memory (ROM), compact disc read-only memory (CDROM).

[0168]   Each I/O interface **2606** enables computing device **2600** to interconnect with one or more input devices, such as a keyboard, mouse, camera, touch screen and a microphone, or with one or more output devices such as a display screen and a speaker.

[0169]   Each network interface **2608** enables computing device **2600** to communicate with other components, to exchange data with other components, to access and connect to network resources, to serve applications, and perform other computing applications by connecting to a network (or multiple networks) capable of carrying data including the Internet, Ethernet, plain old telephone service (POTS) line, public switch telephone network (PSTN), integrated services digital network (ISDN), digital subscriber line (DSL), coaxial cable, fiber optics, satellite, mobile,

wireless (e.g., Wi-Fi, WiMAX), SS7 signaling network, fixed line, local area network, wide area network, and others.

[0170]   The foregoing discussion provides many example embodiments of the inventive subject matter. Although each embodiment represents a single combination of inventive elements, the inventive subject matter is considered to include all possible combinations of the disclosed elements. Thus, if one embodiment comprises elements A, B, and C, and a second embodiment comprises elements B and D, then the inventive subject matter is also considered to include other remaining combinations of A, B, C, or D, even if not explicitly disclosed.

[0171]   The embodiments of the devices, systems and methods described herein may be implemented in a combination of both hardware and software. These embodiments may be implemented on programmable computers, each computer including at least one processor, a data storage system (including volatile memory or non-volatile memory or other data storage elements or a combination thereof), and at least one communication interface.

[0172]   Program code is applied to input data to perform the functions described herein and to generate output information. The output information is applied to one or more output devices. In some embodiments, the communication interface may be a network communication interface. In embodiments in which elements may be combined, the communication interface may be a software communication interface, such as those for inter-process communication. In still other embodiments, there may be a combination of communication interfaces implemented as hardware, software, and combination thereof.

[0173]   Throughout the foregoing discussion, references are made regarding servers, services, interfaces, portals, platforms, or other systems formed from computing devices. It should be appreciated that the use of such terms is deemed to represent one or more computing devices having at least one processor configured to execute software instructions stored on a computer readable tangible, non-transitory medium. For example, a server can include one or more computers operating as a web server, database server, or other type of computer server in a manner to fulfill described roles, responsibilities, or functions.

[0174] The technical solution of embodiments may be in the form of a software product. The software product may be stored in a non-volatile or non-transitory storage medium, which can be a compact disk read-only memory (CD-ROM), a USB flash disk, or a removable hard disk. The software product includes a number of instructions that enable a computer device (personal computer, server, or network device) to execute the methods provided by the embodiments.

[0175] The embodiments described herein are implemented by physical computer hardware, including computing devices, servers, receivers, transmitters, processors, memory, displays, and networks. The embodiments described herein provide useful physical machines and particularly configured computer hardware arrangements.

[0176] Although the embodiments have been described in detail, it should be understood that various changes, substitutions and alterations can be made herein.

[0177] Moreover, the scope of the present application is not intended to be limited to the particular embodiments of the process, machine, manufacture, composition of matter, means, methods and steps described in the specification.

[0178] As can be understood, the examples described above and illustrated are intended to be exemplary only.

WHAT IS CLAIMED IS:

1.   A system for acquiring and verifying transaction information, the system comprising:

a point-of-sale (POS) device comprising:

a POS processor; and

a POS memory comprising a sequence of instructions which when executed by the POS processor configure the POS processor to:

request an authorization of a customer transaction from a payment card issuer;

request an encrypted copy of a payment card token from a card issuer that generated the payment card token and mapped the payment card token to a card number associated with a card utilized by a customer for the customer transaction;

receive an authorization reply from the payment card issuer comprising the authorization for the customer transaction and the encrypted copy of the payment card token;

generate a customer transaction record for the customer transaction in response to receiving the authorization reply;

link the encrypted copy of the payment card token with the customer transaction record; and

transmit the customer transaction record and the linked encrypted copy of the payment card token to a loyalty program server platform; and

the loyalty program server platform comprising:

a server processor;

a server memory comprising one or more data stores, including:

a transaction database configured to store customer-owned customer transaction records associated with customer accounts; and

- 51 -

a reviews database configured to store customer reviews; and

a sequence of instructions which when executed by the server processor configure the server processor to:

acquire payment transaction data from a data source associated with the at least one customer account, the payment transaction data comprising a payment transaction record for a transaction, the payment transaction record associated with at least one of a product, business or service, wherein the owner of the payment transaction data is a customer in the payment transaction record;

normalize the acquired payment transaction data, wherein the server processor is configured to:

parse the acquired payment transaction data for payment transaction record data;

extract metadata from the acquired payment transaction data; and

map the parsed data to internal data structures in the transaction database, wherein the server processor is configured to:

identify a merchant identifier associated with the payment transaction record data;

decrypt the encrypted copy of the payment card token;

associate the decrypted copy of the payment card token with a customer account in the transaction database associated with the customer associated with the customer transaction; and

associate the merchant identifier with the customer account in the transaction database;

classify the normalized payment transaction data based on contents of the customer account and acquired metadata;

store purchase details and the normalized payment transaction data in the transaction database; and

credit a loyalty account associated with the customer account based on the normalized payment transaction data; and

a reviews engine configured to:

obtain, from the one or more data stores, at least one attribute associated with the customer transaction record;

obtain, from the one or more data stores, at least one keyword associated with the at least one attribute;

obtain, from a machine learning library, at least one contextual review form parameter associated with the at least one keyword, the at least one contextual review form parameter logically associated with a type of product or service listed in the customer transaction record, wherein the machine learning library is configured to:

maintain a corpus of information it discovers from at least one of contextual review form parameters used in past received reviews, or contextual review form parameters defined or selected by users when customizing review forms;

detect changes made by reviewers to past contextual review form parameters for a product or service listed in the customer transaction record; and

update, responsive to the changes, a lookup table of keywords and associated contextual review form parameters;

generate a contextual review form comprising the at least one parameter logically associated with the type of product or service listed in the customer transaction record;

send, to a mobile device or a computer associated with the customer account, the contextual review form;

receive, from the mobile device or computer associated with the customer account, contextual review form data; and

store the contextual review form data, wherein the corpus of information maintained by the machine learning library is updated responsive to the storing of the contextual review form data.

2. The system as claimed in claim 1, wherein the sequence of instructions when executed by the server processor further configure the server processor to:

display an overall score associated with the contextual review form data, wherein the overall score comprises a combination of an average subject matter expert score and an average common person score, and the server processor is further configured to:

maintain a cumulative subject matter expert score used to determine the average subject matter expert score; and

maintain a cumulative common person score used to determine the average person score.

3. The system as claimed in claim 2, wherein to classify the normalized data where the author is a subject matter expert, the server processor is configured to:

determine that the author is a subject matter expert;

assign a subject matter expert score to the contextual review form data; and

store the subject matter expert score with the contextual review form data.

4. The system as claimed in claim 2, wherein to classify the normalized data where the author is a common person, the server processor is configured to:

determine that the author is a common person;

assign a common person score to the contextual review form data; and

store the common person score with the contextual review form data.

5. The system as claimed in claim 1, further comprising a smart card wallet, the smart card wallet comprising:

a jacket of sufficient size to fit at least one smart card;

at least one communication interface for communicating with the at least one smart card, and for communicating with the system;

a display;

a smart card wallet processor; and

a smart card wallet memory comprising a sequence of instructions which when executed by the smart card processor configure the smart card processor to:

receive, from a smart card inserted in the jacket, purchase details of recent purchases made using the smart card, wherein the smart card wallet houses the smart card, the smart card comprising a plurality of cards;

receive, from a server, purchase reviews of the purchases made;

store the purchase details and purchase reviews in the smart card wallet memory; and

display the purchase details and purchase reviews.

6.   The system as claimed in claim 5, wherein the smart card wallet is configured to:

track spending usage of each of the plurality of cards stored in the smart card, the smart card wallet processor configured to:

maintain a balance for each of the plurality of cards; and

display a recommendation to use one of the smart cards having a maximum credit window.

7.   The system as claimed in claim 1, wherein the sequence of instructions when executed by the server processor further configure the server processor to:

obtain a plurality of reviews of the product, business or service associated with the payment transaction record; and

determine a rating score for the product, business or service based on:

a list of parameters that have been evaluated in the reviews;

a number of positive rated parameters from common people;

a number of negative rated parameters from common people;

a number of positive rated parameters from subject matter experts; and

a number of negative rated parameters from subject matter experts.

8.   The system as claimed in claim 1, wherein the sequence of instructions when executed by the server processor further configure the server processor to:

determine a score for the contextual review form data, wherein the score is determined based on at least one of the following:

a number of the parameters in the contextual review form data that have been graded;

a negative rating that is reflected across different categories of the product, business or service provided by the supplier;

a background of a reviewer of the contextual review form data;

a number of reviews submitted by the reviewer;

a number of reviews submitted by the reviewer that have been endorsed;

a number of reviews submitted by the reviewer that have been rejected; or

a number of false reviews previously submitted by the reviewer; and

wherein one of:

the review background is a common person and a rating of the contextual review form data is raised by a first factor;

the review background is an expert and a rating of the contextual review form data is raised by a second factor; or

the background of the reviewer is a fake reviewer and the contextual review form data is discarded.

9.   The system as claimed in claim 8, wherein the sequence of instructions when executed by the server processor further configure the server processor to:

obtain a type of product, business or service;

select parameters associated with the type of product, business or service; and

auto-populate the contextual review form with the parameters logically associated with the type of product, business or service.

10. The system as claimed in claim 8, wherein the sequence of instructions when executed by the server processor further configure the server processor to provide an option for the reviewer to change a parameter in the contextual review form.

11. The system as claimed in claim 1, wherein:

a transaction history is generated following a repeat transaction; or.

a transaction history is generated based on a purchasing behaviour associated with a customer.

12. A computer-implemented method of acquiring and verifying transaction information, the method comprising:

requesting, by a point-of-sale (POS) processor of a POS device, an authorization of a customer transaction from a payment card issuer;

requesting, by the POS processor, an encrypted copy of a payment card token from a card issuer that generated the payment card token and mapped the payment card token to a card number associated with a card utilized by a customer for the customer transaction;

receiving, by the POS processor, an authorization reply from the payment card issuer comprising the authorization for the customer transaction and the encrypted copy of the payment card token;

generating, by the POS processor, a customer transaction record for the customer transaction in response to receiving the authorization reply;

linking, by the POS processor, the encrypted copy of the payment card token with the customer transaction record;

transmitting, by the POS processor, the customer transaction record and the linked with the encrypted copy of the payment card token to a loyalty program server platform;

storing, by a transaction database, customer-owned customer transaction records associated with customer accounts;

acquiring, by a server processor, payment transaction data from a data source associated with a customer account, the payment transaction data comprising a payment transaction record for a transaction, the payment transaction record associated with at least one of a product, business or service, wherein the owner of the payment transaction data is a customer in the payment transaction record;

normalizing, by the server processor, the acquired payment transaction data, said normalizing comprising:

> parsing, by the server processor, the acquired payment transaction data for payment transaction record data;

> extracting, by the server processor, metadata from the acquired payment transaction data; and

> mapping, by the server processor, the parsed data to internal data structures in the transaction database, said mapping comprising:

>> identifying, by the server processor, a merchant identifier associated with the payment transaction record data;

>> decrypting, by the server processor, the encrypted copy of the payment card token;

>> associating, by the server processor, the decrypted copy of the payment card token with a customer account in the transaction database associated with the customer associated with the customer transaction; and

>> associating, by the server processor, the merchant identifier with the customer account in the transaction database;

classifying, by the server processor, the normalized payment transaction data based on contents of the customer account and acquired metadata;

storing, by the server processor in a memory, purchase details and the normalized payment transaction data in the transaction database; and

crediting, by the server processor, a loyalty account associated with the customer account based on the normalized payment transaction data;

obtaining, by a reviews engine from one or more data stores, at least one attribute associated with the customer transaction record;

obtaining, by the reviews engine from the one or more data stores, at least one keyword associated with the at least one attribute;

obtaining, by the reviews engine from a machine learning library, at least one contextual review form parameter associated with the at least one keyword, the at least one contextual review form parameter logically associated with a type of product or service listed in the customer transaction record, wherein the machine learning library is configured to:

> maintain a corpus of information it discovers from at least one of contextual review form parameters used in past received reviews, or contextual review form parameters defined or selected by users when customizing review forms;

> detect changes made by reviewers to past contextual review form parameters for a product or service listed in the customer transaction record; and

> update, responsive to the changes, a lookup table of keywords and associated contextual review form parameters;

generating, by the reviews engine, a contextual review form comprising the at least one parameter logically associated with the type of product or service listed in the customer transaction record;

sending, by the reviews engine to a mobile device or a computer associated with the customer account, the contextual review form;

receiving, by the reviews engine from the mobile device or computer associated with the customer account, the contextual review form data; and

storing, by the reviews engine, the review form data, wherein the corpus of information maintained by the machine learning library is updated responsive to the storing of the review form data.

13. The method as claimed in claim 12, comprising:

displaying, by the server processor on the display, an overall score associated with the contextual review form data, wherein the overall score comprises a combination of an average subject matter expert score and an average common person score, said displaying comprising:

> maintaining, by the server processor, a cumulative subject matter expert score used to determine the average subject matter expert score; and

> maintaining, by the server processor, a cumulative common person score used to determine the average person score;

and at least one of:

> said classifying the contextual review form data where the author is a subject matter expert comprising:

>> determining, by the server processor, that the author is a subject matter expert;

>> assigning, by the server processor, a subject matter expert score to the contextual review form data; and

>> storing, by the server processor, the subject matter expert score with the contextual review form data; or

> said classifying the contextual review form data where the author is a common person comprises:

>> determining, by the server processor, that the author is a common person;

assigning, by the server processor, a common person score to the contextual review form data; and

storing, by the server processor, the common person score with the contextual review form data.

14. The method as claimed in claim 13, wherein classifying the normalized data where the author is a subject matter expert comprises:

determining, by the processor, that the author is a subject matter expert;

assigning, by the processor, a subject matter expert score to the contextual review form data; and

storing, by the processor in a memory, the subject matter expert score with the contextual review form data.

15. The method as claimed in claim 13, wherein classifying the normalized data where the author is a common person comprises:

determining, by the processor, that the author is a common person;

assigning, by the processor, a common person score to the contextual review form data; and

storing, by the processor in the memory, the common person score with the contextual review form data.

16. The method as claimed in claim 12, comprising:

receiving, by a smart card wallet processor from a smart card inserted in a smart card wallet, purchase details of recent purchases made using the smart card;

receiving, by the smart card wallet processor from the system processor, purchase reviews of the recent purchases made;

storing, by the smart card wallet processor in a smart card wallet memory, the purchase details and purchase reviews; and

displaying, by the smart card wallet processor on a smart card wallet display, the purchase details and purchase reviews.

17. The method as claimed in claim 16, wherein the smart card wallet comprises:

a jacket of sufficient size to fit the smart card, wherein the smart card wallet houses the smart card, the smart card comprising a plurality of cards;

at least one communication interface for communicating with the smart card and for communicating with the system;

the display;

the smart card wallet processor; and

the smart card wallet memory.

18. The method as claimed in claim 17, comprising:

tracking, by the smart card wallet processor, spending usage of each of the plurality of cards stored in the smart card, the tracking comprising:

maintaining, by the smart card wallet processor in the smart card wallet memory, a balance for each of the plurality of cards; and

displaying, by the smart card wallet processor on the smart card wallet display, a recommendation to use one of the smart cards having a maximum credit window.

19. The method as claimed in claim 12, comprising:

obtaining a plurality of reviews of the product, business or service associated with the payment transaction record; and

determining, by the server processor, a rating score for the product, business or service based on at least one of:

a list of parameters that have been evaluated in the reviews;

a number of positive rated parameters from common people;

a number of negative rated parameters from common people;

a number of positive rated parameters from subject matter experts; and

a number of negative rated parameters from subject matter experts.

20. The method as claimed in claim 12, further comprising:

determining, by the server processor, a score for the contextual review form data, wherein the score is determined based on at least one of the following:

a number of the parameters in the contextual review form data that have been graded;

a negative rating that is reflected across different categories of the product, business or service provided by or associated with the supplier;

a background of a reviewer of the contextual review form data;

a number of reviews submitted by the reviewer;

a number of reviews submitted by the reviewer that have been endorsed;

a number of reviews submitted by the reviewer that have been rejected; and

a number of false reviews previously submitted by the reviewer;

wherein one of:

the review background is a common person and a rating of the contextual review form data is raised by a first factor;

the review background is an expert and a rating of the contextual review form data is raised by a second factor; and

the background of the reviewer is a fake reviewer and the contextual review form data is discarded.

21. The method as claimed in claim 19, further comprising:

obtaining the type of product, business or service;

selecting the parameters associated with the type of product, business or service; and

auto-populating the review form with the parameters logically associated with the type of product, business or service.

22. The method as claimed in claim 19, comprising providing an option for the reviewer to change a parameter in the review form.

23.   The method as claimed in claim 12, wherein at least one of:

a transaction history is generated following a repeat transaction; or

a transaction history is generated based on a purchasing behaviour associated with a customer.

FIG. 1

2019348201   01 Oct 2024

2/38

FIG. 2

3/38

FIG. 3

4/38

FIG. 4

Unsolicited Reviews 500

FIG. 5

FIG. 6

2019348201   01 Oct 2024
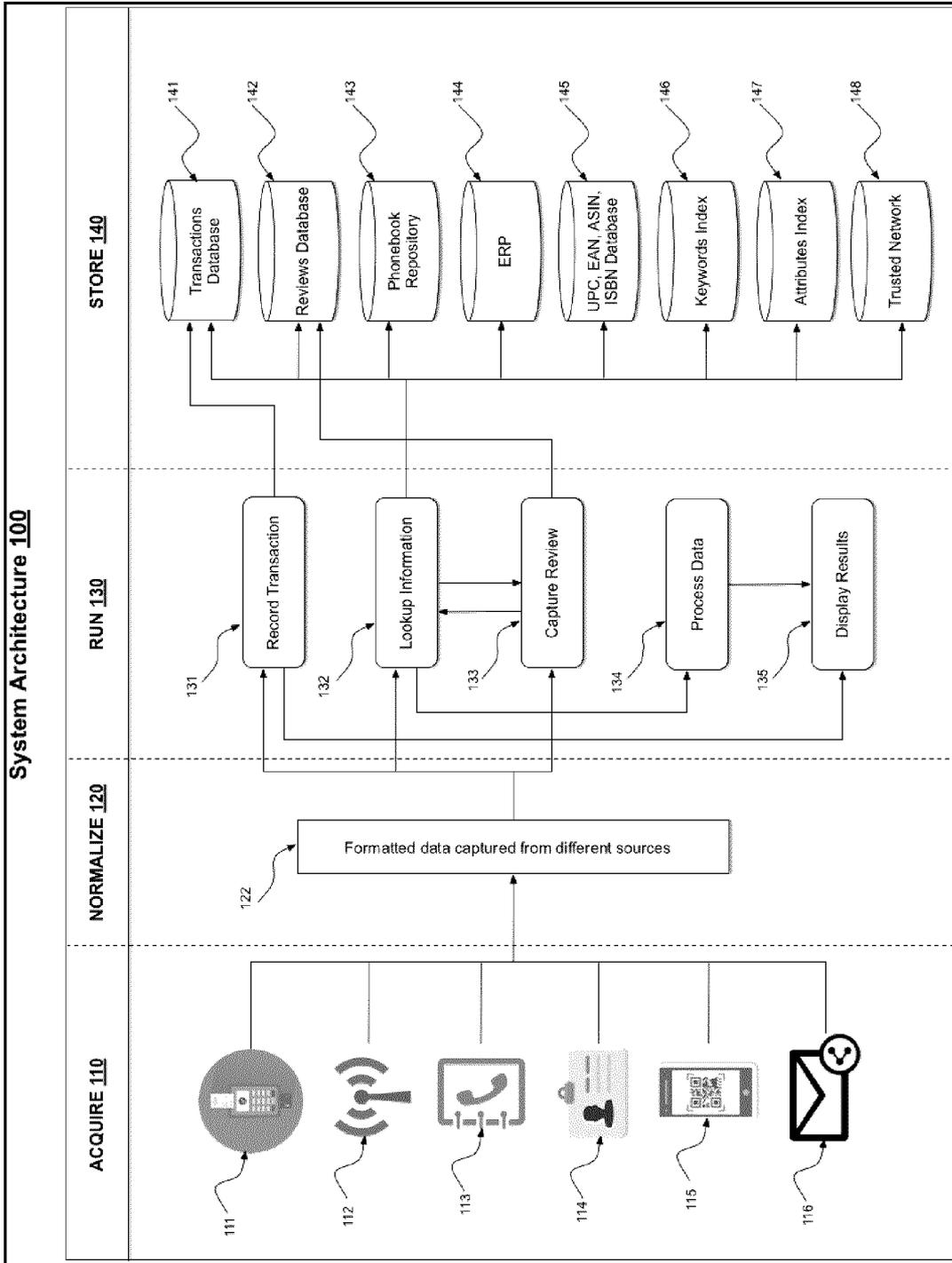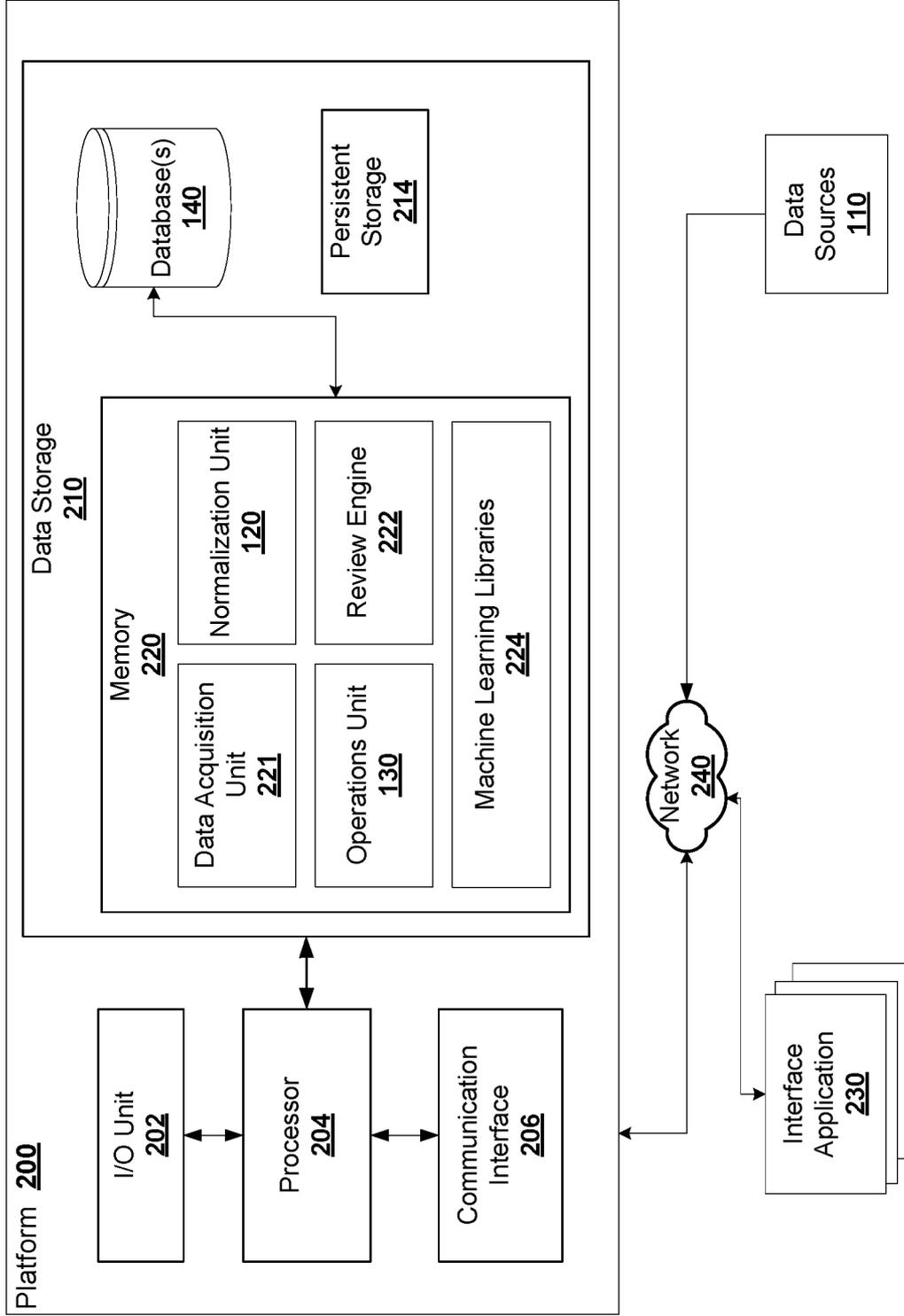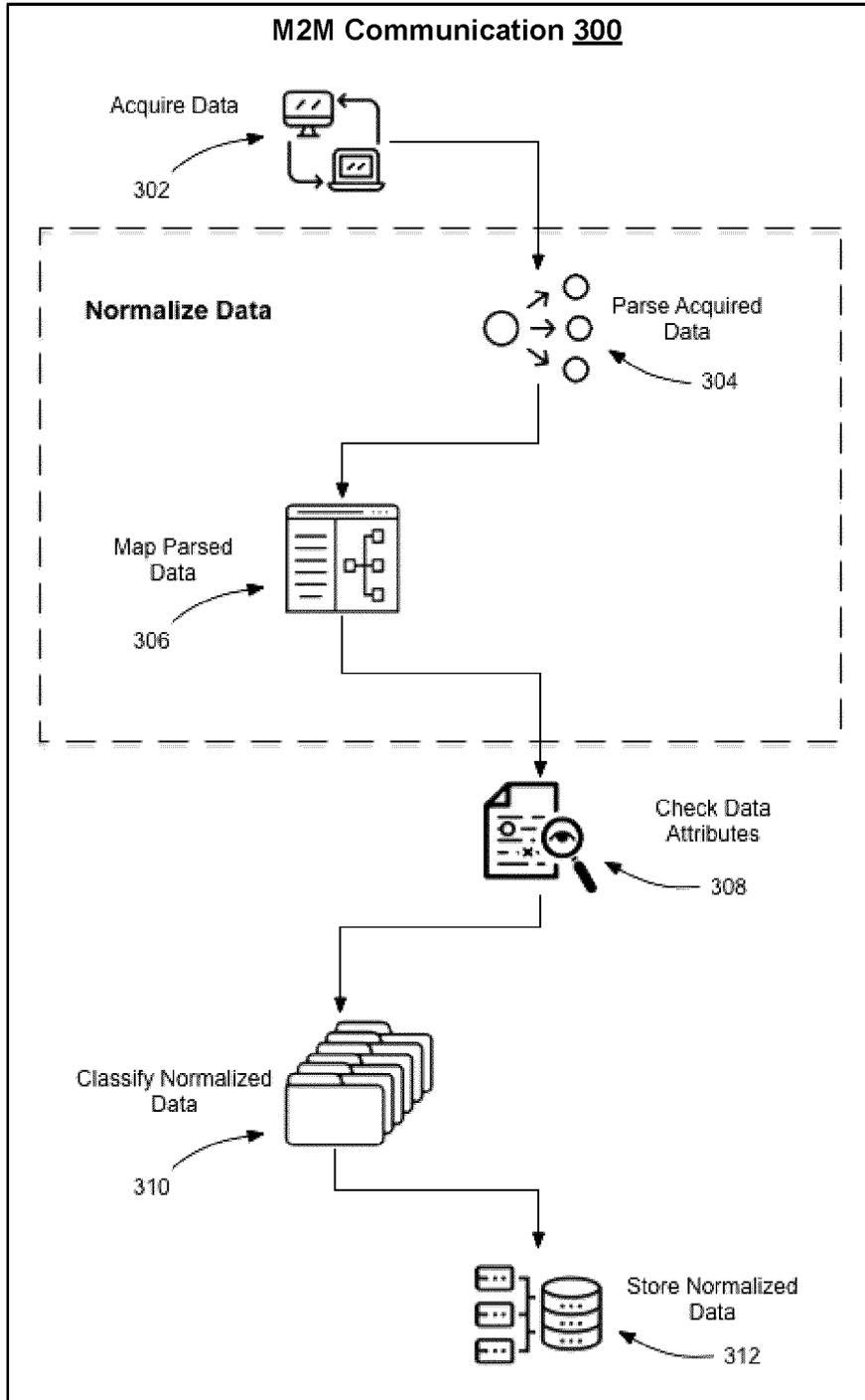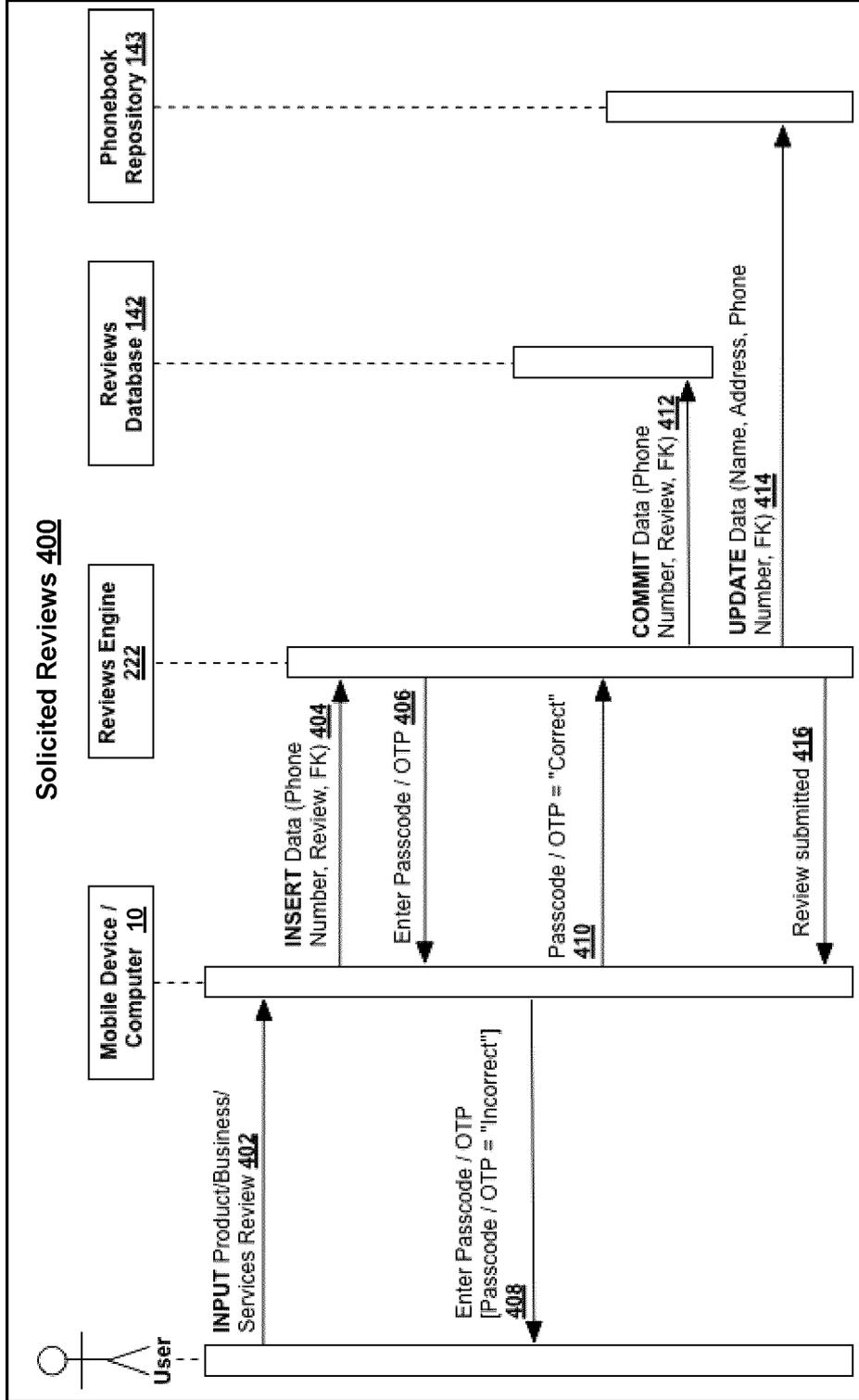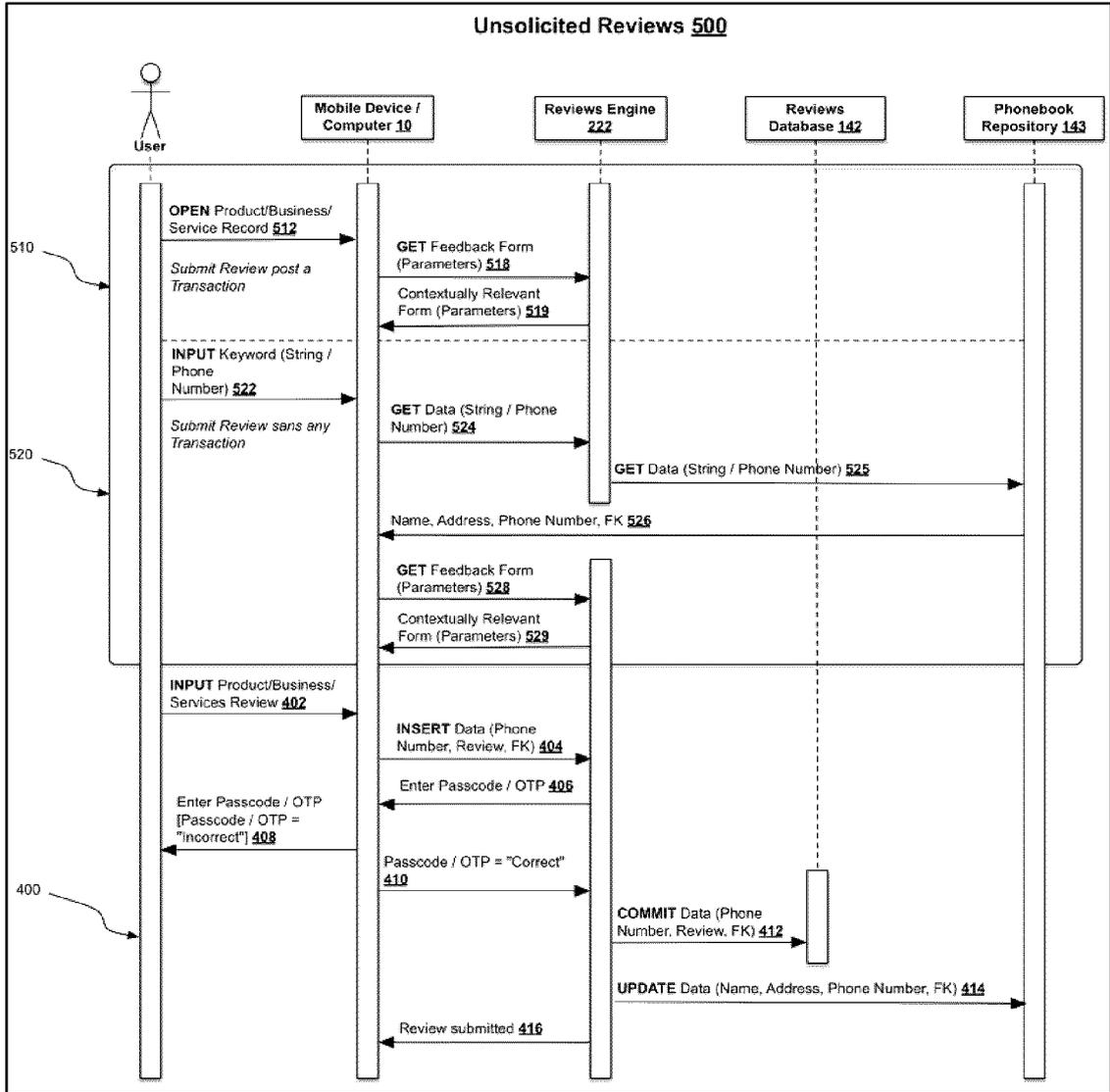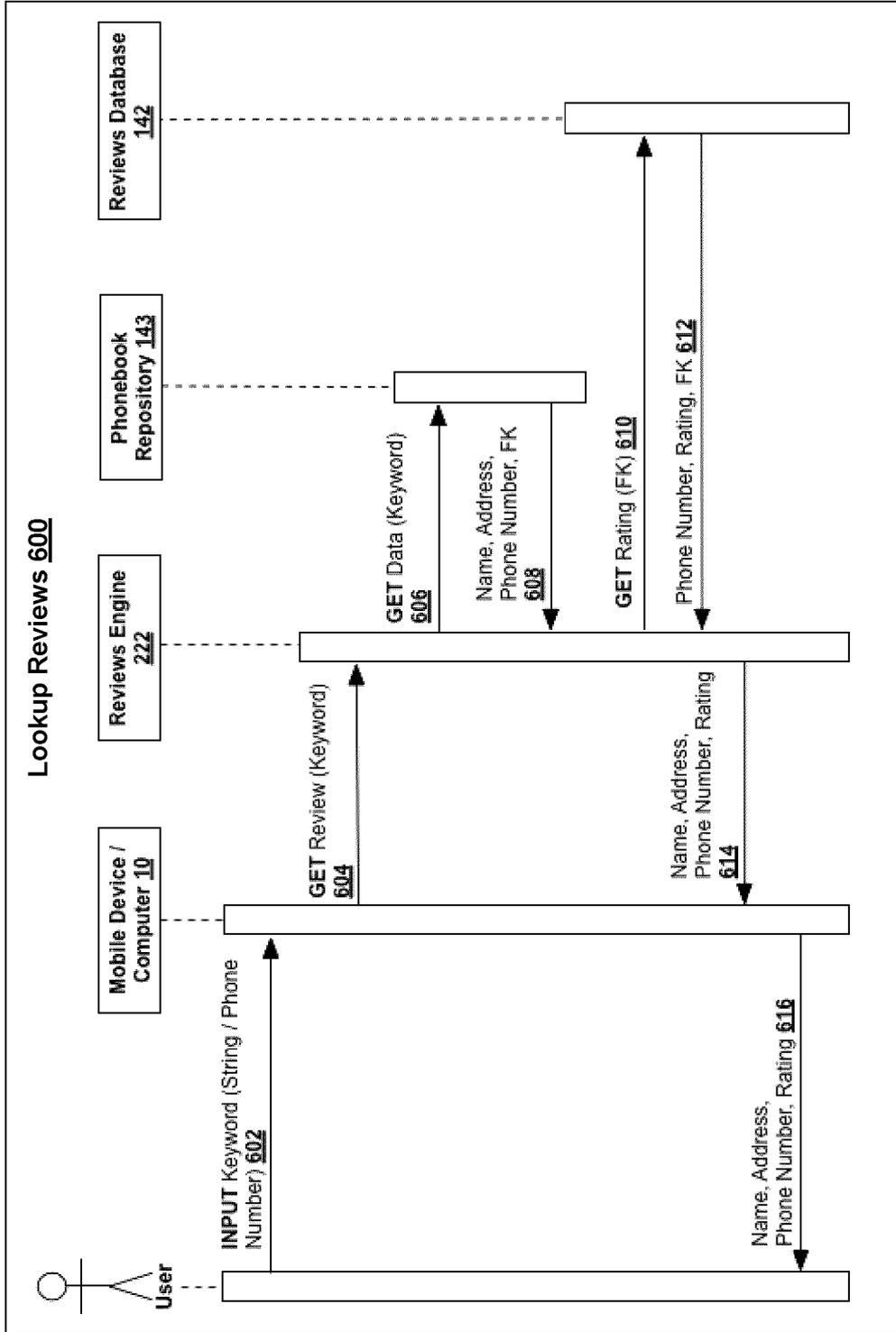
Search Result 700

Keyword 702	Doctor's Picture 704	Doctor's Name 706	Overall Rank 708	Filter 710	Social Rank 712	Reviewer 714	Relationship 716	Rating 718	Value 720
Orthopaedic Doctors in New York	Dr. 1 Picture	Dr. 1 Name	4	Total Experience ☐ Education ☐ Location ☐ Specialty ☐ Credentials ☐	4	Bob	L1	Diagnosis Treatment Bedside Manner Follow-up Courteous Staff	5 5 4 4 4
					4	Mary	L1	Diagnosis Treatment Bedside Manner Follow-up Courteous Staff	5 4 5 4 4
					4	Vincent	L1	Diagnosis Treatment Bedside Manner Follow-up Courteous Staff	4 4 5 5 4
					3	Ph*****	L2	Diagnosis Treatment Bedside Manner Follow-up Courteous Staff	3 3 4 3 4
					5	Sa*****	L3	Diagnosis Treatment Bedside Manner Follow-up Courteous Staff	5 5 5 5 4
					4	Al*****	L3	Diagnosis Treatment Bedside Manner Follow-up Courteous Staff	5 5 5 4 5
	Dr. 2 Picture	Dr. 2 Name	3		4	John	L1	Diagnosis Treatment Bedside Manner Follow-up Courteous Staff	5 5 4 4 4
					4	Megan	L1	Diagnosis Treatment Bedside Manner Follow-up Courteous Staff	5 4 4 4 3
					3	Ch*****	L2	Diagnosis Treatment Bedside Manner Follow-up Courteous Staff	4 3 5 3 4

FIG. 7

8/38

(A): Reviewing a Healthcare Provider on a Mobile Phone — 800

FIG. 8A

(B): Reviewing a Healthcare Provider on a Smart Card Sleeve — 1100

FIG. 8B

9/38

850

| Obtain reviews of a product or service |
| **852** |

↓

| Determine a rating score for the product or service |
| **854** |

FIG. 8C

860

| Send completed review form to a device associated with an appraiser |
| **862** |

↓

| Receive appraised review form with review details |
| **864** |

↓

| Determine a score for the review based on the appraisals |
| **866** |

FIG. 8D

01 Oct 2024

2019348201

Generating Contextual Feedback Forms 900

User

Mobile Device /
Computer 10

Reviews Engine
222

Machine Learning
Libraries 224

Data Stores
140

OPEN Product/Business/
Service Record 902

SELECT/CLICK Review 904

GET Attributes matching the UPC/Phone/Name of the
Product/Business/Service 906

Key attributes corresponding to the UPC/Phone/Name of
the Product/Business/Service 908

GET Keywords matching each of the attributes of the
Product/Business/Service (Attributes) 910

Keywords matching each of the attributes of the Product/
Business/Service 912

925

*User captures Review
via Default
Parameters*

GET Parameters for the
Product/Business/Service
(Keywords) 914

Review Parameters for the
Product/Business/Service
916

Contextually Relevant
Form (Parameters) 918

INPUT Product/Business/
Service review (Default
Parameters) 920

UPDATE Data Stores 922

950

*User captures Review
via Custom
Parameters*

GET Parameters for the
Product/Business/Service
(Keywords) 924

Review Parameters for the
Product/Business/Service
926

Contextually Relevant
Form (Parameters) 928

INPUT Product/Business/
Service review (Custom
Parameters) 930

Revise Machine Learning
Libraries 932

UPDATE Data Stores 934

FIG. 9

Universal Smart Card 1000

NFC 1004	Battery 1012
EEPROM 1006	
E-INK 1008	CPU 1002	Authentication 1014
RFID 1010	Smart Card Electrical Contacts 1018	Display I/F 1016

FIG. 10

2019348201   01 Oct 2024

12/38

1102

Smart Card Sleeve 1100

RAM 1114	
EEPROM 1116	
Display I/F 1118	CPU 1104
Smart Card Charging Pins 1120	

Sleeve Charging Connection 1122

Micro USB 1106

Battery 1108

Wireless I/F (Bluetooth/WiFi) 1110

Authentication 1112

FIG. 11A

FIG. 11B

FIG. 11C

Card Number	Type	Issuer	Avl. Credit	Exp. Date	Status
4536-0025-0143-2009	Credit	Scotiabank	$2,700	06/21	
4537-3729-0143-2044	Debit	Scotiabank	$5,400	02/21	
5228-1400-0789-6223	Credit	WalMart	$1,200	08/21	
5434-7129-4003-3597	Credit	Hudson's Bay	$1,900	11/21	
6018-7294-6473-3312	Debit	TD Bank	$1,080	03/22	

Bill Richardson

1100

1170

1172

Sleeve Receptacle 1200

Charging Pad
1202

Power Connection
1204

1208
Charging LED

1206
WiFi LED

FIG. 12

2019348201   01 Oct 2024

Universal Smart Card inserted in a Sleeve

Card Inserted

10:30

Friday, June 8

FIG. 13

17/38

Universal Smart Card removed from a Sleeve

FIG. 14

18/38

Universal Smart Card unlocked within a Sleeve

FIG. 15

(A): Checking the Purchase History on a Mobile Phone
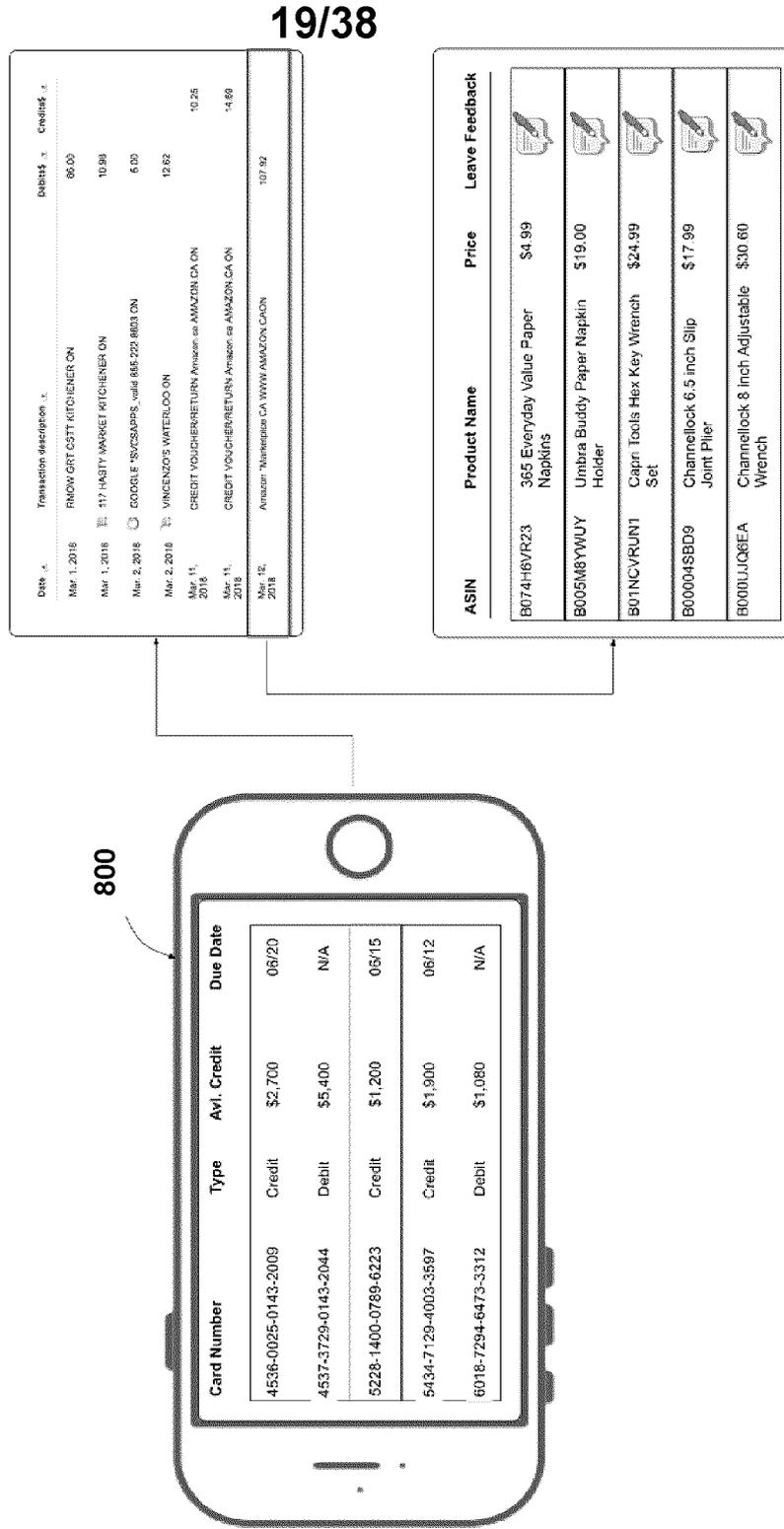
FIG. 16A

20/38

(B): Checking the Purchase History on a Smart Card Sleeve

1100

Card Number	Type	Avl. Credit	Due Date
4536-0025-0143-2009	Credit	$2,700	06/20
4537-3729-0143-2044	Debit	$5,400	N/A
5228-1400-0789-6223	Credit	$1,200	06/15
5434-7129-4003-3597	Credit	$1,900	06/12
6018-7294-6473-3312	Debit	$1,080	N/A

1000

Date ▲	Transaction description ▲	Debit$ ▲	Credit$ ▲
Mar. 1, 2018	RMOW GRT CSTT KITCHENER ON	86.00	
Mar. 1, 2018	117 HASTY MARKET KITCHENER ON	10.98	
Mar. 2, 2018	GOOGLE *SVCSAPPS_valid 855-222-8603 ON	5.00	
Mar. 2, 2018	VINCENZO'S WATERLOO ON	12.62	
Mar. 11, 2018	CREDIT VOUCHER/RETURN Amazon.ca AMAZON.CA ON		10.25
Mar. 11, 2018	CREDIT VOUCHER/RETURN Amazon.ca AMAZON.CA ON		14.69
Mar. 12, 2018	Amazon *Marketplce CA WWW.AMAZON.CA ON	107.92	

ASIN	Product Name	Price	Leave Feedback
B074H6VR23	365 Everyday Value Paper Napkins	$4.99	
B005M8YWUY	Umbra Buddy Paper Napkin Holder	$19.00	
B01NCVRUN1	Capri Tools Hex Key Wrench Set	$24.99	
B00004SBD9	Channellock 6.5 inch Slip Joint Plier	$17.99	
B000UJQ6EA	Channellock 8 inch Adjustable Wrench	$30.60	

FIG. 16B

FIG. 17

22/38

FIG. 18

2019348201 01 Oct 2024

Billing Record of a User 1900

FIG. 19A

Bill Richardson

Card Number	Type	Avl. Credit	Due Date
4536-0025-0143-2009	Credit	$2,700	06/20
4537-3729-0143-2044	Debit	$5,400	N/A
5228-1400-0789-6223	Credit	$1,200	06/15
5434-7129-4003-3597	Credit	$1,900	06/12
6018-7294-6473-3312	Debit	$1,080	N/A

1902 → 5228-1400-0789-6223
1904 → 4536-0025-0143-2009
1906 → 6018-7294-6473-3312

FIG. 19B

Date	Transaction description	Debits	Credits
Mar 1, 2018	RMONY CRT CSTT KITCHENER ON	86.90	
Mar 1, 2018	117 HASTY MARKET KITCHENER ON	10.98	
Mar 2, 2018	UBER BY 800-592-8996	14.28	
Mar 2, 2018	VINCENZO'S WATERLOO ON	12.62	
Mar 2, 2018	PC PAYMENT FROM ...****9F0921		$1.24
Mar 2, 2018	VINCENZO'S WATERLOO ON	21.99	
Mar 3, 2018	Amazon.ca AMAZON.CA ON	124.30	
Mar 3, 2018	THE GREEN DOOR GO THE WORKFOHENER ON	174.00	
Mar 3, 2018	ZIGGY'S CYCLE KITCHENER ON	350.10	
Mar 12, 2018	Amazon *Marketpla CA WWW.AMAZON.CA ON	137.52	
Mar 13, 2018	CA VENDING 800-367-9856 CONCORD ON	2.65	
Mar 13, 2018	ZIGGY'S CYCLE KITCHENER ON	48.69	
Mar 14, 2018	UNION BURGER KITCHENER KITCHENER ON	9.69	

ASIN	Product Name	Price	Leave Feedback
B074H6VRZ3	365 Everyday Value Paper Napkins	$4.99	
B005M8YWUY	Umbra Buddy Paper Napkin Holder	$19.00	
B01NCVRUN1	Capri Tools Hex Key Wrench Set	$24.99	
B000O04SBD9	Channellock 6.5 inch Slip Joint Plier	$17.99	
B000UJQ6EA	Channellock 8 inch Adjustable Wrench	$30.50	

UPC	Product Name	Price	Leave Feedback
608938613097	VeloChampion MLT10 Bike Multi Tool	$26.95	
738481901041	Boeshield T-9 Bicycle Lube	$16.00	

FIG. 19

Bill Richardson

Card Number	Type	Avl. Credit	Due Date
4536-0025-0143-2009	Credit	$2,700	06/20
4537-3729-0143-2044	Debit	$5,400	N/A
5228-1400-0789-6223	Credit	$1,200	06/15
5434-7129-4003-3597	Credit	$1,900	06/12
6018-7294-6473-3312	Debit	$1,080	N/A

1902 → PayPal
to FIG. 19B
5228-1400-0789-6223

1904 →
to FIG. 19B
4536-0025-0143-2009

1906 →
to FIG. 19B
6018-7294-6473-3312

FIG. 19A

1902 from **FIG. 19A** 5228-1400-0789-6223

1904 from **FIG. 19A** 4536-0025-0143-2009

1906 from **FIG. 19A** 6018-7294-6473-3312

Date	Transaction description	Debits$	Credits$
Mar. 1, 2018	RMOW GRT CSTT KITCHENER ON	86.00	
Mar. 1, 2018	117 HASTY MARKET KITCHENER ON	10.98	
Mar. 2, 2018	UBER BV 800-592-8996	14.28	
Mar. 2, 2018	VINCENZO'S WATERLOO ON	12.62	
Mar. 2, 2018	PC - PAYMENT FROM - *****08*0021		41.24
Mar. 2, 2018	VINCENZO'S WATERLOO ON	21.99	
Mar. 3, 2018	Amazon.ca AMAZON.CA ON	124.30	
Mar. 3, 2018	THE GREEN DOOR C/O THE WOKITCHENER ON	174.00	
Mar. 3, 2018	ZIGGY S CYCLE KITCHENER ON	350.30	
Mar. 12, 2018	Amazon *Marketplce CA WWW.AMAZON.CAON	107.92	
Mar. 13, 2018	CA VENDING 800-367-9300 CONCORD ON	2.65	
Mar. 13, 2018	ZIGGY S CYCLE KITCHENER ON	48.59	
Mar. 14, 2018	UNION BURGER KITCHENER KITCHENER ON	9.03	

ASIN	Product Name	Price	Leave Feedback
B074H6VR23	365 Everyday Value Paper Napkins	$4.99	
B005M8YWUY	Umbra Buddy Paper Napkin Holder	$19.00	
B01NCVRUN1	Capri Tools Hex Key Wrench Set	$24.99	
B00004SBD9	Channellock 6.5 inch Slip Joint Plier	$17.99	
B000UJQ6EA	Channellock 8 inch Adjustable Wrench	$30.60	

UPC	Product Name	Price	Leave Feedback
608938613097	VeloChampion MLT10 Bike Multi Tool	$26.95	
738481901041	Boeshield T-9 Bicycle Lube	$16.00	

FIG. 19B

2000

Receive an input comprising a product or service
2002

Locate a review associated with the input
2004

Display the review
2006

FIG. 20

2019348201   01 Oct 2024

Database of Customer Reviews 2000A

(A): Business as Usual 2010

Amazon

SN	Cust_Name	Cust_ID	Prod_Name	Prod_ID	Manufacturer	Mfg_ID	Store	Rating	Review
1	Bob	1145967821	Laptop Memory	3179	Corsair	3876342189	Amazon	5	blah, blah, blah
2	Philip	1189713674	HDD Case	2014	Tizum	3245912736	Amazon	5	blah, blah, blah
3	Bob	1145967821	iPhone Flip Case	6721	Fidesbox	4562890251	Amazon	4	blah, blah, blah

Home Depot

SN	Cust_Name	Cust_ID	Prod_Name	Prod_ID	Manufacturer	Mfg_ID	Store	Rating	Review
1	Alice	1127659834	Nail Clipper	5249	Victorinox	2984516730	Home Depot	5	blah, blah, blah
2	Alice	1127659834	Single Bedsheet	1124	Home Décor	6381940274	Home Depot	4	blah, blah, blah

BestBuy

SN	Cust_Name	Cust_ID	Prod_Name	Prod_ID	Manufacturer	Mfg_ID	Store	Rating	Review
1	Bob	1145967821	WiFi Extender	3020	Netgear	3612400951	Bestbuy	1	blah, blah, blah
2	Philip	1189713674	USB Cable	1065	iVolta	3926781454	Bestbuy	1	blah, blah, blah
3	Philip	1189713674	MP3 Player	8936	Transcend	4276983216	Bestbuy	1	blah, blah, blah

Crate & Barrel

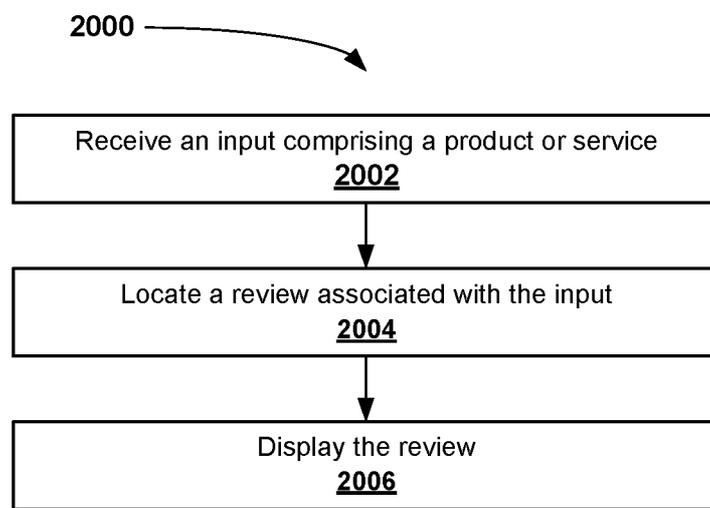| SN	Cust_Name	Cust_ID	Prod_Name	Prod_ID	Manufacturer	Mfg_ID	Store	Rating	Review
1	Alice	1127659834	Ice Cube Tray	7281	Prime	7419322468	Crate & Barrel	1	blah, blah, blah
2	Alice	1127659834	Rolling Pin Holder	7546	Sterling	7024819032	Crate & Barrel	5	blah, blah, blah

WalMart

SN	Cust_Name	Cust_ID	Prod_Name	Prod_ID	Manufacturer	Mfg_ID	Store	Rating	Review
1	Bob	1145967821	Hair Trimmer	5127	Panasonic	2716384905	WalMart	3	blah, blah, blah

Office Depot

SN	Cust_Name	Cust_ID	Prod_Name	Prod_ID	Manufacturer	Mfg_ID	Store	Rating	Review
1	Philip	1189713674	Whiteboard Marker	9437	Staedtler	5274901267	Office Depot	5	blah, blah, blah

FIG. 21A

28/38

Database of Customer Reviews 2000B

(B): SPOT - Consolidated Reviews per Person 2020

SN	Cust_Name	Cust_ID	Prod_Name	Prod_ID	Manufacturer	Mfg_ID	Store	Rating	Review
1	Bob	1145967821	WiFi Extender	3020	Netgear	3612400951	Bestbuy	1	blah, blah, blah
2	Bob	1145967821	Laptop Memory	3179	Corsair	3876342189	Amazon	5	blah, blah, blah
3	Bob	1145967821	iPhone Flip Case	6721	Fidesbox	4562890251	Amazon	4	blah, blah, blah
4	Bob	1145967821	Hair Trimmer	5127	Panasonic	2716384905	WalMart	3	blah, blah, blah

SN	Cust_Name	Cust_ID	Prod_Name	Prod_ID	Manufacturer	Mfg_ID	Store	Rating	Review
1	Alice	1127659834	Nail Clipper	5249	Victorinox	2984516730	Home Depot	5	blah, blah, blah
2	Alice	1127659834	Ice Cube Tray	7281	Prime	7419322468	Crate & Barrel	1	blah, blah, blah
3	Alice	1127659834	Rolling Pin Holder	7546	Sterling	7024819032	Crate & Barrel	5	blah, blah, blah
4	Alice	1127659834	Single Bedsheet	1124	Home Décor	6381940274	Home Depot	4	blah, blah, blah

SN	Cust_Name	Cust_ID	Prod_Name	Prod_ID	Manufacturer	Mfg_ID	Store	Rating	Review
1	Philip	1189713674	HDD Case	2014	Tizum	3245912736	Amazon	5	blah, blah, blah
2	Philip	1189713674	USB Cable	1065	iVolta	3926781454	Bestbuy	1	blah, blah, blah
3	Philip	1189713674	MP3 Player	8936	Transcend	4276983216	Bestbuy	1	blah, blah, blah
4	Philip	1189713674	Whiteboard Marker	9437	Staedtler	5274901267	Office Depot	5	blah, blah, blah

FIG. 21B

Database of Customer Reviews 2000C

(C): Shared - Reviews Shared among a Group 2030

SN	Cust_Name	Cust_ID	Prod_Name	Prod_ID	Manufacturer	Mfg_ID	Store	Rating	Review
1	Bob	1145967821	WiFi Extender	3020	Netgear	3612400951	Bestbuy	1	blah, blah, blah
2	Bob	1145967821	Laptop Memory	3179	Corsair	3876342189	Amazon	5	blah, blah, blah
3	Philip	1189713674	HDD Case	2014	Tizum	3245912736	Amazon	5	blah, blah, blah
4	Bob	1145967821	iPhone Flip Case	6721	Fidesbox	4562890251	Amazon	4	blah, blah, blah
5	Alice	1127659834	Nail Clipper	5249	Victorinox	2984516730	Home Depot	5	blah, blah, blah
6	Philip	1189713674	USB Cable	1065	iVolta	3926781454	Bestbuy	1	blah, blah, blah
7	Philip	1189713674	MP3 Player	8936	Transcend	4276983216	Bestbuy	1	blah, blah, blah
8	Alice	1127659834	Ice Cube Tray	7281	Prime	7419322468	Crate & Barrel	1	blah, blah, blah
9	Alice	1127659834	Rolling Pin Holder	7546	Sterling	7024819032	Crate & Barrel	5	blah, blah, blah
10	Bob	1145967821	Hair Trimmer	5127	Panasonic	2716384905	WalMart	3	blah, blah, blah
11	Philip	1189713674	Whiteboard Marker	9437	Staedtler	5274901267	Office Depot	5	blah, blah, blah
12	Alice	1127659834	Single Bedsheet	1124	Home Décor	6381940274	Home Depot	4	blah, blah, blah

FIG. 21C

Search Results of Products across Vendors and Over Time 2200A

(A): RETAIL PRICES ACROSS VENDORS

Photo	UPC	Product Name	Customer Reviews
	071249266236	L'Oreal Paris Hair Expertise Extraordinary Oil Shine Serum	★★★★☆ 80 4.1 out of 5 stars ˮ 5 star 57% 4 star 18% 3 star 14% 2 star 9% 1 star 2% See all 80 customer reviews ›

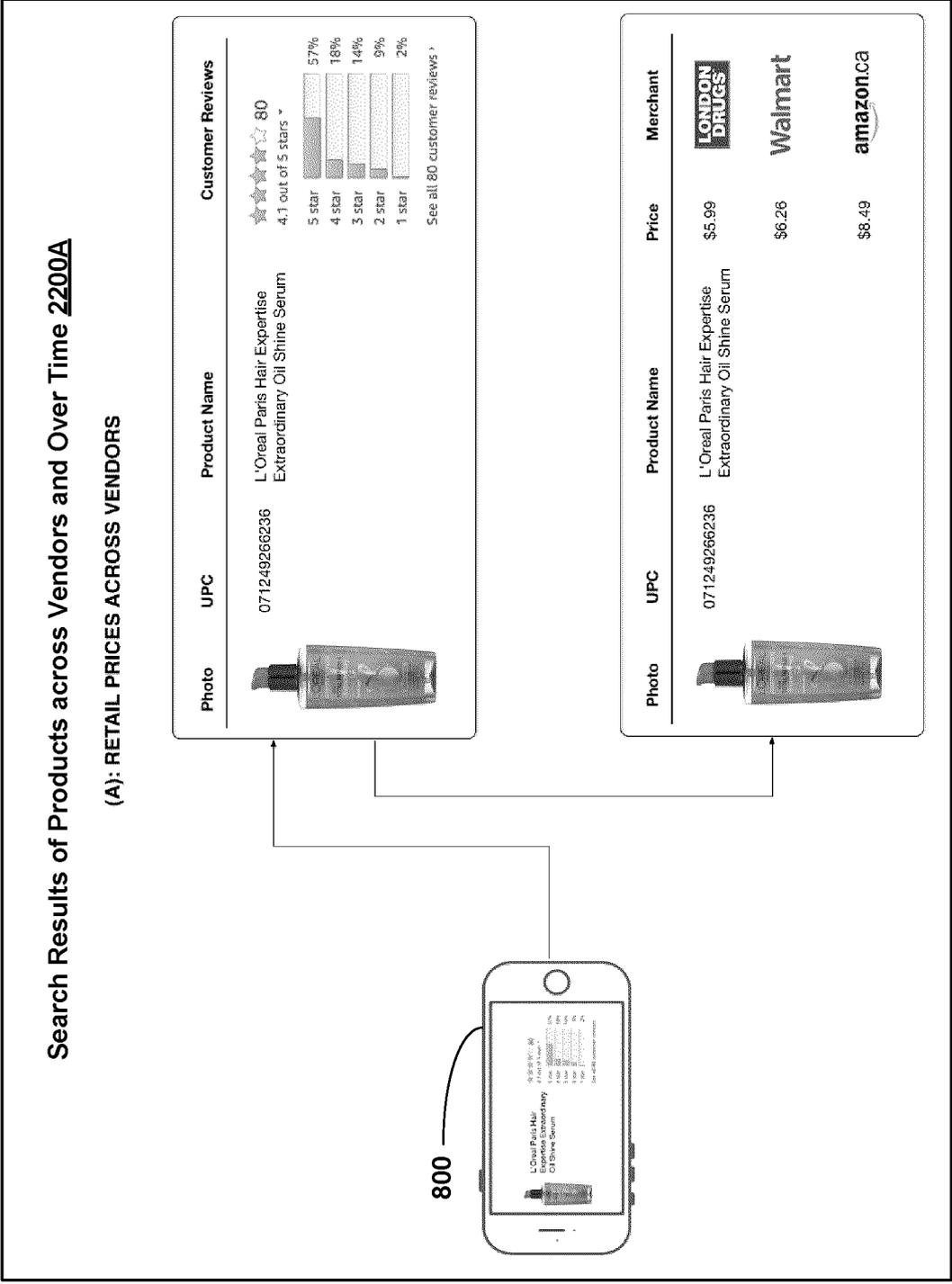| Photo	UPC	Product Name	Price	Merchant
	071249266236	L'Oreal Paris Hair Expertise Extraordinary Oil Shine Serum	$5.99	LONDON DRUGS
			$6.26	Walmart
			$8.49	amazon.ca

800

FIG. 22A

Search Results of Products across Vendors and Over Time 2200B

(B): RETAIL PRICES OVER TIME (MONTHS)

SN	Photo	UPC	Product Name	Merchant	Current Price	Avg. Price 1 Month Back	Avg. Price 2 Months Back	Avg. Price 3 Months Back	Avg. Price > 3 Months Back
1		71249266236	L'Oreal Paris Hair Expertise Extraordinary Oil Shine Serum - 100 ml	LONDON DRUGS	$5.99	$6.99	$7.89	$6.89	$6.37
				Walmart	$6.26	$6.97	$6.21	$6.12	$5.89
				amazon.ca	$8.49	$6.97	$6.97	$6.76	$5.41
2		64100001596	Kellogg's Muslix Almond Raisin Cereal - 450g	SHOPPERS DRUG MART	$3.99	$5.29	$5.49	$5.49	$4.99
				Walmart	$4.68	$4.68	$4.68	$4.68	$4.23
				amazon.ca	$4.68	$4.68	$4.68	$4.68	$4.18
				Loblaws	$5.29	$5.49	$5.99	$5.49	$5.09

FIG. 22B

FIG. 23A

FIG. 23B

FIG. 24A
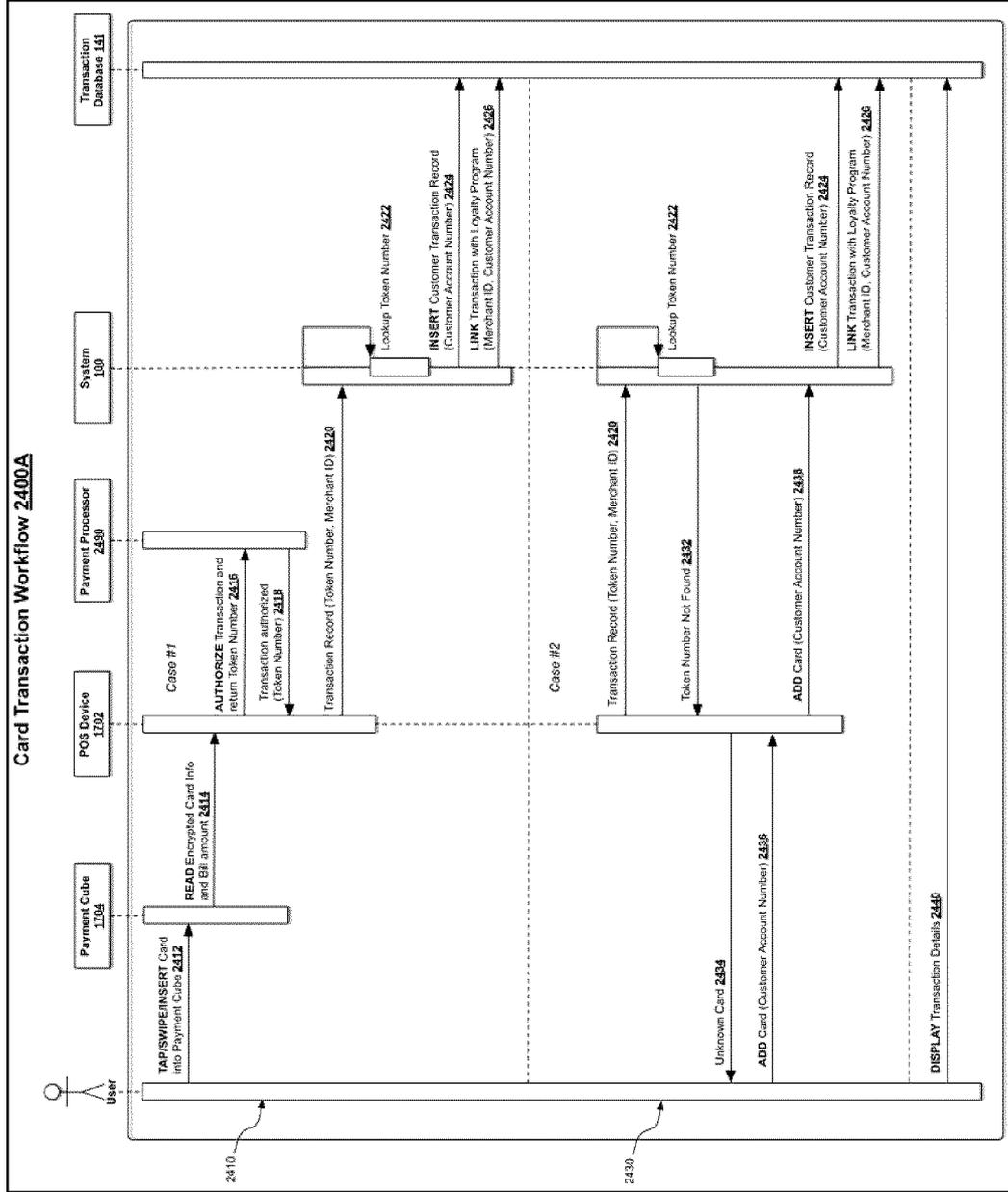
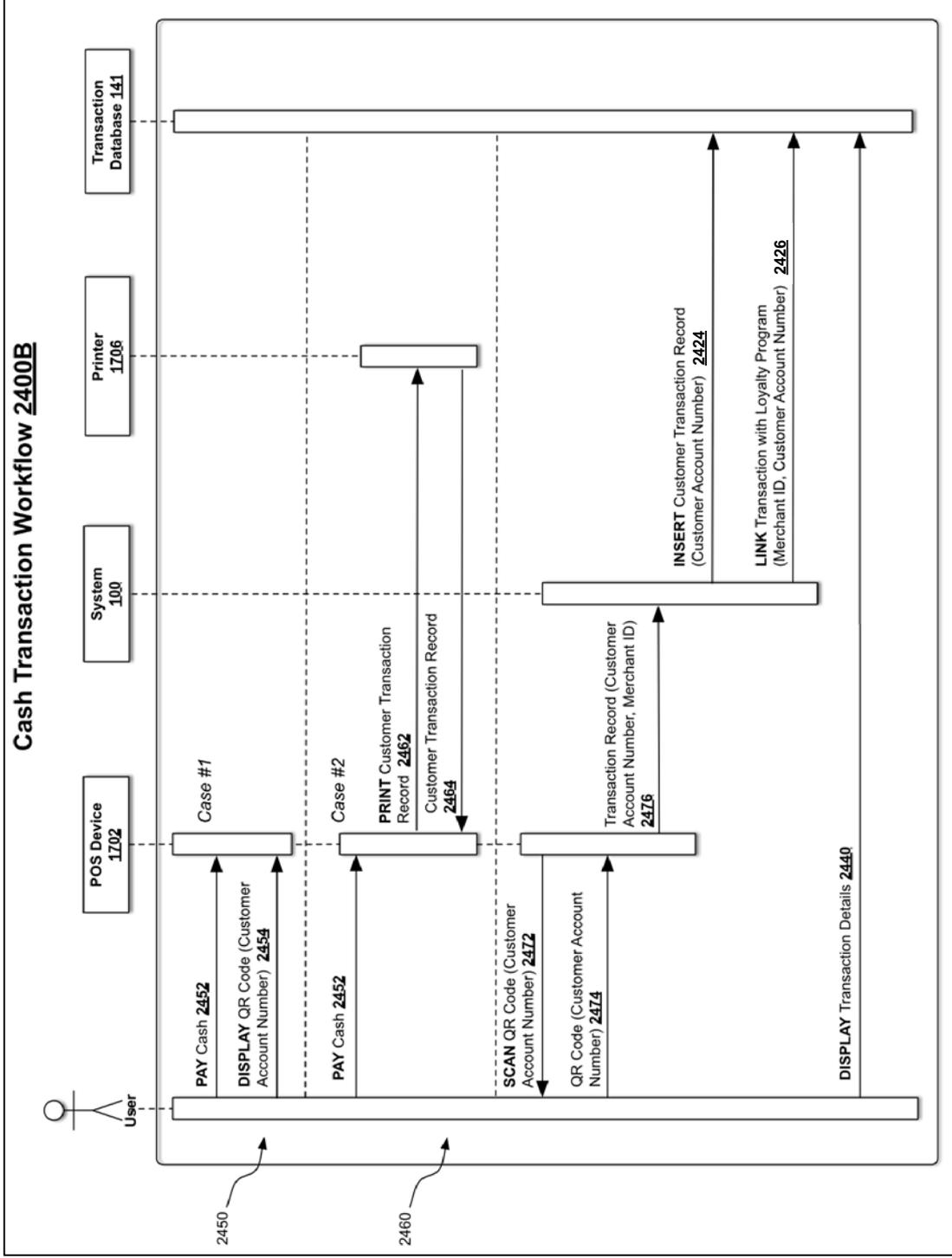## Cash Transaction Workflow 2400B
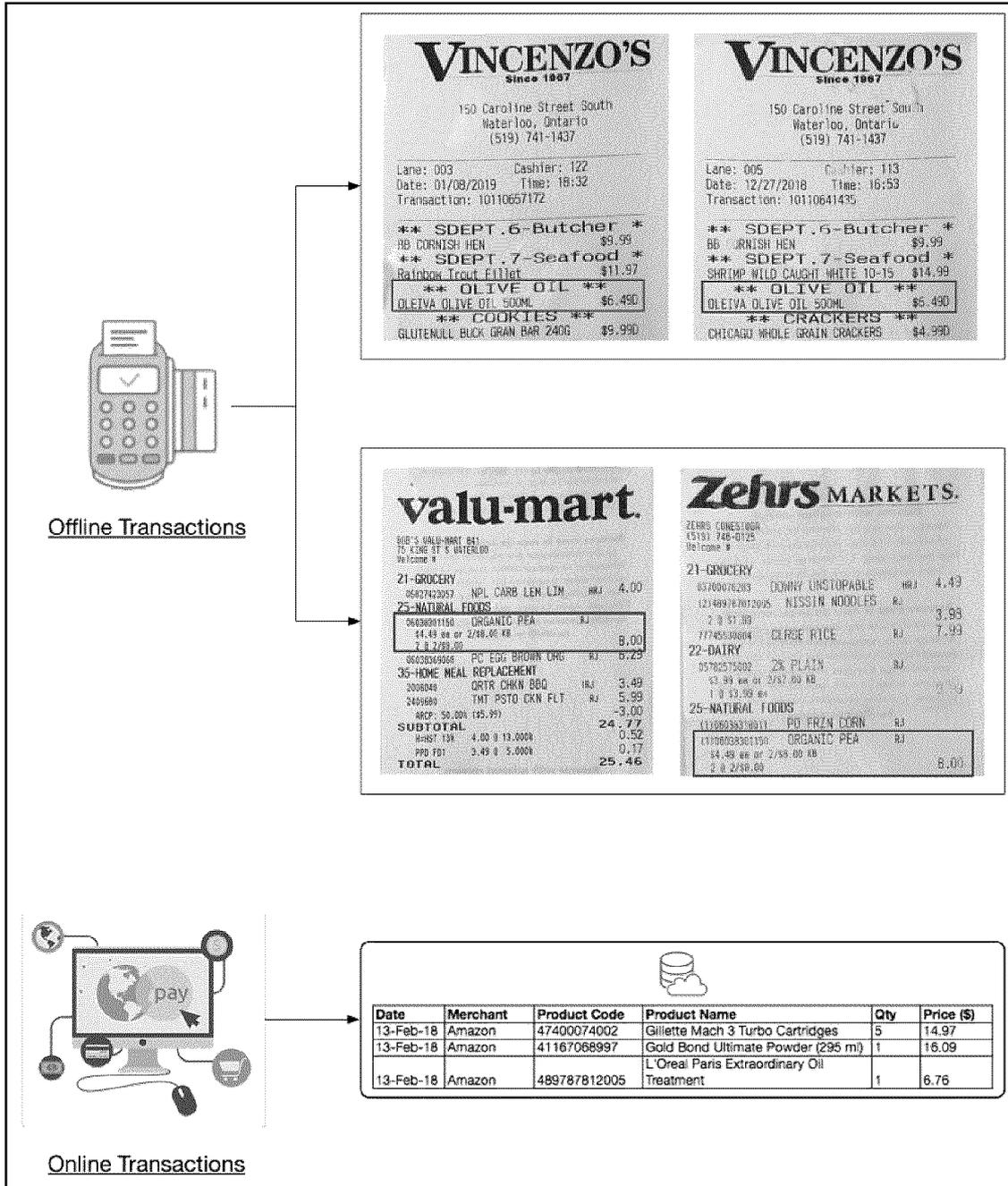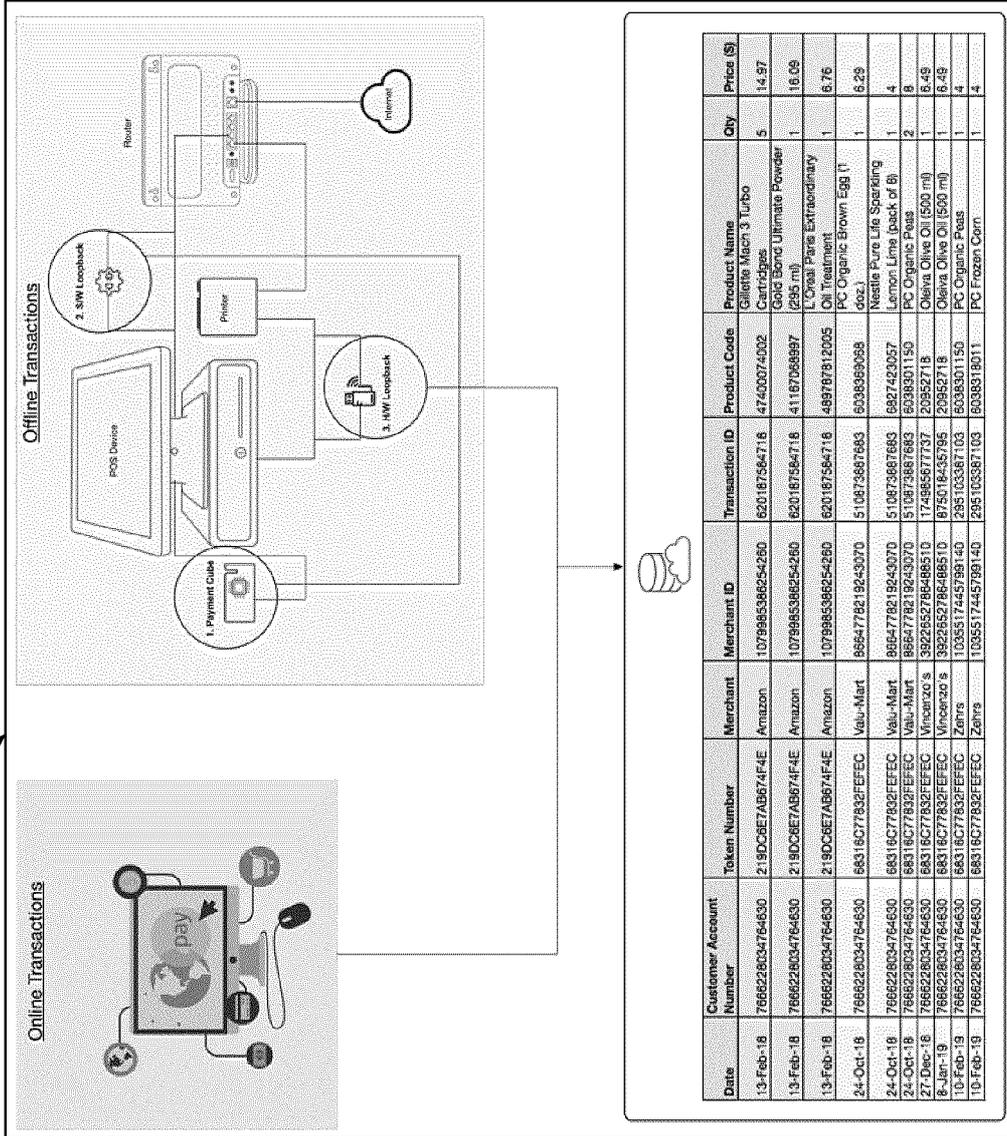
FIG. 24B

Customer — 2510

Date	Name	Customer Account Number	Card Number	Token Number	Merchant	Merchant ID	Transaction ID	Product Code	Product Name	Qty	Price ($)
13-Feb-18	Bill Richardson	76662280034764630	4536-0025-0143-2009	219DC6E7AB674F4E	Amazon	10799853862542260	62018758647189	4740007402	Gillette Mach 3 Turbo Cartridges	5	14.97
13-Feb-18	Bill Richardson	76662280034764630	4536-0025-0143-2009	219DC6E7AB674F4E	Amazon	10799853862542260	62018758647189	41167068897	Gold Bond Ultimate Powder (295 ml)	1	16.09
13-Feb-18	Bill Richardson	76662280034764630	4536-0025-0143-2009	219DC6E7AB674F4E	Amazon	10799853862542260	62018758647189	48976781205	L'Oreal Paris Extraordinary Oil Treatment	1	6.76
24-Oct-18	Bill Richardson	76662280034764630	6018-7294-6473-3312	68316C77832FEFEC	Valu-Mart	86647778219243070	51087388768	6038369068	PC Organic Brown Egg (1 doz.)	1	6.29
24-Oct-18	Bill Richardson	76662280034764630	6018-7294-6473-3312	68316C77832FEFEC	Valu-Mart	86647778219243070	51087388768	6827423057	Nestle Pure Life Sparkling Lemon Lime (pack of 8)	1	4
24-Oct-18	Bill Richardson	76662280034764630	6018-7294-6473-3312	68316C77832FEFEC	Valu-Mart	86647778219243070	51087388768	6038301150	PC Organic Peas	2	8
27-Dec-18	Bill Richardson	76662280034764630	6018-7294-6473-3312	68316C77832FEFEC	Vincenzo's	39226527864688510	17498567737	20952718	Oleiva Olive Oil (500 ml)	1	6.49
8-Jan-19	Bill Richardson	76662280034764630	6018-7294-6473-3312	68316C77832FEFEC	Vincenzo's	39226527864688510	87501843579	20952718	Oleiva Olive Oil (500 ml)	1	6.49
10-Feb-19	Bill Richardson	76662280034764630	6018-7294-6473-3312	68316C77832FEFEC	Zehrs	1035517445799140	29510338711	6038301150	PC Organic Peas	1	4
10-Feb-19	Bill Richardson	76662280034764630	6018-7294-6473-3312	68316C77832FEFEC	Zehrs	1035517445799140	29510338711	6038318011	PC Frozen Corn	1	4

FIG. 25A

Transaction — 2520

Date	Customer Account Number	Token Number	Merchant	Merchant ID	Transaction ID	Product Code	Product Name	Qty	Price ($)
13-Feb-18	76662280034764630	219DC6E7AB674F4E	Amazon	10799853862542260	62018758647189	4740007402	Gillette Mach 3 Turbo Cartridges	5	14.97
13-Feb-18	76662280034764630	219DC6E7AB674F4E	Amazon	10799853862542260	62018758647189	41167068897	Gold Bond Ultimate Powder (295 ml)	1	16.09
13-Feb-18	76662280034764630	219DC6E7AB674F4E	Amazon	10799853862542260	62018758647189	48976781205	L'Oreal Paris Extraordinary Oil Treatment	1	6.76
24-Oct-18	76662280034764630	68316C77832FEFEC	Valu-Mart	86647778219243070	51087388768	6038369068	PC Organic Brown Egg (1 doz.)	1	6.29
24-Oct-18	76662280034764630	68316C77832FEFEC	Valu-Mart	86647778219243070	51087388768	6827423057	Nestle Pure Life Sparkling Lemon Lime (pack of 8)	1	4
24-Oct-18	76662280034764630	68316C77832FEFEC	Valu-Mart	86647778219243070	51087388768	6038301150	PC Organic Peas	2	8
27-Dec-18	76662280034764630	68316C77832FEFEC	Vincenzo's	39226527864688510	17498567737	20952718	Oleiva Olive Oil (500 ml)	1	6.49
8-Jan-19	76662280034764630	68316C77832FEFEC	Vincenzo's	39226527864688510	87501843579	20952718	Oleiva Olive Oil (500 ml)	1	6.49
10-Feb-19	76662280034764630	68316C77832FEFEC	Zehrs	1035517445799140	29510338711	6038301150	PC Organic Peas	1	4
10-Feb-19	76662280034764630	68316C77832FEFEC	Zehrs	1035517445799140	29510338711	6038318011	PC Frozen Corn	1	4

FIG. 25B

Merchant

2530

Date	Customer Account Number	Merchant	Merchant ID	Transaction ID	Product Code	Product Name	Qty	Price ($)
24-Oct-18	7666228034764630	Valu-Mart	8664778219243070	5108738887683	6038369068	PC Organic Brown Egg (1 doz.)	1	6.29
24-Oct-18	7666228034764630	Valu-Mart	8664778219243070	5108738887683	6827423057	Nestle Pure Life Sparkling Lemon Lime (pack of 8)	1	4
24-Oct-18	7666228034764630	Valu-Mart	8664778219243070	5108738887683	6038301150	PC Organic Peas	2	8
10-Feb-19	7666228034764630	Zehrs	1035517445799140	295103387103	6038301150	PC Organic Peas	1	4
10-Feb-19	7666228034764630	Zehrs	1035517445799140	295103387103	6038318011	PC Frozen Corn	1	4

FIG. 25C

Bank

2540

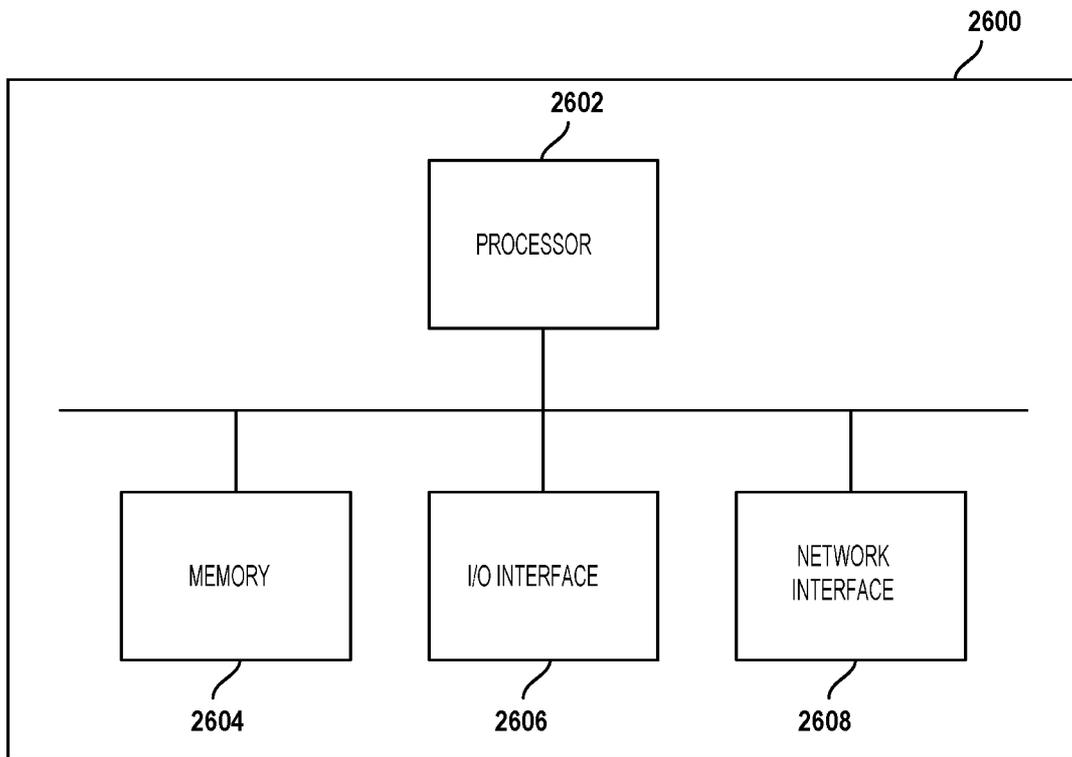| Date	Name	Card Number	Token Number	Merchant	Merchant ID	Amount ($)
13-Feb-18	Bill Richardson	4536-0025-0143-2009	219DC6E7AB674F4E	Amazon	1079985386254260	37.82
24-Oct-18	Bill Richardson	6018-7294-6473-3312	68316C77832FEFEC	Valu-Mart	8664778219243070	18.29
27-Dec-18	Bill Richardson	6018-7294-6473-3312	68316C77832FEFEC	Vincenzo's	3922652786488510	6.49
8-Jan-19	Bill Richardson	6018-7294-6473-3312	68316C77832FEFEC	Vincenzo's	3922652786488510	6.49
10-Feb-19	Bill Richardson	6018-7294-6473-3312	68316C77832FEFEC	Zehrs	1035517445799140	8

FIG. 25D

2019348201   01 Oct 2024

2600

2602

PROCESSOR

MEMORY

I/O INTERFACE

NETWORK
INTERFACE

2604

2606

2608

FIG. 26